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## Fiscal policy and business formation in open economies

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### ABSTRACT

According to empirical evidence, expansionary government spending policies increase consumption and the number of active firms in an economy and have large positive international spillover effects. Using a two-country sticky-price model with a variable number of producers, we analyze movements in output, consumption, extensive-margin investment and foreign output in response to government spending expansions. Our baseline results show that, first, there is divergence between consumption and firm entry; and second, spillovers are generally small. A large share of imports in government spending or a high trade elasticity can generate large spillovers in the model, but do not induce consumption–investment comovement. We propose useful government spending as a device to induce both large spillovers and positive consumption–investment comovement.

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## 1. Introduction

Large fiscal spending programs, enacted in Europe and the U.S. in response to the global economic crisis, have stimulated interest in the international transmission of government spending expansions. If expansionary policies have beggar-thy-neighbor effects, an individual country's efforts to boost economic activity could have adverse consequences for its trading partners. Since the ongoing crisis has hit countries on a global scale, understanding the international effects of policies is more important than ever.

The textbook Mundell–Fleming model makes two stark predictions regarding cross-country spillovers. First, increases in government spending have positive short run effects on output in the country's trading partners. Second, the country's real exchange rate appreciates. Empirical evidence by [Canzoneri et al. \(2003\)](#) confirms these predictions. Regarding the home country effects, empirical evidence suggests that government spending expansions stimulate private consumption and extensive-margin investment, i.e. firm entry, see [Lewis and Winkler \(2015\)](#). Open economy models struggle to explain the rise in private economic activity in the domestic country together with sizable positive output spillovers and a real exchange rate appreciation after domestic government spending expansions. [Corsetti et al. \(2010\)](#) propose a two-country model in which a domestic spending expansion that comes along with the announcement of future government spending contractions leads to a positive comovement of domestic consumption and investment (at the intensive margin) and positive output spillovers on the foreign economy. However, in their model the domestic currency depreciates, which stands in

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contrast to recent evidence provided by [Auerbach and Gorodnichenko \(2015\)](#) who show that U.S. government spending shocks lead to an appreciation of the U.S. dollar.

We revisit the question of international fiscal policy spillovers using a business cycle model with endogenous producer entry (extensive margin investment) as in [Bilbiie et al. \(2012\)](#). More specifically, we extend the sticky-price version, [Bilbiie et al. \(2008\)](#), to an open economy setting. We propose a model where government spending and private consumption fall disproportionately on home-produced goods, as in [Corsetti et al. \(2010\)](#). Also, capital goods that new firms need to purchase to enter the domestic market are aggregates of home-produced and imported varieties, and their import content can differ from the consumption bundles of home households and the government. [Cavallari \(2013\)](#) shows that introducing endogenous firm entry, combined with entry costs with a substantial import content, into a two-country model helps to generate international output comovement in response to technology shocks as observed in the data.

Our results show that output spillovers are positive but rather small in the baseline model, while [Canzoneri et al. \(2003\)](#) find sizable spillovers in the data. A sensitivity analysis reveals that spillovers increase if the government buys a large share of goods abroad, or if the trade elasticity is very high. Both assumptions seem empirically implausible. We instead propose to include public goods in the model, modeled as government consumption entering household utility. We show that this model feature can generate positive and large international spillovers and a real appreciation of the home currency. In addition, consumption and firm entry positively comove with domestic government spending.

Sizeable cross-country spillovers of fiscal expansions have been empirically documented by, e.g., [Canzoneri et al. \(2003\)](#), [Beetsma et al. \(2006\)](#), and [Auerbach and Gorodnichenko \(2013\)](#). [Corsetti et al. \(2010\)](#) use, as we do, a two-country DSGE model to analyze the spillover effects of a unilateral government spending expansion. As mentioned above, their model produces sizeable output spillovers and a positive consumption-investment comovement in the home country if a rise in government spending today is accompanied by an announcement of future spending contractions (a spending reversal). Our paper is different from the paper by [Corsetti et al. \(2010\)](#) in that investment in our paper takes the form of creation of new firms instead of investment in physical capital. Firm entry has shown to be an important margin of investment altering the transmission of shocks to the economy, see e.g. [Lewis and Stevens \(2015\)](#). Moreover, we do not consider spending reversals here but instead propose useful government spending as an alternative modeling device to reconcile the model with the data. Spending reversals imply a depreciation of the domestic currency, whereas under useful government spending the domestic exchange rate robustly appreciates. The jury is still out on the effects of spending shocks on the real exchange rate. Some papers find evidence for a real exchange rate depreciation, e.g., [Enders et al. \(2011\)](#); [Monacelli and Perotti \(2010\)](#), and [Ravn et al. \(2012\)](#), while there is competing evidence of appreciations after spending shocks, see e.g., [Auerbach and Gorodnichenko \(2015\)](#), [Canzoneri et al. \(2003\)](#), [Benetrix and Lane \(2013\)](#), and [Born et al. \(2013\)](#).

The paper is structured as follows. [Section 2](#) derives the two-country model featuring endogenous firm entry and strategic complementarities between producers. Then in [Section 3](#), we calibrate the model and show impulse responses to government spending expansions, both home-country effects and cross-border spillovers. [Section 4](#) explores the importance of parameter values in shaping model predictions. In [Section 5](#), we extend the model to include useful government spending. [Section 6](#) concludes.

## 2. Model

The model economy is composed of two countries, Home and Foreign (denoted  $H$  and  $F$  for short). The structure of the model is similar to [Benigno and De Paoli \(2010\)](#), where the two countries may differ in size. This allows us to consider the small open economy as a limiting case, where the size of the home country is shrunk to zero. Final goods firms in each country produce a homogeneous good consumed by home and foreign households, the home and foreign governments, and entrants in both countries. Each household consumes both home final goods and imports, but has a bias for goods produced domestically. In what follows, we use stars to indicate foreign variables and omit detailed derivations for the foreign economy wherever they are equivalent to those of the home country.<sup>2</sup>

### 2.1. Households

There is a mass  $n$  and  $(1 - n)$  of agents in the home and foreign economy, respectively. Preferences of *home* households are summarized by

$$E_0 \sum_{t=0}^{\infty} \beta^t [U(c_t) + V(1 - l_{H,t})], \quad (1)$$

where  $c_t$  is consumption of a composite good (including both domestic and foreign goods),  $l_{H,t}$  is labor, and the time endowment is normalized to unity.  $V(\cdot)$  and  $U(\cdot)$  are single-period utility functions, which follow the standard continuity and concavity assumptions.

<sup>2</sup> A detailed derivation of all model equations for the foreign economy can be found in the Appendix.

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