

THE YOUNG, THE OLD, AND THE GOVERNMENT: DEMOGRAPHICS AND FISCAL MULTIPLIERS

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HENRIQUE S. BASSO AND OMAR RACHEDI

Both advanced and developing economies are experiencing a rapid process of population aging that will shape macroeconomic dynamics over the next decades. Indeed, demographic changes affect not only long-run trends (Krueger and Ludwig, 2007; Aksoy et al., 2019; Carvalho et al., 2016), but also short-term fluctuations (Jaimovich and Siu, 2009; Wong, 2016). We argue that population aging can also influence the effectiveness of fiscal policy. This effectiveness is often summarized by the size of the fiscal multipliers. In this feature, we highlight a novel determinant of the size of the government consumption spending fiscal multipliers: the age structure of an economy.

Fiscal multipliers, which measure the dollar change in output following an exogenous increase in government consumption spending, are not constant structural parameters, but rather they depend on the characteristics of the economy. In Basso and Rachedi (2018), we study a panel of output, military spending, and demographic characteristics across U.S. states and document that federally-financed local fiscal multipliers rise with the share of young people in total population. We show that a parsimonious life-cycle open economy New Keynesian with credit market imperfections and age-specific labor supply elasticities can explain 87% of the link between local fiscal multipliers and demographics. Then, we use the model to study the implications of population aging and find that nowadays U.S. national government consumption spending multipliers are 38% lower than in 1980.

We focus on the differences across U.S. states to uncover the causal effect of demographics on fiscal multipliers. The identification comes from the cross-state variation in the share of young people in total population. As states' age structure can respond to government spending shocks through migration flows, we exploit the heterogeneity in fertility across U.S. states and instrument the share of young people with lagged birth rates. Then, we identify the government spending shocks by leveraging the heterogeneity in the geographical distribution of military spending, as in Nakamura and Steinsson (2014).

In our benchmark regression, whose results are reported in the first column of Table 1, the size of the local fiscal multiplier depends positively on the share of young people (aged 20-29) in total population: increasing the

share of young people by 1% above the average share across U.S. states raises the local output fiscal multiplier by 3.1%, from 1.51 up to 1.56. We run a comprehensive battery of robustness checks and find that the age sensitivity of local fiscal multipliers is always highly economically and statistically significant.

To rationalize the link between demographics and government spending multipliers, we build a life-cycle open-economy New Keynesian model with credit market imperfections and age-specific differences in labor supply and labor demand. We consider a staggered price setting model with two countries that belong to a monetary union. The household sector has a life-cycle structure, whereby individuals face three stages of life: young, mature, and old. This feature allows us to emphasize the heterogeneity across age groups and incorporate nominal rigidities and open economy interactions into a tractable environment. In this way, our model extends a standard two-country New Keynesian economy with a rich life-cycle structure.

The model features credit market imperfections. Households can trade capital and bonds but cannot perfectly smooth consumption because markets are incomplete. In the baseline model, we restrict further households' borrowing capacity with an ad-hoc constraint that does not allow any borrowing at all. Then, we consider age-specific differences in both labor supply and demand. In the empirically relevant case, young and old workers have a higher elasticity of labor supply than mature workers, and young labor is relatively less complementary to capital, which makes its labor demand to be more volatile. Age-specific differences in labor allow the model to be consistent with the high volatility of hours worked and hourly wages of young workers observed in the data.

How can demographics alter fiscal multipliers? The link is twofold. First, age-specific differences in labor supply and demand makes young employment much more responsive to government spending shocks than the employment of mature workers. Second, an economy with relatively more young households features a stronger demand channel. Since young households face a hump-shaped labor income over the life-cycle, they want to borrow and smooth lifetime consumption. Yet, this mechanism is limited by the presence of credit market imperfections, which boost the marginal propensity to consume of young households well above

LOCAL OUTPUT FISCAL MULTIPLIER – DATA VS. MODEL

TABLE 1

	Data	Model
Avg. Local Output Fiscal Multiplier	1.511	1.463
Sensitivity of Local Output Fiscal. Multiplier with States' Age Structure	0.047	0.039
Δ Local Output Fiscal Multiplier of 1%. Increase in Share Young People	3.1%	2.7%

AGE SENSITIVITY OF LOCAL OUTPUT FISCAL MULTIPLIER - CHANNELS

TABLE 2

	Data	Baseline Model	Constant Labor Supply Elasticity	No Capital Experience Complementarity	No Borrowing Constraint
Δ Local Output Fiscal Multiplier of 1% Increase in Share Young People	3.1%	2.7%	2.5%	1.6%	0.8%

the one of mature households, as it is in the data. Consequently, as the proportion of young workers increases, both labor and output react more sharply to a fiscal shock.

Although in the model also old individuals have a high marginal propensity to consume, the fiscal multiplier is small when the age structure tilts towards older ages. This result is due to the fact that the response of consumption can be decomposed into the product of the marginal propensity to consume and the response of income. Since old individuals contribute very little to the labor force, they experience a dampened rise in labor earnings following a government spending shock. As a result, the consumption of old individuals does not increase substantially notwithstanding their high marginal propensity to consume.

Column 2 of Table 1 reports the results of the quantitative analysis, and shows the model matches almost entirely the size of the local fiscal multiplier and explains 87% of the link between fiscal multipliers and demographics: increasing the share of young people by 1% above the average share across U.S. states raises the local output fiscal multiplier by 2.7%, from 1.463 up to 1.502.

The age sensitivity of local multipliers depends mostly on credit market imperfections. Indeed, Table 2 shows that when we eliminate the differences in the Frisch elasticity, the age sensitivity drops just by 10%, from 2% to 1.8%. Instead, when we also remove the ad-hoc borrowing constraint and let young households to borrow, the age sensitivity equals 0.9%. Hence, even in absence of the ad-hoc borrowing constraint, the lack of complete markets in a life-cycle setting can generate the age sensitivity of local multipliers.

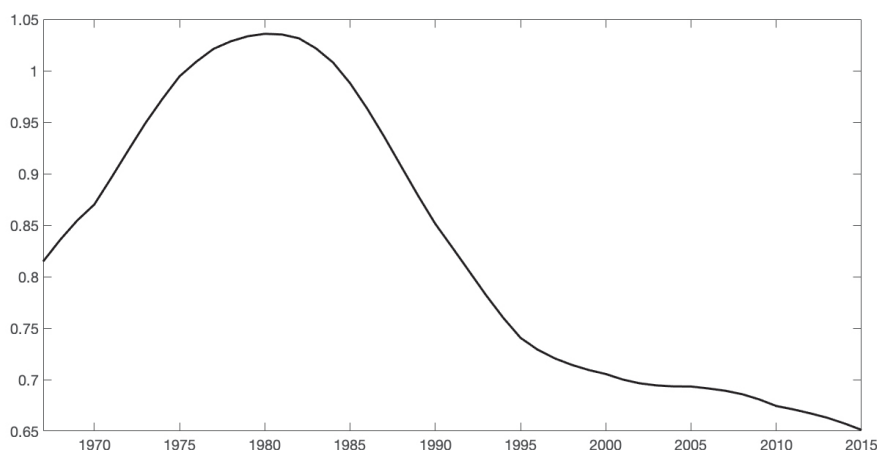
Focusing on regional data allows us to leverage local heterogeneity to identify fiscal multipliers and their sensitivity to demographics. Yet, the effectiveness of fiscal policy should also be evaluated at the national level, taking account of all general equilibrium mechanisms. Since our theoretical model is consistent with the empirical evidence on local multipliers, it represents an ideal laboratory to study whether the link between demographics and fiscal multipliers exist also at the national level. We evaluate in the model the effects of government spending on national output and find that demographics still matter: Table 3 shows that increasing the share of young people by 1% raises the national output fiscal multiplier by 1.1%.

AGE SENSITIVITY OF NATIONAL FISCAL MULTIPLIERS

TABLE 3

	Output	Consumption	Investment	Employment
Avg. National Fiscal Multiplier	0.82	0.61	-0.79	1.34
Δ National Fiscal Multiplier of 1% Increase in Share Young People	1.1%	1.5%	0.2%	1.0%

Since the model predicts that also national fiscal multipliers depend on the age structure of the population, we can now evaluate how the effectiveness of government spending has been shaped by the dramatic changes in the demographic structure of the U.S. population over the recent decades: the share of young people in total population plummeted by 30% from 1980 to 2015. We feed this shift in population shares into our model, and find substantial low-frequency variation in the size of the national fiscal multiplier over the recent decades, as reported in Figure 1. In particular, we find that nowadays the



national output fiscal multiplier is 38% lower than forty years ago. Since most advanced economies are experiencing a gradual population aging, the model suggests that over time fiscal stimulus through government consumption spending could become a relatively less effective tool to spur economy activity. This result has to be interpreted with two caveats. First, our analysis refers to the effectiveness of fiscal policy in normal times, abstracting from cases in which there is slack in the economy (e.g., Auerbach and Gorodnichenko, 2012; Rendahl, 2016) or the stance of monetary policy changes (Christiano et al., 2011; Woodford, 2011). Second, although fiscal policy – intended in the classical form of purchasing goods from the private sector – becomes less effective in spurring economic activity due to population aging, fiscal interventions targeted to specific age groups could be still highly expansionary.

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