

DISCUSSION OF THE PAPER BY AMANDA CARMIGNANI AND ALESSIO D'IGNAZIO

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1. Introduction

This workshop makes a major contribution to the culture of accountability, which demands thorough analysis of the effectiveness of public spending. Given the severe budget constraints that followed the financial crisis of 2007-2008, this is indispensable to the justification of any form of state aid.

In this setting, the paper by Amanda Carmignani and Alessio D'Ignazio is a very opportune and timely analysis of one specific form of state aid: subsidized credit programs. The economic rationale depends on the widespread information asymmetries in banking and financial markets, which often cause credit rationing and hence underinvestment. Carmignani and D'Ignazio test whether the firms that get subsidized loans use the additional funds made available by government to increase investment or instead to reduce their liabilities to banks.

The research exploits a very rich data set obtained from the Bank of Italy's Central Credit Register, supplemented by information on firms' balance sheets from Cerved. The study covers the ten years from 1998 through 2007 for a sample of up to 1,326 firms that received subsidized credit and a matching control sample of similar firms that did not.

In a word, the authors compare the rates of growth of bank loans to the subsidized sample with that for the matching non-subsidized sample. The results provide convincing evidence that to a large extent the subsidized firms merely substituted the subsidized credit for bank loans at market rates.

In my discussion, I focus on the appropriateness of the empirical framework that the paper uses to answer the original question, and on some issues involving the authors' econometric methodology and some possible refinements.

2. The research question

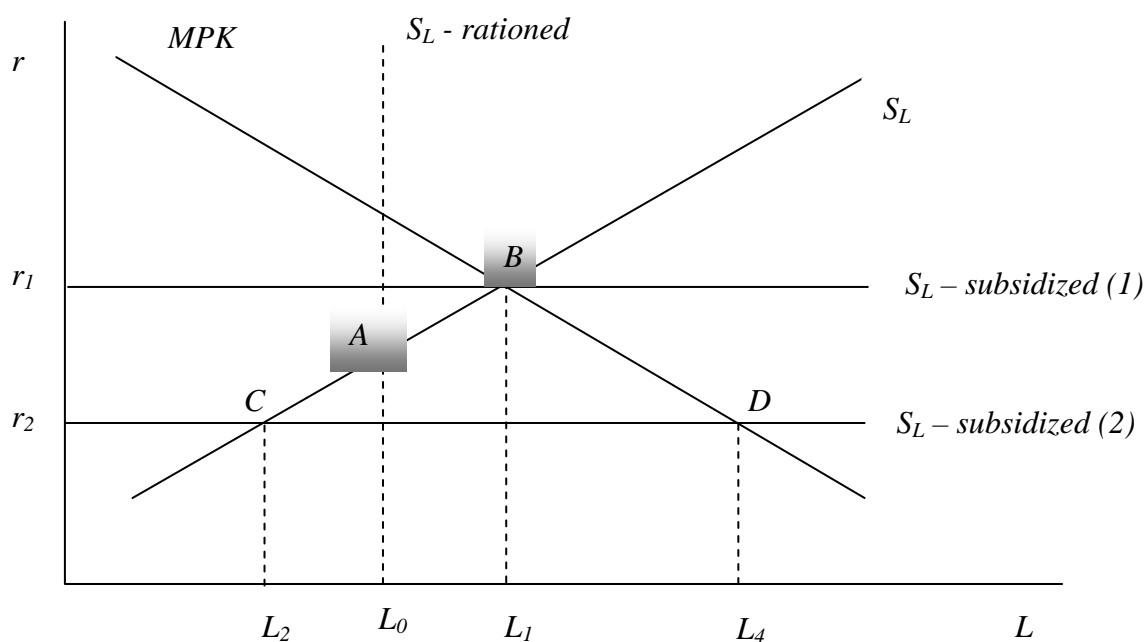
The key research question hinges on the assumptions that subsidized credit: *a*) should be granted to financially constrained firms and *b*) should be additional to other sources of finance, allowing the firm to expand investment and output. If this were the case, state aid would succeed in

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attenuating the problem of underinvestment that typically plagues smaller and more opaque firms.

As noted, the evidence presented here shows that the firms that benefited from credit subsidies reduced their market borrowing from banks. The authors take this as evidence that credit subsidies are not used fully to overcome financial constraints and enable the recipient firms to reach the optimal level of investment. This interpretation postulates that credit subsidies should be entirely additional, not substitutive, but this is not necessarily the case. In Figure D1, I present an illustration of the effects of credit subsidies on the financial liabilities of a representative firm, alternative to Figure 1 in the paper. The x -axis measures the firm's liabilities, which can be either bank debt or credit subsidies, and the y -axis is the interest rate. S_L is an upward-sloping supply schedule of bank loans, which is assumed to be a positive function of the interest rate because of the increasing costs of bank funding. MPK is a negative credit demand schedule, reflecting decreasing returns to invested capital. With perfect capital markets and no subsidies, the equilibrium is at point B , for a level of loans L_1 and an interest rate r_1 .

Figure D1



Under the hypothesis of credit rationing, the firm does not get all the bank financing it requires at the market interest rate and is constrained at a level $L_0 < L_1$. Now, assume that subsidized credit is granted at the interest rate prevailing in the perfect-capital-markets equilibrium without credit constraints, r_1 , according to the supply schedule $S_L - subsidized (1)$. In this case the firm maintains its initial level of bank debt at L_0 and uses an amount $L_1 - L_0$ of subsidized credit. This is the case that the authors

implicitly judge as the optimal policy, in which state aid solves the underinvestment problem and does not alter the initial level of bank debt.

Assume instead that the firm is not financially constrained but can nevertheless obtain a fixed amount L_2 of subsidized credit at an interest rate r_2 . In this case, it will take the subsidized credit and use it to pay back an amount of bank debt $L_1 - L_2$, keeping its total liabilities and investment unchanged. This is the case that the authors see as a negative outcome of state aid, because it fails to stimulate investment.

However, another interesting case is also possible. Assume that subsidized credit is offered at the lower interest rate r_2 , according to the supply schedule $S_L - subsidized$ (2). Leaving aside political economy justifications, this choice could be socially optimal – if, say, investment generated positive externalities. Under this assumption, the firm reduces its bank loans from L_0 to L_2 , using an amount $L_4 - L_2$ of subsidized credit. In this case the effect on investment would be greater than in the first case described above, but there would still be some substitution of subsidized loans for bank credit.¹

In summary, what this very simple model shows is that the cost of subsidized credit is a key feature that must be known if we are to assess the impact on firms' investment. Complementing the analysis with information on interest rates, which should be at least partially available from the Central Credit Register, would therefore strengthen the authors' evidence.

In alternative, although the negative effect of the subsidies on bank debt is of course consistent with the hypothesis that they are not wholly attaining their planned objectives, a more thorough analysis of the effects on firms' investment policies, along the lines sketched out at the end of the paper itself, would provide a neater overall picture. In addition, if the data on credit were matched with the characteristics of the borrowing firms, one could also study the parallel issue of the effects of subsidies on dividend policies and internal funding.

3. The econometric methodology

The empirical analysis centers on the estimation of a number of *differences-in-differences* specifications. The authors do not conduct their estimates on the entire sample of borrowers in the Central Credit Register but on the sample of firms that received subsidized credit and a matched control sample of firms with similar characteristics that did not. As the authors recognize, a crucial issue in this procedure is identifying the control sample. Their choice is one-to-one exact matching, based on each firm's sector of economic activity, legal form, geographical location, and size class of bank debt. Since the omission of some relevant firm characteristics could

¹ One could argue that the same level of investment could be obtained granting subsidized credit at a decreasing interest rate, along the credit demand schedule MPK ; however, this might be impossible without a perfect knowledge of the curve's slope and position.

seriously bias the *differences-in-differences* estimates, a finer matching strategy using on all available information and propensity score techniques could strengthen the results.

A neater strategy might entail two steps. First, present non-parametric evidence along the lines of Table 1, but with a more rigorous analysis of the different performance of the treated and control samples, including some diagnostic tests as discussed by Becker and Ichino (2002) or Sianesi (2004). Second, estimate the *differences-in-differences* model on the treated and the controls (and possibly on the entire sample of borrowers) including the lagged dependent variable (since it is statistically significant in all GMM specifications) and a large set of controls: time-varying firm characteristics, firm-specific, lender-specific and time-fixed effects.

Interestingly, from the estimates reported in Tables A5-A8, it also appears that all firms – rationed and not-rationed both (???) – reduce their borrowing from banks when subsidized credit is granted. Since this could signal that the credit is granted at times when there is an overall contraction in bank credit supply – so that all firms reduce bank loans but those that obtain subsidized credit can still benefit from the additional source of funding – it might be relevant to control for time-varying measures of local credit supply.

Finally, it could also be interesting to analyze the effects of subsidized credit over different time horizons, as in a dynamic setting firms might initially substitute subsidized credit for bank loans but eventually improve their economic performance and so also increase their debt to banks.

4. Conclusion

The authors have provided a timely and interesting analysis of the effects of subsidized credit on firms' investment. Their results certainly indicate that in the past credit subsidies may not have succeeded in achieving their objectives. Given the extremely rich information set available to the authors, an outside commentator is inevitably tempted to ask for a number of additional checks and controls. If, as is very likely, the original findings should be confirmed by additional evidence, especially on the direct impact of subsidized credit on firms' investment and output, this would call for significant revision of credit subsidy programs.

References

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