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Fiscal financing and the efficacy of fiscal policy in Korea: An empirical assessment with comparison to the U.S. evidence[☆]

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ABSTRACT

This paper aims to assess the empirical implications of fiscal financing in Korea and study how they differ from those of the U.S. We estimate two versions of the dynamic stochastic general equilibrium (DSGE) model—a small open economy (SOE) model for Korea and its closed economy counterpart for the U.S.—in which the former nests the latter as a special case. The fiscal policy specification posits that government spending, lump-sum transfers, and distortionary taxation on labor income, capital income and consumption expenditures respond to the level of government debt and the state of economic activity. Analysis of the data from 2000 to 2015 shows that distortionary capital taxes play a critical role in stabilizing government debt in the U.S., whereas non-distorting fiscal instruments are the primary means of fiscal adjustment in Korea. Regarding the magnitude of debt-financed fiscal stimuli, the substantial trade openness of Korea is significant in that it produces relatively smaller government spending and transfer multipliers compared to the U.S.

1. Introduction

In the wake of the global recession and financial crisis of 2008–2010, countries around the world pursued aggressive fiscal expansion to stimulate domestic demand. As a consequence of these policy actions, government debt in many countries rose dramatically during the crisis. As summarized in Fig. 1, the OECD average debt-to-GDP ratio was 73.5% in 2007 and reached 111.4% in 2015. A similar tendency was observed for the United States. In sharp contrast, however, the surge in the debt-to-GDP ratio was strikingly less pronounced in Korea. The ratio increased by 9.8% between 2007 and 2015, which was substantially lower than the OECD average growth of 41.1%.

From a scholarly standpoint, a plethora of literature analyzes the U.S. data and demonstrates that the method of fiscal financing is one of the key elements for fiscal policy evaluation (Leeper et al., 2010; Uhlig, 2010; Drautzburg and Uhlig, 2015). Despite the prevalence of fiscal financing issues both in real world situations as well as in academia,

there is almost no exploration of how government debt in Korea has been managed and of its macroeconomic consequences.

This paper aims to assess the empirical implications of fiscal financing in Korea and study how they differ from the U.S. evidence. As aforementioned, the two countries exhibit two distinct government debt trends following the fiscal expansion since the global financial crisis. Hence it is informative to dissect the fiscal policies of the two countries and their impacts on the overall economy. To this end, we estimate two versions of the dynamic stochastic general equilibrium (DSGE) model—a small open economy (SOE) model for Korea and its closed economy counterpart for the U.S.—in which the former nests the latter as a special case.¹ The model incorporates a rich description of fiscal policy and debt dynamics. We consider five fiscal instruments—government spending, transfers, consumption taxes, labor taxes and capital taxes—each of which can respond to government indebtedness, as in Leeper et al. (2010). The model also includes features that are known to be crucial for fiscal policy analyses, including the fraction of hand-to-mouth (liquidity-constrained) consumers (Galí et al., 2007;

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¹ In this regard, this paper is closely related to existing studies on fiscal sustainability in developing countries. For instance, Melina et al. (2016) propose a SOE model with calibrated parameters to assess the macroeconomic impacts of public investment in resource-rich developing countries, including the effects on growth and debt sustainability. In spite of the similar research question, our focus in this article is primarily to run a comparison study on two countries with contrasted debt paths, Korea and the U.S., by adapting both SOE and closed versions of the model.

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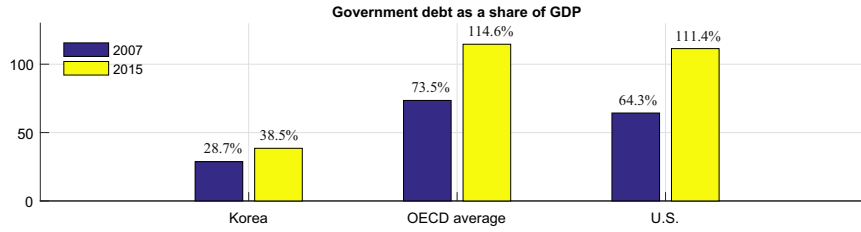


Fig. 1. International comparison of changes in debt-to-GDP ratios before and after the global financial crisis of 2008–2010. Source: OECD Economic Outlook 97 database (June 2015).

Forni et al., 2009), real and nominal rigidities (Leeper et al., 2011), and monetary policy behaviors (Kim, 2003; Christiano et al., 2011; Erceg and Lindé, 2014). Using Bayesian methods, the model is estimated with both countries' data ranged from 2000:Q1 to 2015:Q2.

The empirical analysis reveals a number of key differences in fiscal policy behavior between the U.S. and Korea. First, in terms of the methods of fiscal financing, distortionary capital taxes play a critical role in stabilizing government debt in the U.S., whereas non-distorting fiscal instruments are the primary means of fiscal adjustment in Korea. Second, the fiscal policy rules of Korea are associated with substantially lower persistence than those of the U.S., suggesting that fiscal policy in Korea is operated in a more discretionary manner. Third, the relative magnitude of debt-financed fiscal stimuli in both countries varies across the fiscal instruments. Government spending and transfer multipliers are smaller in Korea than in the U.S., whereas the expansionary effects of capital and labor tax cuts are more pronounced in Korea. We find that the former result is attributable to the significant trade openness of the Korean economy, characterized by the SOE feature of the model. From a theoretical perspective, the SOE setup allows import substitution in response to an expansion in government outlays. As demonstrated in Perotti (2005) and Beetsma et al. (2008), this induces substitution away from domestically-produced goods toward imported goods, producing smaller multipliers.

Having obtained the estimated model, we conduct a counterfactual exercise for Korea. The counterfactual examines the impacts of the corporate tax rate cuts from 2009 to 2014, which is one of the most debated issues of contemporary policy discourse in Korea. The results reveal that, if the corporate tax rate had been fixed at the 2009 level, both output and debt would have been lower than their historical levels. In addition, the trade-off ratio between output and debt turns out to be 3 on average, indicating that 3% of GDP needs to be sacrificed to reduce government debt by 1% in terms of GDP.

2. The model

This section describes the small open economy DSGE model employed in the paper. It is a new Keynesian model based on a conventional small open economy setup with hand-to-mouth agents as well as several real rigidities. The real rigidities include consumption habit formation and investment adjustment costs. The world economy consists of home (H) and foreign (F) countries.

2.1. Households

The economy consists of a continuum of households indexed by $j \in [0, 1]$. Among them, a fraction $1 - \mu$ of households are savers (denoted by the superscript S) and a fraction μ are non-savers (denoted by the superscript N) as in Galí et al. (2007).

2.1.1. Savers

Savers choose sequences $\{c_t^S, l_t^S, B_t^S, F_t^S\}_{t=0}^{\infty}$ to maximize expected lifetime utility, given by

$$E_0 \sum_{t=0}^{\infty} \beta^t u_t^b \left[\frac{(c_t^S(j) - \theta C_{t-1}^S)^{1-\gamma}}{1-\gamma} - \frac{l_t^S(j)^{1+\xi}}{1+\xi} \right] \quad (1)$$

where β is the subjective discount factor, γ is the inverse of intertemporal elasticity of substitution, ξ is the inverse of Frisch elasticity of labor supply, C_{t-1}^S is the one-period lagged aggregate consumption of savers, $c_t^S(j)$ and $l_t^S(j)$ are the consumption of final goods and labor hours at time t by agent $j \in [0, 1 - \mu]$, respectively. u_t^b is an AR(1) preference shock that follows

$$\log(u_t^b) = \rho_b \log(u_{t-1}^b) + \sigma_b \epsilon_t^b, \quad \epsilon_t^b \sim N(0, 1).$$

The choices of saving households are constrained by

$$\begin{aligned} P_t^C(1 + \tau_t^C)c_t^S(j) + P_t^I i_t^S(j) + B_t^S(j) + F_t^S(j) = R_{t-1} B_{t-1}^S(j) \\ + R_{t-1}^* S_t [1 - \Gamma_f(\cdot)] F_{t-1}^S(j) + (1 - \tau_t^I) \\ \int_0^1 W_t(l) l_t^S(j, l) dl + (1 - \tau_t^K) R_t^k v_t(j) \bar{k}_{t-1}^S(j) \\ - \psi(v_t) \bar{k}_{t-1}^S + P_t^C Z_t^S(j) + D_t(j) \end{aligned}$$

where $v_t(j)$ is the utilization rate of capital, P_t^C is the after-tax consumer price level, and R_t and R_t^* are the gross nominal interest rates on domestic and foreign bonds purchased, respectively. R_t^K is the gross nominal rate of return from capital at time t , and τ_t^C , τ_t^L , and τ_t^C are tax rates on capital income, labor income, and consumption, respectively. P_t^I denotes the price of investment goods and $i_t^S(j)$ is saver j 's gross investment. $W_t(l)$ is the nominal wage for labor type l , $Z_t^S(j)$ is government lump-sum transfers, and $D_t(j)$ denotes the share of nominal firm profits in the form of dividends received by agent j .

$B_t^S(j)$ and $F_t^S(j)$ denote the level of savers' domestic and foreign nominal riskless government bonds, respectively. $\Gamma_f(\cdot)$ is a risk premium on

foreign bonds defined as $\Gamma_f\left(\frac{s_t}{Y_t}\right) \equiv \gamma_f \left[\exp\left(\frac{s_t}{Y_t}\right) - 1 \right]$ where s_t is the real exchange rate. The real exchange rate is defined as $s_t \equiv S_t P_t^{C*} / P_t^C$ where S_t is the nominal exchange rate, expressed as the price of one domestic consumption basket in terms of foreign consumption, and P_t^{C*} is the foreign price level. We assume that foreign inflation, defined as $\pi_t^{C*} = P_t^{C*} / P_{t-1}^{C*}$, follows an exogenous AR(1) process given as

$$\log(\pi_t^{C*}) = \rho_{\pi}^{C*} \log(\pi_{t-1}^{C*}) + \sigma_{\pi}^{C*} \epsilon_t^{\pi C*}, \quad \epsilon_t^{\pi C*} \sim N(0, 1).$$

We further assume physical capital is owned by households, and its law of motion is given by

$$\bar{k}_t^S(j) = (1 - \delta) \bar{k}_{t-1}^S(j) + \left[1 - \Gamma_i\left(\frac{u_t^i(j)}{i_{t-1}^S(j)}\right) \right] i_t^S(j) \quad (2)$$

where $\Gamma_i(\cdot)$ is the investment adjustment cost function that satisfies the properties $\Gamma_i(1) = \Gamma_i'(1) = 0$ and $\Gamma_i''(1) > 0$ as in Christiano et al. (2005) and Smets and Wouters (2007). Effective capital, $k_t^S(j)$, is linked to physical capital via the utilization rate of capital as $k_t^S(j) = v_t(j) \bar{k}_{t-1}^S(j)$ so that the utilization incurs a cost of $\Psi(v_t)$ per unit of physical capital. In the steady state, $v=1$ and $\Psi(1) = 0$. We define the capital utilization cost parameter, $\psi \in [0, 1)$, to satisfy $\frac{\Psi'(1)}{\Psi(1)} = \frac{\psi}{1-\psi}$ as in Smets and Wouters (2007).

Finally, u_t^i is an AR(1) investment-specific shock that follows

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