Reactions of Large, Mid, and Small Stocks to Macroeconomic and Non-Macroeconomic Factors : Similar or Different?

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Abstract

Purpose : This paper investigated how the stock returns of large, mid, and small companies reacted to macroeconomic and non-macroeconomic factors in India.

Methodology : We used the quantile regression method and the quarterly data between Q1 2010 – Q4 2022 for the analysis. As dependent variables, we took into account companies listed under the Large Cap100, Mid Cap100, and Small Cap100 Indian stock exchange indices. In addition, we have included inflation, interest rates, and exchange rates as macroeconomic factors. We also added non-macroeconomic indicators as proxied by the Nifty, GPR, VIX, and EPU in addition to macroeconomic variables.

Findings : It was discovered that the stock returns of small companies are negatively impacted by inflation, while huge companies see no effect at all. Furthermore, whereas small businesses are unaffected by interest rates, large and midsized businesses benefit from them. Furthermore, the Nifty, volatility, and the uncertainty surrounding economic policy benefit each of the three categories of businesses. Geopolitical risk and exchange rates also have a detrimental impact on large, mid, and small businesses.

Practical Implications : Our findings will help investors and portfolio managers recognize market patterns, control portfolio risk, foresee future shifts in the stock market, and modify their investment strategy for investments in big, mid-sized, and small businesses.

Originality : As far as we are aware, this is the first effort to investigate the impact of macro and non-macroeconomic factors on LMS companies in India using the panel quantile regression methodology.

Keywords : **macroeconomic, non-macroeconomic, large-cap, mid-cap, small-cap, stock returns, quantile regression, India**

JEL Classification Codes : C31, G11, G12

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The stock market is closely related to macroeconomic and non-macroeconomic factors, and the stock market performance is often seen as a barometer of the overall health of the economy. The previous studies reveal that exchange rates, interest rates, and inflation are some of the most important macroeconomic

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factors that impact the stock market (Chellaswamy et al., 2020; Jareño et al., 2016; Jagotra & Singh, 2018; Lohan et al., 2023). The changes in interest rates can impact the cost of borrowing money and can affect the profitability of companies and vice versa. Furthermore, high inflation can increase the cost of goods and services, leading to reduced consumer spending and lower corporate profits. Stock prices may decline as a result of this. Due to its sizable and expanding economy and strong ties to international markets, exchange rates can have a significant effect on the Indian stock market.

Along with the macro variables, the previous literature also supports the non-macro variables' influence on stock returns (Hoque & Zaidi, 2020; Patel et al., 2023; Raghuram & Erickson, 2017; Salisu et al., 2022). Geopolitical events can create uncertainty and fear among investors, leading to market volatility and a decrease in stock prices. In this paper, we use the geopolitical risk (GPR) index, constructed by Caldara and Iacoviell (2022), as one tool to assess the potential impact of geopolitical risk on the stock market. The economic policy uncertainty (EPU) index, proposed by Baker et al. (2016), is a measure of the level of uncertainty in the economy based on news coverage of economic policy issues. Furthermore, volatility refers to the degree of fluctuation in the stock market.

In India, stocks are generally categorized into three categories based on the market capitalization (market cap) of the company: large-cap, mid-cap, and small-cap (hereinafter LMS). The companies with a market cap of more than ₹ 20,000 crores are classified as large-cap stocks, between ₹ 5,000 and ₹ 20,000 crores as mid-cap, and a market capitalization of less than ₹ 5,000 crores as small-cap companies. Large companies are generally the leaders in their respective industries and are known for their stable earnings and consistent dividend payouts. Furthermore, mid-cap companies are generally in a growth phase, which means they have the potential to grow and expand their business operations. These companies may offer enormous returns than large-cap stocks but also hold enormous risk due to their smaller size and lower liquidity, whereas small-cap companies are typically newer and smaller in size, and they may operate in niche markets or emerging industries.

Moreover, small-cap companies have the potential to yield bigger returns than large-cap and mid-cap stocks, but they also entail a higher risk because of their smaller size, less liquidity, and volatility potential. Investors should consider their risk appetite and investment goals before investing in any of these categories of stocks. Small-cap stocks may yield larger returns but are more volatile than large-cap equities, which are often regarded as more stable and less hazardous. A balance between the two may be found in mid-cap equities.

Our paper tackles the following open-ended questions in this context. (a) Do the macro and non-macroeconomic variables affect the three different company groupings in the same way? (b) Do the variables exhibit any symmetric or asymmetric dependencies? Based on the above discussion, our paper examines the impact of macroeconomic and non-macroeconomic factors on the stock returns of large-, mid-, and small companies. Our contribution to the existing literature is that this is the first effort to investigate the impact of macro and non-macroeconomic factors on LMS companies in India using the panel quantile regression methodology as far as we are aware. We find that there is a complex and dynamic relationship between macroeconomic and non-macroeconomic factors with stock returns across three different groups of companies in India. Our results can be helpful for investors who want to make informed investment decisions and manage their portfolio risk.

Review of Literature

There is a prominent research work available on the influence of macroeconomic elements on stock returns. Ashwani and Sheera (2018) explained that the exchange rate, money supply, and treasury bill rate create stock market volatility using the MIDAS GARCH approach. Faniband et al. (2022) found a heterogeneous relationship between sugar industry factors and sugar firms' stocks. Nayak and Barodawala (2021) revealed the association between major macroeconomic variables and Sensex using the ARDL model. Furthermore, Rehman et al. (2016)

found that industrial production and foreign inflow in equity are the determinants of stock market liquidity. Faniband and Faniband (2021) investigated the volatility spillover effect between government bonds and the stock market. Jareño et al. (2016) applied quantile regression and found that the US stock market had a substantial association with inflation and interest rates. Chellaswamy et al. (2020) showed that stock markets in India and China reacted to their interest and inflation rates.

Syed et al. (2021) concluded that the first wave of COVID-19 had a negative and the second wave had a positive impact on the stock market in India. Muthukamu and Amudha (2020) found that the stocks of Indian private-sector banks were more volatile than the public-sector banks due to demonetization. Chavali and Zahid (2011) considered 20 stock splits and found that the stock splits had a significant and positive effect on the stock prices of Indian companies using the event study method. Boadi (2018) showed that the selected financial ratios were the significant predictors of the stock returns of all listed companies in the Ghana Stock Exchange using the generalized methods of moments. Nõu et al. (2023) revealed that the machine learning methods were a better predictor of stock returns and volatility than the autoregressive moving average models in the Baltic stock market. Yadav and Behera (2023) investigated the impact of the ESG (environmental, social, and governance) ratings on the stocks of Indian companies. The authors found that the improvements in ESG ratings affected the stock returns. Chellaswamy et al. (2021b) took an overview of various stock market reforms made in India and their impact on stock market performance. Faniband et al. (2023) noticed a heterogeneous impact of company-specific variables on firms from large-, mid-, and small-cap groups.

The latest study conducted by Salisu et al. (2022) found that the stock market volatility in emerging economies responded more positively to GPR using the GARCH – MIDAS approach. Furthermore, Yang et al. (2021) showed that the global and regional GPR substantially affected the stock market in China. Chellaswamy et al. (2021a) found that the Indian and Chinese stock markets were interlinked. Rawat and Arif (2018) found no homogeneity between BRIC (Brazil, Russia, India, and China) equity returns and their own country GPR using quantile-on-quantile regression. This result is in similar line with Balcilar et al. (2018) who revealed that the effects of GPR on return and volatility were not uniform across BRICS countries using nonparametric causality-in-quantiles tests. Hoque and Zaidi (2020) found that, using a three-regime Markov-switching technique, both global and country-specific GPR had an impact on the stock returns of Brazil, India, Indonesia, South Africa, and Turkey.

Several studies have examined the effects of EPU on stock markets. Faniband and Shamsher (2024) revealed that the impact of EPU on the stock markets of various Middle East markets is heterogeneous. Škrinjarić and Orloví (2020) examined how the EPU shocks affected stock market returns of Central and Eastern European markets using vector autoregression (VAR). Some of the sample countries reacted substantially to EPU. Alqahtani et al. (2017) also noticed that European policy uncertainty had a negative but insignificant impact on Gulf Cooperation Council countries. Kalra and Gupta (2023) found that market volatility was positively correlated, and returns were negatively correlated with EPU in the Indian stock market.

Quite a few studies have examined the impact of stock market volatility on stock returns. Saranya and Sudhamathi (2024) found the impact of VIX's lag returns on the Nifty returns. Bagchi (2012) found that stock returns substantially and positively reacted to India VIX. On the other hand, Chandra and Thenmozhi (2015) revealed that Nifty returns reacted negatively to the India VIX. Shanthi and Thamilselvan (2019) found that volatility in BSE Sensex and Nifty was caused by foreign capital inflow, the balance of payment, currency, and interest rates.

The past studies concerning LMS stocks included Jagotra and Singh (2018), who found that the BSE LMS indices were substantially affected by the index of industrial production, inflation and exchange rate. Furthermore, Khanra and Dhir (2017) showed that volatility had less impact on the NSE Small 100 index compared to large and mid-cap stocks. Moreover, Jena et al. (2021) found that mid-cap stocks contributed more to

total volatility and after that, the small- and large-cap stocks in order. Wang et al. (2013) detected that most large-cap stocks followed the international asset pricing model, whereas small-cap stocks did not follow it.

Based on the above literature, it is clearly evident that the impact of macro and non-macroeconomic variables on LMS companies in India has been ignored in past studies. Therefore, we cover this gap to better understand the comparative reaction of these three groups of companies to macro and non-macroeconomic factors.

Data and Variables

In this paper, we considered companies listed under three Indian indices of the National Stock Exchange: Large Cap100, Mid Cap 100, and Small Cap 100, and we have taken into account the quarterly data between Q1 2010– Q4 2022. Our analysis took into account the interest rate (IR) and exchange rate (ER) of less than 24 hours between the US dollar and the Indian rupee using the consumer price index (CPI) as a proxy for inflation and call money/interbank rate. The selection of these variables is supported by Ashwani and Sheera (2018), Faniband and Jadhav (2024), Jareño et al. (2016), and Nayak and Barodawala (2021). In addition to macroeconomic variables, we included non-macroeconomic variables as proxied by EPU, GPR, VIX and Nifty (index of NSE). The previous studies support the selection of non-macro variables (Bagchi, 2012; Chandra & Thenmozhi, 2015; Hoque & Zaidi, 2020; Rawat & Arif, 2018; Salisu et al., 2022).

While screening the data of companies, we noticed that data of a few companies were missing or a few companies were not listed in 2010. Based on this screening, we counted 220 companies as our sample size. It includes 84 companies from large-cap, 70 from mid-cap, and 66 companies from small-cap. We captured stock price data from the ProwessIQ CMIE database, and later, we took the log of stock prices to get the data of stock returns. We used the FRED database to collect the data on macroeconomic variables. The data of EPU and GPR were collected from the website policyuncertainty.com. Volatility index data were gathered from the website of www.nseindia.com, and the data of the Nifty index were captured from the website of www.niftyindices.com. The analysis is done using STATA and R Software.

Methodology

Panel quantile regression is a statistical technique that combines two commonly used methods: panel data analysis and quantile regression. Panel data analysis is used when data is collected over time from a group of individuals, firms, or countries, while quantile regression estimates the relationship between variables at different points in the distribution of the dependent variable. In panel quantile regression, the aim is to estimate the relationship between one or more independent variables and a specific quantile of the dependent variable in panel data. This allows researchers to examine how the relationship between the independent and dependent variables differs across different points in the distribution of the dependent variable using maximum likelihood estimation rather than just focusing on the mean relationship.

The following is the panel quantile regression equation with a fixed effect:

$$Q_{yij}(\tau \mid x_{ij}) = \alpha_i + x_{ij}^{T} \beta\tau \quad i=1,\ldots,m;\ j=1,\ldots,n \qquad (1)$$

In formula (1), α's have a pure location shift impact on the conditional quantiles. The impact of the covariates x_{ij} is permitted to rely on the quantile τ of interest; i is the index of the individual and j is the index of time ; m is the number of observations on the individual i ; n is the number of observations on the time t.

The results for the 0.2, 0.4, 0.5, 0.6, and 0.8 quantiles reported in Tables 2, 3, and 4 convey a sense of the relationship of the selected explanatory variables across the entire conditional LMS companies' distribution.

Table 1. ***Results of Panel Unit Root Tests***

	CPI	*IR*	*ER*	*EPU*	*GPR*	*Nifty*	*VIX*	Large - Cap	Mid - Cap	Small - Cap
LLC	–44.15***	–18.44***	–39.89***	–31.47***	–10.23***	–0.95***	–56.82***	–30.40***	–22.92***	–20.09***
IPS	–41.19***	–26.81***	–35.92***	–55.85***	–15.35***	–28.22***	–51.17***	–31.87***	–25.75***	–22.73***
ADF	1725.46***	1011.93***	1492.08***	2461.66***	526.80***	1078.37***	2232.83***	1226.31***	914.79***	747.50***
PP	2345.74***	2607.68***	2904.53***	3839.77***	773.75***	2462.60***	3820.40***	1878.04***	1469.75***	1149.57***

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The basic regression model is written as :

$$SR_{it} = \alpha_i + \beta_1 CPI_{it} + \beta_2 IR_{it} + \beta_3 ER_{it} + \beta_4 EPU_{it} + \beta_5 GPR_{it} + \beta_6 Nifty_{it} + \beta_7 VIX_{it} + \mu_{it} \quad (2)$$

The results presented in Table 1 reveal that the variables are conclusively and consistently stationary at level using Levin, Lin, and Chu (LLC), Im, Pesaran, and Shin (IPS), Phillips-Perron (PP), and Augmented Dickey–Fuller (ADF).

Analysis and Results

Table 2 shows that, with the exception of 0.8 for inflation and 0.1 for interest rate, both inflation and interest rates have a significant and positive impact on the stock returns of large corporations across all quantiles. Because big businesses frequently have more market power, brand awareness, and economies of scale than smaller competitors, the effect of inflation is conceivable. Inflation can disproportionately affect smaller or less

Table 2. ***Results for Large-Cap***

	0.2	**0.4**	**0.5**	**0.6**	**0.8**
CPI	1.324*	1.791***	1.376**	1.142*	1.118
	(0.787)	(0.603)	(0.578)	(0.620)	(0.743)
IR	0.019	0.170***	0.219***	0.198***	0.293***
	(0.084)	(0.065)	(0.062)	(0.066)	(0.080)
ER	–1.458***	–0.802***	–0.257	0.087	0.594*
	(0.331)	(0.253)	(0.243)	(0.260)	(0.312)
EPU	0.080***	0.041**	0.047***	0.030*	0.023
	(0.023)	(0.017)	(0.017)	(0.018)	(0.021)
GPR	–13.901**	–13.318***	–14.123***	–10.310**	–9.245
	(6.241)	(4.779)	(4.586)	(4.914)	(5.890)
NIFTY	2.000***	2.060***	2.417***	2.464***	2.541***
	(0.180)	(0.137)	(0.132)	(0.141)	(0.169)
VIX	3.282	2.681	4.051**	3.614*	4.758**
	(2.562)	(1.961)	(1.882)	(2.017)	(2.417)
Constant	–5.648***	0.167	2.743***	4.555***	10.526***
	(1.212)	(0.928)	(0.890)	(0.954)	(1.143)

Standard errors in parentheses.

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

established firms that may struggle to cope with rising costs. This ability to pass on higher costs to consumers can help maintain profit margins and sustain business growth. Furthermore, we detected that the exchange rate influences negatively and significantly at the bottom quantiles, whereas it has a positive and substantial impact at the end quantile (0.8).

Moreover, we noticed that economic policy uncertainty has a substantial and positive effect on large-cap stock returns (except 0.8). Similarly, the impact of Nifty is found to be substantial and positive for all the quantiles. The effects of the volatility index on large-cap stock returns are asymmetric because the coefficients at the bottom quantiles are insignificant, and the higher quantiles, including the median, are substantial and positive. However, the large-cap stock returns are substantially and negatively determined by the geopolitical risk across different quantiles except 0.8. These results are consistent with the findings of Balcilar et al. (2018), Chellaswamy et al. (2020), and Jagotra and Singh (2018).

Table 3 indicates the results for the mid-cap stock returns. Unlike large-cap, inflation has no impact on mid-cap stock returns. The finding of inflation may be plausible for two reasons. First, the valuations of mid-cap companies are typically based on factors such as earnings growth, revenue growth, and industry dynamics. As long as they continue to deliver strong financial performance and growth, investors may still find them attractive, regardless of the prevailing inflationary environment. Second, mid-cap stocks are generally more diversified across sectors compared to large-cap stocks, which may help mitigate the impact of inflation on their overall performance. It is surprising to note that interest rate, exchange rate, economic policy uncertainty, geopolitical risk, and Nifty have a substantial impact (positive/negative) for all the quantiles. Exchange rate and geopolitical risk have an inverse relationship with the mid-cap stock returns; whereas, interest rate, economic policy uncertainty, and Nifty have a positive effect. Furthermore, the volatility index has a substantial positive impact only at the end quantile.

Table 3. ***Results for Mid-Cap***

	0.2	**0.4**	**0.5**	**0.6**	**0.8**
CPI	0.229	–0.201	–0.523	0.252	1.134
	(0.987)	(0.780)	(0.776)	(0.851)	(1.062)
IR	0.335***	0.338***	0.271***	0.308***	0.481***
	(0.106)	(0.084)	(0.083)	(0.091)	(0.114)
ER	–2.671***	–1.006***	–1.024***	–1.353***	–0.963**
	(0.415)	(0.328)	(0.326)	(0.358)	(0.446)
EPU	0.112***	0.061***	0.077***	0.072***	0.062**
	(0.028)	(0.022)	(0.022)	(0.024)	(0.030)
GPR	–20.094**	–19.796***	–11.995*	–19.805***	–26.874***
	(7.828)	(6.184)	(6.151)	(6.752)	(8.419)
NIFTY	2.423***	2.409***	2.697***	2.524***	2.723***
	(0.225)	(0.178)	(0.177)	(0.194)	(0.242)
VIX	2.783	–1.580	3.493	2.155	8.664**
	(3.213)	(2.538)	(2.524)	(2.771)	(3.455)
Constant	–6.576***	0.711	2.367**	6.956***	15.972***
	(1.520)	(1.201)	(1.194)	(1.311)	(1.634)

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4. ***Results for Small-Cap***

	0.2	0.4	0.5	0.6	0.8
CPI	–2.564*	–2.637**	–2.634**	–2.823***	–2.719*
	(1.316)	(1.075)	(1.129)	(1.029)	(1.504)
IR	–0.064	–0.034	–0.044	0.054	0.150
	(0.141)	(0.115)	(0.121)	(0.110)	(0.161)
ER	–2.960***	–2.213***	–2.189***	–1.946***	–1.414**
	(0.552)	(0.451)	(0.473)	(0.432)	(0.631)
EPU	0.212***	0.197***	0.178***	0.178***	0.219***
	(0.038)	(0.031)	(0.032)	(0.030)	(0.043)
GPR	–42.807***	–25.861***	–23.936***	–21.845***	–22.048*
	(10.446)	(8.535)	(8.960)	(8.167)	(11.940)
NIFTY	3.571***	3.450***	3.571***	3.893***	4.522***
	(0.300)	(0.245)	(0.257)	(0.234)	(0.343)
VIX	15.581***	10.223***	11.236***	14.376***	23.069***
	(4.279)	(3.496)	(3.670)	(3.345)	(4.891)
Constant	–4.708**	1.347	5.310***	8.549***	17.589***
	(2.029)	(1.658)	(1.740)	(1.586)	(2.319)

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Finally, we documented the results of small-cap stock returns in Table 4. It is interesting to note that inflation, exchange rate, and geopolitical risk have a substantial and negative effect on the small-cap stock returns for all the quantiles. In contrast, economic policy uncertainty, Nifty, and volatility are the factors that significantly and positively affect the small-cap stock returns across all the quantiles. We find that interest rate is the only variable that does not affect the small-cap stock returns because all coefficients are insignificant. We point out two interesting findings here related to inflation and interest rate for small companies. Inflation has a positive impact on large companies; no impact on mid companies; and a negative effect on small companies. Inflation may have a negative effect on small firms because it can cause higher operating costs, investors may become risk-averse during inflationary periods, and limited access to capital because of an increase in borrowing costs.

Furthermore, small companies may not be influenced by interest rates because of two reasons. First, small companies are often associated with higher growth potential compared to larger, more established companies. Investors in small-cap stocks typically focus more on company-specific factors such as revenue growth, earnings potential, and market opportunities rather than solely relying on interest rate movements. Second, small companies in India generally have a higher reliance on equity financing rather than debt financing. This means they may be less directly affected by changes in interest rates compared to large and mid-cap companies that have substantial debt obligations.

Conclusion and Implications

We use panel quantile regression with quarterly data from Q1 2010 to Q4 2022 to examine the effects of macro and non-macroeconomic variables on the stock returns of large, mid, and small enterprises in India. Our findings are highly intriguing and beneficial to numerous parties. Initially, the stock returns of small businesses are negatively

impacted by inflation, while huge corporations experience no influence at all. Second, the interest rate has a positive influence on large and mid-companies ; whereas, it has no impact on small companies. Third, economic policy uncertainty, Nifty, and volatility have a positive impact on all three groups of companies. Fourth, exchange rates and geopolitical risk have negative effects on large, mid, and small companies. The results of this study are significantly beneficial to investors, portfolio managers, and other stock market participants to make investment decisions and hedge portfolio risk. Our results can help investors identify market trends, manage their portfolio risk, anticipate potential changes in the stock market, and adjust their strategy of investment accordingly. Investors may be able to increase returns or lower risk by implementing our findings into their investment strategy, which would enhance their overall performance.

Limitations of the Study and Scope for Further Research

This research can be extended to examine the effects of global factors on LMS companies in India, even though it focuses on the effects of domestic macro and non-macroeconomic variables on LMS enterprises. Furthermore, there may be immediate uses for the results of our investigation. Future studies can formally assess these applications.

Authors' Contribution

Muhammadriyaj Faniband and Dr. Pravin Jadhav conceived the idea and developed a quantitative design to undertake the empirical study. Muhammadriyaj Faniband extracted research papers with high repute, filtered these based on keywords, and identified the research gap. Dr. Pravin Jadhav verified the analytical methods and supervised the study. The analysis of the data was carried out by Muhammadriyaj Faniband using STATA and R. Muhammadriyaj Faniband wrote the manuscript in consultation with Dr. Pravin Jadhav.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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