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Monetary Policy Announcement and Stock Returns: Evidence From Long-Term Repo Operations in India

Radeef Chundakkadan¹^a, Subash Sasidharan²

¹ Department of Liberal Arts, Indian Institute of Technology Bhilai, India, ² Department of Humanities and Social Sciences, Indian Institute of Technology Madras, India

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This paper investigates the impact of unconventional monetary policy on stock returns using the Reserve Bank of India's long-term repo operations (LTROs). We provide evidence that firms listed on the Bombay Stock Exchange register higher returns on the days of LTRO announcements. We also find the stock returns of bank-dependent and financially constrained firms to be relatively higher on the days of announcements.

I. Introduction

The COVID-19 pandemic has severely affected different sectors of the global economy.¹ Pandemic-induced demand- and supply-side shocks have impacted the stock markets as well (Baker et al., 2020). Governments worldwide have implemented policies to offset the economic shock (Kumar et al., 2021).² In this context, India's story is no different. To mitigate the shock of the pandemic, the Reserve Bank of India (RBI) has resorted to unconventional policies. The RBI announced long-term repo operations (LTROs) to maintain liquidity, smoothen credit flow, ease financial stress, and facilitate the proper functioning of financial markets (RBI, 2020b). Between February and April 2020, the RBI injected INR 2500 billion (USD 33.02 billion) through LTROs. These policies have enabled banks to borrow money directly from the RBI for a longer duration at a short-term interest rate (RBI, 2020a), which mitigates disruption in the credit market and relaxes the financial constraints of firms.³ In other words, this policy favors financially vulnerable firms and firms that depend on bank credit. Therefore, we hypothesize that the stock prices of such firms could shoot up on the day of LTRO announcements.

Given this scenario, the present study addresses the following questions. First, how does the stock market respond to LTRO announcements? Previous studies have explored the nexus between monetary policy announcements and

stock market response (Kontonikas et al., 2013; Kurov & Gu, 2016); however, the results have been inconclusive. On the one hand, studies have highlighted the positive response of stock returns on the day of unconventional monetary policy announcements (Kurov & Gu, 2016). On the other hand, several studies express concern about the adverse effects of monetary policy on the stock market during economic crises (Florackis et al., 2014; Kontonikas et al., 2013). Kontonikas et al. (2013) interpret this phenomenon as expansionary policies during the crisis period potentially signaling further worsening of the economy and investors moving their investments to a safe haven.

Second, how do bank-dependent firms respond to LTRO announcements? We suspect that the announcements have a differential effect on bank-dependent firms, based on the *relationship lending hypothesis* and the *zombie lending hypothesis*. According to the relationship lending hypothesis, banks may prefer to become involved in relationship lending during times of crisis (Dewally & Shao, 2014; Sette & Gobbi, 2015). Therefore, if market participants expect LTROs to ease financial access for firms that traditionally rely on bank debt, these firms' stock returns are more likely to rise. On the other hand, the zombie lending hypothesis posits that banks may fail to translate the LTRO benefits into economic activities by lending to zombie firms⁴ (Acharya et al., 2019), which does not affect the stock market.

a Corresponding author email: radeef@iitbhillai.ac.in

1 See Padhan & Prabheesh (2021) for a detailed survey on the economic effects of the COVID-19 pandemic.

2 These policies include access to new credit, the deferral of payments, cash transfers, fiscal measures, and wage subsidies (see the World Bank's COVID-19 Follow-up Enterprise Survey at <https://www.enterprisesurveys.org>).

3 The statement of Development and Regulatory Policies states the objective of LTROs as "assuring banks about the availability of durable liquidity at reasonable cost relative to prevailing market conditions. This should encourage banks to undertake maturity transformation smoothly and seamlessly so as to augment credit flows to productive sectors" (RBI, 2020a, p. 2).

Third, how does the equity of financially constrained firms react to LTRO announcements?⁵ The COVID-19 crisis has exacerbated financial stress and is likely to deepen the financial crunch of previously constrained firms (Baldwin & Di Mauro, 2020). Since LTROs are intended to boost credit availability in the economy, these operations may generate relief for financially constrained firms. The reaction of the stock prices of such firms to monetary policy, especially in the context of COVID-19, is underexplored.

This paper differs from other studies as follows. First, our study extends the literature by analyzing the impact of unconventional monetary policy during the COVID-19 pandemic period. Therefore, our study contributes to the broader literature that addresses the topic of unconventional monetary policy in response to economic shocks (Hachula et al., 2020; Inoue & Rossi, 2019; Luck & Zimmermann, 2020). Second, we link monetary policy announcements during the COVID-19 crisis with stock returns. Our study is thus a valuable addition to the stream of studies that address the nexus between unconventional monetary policy and financial markets (Ambler & Rumler, 2019; Eo & Kang, 2020; Rogers et al., 2014). Third, our study complements the literature that links pandemics to financial markets (Al-Awadhi et al., 2020; Bannigidadmth et al., 2021; Ichev & Marinč, 2018).

The remainder of the article is organized as follows. Section II covers the data and methodology. Section III reports the empirical results. Section IV concludes the study.

II. Data and empirical model

We use the daily data of manufacturing companies listed on the Bombay Stock Exchange over the period from February to April 2020. The data are obtained from the Centre for Monitoring Indian Economy Prowess database. In the data cleaning process, we drop observations if the information on any of the main or control variables is missing. Our final sample includes 49,730 firm-time observations.

To analyze the first research question, the impact of LTRO announcements on the stock market, the following equation is estimated using a panel data framework:

$$r_{i,t} = \alpha + \beta LTRO_t + Controls + Month Dummies + Industry Dummies + \varphi_i + \varepsilon_{i,t} \quad (1)$$

where $r_{i,t}$ is the daily return of firm i at time t , measured as $\ln(\text{closing price}_{i,t} / \text{closing price}_{i,t-1})$; $LTRO$ is a dummy variable that equals one for the announcement day, and zero otherwise; and $Controls$ includes various trade-related measures, such as $Beta$, the price-to-earnings ratio (P/E),⁶ the price-to-book value ratio (P/B), $Turnover$, $Size$, and information from the firm's financial statements, including $Total$

$Assets$, ROA , and $Debt$, as well as the age of the firm, Age . To check the robustness of our results, we include a proxy for RBI's key policy variable, change in the cash reserve ratio ($D.CRR$) in our model. The variable $Industry Dummies$ is based on the two-digit National Industrial Classification, φ is firms' time-invariant unobserved characteristics, and β captures the monetary policy announcement effect on stock returns.

Similarly, to examine the second research question, the response of bank-dependent firms to LTRO announcements, we estimate the following model (Foley-Fisher et al., 2016):

$$r_{i,t} = \alpha + \beta LTRO_t + \gamma BDep_{i,t} + \delta LTRO_t * BDep_{i,t} + Controls + Month Dummies + Industry Dummies + \varphi_i + \varepsilon_{i,t}, \quad (2)$$

where $BDep$ is the bank dependency variable, measured by the ratio of long-term borrowings from banks to total assets. The information to construct this measure is based on the firms' 2019 financial statements. The coefficient of the interaction term (δ) sheds light on the differential effect of policy announcements on bank-dependent firms.

Our final set of analyses explores whether LTROs reduce the financial constraints affecting stock returns, using

$$r_{i,t} = \alpha + \beta LTRO_t + \theta FC_{i,t} + \emptyset LTRO_t * FC_{i,t} + Controls + Month Dummies + Industry Dummies + \varphi_i + \varepsilon_{i,t} \quad (3)$$

where FC represents financial constraints, as measured by Whited & Wu (2006), and the Kaplan-Zingales (1997) index:

$$WWI_{i,t} = -0.091 * CF_{i,2019} + 0.021 * Debt_{i,2019} - 0.062 * Div_{i,2019} - 0.044 * Total Assets_{i,2019} - 0.035 * SG_{i,2019} + 0.102 * ISG_{i,2019}$$

$$KZI_{i,t} = -1.001909 * CF_{i,2019} + 3.139193 * Debt_{i,2019} - 39.36780 * Div_{i,2019} - 1.314759 * Cash_{i,2019} + 0.2826389 * Q_{i,2019}$$

where CF is the cash flow, Div indicates the dividend payment, SG is the annual sales growth, ISG denotes the industry sales growth, $Cash$ indicates the firm's cash in hand, and Q is Tobin's Q . In this analysis, \emptyset (the coefficient of the interaction terms) is the main interest. All the estimations are carried out over models with the population average method, since it accounts for the correlation structure of the data.

III. Results

Table 1 reports the regression results of the stock returns and LTRO announcements (Eq. (1)). Column (1) presents the findings of our parsimonious model; consequently, we introduce industry dummies (Column (2)), trade-related variables (Column (3)), other firm-related measures (Col-

4 Zombie firms are firms that are unable to cover their operating costs from their profits and which typically rely on banks and other financial institutions for life support.

5 The nexus between monetary policy and the financial constraint of firms is well established. Monetary policy affects firms' financial access through interest rate and balance sheet channels.

6 We noticed outliers in the price-to-earnings ratio and therefore winsorized the distribution at the first and 99th percentiles.

Table 1. LTRO announcements and stock returns

Variables	(1)	(2)	(3)	(4)	(5)
<i>LTRO</i>	0.0025*** (0.0008)	0.0025*** (0.0008)	0.0025*** (0.0008)	0.0028*** (0.0008)	0.0030*** (0.0009)
<i>P/E</i>			0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
<i>P/B</i>			0.0002*** (0.0000)	0.0001*** (0.0000)	0.0001*** (0.0000)
<i>Beta</i>			-0.0008* (0.0004)	-0.0001 (0.0006)	-0.0001 (0.0006)
<i>Turnover</i>			0.0011*** (0.0002)	0.0013*** (0.0003)	0.0014*** (0.0003)
<i>Size</i>			-0.0003* (0.0002)	0.0006** (0.0002)	0.0006** (0.0002)
<i>Total Assets</i>				-0.0012*** (0.0004)	-0.0013*** (0.000397)
<i>ROA</i>				-0.0088* (0.0047)	-0.0089* (0.0047)
<i>Age</i>				-0.0004 (0.0003)	-0.0005 (0.0003)
<i>Debt</i>				0.0002 (0.0013)	0.0002 (0.0013)
<i>D.CRR</i>					-0.0078*** (0.0018)
<i>Constant</i>	-0.0053*** (0.0003)	-0.0058*** (0.0014)	-0.0033* (0.0017)	0.0015 (0.0026)	0.00160 (0.00257)
Month dummies	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	Yes	Yes	Yes
Observations	49,730	49,730	49,730	44,458	44,458
Number of id	1,001	1,001	1,001	902	902

This table presents the estimation result of equation 1. The values 0.0000 indicate that they are close to zero or less than a multiple of 10^{-4} . Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

umn (4)), and a key policy variable (Column (5)) in a step-wise manner. We find that the coefficient of *LTRO* is positive and statistically significant; that is, on average, LTRO announcements are associated with 0.25–0.30% higher stock returns.

In [Table 2](#), we report the estimation results of Equation (2) (Columns (1)–(4)). Irrespective of the model specification, we find a positive and significant coefficient for the key variable of interest. A one standard deviation increase in bank dependence is associated with an increase of about 0.15% in the daily return on the days of LTRO announcements. This finding indicates that market participants expect bank-dependent firms to raise relatively more funds, or the possibility of relationship banking. Finally, [Table 3](#) reports the estimation results of Equation (3) using Whited and Wu's (2006) and Kaplan and Zingales' (1997) measure in Columns (1) and (2), respectively. We did not include the financial statement measures during this analysis, since most of the variables are used in the index construction. Irrespective of the financial constraint measure, we find a

positive and significant coefficient for the interaction term. More specifically, highly constrained firms earned higher stock returns on the day of LTRO announcements. We interpret this finding as market participants expecting LTROs to relax the financial constraints of firms.

IV. Conclusion

Despite the central banks implementing several unconventional measures to cope with the COVID-19 crisis, little is known about the effect of their announcement on stock returns. This paper attempts to fill the gap by examining the announcements of the RBI's LTROs on the Indian stock market. Using panel data on companies listed on the Bombay Stock Exchange from February to April 2020, we show that stock returns on the days of LTRO announcements are higher than on non-announcement days. The effect is more pronounced for firms that are highly dependent on banks. We also demonstrate that the stock returns of financially constrained firms increased significantly on the day of LTRO announcements.

Table 2. LTRO announcements and stock returns of bank-dependent firms

Variables	(1)	(2)	(3)	(4)
<i>LTRO*BDep</i>	0.0148** (0.0071)	0.0147** (0.0071)	0.0148** (0.0071)	0.0149** (0.0071)
<i>LTRO</i>	0.0008 (0.0014)	0.0008 (0.0014)	0.0008 (0.0014)	0.0008 (0.0014)
<i>BDep</i>	-0.0053** (0.0023)	-0.0031 (0.0021)	-0.0010 (0.0024)	0.0006 (0.0027)
<i>Constant</i>	-0.0047*** (0.0004)	-0.0055*** (0.0015)	-0.0027 (0.0020)	0.0023 (0.0027)
Controls	Yes	Yes	Yes	Yes
Month dummies	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	Yes	Yes
Observations	41,309	41,309	41,309	41,309
Number of id	841	841	841	841

This table presents the estimation result of equation 2. The values 0.0000 indicate that they are close to zero or less than a multiple of 10^{-4} . The controls are *P/E*, *P/B*, *Beta*, *Turnover*, *Size*, *Total Assets*, *ROA*, *Age* and *Debt*. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3. LTRO announcements and stock returns of financially constrained firms

Variables	(1)	(2)
<i>LTRO*WWI</i>	0.0179** (0.0087)	
<i>LTRO*KZI</i>		0.0001* (0.0000)
<i>LTRO</i>	0.0105*** (0.004)	0.0055*** (0.0018)
<i>WWI</i>	0.0166*** (0.0042)	
<i>KZI</i>		0.0000 (0.0000)
<i>Constant</i>	-0.0017 (0.0021)	-0.0031* (0.0018)
Controls	Yes	Yes
Month dummies	Yes	Yes
Industry dummies	Yes	Yes
Observations	44,399	41,047
Number of id	901	830

This table presents the estimation result of equation 3. *WWI* and *KZI* are the Whited and Wu (2006) and Kaplan and Zingales (1997) indices. The controls are *P/E*, *P/B*, *Beta*, *Turnover*, *Size*. The financial statement measures such as *Total Assets*, *ROA*, and *Debt* are not included in this analysis since these are part of the index constructions. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

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