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The real effects of financial constraints: Evidence from a debt subsidization program targeted at strategic firms

Yulia Davydova [a], Vladimir Sokolov [b,*]

[a] CitiGroup Global Markets Prime Finance Risk, London, UK
[b] International College of Economics and Finance, NRU — Higher School of Economics, Moscow, Russia

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ABSTRACT

We investigate the rationale and impact of the corporate debt subsidization program implemented by the Russian government during the recent financial crisis. Employing the difference-in-difference approach, we show that the program did not have a significant impact on capital investments of subsidy recipients, contrary to its intentions. We also find that a matched group of non-recipients on average exhibited a higher degree of cash hoarding behavior than subsidy-recipients in the post-program period, which suggests that the program eased external financial constraints of recipient-firms. Consistent with the theory on precautionary cash savings by firms, we further find that firms non-recipients based in cities with low banking development accumulated more cash holdings than recipients based in cities with a high banking development. Overall, our findings indicate that greater cash holdings are positively associated with the level of financial constraints of firms.

1. Introduction

The issue of how credit supply reduction impacts corporate policies of firms has received increasing academic attention in the recent period. For example, Campello et al. (2010) and Almeida et al. (2012) have demonstrated that a bank lending shock caused by a subprime mortgage crisis has a pronounced real effect on financially constrained firms. Following such shocks policy-makers often respond with bailout programs aimed at relaxing the financial constraints of firms considered crucial to the national economy.[1] Existing academic work on such government-managed capital reallocations focuses on factors that make such programs beneficial to the real sector. Philippon and Schnabl (2013) study how government interventions can improve social welfare when banks suffer from the debt overhang problem. Giannetti and Simonov (2013) provide microeconomic evidence that bank-recipients of government-induced capital infusions increase lending to firms only if recapitalizations are sufficiently large.

In this paper we study how the corporative policies of firms were impacted by the 2009 subsidization program implemented by the Russian government following the banking crisis caused by the Lehman Brothers' collapse. The program was designed to subsidize

* Corresponding author at: ICEF, NRU-Higher School of Economics, ul. Shabolovka 26, Room 3420, 119049 Moscow, Russia. Tel.: +7 495 772 95 90x26094.
E-mail addresses: yulia.davydova@citi.com (Y. Davydova), vsokolov@hse.ru (V. Sokolov).

[1] Notable examples of such programs are the Troubled Asset Relief Program (TARP) that entailed recapitalization of "too-big-to-fail" banks, as well as the $25 billion Advanced Technology Vehicles Manufacturing (ATVM) Loan program designed to support vehicle manufacturing in the U.S.

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interest payments on bank loans taken by firms for investment purposes.[2] This setting enables us to ask two related questions regarding the investment and liquidity management policies of firms. First, did a program that was *de jure* designed to secure long-term investments by firms but *de facto* alleviated short-term crisis effects have the desired effect on subsidy recipients? Second, did the impact of the program differ with respect to financially constrained and unconstrained recipients?

We expect that, in the absence of an enforcement mechanism, firms did not significantly increase capital investments upon receiving interest rate subsidies from the government, although they may have changed their cash management policies. Further, knowing that firms take into consideration both current and future funding needs when making policy decisions, we expect that subsidy-receiving firms located in cities with a low level of banking development (financially constrained firms) did not significantly change their corporate policies relative to non-recipients in similar locations. On the contrary, we expect that the impact of subsidies on firms located in cities with a high availability of banking services (financially unconstrained firms) was significant compared to that on non-recipients in similar locations.

The literature recognizes that observed and unobserved factors such as firms' political connections may simultaneously determine the corporate policies of subsidy-recipients and government decisions to choose particular firms for subsidies (Faccio et al., 2006). Because the program we study was targeted at so-called *strategic* firms with an average government ownership stake of 73%, the heterogeneity of firms with respect to their political connections is greatly reduced.[3] Focusing on *strategic* firms with significant government ownership and with equally high socio-economic value presents an opportunity to isolate firms that operate within the same legal and institutional environment, have similar political connections, are at the same stage of the business cycle and differ only in terms of observable characteristics that we can control. In view of this, the setup is ideal.

Studying the Russian experience is informative because we can exploit a substantial spatial diversity existing in the degree of banking development across the locations of strategic firms' and categorize firms into financially constrained and unconstrained groups.[4] Because the country's financial system is bank-based, the variation in the supply of banking services across locations determines firms' access to capital and is likely to be important in determining how they would respond to the subsidization of interest payments on debt. This setting enables us to employ the difference-in-difference-in-difference (D-D-D) estimator (see Gruber, 1994; Imbens and Wooldridge, 2007) and quantify the impact of the subsidization program across four groups of firms: (un)constrained (non)-recipients.

Our analysis consists of several components. Using a sample of 357 strategic firms that were eligible for interest payment subsidies, and controlling for industry affiliation and the pre-crisis financial and operating performance of firms, we first show that the government was more likely to subsidize larger firms from smaller cities with low alternative employment opportunities. These findings are consistent with the government's public announcements on maintaining employment during the crisis period. This result is interesting in itself and contributes to the literature investigating government agendas for getting involved into the private sector (Frye and Shleifer, 1997; Megginson and Netter, 2001; Shleifer and Vishny, 1994). We use this finding to validate our further analysis of the post-subsidization performance of subsidy recipients.

In the following step, we match strategic firms that were subsidy-recipients (treated firms) with eligible strategic non-recipients based on size, operating performance, industry affiliation, and regional location using the propensity score matching (henceforth PSM) algorithm. This method creates a sample of "counterfactual" control firms that are similar to recipients along the specified observable characteristics (see Roberts and Whited, 2012; Zhao, 2004). As a robustness check, we also isolate all strategic firms that were financially distressed in the pre-crisis period and test how the policies of distressed subsidy-recipients differed from those of distressed non-recipients. Although isolating only distressed firms leaves the firms heterogeneous in other dimensions, this approach narrows down the sample along the characteristics at which the subsidization program was directed.

We find that, two years after completion of the government subsidization program, recipients had not significantly changed their investment and employment policies as could have been expected given program priorities. Our study also does not reveal any significant variation between financially constrained and unconstrained firms with respect to long-term capital spending policies. This finding is consistent with Giannetti and Simonov (2013) and Dasgupta et al. (2011) who document that while additional short-term cash flows result in substantial cash savings by firms, the impact of such cash flows on long-term investment decisions is marginal.

Our main findings concern the cash management policies of firms. The theoretical literature predicts that, in periods of increased uncertainty, firms experiencing constraints in external funding have incentives to increase cash holdings for precautionary reasons (*e.g.*, Almeida et al., 2004; Han and Qiu, 2007). We find evidence consistent with this thesis: firms that did not receive subsidies from the Russian government significantly increased their cash holdings following the credit supply shock, while subsidy recipients on average maintained the accumulation of cash at the pre-crisis level. Our difference-in-difference estimates suggest that cash holdings of non-recipients grew by 6% relative to recipients for the PSM sample and by 10% for a sub-sample of financially distressed strategic firms. Thus, our results suggest that the program eased external constraints of treated firms.

Drawing on studies that examine the effect of spatial distribution of banking services on corporate polices (Benfratello et al., 2008; Degryse and Ongena, 2005; Di Patti and Dell'Ariccia, 2004), we conjecture that firms that are located in cities with a high

[2] The program used resources that were accumulated during the petro boom period in the Russian National Reserve Fund. Following public pressure this Fund was untapped to help domestic firms suffering from the global financial crisis.

[3] A list of 1063 *strategic* firms was created by Presidential Decree No. 1009 adopted on August 4, 2004. According to the decree, the firms ascribed this status are those that "produce goods and services of foremost national priority". As strategic firms were granted this status long before the crisis and the subsequent subsidization program, possible concerns about sample selection bias are lowered.

[4] We employ the BEPS II data set compiled by the EBRD, which reports geo coordinates (latitude and longitude) of all bank branches across the Russian Federation. See Bircan and De Haas (2013) and Brown et al. (2013) for recent applications of the BEPS II data.

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