Debt-dependent effects of fiscal expansions

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A B S T R A C T

Economists often postulate that fiscal expansions are less stimulative when government debt is high than when it is low. Empirical evidence, however, is ambiguous. Using a nonlinear neoclassical growth model, we show that the difference in government spending effects between high- and low-debt environments depends on the wealth effect on labor supply and on whether the government uses taxes or spending to retire debt. Because of interrelated state variables, structural VAR estimations conditioning on debt alone can fail to isolate debt-dependent effects. Also, uncertainty on when the government will conduct fiscal consolidations generates wide confidence bands for spending multipliers, further complicating efforts to estimate debt-dependent government spending effects.

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1. Introduction

After the global financial crisis, many advanced economies entered an era of high government debt and slow growth. The average net government debt-to-GDP share increased from 44 percent in 2007 to 70 percent in 2014 for advanced economies (International Monetary Fund, 2015). Among G7 countries, excluding Canada and Germany, the average net government debt was 97 percent of GDP in 2014. Despite significant fiscal and monetary stimulus, the International Monetary Fund (2015) estimates that the output gap was -1.9 percent of potential GDP for advanced economies (-2.8 percent for the euro area) in 2014. Weak economic performance normally calls for expansionary fiscal policy. A high-debt environment, however, can undermine fiscal policy as an effective tool to combat recession.

Can government debt (hereinafter "debt") accumulation affect fiscal policy effects? The conventional view is that a fiscal expansion is less stimulative when debt is high than when it is low: a high-debt level induces expectations of high future taxes, discouraging current consumption, investment, and output. Empirical evidence, however, is ambiguous. Several papers, including Kirchner et al. (2010), Ilzetzki et al. (2013), and Nickel and Tudyka (2014), use large samples for OECD or other countries and find that the output multiplier is small or even negative in highly-indebted economies.[1] Using a similar dataset of OECD countries, Corsetti et al. (2012) do not find significant differences in output multipliers under various debt or deficits

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  [1] Although Ilzetzki et al. (2013) report significant differences in the cumulative output multiplier between high- and low-debt countries for a longer horizon, the significance vanishes under an alternative specification as shown in their Online Appendix (Fig. A11).

levels. When measuring fiscal conditions by sovereign yield spreads instead of debt levels, Born et al. (2015) find that a government spending cut has a negative effect on output under fiscal stress but a positive effect under no stress.[2] Such inconsistent findings could be driven by small differences in the debt-dependent effects or difficulty in isolating the effects.

In this paper, we first explore whether debt-dependent government spending effects are theoretically robust. They are not, particularly in the short run. The output multiplier difference between high- and low-debt states can be nontrivial or trivial, depending on the wealth effect on labor supply and on whether the government uses tax increases or spending reversals to retire debt. We then show that commonly adopted VAR estimations conditioning on debt alone are unlikely to isolate debt-dependent effects. Next, we allow for uncertain fiscal adjustment rules and find that uncertain fiscal consolidations generate wide confidence bands for spending multipliers.

We adopt a neoclassical growth model, where government spending enters households' utility as a complement to private consumption. This captures the short-run expansionary effects of government spending on consumption and output, as found in empirical work (see Blanchard and Perotti, 2002; Perotti, 2005; Galí et al., 2007). Fiscal multipliers are often computed by solving a linearized equilibrium system and, therefore, do not depend on debt levels (see Galí et al., 2007; Zubairy, 2014; Leeper et al., 2015). Instead, we obtain a fully non-linear solution under rational expectations, which allows us to explore government spending effects at different debt levels.[3] We find that, on average, an economy in a high-debt state has a smaller output multiplier than one in a low-debt state under the baseline specification with Greenwood, Hercowtiz, and Huffman's preference (GHH, Greenwood et al., 1988) and with income taxes stabilizing debt. In the short run, the policy-expectations channel prevails; expecting higher future taxes discourages current consumption. Thus, a government spending increase is less expansionary on output. In the longer run, higher tax *levels* and a larger magnitude of fiscal adjustments in a high-debt state make a spending increase more contractionary on output than in a low-debt state.

The nontrivial differences in government spending effects between high- and low-debt states in the short run, however, are not robust to alternative model specifications. Since households derive utility from leisure, government spending effects also depend on the wealth effect on labor. The hybrid GHH preference with government spending in the utility function substantially weakens this effect. Under King, Plosser, and Rebelo's preference (KPR, King et al., 1988), we find that the stronger wealth effect on labor from expecting higher taxes in a high-debt state induces households to work harder initially than in a low-debt state, reversing the short-run labor response pattern observed under the hybrid GHH preference. Next, we allow both income tax rates and government spending to stabilize debt. Expecting lower future government spending then induces a positive wealth effect, making consumption and output rise more in a high-debt state than in a low-debt state, shrinking the short-run differences between two debt states.

Aside from different preferences and adjustment instruments, we also study how the capital state can affect debt-dependent government spending effects. At each period, an economy that is away from the steady state inherits a set of state variables that are jointly affected by the history of economic and policy shocks. Historically, capital and debt are negatively correlated, although moderately. Thus, conditioning on debt alone may not be sufficient to recover the debt-dependent government spending effects. To show this, we perform structural VAR estimations on simulated data, following the standard structural VAR methodology in estimating fiscal policy effects. The simulated data from the baseline specification exhibit nontrivial debt-dependent effects in both the short and longer runs. Our estimations show that separating samples based on debt-to-output ratios (thus conditioning on the debt state only) fails to recover the true debt-dependent government spending effects.

Lastly, we explore policy uncertainty. Governments are often forced to conduct fiscal consolidations when debt is very high. When and how they do it, however, is often uncertain. To capture such uncertainty, we introduce an exogenous distribution of debt thresholds and model adjustment magnitudes to debt as a regime-switching process. At each period, an effective threshold is drawn from its distribution. If current indebtedness exceeds the effective threshold, which is more likely to occur with high debt, the government undertakes consolidations. Such policy uncertainty generates wide confidence bands surrounding output multipliers, further complicating efforts to estimate debt-dependent multipliers.

Our analysis adds to the literature on state-dependent fiscal policy effects, a topic enjoying substantial interest since the global financial crisis. The zero lower bound on the nominal interest rate and the deep recession have inspired research in fiscal policy effects conditional on different types of states, including monetary policy (e.g., Christiano et al., 2011 and Erceg and Lindé, 2014) and business cycles (e.g., Corsetti et al., 2010; Auerbach and Gorodnichenko, 2012; Blanchard and Leigh, 2013; Owyang et al., 2013). Our analysis is also related to papers that study how future fiscal adjustments can affect current fiscal policy effects through the intertemporal balancing of the government budget constraint, such as Dotsey (1994) and Dotsey and Mao (1997), but they do not focus on debt levels. Davig and Foerster (2015) study the impact of fiscal uncertainty with a known resolution date but a probabilistic adjustment magnitude, like the US "fiscal cliff," and find that such uncertainty can generate volatility in the economy. Also, Bi et al. (2013) explore whether expansionary fiscal consolidations are likely for a high-debt economy. They adopt a New Keynesian model but omit capital, important for debt-dependent government spending effects as shown in our analysis.

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[2] Afonso and Jalles (2014) find similar results as Born et al. (2015) for consumption multipliers.
[3] By obtaining a fully non-linear solution, we also address Parker's (2011) critique on studying linearized dynamics of fiscal policy effects.