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Local Policy Uncertainty and the Firm's Investment Reaction to Monetary Policy

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Abstract

Rising local economic policy uncertainty increases the firm's capital investment sensitivity to monetary shocks. This effect is driven by the tendency of uncertainty-driven precautionary behavior to increase the firm's propensity to reduce investment in response to contractionary monetary shocks. This effect is more pronounced for geographically bound firms that are financially constrained. Our results show how the investment effects of local economic policy uncertainty are entangled with the asymmetries that govern the economic impact of monetary policy.

Keywords: Monetary Policy; Capital Investments; Local Economic Policy Uncertainty.
JEL Codes: E52; G30; G31.

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1. Introduction

Monetary policy is recognized as a strong driver of firm-level investment (Ottonello and Winberry, 2020). Recent evidence suggests that the investment effects of monetary policy are far from homogenous, and largely vary with firm-level features such as age, profitability, and leverage (Cloyne et al., 2023; Ottonello and Winberry, 2020). We expand this analysis by providing the first investigation of the role of local economic policy uncertainty in shaping the firm's capital investment response to monetary shocks. Despite growing economic integration, most firms remain geographically bound and vulnerable to local economic forces (Tuzel, 2010). Moreover, recent events such as the COVID-19 pandemic reaffirmed the view that state-level differences in navigating uncertainty have tangible ramifications on how firms invest, hire, and survive economic hardships (Baker et al., 2022).

How does the rise in state-level policy uncertainty shape the firm's investment reaction to monetary policy? Answering this question requires recognizing that policy uncertainty induces precautionary delays by firms dealing with irreversible investments (Gulen and Ion, 2016). From a real options perspective, rising policy uncertainty increases the value of the option to delay irreversible investment, especially for firms whose business prospects strongly depend on local policy decisions.

We posit that factoring in the precautionary impact of policy uncertainty in the investment reaction to monetary policy requires an explicit separation of contractionary shocks that induce a decrease in investments from expansionary shocks that trigger a rise in investments. If local economic policy uncertainty induces a strong precautionary behavior on the firm's part, then we would expect the firm's propensity to reduce investment in response to contractionary monetary shocks to grow stronger with larger local policy uncertainty. In turn, we would expect the firm's propensity to increase investment in response to monetary expansion to be weakened with rising local policy uncertainty. While the first mechanism increases the overall negative sensitivity of firm-level investment to interest rate shocks, the second mechanism is expected to weaken such sensitivity.

Our main conjecture is that the first mechanism is considerably more influential than the latter. There is robust evidence that the negative economic effects of monetary contraction are considerably larger than the positive economic effects of monetary expansion (Cover, 1992; Lin, 2021). According to Florio (2004), credit market dynamics imply that precautionary behavior is more influential in shaping investment decisions in response to monetary contraction rather than monetary expansion. This is due to financially constrained firms becoming aware of tightening financing conditions which, in turn, leave such firms with the singular option of reducing key irreversible investments in response to any sign of growing uncertainty. However, investment expansions in response to monetary expansion are relatively slow and subject to considerable delays (Florio, 2004). This leaves more room for firms to navigate uncertainties without cutting a significant part of their investment base.

We test our prediction using a rich dataset that combines the exogenous monetary shocks series recently developed by Bu et al. (2021), the state-level policy indices of Baker et al. (2022), and a wide range of firm- and economy-wide factors. The evidence from local projection analysis on a panel of 14,238 firms with 467,812 firm-quarter observations between 1994 and 2020 suggests that high local economic policy uncertainty at the state level significantly increases the firm's investment sensitivity to monetary shocks. This increased sensitivity is driven by the firms' increased propensity to reduce investments under uncertainty in response to monetary contraction. We find such effects to be more pronounced for geographically bound and financially constrained firms. Such conditions make these firms more vulnerable to local policy decisions and Fed-driven tightening.

To the best of our knowledge, our results are the first to highlight the implications of local policy uncertainty on the transmission of monetary shocks into tangible firm-level investment decisions. Equally important, our analysis is the first to incorporate the mediating role of local policy uncertainty within the asymmetries that govern the economic effects of monetary shocks.

2. Local Policy Uncertainty and Exogenous Monetary Shocks

Our main proxy for local policy uncertainty is the widely used standardized index of Baker et al. (2022). In turn, we use the exogenous monetary shock series estimated by Bu et al. (2021) (hereafter BRW) to represent the monetary policy's stance. Such shocks are estimated via a two-step procedure inspired by the Fama-MacBeth method. In the first step, BRW estimate the time series sensitivities of changes in the yields of all zero-coupon bonds to changes in the yield of two-year zero-coupons. The latter yield is posited to have a one-to-one sensitivity to exogenous monetary shocks. In the second stage, the estimated sensitivities are used in a cross-sectional analysis to retrieve the value of the exogenous monetary shocks. The BRW series has appealing features like (a) bridging periods of conventional and unconventional monetary policy, and (b) excluding Fed information effects. Figure 1 describes the shock series from 1994 to 2020.

(Figure 1 here)

3. Local Projection Results and Discussion

We assess the impact of monetary shocks on firm investments by using the local projection approach, as in Ottonello and Winberry (2020). In Table 1, we estimate the specification:

$$\begin{aligned}\left(\ln(CAPX_{t+h,i,s,y}) - \ln(CAPX_{t,i,s,y})\right) \times 100 \\ = \beta_1^h.Shock_t + \beta_2^h.Shock_t \times HighLocalEPU_{t,s} \\ + \beta_3^h.HighLocalEPU_{t,s} + f\left(Firm\ Control\ Factors_{t,i}\right) \\ + g(Macroeconomic\ Factors_t) + \gamma_s^h + \gamma_y^h + \epsilon_{t+h,i,s}\end{aligned} \quad (1)$$

where we track the growth in the quarterly capital investment (CAPX) for firm *i*, in state *s*, and sector *y* over an eight-quarter horizon *(h=8)* from the quarter *t* of the monetary shock. The monetary shocks are aggregated for each quarter and divided by their standard deviation to produce the main dependent standardized variable $Shock_t$.[2] The dummy variable $HighLocalEPU_{t,s}$ is assigned the value of 1 if the state-level economic policy uncertainty index exceeds the 75th percentile in our sample, and 0 otherwise.[3]

Our analysis covers a wide range of firm-control factors (Total Assets, RoA, CAPX Rate (CAPX/Total Assets)×100, and Debt (Total Debt/Total Assets)×100) in addition to macroeconomic factors including the quarterly natural logarithm of Gross Domestic Product and Consumer Price Index. The firm's state effects are represented by γ_s^h, while the two-digit-sector effects are represented by γ_y^h.[4] $\epsilon_{t+h,i,s}$ is a white noise error. Standard errors are clustered at the sector-state levels. Our results are robust to alternative

[22] For the period covered in our sample, the average quarterly shock is 0% and the standard deviation is 0.06%.
[3] The average quarterly state economic policy uncertainty level in our sample is 77.34 and the 75th percentile is equal to 87.69.
[4] The firm headquarter data is generously made public by Mingze Gao.

clustering approaches and the inclusion of firm effects. For brevity, we report estimations for one and two years after the shock.

Table 1 supports the view that high local policy uncertainty drives the negative sensitivity of firm-level investment to monetary shocks. Under high state-level economic policy uncertainty, a standard-deviation contractionary monetary shock leads to a decline in firm-level capital investments by up to 3% over the subsequent eight quarters. Such declines are less pronounced for firms in low-uncertainty states.

(Table 1)

To differentiate between contractionary and expansionary shocks while also limiting the effect of estimation noise, we expand our specification by introducing the variable $ContractionaryShock_t$, which is assigned the value of $Shock_t$ when it exceeds half a standard deviation, and 0 otherwise. The variable $ExpansionaryShock_t$ is assigned the absolute value of $Shock_t$ when it is negative and larger in absolute terms than half a standard deviation, and 0 otherwise.

$$\begin{aligned}\left(\ln(CAPX_{t+h,i,s,y}) - \ln(CAPX_{t,i,s,y})\right) \times 100 \\ &= \beta_1^h . ContractionaryShock_t \\ &+ \beta_2^h . ContractionaryShock_t \times HighLocalEPU_{t,s} \\ &+ \beta_3^h . ExpansionaryShock_t \\ &+ \beta_4^h . ExpansionaryShock_t \times HighLocalEPU_{t,s} \\ &+ \beta_5^h . HighLocalEPU_{t,s} + f\left(Firm\ Control\ Factors_{t,i}\right) \\ &+ g(Macroeconomic\ Factors_t) + \gamma_s^h + \gamma_y^h + \epsilon_{t+h,i,s}\end{aligned} \tag{2}$$

The estimation of Equation (2) in Table 2 suggests that the increased sensitivity to contractionary shocks is the dominant mechanism. Over an eight-quarter horizon, firms in states with high policy uncertainty decrease their investments by up to 6.5% in response to contractionary monetary shocks relative to firms located in low-uncertainty states. Over the same horizon, investment eventually rises in response to expansionary shocks without the perturbating effect of uncertainty. Equally important, the presence of strong contractionary monetary shocks is a necessary condition for high local policy uncertainty to induce subsequent declines in capital investment.

(Table 2)

In Table 3, we re-estimate Equation (2) over two subgroups. The first subgroup contains firms that are (a) small (Total Assets < median in 2015 dollars) and are subsequently less capable of geographic diversification (Deng and Elyasiani, 2008), and (b) financially constrained (debt ratio > median), which makes them more vulnerable to monetary-policy-driven changes in credit conditions. The second subgroup includes firms where at least one of these conditions is not satisfied. The evidence suggests that the strong precautionary investment behavior under monetary contractionary is more pronounced in the first group (9% vs. 5% eight-quarter decline in CAPX).

(Table 3)

Figure 1: The BRW monetary shock series between January 1994 and December 2020

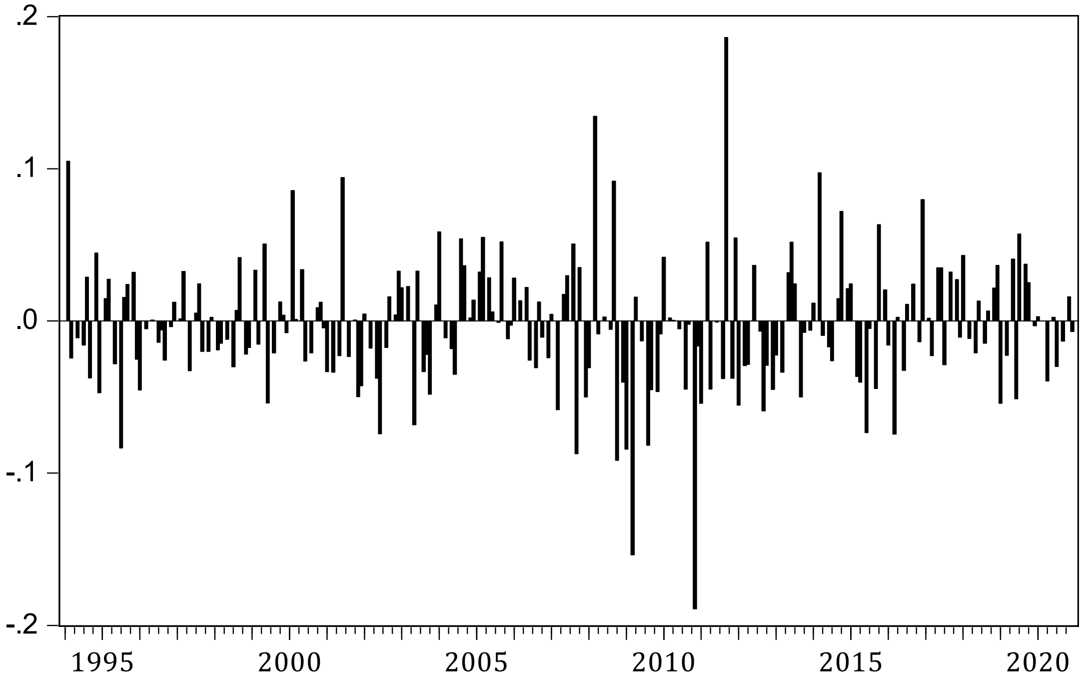

Table 1: Local projections effects under high local policy uncertainty

Variables\Horizon	$h = 4$	$h = 8$
$Shock_t$	0.490**	-0.283
	(0.248)	(0.279)
$Shock_t \times HighLocalEPU_{t,s}$	-2.643***	-3.055***
	(0.360)	(0.407)
$HighLocalEPU_{t,s}$	-5.178***	1.588***
	(0.532)	(0.607)
$ln(Total\ Assets_{i,t})$	-12.044***	-32.291***
	(0.214)	(0.282)
$Debt_{i,t}$	0.023***	-0.025***
	(0.001)	(0.002)
$RoA_{i,t}$	-0.002	-0.081***
	(0.002)	(0.003)
$CAPXRate_{i,t}$	-1.725***	-9.832***
	(0.024)	(0.064)
$ln(GDP_t)$	-35.874***	-136.752***
	(6.823)	(7.766)
$ln(CPI_t)$	35.944***	165.877***
	(7.129)	(8.063)
State Effects	YES	YES
Sector Effects	YES	YES
N	396,316	349,336
$p(F$-test)	0.00	0.00

Standard errors are reported in parentheses. ***, **, * represent significant at the 1%, 5%, and 10% levels, respectively.

Table 2: Local projections effects with asymmetric monetary shocks

Variables\Horizon	$h = 4$	$h = 8$
$ContractionaryShock_t$	-0.803*	1.050**
	(0.452)	(0.512)
$ContractionaryShock_t \times HighLocalEPU_{t,s}$	-6.327***	-6.469***
	(0.721)	(0.827)
$ExpansionaryShock_t$	-1.333***	2.335***
	(0.402)	(0.451)
$ExpansionaryShock_t \times HighLocalEPU_{t,s}$	0.828	0.302
	(0.555)	(0.624)
$HighLocalEPU_{t,s}$	-2.792***	3.785***
	(0.652)	(0.742)
Control Factors	YES	YES
State Effects	YES	YES
Sector Effects	YES	YES
N	396,318	349,336
$p(F$-test)	0.00	0.00

Standard errors are reported in parentheses. ***, **, * represent significant at the 1%, 5%, and 10% levels, respectively.

Table 3: Local projections effects under size and leverage subgroups

Panel A: Total Assets < Median AND Debt > Median		
Variables\Horizon	$h = 4$	$h = 8$
$ContractionaryShock_t$	-2.172 (1.595)	0.649 (1.828)
$ContractionaryShock_t \times HighLocalEPU_{t,s}$	-6.602*** (2.565)	-9.581*** (2.964)
$ExpansionaryShock_t$	-2.129 (1.450)	1.620 (1.642)
$ExpansionaryShock_t \times HighLocalEPU_{t,s}$	3.603* (1.991)	-0.487 (2.259)
$HighLocalEPU_{t,s}$	-0.219 (2.291)	11.271*** (2.622)
Control Factors	YES	YES
State Effects	YES	YES
Sector Effects	YES	YES
N	57,847	48,283
p(F-test)	0.00	0.00
Panel B: Total Assets > Median OR Debt < Median		
Variables\Horizon	$h = 4$	$h = 8$
$ContractionaryShock_t$	-1.502*** (0.437)	0.724 (0.507)
$ContractionaryShock_t \times HighLocalEPU_{t,s}$	-5.303*** (0.697)	-5.353*** (0.818)
$ExpansionaryShock_t$	-1.854*** (0.388)	2.289*** (0.446)
$ExpansionaryShock_t \times HighLocalEPU_{t,s}$	0.560 (0.536)	0.335 (0.617)
$HighLocalEPU_{t,s}$	-4.435*** (0.635)	2.325*** (0.739)
Control Factors	YES	YES
State Effects	YES	YES
Sector Effects	YES	YES
N	338,471	301,053
p (F-test)	0.00	0.00

Standard errors are reported in parentheses. ***, **, * represent significant at the 1%, 5%, and 10% levels, respectively.

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