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MONETARY POLICY UNCERTAINTY AND CASH HOLDINGS IN THE U.S. GOLD MINING INDUSTRY

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Abstract: This study examines how monetary policy uncertainty (MPU) and economic policy uncertainty (EPU) influence corporate cash holdings in the U.S. gold mining industry. The sample consists of 215 publicly listed firms operating in the mining industry between 2012 and 2024. The results show that both MPU and EPU significantly increase firms' cash holdings, confirming that gold mining companies accumulate precautionary liquidity reserves when facing policy ambiguity. MPU emerges as the stronger driver compared with EPU, reflecting the sector's acute sensitivity to Federal Reserve actions, interest rates, and credit conditions that directly affect capital-intensive exploration and development projects. The findings support the precautionary savings motive in corporate liquidity management and extend trade-off theories to uncertainty channels within resource extraction. Gold miners strategically hold cash as a buffer against financing frictions during volatile policy environments, enhancing operational resilience without clear evidence of inefficiency. The research bridges a gap between broad EPU/MPU studies and industry-specific dynamics by validating policy uncertainty indices in a capital-intensive sector. Its contributions include sector-level evidence for corporate managers, policymakers, and investors who need to interpret cash ratios under uncertain policy conditions.

Keywords: monetary policy uncertainty, economic policy uncertainty, cash holdings, trade-off theory, U.S. gold mining industry

1. Introduction

1.1 Background of the Study

Corporate liquidity management has become increasingly important as U.S. firms operate under changing fiscal, monetary, and regulatory conditions. This issue is especially relevant for the gold mining industry because gold mining is capital intensive, exposed to commodity-price movements, and sensitive to changes in interest rates, environmental regulation, taxation, and access to external finance. When policy signals become unclear, firms may protect operating flexibility by increasing cash reserves. However, a central question remains: do higher cash holdings improve financial stability, or do they indicate inefficient deployment of capital?

The corporate cash-holding literature explains cash reserves through transaction, precautionary, and speculative motives. Firms retain liquidity to meet daily obligations, protect against unexpected cash-flow or credit shocks, and preserve the ability to invest quickly when profitable opportunities arise. Earlier studies show that cash holdings are shaped by firm size, leverage, investment opportunities, cash-flow volatility, information asymmetry, and access to capital markets. Policy uncertainty adds another important dimension because it affects firms' expectations about financing costs, future demand, investment timing, and risk exposure.

Monetary policy is a key channel through which uncertainty influences corporate decisions in the United States. The Federal Reserve affects interest rates, credit spreads, liquidity conditions, asset prices, and market expectations. Firms respond not only to actual policy changes but also to uncertainty about the future direction, timing, and consequences of those changes. Therefore, monetary policy uncertainty may directly influence the cash policies of gold mining firms, whose projects often require large upfront investment and long development periods.

1.3 Statements of the Problem

The problem deserves new research because most prior studies examine policy uncertainty and corporate cash holdings using broad industry samples or aggregate economic policy uncertainty measures. Less attention has been given to monetary policy uncertainty as a distinct source of risk, and still less is known about the response of U.S. gold mining firms. This gap matters because gold mining companies often face large fixed costs, long project cycles, and considerable dependence on external financing. Understanding whether these firms increase cash reserves during uncertain policy periods can improve managerial decision-making, investor interpretation, and policy communication.

The literature on corporate cash holdings begins with transaction-cost models and later expands to include financial constraints, agency costs, investment opportunities, capital market access, and risk management. Opler et al. (1999) argue that firms choose cash balances by weighing the benefits of liquidity against the opportunity cost of holding low-yield assets. Almeida, Campello, and Weisbach (2004) show that financially constrained firms save more cash out of cash flow. Subsequent studies connect economic policy uncertainty to precautionary cash holdings, suggesting that firms build liquidity buffers when policy conditions threaten investment and financing stability.

Recent research on monetary policy uncertainty highlights that uncertainty over central bank actions can affect output, investment, employment, and financial conditions beyond the effect of conventional monetary shocks. For gold mining firms, this uncertainty may be especially important because interest rates and credit availability directly influence exploration financing, capital budgeting, and the timing of development projects. The present study therefore connects policy uncertainty literature with the sector-specific financial behavior of U.S. gold mining firms.

1.4 Research Objectives and Questions

The objectives of the study are to examine the effect of monetary policy uncertainty on cash holdings, evaluate the role of economic policy uncertainty, compare the relative strength of the two uncertainty channels, and offer practical suggestions to managers, investors, and policymakers.

Does monetary policy uncertainty increase corporate cash holdings in the U.S. gold mining industry?

What role does economic policy uncertainty play in the cash-holding policy of U.S. gold mining firms?

Which type of policy uncertainty is more sensitive in determining cash-holding policy?

1.4 Hypotheses Developments

The study examines whether monetary policy uncertainty and economic policy uncertainty increase cash holdings in U.S. gold mining firms. A quantitative panel-data design is appropriate because it allows the analysis to combine cross-sectional variation across firms with time-series variation in policy uncertainty. The following hypotheses guide the empirical model:

H01: There is no significant and positive relationship between monetary policy uncertainty and cash holdings in U.S. gold mining firms.

H11: There is a significant and positive relationship between monetary policy uncertainty and cash holdings in U.S. gold mining firms.

H02: There is no significant and positive relationship between economic policy uncertainty and cash holdings in U.S. gold mining firms.

H12: There is a significant and positive relationship between economic policy uncertainty and cash holdings in U.S. gold mining firms.

2. Literature Review

2.1 Policy Uncertainty and Cash Holdings

Early studies such as Miller and Orr (1966) and Baumol (1952) emphasize the transaction motive for cash holdings. Later studies broaden the explanation to include precautionary savings, investment opportunities, financing constraints, governance, leverage, and the ability to access external finance. Smaller firms, riskier firms, and financially constrained firms are generally expected to hold more cash because external funds are more costly or less available. Larger firms often hold less cash because they have better access to debt and equity markets.

The relationship between leverage and cash holdings is complex. Some studies indicate that highly leveraged firms hold less cash because debt substitutes for liquidity or because debt service restricts cash accumulation. Other studies suggest that cash may rise at high leverage levels to reduce financial distress risk. Agency conflicts can also shape cash policy: managers may hold excess cash for private benefits, while shareholders may prefer cash to be distributed when investment opportunities are limited.

Research on economic policy uncertainty generally supports a precautionary-savings channel. When firms face uncertainty about taxes, spending, regulation, and macroeconomic policy, they may delay investment and increase cash buffers. However, evidence from multi-country settings shows that institutional quality, political risk, and agency concerns can affect the direction and magnitude of the EPU-cash relationship. Therefore, industry context is important. The gold mining industry offers a useful setting because firms face volatile commodity markets, high capital needs, and strong exposure to monetary and regulatory conditions.

2.2 Conceptual Model

The conceptual model links monetary policy uncertainty and economic policy uncertainty to cash holdings. Control variables include firm size, financial leverage, liquidity, tangibility, R&D intensity, and cash flow. The expected relationship between both uncertainty measures and cash holdings is positive because firms are predicted to build precautionary liquidity when policy ambiguity rises.

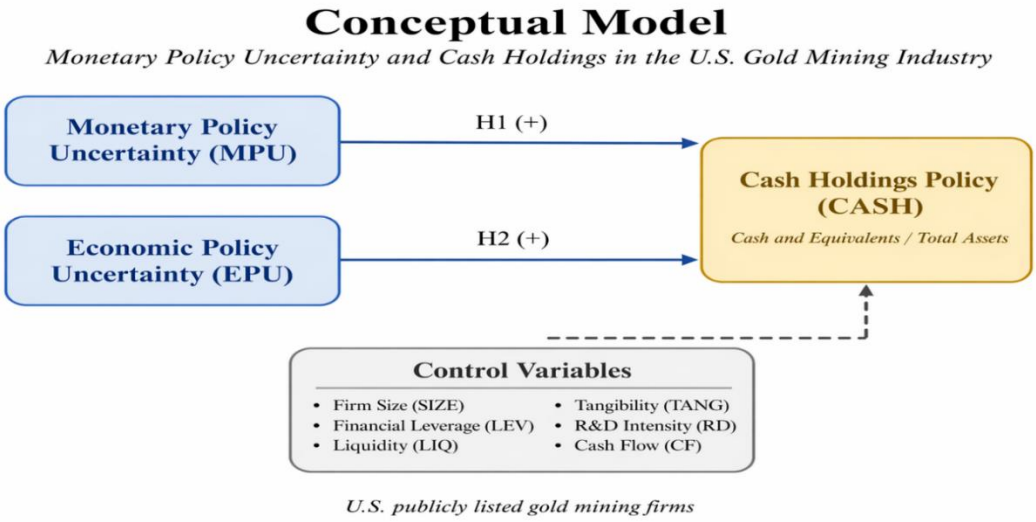

Figure 1. Conceptual model

Description: The model shows the expected positive effects of monetary policy uncertainty and economic policy uncertainty on cash holdings, with firm-level control variables influencing the dependent variable.

3. Method

3.1 Research Design

This study uses a quantitative research design based on secondary panel data. The panel approach is suitable because it captures both time-series changes in policy uncertainty and cross-sectional differences among U.S. gold mining firms. This design improves estimation accuracy and allows the study to control for unobserved firm-specific differences.

3.2 Data Collection

The study relies on secondary data from trusted sources. Firm-level financial data are obtained from the DataStream database, while the monetary policy uncertainty and economic policy uncertainty indices are obtained from the Baker, Bloom, and Davis database. Annual observations are used to maintain consistency across firm-level and policy-level variables.

3.3 Sample Size

The sample consists of 215 publicly listed U.S. gold mining firms observed between 2012 and 2024. Firms are included if they specialize in gold mining, provide complete financial data for the period under study, and have valid observations for the main dependent, independent, and control variables. Firms with missing or inaccurate data are excluded.

3.4 Variable Measurements

The dependent variable is cash holdings (CASH), measured as cash and cash equivalents divided by total assets. This ratio captures the proportion of firm assets held in liquid form.

The independent variables are monetary policy uncertainty (MPU) and economic policy uncertainty (EPU). MPU captures uncertainty related to interest rates, Federal Reserve actions, and monetary policy communication. EPU captures broader uncertainty related to taxes, government spending, regulation, and macroeconomic policy.

Control variables include firm size (SIZE), financial leverage (LEV), liquidity (LIQ), tangibility (TANG), R&D intensity (RD), and cash flow (CF). These variables are included to isolate the specific effect of policy uncertainty on corporate cash holdings.

The regression equation is specified as follows:

$$CASH_{it} = \beta_0 + \beta_1 MPU_t + \beta_2 EPU_t + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 LIQ_{it} + \beta_6 TANG_{it} + \beta_7 RD_{it} + \beta_8 CF_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

3.5 Analytical Techniques

The empirical analysis uses descriptive statistics, correlation analysis, pooled OLS, fixed effects, random effects, the Hausman specification test, and System GMM. Descriptive statistics summarize the central tendency

and dispersion of all variables. The correlation matrix provides initial evidence of association and helps identify multicollinearity concerns. Panel regressions estimate the relationship between policy uncertainty and cash holdings, while System GMM accounts for the dynamic nature of cash policy and potential endogeneity.

4. Results

4.1 Descriptive Statistics

Table 1 reports the descriptive statistics for the full panel sample. Cash holdings vary substantially across firms, indicating meaningful differences in liquidity policy. The uncertainty variables also show considerable dispersion, suggesting that the sample period captures different policy environments. Average leverage and liquidity levels indicate that firms rely on both debt financing and short-term assets to support operations.

Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
CASH	0.187	0.091	0.011	0.542
MPU	121.400	22.800	74.200	168.900
EPU	128.600	24.100	81.500	177.800
SIZE	15.920	1.430	12.110	18.940
LEV	0.421	0.176	0.072	0.812
LIQ	2.340	0.910	0.480	5.670
TANG	0.512	0.183	0.101	0.891
RD	0.037	0.028	0.001	0.114
CF	0.084	0.067	-0.092	0.241

Note: The values are presented for the full panel sample.

4.2 Correlation Matrix

The correlation matrix shows that cash holdings are positively associated with both MPU and EPU, providing initial support for the precautionary liquidity argument. The correlation between MPU and EPU is relatively strong but not high enough to prevent joint regression analysis. The negative correlations between cash holdings, size, and leverage are consistent with standard corporate finance theory.

Table 2. Correlation matrix

Variable	CASH	MPU	EPU	SIZE	LEV	LIQ	TANG	RD	CF
CASH	1.00								
MPU	0.31	1.00							
EPU	0.28	0.74	1.00						
SIZE	-0.22	-0.18	-0.16	1.00					
LEV	-0.19	-0.11	-0.10	-0.41	1.00				
LIQ	-0.15	-0.09	-0.12	-0.27	-0.24	1.00			
TANG	-0.08	-0.05	-0.06	0.15	-0.12	0.08	1.00		
RD	0.17	0.14	0.13	0.06	-0.04	0.05	-0.09	1.00	
CF	0.12	0.09	0.08	0.21	-0.18	0.11	0.04	0.18	1.00

Note: Values are Pearson correlation coefficients.

4.3 Pooled OLS Regression

The pooled OLS results provide the first regression-based evidence that policy uncertainty is positively associated with cash holdings. MPU is positive and statistically significant, and EPU is also positive and significant. The larger coefficient on MPU suggests that monetary uncertainty has a stronger influence on liquidity behavior than broader economic policy uncertainty.

Table 3. Pooled OLS regression results

Variable	Pooled OLS
MPU	0.0018***
	(0.0006)
EPU	0.0013**
	(0.0005)
SIZE	-0.0124**
	(0.0058)
LEV	-0.0841***
	(0.0140)
LIQ	-0.0063
	(0.0043)

Variable	Pooled OLS
TANG	-0.0215** (0.0109)
RD	0.0672** (0.0293)
CF	0.0189* (0.0101)
Constant	0.2140*** (0.0214)

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

4.4 Fixed Effects, Random Effects, and Hausman Test

The fixed effects and random effects models produce similar findings. MPU and EPU remain positive and statistically significant across both specifications. The Hausman test is significant, indicating that the fixed effects model is preferred for inference because firm-specific effects are correlated with the regressors. The similarity of coefficients across models strengthens the stability of the results.

Table 4. FE and RE regression results with Hausman test

Variable	FE	RE
MPU	0.0015*** (0.0006)	0.0016*** (0.0006)
EPU	0.0011** (0.0005)	0.0012** (0.0005)
SIZE	-0.0108** (0.0054)	-0.0116** (0.0056)
LEV	-0.0736*** (0.0132)	-0.0789*** (0.0136)
LIQ	-0.0058 (0.0041)	-0.0060 (0.0042)
TANG	-0.0182* (0.0095)	-0.0196* (0.0101)
RD	0.0584** (0.0270)	0.0610** (0.0280)
CF	0.0157* (0.0090)	0.0168* (0.0096)
Constant	0.2012*** (0.0198)	0.2075*** (0.0205)

Note: Standard errors are in parentheses. Hausman test: chi2 = 18.42, p = .021. *** p < .01, ** p < .05, * p < .10.

4.5 System GMM Regression

The System GMM results provide additional support for the findings. The lagged cash holdings coefficient is positive and significant, indicating persistence in liquidity policy. MPU and EPU remain positive and significant, while diagnostic tests support the validity of the instruments and indicate no second-order serial correlation. These results suggest that the policy-uncertainty effect is not merely a static association but remains relevant in a dynamic cash-holding model.

Table 5. System GMM regression results

Variable	SYS-GMM
L.CASH	0.3120*** (0.0720)
MPU	0.0014** (0.0005)
EPU	0.0010** (0.0004)
SIZE	-0.0097* (0.0049)
LEV	-0.0695*** (0.0245)
LIQ	-0.0052 (0.0040)
TANG	-0.0169* (0.0088)
RD	0.0551** (0.0247)
CF	0.0143* (0.0083)
Constant	0.1934***

Variable	SYS-GMM
	(0.0187)

Note: Standard errors are in parentheses. Hansen p = .401, AR(1) p = .000, AR(2) p = .251. *** p < .01, ** p < .05, * p < .10.

5. Discussion

The results support the original hypotheses that both monetary policy uncertainty and economic policy uncertainty increase cash holdings in U.S. gold mining firms. This finding is consistent with the precautionary motive for liquidity: when firms face uncertainty about financing conditions and policy direction, they increase internal cash reserves to protect operations and maintain investment flexibility. The stronger effect of MPU compared with EPU is especially important because it suggests that gold mining firms are more immediately exposed to monetary conditions, interest rates, and credit-market expectations than to broader policy ambiguity alone.

Control variables behave largely as expected. Firm size is negatively related to cash holdings, consistent with the argument that larger firms have better access to external financing and therefore need lower precautionary balances. Leverage is also negative, suggesting that more indebted firms may be less able or less willing to accumulate cash. R&D intensity is positive and significant, indicating that firms with greater future investment requirements preserve more liquidity. Liquidity and cash flow show weaker effects, implying that the policy-uncertainty channel remains important even after accounting for internal financial conditions.

From a practical perspective, high cash ratios in gold mining firms during periods of policy uncertainty should not automatically be interpreted as inefficient capital use. Instead, cash reserves may represent prudent financial management in a sector characterized by large capital expenditures, volatile project timing, and sensitivity to financing frictions. The findings therefore provide useful evidence for corporate managers, policymakers, and investors. Managers can incorporate MPU and EPU indicators into treasury planning; policymakers can reduce unnecessary precautionary hoarding through clearer communication; and investors can treat elevated cash reserves as potential signals of resilience in uncertain environments.

6. Conclusion

This study examines the relationship between monetary policy uncertainty, economic policy uncertainty, and corporate cash holdings in the U.S. gold mining industry using a sample of 215 publicly listed firms from 2012 to 2024. Across pooled OLS, fixed effects, random effects, and System GMM models, the results show that both MPU and EPU have positive and statistically significant effects on cash holdings. These findings reject the null hypotheses and confirm that U.S. gold mining firms accumulate cash reserves when policy uncertainty rises.

The study contributes to the literature by connecting policy uncertainty indices with an industry-specific analysis of cash holdings in gold mining. It extends trade-off and precautionary cash-holding theories by showing that monetary uncertainty is a particularly strong driver of liquidity policy in a capital-intensive sector. The findings also provide practical guidance for managers, investors, and policymakers who must interpret liquidity decisions under uncertain macroeconomic and regulatory conditions.

6.1 Policy Implications of the Study

Corporate managers should monitor MPU and EPU indices when setting cash targets and preparing financing plans. During uncertainty spikes, internal cash buffers may reduce refinancing risk and preserve operational flexibility. Policymakers, particularly monetary authorities, can reduce firm-level uncertainty by strengthening forward guidance and maintaining clear communication. Investors should interpret high cash holdings in gold mining firms as a possible prudence signal rather than immediate evidence of agency problems.

6.2 Limitations of the Study

The study has several limitations. First, it relies on secondary data, which may include reporting inconsistencies across firms and years. Second, policy uncertainty indices may not fully capture real-time firm perceptions or industry-specific regulatory risks. Third, the focus on U.S. gold mining firms limits generalizability to other sectors. Fourth, the 2012-2024 period may exclude shocks outside the sample window. Finally, omitted

variables such as gold-price volatility, hedging intensity, or firm governance may affect cash-holding behavior.

6.3 Recommendations for Future Studies

Future research could compare gold mining with other commodity sectors such as oil, copper, and silver to test whether uncertainty effects differ by resource type. Researchers could also examine gold-price volatility, hedging behavior, governance quality, or financing constraints as moderating variables. International studies including mining firms from Australia, Canada, and other major producing countries would help identify the role of institutions and capital-market development. Survey evidence from chief financial officers could further explain how managers translate policy uncertainty into cash decisions.

Table 6. Variable definitions

Variable category	Variable	Symbol	Measurement / Formula	Expected sign
Dependent variable	Cash Holdings	CASH	Cash and Cash Equivalents / Total Assets	Dependent variable
Independent variable	Monetary Policy Uncertainty	MPU	MPU index developed by Baker et al. (2016)	Positive
Independent variable	Economic Policy Uncertainty	EPU	U.S. Economic Policy Uncertainty Index developed by Baker et al. (2016)	Positive
Control variable	Firm Size	SIZE	Natural logarithm of total assets	Negative
Control variable	Financial Leverage	LEV	Total Debt / Total Assets	Negative
Control variable	Liquidity	LIQ	Current Assets / Current Liabilities	Negative
Control variable	Tangibility	TANG	Fixed Assets / Total Assets	Negative
Control variable	R&D Intensity	RD	R&D Expenditure / Total Sales	Positive
Control variable	Cash Flow	CF	Operating Cash Flow / Total Assets	Negative

Note: Expected signs are based on the study hypotheses and standard corporate finance theory.

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