Fiscal stimulus, credit frictions and the amplification effects of small firms*

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"Monetary policy cannot, and should not, be the only game in town"

ECB President Christine Lagarde, February 12, 2020

I. Motivation. How does the effectiveness of fiscal stimulus depend on the composition of firms where the stimulus takes place? I study the effects of government spending on output, the so-called government spending multiplier. The empirical evidence reports a wide range of multipliers, from as low as 0.5 to larger than 2 (Ramey (2011); Auerbach and Gorodnichenko (2012)). There is no such thing as a unique fiscal multiplier, it depends on the characteristics of the economy. Recent empirical evidence on firm dynamics document that small firms are different from large firms in several dimensions that may affect the size of the fiscal multiplier. Specifically, (i) conditional on surviving, small and young firms grow faster than large and more mature firms, contributing disproportionately to output growth (Decker et al., 2014); (ii) small firms are cyclically more sensitive than large firms to the local business cycle (Fort et al., 2013); and (iii) small firms are typically more bank dependent and exhibit different investment, revenues and financing dynamics along the business cycle (Dinlersoz et al., 2019).

II. Research question. Given the enormous heterogeneity in productivity, investment and borrowing behaviour across firms, this paper asks: How does firm size heterogeneity affect the fiscal multiplier? Which firms are the most responsive to aggregate fiscal stimulus? The central question in this literature is whether the fiscal multiplier is greater or lower than 1, i.e. the direction and strength of fiscal spillovers. I ask: Are spillover effects heterogeneous by firm size?

III. Empirical facts. I exploit cross sectional and time variation in military procurement across US *metropolitan areas* to estimate the aggregate consequences of firm heterogeneity on the size of the fiscal multiplier. Using this aggregate local fiscal shock, I estimate the relative response of different firms to government spending.

Fact 1. The local fiscal multiplier increases with the share of small firms. Using cross sectional and time variation in national military procurement across metropolitan areas (MSAs) in the US, and lagged employment creation by new business from Business Dynamic Statistics (BDS), I estimate the sensitivity of the local fiscal multiplier to the firm size distribution. Figure 1(a) shows that the median local fiscal multiplier is 1.50 and increases with the share of small firms, implying multipliers of 0.95-2.15 in the interquantile range.[1]

Fact 2. Using firm level panel data from ORBIS, I show that within firms that did **not** receive a contract from the government, small firms increase operating revenues, investment and borrowing by 5%-10% relative to large firms in response to an aggregate military spending shock (see Figure 1(b)). I find positive spillovers for small firms and neutral for large firms of aggregate local fiscal stimulus.

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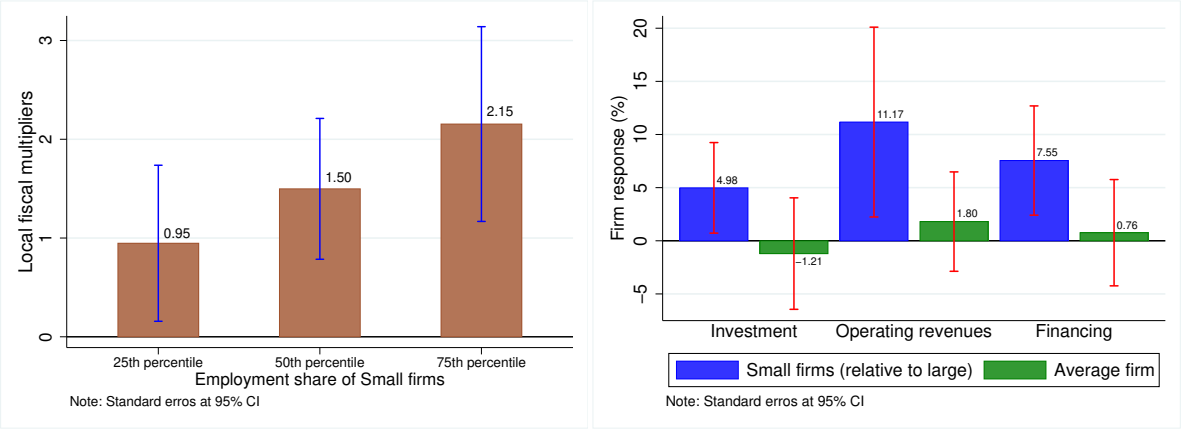
[1] See Chodorow-Reich (2019) for a review of the literature on geographical cross-sectional fiscal spending multipliers. The preferred average point estimate is 1.8.

Figure 1: **The local fiscal multiplier and firm size heterogeneity**



(a) The local fiscal multiplier (b) Firms' responses

Note: Panel (a) displays the implied 1-year local fiscal multiplier along the distribution of the share of small firms in MSAs in US. Sample period is 2001-2013 and includes 344 MSAs. Data for the share of small business is from Business Dynamic Statistics. The government spending shock is identified with the cross-sectional variation of military spending across MSAs. Standard errors are clustered at MSAs level. Panel (b) shows the response of investment, operating revenues and financing (change in total liabilities) for the average firms and small firms relative to large firms that *did not receive* a DOD contract to a state-level DOD shock. Firm data is from ORBIS.

This evidence is qualitatively consistent with a financial accelerator mechanism, where the aggregate fiscal stimulus improves firms' balance sheet easing borrowing constraints of small firms. This countercyclical credit spread endogenously amplifies the fiscal multiplier.[2]

IV. Model. I build a two-firm New Keynesian open economy model with credit market imperfections to rationalize the empirical evidence and quantitatively evaluate the heterogeneous firm credit channel of fiscal stimulus. I embed the financial accelerator mechanism in a standard open economy model and allow for firms to have different access to credit markets (Bernanke et al. (1999); Nakamura and Steinsson (2014)). Calibrated to match the share of small firms, leverage and external finance premium, the mechanism can account for 2/3 of the heterogeneous response of investment and 10-20% of the sensitivity of the local fiscal multiplier to firm size heterogeneity. The model implies that the *national* fiscal multiplier increases by 1.08% when the national employment share of small firms increases by 1%. Interestingly, this relationship is non-lineal: it depends on the response of monetary policy to fiscal shocks. The larger the stabilization role, the lower the amplification effects of small firms. This is the third contribution of my paper.

V. Contributions. A better understanding of the transmission mechanism of fiscal policy is needed in policy circles. The main contribution of this paper is to show that the composition of firms where the fiscal stimulus takes place is key to the design of fiscal packages aiming to stabilize the economy. First, I document a novel determinant for the fiscal multiplier: the fiscal multiplier increases with the share of small firms. Second, I find that there are positive fiscal spillovers for small firms but neutral for large firms. Third, the amplification effects of small firms on the *national* fiscal multiplier are larger at the zero lower bound.

[2]In the same spirit, Auerbach et al. (2020) show that the interest rate on consumer loans decrease after a fiscal stimulus in a local economy, with a larger reduction for riskier loans.

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