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. The central question when evaluating the effects of government spending on GDP, is whether the fiscal multiplier is greater or lower than 1, or equivalently, the direction and strength of fiscal spillovers. The empirical evidence reports a wide range of spillovers with fiscal multipliers as low as 0.5 to as high as 2 (Ramey, 2011; Auerbach and Gorodnichenko, 2012). Regardless of the renewed interest in fiscal policy and the focus on the interaction with the response of monetary policy and heterogeneity in households' credit constraints (Woodford, 2011; Christiano et al., 2011; Hagedorn et al., 2019; Auclert et al., 2018), the literature neglects the role of credit market imperfections for firms' financing decisions (Kaplan and Violante, 2014; Farhi and Werning, 2016; Demyanyk et al., 2019; Corbi et al., 2019). I study the role of firm size heterogeneity and credit frictions on the transmission mechanism of fiscal policy. 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 (Fort et al., 2013); and (iii) small firms exhibit different investment, revenues and financing dynamics along the business cycle (Dinlersoz et al., 2019), and (iv) and are typically more bank dependent and credit constrained (Beck et al., 2005).

II. Research question. Given the rich heterogeneity across firms, this paper asks: How does firm size heterogeneity affect the fiscal multiplier? Which firms are the most responsive to aggregate fiscal stimulus? Are fiscal 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 types of 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. I document positive fiscal spillovers for small firms and neutral for large firms. To explain Fact 1, I combine local fiscal stimulus with firm level balance sheet information from ORBIS and identifying government contractors, I show that within firms that did not receive a contract from the government, small firms increased operating revenues, investment and

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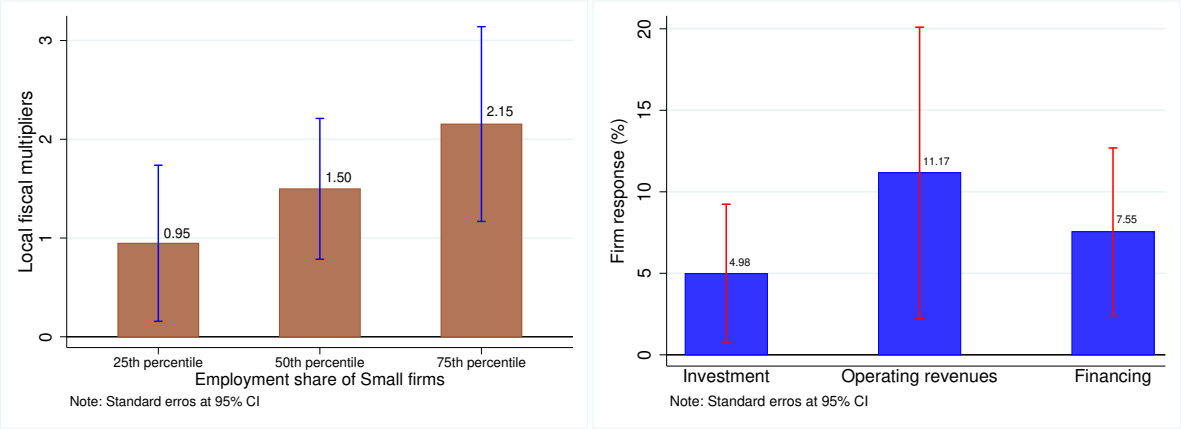
[1]See Chodorow-Reich (2019) for a review of the literature on geographical cross-sectional fiscal spending multipliers. The preferred average point estimate is 1.8.

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 employment share of small firms in MSAs in US from Equation (1). Data for the share of small firms 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 MSA level. See Section 2 for details. Panel (b) shows the response of investment, operating revenues and financing for small firms relative to large firms that *did not receive* a military contract to a state-level military shock. Firm data is from ORBIS. See Equation (5).

borrowing by 5%-10% relative to large firms in response to an aggregate military spending shock (see Figure 1(b)). To estimate fiscal spillovers, its key to recognize that whom and when receive a government contract may be endogenous to firms' decisions. To overcome this endogeneity, I use contract level data from *USAspending.org* to identify the contractors, match them with ORBIS and exclude all firms that received any military contract during the sample period.

IV. Model. To interpret this evidence I propose a heterogeneous firm credit channel of fiscal stimulus. I embed the *"financial accelerator"* mechanism in a New Keynesian open economy model with two types of firms that have different access to credit markets (Bernanke et al., 1998; Nakamura and Steinsson, 2014). Small firms face a higher credit spread in equilibrium that is more sensitive to changes in firms' balance sheets. The fiscal stimulus improves firms' net worth, which reduces credit spreads of small firms, and relaxing borrowing constraints.[2] This boosts borrowing, investment and production; and amplifies endogenously the local fiscal multiplier. Calibrated to match cross-sectional and firm level US data, the model can account for 2/3 of the heterogeneous response in firms' investment. Moreover, the model explains 10-20% of the sensitivity of the local fiscal multiplier to the share of small firms. I use the model to show that a higher *national* employment share of small firms also increase the *national* fiscal multiplier. 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 (Woodford, 2011; Christiano et al., 2011). The larger the stabilization role of monetary policy, the lower the amplification effects of small firms on the national fiscal multiplier.

V. Contributions. 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. I show that the heterogeneous behavior of small and large firms affects the size of the fiscal multiplier. 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, small firms have the largest effect on the *national* fiscal multiplier when monetary policy does not respond to fiscal shocks.

[2] I empirically document that local housing prices, the main collateral value of small firms, rise by 1.25% after a local fiscal stimulus (Bahaj et al., 2019; Auerbach et al., 2019).

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