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Financial Development in Uncertain Economies: A Pathway to Sustainability

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Abstract

This study is the first to explore the effect of economic policy uncertainty (EPU) on multidimensional financial development. Using data from 22 countries over 20 years (2002–2021) and employing fixed effects regression and two-step dynamic system GMM estimators, the results reveal a significant negative impact of EPU on financial development. This adverse effect spans both key dimensions: financial institution development and financial market development. The analysis further highlights how EPU hampers key dimensions of financial institutions' and markets' performance – depth, access and efficiency. Importantly, the study highlights the positive moderating role of institutional quality, which mitigates the negative impact of EPU, reinforcing its importance in enhancing financial resilience. Furthermore, this study differentiates between elevated and mild EPU regimes, highlighting the capacity of the latter to significantly hinder financial development. These findings underscore the vital role of strong institutions in stabilizing financial systems amid policy uncertainty.

Keywords: Economic policy uncertainty, financial development, institutional quality

JEL Classification: G18, G21, G28, G30

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1. Introduction

Financial development plays a crucial role in sustainable development, contributing significantly to the attainment of various Sustainable Development Goals (SDGs). Notably, it positively influences SDG 7 (affordable and clean energy), SDG 9 (industry, innovation and infrastructure), SDG 13 (climate action) and the goal of reducing inequality (SDG 10), among others (Saqib *et al*., 2024). Therefore, the exploration of the determinants of financial development stands as an important research focus.

Recently, economic policy uncertainty (EPU) has gained significant scholarly attention due to its profound implications for businesses and economies worldwide (see Literature Review, Al-Thaqeb and Algharabali, 2019). Existing research highlights that the adverse effects of EPU on businesses and economies primarily manifest through its disruptive influence on the financial system (Valíčková *et al*., 2015). This disruption significantly impedes operations of the financial sector, which is vital for both businesses' success and broader economic growth and development (Gholipour, 2019; Gozgor *et al*., 2019; Ngene and Tah, 2023).

Notably, literature shows that EPU negatively influences various aspects of the financial system. For instance, EPU adversely effects financial system stability (Orlowski, 2023; Phan *et al*., 2021; Shabir *et al*., 2023), banking sector activities (Gozgor *et al*., 2019; Ng *et al*., 2020; Nguyen *et al*., 2020) and stock market performance (Li *et al*., 2020). Recently, Aman *et al*. (2024) reported that EPU has a significant negative effect on financial system efficiency.

While it is well-established that EPU can affect financial variables and economic outcomes, less is known about how it affects the broader process of financial development. Financial development is a complex, multi-faceted process that encompasses advancements in several key areas. It involves enhancing the depth, accessibility and efficiency of both core components of the financial system: financial markets and financial institutions. This process aims to improve the overall functionality and effectiveness of the financial sector by addressing these various dimensions (Svirydzenka, 2016). Financial development assumes a crucial role in fostering economic growth and development, a common goal pursued by economies worldwide (Ahmed *et al*., 2022; Gholipour, 2019; Gozgor *et al*., 2019; Haschka *et al*., 2022; Nguyen *et al*., 2022). The present paper aims to fill this gap by exploring how EPU affects financial development. The rationale behind this investigation lies in the pivotal function that a developed financial sector plays in promoting economic prosperity and growth. A robust financial system enables efficient transfer of financial resources from savers to investors, thereby ensuring optimal allocation of limited resources (Mishkin, 1999).

Consequently, any disruption in the functioning of financial systems can lead to a decline in fund flow, which in turn can stifle productive investment and overall economic activity.

EPU may impede financial development by instigating risk and volatility within the financial system (Li *et al*., 2020; Liu and Zhang, 2015; Tsai, 2017). Increased uncertainty not only disrupts the demand for financial services but also imposes constraints on the supply side, influencing both financial institutions and markets and impeding overall financial sector development (Bahmani-Oskooee and Maki-Nayeri, 2019; Balke and Zeng, 2013). Moreover, literature has highlighted the detrimental effects of high EPU on the operational dynamics of the financial sector. Specifically, elevated EPU levels can lead to increased borrower default risk, increased interest rates, higher capital costs, reduced credit supply and decreased liquidity within the financial sector and lower financial stability (Ashraf and Shen, 2019; Bordo *et al*., 2016; Gozgor *et al*., 2019; Yung and Root, 2019). Consequently, these factors may negatively affect financial development. On the given background, this study investigates the effect of EPU on financial development and fills the critical gap in literature.

This study makes several contributions to the existing body of research into the consequences of EPU and the determinants of financial development. Notably, the present study contributes to the literature by examining the broader impact of EPU on financial development, which encompasses financial depth, access and efficiency across both financial institutions and markets. Unlike Aman *et al*. (2024), who focused solely on financial system efficiency – a subset or singular aspect of financial development – this research takes a more holistic approach by incorporating multiple dimensions of financial development. This distinction allows a deeper understanding of how EPU influences not just efficiency but also the depth and accessibility of financial services, which are crucial for economic growth and stability. Moreover, this study introduces a novel perspective by discerning between high and low EPU regimes, unravelling nuanced insights into their distinct influences on financial development.

Lastly, unlike Aman *et al*. (2024), the present research investigates the moderating effect of institutional quality on the nexus between EPU and financial development and highlights the crucial mitigating role of high-quality institutions in counteracting the adverse effects of EPU on financial development. This interaction effect is a crucial addition to the literature, as it highlights the role of strong institutions in buffering financial systems against uncertainty. Each of these contributions offers valuable insights for policymakers and financial practitioners, helping them navigate the challenges posed by EPU and foster financial development in the face of such uncertainty.

1. Literature Review

The impact of EPU on financial sector development indicators has garnered considerable attention in scholarly literature. The financial sector comprises two primary segments: financial markets and financial institutions. Existing research indicates that numerous facets within both segments are susceptible to the influence of EPU. Nguyen *et al*. (2020) reported a significant negative effect of EPU on bank credit growth. Danisman *et al*. (2020) scrutinized the role of EPU on advancing credit facilities, utilizing banking sector data from five European economies for 2009–2018. Utilizing panel data fixed effects methodology and addressing endogeneity with two-step difference GMM estimators, the authors found that EPU hinders the credit growth of European banks, highlighting the significant influence of EPU on the financial landscape of the banking sector in Europe.

In this vein, Karadima and Louri (2021) underscored that EPU can exacerbate the issue of non-performing loans in banks. This is fuelled by the increased risks and economic instability that are characteristic of uncertain policy environments. The ripple effects of this phenomenon go beyond the banking sector, negatively affecting key macroeconomic indicators such as GDP growth, unemployment and inflation (Beck *et al*., 2015). This underscores the multifaceted influence of EPU on banks and the broader economy. In addition, EPU significantly increases the default risk (Lu *et al*., 2023) and thereby may affect the demand and supply of financial services in the financial sector. Additionally, EPU, which refers to the difficulty faced by economic agents in predicting the future direction of fiscal, monetary, regulatory and trade policies, has emerged as a significant element affecting credit risk. Recurrent and vague alterations in various economic plans can result in inefficient allocation of credit resources by banks and may adversely affect operations of borrowing firms (Chi and Li, 2017).

Moreover, the examination of effects of EPU on banking sector stability reveals that EPU adversely affects financial stability of banks. This effect, however, is not consistent and fluctuates based on the bank's structure and prevailing market conditions. Importantly, during financial crises, this negative influence of EPU becomes more evident (Shabir *et al*., 2021). EPU increases the volatility of the Chinese stock market (Li *et al*., 2020). This suggests that periods of uncertainty in economic policy can lead to greater fluctuations in the market (Cai *et al*., 2022). This volatility can affect investment decisions and the overall stability of the financial market. Using a vector autoregressive framework, Barraza and Civelli (2020) revealed that an unexpected rise in EPU prompts banks to reduce their business credit supply. This reduction is seen in two ways: a limitation in spot fund supply and a decrease in liquidity insurance provision. The impact of a one-standard-deviation increase in EPU results

in a 3–5% contraction in business loans. This research sheds light on how EPU influences banking practices and business credit supply. EPU is found to have adverse effects on financial market activities such as gross capital formation (Gholipour, 2019).

EPU results in allocative distortions and has a negative impact on the efficiency of resource allocation on markets. This suggests that EPU can disrupt the optimal distribution of resources, leading to less efficient outcomes (Guedhami *et al*., 2021). Researchers argue that when policy effectiveness and government commitment are uncertain and political turmoil is present, rational players such as firms and households delay investments. They prefer to wait until the uncertainty lifts, especially if the investments cannot be easily reversed (Antonakakis *et al*., 2013; Büttner *et al*., 2022).

Jia *et al*. (2021) explored the relationship between EPU and financial innovation within the BRICS region. The study found that the rise and decline of EPU adversely affects financial innovations. This suggests that EPU can have a significant impact on financial development, particularly in terms of financial innovation. Almustafa *et al*. (2023) examined the effect of EPU on firm-level investment and corporate financial leverage. The empirical findings indicated that EPU has a detrimental impact on a firm's financial leverage, leading to reduced levels of borrowing. Furthermore, EPU adversely influences companies' investment choices and their reliance on debt financing, resulting in a general decline in their investment activity and financial commitments. This indicates that EPU can influence financial development at the firm level, affecting both investment decisions and financial leverage.

EPU increases risks and volatility on financial markets, thereby discouraging investment and hindering the efficient functioning of financial institutions and markets (Li *et al*., 2020; Liu and Zhang, 2015; Tsai, 2017). Increased uncertainty not only disrupts the demand for financial services but also imposes constraints on the supply side, influencing both financial institutions and markets and impeding overall financial sector development (Bahmani-Oskooee and Maki-Nayeri, 2019; Balke and Zeng, 2013). The amplification of risk and volatility acts as a dual deterrent, affecting the dynamics of both financial service users and providers.

Recent studies have highlighted the detrimental effects of high EPU on the operational dynamics of the financial sector. Specifically, elevated EPU levels can lead to increased borrower default risk, increased interest rates, higher capital costs, reduced credit supply and decreased liquidity within the financial sector, and lower financial stability (Ashraf and Shen, 2019; Yung and Root, 2019). Consequently, these factors may negatively affect financial development. Drawing on the above discussion, we posit as follows:

***H_1*:** EPU hinders financial development.

EPU has been widely recognized as a significant impediment to financial development, as it creates an unpredictable environment that discourages investment, disrupts credit markets and exacerbates financial market inefficiencies (Baker *et al*., 2016). However, robust institutional structures, defined by well-established legal systems, stable political environments and efficient governance, can alleviate the negative impact of EPU by enhancing trust and stability within financial markets and institutions.

For instance, La Porta *et al*. (1998) argued that legal and regulatory institutions play a crucial role in protecting investors and ensuring efficient financial market operations. Similarly, North (1990) emphasized that well-functioning institutions provide stability and reduce transaction costs, enabling financial markets to operate efficiently even in the presence of policy uncertainty. Recent literature also highlights the crucial role of institutional quality in enhancing financial sector performance, including depth, access and efficiency across both financial institutions and markets, as well as overall financial sector development (Muh. At. Khan *et al*., 2022; Moh. Ar. Khan *et al*., 2023).

Moreover, studies have shown that institutional quality enhances financial sector stability and mitigates the adverse effects of EPU. For instance, Shabir *et al*. (2021) investigated the impact of EPU on bank stability and found a negative relationship between the two. Furthermore, their findings indicate that institutional quality significantly moderates this negative effect, reducing the destabilizing impact of EPU on banks. Notably, countries with institutional quality above a certain threshold are more effective in mitigating the adverse effects of policy uncertainty on bank stability. Ogbonna *et al*. (2022) found that institutional quality, characterized by effective control of corruption, political stability and adherence to the rule of law, plays a crucial role in enhancing financial sector performance. By reducing issues such as moral hazard and adverse selection, strong institutional frameworks contribute to a more developed financial system.

EPU aggravates information asymmetry within the financial system, hindering its ability to efficiently allocate funds to the most lucrative investment opportunities. In such a scenario, high-quality institutions can help mitigate inefficiencies arising from information asymmetry. By strengthening institutional frameworks and enhancing transparency, quality institutions play a crucial role in fostering financial sector development and minimizing the adverse effects of EPU.

Schiantarelli *et al*. (2020) emphasized a similar viewpoint, highlighting that strong institutional quality helps mitigate moral hazard and adverse selection. This, in turn, enhances loan repayment rates and contributes to the overall efficiency and stability of the financial sector. EPU exacerbates information asymmetry (Lei and Luo, 2023), which can disrupt

the financial intermediation process and hinder the overall development of the financial sector. High-quality institutions can reduce information asymmetry by enforcing disclosure requirements, strengthening corporate governance and enhancing financial transparency (Brown and Hillegeist, 2007).

The reviewed literature highlights that although EPU creates substantial obstacles to financial development by heightening uncertainty, increasing information asymmetry and raising transaction costs, strong institutional frameworks serve as a crucial stabilizing force. By improving transparency, minimizing information asymmetry and enforcing robust financial regulations, institutional quality supports sustained financial development even in volatile economic conditions. Based on the existing literature, the following hypothesis is proposed:

> ***H_2*:** Institutional quality positively moderates the impact of EPU on financial development.

2. Methodology

2.1 Variables and data description

This study explores the impact of *EPU* on financial development by analysing a 20-year dataset, covering the period from 2000 to 2020, across 22 countries (refer to Table X1 in Appendix A). The selection of this time frame and the countries included in the study is primarily dictated by maximum data availability. The dependent variable in this study is financial development, which is measured using the Financial Development Index formulated by Svirydzenka (2016). This index is widely recognized as a comprehensive measure and widely utilized in recent empirical literature (see, for example, Muh. At. Khan *et al*., 2022; Muh. At. Khan *et al*., 2020; Li *et al*., 2021). The data for this variable are sourced from the IMF financial development database.

The Financial Development Index is composed of two sub-indicators: the financial institution development index and the financial market development index. Each of the sub-indicators is based on further three sub-sub-indices, *i.e.*, financial institution depth, access and efficiency and financial market depth, access and efficiency. In contrast to conventional research methods that typically gauge financial development using indicators such as the ratio of private credit to GDP or stock market capitalization to GDP, this study employs a more comprehensive measure. It evaluates financial development by independently analysing advancements in two key components of the financial sector: financial institutions and financial markets. The development of each component is assessed in three specific dimensions

– depth, access and efficiency – offering a more nuanced understanding of the sector growth. Precisely, this index of financial development (*FD*) is a composite measure consisting of two primary sub-indicators: financial institution development (*Inst_D*) and financial market development (*Mkt_D*). Each of these sub-indicators is further divided into three more indices, allowing a thorough evaluation of multiple facets of the financial landscape. This detailed breakdown provides a more comprehensive analysis, capturing the diverse dimensions and complexities within the financial system.

These indices encompass financial institution depth (*Inst_depth*), financial institution access (*Inst_access*) and financial institution efficiency (*Inst_efficiency*), as well as financial market depth (*Mkt_depth*), financial market access (*Mkt_access*) and financial market efficiency (*Mkt_efficiency*). For a detailed description of the methodology used to construct these indices, refer to Svirydzenka (2016).

In summary, financial development (*FD*) is divided into two main components, each further broken down into three sub-components, as outlined below (all sub-components serve as dependent variables in the analysis):

Financial institution development (*Inst_D*):

1.1) Institutional depth (*Inst_depth*),

1.2) Institutional access (*Inst_access*),

1.3) Institutional efficiency (*Inst_efficiency*).

Financial market development (*Mkt_D*):

2.1) Market depth (*Mkt_depth*),

2.2) Market access (*Mkt_access*),

2.3) Market efficiency (*Mkt_efficiency*).

The core independent variable is *EPU*, measured using country-specific indices of *EPU* constructed by Baker *et al*. (2016). The EPU index is a barometer of economic uncertainty based on the frequency of related newspaper coverage. The index value escalates with an increase in the number of articles featuring terms from three specific categories: "uncertainty", "economic" and "policy". The keywords may vary slightly depending on the country sampled. This index serves as a significant indicator of policy-related economic uncertainty, providing valuable insights into the economic climate of a country. The frequency of the EPU index, which is available monthly, is harmonized with the financial development index by

calculating the annual average of monthly *EPU* values, thereby yielding an annual index. This method provides a comprehensive and smoothed representation of *EPU* over the study period.

For the sake of robustness, we also consider the *EPU* value for December (*EPU_X*) of each year as an alternative representation of the *EPU*. For further information on how the EPU index is constructed, refer to Baker *et al*. (2016). This approach to assessing the *EPU* is consistent with methods used in similar studies, such as those by Gholipour (2019) and Nguyen *et al*. (2020) among others. Control variables are also incorporated in the model for financial development, aligning with existing literature (Aman *et al*., 2024; Muh. At. Khan *et al*., 2022; Muh. At. Khan *et al*., 2020; Moh. Ar. Khan *et al*., 2023). These controls include institutional quality, measured using an index constructed through principal component analysis (PCA) based on six key governance metrics – rule of law, control of corruption, government effectiveness, political stability, regulatory quality and voice and accountability – sourced from the Worldwide Governance Indicators (WGI)[1], GDP per capita (*GDP_PCA*) measured in constant 2015 USD, foreign direct investment (*FDI*) represented by net inflows of foreign direct investment (% of GDP), total trade (the ratio of the total value of exports and imports to GDP) and education (measured by entire gross primary school enrolment). The data pertaining to these control variables are extracted from the World Development Indicators database maintained by the World Bank. All the variables used in this study are summarized in Table X2 in the Appendix.

While this study shares some methodological elements with prior research (*e.g.*, Aman *et al*., 2024), it differs significantly in scope, analytical framework and empirical focus. Unlike Aman *et al*. (2024), who exclusively examined financial efficiency – a single facet of financial development measured by averaging the efficiency indices of financial institutions and markets (Svirydzenka, 2016) – this study takes a more comprehensive approach. It investigates overall financial development as a multidimensional construct encompassing depth, access and efficiency across both financial institutions and financial markets. Furthermore, this study provides a detailed analysis by separately examining financial institution development, financial market development and their respective dimensions of depth, access and efficiency. Hence, it offers a broader perspective on financial development.

1 The results of PCA are available on demand.

2.2 Econometric model and methods

Drawing on the literature, the following econometric model is specified to empirically verify our hypothesis.

$$Financial\ Development_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 \boldsymbol{X}_{it} + \mu_{it} \quad (1)$$

where *Financial Development* is the dependent variable, representing the financial development of a given country *i* at a time *t*. *EPU* is the explanatory variable, representing the EPU index for a given country *i* at a time *t.* $\boldsymbol{X}$ is a vector of control variables, which includes institutional quality, *GDP_PCA*, *FDI*, *Trade* and *Education*. These factors are considered to potentially influence financial development. β_0, β_1 and β_2 are the coefficients to be estimated. They measure the impact of the corresponding variables on financial development. β_1 is the primary coefficient of focus and is anticipated to be both negative and statistically significant; μ is the error term, capturing the influence of all other omitted variables. For estimation of the given empirical model, we employed a fixed effects regression model with robust standard errors as our baseline estimator. This approach allows us to control unobserved time-invariant characteristics that are unique to each country in our sample. The fixed effects regression model allows us to estimate these coefficients, and the use of robust standard errors helps ensure the reliability of our estimates in the presence of heteroscedasticity or autocorrelation in the error term.

Furthermore, our model confronts a potential challenge related to endogeneity, given the plausible reverse causality between *EPU* and financial development. To address this endogeneity, our model employs the two-step dynamic system generalized method of moments (GMM) estimator, as introduced by Arellano and Bond (1991) and Blundell and Bond (1998), for empirical examination. The system GMM technique mitigates the problem of reverse causality by employing lagged values of the variables as instruments. Widely acknowledged in academic literature, this method has been successfully applied in similar studies, including those by Muh. At. Khan *et al*. (2020) and Rashid Khan *et al*. (2019) among others. Additionally, the two-step system GMM proves effective in handling challenges such as omitted variables, weak instrument problems, autocorrelation and unobserved heterogeneity (Kutan *et al*., 2017). Equation (1) is transformed for the estimation using two-step dynamic system GMM as follows:

$$Financial\ Development_{it} = \beta_0 + Financial\ Development_{it-1} + \beta_1 EPU_{it} + \beta_2 \boldsymbol{X}_{it} + \mu_{it} \quad (2)$$

where $Financial\ Development_{it-1}$ represents the lagged value of financial development. The rest of the equation remains consistent with Equation (1).

3. Results and Discussion

3.1 Baseline results

The baseline estimation results, as shown in Table 1, reveal a negative coefficient for the *EPU*. This suggests that an increase in *EPU* corresponds to a decline in financial development. Specifically, in Column 1, the negative coefficient for *EPU* implies that higher levels of *EPU* have a detrimental effect on overall financial development. This could be attributed to the repercussions of uncertainty in economic policy, which can lead to increased risk and volatility in the financial sector, discouraging investment and hindering the growth and development of financial institutions and markets. Columns 2 and 3 further dissect the impact of *EPU* on different segments of the financial sector, *i.e.*, financial institutions (*Inst_D*) and financial markets (*FMK_D*). The negative coefficients in these columns suggest that increased *EPU* negatively affects both financial institution and financial market development, implying a broader impact of *EPU* across the financial landscape.

This could be because policy uncertainty can create an unstable environment for both financial institutions and markets, making it more difficult for them to operate effectively and efficiently. *EPU* rises financial frictions that disrupt the operations of the financial sector and may hamper the efficient allocation of financial resources (Gilchrist *et al*., 2013). These frictions encompass policy distortions and uncertainty (Ma and Hao, 2022), information asymmetries (Bemanke and Gertler, 1989) and transaction costs, among others. These results align with prior research, reinforcing the notion that heightened *EPU* can contribute to a less conducive environment for financial development. The negative influence on both financial segments underscores the pervasive nature of this phenomenon, affecting not only specific institutions but also financial markets. Existing studies have highlighted the detrimental effects of high *EPU* on the operational dynamics of the financial sector.

Specifically, elevated *EPU* levels can lead to increased borrower default risk, increased interest rates, higher capital costs, reduced credit supply and decreased liquidity within the financial sector and financial stability (Ashraf and Shen, 2019; Bordo *et al*., 2016; Gozgor *et al*., 2019; Yung and Root, 2019). These factors may hinder financial development, highlighting the need for stable and predictable economic policies. Mitigating *EPU* could foster a more robust and stable financial sector.

Table 1: *EPU* and financial development: baseline results

Variables	(1)	(2)	(3)
	FD	***Inst_D***	***Mkt_D***
EPU	−0.0413*** (0.0112)	−0.0398*** (0.0147)	−0.0426** (0.0184)
Institutional quality	0.0612* (0.035)	0.1384*** (0.0462)	0.0575* (0.0333)
GDP_PCA	0.0719* (0.0371)	0.203*** (0.0489)	−0.0028 (0.0612)
FDI	0.0058* (0.0034)	0.0099** (0.0045)	0.002 (0.0056)
Trade	−0.1968*** (0.0338)	−0.3596*** (0.0446)	−0.0184 (0.0558)
Education	−0.2084*** (0.0706)	0.011 (0.093)	−0.4494*** (0.1164)
Country fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Cons	5.3219*** (0.5516)	3.6638*** (0.7269)	6.3997*** (0.9099)
Observations	371	371	371
R^2	0.4037	0.4602	0.2237
***F*-stat**	38.7716	41.0175	37.1353
Adjusted R^2	0.319	0.3835	0.1135

Notes: Robust standard errors are reported in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: Authors' own calculations

3.2 Main results: system GMM estimation

Recognizing the potential endogeneity issue in our model, we adopted a two-step dynamic system GMM estimator, consistent with its use in comparable literature. Table 2 demonstrates the outcomes of the dynamic two-step system GMM analysis, offering an intricate insight into the influence of *EPU* on financial development. Columns 1, 2 and 3 correspond to the overall financial development, financial institution development and financial market development, respectively. The negative coefficients associated with *EPU* across all the col-

umns underscore a consistent adverse effect on overall financial development and its two segments: financial institutions and financial markets. These findings are consistent with primary findings and represent the robustness of our results.

Table 2: *EPU* and financial development: system GMM

Variable	(1)	(2)	(3)
	FD	***Inst_D***	***Mkt_D***
L.*FSD*	0.7761*** (0.1453)	– –	– –
L.*Inst._D*	– –	0.9602*** (0.0958)	– –
L.*Mkt_D*	– –	– –	0.6288*** (0.2165)
EPU	−0.0411** (0.0154)	−0.0311** (0.0148)	−0.04** (0.0163)
Institutional quality	−0.0992** (0.0461)	−0.0529 (0.0465)	−0.0899 (0.0905)
GDP_PCA	0.2635*** (0.075)	0.1104** (0.0457)	0.2878* (0.1563)
FDI	0.0343** (0.0142)	0.0183** (0.0086)	0.0436* (0.0239)
Trade	−0.3297*** (0.071)	−0.1848*** (0.058)	−0.4421*** (0.1533)
Education	0.3892 (0.4206)	0.2972 (0.3505)	0.3237 (1.1266)
Cons	−1.9741 (2.1045)	−1.4293 (1.9524)	−0.8513 (5.4848)
Observations	354	354	354
***F*-stat**	34.4101	41.3431	34.4436
AR(1) [*p*-value]	0.002	0.016	0.004
AR(2) [*p*-value]	0.920	0.535	0.786
Hasnsen [*p*-value]	0.262	0.144	0.166

Notes: Robust standard errors are reported in parentheses; ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: Authors' own calculations

Moreover, the Arellano–Bond test for first-order serial correlation AR(1) is significant (*p*-values: 0.002, 0.016, 0.004), as expected due to the differencing process. The Arellano–Bond test for second-order serial correlation AR(2) is insignificant (*p*-values: 0.920, 0.535, 0.786), confirming that no second-order autocorrelation exists, which supports the validity of our instruments. The Hansen test for overidentifying restrictions yields *p*-values of 0.262, 0.144 and 0.166, suggesting that our instruments are valid and not overfitting the model.

These diagnostic tests indicate that our instrument set is appropriate, reinforcing the robustness of our results. The findings remain consistent across different financial development measures, further strengthening the argument that economic policy uncertainty hampers financial development across multiple dimensions.

3.3 Disaggregated analysis: unpacking financial development

Table 3 breaks down financial development into three key dimensions – depth, access and efficiency – for both financial institutions and markets, revealing the negative impact of *EPU* on each. The findings show that *EPU* consistently undermines the growth of these dimensions, indicating that higher policy uncertainty reduces the depth, access and efficiency of financial systems. This suggests that *EPU* heightens risk and volatility, discourages investment and stifles financial growth. Policymakers should consider these effects when shaping policies to ensure the robust development of the financial sector.

Table 3: Disaggregated analysis: unpacking financial development

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Inst_depth	***Inst_access***	***Inst_ efficiency***	***Mkt_depth***	***Mkt_access***	***Mkt_ efficiency***
EPU	−0.0707*** (0.0205)	−0.0812** (0.0359)	−0.0296** (0.0139)	−0.1206*** (0.024)	−0.2059* (0.1124)	−0.0425* (0.0229)
Institutional quality	0.262*** (0.0641)	0.0109 (0.0275)	0.1444** (0.0586)	0.0703 (0.0752)	−0.0461 (0.0862)	−0.3638** (0.1442)
GDP_PCA	0.0102 (0.0678)	1.3949*** (0.119)	−0.1604** (0.0621)	0.2127*** (0.0796)	−0.2793*** (0.0913)	0.4033*** (0.1526)
FDI	0.0077 (0.0063)	0.0329*** (0.011)	0.0069 (0.0057)	0.0026 (0.0073)	−0.0073 (0.0084)	0.006 (0.0141)
Trade	−0.2158*** (0.0619)	−0.8473*** (0.1085)	−0.0227 (0.0566)	0.1342* (0.0726)	−0.0976 (0.0833)	0.2505* (0.1392)
Education	−0.041 (0.1291)	−0.07 (0.2264)	0.075 (0.1181)	−0.3701** (0.1515)	−0.0034 (0.1738)	−0.8989*** (0.2905)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Cons	5.0763*** (1.009)	−5.724*** (1.7695)	5.452*** (.9233)	3.5174*** (1.1844)	6.9197*** (1.358)	3.2921 (2.2702)
Observations	371	371	371	371	371	371
R^2	0.4049	0.548	0.1099	0.4011	0.1798	0.1821
Adjusted R^2	0.3205	0.4838	−0.0165	0.316	0.0634	0.066

Notes: Robust standard errors are reported in parentheses; ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: Authors' own calculations

3.4 Heterogeneity analysis: high versus low EPU periods

Table 4 highlights the varying effects of *EPU* on financial development across high and low *EPU* periods. We define high and low *EPU* periods based on the average *EPU* score over the entire study period. Periods with an *EPU* score above the mean are classified as high *EPU* periods, while those below the mean are designated as low *EPU* periods. The results

show that *EPU* negatively affects financial development only in high *EPU* periods, with no significant effect in low *EPU* periods. This suggests that heightened policy uncertainty disrupts financial markets and institutions, while lower uncertainty levels do not have a substantial impact. Policymakers should focus on reducing policy uncertainty, especially during high *EPU* periods, to support financial sector growth.

Table 4: Heterogeneity analysis: high versus low *EPU* periods

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	High_EPU	***Low_EPU***	***High_EPU***	***Low_EPU***	***High_EPU***	***Low_EPU***
	FD	***FD***	***Inst_D***	***Inst_D***	***Mkt_D***	***Mkt_D***
EPU	−0.0346*** (0.013)	−0.0434 (0.0291)	−0.0965*** (0.0347)	−0.0226 (0.0175)	−0.0447** (0.0224)	0.0112 (0.0434)
Institutional quality	0.0522 (0.0966)	0.0564 (0.0451)	0.2605** (0.1155)	0.0848 (0.0606)	−0.1915 (0.1444)	−0.009 (0.0778)
GDP_PCA	−0.0851 (0.1083)	0.1108** (0.0443)	−0.2939** (0.1295)	0.2663*** (0.0595)	0.1874 (0.1619)	0.0256 (0.0763)
FDI	0.0108 (0.0115)	0.0057 (0.0037)	−0.0009 (0.0137)	0.0129** (0.005)	0.0244 (0.0172)	−0.0009 (0.0065)
Trade	−0.2707*** (0.0911)	−0.2203*** (0.0423)	−0.3643*** (0.1089)	−0.4292*** (0.0568)	−0.1697 (0.1362)	−0.0043 (0.0729)
Education	−0.4354* (0.235)	−0.2128*** (0.0783)	−0.1514 (0.2809)	0.081 (0.1053)	−0.801** (0.3512)	−0.5281*** (0.1351)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Cons	8.1641*** (1.5224)	5.0614*** (0.6396)	9.5964*** (1.8198)	2.9036*** (0.8594)	6.372*** (2.2755)	6.5428*** (1.1029)
Observations	108	253	108	253	108	253
R^2	0.593	0.4333	0.4708	0.5235	0.5867	0.2322
Adjusted R^2	0.3501	0.3068	0.1548	0.4171	0.34	0.0607

Notes: This table displays the results of estimations performed to assess the effects of *EPU* on financial development, financial institution development and financial market development under both high *EPU* (*High_EPU*) and low *EPU* (*Low_EPU*) periods. Robust standard errors are reported in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: Authors' own calculations

3.5 EPU and financial development: moderating effect of institutional quality

The interaction between institutional quality and economic policy uncertainty (*EPU*) is a crucial and insightful aspect of our empirical analysis. Previous research emphasizes that while *EPU* typically hampers economic and financial development, the quality of institutions can significantly mitigate these adverse effects (see, for example, Ali *et al*., 2023; Shabir *et al*., 2021). Our findings further highlight this dynamic, showing that institutional quality plays a positive moderating role in reducing the negative impact of *EPU* on financial development, including the development of financial institutions and markets (Table 5). Specifically, the negative effects of *EPU* are less severe in countries with higher institutional quality, as strong institutions provide a buffer against the uncertainty induced by *EPU*. They enhance financial stability by promoting transparency, enforcing contracts and addressing information asymmetries, thereby limiting the disruptions to financial development.

Table 5: *EPU* and financial development: moderating effect of institutional quality

Variable	(1)	(2)	(3)
	FD	***Inst_D***	***Mkt_D***
EPU	−0.0424*** (0.0114)	−0.0477*** (0.0145)	−0.0378** (0.0186)
Institutional quality	0.0006 (0.0038)	0.1314*** (0.0447)	0.0334 (0.0572)
EPU* × *Institutional quality	0.0620* (0.0351)	0.025*** (0.0049)	0.0627* (0.0375)
GDP_PCA	−0.0232*** (0.0062)	0.2226*** (0.0477)	−0.0374 (0.0611)
FDI	0.0067* (0.0035)	0.0133*** (0.0045)	0.0007 (0.0058)
Trade	−0.2091*** (0.0344)	−0.3549*** (0.0437)	−0.0459 (0.056)
Education	−0.2037*** (0.0714)	0.089 (0.0909)	−0.5087*** (0.1165)
Country fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Cons	5.4311*** (0.5632)	3.1186*** (0.7167)	7.0815*** (0.9183)
Observations	361	361	361
R^2	0.4231	0.5152	0.2647
Adjusted R^2	0.3364	0.4424	0.1543

Notes: Robust standard errors are reported in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
Source: Authors' own calculations

3.6 Robustness testing

In this section, we test the robustness of our baseline findings. First, we use an alternative measure of *EPU*, *i.e.*, *EPU_X* for robustness testing. The outcomes of this analysis are documented in Table 6, specifically in Columns 1 to 3. The results are consistent with our baseline findings, indicating a negative effect of *EPU* on financial development, financial institution development and financial market development. This consistency across different measures of *EPU* strengthens the validity of our findings. It suggests that regardless of how *EPU* is measured, higher levels of policy uncertainty are associated with lower levels of financial development.

Moreover, in our further robustness check, we incorporate additional control variables such as legal origin and religious diversity into our model, following the approach of Cooray (2011). Legal origin refers to the type of legal system adopted by a country for its company law or commercial code. It is categorized into five distinct types: English Common Law, French Commercial Code, Socialist/Communist Law, German Commercial Code and Scandinavian Commercial Code, with each category assigned a value from 1 to 5. The data for legal origin are sourced from La Porta *et al*. (1999) as well as from the CIA Factbook. To account for religious diversity, we use the religious fractionalization index developed by Alesina *et al*. (2003), which quantifies the degree of religious variation within a country. The results (Table 6, Column 4–6) are also consistent with our baseline findings, reinforcing the negative effect of *EPU* on financial development, financial institution development and financial market development. The consistency of these results, even with the insertion of addition control variables, strengthens the robustness of our findings. It suggests that the negative relationship between *EPU* and financial development persists even when accounting for other potentially influential factors.

Table 6: Robustness testing: alternative measure of *EPU* and additional controls

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	FD	***Inst_D***	***Mkt_D***	***FD***	***Inst_D***	***Mkt_D***
EPU_X	−0.0221** (0.0087)	−0.052*** (0.0191)	−0.027* (0.0143)	– –	– –	– –
EPU	– –	– –	– –	−0.0213*** (0.0078)	−0.0181* (0.0095)	−0.026* (0.0137)
Institutional quality	0.0617* (0.0356)	0.1359*** (0.0468)	−0.0389 (0.0583)	0.0429 (0.0303)	0.0755** (0.0371)	−0.0059 (0.0535)
GDP_PCA	0.0697* (0.0375)	0.2018*** (0.0493)	−0.0059 (0.0614)	0.1759*** (0.0227)	0.2432*** (0.0278)	0.1466*** (0.0401)
FDI	0.0058* (0.0035)	0.0098** (0.0046)	0.0022 (0.0057)	0.0003 (0.0028)	0.0037 (0.0034)	−0.0019 (0.0049)
Trade	−0.1868*** (0.034)	−0.3471*** (0.0447)	−0.0109 (0.0556)	0.1846*** (0.0137)	0.2776*** (0.0168)	0.0837*** (0.0241)
Education	−0.2223*** (0.0712)	−0.0039 (0.0935)	−0.4623*** (0.1165)	−0.0541 (0.0659)	0.119 (0.0809)	−0.282** (0.1165)
French law	– –	– –	– –	0.0178 (0.0113)	−0.0105 (0.0187)	0.06*** (0.02)
Socialist law	– –	– –	– –	0.0638*** (0.0199)	0.0277 (0.0244)	0.1233*** (0.0351)
German law	– –	– –	– –	0.0738*** (0.0263)	0.0196 (0.0322)	0.1346*** (0.0464)
Scandinavian law	– –	– –	– –	−0.0227 (0.0213)	−0.0688*** (0.0261)	0.0285 (0.0376)
Religion	– –	– –	– –	−0.1304*** (0.0303)	−0.1748*** (0.0372)	−0.0858 (0.0536)
Cons	5.2812*** (0.5587)	3.5897*** (0.7341)	6.3903*** (0.9141)	2.0035*** (0.4214)	0.1599 (0.5171)	3.7121*** (0.745)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	371	371	371	322	322	322
***R*²**	0.3907	0.4517	0.2196	0.6315	0.6988	0.2366
Adjusted *R*²	0.3042	0.3738	0.1088	0.5907	0.6655	0.1521

Notes: Robust standard errors are reported in parentheses; ***, **, * denote statistical significance at 1%, 5% and 10% levels, respectively.

Source: Authors' own calculations

4. Conclusion and Policy Implications

The present research examined the influence of EPU on financial development. We analysed data from 22 countries over a period of 20 years (2002–2021) using fixed effect regression and a dynamic system GMM estimator. Our results provide robust and consistent empirical evidence on the negative impact of EPU on overall financial development. This effect is observed across different dimensions of financial development, namely financial institutions and financial markets, and their depth, access and efficiency. This aligns with existing literature, emphasizing the adverse consequences of heightened economic policy uncertainty.

A key finding from our analysis of the effects of EPU on financial development across high and low EPU quartiles is particularly noteworthy. Our results reveal that EPU has a detrimental effect on overall financial development, as well as on the development of financial institutions and financial markets, during periods of high EPU. Conversely, during periods of low EPU, the impact is statistically insignificant. This suggests a contextual sensitivity, with the influence of EPU being more pronounced during periods of heightened uncertainty. The negative impact of EPU is particularly pronounced in high EPU periods, suggesting that periods of heightened policy uncertainty can be especially detrimental to the financial sector.

Further enriching our understanding, we explored the moderating role of institutional quality on the EPU and financial development nexus. The positive moderation effect indicates that a higher institutional quality mitigates the negative impact of EPU on financial development.

This underscores the importance of strong institutional frameworks in buffering the negative effects of EPU on financial sector development. To fortify our results, we conducted robustness checks using alternative measures of EPU and additional control variables. The consistent reinforcement of our baseline findings across these variations enhances the reliability and robustness of our conclusions.

The results of our study carry significant implications for policymakers. They indicate that reducing policy uncertainty can be an effective strategy for promoting financial development. Policymakers should strive to maintain stable and predictable economic policies, particularly in periods of high EPU, to support the growth and development of the financial sector. Furthermore, our results highlight the role of institutional quality in mitigating the negative effects of EPU. Improving institutional quality can provide a stable environment that reduces the impact of policy uncertainty, thereby promoting financial development. Policymakers should therefore consider measures to strengthen institutional quality as part

of their strategies to promote financial development. In conclusion, our study emphasizes the multidimensional nature of the association between EPU and financial development, acknowledging contextual nuances and the mitigating influence of institutional quality. As economic environments evolve, continuous attention to these dynamics is essential for informed policymaking and sustained growth of financial systems.

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Appendix

Table X1: List of countries

Serial no.	Country	Serial no.	Country
1	Australia	**12**	Italy
2	Brazil	**13**	Japan
3	Canada	**14**	South Korea
4	Chile	**15**	Mexico
5	China	**16**	Netherlands
6	Colombia	**17**	Russia
7	France	**18**	Singapore
8	Germany	**19**	Spain
9	Greece	**20**	Sweden
10	India	**21**	United Kingdom
11	Ireland	**22**	United States

Source: Authors' own elaboration

Table X2: Description of variables and data sources

Variables	Description	Data source
Dependent variables		
Financial development (*FD*)	Financial development is a multidimensional process encompassing depth, access and efficiency across both segments of the financial sector: financial institutions and financial markets. It is measured using the Financial Development Index developed by the International Monetary Fund (Svirydzenka, 2016), which provides a comprehensive assessment of financial development. The overall Financial Development Index consists of two primary indices: the financial institution development index and the financial market development index. Each of these indices is further divided into three sub-indices: depth, access and efficiency. In summary, Financial Development (*FD*) is divided into two main components, each further broken down into three sub-components, as outlined below (all sub-components serve as dependent variables in the analysis): **Financial institution development (*Inst_D*)** 1.1) Institutional depth (*Inst_depth*) 1.2) Institutional access (*Inst_access*) 1.3) Institutional efficiency (*Inst_efficiency*) **Financial market development (*Mkt_D*)** 2.1) Market depth (*Mkt_depth*) 2.2) Market access (*Mkt_access*) 2.3) Market efficiency (*Mkt_efficiency*)	International Monetary Fund (Svirydzenka, 2016)
Dependent variables		
Economic policy uncertainty (*EPU*)	Economic Policy Uncertainty Index	Baker *et al*. (2016)
Control variables		
Institutional quality	It is measured using a PCA-developed index derived from the average of six key governance metrics – rule of law, control of corruption, government effectiveness, political stability, regulatory quality and voice and accountability – obtained from the Worldwide Governance Indicators (WGI).	World Bank, World Governance Indicators
Economic growth (*GDP_PCA*)	GDP per capita (*GDP_PCA*) measured in constant 2015 USD	World Development Indicators, World Bank
Foreign direct investment (*FDI*)	Represented by net inflows of foreign direct investment (% of GDP)	
Trade	The ratio of the total value of exports and imports to GDP	
Education	Measured by entire gross primary school enrolment	

Source: Authors' own elaboration

Table X3: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) *EPU*	1.0000	–	–	–	–	–
(2) *Institutional quality*	0.1383	1.0000	–	–	–	–
(3) *GDP_PCA*	0.1947	0.3288	1.0000	–	–	–
(4) *FDI*	−0.0468	0.1429	0.0651	1.0000	–	–
(5) *Trade*	0.0063	0.3688	0.3505	0.3552	1.0000	–
(6) *Education*	−0.1064	−0.2649	−0.2678	−0.0028	−0.3050	1.0000

Source: Authors' own calculations