

The role of financial inclusion on economic uncertainties-growth nexus: Evidence from the dynamic panel threshold

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ABSTRACT

This paper examines the influence of financial inclusion on moderating the uncertainty-growth nexus. By employing the dynamic panel threshold method suggested by Seo and Shin (2016) and utilising data from 2007 to 2021, the analysis of the results reveals that the degree of financial inclusion exerts a substantial influence on the transmission effect of United States (US) and China uncertainties on economic growth. The findings suggest that US and Chinese economic policy uncertainty (EPU) harms economic growth when financial inclusion (FI) is below the threshold value (low-FI regime). Nevertheless, when financial inclusion is above a threshold value (high-FI regime), the impact of US and Chinese EPU on economic development becomes insignificant. These findings indicate that financial inclusion matters in mitigating the transmission of uncertainty shocks to economic growth. These results are robust using disaggregated growth data by analysing the manufacturing, services, industry, and agriculture sectors. Policymakers should advocate for financial inclusion in light of these findings, as it not only directly fosters development but also alleviates the adverse effects of uncertainty on economic growth.

Keywords: economic policy uncertainty, financial inclusion, economic growth, dynamic panel threshold

1.0 Introduction

The importance of financial inclusion has grown significantly among scholars, stakeholders, and policymakers. The United Nations' 2030 Agenda for Sustainable Development seeks to promote equitable and sustainable economic growth by facilitating the formalisation and development of micro, small, and medium-sized businesses by providing access to financial services (Duvendack and Mader, 2020). Investigating dimensions of financial development beyond financial depth, including financial inclusion, may provide a better understanding of how finance promotes economic growth. Access to financial services, including online transactions, commercial bank accounts, ATMs, and the Internet, is a key component of financial inclusion, supporting financial activity (Saleem, Nasreen, and Azam, 2022). This ensures that everyone shares in the advantages of economic growth. Promoting economic growth through increased access to financial services is an important policy instrument for tackling social problems like poverty and income inequality (Abdul Karim et al., 2021; Nizam et al., 2021; Rahim et al., 2023; Yang & Zhang, 2020). Financial inclusion promotes economic growth by reducing financing obstacles and inspiring enterprises and people who had no access to financial services before to do so (Inoue and Hamori, 2019).

At the same time, the global economy is uncertain, and domestic macroeconomic variables are vulnerable, especially in emerging markets and developing countries. Global crises, such as the COVID-19 pandemic and the Great Recession (2008), created uncertainty and an unpredictable future global economic environment. (Baker et al., 2020). The macroeconomic has been significantly impacted by the worldwide economic uncertainty caused by the coronavirus (COVID-19) (Altig et al., 2020; Choi, 2020). Economic uncertainty also has a severe effect on economic activities and macroeconomic performance (Altig et al., 2020; Caggiano, Castelnuovo, and Kima, 2020; Caggiano, Castelnuovo, and Pellegrino, 2020; Gómez-pineda, 2020; Trung, 2019). The argument that uncertainty impacts output growth is based on Bloom (2009), who claims that increased uncertainty leads firms to "wait and see." Investors are reluctant to invest during periods of high uncertainty as a preventive measure for their investment returns. Given the current situation, where there is a great deal of uncertainty around the macroeconomic effect, this study is motivated by the importance of financial inclusion in reducing the severe effect of uncertainties on economic development that can be discussed on the risk mitigation center stage in policy and academic circles.

In the past few decades, globalisation has fostered increased interconnectedness across nations, resulting in unprecedented levels of global interaction. The interconnectedness of international trade and financial markets creates a complex transmission network, causing economic policy uncertainty to spread across nations. This poses a dilemma for global economies rather than specific countries or regions (Zhou et al., 2022). Regarding global influence, two economies stand head and shoulders above the others: the United States (US) and China (Nong, 2021; T. Yang et al., 2023; Zhang et al., 2019). Broadly speaking, since the aftermath of World War II, the US has led global economic progress (Zhang et al., 2019). The US, as the global economy's center or global economic indicator, while China has surpassed the US as the world's second-largest economy and a critical economic powerhouse, can be an essential determinant of economic growth. The dataset of this study contained several fascinating events, such as the worldwide financial crisis of 2007–2008 and the surprising

triumph of a political outsider in the 2016 US. The presidential election, and the coronavirus (COVID-19) pandemic give this study advantages in examining the uncertainty effect.

This paper aims to examine the relationship between the transmission effect of US and Chinese uncertainties on economic growth at a conditional level of financial inclusion. This study specifically investigates the impact of uncertainty in US and Chinese economic policies (EPU) on economic growth, using the threshold of financial inclusion. The study is driven by the following three key research questions: Does the impact of US and Chinese EPU on economic growth vary depending on the extent of financial inclusion? Furthermore, does the impact of uncertainty on overall GDP growth align with the individual components of economic growth, such as manufacturing, services, industry, and agricultural growth? Thirdly, which country, the US or China's EPU, has a more important impact on economic growth? This study used annual data from 2007 to 2021 for 165 countries and employed the dynamic panel threshold approach to achieve its goals. Financial inclusion can have a significant impact on the indirect relationship between uncertainties and economic growth.

The following is a concise summary of the findings from this research. First, financial inclusion plays an important role and asymmetrically influences the transmission effect of U.S. and Chinese EPU on economic growth. The findings indicate that US and Chinese EPUs significantly impact economic growth if the level of financial inclusion is below the threshold value. However, above the threshold value, the transmission of uncertainties from the United States and China has a negligible impact on economic growth. These results on aggregate real GDP growth are consistent when I replace them with disaggregated growth in manufacturing, services, industry, and agricultural growth. Next, US EPU has a higher magnitude impact on real GDP and sectoral growth than China EPU. Moreover, the US and China EPU tend to impact manufacturing and services sectors more than agricultural and industrial growth. The results of this study will benefit organisations operating in the industrial and financial sectors when it comes to creating policies. Access to credit may have a variable impact on the company's growth depending on whether it has reached a particular threshold level of financial inclusion. By gaining awareness of both the potential effect and the appropriate level of financial inclusion threshold, the owner of the firm and the financial institutions will be able to limit the excess credit amount to the best level possible. Therefore, the proprietor of the firm and the financial institutions must devise a feasible strategy and impose restrictions on loan availability if there is clear evidence of a negative impact following the achievement of a given threshold level.

With the goal of adding a fresh perspective to the existing empirical literature, this work has already significantly advanced the field on several important fronts. First, there is a dearth of information in the literature about the indirect impact of financial inclusion on the uncertainty-growth link, despite the overwhelming evidence of the significance of financial inclusion for economic growth. By conducting an empirical investigation into the impact of financial inclusion on the relationship between uncertainty and growth, this work adds to the body of research on financial inclusion, uncertainty, and economic growth. By examining the connection between economic growth and uncertainty and the conditional degree of financial inclusion in a nation, this study closes this gap. A high degree of financial inclusion can serve as a buffer against the potentially harmful effects of uncertainty on economic growth in addition to having a direct positive influence on growth.

Secondly, this research makes a substantial contribution to the analysis of the goal of aggregate and disaggregate economic growth. Unlike previous research, which typically looked

at GDP growth to gauge economic expansion, this study looked at growth in manufacturing, services, industry, and agriculture, in addition to using real GDP growth as a whole to estimate economic development. Thus, this study offers a thorough understanding of economic growth. This allows the study to address the question of whether or not the disaggregate economic growth of various sectors has varied effects. To the best of the author's knowledge, this is the first study to look at how uncertainties affect growth in conditional terms as well as aggregately and disaggregate at the level of financial inclusion. Third, this study uses the dynamic panel threshold econometric approach, which was established by Seo and Shin (2016) and has the advantage of examining the non-linear effect rather than the linear effect. This dynamic panel approach can achieve the goal of examining the impact of the US and China EPU on economic growth under a threshold level of financial inclusion. When compared to the static threshold methods of Hansen (1999), Caner and Hansen (2004), the dynamic panel threshold developed by Seo and Shin (2016) has advantages because it can mitigate the endogeneity problem for both the threshold variable and the independent variable.

The remainder of the paper is structured in the following manner. Section 2 provides an overview of the theoretically relevant literature. Section 3 will detail the data, methodology, and empirical model employed. Section 4 will provide the findings and robustness analysis, and Section 5 will draw conclusions and policy implications.

2.0 Literature Review

Theoretical framework

The impact that finance has on economic expansion is well-known. The seminal work of Schumpeter (1911), Gurley and Shaw (1955), and McKinnon (1973) pointed out the importance of financial factors in boosting economic growth. A strong financial system in a country will help the economy grow by inspiring entrepreneurs to be creative and productive, turning savings from unproductive assets that don't have a high return on investment into assets that do. This leads to more investment and capital accumulation, which in turn leads to a high growth rate (King and Levine, 1993a, 1993b). In addition, current development theories demonstrate that limited financial resources contribute significantly to the persistence of income disparity and the sluggishness of economic growth. In addition, contemporary development theories show that limited financial resources contribute significantly to both the persistence of income disparity and the sluggishness of economic growth. Seeking out and finding all good development prospects, as well as making sure as many people as possible have access to savings, payment, and risk-management products, are critical to a developed financial system. To invest in education, start a business, or take advantage of attractive development possibilities, low-income people and small businesses must depend on their own wealth or internal resources in the absence of inclusive financial institutions (Beck and Demirgu, 2009).

Increasing uncertainty causes the firm to put on hold or suspend its investment until the uncertainty decreases and economic conditions are more stable and confident about future expectations (Bernanke, 1983; Cukierman, 1980). The theoretical work by Bloom (2009) pointed out that temporary shocks of high uncertainty significantly cause a drop in a firm's investment and hiring, consequently leading to diminished output. Motivated by Bloom (2009) work, there are several other theoretical studies providing models of the relationship between uncertainty

and business cycles using dynamic stochastic general equilibrium (DSGE) models (Bachmann and Bayer, 2013; Baker et al., 2016; Basu and Bundick, 2017; Gourio, 2012; Jurado, Ludvigson and Ng, 2015). Fluctuations in regulatory environments frequently impede hiring and investment, as businesses are generally hesitant to make critical or expensive decisions when uncertainty prevails (Bloom, 2014).

According to another line of reasoning, uncertainty slows economic development because of financial friction. Theoretically, based on the groundbreaking work of Bernanke, Bernanke, Gertler and Gilchrist (1996) (BGG) and Kiyotaki and Moore (1997), it is argued that uncertainty negatively impacts financial friction. Rising uncertainty causes a contraction of credit to the company, which in turn increases default risk and financial costs. They assert that adverse uncertainty shocks increase agency costs for borrowers, including small firms, thereby restricting their access to credit from financial institutions. They concluded that the transmission effects of uncertainty, which reduced firm production and consumer expenditure, explained the slowdown in credit market friction resulting from rising uncertainty shocks. The uncertainty about repercussions has a severe impact on output (Akinci, 2021). Other theoretical work, including that of Christiano and Christiano (2010), Gilchrist et al. (2014), Arellano and Kehoe, (2019), supports the BGG hypothesis of financial constraints. Jer'onimo et al. (2023) reported that attention was given to the significant role that financial frictions play in the process of shock transmission into the real economy.

Alongside these theoretical insights, this research adds empirical literature to investigate the function of financial inclusion in moderating the potentially detrimental spillover effect of economic policy uncertainty in the United States and China on economic growth. According to the hypothesis, the financial friction that the company is experiencing due to increases in uncertainty may be mitigated by financial inclusion, which in turn can support the expansion of production.

Empirical Literature

Financial inclusion and economic growth

The importance of financial inclusion has grown significantly among scholars, stakeholders, and policymakers, particularly in developing countries. Investigating dimensions of financial development beyond financial depth, including financial inclusion, may provide a better understanding of how financial development impacts economic growth. In recent years, many studies have examined the importance of financial inclusion for economic growth. Access to financial services, including online transactions, commercial bank accounts, ATMs, and the Internet, is a key component of financial inclusion, supporting financial activity (Saleem, Nasreen, and Azam, 2022). This ensures that everyone shares in the advantages of economic growth. Along the line, several countries found significant financial inclusion in economic growth (Emara & El, 2021; Ifediora et al., 2022; Kim et al., 2018; Nizam et al., 2021; Sethi & Acharya, 2018; Van et al., 2019). Without a shadow of a doubt, one of the primary factors that contribute to economic development is the inclusion of financial services. Specifically, Ifediora et al.(2022) and Van et al.(2019) examine the impact of financial inclusion on economic growth using panel data from 22 sub-Saharan African (SSA) countries and the panel of emerging market economies respectively by employing the system Generalized Method of Moments (GMM) method. They conclude that financial inclusion promotes economic growth.

Similarly, [Kim et al. \(2018\)](#) examined the relationship between financial inclusion and economic growth in OIC countries, while [Emara and El. \(2021\)](#) examined it in MENA countries. [Huang et al. \(2021\)](#), using panel autoregressive distributed lag (ARDL) and financial multi-objective logistic regression (FMOLS) models, revealed that financial inclusion was critical for economic growth in the European Union (EU) from 1995 to 2015. [Omar and Inaba \(2020\)](#) found that financial inclusion increases growth by decreasing poverty and income inequality, while [Younas et al., \(2022\)](#) show financial inclusion reduces the shadow economy. Other studies, such as [Lakuma et al. \(2019\)](#) and [Chauvet Jacolin \(2017\)](#), examine the relationship between financial inclusion and firms or micro, small, and medium companies (MSMEs). They conclude from their findings that financial inclusion positively impacts firm growth. However, they all examined the linear effect of financial inclusion on economic growth. Providing low-cost financial services to the public via financial inclusion is a key component of financial development as it encourages economic growth. Small firms and marginalised groups might benefit significantly from inclusive financial systems, that remove financial and other participation barriers. Financial exclusion prevents low-income firms and people from using their limited resources to better themselves via education or business ventures. It also prevents small enterprises from using their profits to pursue growth opportunities ([Demircuc-Kunt et al.,2012, 2017](#)).

Recent studies examine the asymmetric effect of financial inclusion on economic growth. [Chen et al. \(2023\)](#) evaluate the asymmetric correlation between financial inclusion and economic development in the top ten nations with high levels of financial inclusion. Based on the findings, financial inclusion seems to stimulate economic development over various quantiles. [Abdul Karim et al. \(2021\)](#) examine the relationship between financial inclusion and economic growth using panel threshold data from 60 countries from 2010-2017 and conclude that financial inclusion significantly impacts economic growth below the threshold value. They also found that financial inclusion had a more significant effect on enhancing economic growth in emerging and developing countries. Similarly, [Nizam et al.,\(2021\)](#), who study the impact of financial inclusion on firms' growth in ASEAN-5 countries using panel thresholds, make the point that the distribution of financial access to the expansion of a firm is one of the primary reasons why financial inclusion has such a large impact on economic development. Lack of convenient access to banking, insurance, and other financial services limits the growth potential of small and medium-sized enterprises (SMEs). Businesses also benefit from financial inclusion since it increases their access to traditional financing sources like banks and the stock market. [Lakuma et al.\(2019\)](#) findings indicate that access to financial resources benefits micro, small, and medium companies (MSMEs) in Uganda more than big organizations. These impacts are more pronounced among medium-sized businesses and last for extended periods. [Chauvet and Jacolin, \(2017\)](#) examined a sample of 55,596 firms in 79 countries and found that financial inclusion, for example, the distribution of financial services across firms, positively impacts firm growth. High levels of financial inclusion, while bank concentration is particularly favourable to foreign and state-owned firms, increase strong growth.

As part of efforts to ascertain whether or not the threshold of financial inclusion exists in the link between the transmission impact of economic policy uncertainty in the United States and China on economic development in other countries, this study adds empirical literature to the theoretical insights already discovered. To put it another way, the purpose of this research is to investigate whether or not a high degree of financial inclusion may moderate the influence that the transmission effect of uncertainty in the United States and China has on economic development. This research is unusual because it exemplifies the indirect impact of financial inclusion on lowering the risk of transmission effects caused by uncertainties in the United

States and China. This is in contrast to most studies that have evaluated the direct impact of financial inclusion on economic development.

Economic uncertainty and economic growth

Increased uncertainty due to the crises has prompted much study on the impact of uncertainty on the macroeconomy in recent years. A growing body of research shows that macroeconomic variables suffer as uncertainty levels rise (Bachmann and Bayer, 2013; Baker et al., 2016; Bloom, Floetotto, Jaimovich, Saporta-Ekston and Terry, 2018; Leduc and Liu, 2016). Most of these studies have focused on how macroeconomy uncertainty affects growth and economic performance. With many countries, international standing is rising, and cooperation between countries is growing, more and more research has looked at how the spillover of the country's economic uncertainty affects both developed and developing countries. According to several studies, risk-averse or ambiguity-averse agents may increase their precautionary savings or postpone consumption, hiring, and investment when economic uncertainty rises. Shocks caused by uncertainty harm growth (Choi et al., 2018; Gu et al., 2021; Iqbal et al., 2019).

Several articles in this rapidly growing body of research have investigated the EPU transmission effect (Bhattarai et al., 2020; Caggiano, Castelnuovo, and Figueres, 2020; Chatterjee, 2023; Gupta et al., 2020; Trung, 2019). Trung (2019) discovered that U.S. economic policy uncertainty significantly affects euro area prices and output more than EU economic policy uncertainty. Because of increased trade and financial movements, the global economy is now wholly interdependent. If a world-leading economy, like the United States, has policy uncertainty, it might affect the economies all across the globe. Gupta et al. (2020) analysed the effects of U.S. uncertainty transmission on economic growth in a panel of 50 advanced and developing nations. Their findings show that when U.S. uncertainty rises, other countries' GDP falls more than the U.S. Shocks from foreign markets exhibit a far more significant influence on macroeconomic variables than those from local markets. Therefore, the expansion of external uncertainties has occurred (Shah et al., 2019).

As a result of globalisation and the movement of fundamental and financial resources between nations, the transmission of global variables has become an increasingly crucial component in determining the macroeconomic performance of countries. The transmission of one country to another can be due to trade and financial liberalisation (Mumtaz and Theodoridis, 2017). The rises in uncertainty lead to capital outflow, or "flight-to-safety" and, hence, drop economic growth (Murdipi et al., 2023). The trade channel posits that heightened uncertainty in the United States suppresses domestic consumer spending and income, reducing demand for domestically and internationally manufactured products. Consequently, this decrease in demand hampers economic development in other nations. Bhattarai et al. (2020) examined the transmission of U.S. uncertainty on macroeconomics in emerging market economies (EMEs). They discovered a significant impact of U.S. uncertainty's transmission on the macroeconomics of EMEs. A shock of doubt in the US hurts the prices and exchange rates of stocks and bonds in the EME, increases the spreads between EME countries, and causes money to leave those countries. It also lowers EME countries' output while raising market prices and net exports. Emerging nations see a more pronounced decline in consumption, investment, and GDP relative to mature countries due to uncertainty shocks (Chatterjee, 2023), and increased unemployment rate (Caggiano, Castelnuovo, and Figueres, 2020). Abaidoo and Ellis (2016) and Zhang et al. (2019) analyze the transmission effect of uncertainties in U.S. and China on

economic growth. They found that U.S. uncertainty has a more significant impact on growth than China uncertainty.

The work of BGG(1996) on the importance of financial friction in the intermediation effect of uncertainty on growth has prompted numerous studies to investigate the role of financial or credit friction in this effect (Arellano and Kehoe, 2019; Duval et al., 2020; Fernández-Villaverde & Guerrón-Quintana, 2020; Jerónimo et al., 2023; Nalban and Smădu, 2021). Rather than being a "wait-and-see" argument directly affecting production growth, they claim that uncertainty affects macroeconomics via increased financial friction. Quite a drop in total production and labor force participation due to credit tightening. (Arellano & Kehoe, 2019; Fernández-Villaverde and Guerrón-Quintana, 2020) and slowed productivity growth (Duval et al., 2020). Worsen the lender-borrower knowledge gap and heighten the level of uncertainty. Financial intermediaries provide an external financing premium to offset the lender's risk of adverse selection and moral hazard by imposing collateral limits on loans. According to Carbonari and Maurici (2023) and Jer'onimo et al., (2023)., this informational asymmetry is one source of financial friction that might cause more significant swings in the economy. In addition, firms put off investment projects, and consumers put off purchasing out of caution or because they are saddled with tighter budgets due to increased uncertainty and tightening financial circumstances (Nalban and Smădu, 2021). Restricting lending, particularly in emerging nations, exacerbates the impact of uncertainty on business investment and, by extension, GDP growth (Chatterjee, 2023). Although access to credit may have increased during the Great Moderation, shifting financial frictions were a major factor in the Great Moderation's reduced volatility (Higgins, 2020). The negative impact of uncertainty on economic development may be mitigated by expanding financial inclusion.

3.0 Data and Empirical Model

Data

This analysis used panel data covering 165 nations from 2007 to 2021. Since many countries' financial inclusion data began in 2007, this study starts with that year. The World Bank's World Development Indicators (WDI) database is the source for real GDP growth, service growth, agricultural growth, manufacturing growth, industry growth, government spending, inflation, and human capital. Financial index data, however, comes directly from the International Monetary Fund (IMF). US and China uncertainty data is available at <http://www.policyuncertainty.com>. Measuring economic policy uncertainty (EPU) is based on Baker et al. (2016). Table A1 details the various data collection methods used.

Table A1: Variables and Data Sources

Variables	Definition	Source
Growth rate	GDP per capita growth (annual %)	WDI, World Bank

Government expenditure	General government final consumption expenditure (% of GDP)	WDI, World Bank
Inflation rate	Consumer price index (2010 = 100)	WDI, World Bank
Investment	Gross capital formation (% of GDP)	WDI, World Bank
U.S and China EPU	Articles containing the term 'uncertainty' or 'uncertain', the terms 'economic', 'economy', 'business', 'commerce', 'industry', and 'industrial' as well as one or more of the following terms: 'congress', 'legislation', 'white house', 'regulation', 'federal reserve', 'deficit', 'tariff', or 'war'. See Baker et al. (2016)	http://www.policyuncertainty.com
Manufacturing growth	Manufacturing, value added (annual % growth)	WDI, World Bank
Services growth	Services, value added (annual % growth)	WDI, World Bank
Agricultural growth	Agriculture, forestry, and fishing, value added (annual % growth)	WDI, World Bank
Industrial	Industry (including construction), value added (annual % growth)	WDI, World Bank

Empirical Model and Methodology

The research aims to study the transmission effect of the economic uncertainty in the economic uncertainty in the United States and China on economic growth, considering the level of financial inclusion (FI). The threshold specification suggested by Seo and Shin (2016) is utilised in this study to incorporate the contingent effect of financial inclusion into our analysis of the correlation between economic growth and uncertainty. Following the studies of Kırvaç Karaman and Yıldırım-Karaman (2019), Kim et al.(2018), Huang et al. (2021),, among others, the model that describes the link between transmission of U.S. and China economic uncertainty in the US and China, financial inclusion, and economic growth may be expressed as follows:

$$Growth_{it} = (Growth_{it-1} + \beta_1 linitial_{it} + \beta_2 lgov_{it} + \beta_3 lhuman_{it} + \beta_4 lcapital_{it} + \beta_5 linf_{it} + \beta_6 EPU_{it})I\{FI_{it} \leq \gamma\} + (Growth_{it-1} + \beta_7 linitial_{it} + \beta_8 lgov_{it} + \beta_9 lhuman_{it} + \beta_{10} lcapital_{it} + \beta_{11} linf_{it} + \beta_{12} EPU_{it})I\{FI_{it} > \gamma\} + \varepsilon_{it} \quad (1)$$

Or it can be written as:

$$\begin{aligned} Growth_{it} &= \beta_{it} X_{it} + \beta_{it} EPU_{it} + \varepsilon_{it} & FI_{it} \leq \gamma \\ Growth_{it} &= \beta_{it} X_{it} + \beta_{it} EPU_{it} + \varepsilon_{it} & FI_{it} > \gamma \end{aligned} \quad (2)$$

where $1 \{ \cdot \}$ is an indicator function, FI_{it} is financial inclusion is the transition variable, γ is the threshold parameter of financial inclusion. $Growth_{it}$ is represents the dependent variable of real GDP growth, is X_{it} are the set of control variables consisting of initial GDP, government spending, human capital, investment, and inflation. EPU_{it} represents economic uncertainty I

utilize two indicators often found in the research on financial inclusion: (1) Count of commercial bank branches per 100,000 adults (2) Number of automated teller machines per 1000 km (Emara & El, 2021; Huang et al., 2021; Kim et al., 2018; Saleem et al., 2022; Van et al., 2019). The analysis averaged across three years to account for business cycles. The focus of this research work is on the effect of EPU_{it} , U.S. and China economic policy uncertainty (EPU) on economic growth with conditional of FI_{it} , level of financial inclusion. Equation (1) and (2) illustrates that an estimated FI_{it} may be classified into two distinct regimes: high- FI_{it} and low- FI_{it} . The distinction between these two regimes is based on whether the estimated FI_{it} , is lower than (low- FI_{it}) or higher than (high- FI_{it}) the estimated threshold value. Consequently, FI_{it} acts as a sample splitter for the spillover effect of U.S. and China uncertainties on economic growth. Hence, the coefficient interest is β_6 (effect of EPU_{it} on $Growth_{it}$ in low- FI_{it} regime), β_{12} (effect of EPU_{it} on $Growth_{it}$ in high- FI_{it} regime),

Looking at non-linear effects may be more beneficial than relying on linear regression, such as the dynamic GMM method. For instance, this study's hypothesis suggests that more financial inclusion may mitigate uncertainty's negative impact on economic growth, but lower levels may have no such effect. This suggests that the uncertainty-growth nexus may have a non-linear impact depending on the level of financial inclusion. To access the potential of different effects of uncertainties on growth based on the level of financial inclusion, this study employs the dynamic panel threshold regression (DPTR) method developed by Seo and Shin (2016) to analyse the above regression model. This model expands upon the static panel threshold models proposed by Hansen (1999), Caner and Hansen (2004). The well-known problem with static panel thresholds is the problem of endogeneity. Kremer et al. (2013) developed a dynamic panel threshold, however, Kremer et al. (2013) identified an inherent limitation of their method in the form of an exogenous threshold variable. A potential resolution to the issue of threshold variable endogeneity could include implementing the techniques proposed by Seo and Shin (2016). Seo and Shin (2016) suggest the use of a first-differenced estimator, GMM, to address the situation in which both the threshold variable and the regressors are endogenous. This study uses a sup-Wald test developed by Seo and Shin (2016) to assess the existence of threshold effects.

Seo & Shin (2016) allow the threshold variable q_{it} to be endogenous. $E(q_{it}, \Delta \varepsilon_{it}) \neq 0$ indicates that q_{it} does not belong to the set of instrumental variables. $\{z_{it}\}_{t=0}$

$$\bar{g}_n(\theta) = \frac{1}{n} \sum_{i=1}^n g_i(\theta)$$

Where

$$g_i(\theta) = \begin{pmatrix} z_{it_0} (\Delta y_{it_0} - \beta' \Delta x_{it_0} - \delta' X'_{it_0} \mathbf{1}_{it_0}(\gamma)) \\ \vdots \\ z_{iT} (\Delta y_{iT} - \beta' \Delta x_{iT} - \delta' X'_{iT} \mathbf{1}_{iT}(\gamma)) \end{pmatrix}_{l \times 1}$$

4. Results and Discussion

Descriptive Statistics and correlation matrix

This section presents the descriptive analysis and correlation matrices of the variables used in this work. The descriptive statistical results are shown in Table 1, while the correlation matrix results are displayed in Table 2.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
growth	825	0.016546	0.032095	-0.15466	0.18424
manufacturing	825	0.026314	0.061287	-0.31957	0.702742
services	825	0.035144	0.033756	-0.15061	0.220492
industry	825	0.029595	0.06885	-0.33849	0.891349
agriculture	825	0.022453	0.044991	-0.19239	0.231107
lusepu	825	4.990479	0.255506	4.740191	5.43847
lchiepu	825	5.491148	0.653272	4.864738	6.526312

Table 2: Correlation

	GDP growth	linitial	lgov	lhuman	lcapital	linf	lusepu	lchiepu
growth	1							
linitial	-0.2034	1						
lgovment	-0.0919	0.302	1					
lhuman	0.0163	0.3354	0.2563	1				
lcapital	0.1646	-0.0614	0.2373	0.124	1			
linflation	-0.0051	-0.1147	-0.2081	-0.0393	0.0045	1		
U.S. EPU	-0.1592	0.0321	0.0323	0.0007	-0.0228	0.035	1	
China EPU	-0.1702	0.0418	0.0341	0.004	-0.0212	0.0461	0.8861	1

Notes: Growth = economic growth; Initial = initial income; government=government expenditure, human= human capital

Empirical Results

Table 3 displays the results of the non-linear effect of the dynamic panel threshold on economic growth and financial inclusion as threshold variables. Seo and Shin (2016) proposed a dynamic panel threshold model that the present analysis uses, allowing both the threshold variable and regressors to exhibit endogeneity. The financial inclusion threshold is estimated. The two indicators used to measure financial inclusion in this study are branches (FINB) and automated teller machines (FINATM). To assess the influence of financial inclusion on the relationship between uncertainty and economic growth, this study uses financial inclusion variables as threshold variables. First, most control variables, including inflation, human capital, investment ratios, initial income, and government expenditure, have the anticipated sign and are significantly aligned with the existing literature on growth, both theoretical and empirical (Barro, 1991, 1997; Barro and Sala-i-Martin, 2004; Solow, 1956).

Table 3: Dynamic Panel Threshold Regression Results when Financial inclusion is used as a threshold variable

	US uncertainty		China uncertainty	
	Low	High	Low	High
PANEL A: FINB				
Threshold		3.1600***		3.1600***
initial income	-0.0855*** (0.0000)	0.0743*** (0.0115)	-0.0785*** (0.0000)	0.0692* (0.0136)
government	-0.0089 (0.1378)	-0.2785*** (0.0000)	-0.0050 (0.4562)	-0.2460*** (0.0000)
human capital	0.0289*** (0.0000)	-0.0442*** (0.0000)	0.0301*** (0.0000)	-0.0428*** (0.0000)
investment	0.0193*** (0.0002)	-0.1578*** (0.0000)	0.0208*** (0.0001)	-0.1628*** (0.0000)
Inflation	-0.0452*** (0.0000)	0.2064*** (0.0000)	-0.0524*** (0.0000)	0.2011*** (0.0000)
Uncertainty	-0.0196*** (0.0000)	0.0143 (0.1128)	-0.0085*** (0.0000)	0.0088* (0.0632)
PANEL B: FINATM				
Threshold		2.0888***		2.0888***
initial income	-0.0986*** (0.0000)	0.0251 (0.1163)	-0.0869*** (0.0000)	0.0138 (0.4064)
government	-0.0150 (0.1578)	-0.1498*** (0.0000)	-0.0189 (0.0909)	-0.1643*** (0.0000)
human capital	-0.0126*** (0.0067)	0.0264** (0.0021)	-0.0112** (0.0169)	0.0306*** (0.0002)
investment	0.0735*** (0.0000)	-0.1177*** (0.0000)	0.0796*** (0.0000)	-0.1371*** (0.0000)
Inflation	-0.0762*** (0.0000)	0.1004*** (0.0000)	-0.0700*** (0.0000)	0.0885*** (0.0001)
Uncertainty	-0.0139** (0.0292)	0.0067 (0.4351)	-0.0055* (0.0963)	0.0053 (0.2461)
No. of observation		164		164

Note: This table provides estimations of the dynamic panel threshold regression model (DPTRM) from (5). ***, **, and * denote significance at the 10%, 5% and 1% levels, respectively.

The impact of the US EPU is shown in Columns 1 and 2 of Table 3, while the effects of the China EPU are displayed in Columns 2 and 3 of the same table. The threshold level of financial inclusion is our primary variable of interest when examining the impact of EPU on growth. Column 1 displays the effect of FINB as a threshold variable on economic growth. The estimated threshold of financial inclusion (FINB) is 23.57 ($\ln(\text{FI}) < 3.16$) and is found to be statistically significant at the 1% level, confirming the presence of financial inclusion threshold effects on economic growth. According to the results, the degree of financial inclusion is a significant factor in determining the impact of uncertainty transmission in the United States on economic growth. The findings indicate that when countries have financial inclusion below the

threshold level ($\ln(\text{FI}) < 3.16$), the U.S. EPU has a significant and negative impact on economic growth. Specifically, when financial inclusion falls below the threshold value (low FI regime), the findings show that the coefficient of U.S. EPU (-0.0196) is statistically significant at a 1% level. However, if countries have financial inclusion above the threshold level ($\ln(\text{FI}) > 3.16$), the negative effect of uncertainty on economic growth is not statistically significant. These outcomes are consistent with other FINATM proxies for financial inclusion. The U.S. EPU coefficient (-0.0139) is statistically significant at a 1% significance level when FINATM is below the threshold value ($\ln(\text{FI}) < 2.0888$). However, the U.S. EPU coefficient (0.0067) is insignificant when financial inclusion exceeds the threshold value.

Columns 3 and 4 demonstrate the impact of replacing uncertainty with China EPU on growth, with contingent financial inclusion as the threshold variable. Column 3 represents the financial inclusion proxy measured by FINB, whereas the column 4 represents the financial inclusion proxy measured by FINATM. In column 3, the empirical results show that the China EPU coefficient has a statistically significant negative effect (-0.0085) at a significance level of 1% when the level of financial inclusion is below the threshold value. This means that an increase of 1% in China's EPU causes 0.85% less economic growth. However, above the threshold point, the positive EPU coefficient (0.0088) is statistically significant at the 10% level. Employing the FINATM threshold reveals a consistent pattern where EPU negatively impacts economic growth when it falls below the threshold (-0.0055). However, when the FINATM value exceeds the threshold, we find this coefficient (0.0053) to be statistically insignificant. The findings indicate that China's EPU has a spillover impact when the country lacks financial inclusion. A country with a high degree of financial inclusion has effectively reduced the adverse spillover effects of China's EPU. This aligns with the US EPU's economic growth results.

Our findings suggest that when examining the impact of US EPU and China EPU on growth, the transmission effect of US uncertainty has a more detrimental impact on growth than China EPU. For instance, in the FINB dataset (specifically, Columns 1 and 3), in the low-FI regime, it is observed that the negative magnitude coefficient of the US EPU (-0.0196) is higher when compared to that of the China EPU (-0.0085), both of which fall below the threshold value. We observe that a 1% increase in the US EPU results in a corresponding fall of 1.96% in real economic growth in the context of below-the-threshold financial inclusion. However, a 1% increase in the China EPU index is associated with a 0.88% decline in economic growth. Using FINATM, an alternative measure of financial inclusion, yields consistent results. The U.S. EPU has a more significant impact than the Chinese EPU. Congruent with the conclusions of [Abaidoo and Ellis \(2016\)](#) and [Zhang et al. \(2019\)](#), our data show that US uncertainty has a far larger impact than China uncertainty. Theoretically, an increase in US. EPU could cause the dollar to depreciate relative to other currencies due to the decreased demand for US currency holdings. Despite the recent rapid growth of the Chinese economy, estimates suggest that macroeconomic developments in the U.S. economy continue to have a far more substantial influence on significant economies globally.

Alternative Measure of Dependent Variable: Disaggregate economic growth

The next step was to replace the real GDP growth with sectoral growth statistics for manufacturing, services, industrial, and agricultural growth. This was done to get disaggregated data on economic growth. The findings are summarised in Tables 4 and 5 for US and Chinese uncertainties, respectively.

Column 1 of Table 5 displays the results of the manufacturing dependent variable. The findings indicate that the impact of the US EPU on the manufacturing sector varies depending on the degree of financial inclusion. The US EPU coefficient of -0.0299 is statistically significant at a 1% level, indicating that it is below the threshold value of financial inclusion. Nevertheless, when it surpasses a threshold value for financial inclusion, it has an insignificant impact on the growth of the manufacturing sector. These results are consistent with other indices of financial inclusion, specifically FINATM. These results suggest that the degree of financial inclusion has a considerable impact on the spillover effect of US EPU on manufacturing growth. The results affirm the primary conclusions that the US EPU has a major influence on economic development, but only when the country has a low level of financial inclusion. Financial inclusion can help reduce and alleviate the negative impact of US uncertainty on economic growth. The second column examined the impact of US EPU on service sector growth. The findings indicate that the US EPU has a considerable adverse impact on the growth of the services sector, but only when the level of financial inclusion is below a threshold value. The US EPU has an insignificant impact on the growth of the services sector when financial inclusion exceeds the threshold value.

Columns 4 and 5 of Table 4 illustrate the impact of US EPU on industrial and agricultural growth. Using the FINATM measure of financial inclusion, US EPU has a negative impact on industrial growth when financial inclusion falls below the threshold value. However, over this threshold, US EPU has a minimal impact on industrial growth. Surprisingly, using the FINB measure of financial inclusion, US EPU had a statistically significant negative influence on sector growth when above the threshold value, contradicting the FINATM results. The fact that digital financial inclusion is better suited for application in industrial sectors than financial institution branches could explain this finding. Finally, Column 4 in Table 4 showed the impact of US EPU on agricultural growth. Panel A's FINB results reveal that the US EPU has no substantial influence on agricultural growth, regardless of whether financial inclusion is below or over the threshold value. These findings appear to show that the US EPU has a less significant effect on agricultural growth than other industries. However, using the FINATM measure of FI, US EPU has a considerable impact on agricultural growth if FI is less than the threshold value. When FI falls below the threshold value, US EPU exerts a more significant influence on the industrial sectors. Furthermore, industrial sectors have a significantly higher level of FI is significantly higher in industrial sectors compared to other sectors. When FI exceeds the threshold value, the US EPU's sign changes to positive, albeit insignificantly.

Table 5 summarises the effects of China's EPU on disaggregate economic development. The findings, using FINB as a measure of FI, reveal that Chinese EPU has a statistically significant impact on manufacturing, services, and agriculture growth when FI falls below the threshold amount. However, when FINB exceeds the threshold value, Chinese EPU has a beneficial impact on growth. For industrial growth, if FINATM was used to quantify FI, the results were consistent with other sectors, with Chinese EPU having a large negative influence on industry if FINATM was less than the threshold value, but having no effect on industry growth if FINATM was more than the threshold value. Nonetheless, when

Table 4: Dynamic Panel Threshold Regression Results when Financial inclusion is used as a threshold variable (U.S uncertainty)

	manufacturing		services		industry		agricultural	
	Low	High	Low	High	Low	High	Low	High
PANEL A: FINB								
Threshold	2.5088***		2.6672***		1.7168***		2.5968***	
initial income	0.0018 (0.4570)	0.0053 (0.1794)	-0.0015 (0.3979)	0.0020 (0.6470)	-0.0137** (0.0421)	0.0166** (0.0188)	0.0041 (0.1709)	-0.0116*** (0.0089)
government	0.0574*** (0.0000)	-0.1647*** (0.0000)	-0.0418*** (0.0002)	-0.0333 (0.0994)	-0.1846*** (0.0000)	0.2431*** (0.0000)	-0.0276** (0.0052)	-0.0069 (0.7766)
human capital	0.0248 (0.4665)	-0.0260 (0.4570)	-0.0080 (0.2893)	0.0086 (0.2240)	0.0235 (0.3701)	-0.0263 (0.3132)	0.0267*** (0.0005)	-0.0300*** (0.0003)
investment	0.0548*** (0.0000)	-0.0829*** (0.0003)	0.0232*** (0.0108)	-0.0122 (0.2617)	0.1298*** (0.0000)	-0.0742** (0.0285)	0.0079 (0.3715)	-0.0101 (0.4419)
Inflation	-0.0198 (0.2142)	0.0788 (0.0606)	-0.0154 (0.0943)	-0.0317 (0.4092)	-0.0516** (0.0387)	0.0574 (0.1213)	0.0008 (0.8973)	0.0088 (0.2203)
Uncertainty	-0.0299*** (0.0001)	0.0089 (0.4436)	-0.0272*** (0.0000)	-0.0001 (0.9908)	0.0155 (0.2983)	-0.0577*** (0.0003)	-0.0029 (0.5816)	-0.0159 (0.1064)
PANEL 2: FINATM								
Threshold	1.7778**		2.2271***		4.0933***		3.7131***	
initial income	-0.0050 (0.1781)	0.0068 (0.1001)	0.0121*** (0.0107)	-0.0153** (0.0228)	-0.0109*** (0.0001)	0.0193*** (0.0078)	0.0073*** (0.0131)	-0.0076 (0.2296)
government	0.0318** (0.0199)	-0.0870*** (0.0000)	-0.0596*** (0.0000)	-0.0221 (0.3565)	0.0321*** (0.0010)	-0.3815*** (0.0000)	-0.0066 (0.5109)	-0.0334 (0.2968)
human capital	-0.0186*** (0.0062)	0.0309** (0.0174)	0.0035 (0.4159)	-0.0030 (0.7348)	0.0092 (0.3781)	-0.0046 (0.8113)	0.0576*** (0.0003)	-0.0838*** (0.0000)
investment	0.0596*** (0.0002)	-0.1174*** (0.0000)	0.1093*** (0.0019)	-0.2160*** (0.0026)	0.0385*** (0.0025)	0.0637 (0.5418)	-0.0203 (0.0734)	0.1273*** (0.0006)
Inflation	-0.0375*** (0.0003)	0.0419*** (0.0022)	0.0151 (0.1430)	-0.0522*** (0.0012)	-0.0694*** (0.0000)	0.6964*** (0.0000)	-0.0152 (0.1582)	0.0836 (0.1508)
Uncertainty	-0.0282*** (0.0046)	0.0094 (0.4502)	-0.0146* (0.0999)	-0.0054 (0.6438)	-0.0064** (0.0549)	0.0041 (0.5982)	-0.0069*** (0.0040)	-0.0009 (0.8122)
No. of observation	164		164		164		164	

Note: This table provides estimations of the dynamic panel threshold regression model (DPTRM) from (5). ***, **, and * denote significance at the 10%, 5% and 1% levels, respectively

Table 5: Dynamic Panel Threshold Regression Results when Financial inclusion is used as a threshold variable (China uncertainty)

	manufacturing		services		industry		agricultural	
	Low	High	Low	High	Low	High	Low	High
PANEL A: FINB								
Threshold	2.5088***		2.7024***		1.7168***		2.2096***	
initial income	0.0015 (0.5667)	0.0053 (0.2368)	-0.0025 (0.1461)	0.0096** (0.0387)	-0.0030 (0.6437)	0.0043 (0.5392)	0.0120*** (0.0029)	-0.0181*** (0.0003)
government	0.0693*** (0.0000)	-0.2159*** (0.0000)	-0.0208 (0.1098)	-0.1069*** (0.0001)	-0.1355*** (0.0001)	0.1370** (0.0041)	0.0333*** (0.0053)	-0.0895*** (0.0001)
human capital	0.0352 (0.2729)	-0.0347 (0.2919)	-0.0172*** (0.0034)	0.0149*** (0.0082)	0.0228 (0.3574)	-0.0254 (0.3044)	0.0184 (0.4887)	-0.0193 (0.4747)
investment	0.0519*** (0.0000)	-0.0702*** (0.0024)	0.0163 (0.0567)	-0.0191** (0.0389)	0.0831*** (0.0008)	-0.0114 (0.7358)	-0.0417*** (0.0085)	0.1043*** (0.0000)
Inflation	-0.0049 (0.7601)	0.0495 (0.2696)	-0.0061 (0.4424)	-0.0045 (0.8837)	-0.0412 (0.0737)	0.0236 (0.4846)	-0.0043 (0.7479)	0.0509 (0.1953)
Uncertainty	-0.0151*** (0.0000)	0.0085* (0.0744)	-0.0151*** (0.0000)	0.0094*** (0.0071)	0.0065 (0.1781)	-0.0204*** (0.0002)	-0.0079** (0.0381)	0.0008 (0.8612)
PANEL 2: FINATM								
Threshold	1.7087*		1.9852***		4.0933***		3.7131***	
initial income	-0.0050 (0.2072)	0.0058 (0.1946)	0.0149*** (0.0012)	-0.0201*** (0.0004)	-0.0109*** (0.0001)	0.0193*** (0.0078)	0.0073*** (0.0131)	-0.0076 (0.2296)
government	0.0244 (0.1740)	-0.1247*** (0.0000)	-0.0312** (0.0199)	-0.1100*** (0.0000)	0.0321*** (0.0010)	-0.3815*** (0.0000)	-0.0066 (0.5109)	-0.0334 (0.2968)
human capital	-0.0108 (0.1442)	0.0144 (0.3488)	-0.0096** (0.0494)	0.0052 (0.6218)	0.0092 (0.3781)	-0.0046 (0.8113)	0.0576*** (0.0003)	-0.0838*** (0.0000)
investment	0.0624*** (0.0021)	-0.1224*** (0.0002)	0.0475** (0.0169)	-0.1084*** (0.0056)	0.0385*** (0.0025)	0.0637 (0.5418)	-0.0203 (0.0734)	0.1273*** (0.0006)
Inflation	-0.0212 (0.0823)	0.0386*** (0.0050)	-0.0013 (0.8638)	-0.0066 (0.3237)	-0.0694*** (0.0000)	0.6964*** (0.0000)	-0.0152 (0.1582)	0.0836 (0.1508)
Uncertainty	-0.0172*** (0.0001)	0.0113** (0.0254)	-0.0133*** (0.0001)	0.0161*** (0.0000)	-0.0064** (0.0549)	0.0041 (0.5982)	-0.0069*** (0.0040)	-0.0009 (0.8122)

No. of observation	164	164	164	164
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Note: This table provides estimations of the dynamic panel threshold regression model (DPTRM) from (5). ***, **, and * denote significance at the 10%, 5% and 1% levels, respectively.

the FINB measure FI exceeds the threshold value, Chinese EPU has a statistically significant effect on industrial growth. These might be interpreted as choosing digital financial inclusion (FINATM) over new financial institution branches for industry growth. The Chinese EPU, like the US EPU, has a significant impact on the manufacturing sector when compared to other sectors. When comparing the effects of the US EPU and the Chinese EPU, the US EPU has a larger impact on sectoral growth than the Chinese EPU. These findings are consistent with the overall conclusions about aggregate real GDP growth.

Discussion and theoretical explanation

The research aimed to explain the theoretical aspects and analyse the empirical evidence of how financial inclusion reduces the risk of uncertainty in economic growth. Accordingly, our results suggest that the significant nature of the spillover effect of the U.S. and China's EPU is contingent upon the countries' financial inclusion levels. The inclusiveness of the financial system decreases the financial obstacles firms face while expanding their operations. When there is a high regime of financial inclusion, the transmission impact of U.S. and Chinese EPU on economic growth is significantly reduced. This study could potentially clarify why some studies have found a negative impact of external uncertainty, while others have found no significant impact. Our findings align with the research conducted by [Lee et al. \(2022\)](#) and [Kıvanç Karaman and Yıldırım-Karaman \(2019\)](#). According to the empirical results by [Lee et al. \(2022\)](#), promoting financial inclusion might lessen the bad effects of uncertainty on economic performance through two-stage least squares regression (IV-2SLS). The authors of the study, [Kıvanç Karaman and Yıldırım-Karaman \(2019\)](#), discovered that the development of financial development has the potential to mitigate the negative effect of uncertainty on economic growth.

The findings presented in Tables 3, 4, and 5 have significant economic implications. Our results indicate that the financial accelerator plays a crucial role in mitigating the impact of uncertainty on economic development. This supports the idea of financial friction proposed by [BGG \(1999\)](#). According to the theoretical literature on financial friction, studies by [Bernanke et al. \(1999\)](#), [Christiano et al. \(2014\)](#), [Gilchrist et al. \(2014\)](#), and [Arellano et al. \(2012\)](#) have emphasized the significance of financial friction as a mediating component in the relationship between uncertainty and economic growth. They claimed that increased uncertainty would result in heightened financial friction for enterprises, ultimately leading to a decline in production growth. These theoretical findings are congruent with the data, which demonstrate that an increase in financial inclusion may alleviate the adverse impact of uncertainty on economic development. This is because the increase in uncertainty leads to higher financial friction for enterprises, which is relieved by the growth in financial inclusion. Addressing the financial inclusion issue would reduce the financial obstacles faced by enterprises as a result of increased uncertainty, hence mitigating the decline in production. Second, The significance of the spillover effect of uncertainty on output growth is in line with those of other studies such as [Gupta et al. \(2020\)](#), [Trung \(2019\)](#) [Bhattarai et al. \(2020\)](#) and several others that have found a direct relationship between external U.S. uncertainty transmission and economic growth. This aligns with the theoretical literature of "wait-and-see" [Bloom \(2009\)](#), which suggests that uncertainty substantially impacts economic development. Another factor contributing to the transmission of U.S. uncertainty to economic growth in other countries is the negative impact of these shocks, which may be worsened by financial openness ([Murdiipi et al., 2023](#)) and trade openness ([Alam & Istiak, 2020](#)). When there is a high regime of financial inclusion, the transmission impact of uncertainty on

economic growth in the United States and China is significantly reduced, as presented in the results of this study.

Overall, the results demonstrate a favourable indirect impact of financial inclusion on economic growth. A significant degree of financial inclusion helps alleviate uncertainty's adverse impact on economic growth in the United States and China. The results of our study validate our premise that financial inclusion has both direct and indirect positive effects on economic growth. The empirical studies conducted by [Van et al. \(2019\)](#), [Huang et al., \(2021\)](#) [Abdul Karim et al. \(2021\)](#), [Ifediora et al. \(2022\)](#) and [Chen et al. \(2023\)](#) have also confirmed our results on the favourable impact of financial inclusion on economic growth. Identifying substantial and favourable financial inclusion coefficients provides support for policy declarations about SDGs, given that financial inclusion is the primary emphasis in 8 out of the 17 SDGs. The results confirm the notion that financial inclusion contributes to economic expansion, as shown by [Kim et al. \(2017\)](#), [Sethi and Acharya \(2018\)](#), [Siddik et al. \(2019\)](#) in 24 Asian nations, along with findings by [Chatterjee \(2020\)](#), [Huang et al. \(2021\)](#), [Singh and Stakic \(2020\)](#), and [Nizam et al. \(2020\)](#). It is supposed to help the economy grow by doing the essential things that financial activity does

In summary, our findings on financial inclusion's influence on economic output revealed that financial inclusion plays a crucial role in moderating and minimising the possible adverse effect of uncertainty on economic growth. These findings are reliable when both the aggregate growth of the economy and the sub-growth of sectoral growth, such as the growth of manufacturing, are considered. Financial inclusion has a significant positive influence on economic performance, not only because it directly impacts economic development, but also because it acts as a mediator in mediating the effect of uncertainty on economic growth. This scenario implies that increased financial inclusion contributes to reducing the financial friction that enterprises experience due to increased anxiety and shocks caused by uncertainty. As a result, the number of businesses will decrease, particularly those in the small sector or those that have gone bankrupt due to increased financial friction. Therefore, I argue that financial inclusion not only directly influences economic development but also indirectly encourages growth by moderating the negative effect of uncertainty on economic growth. Given these arguments, it is essential to note that for policymakers to achieve targeted growth rates in economic performance and risk management, they must prioritise financial inclusion. This is because financial inclusion plays a crucial and indirect role in economic growth and risk mitigation. It is possible that policymakers will end up with policies that are unhelpful in terms of risk mitigation and intended sustained economic growth if they ignore financial inclusion when they are designing policies.

According to our findings, financial inclusion is a key factor in reducing the impact of all industries, including manufacturing and services. According to these results, low financial inclusion makes economic growth more vulnerable to uncertainties in the US and China, but high financial inclusion may reduce this impact. Also, compared to China, the impact of US EPU on economic growth is larger, according to our results. Still, as financial inclusion rises over the cutoff, both worries might fade. For this reason, policymakers must be aware of how financial inclusion helps lessen uncertainty's impact on economic development in certain sectors.

5.0 Conclusion and policy implication

This study is driven by current theoretical and empirical research on the uncertainty-growth linkages and the significance of financial inclusion in fostering economic development. This study aims to expand existing research examining financial inclusion's direct impact on economic development. Specifically, it investigates the indirect impact of financial inclusion on the relationship between uncertainty and growth. In this work, I assert that financial inclusion plays a crucial role in reducing the effects of unpredictable shocks on economic development. This research explicitly investigates the impact of uncertainty in the United States and China on economic development in different countries, considering the amount of financial inclusion. The study analyses a sample of 165 countries from 2007 to 2021 using Seo and Shin's dynamic panel threshold approach (2016). The findings of this research demonstrate that financial inclusion plays a significant role in the link between uncertainty and economic development. When the level of financial inclusion is below a threshold value, the United States and China EPU significantly adversely affect overall economic development. Nevertheless, financial inclusion over the threshold value is not adversely affected by uncertainty in terms of economic development. This approach remains robust when I substitute the overall GDP growth with the disaggregate growth rates of the manufacturing, services, industrial, and agriculture sectors. The findings indicate that the inclusion of financial services plays a vital role in reducing the impact of external uncertainty shocks on economic development. The results of this study provide evidence that supports BGG's (1999) argument on the significance of financial accelerators in relation to the influence of uncertainty on production growth. This research is also in line with the findings of Kıvanç Karaman and Yıldırım-Karaman (2019), who emphasized the impact of financial development on economic growth. Therefore, this work implicitly endorses the benefits of financial inclusion in fostering economic development.

This study offers several helpful recommendations for policymakers in light of the predicted results. Financial intermediaries should establish a widespread national network to make financial services more user-friendly and accessible for their consumers, rather than expanding their overall size, as one of these recommendations suggests. By reducing obstacles to financing and encouraging enterprises and individuals who were previously unable to use financial services, financial inclusion will make it possible for these groups to receive loans. Although financial inclusion does not directly boost economic development, it is a component that contributes to the resilience of sectors to continue existing and helps offset the negative impact that uncertainty has on growth. Second, policymakers should foster financial inclusiveness, especially for small firms, which not only helps the economy grow but also helps it remain stable and resistant to the adverse effects of uncertainty on economic prosperity. In conclusion, it is crucial to maintain the stability and resilience of economic and sectoral growth to ensure the sustainability of economic growth. In this regard, financial inclusion may be seen as one of the most successful ways to assist businesses and individuals in sustaining themselves in the face of an unpredictable economic climate. This study aims to enhance economic growth and social well-being, making it a valuable contribution to the community. Increasing industries' robustness and expanding individual sectors encourages high employment, boosts income, and improves social well-being. Promoting social well-being may be accomplished by emphasising financial inclusion's role in assisting sectors in maintaining stability in the face of shocks caused by external uncertainty.

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