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The Role of Corporate Cash Holdings in the Transmission of Monetary Policy Tightening

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Abstract

The U.S. economy has been exceeding expectations amid one of the most aggressive monetary policy tightening cycles. This paper provides firm-level evidence showing that abundant cash holdings enable firms to benefit from higher interest rates, thereby reducing net interest payments and mitigate the adverse impact from interest rate hikes to firms' investment and employment.

1 Introduction

Despite the rapid monetary policy tightening, the U.S. economy has demonstrated remarkable resilience over the past few years, fueling the debate about whether this is due to a potential shift in the monetary policy transmission mechanism or unprecedented economic conditions (e.g., Waller (2023), Barrett and Platzer (2024)). This note focuses on the resilience of the U.S. non-financial corporate sector, particularly the role of cash holdings in insulating firms from the impact of higher interest rates on real activities like investment and employment, through the balance sheet channel.

Prior to the rate hikes that began in 2022, non-financial corporations managed to increase their holdings of liquid assets by approximately 2 percent of total assets during the pandemic (Figure 1). Meanwhile, they locked in low rates for long maturity debt, thereby reducing their exposure to interest rate hikes (IMF (2024*c*)). These contributed to an exceptional feature[1] of the latest tightening cycle: net interest payments by the U.S. non-financial corporations almost halved—

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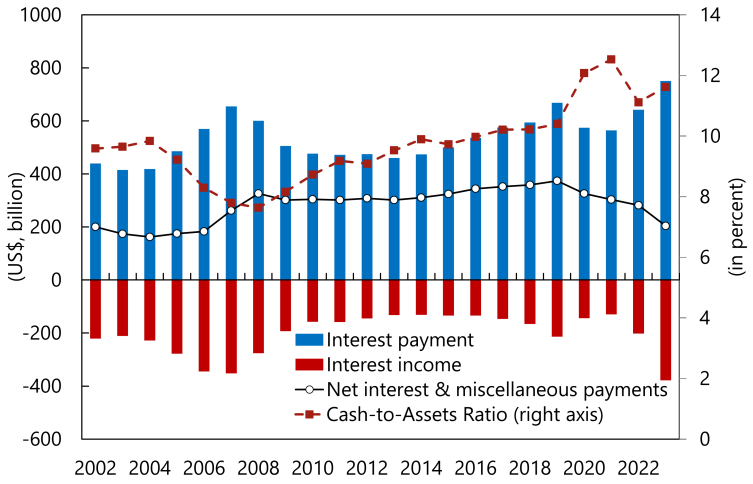
[1]Similarly, IMF (2024*a*) document limited impact on corporate net interest costs from the monetary policy rate hikes of 2022 and 2023 in the Asia-Pacific region.

despite the rapid rise in the federal funds rate—in contrast with previous tightening episodes, where net interest payments grew in proportion to the federal funds rate (Figure 2).

In this context, we examine how corporate cash holdings have affected the transmission of monetary policy tightening. Analysis of firm-level data reveals two key results. First, the decline in net interest payments is primarily due to higher corporate cash balances. Second, the negative correlation between policy rate and firms' net interest payments has significant implications for monetary transmission and the real economy. Since 2020, firms with high cash holdings have increased their capital spending and hiring relative to similar firms with lower cash. These suggest that corporate investment and employment have been partially insulated from monetary policy tightening, largely due to the cash accumulation during the pandemic.

FIGURE 1 Interest Payment, Interest Income, and Liquid Assets of Non-Financial Corporations



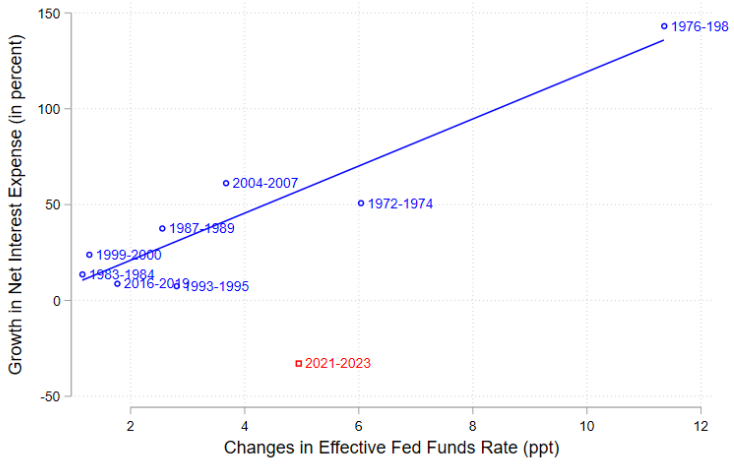
Notes: This figure shows the time-series changes in aggregate interest payments, interest income, and cash-to-assets ratio for the U.S. non-financial corporations. Cash-to-assets ratio is measured as the share of liquid assets in total assets.

Sources: Bureau of Economic Analysis and Board of Governors of the Federal Reserve System.

This paper is closely related to the literature on the state-dependent impact of monetary policy at firm-level, varying by the liability structure and cash flows of firms (e.g., Ippolito, Ozdagli and Perez-Orive (2018)), Gürkaynak, Karasoy-Can and Lee (2022), and Jeenas (2024)). There is also an emerging literature on the economic performance of the U.S. during the post-pandemic interest rate hiking, focusing on the role of abundant cash reserves (Tawiah and O'Connor Keefe (2022), Zheng (2022), Bräuning, Fillat and Joaquim (2023)), fixed-rate mortgages (IMF (2024*b*)), tight labor market (Cohen (2023)), resilient private consumption (Dao, Jirasavetakul and Zhou (2024)),

and debt servicing cost (Bräuning, Joaquim and Stein (2023) and Kitsul, Lang and Samadi (2023)). This paper complements these studies by analyzing the monetary policy transmission via the lens of firm's balance sheet, offering a clear look into how interest rate hikes pass through into interest income and expense, evaluating the role of cash holdings and the consequent implication on the investment and employment decisions of firms.

FIGURE 2 Net Interest Expenses Growth during Monetary Policy Tightening Phases



Notes: This figure plots the growth of aggregate net interest expenses for non-financial corporations (y-axis) against changes in the effective federal funds rate during monetary policy tightening cycles (x-axis). The blue solid line represents the OLS fitted line from previous tightening cycles, excluding the 2021-2023 episode.

Sources: Board of Governors of the Federal Reserve System and Haver Analytics.

2 Data

We use firm-level balance sheet data from S&P Global's Capital IQ database (CIQ), covering the period from 2010 to 2023. We chose CIQ as our data source because it provides interest income information for both domestic and multinational firms.Moreover, CIQ's debt structure data offers detailed information on debt characteristics including the share of floating-rate and fixed-rate debt. Our analysis focuses on U.S.-headquartered firms, excluding those with North American Industry Classification System (NAICS) codes beginning with 52 ("Finance and Insurance") to ensure the sample consists only of non-financial firms, resulting in a dataset of approximately 23,000 firm-year observations across about 3,300 firms. Summary statistics for the main variables used in the analysis are provided in Table 1.

TABLE 1 Summary Statistics

	Mean	Median	SD	Count
Interest Income	0.023	0.001	0.139	23905
Interest Expense	0.108	0.015	0.290	23905
Current Asset	2.465	0.321	9.541	23712
Cash-to-Asset Ratio	0.419	0.367	0.298	23587
Total Debt	2.947	0.333	9.349	23738
Fixed-Rate Debt/Total Debt	0.642	0.721	0.309	15367
Capital Expenditure	0.427	0.034	1.643	20798
Total Employment	15.92	1.590	79.11	16728

Note: The summary statistics are expressed in billions of USD, with "Total Employment" representing the number of employees in thousands and "cash-to-asset ratio" and "fixed-rate debt to total debt ratio" as share between 0 and 1. Cash is measured by the "IQ_CASH_ST_INVEST" variable in the database, which encompasses cash on hand, readily convertible deposits, securities, other short-term investments, and debt and equity securities intended for profit generation rather than long-term holding or capital appreciation.

3 Empirical Evidence

3.1 Interest income

We begin by estimating the effect of corporate cash holdings on interest income based on the specification below:

$$\begin{aligned}\ln InterestIncome_{it} &= \beta_1 \ln CurrentAssets_{it-1} + \beta_2 FFR_t + \beta_3 CashToAssets_{it-1} \\ &+\beta_4 (FFR_t \times CashToAssets_{it-1}) + \psi_i + \epsilon_{it},\end{aligned} \tag{1}$$

where the dependent variable is the log of interest income ($\ln InterestIncome_{it}$). Considering that interest income is essentially a function of interest rate and current assets, independent variables include the effective federal funds rate (FFR_t) and the log of one-year lagged current assets ($\ln CurrentAssets_{it-1}$). ψ_i denotes firm fixed effects. The coefficient of primary interest is β_4, associated with the interaction term between the effective federal funds rate and the one-year lagged cash-to-assets ratio ($FFR_t \times CashToAssets_{it-1}$). This coefficient indicates the extent to which cash holdings affect the semi-elasticity of interest income with respect to interest rates.

Estimation results show that cash holdings significantly increase the rise in interest income when policy rate tightens. Column (1) in Table 2 estimates the plain vanilla relationship between interest income, current assets, and interest rate: one percent growth in current assets and one percentage point increase in FFR would translate to 0.8 and 0.3 percent growth in interest income, respectively.

TABLE 2 Baseline Estimation Results: Interest Income

Dependent variable: $\ln InterestIncome_{it}$	(1)	(2)	(3)	(4)
$\ln CurrentAssets_{it-1}$	0.808***	0.743***	0.792***	0.733***
	(0.045)	(0.045)	(0.029)	(0.030)
FFR_t	0.330***	0.214***	0.363***	0.195***
	(0.011)	(0.018)	(0.008)	(0.014)
$CashToAssets_{it-1}$		0.422***		0.428***
		(0.152)		(0.115)
$FFR_t \times CashToAssets_{it-1}$		0.398***		0.437***
		(0.043)		(0.025)
Observations	8,413	8,413	18,864	18,771
Adj.R-squared	0.869	0.874	0.872	0.877
Firm FE	Yes	Yes	Yes	Yes
Balanced Sample	Yes	Yes	No	No

Note: This table summarizes the baseline estimation results on the effect of corporate cash holdings on interest income. The dependent variable is the log of interest income. Independent variables include the effective federal funds rate, the cash-to-assets ratio, their interaction term, and the log of lagged current assets. The first two columns are based on a balanced sample, restricted to firms with complete information throughout the sample period, while the last two columns use an unbalanced sample. All columns include firm fixed effects. Standard errors, clustered at the firm level, are shown in parentheses. Significance: * 10 percent; ** 5 percent; *** 1 percent.

Column (2) further reveals that interest income increases with the cash-to-assets ratio, and this effect becomes more pronounced as interest rates rise. This confirms that, during periods of rapid monetary policy tightening, firms with a larger portion of their assets in cash—probably parked in money market funds—benefit more from rising short-term interest rates and gain a greater interest income. The estimated coefficient suggests that a firm with a cash-to-assets ratio 2 percentage points higher—the increase during pandemic—experienced an approximate 4 percent greater increase in interest income from a recent rate hike of 5.25 percentage points ($\approx 0.4 \times 2 \times 5.25$). The baseline estimation results based on a balanced sample are robust to an unbalanced sample, as reported in columns (3) and (4).

TABLE 3 Baseline Estimation Results: Interest Expense

Dependent variable: $\ln InterestExpense_{it}$	(1)	(2)	(3)	(4)
$\ln Debt_{it-1}$	0.581***	0.575***	0.600***	0.663***
	(0.027)	(0.028)	(0.016)	(0.022)
FFR_t	0.033***	0.091***	0.027***	0.104***
	(0.007)	(0.015)	(0.005)	(0.012)
$CashToAssets_{it-1}$		-0.243***		-0.238***
		(0.079)		(0.065)
$FixedRateRatio_{it-1}$		0.341***		0.535***
		(0.063)		(0.056)
$FFR_t \times CashToAssets_{it-1}$		-0.064**		-0.070***
		(0.028)		(0.020)
$FFR_t \times FixedRateRatio_{it-1}$		-0.061***		-0.090***
		(0.020)		(0.017)
Observations	8,212	7,690	18,126	12,427
Adj.R-squared	0.945	0.947	0.936	0.957
Firm FE	Yes	Yes	Yes	Yes
Balanced Sample	Yes	Yes	No	No

Note: This table summarizes the baseline estimation results on the effect of corporate cash holdings and fixed-rate debt on interest expense. The dependent variable is the log of interest expense. Independent variables include the effective federal funds rate, the lagged cash-to-assets ratio, their interaction term, the lagged ratio of fixed-rate debt to total debt, and its interaction term with the effective federal funds rate. The log of lagged total debt is also included as a control variable. The first two columns are based on a balanced sample, restricted to firms with complete information throughout the sample period, while the last two columns use an unbalanced sample. All columns include firm fixed effects. Standard errors, clustered at the firm level, are shown in parentheses. Significance: * 10 percent; ** 5 percent; *** 1 percent.

3.2 Interest expense

We turn to estimating the effect of corporate cash holdings and fixed-rate debt on interest expense using the specification below:

$$\ln InterestExpense_{it} = \beta_1 \ln Debt_{it-1} + \beta_2 FFR_t + \beta_3 FixedRateRatio_{it-1} + \beta_4 (FFR_t \times FixedRateRatio_{it-1}) + \beta_5 CashToAssets_{it-1} + \beta_6 (FFR_t \times CashToAssets_{it-1}) + \psi_i + \epsilon_{it}, \tag{2}$$

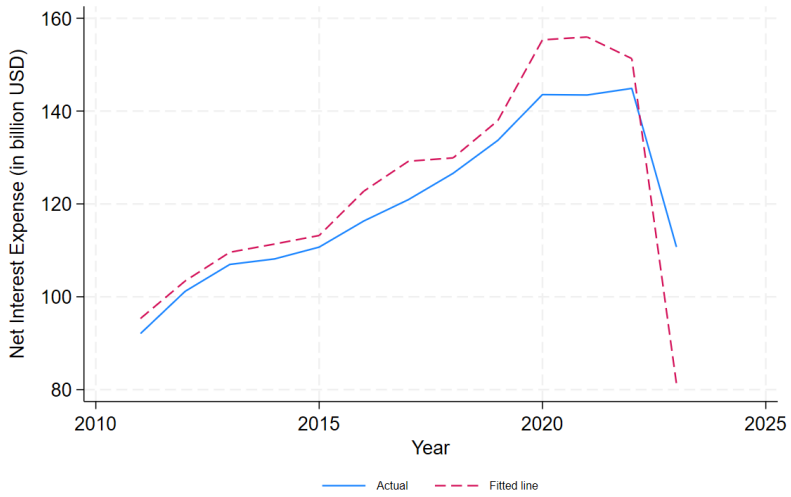
where the dependent variable is the log of interest expense ($\ln InterestExpense_{it}$). Since interest expense is basically a function of interest rates and debt, the independent variables include the effective federal funds rate (FFR_t) and the one-year lagged debt in log ($\ln Debt_{it-1}$). ψ_i denotes firm fixed effects. The one-year lagged cash-to-assets ratio ($CashToAssets_{it-1}$) is included, along with its interaction term with the effective federal funds rate ($FFR_t \times CashToAssets_{it-1}$), which is

to capture the effect of cash holdings on the sensitivity of interest expense to interest rate changes. Specifically, it examines whether firms with higher cash holdings are better able to mitigate the impact of rising interest rates on their interest expenses by reducing the need for new borrowing. Additionally, to account for the fact that fixed-rate debt is less sensitive to interest rate changes, the one-year lagged ratio of fixed-rate loans to total debt ($FixedRateRatio_{it-1}$) and its interaction term with the effective federal funds rate ($FFR_t \times FixedRateRatio_{it-1}$) are also included.

Estimation results show that cash holdings and fixed-rate debt alleviate the rise in interest expense when monetary policy tightens. Column (1) in Table 3 verifies the basic relationship between interest expense and debt level and interest rate. Note that the pass-through of FFR to interest expense is much smaller than that to interest income, partly reflecting the role of fixed-rate debt. More interestingly, column (2) confirms that interest expense decreases as the cash-to-assets ratio increases, and this effect becomes more pronounced when interest rates rise. This supports the notion that firms with a higher cash-to-assets ratio are better able to avoid the increased interest burdens associated with higher rates. The size of the estimated coefficient implies that a firm with a cash-to-assets ratio 2 percentage points higher experienced a 0.6 percent smaller increase in interest expense from a recent rate hike of 5.25 percentage points ($\approx -0.064 \times 2 \times 5.25$). Moreover, while a greater portion of fixed-rate debt relative to total debt generally raises interest expense due to the more expensive nature of fixed-rate debt, the presence of fixed-rate debt tends to dampen the effect of rising interest rates on interest expense. For example, firms with a higher fixed-rate debt ratio by 2 percentage points would have also experienced a 0.6 percent smaller increase in interest expense from a recent rate hike of 5.25 percentage points ($\approx -0.061 \times 10 \times 5.25$). We note that the increase in cash holdings alone more than offset the effect from the interest rate hike. The estimation results based on an unbalanced sample reported in columns (3) and (4) are qualitatively identical.

Taken together, the estimates from the interest income and expense regressions provide a good fit to the actual net interest payment pattern. As illustrated in Figure 3, the fitted value (in red dashed) tracks closely with the actual (in blue solid), and it suggests that net interest expenses for the sample firms are expected to have declined more than what has been observed recently, implying that the exceptional feature of the latest tightening cycle regarding net interest expenses should not have been surprising at all.

FIGURE 3 Aggregate Net Interest Expenses: Data vs. Fitted



Notes: This figure presents the actual (in blue solid) and predicted (in red dashed) aggregate net interest expenses over time from the regression sample.

3.3 Real effects

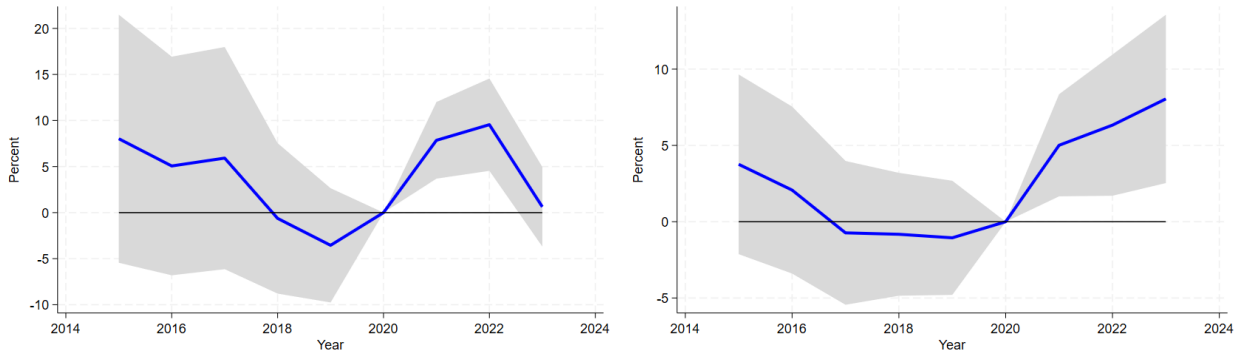
Finally, we examine the real consequences of cash holdings beyond their balance sheet effects, by comparing average time-series changes in real activities—such as capital expenditure and employment—between firms with high cash holdings and those with lower cash holdings.

Specifically, we consider the following specification:

$$\ln Y_{ijt} = \sum_{s \neq 2020} \beta_s \mathbb{1}\{t = s\} \times Cash_i + \Gamma X_{ijt} + \delta(D_j \times T_t) + \psi_i + \kappa_t + \epsilon_{ijt}, \tag{3}$$

where the dependent variable is either the log of capital expenditure or employment for a firm i in sector j in year t. We categorize the sample firms into two groups: firms with high cash holdings ($Cash_i = 1$) and firms with low cash holdings ($Cash_i = 0$), whereby the threshold is the median cash-to-assets ratio within each NAICS 2-digit sector for the year 2020. To ensure that firms are otherwise comparable, we include X_{it}, which encompasses other time-varying firm-level control variables such as revenue and debt, both in log and lagged by one year. ψ_i and κ_t denote firm and time fixed effects, respectively, while $\delta(D_j \times T_t)$ captures sector-specific trends. Time-varying coefficient estimate of $Cash_i$, β_t, which is normalized to 0 for the year 2020, indicates the average time-series changes in real activities among high cash-holding firms relative to low cash-holding firms.

FIGURE 4 Real Effects: High vs. Low Cash-holding Firms



(a) Capital Expenditure (b) Employment

Notes: This figure illustrates the estimation results from equation (3). The top and bottom panels show results for capital expenditure and employment as the dependent variables, respectively. Firms are categorized as having high or low cash holdings based on their cash-to-assets ratio relative to the median value within their two-digit NAICS sector. The solid line represents the year-specific estimated coefficient of the interaction term between the year and the high cash firm dummy variable, with 2020 as the baseline year. Shaded areas indicate the 95% confidence interval where standard errors are clustered at the firm and year level.

Figure 4 illustrates the estimation results from equation (3). Clearly, while the average capital expenditure by high cash-holding firms was not statistically different from that of low cash-holding firms prior to 2020, it became significantly higher in 2021, peaked in 2022, and then returned to levels similar to those of low cash-holding firms in 2023 (top panel of Figure 4). Likewise, the average employment of high cash-holding firms was not statistically different from that of low cash-holding firms from 2016 until 2020. However, after 2020, it increased significantly, with a notable jump in 2022, and remained higher than that of low cash-holding firms (bottom panel of Figure 4).

Overall, these results suggest that the increase in cash holdings by corporations during the COVID-19 pandemic—driven by ultra-low interest rates, fiscal policy, and heightened uncertainty—inadvertently served as a shock absorber, thereby contributing to resilient performance in the corporate sector despite the rapid interest rate hikes that began in 2022.[2]

4 Conclusion

Motivated by non-financial firms' notable cash accumulation during pandemic and their solid performance during the post-pandemic monetary policy tightening in the U.S., this paper analyzes the role of cash holdings in how monetary policy affecting firm balance sheet (interest income

[2]Quantitatively, the estimation results suggest that if all firms had switched from low- to high-cash holding status, aggregate capital expenditure and employment could have increased by approximately 10 percent and 5 percent, respectively, as of 2022. This can be interpreted as an upper bound for the effect of increased cash holdings during the COVID-19 pandemic.

and expense) and real operations (investment and employment). Firm-level evidence shows that cash holdings boost the interest income increase, dampen the interest expense rise, alleviate the investment and employment curtailment, in response to interest rate hikes. The results highlight corporate cash holdings as one factor that contributes to the seemingly less effective monetary policy tightening in constraining the real economy in the post-pandemic hiking episode.

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