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# The Effects of Economic Policy Uncertainty on the Indian Stock Market

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**Abstract**

This paper investigates the impact of macroeconomic variables and economic uncertainty on the size of portfolio returns in the Indian stock market. Results show that economic policy uncertainty—in addition to macroeconomic variables—can play a big role in explaining the returns of Indian stocks. Since investors cannot reduce such risk by constructing well-diversified portfolios, it is in fact a source for systematic risk, which must be considered by investors when making investment decisions. However, Granger-causality tests show that there is a unidirectional causality running from portfolio returns to economic policy uncertainty. That is, the Indian stock market predicts economic policy uncertainty, not the other way around.

**Keywords:** economic policy uncertainty, Indian stock market, Granger causality

## 1. Introduction

Stock prices are supposed to reflect the present value of all of the future cash flows. Thus, stock prices are related to both future cash flows and the cost of capital of the firm. Both cash flows and cost of capital are influenced by systematic risk, which is, in turn, directly related to macroeconomic factors. There are many studies that have examined the relationship between stock returns and macroeconomic variables. Most such studies are based on APT (Arbitrage Pricing Theory) framework, which relates macroeconomic changes to stock returns (Fama, 1981, 1990; Fama & French, 1989; Schwert, 1990; Ferson & Harvey, 1991).

Later research has mainly focused on the time-series aspect of the relationship between macroeconomic variables and stock returns (Kwon & Shin, 1999; Ratanapakorn & Sharma, 2007; Humpe & Macmillan, 2009). Following these studies, many authors investigate the relationship between emerging markets' stock returns and respective macroeconomic variables (for example, Chowdhury & Sharmin, 2013; Gay, 2016). However, there are doubts that these variables may not be able to capture all of the risks that may have an impact on the stock prices. In other words, when the uncertainty of the future cash flows is related to policy-related issues, it is possible that the movements in the macroeconomic variables are partially able to account for uncertainties. That is, an asset pricing model can be further improved by adding a quantifiable measure of such uncertainty (Baker, Boom, & Davis, 2012).

Economic Policy Uncertainty (EPU), or simply Policy Uncertainty, is the kind of economic risk that arises when a government's future economic actions are uncertain. EPU may include uncertainly related to political regime changes, uncertainty about monetary or fiscal policy changes, and ultimate uncertainly affecting the overall business and economic environment. EPU may intensify in situations such as the Global Financial Crisis in 2008, Eurozone crises, and the US partisan policy disputes in 2016.

In the case of high economic uncertainty, firms may delay their investments or consumers may delay their consumptions. If economic policy is predicted properly, investors may be able to forecast future stock price movements with more confidence. Thus, we need an index that is able to combine all of the policy-related uncertainties in one place. Relatively recently, Baker et al. (2012) have constructed an index that was able to indicate the policy-related uncertainty of an economy at any particular point of time. Their index effectively tracked the financial scares and crises of the U.S. economy. Specifically, their index was extremely successful in predicting economic events soon after the US housing crisis. To construct the economic policy uncertainty index, they used a weighted average of uncertainty related to news reports, tax codes, inflation, and government

purchase disagreements.

Pastor & Veronesi (2011) showed that during the periods of high economic uncertainty, firm-level stock returns moved together more closely. So, policy uncertainty influenced the market as well as the firm-level volatility. In times of economic uncertainty, firms tend to have more cash holdings and less dividends (Im, Park, & Zhao, 2017; Li, 2019). The negative impact of economic uncertainty was also reported for the U.S. market by Arouri, Estay, Rault, & Roubaud (2016). Li & Zhong (2020), Chen, Jiang, & Tong (2017), Xiong, Bian, & Shen (2018), Li, Balcilar, Gupta, & Chang (2016), and Christou, Cunado, Gupta, & Hassapis (2017) reported similar findings for China, India, and Pacific Rim markets. Batabyal & Killins (2021) showed that, for the Canadian market, there is an asymmetric impact of EPU on stock prices. An increase in EPU leads to investors holding lower-risk assets, whereas a decrease in uncertainty causes investors to take more risk. Although EPU has the potential to capture the movements of stock prices, there is limited research on this for an important emerging stock market such as India.

Naka, Mukherjee, & Tufte (1998) reported that inflation and domestic output growth are the main driving forces for the Indian stock market. Kotha & Sahu (2016) used time series models and found long-run relationship between BSE Sensex and exchange rates, wholesale price index, T-bill rates, and money supply. Giri & Joshi (2017) showed a long-run relationship between economic growth, inflation, exchange rates, and stock prices. In another time series study, Gopinathan & Durai (2019) showed that the relationship between stock prices and macroeconomic variables in India was non-linear and time-varying. Kundu & Paul (2019) reported that an increase in EPU increased market volatility and reduced return contemporaneously. Moreover, the impact was significant only in bear markets.

Ulusoy & Pirgaip (2019) showed that the stock prices of Indian market—like some other developed markets such as the US, Canada, and Sweden—lead policy uncertainty, suggesting that investors of these markets were quite updated about the future financial condition of the country. Aydin, Pata, & Inal (2022) reported that there is a presence of permanent causality running from the positive components of EPU to the positive components of Indian and Brazilian stock prices. Arouri & Roubaud (2016) examined the relationship between economic policy uncertainty and Chinese, Indian, and American stock market returns. They found that policy uncertainty in the USA and India negatively affects stock returns.

Most of the research on the Indian stock market focuses on the macroeconomic risk factors, ignoring the fact that an EPU index may have a strong ability to account for a good share of macroeconomic uncertainty and systematic risk. Thus, in this study, we examined the impact of EPU on Indian stock portfolio indexes for the market's large, medium, and small firms. For this study, in addition to EPU, we used macroeconomic variables, namely, industrial production growth, inflation rate, interest rates, and exchange rates. The ultimate goal of the study was to find out whether or not economic policy uncertainty could contribute to the stock price movements of the Indian stock market in the presence of macroeconomic risk factors.

The results showed that economic policy uncertainty has the ability to capture stock price movements, which is not accounted for by macroeconomic, non-diversifiable risk factors. As such, investors must consider economic uncertainty index in order to predict future stock price movements. However, Granger-causality tests showed that stock market movements predicted economic uncertainty, but not the other way around.

This paper is structured as follows: the next section discusses the data and methodology used in the study. Section 3 explains results obtained from regressions. Section 4 concludes the paper with some policy implications.

## 2. Data and Methodology

This study used monthly data for the period February, 2005 through August, 2022. Data for the Indian stock indexes were collected from the National Stock Exchange of India. Nifty 50, Nifty Mid-cap 50, Nifty Small-cap 50, and Nifty Total market represent the large, medium, small, and market portfolios of stocks listed in the NSE. All of these series are return index series. Monthly returns were calculated as the logged difference of two consecutive months' returns indexes multiplied by 100. Macroeconomic data on industrial production, consumer price index (CPI), interest rates and exchange rates were collected from FRED (Federal Reserve Economic Data), provided by the Economic Research Division of Federal Reserve Bank of St. Louis. The monthly inflation rate is the percentage change of monthly CPIs. Economic policy uncertainty data were collected from the website policyuncertainty.com. This data is also available at FRED website.

The model used in the study to examine the pure impact of macroeconomic variables on stock returns of portfolios was given by

$$R_{i,t} = \alpha_i + \beta_1 INDP_t + \beta_2 INF_t + \beta_3 INT_t + \beta_4 XRATE_t + \varepsilon_{i,t}, \quad (1)$$

where $INDP_t$, $INF_t$, $INT_t$, and $XRATE_t$ were the industrial production growth, inflation rate, interest rate, and exchange rate (Indian rupee for one US dollar) changes of Indian rupee at time *t*. $\varepsilon_{i,t}$ is error term at time *t*. The error term was assumed to follow a white noise process. Returns of portfolio *i* represent the returns of Nifty total, Nifty 50, Nifty Mid-cap 50, and Nifty Small-cap 50 indexes. The model used in the study to examine the pure impact of macroeconomic variables plus the lagged own returns ($R_{i,t-1}$) on the contemporaneous returns of portfolios was given by

$$R_{i,t} = \alpha_i + \beta_1 INDP_t + \beta_2 INF_t + \beta_3 INT_t + \beta_4 XRATE_t + \beta_5 R_{i,t-1} + \varepsilon_{i,t}. \quad (2)$$

Finally, the model to examine the pure impact of macroeconomic variables, lagged own returns and the economic policy uncertainty ($EPU_t$) on the contemporaneous portfolio returns could be expressed as

$$R_{i,t} = \alpha_i + \beta_1 INDP_t + \beta_2 INF_t + \beta_3 INT_t + \beta_4 XRATE_t + \beta_5 R_{i,t-1} + \beta_6 EPU_t + \varepsilon_{i,t}. \quad (3)$$

Even if *EPU* has influence on the returns of all the size portfolios, the causal relationship between them may not be clear. Thus, we used the pairwise causality test in a Granger-causality framework in order to detect the causal relationship between them. Since there are strong rewards for investors to be able to predict the future state of the economy, there is a good possibility that stock market reactions lead the EPU index.

## 3. Results

Figure 1 exhibits the EPU series for the period 01/2003-08/2022. It shows several peaks around 2008. This corresponds to the Great Recession, which started in the USA as the housing market collapsed in 2007-2008, and then it spread world-wide.

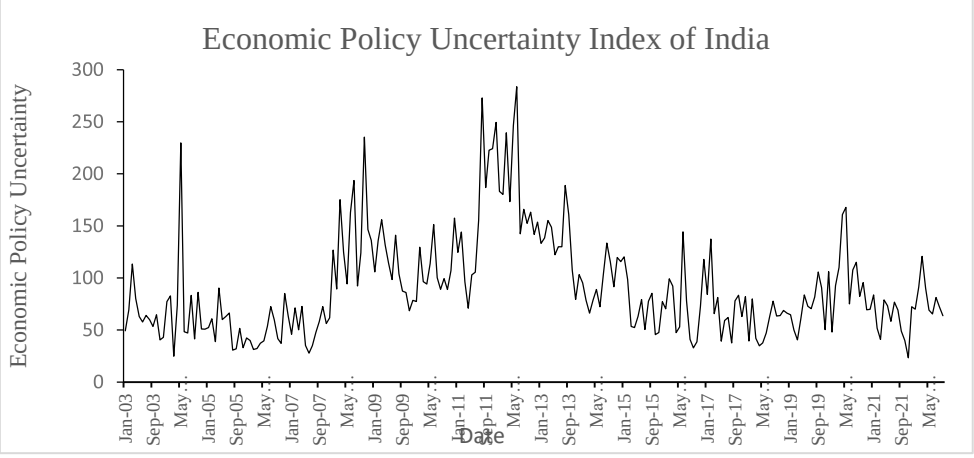


Figure 1. The Economic Policy Index of India, January 2003 – August 2022

Source: Authors' own calculations.

There was a big leap of uncertainty in India during the 2011-2012 period. There was a policy reversal on FDI in multi-brand ownership, followed by a budget without strong support from major policy-related changes (Sahoo, 2012). An ambiguous private investment policy and an amendment of the existing income tax law to retrospectively tax overseas transactions of Indian assets panicked both domestic and foreign investors (Sahoo, 2012). Reputed rating agencies downgraded the Indian economic outlook from "stable" to "negative." The rupee also depreciated significantly during the same period. All these negative events imposed a strong adverse pressure on the investment climate of that time. Both domestic and foreign investment dramatically declined, which was very nicely captured in the graph.

There was another sudden increase of EPU around August 2013, which could be linked to the depreciation of the rupee against the US dollar (Younus, undated). Another depreciation of the US dollar happened in February 2017, which was also captured in the graph. This can also be related to the demonetization of 500 and 1000 Indian rupee notes. The sudden jump of EPU in May 2020 occurred possibly due to the global outbreak of Covid 19.

Table 1 shows the effect of macroeconomic variables and lagged own returns on the market's large, medium, and small portfolio returns. Among the macroeconomic variables, the impact of industrial production and exchange

rate is always significant. It seems that exchange rate is the most influential macroeconomic variable among all. As the size of the portfolio increases, the impact of the exchange rate also increases. This also shows the vulnerability of Indian firms to the demand and supply of Indian rupees in the international foreign currency market. The significantly negative relationship implies that as the value of Indian rupees goes down (thus, the appreciation of U.S. dollar), the stock returns go down as well. The significantly positive relationship with industrial production implies that it is also a strong predictor of future stock prices. Surprisingly, inflation and interest rates show no relationship with the returns of any of the size portfolios. It suggests that the Central Bank of India has a limited power to influence the stock market with its interest rate policies.

Table 1. Effects of Macroeconomic Variables on Stock Portfolio Returns

| Dependent Variables | Constant | LRET | INDP | INF | INTRATE | XRATE | EPU | Adj. $R^2$ |
|---|---|---|---|---|---|---|---|---|
| *Panel A. Only macroeconomic variables are considered* | | | | | | | | |
| Market | 2.569 | - | 0.1337 | 0.5187 | -0.2374 | -0.9304 | - | 0.20 |
| | (1.70) | | (2.48)** | (1.18) | (-1.12) | (-6.12)*** | | |
| Nifty Large | 2.0214 | - | 0.2640 | 0.5631 | -0.1344 | -1.4388 | - | 0.38 |
| | (1.28) | | (4.66)*** | (1.22) | (-0.60) | (-9.01)*** | | |
| Nifty Medium | 2..9934 | - | 0.3258 | 0.6656 | -0.2838 | -1.9328 | - | 0.33 |
| | (1.31) | | (4.00)*** | (1.01) | (-0.88) | (-8.42)*** | | |
| Nifty Small | 1.9446 | - | 0.3566 | 0.3860 | -0.1310 | -2.0566 | - | 0.32 |
| | (0.77) | | (3.93)*** | (0.532) | (-0.37) | (-8.05)*** | | |
| *Panel B. Both lagged own returns and macroeconomic variables are considered* | | | | | | | | |
| Market | 2.3515 | 0.1468 | 0.1149 | 0.4276 | -0.2235 | -0.8173 | - | 0.21 |
| | (1.56) | (2.18)** | (2.11)** | (0.98) | (-1.06) | (-5.11)*** | | |
| Nifty Large | 2.0122 | 0.0049 | 0.2643 | 0.5610 | -0.1341 | -1.4380 | - | 0.37 |
| | (1.26) | (0.09) | (4.63)*** | (1.21) | (-0.60) | (-8.95)*** | | |
| Nifty Medium | 2.8300 | 0.0731 | 0.3335 | 0.5865 | -0.2664 | -1.9190 | - | 0.34 |
| | (1.24) | (1.28) | (4.08)*** | (0.88) | (-0.83) | (-8.35)*** | | |
| Nifty Small | 1.7339 | 0.1573 | 0.3795 | 0.2119 | -0.1162 | -1.9996 | - | 0.34 |
| | (0.70) | (2.72)*** | (4.23)*** | (0.29) | (-0.33) | (-7.93)*** | | |

Note: *t*-values are reported in parentheses. ** and *** indicate significance at 5% and 1% level, respectively.
Source: Authors' own calculations.

Panel B of table 1 includes an additional variable – own lagged returns. Even in the presence of this, the strong impact of industrial production and exchange rate still exists. Interestingly, the macroeconomic variables were least able to predict the market portfolio returns. In general, adjusted $R^2$ of large portfolio was the highest among all the portfolios. It makes sense since large firms are probably more export-oriented and more vulnerable to exchange rate movements. Moreover, the exchange rates of the Indian rupee were never stable in a true sense during the entire study period. However, as before, inflation and interest rates cannot influence stock returns. This is a surprising finding. Adjusted $R^2$s range from 0.20 to 0.38, which indicates that a decent portion of the Indian stock price movements can be explained by macroeconomic factors.

Table 2 shows how the Indian stock price movements can be explained when economic policy uncertainty is introduced in the model. Panel A shows the results without lagged returns. Adjusted $R^2$s increased when EPU was added to the models for size portfolios. Surprisingly, market returns were not influenced by EPU. The significantly negative impact of EPU on size portfolio returns suggests that EPU is a risk factor which cannot be accounted for by macroeconomic factors. Thus, investors must consider including EPU in their asset valuation models.

Although not reported here, we have also considered lagged EPU. However, lagged EPUs were not able to improve the model significantly. The results show that the impact of EPU on the Indian stock market is similar to other studies on developed markets. The findings of those studies were mentioned in the introduction. Panel B of the table shows the results when lagged returns were added to the model. The EPU had almost the same level of influence on size portfolio returns. The combined impact on industrial production, exchange rate, and economic policy uncertainty was the highest for the large stock portfolio.

Table 2. Effects of Macroeconomic Variables and Economic Uncertainty on Stock Portfolio Returns

| Dependent Variables | Constant | LRET | INDP | INF | INTRATE | XRATE | EPU | Adj. $R^2$ |
|---|---|---|---|---|---|---|---|---|
| *Panel A. EPU and macroeconomic variables are considered* | | | | | | | | |
| Market | 2.5556 | - | 0.1326 | 0.5284 | -0.2364 | -0.9221 | -0.0636 | 0.20 |
| | (1.69) | | (2.45)** | (1.20) | (-1.11) | (-6.03)*** | (-0.69) | |
| Nifty Large | 1.9543 | - | 0.2587 | 0.6110 | -0.1294 | -1.3977 | -0.3139 | 0.42 |
| | (1.26) | | (4.68)*** | (1.36) | (-0.59) | (-8.94)*** | (-3.32)*** | |
| Nifty Medium | 2.8780 | - | 0.3167 | 0.7479 | -0.2752 | -1.8620 | -0.5403 | 0.38 |
| | (1.31) | | (4.03)*** | (1.17) | (-0.89) | (-8.39)*** | (-4.02)*** | |
| Nifty Small | 1.7934 | - | 0.3470 | 0.5164 | -0.1235 | -1.9823 | -0.5536 | 0.37 |
| | (0.73) | | (3.92)*** | (0.72) | (-0.36) | (-7.96)*** | (-3.61)*** | |
| *Panel B. Lagged own returns, EPU and macroeconomic variables are considered* | | | | | | | | |
| Market | 2.3522 | 0.1452 | 0.1149 | 0.4298 | -0.2235 | -0.8175 | -0.0077 | 0.21 |
| | (1.56) | (2.06)** | (2.11)** | (0.98) | (-1.05) | (-5.10)*** | (-0.08) | |
| Nifty Large | 1.9608 | -0.0143 | 0.2576 | 0.6273 | -0.1299 | -1.3390 | -0.3172 | 0.40 |
| | (1.26) | (-0.26) | (4.62)*** | (1.38) | (-0.59) | (-8.90)*** | (-3.32)*** | |
| Nifty Medium | 2.7721 | 0.0426 | 0.3212 | 0.7066 | -0.2650 | -1.8553 | -0.5272 | 0.38 |
| | (1.26) | (0.76) | (4.06)*** | (1.09) | (-0.85) | (-8.32)*** | (-3.87)*** | |
| Nifty Small | 1.6294 | 0.1264 | 0.3667 | 0.3519 | -0.1114 | -1.9395 | -0.5015 | 0.37 |
| | (0.67) | (2.40)** | (4.18)*** | (0.49) | (-0.32) | (-7.86)*** | (-3.28)*** | |

Note: *t*-values are reported in parentheses. ** and *** indicate significance at 5% and 1% level, respectively.

Source: Authors' own calculations.

Although EPU has influence on the returns of all of the size portfolios, the causal relationship between them is not clear yet. Table 3 shows the pairwise causality direction in a Granger-causality framework. Interestingly, for all three pairwise relationship tests, there is unidirectional causality running from portfolio returns to economic policy uncertainty. Thus, Indian stock market moves before the uncertainty level changes. This significantly negative relationship implies that stock price drops before the uncertainty kicks in. This is not unusual, since the Indian stock market is a vibrant emerging market that is followed by sophisticated investors and analysts. Thus, the market is able to successfully predict the future condition of the economy.

Table 3. Pairwise Granger Causality Tests

| Null Hypothesis: | Obs. | F-Statistic | Prob. |
|---|---|---|---|
| EPU does not Granger Cause NIFLAR | 207 | 0.80064 | 0.5261 |
| NIFLAR does not Granger Cause EPU | | 3.04685 | 0.0182 |
| EPU does not Granger Cause NIFMID | 207 | 0.72258 | 0.5774 |
| NIFMID does not Granger Cause EPU | | 5.70336 | 0.0002 |
| EPU does not Granger Cause NIFSML | 204 | 0.64696 | 0.6297 |
| NIFSML does not Granger Cause EPU | | 3.75224 | 0.0058 |

Notes: Number of lags = 4. NILFAR, NIFMID, and NIFSML present portfolio of large, medium, and small size firms.

Source: Authors' own calculations.

Overall, the findings show that investors, academicians, and policymakers cannot ignore the impact of economic policy uncertainty. In other words, the results suggest that this kind of uncertainty should be considered to be a source of systematic risk, which cannot be captured by macroeconomic movements. The only question is whether uncertainty can capture economic events. It has been shown in Figure 1 that it was really able to detect all of the economic tensions in India during the 2005-2022 period.

## 4. Conclusion

This paper examined the impact of economic policy uncertainty on the Indian stock portfolio indexes for the market's large, medium, and small firms. The ultimate goal of the study was to examine whether or not an economic policy uncertainty index can contribute to the stock price movements of the Indian stock market in the presence of macroeconomic risk factors. The results showed that economic policy uncertainty had the ability to capture stock price movements even after considering macroeconomic, non-diversifiable risk factors in the regression models. As such, investors should consider the economic uncertainty index in order to predict future stock price movements. That is, economic policy index should be treated as an additional systematic risk factor for the Indian stock market. A similar impact of economic policy uncertainty was also reported for the U.S. market by Arouri et al. (2016). This finding was supported by Li and Zhong (2020), Chen et al. (2017), Xiong et

al. (2018), Li et al. (2016), and Christou et al. (2017) for China, India, and Pacific Rim regional markets.

Interestingly, there is only a unidirectional causality running from portfolio returns to economic policy uncertainty. This is not unusual, since the Indian stock market is a vibrant emerging market that is followed by sophisticated investors and analysts. Thus, the market is able to successfully predict the future condition of the economy. Ulusoy and Pirgaip (2019) also reported a similar finding for the Indian market and concluded that investors of this market were quite updated about future economic conditions. Aydin et al. (2022) also supported this finding for Brazil, another large emerging market. However, this lead-lag relationship needs further examination since higher frequency data, such as weekly data, may be able to provide us a better picture.

Seemingly, this kind of index will be very helpful in predicting the stock prices of other emerging and frontier markets as well. More research is required in this line. Another problem is that many emerging markets do not have such an index. Investors can construct such an index for their own purposes. Policymakers and regulators should emphasize these indexes more as long as policy changes are concerned. One note of caution is worth mentioning: since a big part of such indexes comes from news media, their effectiveness obviously depends on the freedom of the press in the country concerned.

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