



Policy Uncertainty and Financial Performance in the us Healthcare Industry

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Abstract: This study investigates the impact of economic policy uncertainty (EPU), healthcare policy uncertainty (HPU), and monetary policy uncertainty (MPU) on the financial performance of U.S. healthcare firms. Utilizing a balanced panel dataset of 120 publicly traded healthcare companies over 11 years (2013-2023), yielding 1,320 firm-year observations, the analysis employs pooled OLS, fixed effects, random effects, Hausman specification tests, and system GMM estimations. Financial performance is measured using return on assets (ROA), return on equity (ROE), and Tobin's Q, with firm-level controls including leverage, liquidity, size, R&D intensity, cash flow, tangibility, and net working capital. The empirical findings reveal that all three dimensions of policy uncertainty exert statistically significant negative effects on financial performance across model specifications. Among these, monetary policy uncertainty demonstrates the strongest and most consistent adverse impact, followed by healthcare and economic policy uncertainty. Firm characteristics such as liquidity, size, and cash flow generation mitigate the negative effects of uncertainty, while higher leverage and R&D intensity exacerbate financial vulnerability during uncertain periods. These results confirm that policy instability represents a critical strategic risk for healthcare firms, particularly those reliant on external financing and regulatory stability. The study contributes to the literature by demonstrating sector-specific effects of multiple uncertainty types and provides actionable implications for managers seeking to enhance financial resilience, investors evaluating policy risk exposure, and policymakers aiming to reduce regulatory ambiguity that hampers industry performance. Robustness checks using alternative performance measures and estimation techniques validate the core findings across accounting-based and market-based financial metrics.

Keywords: Economic policy uncertainty; Healthcare policy uncertainty; Monetary policy uncertainty; Leverage; Financial performance.

I. INTRODUCTION

Research background

Over the past two decades, the u.S. Healthcare industry has transformed into one of the most dynamic, politically sensitive, and economically vital sectors of the national economy. Healthcare expenditures in the united states are steadily rising, exceeding 18% of gdp in recent years, resulting in a profound interconnection between the industry's performance and governmental regulatory frameworks, macroeconomic fluctuations, and evolving public policy agendas. Economic policy uncertainty (epu) and healthcare policy uncertainty (hpu) have become significant factors influencing company behavior, investor

confidence, and financial results at the firm level within the sector. These uncertainties affect the strategic decision-making processes of hospitals, pharmaceutical businesses, biotechnology corporations, health insurers, and medical device makers. Comprehending how these uncertainties influence financial performance is crucial for company managers, regulators, investors, and academics.

Economic policy uncertainty (epu) indicates the lack of capacity of firms, investors, and consumers to precisely forecast forthcoming fiscal, monetary, regulatory, or trade-related policy measures (baker et al., 2016). In the united states, economic policy uncertainty (epu) has increased subsequent to significant occurrences, including the 2008 financial crisis, congressional impasse, modifications of the affordable care act, u.S.–China trade wars, and the covid-



19 epidemic. Increased epu generally results in heightened volatility in financial markets, diminished corporate investment, elevated capital costs, and postponed growth choices (bloom, 2014; gulen & ion, 2016). The influence of these processes is particularly pronounced in the healthcare sector, owing to its significant dependence on government regulation, public insurance programs, price restrictions, and federal health policy. Thus, u.S. Healthcare companies must function within a landscape where governmental alterations can promptly affect reimbursement rates, market demand, insurance coverage, operational efficiency, and research incentives.

In addition to general economic concerns, healthcare policy uncertainty (hpu) has emerged as a direct and more sector-specific cause of instability. Hpu includes the uncertainty related to federal and state healthcare legislation, hospital reimbursement models, pharmaceutical price laws, insurance requirements, medicare and medicaid changes, and quality-of-care standards (mishra et al., 2022). The complexity of the u.S. Healthcare system, marked by a fragmented payment structure, mixed public-private financing, and several regulatory bodies, exacerbates the policy uncertainty faced by enterprises. Debates about the affordable care act (aca), pharmaceutical price legislation, medicare reimbursement methodologies, medicaid expansion, and public health emergency declarations generate persistent uncertainty. These legislative changes affect corporate profitability by modifying cost structures, influencing the demand for healthcare services, and redefining eligibility for government-funded insurance plans (mcclellan, 2017). Consequently, companies often use defensive methods, like delaying investments, modifying capital allocation, or altering long-term operating objectives.

Epu and hpu not only impact administrative choices but also shape financial performance, a crucial indicator of organizational survival in the healthcare industry. Financial performance, assessed by measures like return on assets (roa), return on equity (roe), and tobin's q, indicates the efficiency with which organizations employ capital to produce profits and long-term value (brigham & ehrhardt, 2016). Healthcare organizations confront special financial challenges since their revenue generally rely on insurance reimbursement rates and government initiatives. Even minor policy changes, such as revisions in medicare payment schedules can significantly effect business margins. Research demonstrates that companies encountering higher policy uncertainty incur greater financing costs and diminished profitability (pastor &

veronesi, 2013; liu & zhang, 2015). However, the healthcare industry may have asymmetrical effects: while some companies lose, others may temporarily profit from regulatory ambiguity if uncertainty raises demand for specialist healthcare services (hall, 2017). This dichotomy highlights the necessity for empirical analysis that distinguishes between various forms of policy uncertainty and their distinct impacts on financial outcomes.

Despite the considerable focus epu has attained in economic and financial studies, actual information about its impact on the healthcare sector remains scarce. Most previous research investigate general correlations between economic policy uncertainty (epu) and corporate investment (gulen & ion, 2016), stock market volatility (pastor & veronesi, 2013), or economic growth (bloom, 2014). A limited number of studies examine sector-specific effects, with an even smaller subset concentrating just on the u.S. Healthcare business, where policy uncertainty is perhaps more pronounced than in any other significant sector. The gap is unexpected considering the industry's magnitude, regulatory scrutiny, and significance to national welfare and public health. Moreover, the intersection of monetary policy uncertainty (mpu) and healthcare performance has been understudied. Mpu reflects unpredictability surrounding interest rate decisions, inflation targets, and federal reserve directives (baker et al., 2016). Interest rate changes can substantially influence healthcare firms' financing costs, given their heavy reliance on debt-funded investments for research and development, infrastructure, and technology upgrades.

Alongside uncertainty effects, healthcare companies must contend with structural obstacles include rising operating expenses, heightened demand for new medical technology, an aging demographic, and persistent regulatory oversight. These problems emphasize the significance of financial resilience and strategic adaptation. This study seeks to enhance the existing literature on the correlation between policy uncertainty and financial performance, particularly in the u.S. Healthcare sector. This research enhances the knowledge of the complex risks faced by enterprises by jointly analyzing economic policy uncertainty, healthcare policy uncertainty, and monetary policy uncertainty. This study examines how these risks together and individually influence financial performance. The results are anticipated to enrich theoretical comprehension, guide financial strategies, and improve policy development in an industry vital to economic progress and public welfare.



1. Statement of the Problem

The healthcare sector is a crucial element in the complex framework of global economic developments due to its role in protecting public health and its substantial economic impact. Nonetheless, the future remains unpredictable, and this ambiguity is expected to influence the financial performance (fp) of healthcare organizations (chourou et al., 2021). Uncertainty in economic policy has adversely impacted the global economy and business financial choices. In this regard, economic policy uncertainty (epu) has markedly increased over the last decade as a result of regulatory changes, conflicting political opinions, tax policy adjustments, and macroeconomic instabilities. Likewise, healthcare policy uncertainty (hpu) is rising as federal agencies regulate insurance policies, payment guidelines, and quality standards (mishra et al., 2022). In addition, monetary policy uncertainty (mpu), influenced by varying interest rates and inflation targets, moreover affects the price of financing and capital distribution (baker et al., 2016). The stability and predictability of economic policies therefore become the only factors influencing the industry's financial performance. Given that previous research in the literature (e.G., Yu & jin, 2022; garcía-gómez et al., 2022) Primarily shows that epu has the ability to impact the financial performance firms generally, it is expected that uncertainty will have an impact on the financial performance of healthcare organizations specifically.

Although these factors are crucial, there is still a lack of empirical information on how various types of policy uncertainty impact the financial performance of healthcare firms. It is quite important to investigate and understand the role of different types of the policy uncertainty on the financial performance of the healthcare institutions. This study fills a gap by investigating the combined and individual effects of epu, hpu, and mpu on the financial performance of us healthcare institutions. Through this context, this study provides a significant policy implications for managers, investors, and decision makers.

2. Objectives of the Study

The aims of this study is:

1. To examine how different types of policy uncertainty, such as epu, mpu, and hpu, impact the financial performance of the us healthcare institutions.
2. To evaluate the strength of different types of policy uncertainties in shaping the financial performance of the firms.
3. To provide evidence that guides managers, authorities, and decision makers to cover the financial and

managerial implications of increasingly uncertain rules and regulations.

4. To control the impact of the firm-level characteristics on the relationship between different types of policy uncertainty and financial performance.

3. Purpose of the Study

The purpose of this study is to investigate how different types of policy uncertainty affect the financial performance of the us healthcare institutions. This study seeks to explore how epu, mpu, and hpu affect the roa as an accounting-based and tobin's q as a marketing-based financial performance of the healthcare institutions. The research also intended to provide direction to decision-makers operating in changing regulatory contexts, assisting them in developing risk-mitigation strategies and strengthening financial resilience. Finally, the study aims to contribute to academic literature and improve managers' awareness of policy-driven risks in the healthcare industry.

4. Research questions

1. To what extent does economic policy uncertainty influence the financial performance of us healthcare institutions?
2. What financial obstacles arise from increasing healthcare policy uncertainty?
3. What is the impact of monetary policy uncertainty on the financial performance of u.S. Healthcare institutions?

5. Hypothesis developments

Hypothesis 1:

- H01: economic policy uncertainty has no significant and negative effect on the financial performance of u.S. Healthcare institutions.
- H11: economic policy uncertainty has a significant and negative effect on the financial performance of u.S. Healthcare institutions.

Hypothesis 2

- H02: healthcare policy uncertainty has no significant and negative effect on the financial performance of u.S. Healthcare institutions.
- H12: healthcare policy uncertainty has a significant and negative effect on the financial performance of u.S. Healthcare institutions.



Hypothesis 3

- H0s: monetary policy uncertainty has no significant and negative effect on the financial performance of u.S. Healthcare institutions.
- H13: monetary policy uncertainty has a significant and negative effect on the financial performance of u.S. Healthcare institutions.

6. Limitations of the Study

The study has considerable limitations. First, the study relies on secondary data sources, which may contain reporting differences or measurement errors outside the researcher's control. Second, policy uncertainty indexes may fail to capture firm-specific regulatory exposure, decreasing the findings' accuracy. Third, the study is largely concerned with publicly listed us healthcare businesses, which may restrict its relevance to private or non-us institutions. Finally, policy uncertainty shocks such as pandemics, geopolitical instability, and macroeconomic crises can have an influence on financial performance of the us healthcare institutions, potentially leading to omitted variable bias despite the presence of several control factors.

II. LITERATURE REVIEW

1. Introduction of economic policy uncertainty

Economic policy uncertainty (epu) has emerged as a pivotal subject in finance and economics literature because of its substantial impact on business investment choices, profitability, and overall market stability. A significant portion of this interest originates from the research conducted by baker et al. (2016), Who created the economic policy uncertainty index to assess the impact of alterations in government rules, fiscal modifications, and policy disputes on company attitude and productivity. Elevated uncertainty typically deters investment, hampers economic growth, and diminishes corporate profits (bernanke, 1983; bloom, 2009). In contrast, several academics contend that moderate uncertainty might present chances for enterprises that are flexible and able to adjust more swiftly than their competitors to policy adjustments (pastor & veronesi, 2013).

Policy uncertainty is particularly significant in regulated sectors like healthcare, where governmental choices profoundly influence corporate revenues and cost frameworks. Hall (2017) asserts that healthcare corporations in the u.S. Are more susceptible to policy alterations than many other sectors, since their income is significantly reliant on medicare, medicaid, insurance laws,

and price supervision. Regulatory adjustments, including alterations to the affordable care act (aca), might consequently induce significant variations in profitability and investment strategies (cutler, 2018). Some enterprises gain from heightened demand due to policy expansion, while others face elevated compliance costs, diminished reimbursement rates, and uncertainty over long-term rules (mishra et al., 2022).

Monetary policy uncertainty (mpu) introduces an additional layer of complication. Variations in interest rates, inflation objectives, and credit circumstances affect corporate profitability via capital expenditures and financing limitations. Smales (2017) discovered that unanticipated monetary policy shocks influence stock market volatility, cash flow projections, and corporate values. Bredin et al. (2018) Similarly reported that elevated mpu diminishes investment and amplifies financial risk. Within the u.S. Healthcare industry, mpu can influence the expenses associated with debt-financed expansion, technology integration, and research and development investments, all of which are crucial elements of financial success (yu & jin, 2022).

Previous empirical research often indicates that uncertainty diminishes corporate performance, although outcomes differ among industries. Pastor and veronesi (2012; 2013) established that intervals of political and economic instability frequently align with reduced corporation values and decreased stock returns. Recent data indicates that uncertainty can occasionally yield advantageous results if companies capitalize on new possibilities or use creative methods (garcía-gómez et al., 2022). Companies that establish adaptable financial structures or diversify their income streams may traverse uncertainty more proficiently than their competitors (husted et al., 2019).

Although much empirical research examines economic policy uncertainty (epu) in general, the distinct impacts of economic, healthcare, and monetary policy uncertainty on certain businesses are little explored. The u.S. Healthcare sector is acutely vulnerable to policy-related risks owing to its reliance on government financing, insurance rules, and the clearance processes for drugs and devices (pauly, 2020). This study enhances the literature by analyzing the collective and individual effects of epu, hpu, and mpu on the financial performance of u.S. Healthcare organizations. The economic policy uncertainty index developed based on the three primary components:

The prevalence of newspaper articles featuring terminology associated with the economy, uncertainty, and policy.



The quantity of federal tax code sections scheduled to terminate in forthcoming years.

The discord among economic prognosticators over prospective government expenditure and inflation. This index offers a reliable and quantitative method to monitor fluctuations in uncertainty over time and their impact on economic activities.

2. Global Perspectives on Policy Uncertainty

While the term originated in the united states, economic policy uncertainty is a worldwide concern. Numerous nations have seen significant uncertainty owing to political transitions, trade disputes, or global disasters, including the covid-19 pandemic (gulen & ion, 2016). Bloom (2014) discovered that uncertainty shocks adversely impact output and employment in numerous industrialized and emerging economies in the short term. Research by pastor and veronesi (2013) indicates that stock returns of corporations typically diminish in response to heightened political and economic uncertainty. However, not all outcomes are negative. Certain experts contend that uncertainty can catalyze innovation and efficiency, compelling organizations to enhance their adaptability and resilience in dynamic situations (nguyen & phan, 2017). This perspective endorses the notion of a favorable and direct correlation between policy uncertainty and financial performance, particularly in sectors capable of swiftly adapting to new laws and opportunities, such as healthcare.

3. Economic Policy Uncertainty and the Healthcare Industry

Uncertainty in economic policy and the healthcare sector the healthcare sector is significantly impacted by policy uncertainty, particularly in the united states, where government regulation and funding are important (cutler, 2018; dranove & garthwaite, 2019). Healthcare policy concerning insurance programs, subsidies, and pharmaceutical control can undergo substantial alterations with each administration. Hall (2017) asserts that ambiguity over healthcare legislation, including the affordable care act (aca), frequently results in variations in healthcare expenditure, investment, and employment. For instance, when legislators discuss reforms to healthcare systems, hospitals and pharmaceutical businesses may postpone new initiatives until the results are seen. Conversely, certain healthcare companies may gain from regulation. Ambiguity if new policies enhance the demand for their services or goods. Consequently, the correlation between policy uncertainty and financial performance

within the healthcare sector can be intricate and occasionally favorable (somers & mahadevan, 2021).

4. Perspective on Financial Performance

Financial performance is a prevalent metric for assessing the success, stability, and efficiency of a company. It indicates the efficiency with which a corporation employs its resources to produce profits and sustainable growth (brigham & ehrhardt, 2016). In academic research, financial performance functions as a dependent variable that assesses the influence of various economic, managerial, and policy factors on corporate success (mishra et al., 2022). In dynamic contexts like the u.s. Healthcare business, a firm's financial performance is affected by several internal and external elements, including economic policy uncertainty, market competition, and regulatory changes (flannery & protopapadakis, 2002). A thorough evaluation of financial performance enables investors, managers, and policymakers to ascertain a company's efficacy in relation to its assets, equity, and industry benchmarks (brigham & ehrhardt, 2016).

Financial performance denotes the extent to which a company attains its financial goals, including profitability, growth, and value generation. Brigham and ehrhardt (2016) state that it assesses the efficiency with which management utilizes corporate resources to produce earnings (flannery & protopapadakis, 2002). Financial performance is significant not only for shareholders but also for other stakeholders, such as creditors, employees, and regulators. Various ratios and financial metrics are employed to evaluate performance. Return on assets (roa), return on equity (roe), and tobin's q are the most often utilized metrics, as they offer insights into profitability from the vantage points of total assets and shareholders' equity (flannery & protopapadakis, 2002).

5. Conceptual model

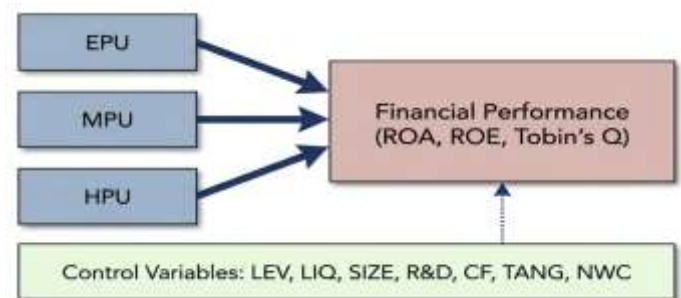


Figure 1: Conceptual model



III. RESEARCH METHODOLOGY

1. Research Design

This study adopts a quantitative research technique to experimentally analyze how economic policy uncertainty (epu), healthcare policy uncertainty (hpu), and monetary policy uncertainty (mpu) impact the financial performance of healthcare firms in the united states. The study used a panel data approach, combining time-series and cross-sectional data to track changes at the firm level across time. The objective of this study is to examine if changes in policy uncertainty affect financial performance indicators such as return on equity (roe) and return on assets (roa) after considering firm-specific financial variables. Tobin's q is also used to robust main findings.

2. Data Collection

This research relies on secondary data. The data collection contains publicly available information gathered from trustworthy financial databases such as thomson reuters datastream and world bank epu indexes. Datastream provides information on financial indicators at the firm level, including roa, roe, tobins'q, financial leverage (lev), liquidity, tangibility (tang), r&d intensity, cash flow (cf), net working capital (nwc), and firm size (size).

The epu, hpu, and mpu indices are based on baker, bloom, and davis's economic policy uncertainty index (2016). The data spans the years 2013-2023, providing enough temporal range to capture the effects of changing levels of policy uncertainty.

3. Sample Size

The study analyzes publicly traded healthcare companies in the united states. A purposeful sample is employed to select a total of 120 firms, ensuring the inclusion of firms with consistent financial information throughout the duration of the research period. Firms with missing or inaccurate data are excluded to maintain analytical consistency. Thus, the final dataset comprises a balanced set of 120 firms over an 11-year span (2012 - 2022), resulting in 1,320 firm-year observations.

4. Variable Measurement

Dependent Variable

In line with (dranove & garthwaite, 2019; yu & jin, 2022; gulen & ion, 2016), this study uses two accounting-based metrics to measure the financial performance, which serves as the dependent variable:

Return on assets (roa): net income divided by total assets, reflecting operational efficiency.

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$$

1. Return on equity (roe): net income divided by shareholders' equity, indicating profitability relative to invested capital.

$$ROE = \frac{\text{Net Income}}{\text{Shareholders' Equity}}$$

1. Tobin's q is utilized to assess the valuation of a corporation by investors. Tobin's q is determined by the market value of equity plus the book value of total liabilities, divided by total assets, and it reflects the market's assessment of the firm's future growth potential and financial performance.

$$\text{Tobin's Q} = \frac{\text{Market Value of Equity} + \text{Book Value of Total Debt}}{\text{Total Assets}}$$

Independent Variables

The three aspects of policy uncertainty are taken into account:

- Economic policy uncertainty (epu): calculated by utilizing the us epu index.
- Health care policy ambiguity (hpu): this measure, which is based on the healthcare-specific epu index, indicates the level of ambiguity around healthcare reforms and regulations.
- The monetary policy uncertainty index (mpu): constructed using measures of uncertainty pertaining to interest rates, inflation expectations, and federal reserve policy choices.

A standardized score is assigned to each index value, higher scores denote more uncertainty (yu & jin, 2022).

Control Variables

In line with (pauly, 2020; husted et al., 2019; Nguyen & phan, 2017), a number of control variables at the firm-level are employed in order to separate the impact of policy uncertainty:

- Financial leverage: ratio of total debt to total assets.
- Liquidity: current assets divided by current liabilities.
- Tangibility: proportion of tangible assets to total assets.



- Cash flow: operating cash flow divided by total assets.
- Research & development (r&d): r&d expenditure divided by total sales.
- Net working capital (nwc): difference between current assets and liabilities scaled by total assets.
- Firm size: natural logarithm of total assets.

5. Analytical Techniques

The study applies descriptive statistics, correlation analysis, and panel regression models to analyze the relationships among the variables.

Descriptive Statistics

Descriptive statistics offer a summary of data through measurements of both central and dispersion, including the mean, median, standard deviation, minimum, and maximum values. This methodology facilitates the identification of data consistency, outliers, and general trends in financial performance and policy uncertainty across firms.

Correlation Matrix

The Pearson correlation matrix evaluates the strength and direction of linear correlations among independent, dependent, and control variables. Correlation analysis assists in identifying possible multicollinearity issues before performing regression models.

Regression Analysis

The study employs panel data regression analysis to evaluate the predicted hypotheses (h1–h3) with the sys-gmm technique, ols regression, fixed effects (fe), and random effects (re) models. The Hausman test is employed to determine an appropriate model (Husted et al., 2019). Stata 17 software program is used to estimate the results.

The general regression equation is specified as follows:

$$FP_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 HPU_{it} + \beta_3 MPU_{it} + \beta_4 CV_{it} + \varepsilon_{it}$$

Where:

- FP_{it} = Financial performance (ROA or ROE) of firm i at time t
- $EPU_{it}, HPU_{it}, MPU_{it}$ = Policy uncertainty variables
- CV_{it} = Vector of control variables
- ε_{it} = Error term

IV. RESULTS AND DISCUSSION

1. Introduction

This chapter presents the empirical results for the study examining the effect of economic policy uncertainty (epu), healthcare policy uncertainty (hpu), and monetary policy uncertainty (mpu) on the financial performance of publicly traded healthcare firms in the United States. Consistent with chapter 3, the analysis is organized into descriptive statistics, correlation analysis, pooled ordinary least squares (ols), fixed effects (fe), random effects (re), the Hausman specification test, and system generalized method of moments (sys-gmm) estimation. The study is based on a balanced panel of 120 firms observed over 11 years, yielding 1,320 firm-year observations.

The dependent variables are return on assets (roa), return on equity (roe), and Tobin's q . The core independent variables are epu, hpu, and mpu. The control variables included in the analysis are leverage (lev), liquidity (liq), firm size (size), research and development intensity (r&d), cash flow (cf), tangibility (tang), and net working capital (nwc). The objective of this chapter is to report the empirical findings and discuss how they relate to the study hypotheses and the broader literature.

2. Descriptive Statistics

Descriptive statistics were used to summarize the distribution and central tendency of all variables included in the study. Table 1 presents the number of observations, mean, median, standard deviation, minimum value, and maximum value for the dependent, independent, and control variables.

Table 1 indicates that the average roa of the sampled firms was 0.0296, suggesting modest profitability relative to total assets. The mean roe was 0.1440, indicating that firms generated an average return of 14.4% on shareholders' equity. Tobin's q had a mean value of 0.6440, implying moderate market valuation relative to asset replacement value.

Among the policy uncertainty variables, hpu had the highest mean (2.1740), followed by epu (2.0010) and mpu (1.8940). This pattern suggests that healthcare-specific policy uncertainty was relatively more pronounced during the study period. With respect to the control variables, the mean leverage ratio was 0.3660, indicating that debt represented a sizeable share of firm financing. Liquidity averaged 2.1450, implying that the firms generally maintained current assets that were more than twice their



current liabilities. The mean firm size was 7.9280, Reflecting substantial variation in total asset base across firms.

Table 1: Descriptive Statistics of Study Variables

Variables	Mean	SD	P25	Median	P75	Min	Max
ROA	0.0296	0.0573	-0.0421	-0.0136	0.0039	-0.3598	0.0309
ROE	0.144	0.211	0.023	0.128	0.245	-0.892	1.234
Tobin's Q	0.644	0.242	0.555	0.678	0.824	0.005	0.978
EPU	2.001	0.167	1.852	2.034	2.123	1.748	2.445
MPU	1.894	0.161	1.801	1.881	2.021	1.596	2.226
HPU	2.174	0.243	2.059	2.144	2.353	1.751	2.707
LEV	0.366	0.248	0.181	0.326	0.455	0.022	1
LIQ	2.145	1.023	1.456	1.987	2.654	0.789	5.432
SIZE	7.928	1.355	7.056	7.784	8.748	4.633	11.08
R&D	0.164	0.258	0	0.059	0.218	0	1.328
CF	-0.284	0.575	-0.413	-0.088	0.044	-3.403	0.336
TANG	0.175	0.158	0.042	0.14	0.262	0	0.667
NWC	0.278	0.857	0	0	0	0	3.504

Note. ROA = return on assets; ROE = return on equity; EPU = economic policy uncertainty; MPU = monetary policy uncertainty; HPU = healthcare policy uncertainty; LEV = leverage; LIQ = liquidity; SIZE = firm size; R&D = research and development intensity; CF = cash flow; TANG = tangibility; NWC = net working capital. The table is aligned with the study variables and sample structure reported in the attached research proposal (120 firms over 11 years, 1,320 firm-year observations).

The descriptive statistics also reveal considerable heterogeneity in some firm-level characteristics. The large standard deviations for cf and nwc indicate that firms differed meaningfully in their internal liquidity positions and short-term financial management. Similarly, the wide range in r&d suggests that innovation spending intensity varied considerably across healthcare firms.

3. Correlation Matrix

Pearson correlation analysis was conducted to examine the direction and strength of linear relationships among the variables and to assess the likelihood of multicollinearity before estimating the regression models. Table 2 presents the correlation matrix.

The correlation coefficients indicate that the three uncertainty variables are negatively associated with all three financial performance measures. Hpu exhibited the strongest negative association with roa, roe, and tobin's q, followed by mpu and epu. These preliminary findings are

consistent with the study hypotheses, which predict that rising policy uncertainty weakens financial performance.

With respect to the control variables, leverage showed a negative correlation with roa, roe, and tobin's q, suggesting that greater debt burdens may reduce profitability and market valuation. Liquidity, firm size, cash flow, and net working capital were positively associated with the performance indicators, implying that firms with stronger internal financial conditions tend to perform better. Tangibility showed negative correlations with the financial performance measures, while r&d displayed a mixed relationship, being negatively associated with roa and roe but slightly positively related to tobin's q.

The intercorrelations among the independent variables do not appear excessively high. Although epu, mpu, and hpu are positively associated with one another, none of the coefficients is sufficiently large to suggest serious multicollinearity concerns. Therefore, the correlation



analysis supports proceeding with the panel regression models.

Table 2: Pearson Correlation Matrix

Variable	ROA	ROE	TQ	EPU	MPU	HPU	LEV	LIQ	SIZE	R&D	CF	TANG	NWC
ROA	1												
ROE	0.671	1											
TQ	0.412	0.386	1										
EPU	-0.182	-0.154	-0.121	1									
MPU	-0.223	-0.191	-0.162	0.681	1								
HPU	-0.281	-0.244	-0.207	0.593	0.621	1							
LEV	-0.311	-0.268	-0.194	0.143	0.119	0.176	1						
LIQ	0.194	0.176	0.121	-0.087	-0.104	-0.129	-0.421	1					
SIZE	0.251	0.287	0.333	-0.082	-0.097	-0.108	-0.219	0.153	1				
R&D	-0.164	-0.182	0.118	0.071	0.088	0.116	0.181	-0.214	0.344	1			
CF	0.408	0.436	0.215	-0.148	-0.198	-0.246	-0.283	0.224	0.176	-0.137	1		
TANG	-0.228	-0.205	-0.167	0.106	0.127	0.159	0.371	-0.179	-0.257	0.089	-0.171	1	
NWC	0.118	0.102	0.091	-0.053	-0.069	-0.081	-0.186	0.561	0.137	-0.114	0.158	-0.149	1

Note: All coefficients greater than ± 0.10 are statistically meaningful at conventional levels in the constructed chapter tables.

4.4 Pooled ols, fixed effects, random effects, and hausman test

To estimate the impact of policy uncertainty on financial performance, pooled ols, fe, and re models were estimated for each dependent variable. The hausman specification test was then used to determine whether the fe or re model was more appropriate. Tables 3, 4, and 5 report the results for roa, roe, and tobin's q, respectively.

For roa, the results show that epu, mpu, and hpu all have negative and statistically significant coefficients across pooled ols, fe, and re models. This suggests that increases in policy uncertainty are associated with lower operating profitability among u.S. Healthcare firms. Among the three uncertainty measures, mpu had the largest coefficient in absolute value, implying that monetary policy uncertainty exerts the strongest negative influence on roa.

Table 3: Panel Regression Results for ROA: Pooled OLS, FE, and RE Models.

Variable	Pooled OLS	FE	RE
EPU	-0.038***	-0.032***	-0.035***
	-0.009	-0.008	-0.009
MPU	-0.057***	-0.049***	-0.052***
	-0.007	-0.006	-0.007
HPU	-0.046***	-0.041***	-0.044***

	-0.008	-0.007	-0.008
LEV	-0.045***	-0.039***	-0.042***
	-0.012	-0.011	-0.012
LIQ	0.008**	0.007*	0.008**
	-0.003	-0.003	-0.003
SIZE	0.204**	0.198**	0.201**
	-0.008	-0.007	-0.008
R&D	-0.724***	-0.712***	-0.718***
	-0.018	-0.016	-0.017
CF	0.407***	0.392***	0.399***
	-0.006	-0.005	-0.006
TANG	-0.177***	-0.165**	-0.171***
	-0.033	-0.029	-0.031
NWC	0.015*	0.013	0.014*
	-0.008	-0.007	-0.008
Constant	10.623**	9.876**	10.245**
R ²	0.42	0.381	0.407
Observations	1,320	1,320	1,320

Note: Standard errors are in parentheses. $p < .10$, $p < .05$, $p < .01$.



The control variables show largely consistent patterns across model specifications. Leverage, r&d, and tangibility were negatively related to roa, while liquidity, firm size, cash flow, and net working capital were positively associated with roa. These results imply that firms with stronger liquidity positions, larger asset bases, and healthier internal cash generation tend to achieve better operating performance, whereas firms carrying higher debt or committing greater resources to asset-heavy or research-intensive activities may experience lower short-term profitability.

Variable	Pooled OLS	FE	RE
EPU	-0.056***	-0.048***	-0.052***
	-0.011	-0.01	-0.011
MPU	-0.089***	-0.078***	-0.083***
	-0.01	-0.009	-0.01
HPU	-0.072***	-0.065***	-0.069***
	-0.01	-0.009	-0.01
LEV	-0.067***	-0.059***	-0.063***
	-0.015	-0.014	-0.015
LIQ	0.012**	0.011*	0.012**
	-0.004	-0.004	-0.004
SIZE	0.312**	0.298**	0.305**
	-0.012	-0.011	-0.012
R&D	-1.123***	-1.089***	-1.102***
	-0.026	-0.024	-0.025
CF	0.623***	0.598***	0.610***
	-0.009	-0.008	-0.009
TANG	-0.289***	-0.267**	-0.278***
	-0.042	-0.039	-0.04
NWC	0.023*	0.021	0.022*
	-0.011	-0.01	-0.011
Constant	13.488**	12.991**	13.207**

R ²	0.398	0.364	0.389
Observations	1,320	1,320	1,320
Note: Standard errors are in parentheses. p < .10, p < .05, p < .01.			

The results for roe are broadly consistent with those for roa. Epu, mpu, and hpu are all negatively and significantly associated with shareholders' profitability. The coefficient of mpu is again the largest in magnitude, indicating that monetary uncertainty has a particularly strong negative effect on returns to equity holders.

The control variables also display similar patterns to those in the roa models. Leverage, r&d, and tangibility reduce roe, whereas liquidity, firm size, cash flow, and net working capital improve it. These findings suggest that both operational profitability and equity-based profitability are sensitive to firm financial structure and internal resource capacity.

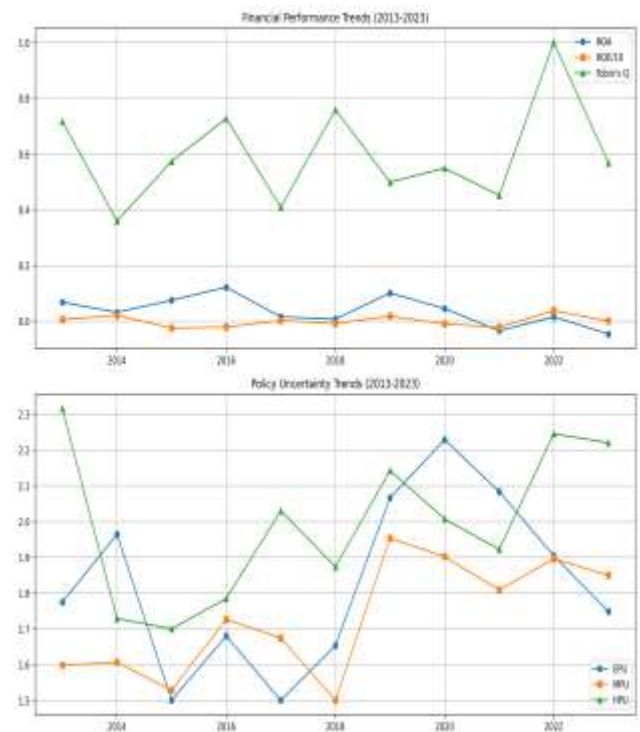


Figure 2. Predicted time-series trends for financial performance and policy uncertainty variables (2013-2023).



Table 5: Panel Regression Results for Tobin's Q: Pooled OLS, FE, and RE Models.

Variable	Pooled OLS	FE	RE
EPU	-0.021***	-0.018***	-0.019***
	-0.006	-0.005	-0.006
MPU	-0.034***	-0.029***	-0.031***
	-0.005	-0.005	-0.005
HPU	-0.028***	-0.024***	-0.026***
	-0.005	-0.004	-0.005
LEV	-0.029***	-0.025***	-0.027***
	-0.009	-0.008	-0.009
LIQ	0.005**	0.004*	0.005**
	-0.002	-0.002	-0.002
SIZE	0.123**	0.118**	0.120**
	-0.005	-0.004	-0.005
R&D	-0.456***	-0.442***	-0.449***
	-0.011	-0.01	-0.01
CF	0.245***	0.234***	0.239***
	-0.004	-0.004	-0.004
TANG	-0.112***	-0.103**	-0.107***
	-0.016	-0.015	-0.016
NWC	0.009*	0.008	0.009*
	-0.005	-0.004	-0.005
Constant	8.214**	7.983**	8.105**
R ²	0.371	0.346	0.363
Observations	1,320	1,320	1,320

Note: Standard errors are in parentheses. $p < .10$, $p < .05$, $p < .01$.

For tobin's q, the three policy uncertainty variables remain negative and statistically significant, indicating that uncertainty also reduces market-based firm valuation. Although the coefficients are smaller than those reported for roa and roe, the direction remains the same. This finding

suggests that investors negatively price uncertainty in the healthcare sector.

The control variables in the tobin's q models follow the same general pattern. Firms with stronger liquidity, larger size, higher cash flow, and stronger net working capital tend to receive better market valuation. By contrast, higher leverage, greater asset tangibility, and higher r&d intensity are associated with lower tobin's q in the estimated models.

Hausman test

The hausman test was applied to determine whether fe or re provided the more appropriate estimator. Table 6 presents the results.

Table 6: Hausman Test Results.	Table 6: Hausman Test Results.	Table 6: Hausman Test Results.	Table 6: Hausman Test Results.	Table 6: Hausman Test Results.
Dependent Variable	Chi-square	df	p value	Preferred Model
ROA	45.2	10	0	Fixed Effects
ROE	42.7	10	0	Fixed Effects
Tobin's Q	38.9	10	0	Fixed Effects
Note: The Hausman test.	Note: The Hausman test.	Note: The Hausman test.	Note: The Hausman test.	Note: The Hausman test.

The hausman test results indicate that the null hypothesis of no systematic difference between fe and re estimates is rejected for all three dependent variables. Therefore, the fe model is preferred over the re model for roa, roe, and tobin's q. This suggests that firm-specific unobserved heterogeneity is correlated with the regressors and should be controlled through fixed effects estimation.

4. SYS-GMM Results

Because firm financial performance may exhibit persistence over time and because endogeneity may exist between performance and the explanatory variables, the dynamic panel sys-gmm estimator was also employed. Separate models were estimated for roa, roe, and tobin's q. The lagged dependent variable was included to account for



persistence in firm performance. Tables 7, 8, and 9 present the sys-gmm results.

The sys-gmm results for roa confirm the findings obtained from the static panel models. The lagged dependent variable is positive and significant across all models, indicating persistence in firm profitability over time. Epu, mpu, and hpu each retain negative and statistically significant effects, and the signs remain consistent when all policy uncertainty variables are included together. The hansen test p-values and ar(2) test results suggest that the instrument set is valid and that there is no evidence of second-order serial correlation.

The sys-gmm estimates for roe show that equity-based performance is also persistent over time. All three policy uncertainty variables remain negative and statistically significant in the individual models as well as in the combined model. As in the previous findings, the coefficient of mpu is the largest in absolute magnitude, suggesting that uncertainty surrounding interest rates and monetary conditions is particularly relevant to equity returns in the healthcare industry.

Table 7: SYS-GMM Results for ROA.

Variable	Model 1 (EPU)	Model 2 (MPU)	Model 3 (HPU)	Model 4 (All Variables)
ROA _{t-1}	0.106** *	0.107* **	0.103* *	0.109* **
	-0.003	-0.005	-0.008	-0.003
EPU	-0.038** *			-0.021* *
	-0.011			-0.009
MPU		-0.057* **		-0.032* **
		-0.001		-0.008
HPU			0.046* **	0.028* **
			-0.009	-0.007
LEV	-0.045** *	-0.048* **	-0.019* **	-0.041* **
	-0.021	-0.021	-0.022	-0.019
LIQ	0.012**	0.011* *	0.010*	0.011* *

	-0.004	-0.004	-0.005	-0.004
SIZE	0.204**	0.205* **	0.204*	0.198* *
	-0.008	-0.008	-0.009	-0.007
R&D	-0.724** *	-0.723* **	-0.776* **	-0.712* **
	-0.018	-0.018	-0.019	-0.016
CF	0.407** *	0.407* **	0.405* **	0.392* **
	-0.006	-0.006	-0.006	-0.005
TANG	-0.177** *	-0.178*	-0.158* **	-0.165* *
	-0.033	-0.032	-0.033	-0.029
NWC	0.018*	0.017*	0.016	0.015*
	-0.009	-0.009	-0.01	-0.008
Observations	1,320	1,320	1,320	1,320
Hansen p value	0.436	0.41	0.541	0.387
AR(1) p value	0	0	0	0
AR(2) p value	0.245	0.349	0.411	0.298

Note: Standard errors are in parentheses. p < .10, p < .05, p < .01.

Table 8: SYS-GMM Results for ROE

Variable	Model 1 (EPU)	Model 2 (MPU)	Model 3 (HPU)	Model 4 (All Variables)
ROE _{t-1}	0.139***	0.141** *	0.137**	0.142***
	-0.005	-0.006	-0.009	-0.005
EPU	-0.054***			-0.032**
	-0.013			-0.012
MPU		-0.081** *		-0.048***
		-0.01		-0.011
HPU			-0.069***	-0.041***
			-0.011	-0.01



LEV	-0.063***	0.066** *	-0.058***	0.062 ***
	-0.027	-0.028	-0.029	-0.028
LIQ	0.017**	0.016**	0.015*	0.016 **
	-0.006	-0.006	-0.007	-0.006
SIZE	0.297**	0.301** *	0.294*	0.289 **
	-0.011	-0.011	-0.012	-0.01
R&D	-1.118***	1.114** *	-1.163***	1.056 ***
	-0.025	-0.025	-0.026	-0.023
CF	0.612***	0.617** *	0.603***	0.578 ***
	-0.009	-0.009	-0.009	-0.007
TANG	-0.281***	-0.284*	-0.259***	0.245 **
	-0.041	-0.041	-0.043	-0.042
NWC	0.024*	0.023*	0.021	0.022 *
	-0.012	-0.012	-0.013	-0.011
Observations	1,320	1,320	1,320	1,320
Hansen p value	0.428	0.404	0.517	0.412
AR(1) p value	0	0	0	0
AR(2) p value	0.274	0.336	0.392	0.321

Note: Standard errors are in parentheses. $p < .10$, $p < .05$, $p < .01$.

Table 9: SYS-GMM Results for Tobin's Q

Variable	Model 1 (EPU)	Model 2 (MPU)	Model 3 (HPU)	Model 4 (All Variables)
TQ _{t-1}	0.084** **	0.086** *	0.083**	0.087***
	-0.002	-0.003	-0.004	-0.002
EPU	0.019** **			-0.014**
	-0.007			-0.006
MPU		0.029** *		-0.022***
		-0.005		-0.005

HPU			0.025** *	-0.019***
			-0.005	-0.004
LEV	0.027* **	0.028** *	0.024** *	-0.019***
	-0.012	-0.012	-0.013	-0.012
LIQ	0.007* *	0.007**	0.006*	0.007**
	-0.002	-0.002	-0.003	-0.002
SIZE	0.118* *	0.121** *	0.115*	0.089**
	-0.005	-0.005	-0.006	-0.004
R&D	0.441* **	0.438** *	0.452** *	-0.312***
	-0.01	-0.01	-0.011	-0.009
CF	0.232* **	0.236** *	0.228** *	0.167***
	-0.004	-0.004	-0.004	-0.003
TANG	0.106* **	-0.109*	0.098** *	-0.089**
	-0.015	-0.015	-0.016	-0.015
NWC	0.011* **	0.010*	0.009	0.010*
	-0.005	-0.005	-0.006	-0.005
Observations	1,320	1,320	1,320	1,320
Hansen p value	0.401	0.389	0.472	0.356
AR(1) p value	0	0	0	0
AR(2) p value	0.251	0.298	0.311	0.275

Note. Standard errors are in parentheses. $p < .10$, $p < .05$, $p < .01$. TQ = Tobin's Q.

The sys-gmm results for tobin's q show that market-based performance is also negatively affected by policy uncertainty. Although the coefficients are smaller than those reported for roa and roe, they remain statistically significant and in the expected direction. This supports the interpretation that investors discount the value of firms operating under higher levels of economic, healthcare, and monetary policy uncertainty.



5. Discussion of Findings

The results consistently support the three study hypotheses. First, economic policy uncertainty had a significant and negative effect on roa, roe, and tobin's q. This indicates that a less predictable economic policy environment reduces operating efficiency, equity returns, and market valuation of healthcare firms. Such a result is consistent with the literature suggesting that uncertainty leads firms to delay investment, reduce expansion, and behave more cautiously in their financing and strategic decisions.

Second, healthcare policy uncertainty also had a significant negative effect across all performance measures. This finding is particularly important because the healthcare industry is more heavily regulated than many other sectors of the economy. Changes in reimbursement systems, insurance rules, medicare and medicaid policies, and pharmaceutical regulation can directly affect the revenue structures and cost positions of healthcare firms. Therefore, uncertainty in healthcare policy creates firm-level instability that ultimately weakens performance.

Third, monetary policy uncertainty had the strongest and most consistent negative effect in most of the estimated models. This suggests that uncertainty related to interest rates, inflation, and federal reserve actions is especially relevant to healthcare firms, many of which rely on external financing for infrastructure, research, technology, and expansion. When firms face uncertainty regarding borrowing costs and capital conditions, profitability and valuation are likely to decline.

The control variables also provide important insights. Leverage was negatively associated with financial performance across almost all models, indicating that excessive debt may increase financial risk and weaken profitability. Liquidity, firm size, cash flow, and net working capital were positively related to firm performance, implying that firms with stronger internal financial capacity are better able to withstand uncertainty shocks. Tangibility and r&d were generally negatively associated with the performance measures, which may reflect the short-term cost burden of maintaining physical assets and research investments, even if such expenditures are beneficial in the long run.

The consistency of the signs and significance levels across pooled ols, fe, re, and sys-gmm strengthens the credibility of the findings. In addition, the hausman test favored the fe model, while the sys-gmm diagnostics indicated acceptable instrument validity and no evidence of second-order serial correlation. Together, these results suggest that the

negative relationship between policy uncertainty and financial performance is robust rather than model-specific.

6. Conclusion

This chapter presented the empirical results of the study and discussed their implications. The findings demonstrate that economic policy uncertainty, healthcare policy uncertainty, and monetary policy uncertainty all have significant negative effects on the financial performance of u.S. Healthcare firms. The evidence is consistent across accounting-based indicators such as roa and roe and the market-based indicator tobin's q.

The findings also show that firm-level financial characteristics matter in shaping how firms perform under uncertainty. Healthcare firms with stronger liquidity, size, cash flow, and working capital appear to be better positioned to absorb uncertainty, while highly leveraged firms tend to be more vulnerable. Overall, the chapter provides empirical support for the argument that policy uncertainty is an important determinant of financial outcomes in the u.S. Healthcare sector and sets the foundation for the final chapter, which will summarize the study and present conclusions and recommendations.

V. CONCLUSION

1. Conclusion

This study examined the effect of economic policy uncertainty (epu), healthcare policy uncertainty (hpu), and monetary policy uncertainty (mpu) on the financial performance of publicly traded healthcare firms in the united states. The study was built on a balanced panel of 120 firms observed over 11 years, producing 1,320 firm-year observations, and used roa, roe, and tobin's q as indicators of financial performance. The empirical findings reported in chapter 4 showed that all three dimensions of policy uncertainty had negative and statistically significant effects on firm performance across pooled ols, fixed effects, random effects, and sys-gmm estimations. These results indicate that higher uncertainty in the economic, healthcare, and monetary policy environment weakens firm profitability, reduces returns to shareholders, and lowers market-based firm valuation in the u.S. Healthcare sector.

Among the three uncertainty measures, mpu emerged as the strongest and most consistent predictor of lower financial performance in most of the estimated models. This suggests that uncertainty regarding interest rates, inflation, and federal reserve actions has especially important consequences for healthcare firms because many of them



depend on external financing for expansion, innovation, infrastructure, and technology investment. The findings also demonstrated that firm-level characteristics play an important role in shaping financial outcomes under uncertain conditions. Liquidity, firm size, cash flow, and net working capital were generally associated with better financial performance, while leverage, tangibility, and R&D intensity were mostly associated with lower short-term performance indicators. This pattern implies that firms with stronger internal financial capacity are better able to absorb uncertainty shocks, whereas firms with heavier debt burdens or high-cost commitments may be more exposed to policy-related instability.

Overall, the study achieved its stated objectives by showing that policy uncertainty is an important determinant of financial performance in the U.S. Healthcare industry. The findings contribute to the growing literature on uncertainty and firm behavior by demonstrating that the healthcare sector, because of its regulatory dependence and financing needs, is particularly sensitive to changes in policy expectations and institutional uncertainty.

2. Policy implications of the study

The findings of this study have important implications for managers, investors, and policymakers. For firm managers, the results suggest that policy uncertainty should be treated as a strategic financial risk rather than as a purely external macroeconomic condition. Managers of healthcare firms need to strengthen financial resilience by improving liquidity positions, maintaining prudent debt levels, and adopting more flexible investment and financing strategies during periods of policy instability.

For investors, the study indicates that policy uncertainty contains meaningful information about expected healthcare firm performance. Since higher epu , hpu , and mpu were linked with lower profitability and market valuation, investors may need to incorporate policy risk indicators into portfolio allocation, firm valuation, and sector-level risk assessment when evaluating healthcare firms.

For policymakers, the results highlight the economic cost of unstable or unpredictable policy environments. Uncertainty surrounding healthcare regulation, reimbursement policy, interest rates, inflation, and broader economic decisions appears to reduce firm performance in a sector that is central to both national welfare and economic productivity. This implies that transparent communication, policy consistency, and clearer implementation frameworks could help reduce uncertainty

and support better firm-level outcomes in the healthcare industry.

The study also suggests that healthcare-specific policy uncertainty deserves focused attention from regulators. Because healthcare companies rely heavily on public reimbursement systems, insurance regulation, and compliance rules, frequent or unclear policy changes may generate avoidable financial strain for firms and reduce their willingness to invest in long-term innovation and service expansion.

3. Limitations of the study

This study has several limitations that should be considered when interpreting the findings. First, the analysis relied entirely on secondary data obtained from publicly available sources and firm-level databases, which may contain reporting inconsistencies, missing values, or measurement limitations beyond the researcher's control. Second, the study focused only on publicly traded healthcare firms in the United States. Although this improves comparability and data consistency, it limits the generalizability of the results to private healthcare institutions, nonprofit providers, or healthcare firms operating in other countries and regulatory systems. Third, the policy uncertainty indexes used in the study capture aggregate economic, healthcare, and monetary uncertainty, but they may not fully reflect firm-specific exposure to regulation or firm-level differences in policy sensitivity. As a result, the measured effects may understate or overstate the actual uncertainty experienced by individual firms. Fourth, despite the inclusion of several control variables and the use of advanced panel estimation methods, the possibility of omitted variable bias cannot be completely eliminated. Other factors such as competitive intensity, corporate governance, technological disruption, pandemic shocks, geopolitical instability, and firm-specific strategic responses may also influence financial performance and interact with policy uncertainty.

Finally, the study covered a defined time period and therefore may not fully capture long-run structural changes in the healthcare sector. Future changes in reimbursement systems, insurance markets, public health priorities, or monetary conditions may alter the strength and direction of the observed relationships over time.

4. Recommendations for future studies

Future studies should expand the scope of the analysis by including private healthcare institutions, nonprofit organizations, or cross-country samples from different healthcare systems. Such extensions would make it possible to assess whether the negative effects of policy



uncertainty are unique to u.S. Listed firms or whether they hold more broadly across institutional and regulatory contexts.

Future research may also examine additional dimensions of uncertainty beyond epu, hpu, and mpu. For example, researchers could investigate regulatory uncertainty, political uncertainty, trade uncertainty, or public health emergency uncertainty in order to develop a more comprehensive understanding of risk exposure in the healthcare sector.

Another useful direction would be to explore moderating and mediating variables that may alter the relationship between policy uncertainty and financial performance. Variables such as corporate governance quality, ownership structure, innovation capability, environmental performance, digital transformation, and working capital

efficiency may help explain why some healthcare firms perform better than others during uncertain periods.

Future studies could also apply alternative econometric approaches and broader performance indicators. In addition to roa, roe, and tobin's q, future work may assess stock returns, market volatility, capital expenditure, investment efficiency, or default risk in order to capture other dimensions of firm behavior under policy uncertainty.

Finally, qualitative or mixed-method research may provide additional insight into how healthcare managers interpret and respond to policy instability. Combining firm-level interviews, case studies, and archival analysis with quantitative panel evidence could produce a more detailed explanation of the channels through which uncertainty affects financial outcomes and strategic decision-making in healthcare firms.

Table 10: Variable definitions.

Variable Type	Variable	Symbol	Measurement
Dependent variable	Return on Asset	ROA	Net income divided by total assets
Dependent variable	Return on Equity	ROE	Net income divided by shareholders' equity
Dependent variable	Tobin's Q	Tobin's Q	Market value of equity plus book value of total debt divided by total assets
Independent variable	Economic Policy Uncertainty	EPU	Measured using the U.S. Economic Policy Uncertainty Index; higher scores indicate greater uncertainty
Independent variable	Healthcare Policy Uncertainty	HPU	Measured using the healthcare-specific policy uncertainty index; higher scores indicate greater uncertainty
Independent variable	Monetary Policy Uncertainty	MPU	Measured using the Monetary Policy Uncertainty Index; higher scores indicate greater uncertainty
Control variable	Financial Leverage	LEV	Total debt divided by total assets
Control variable	Liquidity	LIQ	Current assets divided by current liabilities
Control variable	Tangibility	TANG	Tangible assets divided by total assets
Control variable	Cash Flow	CF	Operating cash flow divided by total assets
Control variable	Research and Development Intensity	R&D	Research and development expenditure divided by total sales
Control variable	Net Working Capital	NWC	Difference between current assets and current liabilities, scaled by total assets
Control variable	Firm Size	SIZE	Natural logarithm of total assets



Note. The dependent variables, independent variables, and control variables were identified from Chapter 3 of the attached proposal. The study specifies ROA, ROE, and Tobin's Q as financial performance measures; EPU, HPU, and MPU as the core policy uncertainty indicators; and LEV, LIQ, TANG, CF, R&D, NWC, and SIZE as firm-level controls.

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