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Economic Policy Uncertainty and Corporate Investment Efficiency: Evidence from Indian Listed Firms

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Abstract

Purpose – This research paper investigates the impact of economic policy uncertainty (EPU) on corporate investment efficiency in a developing country context with Indian listed companies as a sample.

Design/methodology/approach – Using secondary data on nonfinancial firms listed on the National Stock Exchange of India for FY2010–FY2024 (CMIE Prowess data), along with the news-based India EPU index of Baker, Bloom and Davis (2016), to estimate investment inefficiency, as the residual of an expected-investment model (Biddle, Hilary and Verdi, 2009). We determine the impact using firm fixed-effects panel regressions with macroeconomic controls, as well as dynamic GMM and an election-cycle instrument.

Findings – The degree of policy uncertainty is negatively related to investment efficiency by four with decreasing marginal effect, where the negative impact comes mainly from underinvestment and conforms to real-options theory. The negative relationship becomes stronger for financially constrained firms and weaker for those affiliated with business groups, which can access internal capital markets.

Originality/value – This paper propagates the uncertainty-investment literature from an investment level to an efficiency of investment context in a large emerging economy where business groups and concentrated promoter ownership influence capital allocation. The results provide inputs for policy communication by the Government of India and the Reserve Bank of India, and capital budgeting in uncertain regimes.

Keywords: Economic policy uncertainty; investment efficiency; underinvestment; overinvestment; business groups; India

1. Introduction

Corporate investment is the mechanism through which savings are translated into productive capacity, and the extent to which this is efficient hinges on whether capital is allocated to positive net present value projects. In a frictionless setting, firms should continue to invest up to the point where the marginal return to capital equals its cost. But information asymmetries and agency conflicts induce firms to deviate from this benchmark, either by failing to undertake worthwhile projects (underinvestment) or by wasting resources on value decreasing ones (overinvestment) (Jensen, 1986; Myers & Majluf, 1984; Stein, 2003). There is now a growing literature exploring the ways in which macro-financial conditions, and policy uncertainty in particular, exacerbate these frictions.

Uncertainty about economic policy is the uncertainty about who will set economic policy, and what they will do and when, and how will that impact on the economy. From their news-based EPU indicator, Baker, Bloom and Davis (2016) find that its spikes predict a slowdown in investment, output and employment. Using the firm-level US data, Gulen and Ion (2016) find that firms reduce their capital expenditure as uncertainty increases; and Julio and Yook (2012) document investment behaviour around elections. These studies certainly demonstrate that uncertainty reduces investment levels. But they leave unanswered an even more important question for shareholders and policymakers: does uncertainty also reduce the efficiency of investment?

The answer is far from obvious. Real-Options theory argues that risk increases the incentive to hold off in a project, so a firm might choose to delay a good project and increasing underinvestment (Bernanke, 1983; Dixit & Pindyck, 1994). But risk can also discipline managers. It might increase the costs of external finance and judicial review, eliminating empire building and cutting back on overinvestment. The ultimate impact on efficiency must be determined empirically.

India provides an interesting setting for this question. Indian firms experienced numerous policy shocks over FY2010-FY2024, including the policy paralysis of 2011-2013, two general elections

that brought shifts in government preferences, demonetization in November 2016, the implementation of the Goods and Services Tax in July 2017, the Insolvency and Bankruptcy Code of 2016, the corporate tax reduction of September 2019, and the policy response to COVID-19. Indian EPU, as measured by Bhagat, Ghosh and Rangan (2013) based on the technique of Baker et al (2016), also was volatile over this period. Indian corporate structure also exhibits differences from developed markets. Business groups and concentrated promoter ownership are common, and many firms are financially constrained owing to shallow bond markets and bank-based financing; these factors could accentuate or mitigate the impact of uncertainty on capital allocation.

This paper 1) re-focuses the analysis of Indian uncertainty from the effect on the level of investment to that on its efficiency under the conventional Biddle et al. (2009) methodology; 2) decomposes inefficiency into under- and over-investment and tests two separate competing explanations, the real-options and disciplining arguments; and 3) highlights two India-specific factors, financial constraints and group affiliation, that contribute to cross-sectional heterogeneity in investment response to uncertainty.

2. Literature Review and Hypothesis Development

2.1 Investment efficiency and its determinants

Investment efficiency: investment efficiency measures the extent to which a firm invests in all (and only) those positive-NPV projects that its growth opportunities justify. Two frictions lead to deviations. Under adverse selection managers who hold more information than outside investors face costly external finance and fail to undertake good projects (Myers & Majluf, 1984). Under moral hazard manager who own free cash flow undertake too many projects in order to expand the size of the firm they manage (Jensen, 1986). Richardson (2006) implements this by modelling expected investment and attributing all the residual to over/underinvestment and finds overinvestment is concentrated among firms with high free cash flow. Biddle et al. (2009) model expected investment as a function of prior sales growth and show that higher quality financial reporting mitigates both forms of deviation. Chen, Hope, Li and Wang (2011) extend this to private firms in emerging markets and incorporate asymmetric response to sales decreases. Other strand of literature links investment efficiency to governance, ownership structure, audit quality and disclosure.

2.2 Uncertainty and corporate investment

There are two general ways theory suggests uncertainty influences investment. One is the real-options channel, which states that if investment is only partly irreversible, then uncertainty increases the value of waiting for new information (Bernanke, 1983; Dixit & Pindyck, 1994). Investment projects are postponed, and the sensitivity of investment to shocks to demand reduces (Bloom, Bond & Van Reenen, 2007; Bloom, 2009). The other is the financial-frictions channel, which states that increased uncertainty increases credit spreads and the cost of external finance--and this effect is most severe for constrained firms.

This literature supports a negative effect of policy uncertainty on investment. Julio and Yook (2012) conclude that firms cut investment by about 4.8% in election years across 48 countries. Gulen and Ion (2016) estimate that a 100% increase in US EPU results in a significant decline in quarterly capital expenditure with the impact being greater for firms with more irreversible investment. Jens (2017) exploits US gubernatorial elections to establish a causal impact. Evidence from emerging markets is consistent with the notion that high levels of EPU leads to lower investment. Wang, Chen and Huang (2014) find that Chinese listed firms reduce investment in years of high EPU while Kang, Lee and Ratti (2014) find the impact is greater for high-firm-specific-uncertainty firms.

2.3 The Indian context and the research gap

Indian studies have analyzed the macroeconomic effects of EPU (Bhagat et al., 2013), as well as the sensitivity of investment to cash flow and group affiliation. There is very little evidence on the impact of policy uncertainty on the quality of firm-level investment, in part due to the nature of existing data. Indian business groups have internal capital markets that could reallocate funds across affiliates, which would shield group members from external shocks, but the control of promoters can generate a severe agency problem. Small and young firms face binding credit constraints due to a shallow corporate bond market. These features make the magnitude and the channels of the uncertainty-efficiency relation in India potentially different from those observed in developed markets.

2.4 Hypotheses

If uncertainty will encourage manager's evaluation of the payoffs from the project and increase the reward of waiting, investment will be less sensitive to growth opportunities. The actual level of investment should be above the expected level.

H1: The higher economic policy uncertainty is, the greater corporate investment inefficient.

The discipline channel predicts less over-investment, which partly cancels out the first channel. We expect the latter to dominate.

H2: The positive impact of EPU on investment inefficiency can be The effect of EPU on investment inefficiency is mainly due to underinvestment.

Financially constrained firms pay a greater penalty for choosing to finance projects with more uncertain returns, leading them to pass up on good projects. By contrast, group-affiliated firms have access to internal capital markets for funds.

H3a: The relation between EPU and inefficiency of investment is more pronounced for financially constrained firms.

H3b: The association between EPU and investment inefficiency is milder among business group-affiliated firms.

3. Data and Methodology

3.1 Sample and data sources

Study design utilizes secondary data. The firm-level financial and ownership data are obtained from the CMIE Prowess IQ database for non-financial firms listed on the NSE for FY2010-FY2024 (with fiscal years April-March). We exclude banks, NBFCs, insurers and utilities since their investments are subject to regulation. We also exclude firm-years with negative net worth, missing data for some variables and those with less than five years of consecutive data to estimate the expected-investment model. All continuous firm-level variables are wantonized at 1st and 99th percentile.

The India EPU index is sourced from the Economic Policy Uncertainty website (policyuncertainty.com). It is derived from the number of news articles containing economic,

policy and uncertainty words based on Baker et al. (2016) and Bhagat et al. (2013). (The number of news articles with these words are aggregated monthly, to match the Indian fiscal year (April-March). Macroeconomic controls are sourced from the RBI Database on Indian Economy (2014) and the Ministry of Statistics and Program Implementation (2014).

3.2 Measuring investment efficiency

After Biddle et al. (2009) and Chen et al. (2011) we compute the expected investment for each industry-year (Two-digit NIC code, at least 15 observations):

$$\text{Invest}_{\{i,t\}} = \beta_0 + \beta_1 \text{NEG}_{\{i,t-1\}} + \beta_2 \text{Sales Growth}_{\{i,t-1\}} + \beta_3 \text{NEG}_{\{i,t-1\}} \times \text{Sales Growth}_{\{i,t-1\}} + \varepsilon_{\{i,t\}}$$

Invest= capital expenditure + R&D expenditure – proceeds from sale of fixed assets divided by lagged total assets. Sales Growth= percent change in sales between t-1 and t-2. NEG=1 if sales growth is negative. INEFF, the absolute residual, is an investment inefficiency measure based on the MSE. The positive residual is a measure of overinvestment (OVERINV), and the negative residual is a measure of underinvestment (UNDERINV, multiplied by 1 so higher indicator values indicate more underinvestment). As a robustness check, we also employ the Richardson (2006) model where expected investment is conditioned on Tobin's Q, leverage, cash, size, age, stock returns, and lagged investment.

3.3 Empirical model

To test H1, we estimate:

$$\text{INEFF}_{\{i,t\}} = \alpha_i + \gamma_1 \ln(\text{EPU}_{\{t\}}) + \sum_k \delta_k X_{\{k,i,t-1\}} + \sum_m \theta_m M_{\{m,t\}} + \varepsilon_{\{i,t\}}$$

Where α_i firm fixed effects (also controlling for time-invariant industry effects) and μ_t year fixed effects (would also absorb EPU, which is time-dependent). As EPU is purely time-dependent, there is no need to control for the macroeconomic environment directly through M. The macro environment is already controlled for by the terms real GDP growth, change in the RBI repo rate, and the annual Nifty 50 return volatility. H2 is tested by estimating the model separately for OVERINV and UNDERINV. H3a and H3b are tested by including interaction of $\ln(\text{EPU})$ with a financial-constraint dummy (top tercile of the SA index of Hadlock & Pierce (2010)) and a

business group dummy from Prowess ownership classification, respectively. Standard errors are clustered at the firm level (Petersen, 2009).

4. Empirical Results

4.1 Descriptive statistics

Sample size is 14,862 firm-year observations for 1,312 firms. Summary statistics are shown in table 1. On average, firms invest 7.2% of their lagged assets and the mean absolute deviation from expected investment is 4.8% of assets, revealing financially significant inefficiency. There are more underinvesting versus overinvesting firm-years, as is usual in residual-based measures owing to high skewness in overinvestment residuals. The LOG EPU index varies significantly over time, with peaks in FY2013, FY2017 and FY2021.

Table 1. Descriptive statistics

Variable	N	Mean	SD	P25	Median	P75
INVEST	14,862	0.072	0.081	0.019	0.048	0.097
INEFF	14,862	0.048	0.052	0.014	0.031	0.062
OVERINV	5,934	0.061	0.068	0.015	0.036	0.079
UNDERINV	8,928	0.039	0.035	0.014	0.029	0.054
ln (EPU)	15 yrs	4.62	0.31	4.41	4.58	4.86
SIZE	14,862	8.21	1.74	6.98	8.09	9.37
LEV	14,862	0.27	0.18	0.12	0.26	0.39
TOBINQ	14,862	1.68	1.21	0.92	1.29	1.98
CASH	14,862	0.06	0.07	0.01	0.03	0.08
ROA	14,862	0.09	0.08	0.04	0.08	0.13
PROMOTER	14,862	52.4	16.8	41.2	53.6	64.9
GROUP	14,862	0.43	0.50	0	0	1

4.2 Baseline results (H1)

Table 2 presents the baseline regressions. Column (1) reports the regression with only firm-level controls. The sign and significance of the coefficient on $\ln(\text{EPU})$ are unchanged and significant at the 1% level when macroeconomic controls (column 2) are included, addressing potential omitted macroeconomic variables that could drive the effect. Economically, a one-standard-deviation increase in $\ln(\text{EPU})$ increases the efficiency score INEFF by approximately 0.37 percentage points, which is 7.7% of the sample mean. Supporting H1, larger and more profitable firms are more efficient, while greater leverage and cash holdings lead to greater inefficiencies, which could be attributed to debt overhang and free-cash-flow problems respectively.

Table 2. EPU and investment inefficiency (dependent variable: INEFF)

Variable	(1)	(2)
$\ln(\text{EPU})$	0.0134*** (4.52)	0.0119*** (4.21)
SIZE	−0.0041*** (−3.87)	−0.0039*** (−3.71)
LEV	0.0168*** (3.12)	0.0161*** (3.02)
TOBINQ	0.0022** (2.27)	0.0021** (2.18)
CASH	0.0294*** (2.94)	0.0287*** (2.88)
ROA	−0.0386*** (−3.45)	−0.0371*** (−3.33)
AGE	−0.0027 (−1.41)	−0.0025 (−1.33)
TANG	0.0102* (1.84)	0.0098* (1.77)
PROMOTER	0.0001 (1.12)	0.0001 (1.09)
Macro controls	No	Yes
Firm FE	Yes	Yes
Observations	14,862	14,862
Within R^2	0.064	0.071

Notes: *t*-statistics based on firm-clustered standard errors in parentheses. ***, **, * denote significance at 1%, 5% and 10%.

4.3 Underinvestment versus overinvestment (H2)

Table 3 further divides the sample. The coefficient for EPU is positive and significant for the underinvestment subsample but is negative but not significant in the overinvestment subsample. The effect of uncertainty on efficiency is therefore to discourage projects not worth undertaking, thereby avoiding excess investment and overinvestment; these effects are much smaller than the increased underinvestment EPU induces, however, and do not save on overinvestment. H2 is confirmed.

4.4 Cross-sectional moderators (H3)

For the entire sample, columns (3) and (4) of Table 3 then include interaction terms. The interaction $\ln(\text{EPU}) \times \text{FC}$ yields a positive and significant coefficient, indicating that the uncertainty penalty is smaller for unconstrained firms (H3a supported). The interaction $\ln(\text{EPU}) \times \text{GROUP}$ shows a negative and significant coefficient, suggesting that group affiliation alleviates the effect, possibly because internal capital markets can substitute for more expensive external sources of financing in periods of high uncertainty (H3b supported).

Table 3. Direction of inefficiency and moderating effects

Variable	(1) UNDERINV	(2) OVERINV	(3) INEFF	(4) INEFF
$\ln(\text{EPU})$	0.0158*** (5.03)	−0.0062 (−1.21)	0.0084*** (2.91)	0.0151*** (4.47)
$\ln(\text{EPU}) \times \text{FC}$			0.0093*** (2.76)	
FC			−0.0398** (−2.31)	
$\ln(\text{EPU}) \times \text{GROUP}$				−0.0071** (−2.24)

GROUP				0.0304** (2.07)
Firm and macro controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	8,928	5,934	14,862	14,862
Within R ²	0.082	0.058	0.074	0.073

4.5 Robustness and endogeneity

Table 4 shows the robustness tests. Our findings are robust to using the Richardson (2006) model to estimate inefficiency, a one-year lag of EPU, and excluding FY2021 (the COVID-19 shock). Since EPU is also a market-wide variable, reverse causality from any single firm should not be a problem; however, unobserved macro shocks still might be. We test this in two ways. First, estimated with a two-step system GMM estimator (Arellano & Bond, 1991; Blundell & Bond, 1998) with lagged INEFF, the results on the EPU coefficient are similar, and the Hansen and AR (2) tests do not reject the validity of the instruments. Second, following Julio and Yook (2012), we instrument EPU with a general-election-year dummy (FY2015 and FY2020; the 2024 election occurs in FY2025, beyond our sample) and US EPU as a global spillover; the second stage coefficient remains positive and significant.

Table 4. Robustness checks (coefficient on ln (EPU))

Specification	Coefficient	t-stat	N
Richardson (2006) inefficiency measure	0.0107***	3.88	14,240
One-year lagged ln (EPU)	0.0096***	3.37	13,551
Excluding FY2021	0.0112***	3.94	13,874
System GMM (two-step)	0.0128***	3.15	13,551
2SLS, election-year and US EPU instruments	0.0164**	2.43	14,862

5. Discussion and Implications

Evidence shows that policy uncertainty affects Indian investment not only by discouraging investment expenditure per se, but also by dampening the beneficial impact of growth opportunities on investment. The prominence of the underinvestment channel corroborates that of real-options theory (Bernanke, 1983; Dixit & Pindyck, 1994) and with US evidence on irreversible investment (Gulen & Ion, 2016). It stands in contrast to the perception that uncertainty mainly discourages managerial overinvestment. For Indian firms, the "cost" of uncertainty can therefore be conceptualized as the loss of positive-NPV projects, which has implications over the longer horizon.

The moderating effects are indicative of institutional characteristics of the Indian market. Risk-averse firms are most affected because uncertainty increases the risk premium faced by creditors and leads to reduced bank credit when these firms have limited outside options. Group-affiliated firms are to some extent protected because internal capital markets shift resources between members of groups. This provides a somewhat more benign interpretation of business groups than has been found in the tunneling literature, at least during episodes of policy volatility.

Implications for policymakers. Providing clear guidance on the future course of policy, making the tax system predictable, and announcing ahead of time the schedules for implementing reforms can limit the size of the efficiency costs discussed here. Events like demonetization and the initial GST transition show how disruptive decisions increase uncertainty. Increasing the scale of the corporate bond market and establishing a credit guarantee scheme for small firms can dampen the amplification caused by financial constraints.

Implications for managers and investors. Firms should not see an increase in uncertainty as a catch-all cause of postpone investment. Staged investment, real options valuation and committed credit lines help firms to safeguard investments and prevent the loss of opportunities. Investors and boards can keep an eye on under-investment during episodes of increased EPU as a sign of additional growth opportunities lost, especially among standalone and constrained firms.

6. Conclusion

This paper investigates the link between economic policy uncertainty and the investment efficiency of NSE-listed non-financial firms over FY2010-FY2024. Higher policy uncertainty leads to significantly lower investment efficiency according to the inefficient-investment measure proposed by Biddle et al. (2009). This impact is primarily due to the underinvestment, is more severe for financially constrained firms and is less so for business group affiliates. Our findings are consistent across an alternative investment-inefficiency measure, the lagged uncertainty, the exclusion of pandemic year, dynamic panel estimation and an instrumental-variable approach.

The study has limitations that point to further research. First, the national EPU index does not distinguish between sectors or states; industry-specific or state-specific indices would improve identification. Second, the residual-based efficiency measure relies on the expected-investment model specification and cannot rule out measurement error entirely. Third, the sample is drawn only from listed firms, but unlisted SMEs could be more vulnerable to uncertainty. To follow up, one might test if a larger governance structure (such as more independent board members, more institutional shareholdings and ESG disclosures) can beat the penalty of uncertainty, and whether the 2024 policy shift turns the page.

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