Third country effects of fiscal devaluations

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HIGHLIGHTS

- A fiscal devaluation is analyzed in a three-country model of a monetary union.
- Compared to a two-country model, the devaluing country's GDP expansion increases.
- The second monetary union country experiences a boom instead of a recession.
- The rest of the world, outside the monetary union, is hardly affected.

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ABSTRACT

We analyze fiscal devaluation in a three-country model. The introduction of the third country, outside a monetary union, increases the expansionary effect of fiscal devaluation and the second country of the monetary union experiences a boom instead of a recession.

1. Introduction

Fiscal devaluations have been discussed in the recent literature as an alternative macroeconomic stabilization tool to a depreciation of the nominal exchange rate for countries in a monetary union (MU).[1] With the exchange rate fixed vis-à-vis their MU partner countries, a country-specific recession can be mitigated and a current account deficit be reduced by a reduction of the social security contribution (SSC) rate and an offsetting increase of the value-added tax (VAT) rate that makes the policy revenue neutral. So far, this policy has been intensively analyzed in calibrated small open economy or 2-country models of a MU. What has been missing so far, and what this paper contributes, is an explicit analysis of repercussions of a third country outside the MU.

Engler et al. (2017, henceforth EGTV) have shown in a New Keynesian DSGE model of a 2-country MU calibrated to the Eurozone (with a "core" and a "periphery" country, the latter conducting a fiscal devaluation) that if SSC paid by employers are reduced and if nominal wages are sufficiently rigid, firms' real marginal costs of production and inflation decline and the terms of trade deteriorate. The MU's central bank reacts by reducing the real rates of interest boosting consumption, net exports and output in the fiscally depreciating country. The trade balance relative to GDP rises slightly. In contrast, the core suffers from a recession because of a fall in net exports.

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[1] See Engler et al. (2017), Farhi et al. (2014), Gomes et al. (2016), Hohberger and Kraus (2016) for journal publications and Bank of Portugal (2011), Boscá et al. (2012), CPB and CAPP (2013), Lipinska and von Thadden (2012) and de Mooij and Keen (2013) for working papers and book chapters.

In this paper, we add a third country outside the MU with a flexible exchange rate to the model of EGTV. This extension increases the expansionary effects on output in the fiscally depreciating country by 10 basis points in the peak to 1.33% while the core, rather than suffering from a recession, experiences a small expansion of 0.13%. From the perspective of the MU, and in contrast to the finding of EGTV, fiscal devaluations are thus a free lunch regarding the output effects. Furthermore, the MU's trade is further boosted: In the periphery, net exports increase more while the core country's net exports decline by almost 70% less. The conclusion drawn in EGTV that fiscal devaluations are an inadequate tool to reverse trade imbalances is thus slightly weakened with respect to the periphery but strengthened with respect to the core.

2. The model

In this section, we provide a brief overview of the model. The details and the parametrization are relegated to the appendix. The analysis is based on a New Keynesian DSGE model of the world economy that is normalized to size 1 consisting of two countries forming a MU and a third country whose currency is floating vis-à-vis the monetary union's currency. We denote those countries "periphery", "core", and "rest of the world", their relative sizes are n, $m - n$ and $1 - m$ respectively with $n, m \in [0, 1]$. The economies are populated by representative households who derive (dis-)utility from consumption, C_t, and hours worked, N_t. In the periphery,[2] this is $\mathcal{U}_t = \mathbb{E}_t \sum_{s=0}^{\infty} \beta^s \left[\log C_{t+s} - (N_{t+s})^{1+\phi}/(1+\phi) \right]$, with rational expectations operator $\mathbb{E}_t$ and preference parameters β and ϕ. Households face the budget constraint

$$\left(1 + \tau_t^{VAT}\right) P_t C_t + B_t^{Core} + E_t B_t^{RoW}$$
$$= R_{t-1}^{MU} B_{t-1}^{Core} + R_{t-1}^{RoW} E_t B_{t-1}^{RoW} + W_t N_t + \Pi_t + T_t,$$

where τ_t^{VAT} is the (country-specific) VAT rate that applies to all goods consumed within the country, P_t the consumer price level, B_t^{Core} and B_t^{RoW} are, respectively, bonds issued by core and rest of the world households and held by the periphery household, E_t is the nominal exchange rate between the MU and the rest of the world, R_{t-1}^{MU} and R_{t-1}^{RoW} are the nominal interest rates set by the respective central banks, W_t is the nominal wage, Π_t are firms' profits and T_t are lump-sum transfers.

Aggregate consumption of the periphery, C_t, is the following:

$$C_t = \left[\omega^{\frac{1}{\sigma}} C_{Per,t}^{\frac{\sigma-1}{\sigma}} + (\varpi - \omega)^{\frac{1}{\sigma}} C_{Core,t}^{\frac{\sigma-1}{\sigma}} + (1 - \varpi)^{\frac{1}{\sigma}} C_{RoW,t}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}},$$

where $C_{Per,t}$, $C_{Core,t}$ and $C_{RoW,t}$ are indexes of the periphery's, the core's and the rest of the world's goods, ω is the share of the periphery's goods in the periphery's consumption, $\varpi - \omega$ is the share of the core's goods, $1 - \varpi$ is the share of the rest of the world's goods and σ is the (Armington) elasticity of substitution between goods produced in different countries. Households allocate aggregate consumption intertemporally by an Euler equation while wages and employment are determined by trade unions that take account of the household's marginal rate of substitution (see Erceg et al., 2000).

The continuum of firms is indexed with i which produce output, $Y_t(i)$, with labor as the only factor input according to the linear production function $Y_t(i) = N_t(i)$. Therefore, each firm i combines differentiated labor, supplied by households and indexed with z, to an aggregate labor input $N_t(i)$ used in the production of good i and pay wages set by monopolistically competitive unions. Firms themselves operate under monopolistic competition, both prices and wages are set in a staggered fashion a la Calvo (1983). Firms pay country specific distortionary SSC, τ_t^{SSC}, on wages so that their

profits, $\Pi_t(i) = P_t(i) Y_t(i) - \left(1 + \tau_t^{SSC}\right) \int_0^n W_t(z) N_t(i, z) dz$, are directly affected by the SSC rate.

Tax revenues from the VAT and SSC are rebated to households in the form of lump-sum transfers so that the government budget constraint $T_t = \tau_t^{VAT} P_t C_t + \tau_t^{SSC} W_t N_t$ holds. The VAT- and SSC-rate changes in the periphery are implemented by zero mean, unanticipated "shocks" ε_t^{VAT} and ε_t^{SSC} and follow AR (1)-processes in the (absolute) deviations from their steady state values (indicated by hats, i.e. $\widehat{\tau}_t^{VAT}$ and $\widehat{\tau}_t^{SCR}$ respectively), $\widehat{\tau}_t^{j} = \rho^j \widehat{\tau_{t-1}^{j}} + \varepsilon_t^{j}$ with $j = VAT, SSC$ and $\rho^j \in [0, 1]$. A fiscal devaluation is calibrated as an unanticipated highly persistent (de facto permanent) reduction of the periphery country's SSC rate that reduces revenues worth one percent of its ex-post GDP which is exactly offset by an increase in the VAT rate. Central banks set nominal interest rates proportional to the consumer price inflation and to past interest rates.

The parameters of the model are set to mimic the "Eurozone periphery" (Greece, Italy, Ireland, Portugal and Spain) that makes up roughly a third of the Eurozone GDP and the remaining Eurozone countries denoting the core and the overall Eurozone constituting roughly 20% of world GDP.

3. Results

Fig. 1 compares the effects of the fiscal devaluation enacted in the periphery for the 3-country model with that of the 2-country setting of EGTV. The peak output, consumption and trade balance increases in the periphery country rise from 1.21%, 0.73% and 0.27% of GDP to 1.33%, 0.79% and 0.3% of GDP respectively. The fiscal devaluation thus serves as an even better tool to stimulate output and consumption while the trade effect is a bit larger when the third country is included. The finding of EGTV with respect to the periphery is thus reinforced. At the same time the initial output contraction observed in the core in the 2-country setting turns into a small boom with an initial peak of 0.13% lasting for seven quarters in the 3-country setting. The increase in consumption is mitigated but this is more than offset by a deterioration of the trade balance that is 70% smaller (-0.043% instead of -0.141%). The inclusion of a third country thus serves to cushion the MU core from this policy and hence overturns the finding of EGTV that the spillover effects to the core constitute a cost of fiscal devaluations to the MU.[3]

The reason for these effects are as follows: The periphery benefits from being a relatively smaller country in a 3-country world than in a 2-country world so that the foreign price reaction will be smaller and, c.p., a given fall in domestic goods prices will deteriorate the terms of trade more, boost net exports more and thereby generate a bigger wealth effect raising consumption even more. The core country benefits from a deterioration of its terms of trade vis-à-vis the rest of the world because of a nominal depreciation of the exchange rate boosting exports and thereby countering the fall in exports to the MU periphery. This increases hours worked, nominal wages and inflation so that the long-run real rate of interest falls less and consumption rises less. But the effect on trade is larger than the effect on consumption so that output rises while it contracts in the 2-country setting.

The deflation generated in the MU is exported to the rest of the world and with it the loose monetary policy stance. Rest of the world consumption rises but output contracts slightly.

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[2] Core and RoW are described by according equations.

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[3] A brief discussion on the sensitivity of results w.r.t. key parameters is presented in the appendix. If the Armington elasticity is 2 (1), we find a decrease (increase) in the core's output in a 2-country setup. Our choice of setting this parameter to 2 is motivated by recent empirical studies (Feenstra et al., forthcoming; Imbs and Mejean, 2015) suggesting values that are even higher than 2; by the empirical behavior of the trade balance and the terms of trade that our model is able to replicate; and because EGTV use it.