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Abstract

This paper examines the interaction of fiscal and current account balances in open economies subject to monopolistic competition with sticky price-setting behavior, adjustment costs for investment, and distortionary labor income taxes. We find that the elasticity of exports with respect to the real exchange rate influences the correlation between the balances. In particular, in simulations with recurring shocks to productivity, we find that the balances are positively correlated for a range of export elasticities. However, for simulations with recurring real government expenditure shocks, we find that the balances are positively correlated under high export elasticity but negatively correlated under low export elasticity.

1 Introduction

This paper studies the relationship between current account and fiscal balances. Are they twins, or, as Mankiw (2006) notes, "distant cousins"? We examine the correlations of these balances implied by a calibrated stochastic dynamic general equilibrium model for the case of recurring shocks to productivity and the case of recurring shocks to government expenditures.

The motivation for this simulation-based study comes from comments by Bradford De Long (2004) and John Taylor (2004) with respect to U.S. deficits. De Long notes that "we have a large trade deficit now–and did not back in 1997, because the federal budget deficit is much larger now than it was then." Taylor argues that the U.S. trade deficit simply reflects the growth of U.S. productivity resulting in capital formation growing faster than U.S. saving. The former is a classic example of a demand shock, while the latter is an example of a supply shock. Can both types of shocks produce positive correlations between fiscal and current account balances?

The paper is also influenced by the fact that the empirical literature gives divergent estimates about the effects of fiscal deficits on trade deficits (see in particular recent econometric time series studies of several European countries by Bussière, Fratzscher, and Müller (2005)). A simple correlation analysis of fiscal and current account balances (based on data reported by the International Monetary Fund in their *International Financial Statistics* and in country specific data) also reveals a range of correlations. Examples of correlations based on quarterly data over the period 1995:01-2004:04 include: Argentina, 0.46, Australia, 0.30, Singapore, 0.98, Peru, -0.37, Thailand, -0.59. The correlation for the U.S. over the same sample period is 0.24.

This paper will focus on the subject of recurring productivity or government expenditure shocks in small open economies and, in particular, it will explore whether variations in the elasticity of the demand for export can yield a range of fiscal and current account correlations. The role of export elasticity has been selected for attention following the finding in Senhadji and Montenegro (1999) that export elasticities of countries vary, with Asian countries having the highest elasticities with respect to prices and African countries the lowest. Are correlations influenced by whether the demand for export is elastic or inelastic?

This paper follows Erceg, Guerrieri and Gust (2004) in using a dynamic stochastic general equilibrium modelling approach to examine the correlations of fiscal and trade balances. Like Erceg, Guerrieri and Gust, the model used here includes sticky prices and incorporates the distortionary effects of monopolistic competition. However, our model also includes features crucial to an analysis of current account and budget deficits. The model incorporates an export demand function which responds to the real exchange rate, endogenous risk premia which depend on the foreign debt and a distortionary income tax system.

Since the model is inherently non-linear, we also eschew standard linearized first-order approximations based on perturbation. Instead, our results come from a nonlinear solution algorithm based on projection methods. Attention is also paid to the accuracy of the approximations before we assess the economic implications from the stochastic simulations.

The analysis in the paper goes beyond the "twin deficits" hypothesis implied in the analysis of the correlations of savings and investment of Feldstein and Horioka (1980). As Mendoza (1991) has pointed out, theoretical work has cast doubt on the relationship of positive savings-investment correlations and limited or imperfect capital mobility. Obstfeld (1986), for example, has shown that a dynamic general equilibrium model subject to recurring productivity shocks can produce high savings/investment correlations even with perfect capital mobility. Similarly Finn (1990) has shown that a two-country general equilibrium model can generate any kind of savings/investment correlation depending on the stochastic structure of the technological disturbances.

To anticipate results, we find that the sensitivity of export demand to real exchange rate changes influences the relationship between the fiscal and current account balances. In the presence of continuing productivity shocks, the fiscal and trade balances are "twins", or positively correlated, under relatively high and low export elasticities. However, for recurring real government expenditure shocks, another picture emerges. Under high export elasticity, there is a positive correlation between fiscal and trade balances, but under a low export elasticity, the correlation becomes negative.

The next section describes the model and the monetary and fiscal policy regimes. In section 3 we evaluate the performance of the model with impulse response functions for alternative export demand regimes, one with relatively high and one with relatively low elasticity with respect to the real exchange rate. Section 4 presents accuracy tests and simulations for regimes with recurring productivity shocks and regimes with recurring government expenditure shocks. The final section concludes.

2 An Open-Economy Model

The model contains: households which follow the standard optimizing behavior characterized in dynamic stochastic general equilibrium models; firms with Calvo-style price-setting behavior and a monetary authority which sets the interest rate using a simple linear Taylor rule. The model contains many households and firms and many differentiated goods. Since aggregation using the Dixit-Stiglitz aggregator is well documented, we shall only present the aggregate equations that are central to the analysis. The parameter values are those typically applied in the literature and they are shown in Appendix 1.

2.1 Households - Consumption and Labor

The utility function adopted is:

$$U_t(.) = \frac{C_t^{1-\eta}}{1-\eta} - \frac{L_t^{1+\varpi}}{1+\varpi} \tag{1}$$

where β is the discount factor, C is an index of consumption goods, L is labor services, η is the coefficient of relative risk aversion and ϖ is the elasticity of marginal disutility with respect to labor supply. The household demands domestic and imported goods such that consumption C is, using the Dixit-

Stiglitz aggregator, given by the following expression:

$$C_t = \left[(1-\gamma)^{\frac{1}{\theta}} \left(C_t^D\right)^{\frac{\theta-1}{\theta}} + (\gamma)^{\frac{1}{\theta}} \left(C_t^F\right)^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}} \tag{2}$$

The parameter θ is the intratemporal elasticity of substitution between domestically produced goods C^D and internationally produced goods C^F and the parameter γ represents the share of foreign goods in total consumption. Minimizing expenditures gives the demand for domestic and imported goods as:

$$C_t^D = (1-\gamma)\left(\frac{P_t^D}{P_t}\right)^{-\theta} C_t \tag{3}$$

$$C_t^F = \gamma\left(\frac{P_t^F}{P_t}\right)^{-\theta} C_t \tag{4}$$

where P^D is the price of domestically produced goods, P^F is the price of foreign produced goods and the overall price index P is given by:

$$P_t = \left[(1-\gamma)\left(P_t^D\right)^{1-\theta} + \gamma\left(P_t^I\right)^{1-\theta}\right]^{\frac{1}{1-\theta}}$$

2.2 Firms - Production and Pricing

The production function is of the Constant Elasticity of Substitution (CES) functional form:

$$Y_t = Z_t\left[(1-\alpha)L_t^{-\kappa} + \alpha K_t^{-\kappa}\right]^{-\frac{1}{\kappa}} \tag{5}$$

where Z is the aggregate total factor productivity shock, and α, $(1-\alpha)$ represent the coefficients for capital and labor, know as distribution parameters which explain the relative factor shares in total output. The parameter κ is the substitution parameter such that the elasticity of substitution of capital and labor, is given by $(1/1+\kappa)$. The K represents the capital stock which is subject to depreciation rate δ, and increases with investment I_t :

$$K_{t+1} = (1-\delta)K_t + I_t$$

The investment goods I are imported and there is a production cost of adjustment $\frac{\phi I_t^2}{2K_t}$ which rise with the level of investment or disinvestment relative to the size of the capital stock. The parameter ϕ is the adjustment cost weight (see, Mendoza (1995) for an example of this type of adjustment costs applied to capital accumulation in open-economies).

The CES production yields the following equations for the marginal products of labor and capital:

$$\frac{\partial Y_t}{\partial L_t} = f_L = Z_t^{-\kappa}(1-\alpha)\left(\frac{Y_t}{L_t}\right)^{\kappa+1} \tag{6}$$

$$\frac{\partial Y_t}{\partial L_t} = f_K = Z_t^{-\kappa}\alpha\left(\frac{Y_t}{L_t}\right)^{\kappa+1} \tag{7}$$

The productivity shock is assumed to follow the following autoregressive process (in log terms):

$$\log(Z_t) = \rho\log(Z_{t-1}) + (1-\rho)\log(\overline{Z}) + \epsilon_t; \qquad \epsilon_t \sim N(0,\sigma_z^2) \tag{8}$$

Aggregate production Y, less the adjustment costs due to investment, is the sum of domestic consumption C^D, government spending G and exports X.

$$\left(Y - \frac{\phi I_t^2}{2K_t}\right) = C^D + G + X \tag{9}$$

2.2.1 Calvo Price Setting for Domestic Goods

Prices are assumed to be set according to the Calvo (1983) staggered pricing system. The aggregate domestic price index is given by the Dixit-Stiglitz aggregator:

$$P_t^D = \left[\left(\xi P_{t-1}^D\right)^{1-\zeta} + (1-\xi)\left(P_t^H\right)^{1-\zeta}\right]^{\frac{1}{1-\zeta}} \tag{10}$$

where ξ represents the proportion of firms which are backward looking and ζ is the elasticity of substitution between differentiated goods. The forward looking price P_t^H is determined as:

$$N_t = Y_t H_t + \frac{1}{(1+r_{t+1})}\xi N_{t+1} \quad (11)$$

$$M_t = Y_t + \frac{1}{(1+r_{t+1})}\xi M_{t+1} \quad (12)$$

$$P_t^H = \frac{N_t}{M_t} \quad (13)$$

where auxiliary variables N_t and M_t have been used instead of the infinite forward sums.[1] The rate of discount is the domestic interest rate r and the marginal cost H_t is:

$$H_t = \frac{w_t}{f_L} + \frac{P_t^F}{f_K}\frac{\partial I}{\partial K} \quad (14)$$

where w is the wage rate.

2.2.2 Calvo Pricing for Imported Consumption Goods

As is the case of domestic goods, the pricing of imported goods is determined by the behavior of backward-looking and forward-looking price setters. The aggregate price index for imported goods is given by the Dixit-Stiglitz aggregator:

$$P_t^F = \left[\xi\left(P_{t-1}^F\right)^{1-\zeta} + (1-\xi)\left(P_t^I\right)^{1-\zeta}\right]^{\frac{1}{1-\zeta}} \quad (15)$$

Again, rather than work with infinite forward sums, two auxiliary variables, N_t^I and M_t^I have been used in the pricing system.

$$N_t^I = (C_t^F + I)S_t P_t^* + \frac{1}{(1+r_{t+1})}\xi N_{t+1}^I \quad (16)$$

$$M_t^I = (C_t^F + I) + \frac{1}{(1+r_{t+1})}\xi M_{t+1}^I \quad (17)$$

$$P_t^I = \frac{N_t^I}{M_t^I} \quad (18)$$

[1] We have also applied the usual assumption that subsidies have been used to eliminate the effect of a mark-up.

2.3 Fiscal and Monetary Policies

2.3.1 Taxes and Domestic Debt

We assume that G_t evolves around its steady state value $\overline{G}$ according to the following law of motion:

$$\log(G_t) = \rho \log(G_{t-1}) + (1-\rho)\log(\overline{G}\,) + \epsilon_t; \qquad \epsilon_t \sim N(0, \sigma^2) \tag{19}$$

Taxes are levied on wage income:

$$Tax_t = \tau w_t L_t \tag{20}$$

where τ is the fixed income tax rate. The fiscal balance is given by the following expression:

$$FB_t = -(B_t - B_{t-1}) = \tau W_t L_t - P_t^D G_t - R_{t-1} B_{t-1} \tag{21}$$

where B is a one-period domestic bonds.

2.3.2 Monetary Policy

The rate of interest rate is assumed to follow a simple Taylor rule with a partial adjustment mechanism for inflation targeting:

$$r_t = \phi_1 r_{t-1} + (1-\phi_1)\left[r^* + \phi_2(\pi_t - \widetilde{\pi})\right], \quad \phi_2 > 1 \tag{22}$$

The target $\widetilde{\pi}$ is zero and r^* is a foreign interest rate.

2.4 Exports and Foreign Debt

Exports depend on the real exchange (S_t/P_t), relative to its steady-state value, $(\overline{S}/\overline{P})$:

$$\ln(X_t) = \ln(\overline{X}) + \chi[\ln(S_t/P_t) - \ln(\overline{S}/\overline{P})] \tag{23}$$

The current account balance is given by the following expression:

$$CAB_t = P_t X_t - P_t^{F^*} S_t \left(C_t^I + I_t\right) - S_t F_{t-1}(R_t^* + \Phi_{t-1})) \qquad (24)$$

where F is a one-period foreign bond and S is the nominal exchange rate (defined as the home currency per unit of foreign). To close the open economy, we have also assumed an asset-elastic foreign interest rate, that is we augment the interest on international asset r_t^* with a risk premium term Φ_t:[2]

$$\Phi_t = sign(F_t) \cdot \varphi \left[e^{(|F_t| - \overline{F})} - 1\right] \qquad (25)$$

where $\overline{F}$ represents the steady-state value of the international asset. If the asset is less (greater) than the steady state, we assume that foreign lenders exact an international risk premium (discount). Note when $F_t = \overline{F}$ then $\Phi = \varphi \left[e^{(|F_t| - \overline{F})} - 1\right] = 0$.

2.5 Lagrangian and Euler Equations

The optimizing equation for the economy becomes:

$$\begin{aligned} Max \quad : \quad & Ł = \mathbf{E}_t \sum_{i=0}^{\infty} \beta^i \{U(C_{t+i}, L_{t+i}) \\ & -\lambda_{t+i}[P_t C_t + \tau W_t L_t + S_t F_{t-1}(1 + R_{t-1}^* + \Phi_{t-1}) + B_t \\ & -S_t F_t - (1 + r_{t-1}) B_{t-1} - W_t L_t - P_t^D \left(Y_t - \frac{\phi I_t^2}{2K_t}\right) + W_t L_t + P_t^i I_t] \\ & -Q_{t+i}\left[K_{t+i} - I_{t+i} - (1-\delta) K_{t-1+i}\right] \qquad (26) \end{aligned}$$

There is a second Lagrangian multiplier, $Q_{t,}$ which we attach to the law of motion for capital, in addition to the multiplier λ_t, applied to the budget constraint given by equation. Maximizing equation (26) with respect to C_t,B_t, F_t, L_t, I_t and K_t yields the following set of Euler equations:

[2] See, Schmitt-Grohé and Uribe (2003) for further discussion about alternative ways to close the open economy.

$$\lambda_t = \frac{C_t^{-\eta}}{P_t} \tag{27}$$

$$\frac{\lambda_t}{(1+r_t)} = \beta \mathbf{E}_t \left(\lambda_{t+1}\right) \tag{28}$$

$$\frac{\lambda_t S_t}{(1+R_t^* + \Phi_t + F_t \Phi_t')} = \beta \mathbf{E}_t \left(\lambda_{t+1} S_{t+1}\right) \tag{29}$$

$$L_t^{\varpi} = \lambda_t \left(P_t^D f_L - \tau W_t\right) \tag{30}$$

$$Q_t = \lambda_t \left(P_t^D \frac{\phi I_t}{K_t} + P_t^i\right) \tag{31}$$

$$\lambda_t P_t^D \left(f_K + \frac{\phi I_t^2}{2K_t^2}\right) = Q_t - Q_{t+1}\beta(1-\delta) \tag{32}$$

where $\mathbf{E}_t$ is the expectations operator conditional on information available at time t. Note that we do not work with linearized Euler equations and we do not assume zero covariances between the terms $S_{t+i}, \frac{C_{t+1}^{-\eta}}{P_{t+1}}$.

3 Computational Analysis

Overall, we seek to determine decision rules for consumption C_t, the exchange rate S_t, the numerator and denominator of the forward-looking Calvo prices for domestic and imported goods N_t, M_t, N_t^I, M_t^I, as well as a decision rule for Q_t, which determines investment. We apply a parameterized expectations solution method, in which decision rules for C, S, Q, N_t, M_t, N_t^I, M_t^I are specified as nonlinear neural network functional forms of state variables.[3] The state variables used as arguments for these decision rules are the current shocks to productivity or government spending, Z_t or G_t, the capital stock, K_{t-1},foreign debt F_{t-1},government bonds, B_{t-1} and the interest rate R_{t-1}. In order to understand the separate effects of productivity and government expenditure shocks, we solve the model separately for productivity shocks and for spending shocks.

The coefficients of the decision rules are obtained from stochastic simu-

[3] See Sirakaya, Turnovsky, and Alemdar (2005) for a discussion about the advantages of using neural networks as approximating functions.

lations for $T = 30000$, based on minimization of the sum of squared Euler equation errors. The errors we minimize are the five intertemporal Euler equation errors, given below:

$$\epsilon_t^C = \frac{\lambda_t}{(1+R_t)} - \beta E_t\left(\lambda_{t+1}\right) \tag{33}$$

$$\epsilon_t^S = \frac{\lambda_t S_t}{(1+R_t^* + \Phi_t + F_t \Phi_t')} - \beta E_t\left(\lambda_{t+1} S_{t+1}\right) \tag{34}$$

$$\epsilon_t^Q = Q_t - \beta Q_{t+1}(1-\delta) - \lambda_t P_t^D \left(f_K + \frac{\phi I_t^2}{2K_t^2}\right) \tag{35}$$

$$\epsilon_t^D = \frac{N_t}{M_t} - \frac{\left[Y_t H_t + \frac{1}{(1+R_{t+1})}\xi N_{t+1}\right]}{\left[Y_t + \frac{1}{(1+R_{t+1})}\xi M_{t+1}\right]} \tag{36}$$

$$\epsilon_t^I = \frac{N_t^I}{M_t^I} - \frac{\left[(C_t^F + I) S_t P_t^* + \frac{1}{(1+R_{t+1})}\xi N_{t+1}^I\right]}{\left[(C_t^F + I) + \frac{1}{(1+R_{t+1})}\xi M_{t+1}^I\right]} \tag{37}$$

This method was developed by Marcet (1992) and further elaborated by Marcet and Lorenzoni (1999). Canova (2005) points out two advantages of this method: first, it can be used when inequality restrictions are present, and it has a built-in mechanism for evaluating whether a candidate solution satisfies the optimality conditions of the model. Canova also notes that this approach gives a globally valid approximation, as opposed to quadratic, log-linear, or second-order approximations which are valid only around a particular point.

We also keep the domestic and foreign debt to GDP ratios bounded, thus fulfilling the transversality condition, by imposing the following constraints on the parameterized expectations algorithm:[4]

$$\sum \left(\frac{|S_t F_t|}{P_t C_t}\right)/T < \widetilde{L}, \qquad \sum \left(\frac{|B_t|}{P_t C_t}\right)/T < \widetilde{B} \tag{38}$$

where $\widetilde{L}$, and $\widetilde{B}$ are the critical foreign and domestic debt ratios.

[4] In the PEA algorithm, the error function will be penalized if the foreign or domestic debt/gdp ratio is violated. Thus, the coefficients for the optimal decision rules will yield debt/gdp ratios which are well belows levels at which the constaint becomes binding.

4 Impulse Response Analysis

Figures 1 and 2 show the impulse responses for the fiscal and trade balances, interest rates, and employment, following a productivity shock and a real government expenditure shock under the assumption of relatively high elasticity of exports with respect to the real exchange rate ($\chi = 2.0$) and relatively low export elasticity ($\chi = 0.2$). Overall, these impulses indicate that the calibrated model is stable. In particular, the results show that a productivity change induces a fall in employment due to the labor-leisure trade-off. With higher productivity and higher real wages, households can enjoy the same welfare with lower labor. In contrast, as government spending rises, there is an increased demand for labor to produce the domestic goods.

The results also show the expected response of the rate of interest - under a productivity scenario, there is a fall in the interest rate (due to falling prices) but under a expenditure scenario, there is an increase in the interest rate as the spending shock induces a rise in prices and a tightening in monetary policy (through the Taylor rule).

The main results for the relationship between the balances are as follows.

- Productivity Shocks

In both cases, there are improvements in the fiscal and current account balances. Not surprisingly, the improvement in the current account is much stronger and more persistent in the case of high export elasticity (due to the depreciation of the exchange rate). In the case of low elasticity, the increased consumption has a stronger effect. This result is consistent with the analysis in Mendoza (1991) which argues for a strong income effect on imports and where the pro-borrowing effect induced by increased investment and expected future output dominates the pro-saving effect.

- Government Expenditure Shocks

The results show that a temporary increase in government spending leads to a fall in the fiscal balance, as expected. But there is an important difference between the high and low elasticity cases. In general, a government

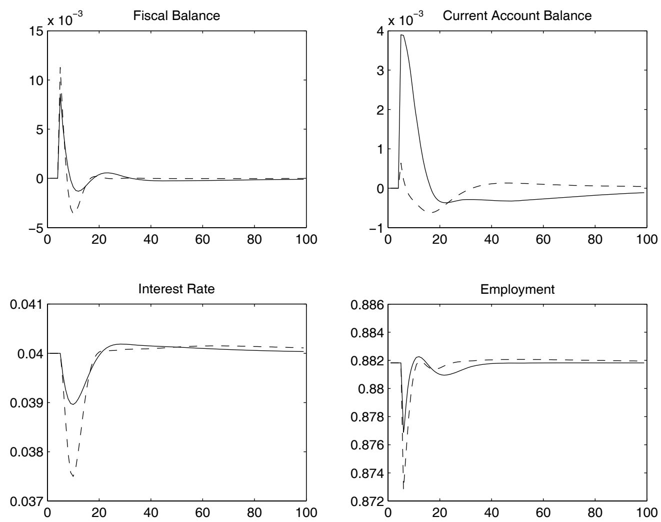

Figure 1: Impulse Responses for the case of a shock to Productivity when the export elasticity is high (solid line) and when it is low (dashed line)

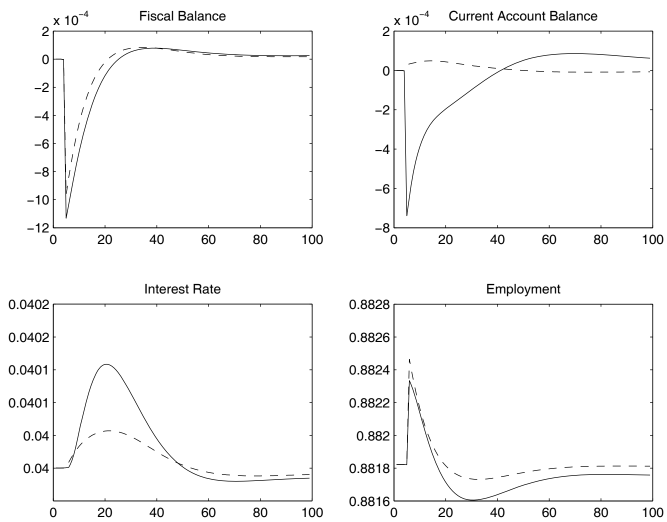

Figure 2: Impulse Responses for the case of a shock to Government expenditure when the export elasticity is high (solid line) and when it is low (dashed line)

spending shock generates a negative fiscal balance, an increase in interest rates which induces a real appreciation of the exchange rate and hence a negative effect on the current account. When the price elasticity of exports is high, the negative effect of the fall in exports on the current account more than offsets the positive effects of the fall in imported investment goods. When the price elasticity of exports is low, the outcome on the current account is driven by the changes in imported investment goods, since exports hardly change.. This "crowding out" of investment drives down the demand for imports and the net effect of the investment crowding out is a slight improvement in the current account.

4.1 Stochastic Simulations

4.1.1 Accuracy Assessment

Judd and Gaspar (1997) suggest checking the accuracy of the approximations by examining the absolute Euler equation errors relative to their respective forward looking variable:

$$\mathcal{L}(C_t) = \frac{\left|\epsilon_t^C\right|}{C_t}; \quad \mathcal{L}(S_t) = \frac{\left|\epsilon_t^S\right|}{S_t}; \quad \mathcal{L}(Q_t) = \frac{\left|\epsilon_t^Q\right|}{Q_t}; \quad \mathcal{L}(P_t^D) = \frac{\left|\epsilon_t^D\right|}{P_t^D}, \quad \mathcal{L}(P_t^I) = \frac{\left|\epsilon_t^I\right|}{P_t^I}$$

For example, if the mean absolute value of the consumption errors, deflated by consumption is 10^{-2}, Judd and Gaspar note that the Euler equation is accurate to within a penny per dollar of expenditure. Figure 3 and 4 show the distribution of the Judd-Gaspar error measures for 1000 simulations, for the mean of the five Euler equation errors, under the assumption of a high export price elasticity ($\chi = 2.0$) and under a low elasticity ($\chi = 0.2$) for both simulations. We see that the errors do not differ by much and represent less than one percent of their respective decision-rule variables.

Den Haan-Marcet (1994) suggest assessing the significance of Euler-equation errors by examining the squared Euler equation errors relative to a chi-square distribution. Under the null hypothesis of accuracy in simulations, the number of chi-square statistics, in the lower and upper five percent region should

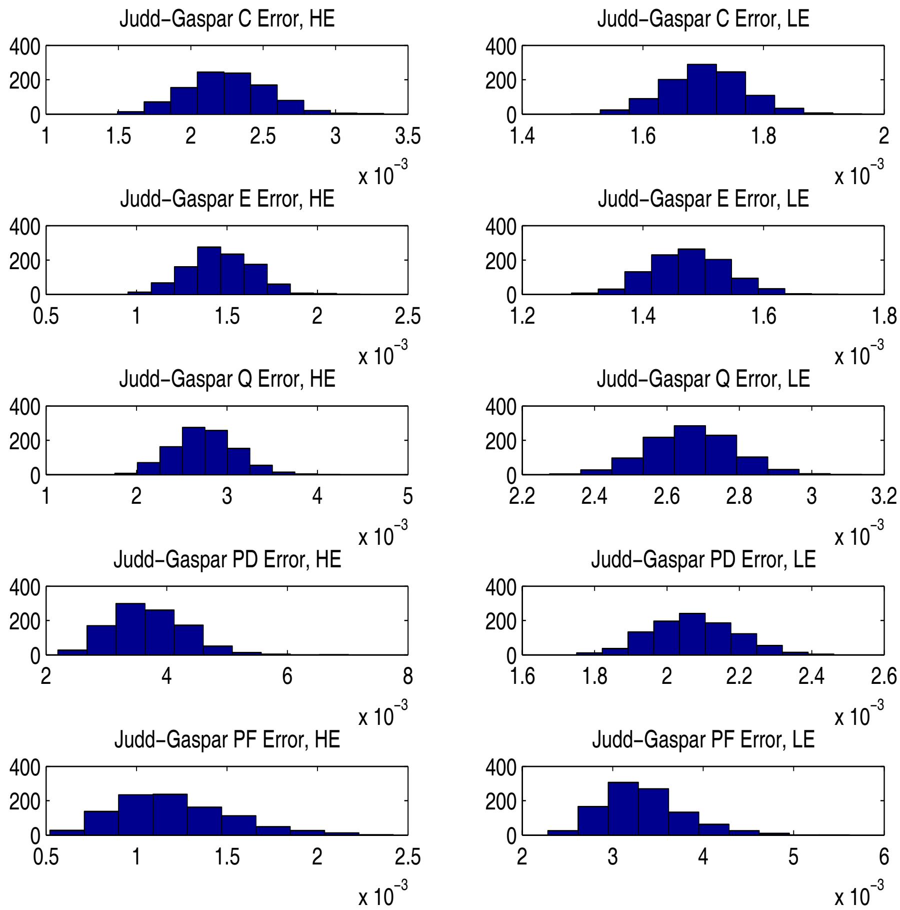

Figure 3: Judd-Gaspar Statistics for the case of high export elasticity (HE) and the case of low export elasticity (LE): shocks to productivity

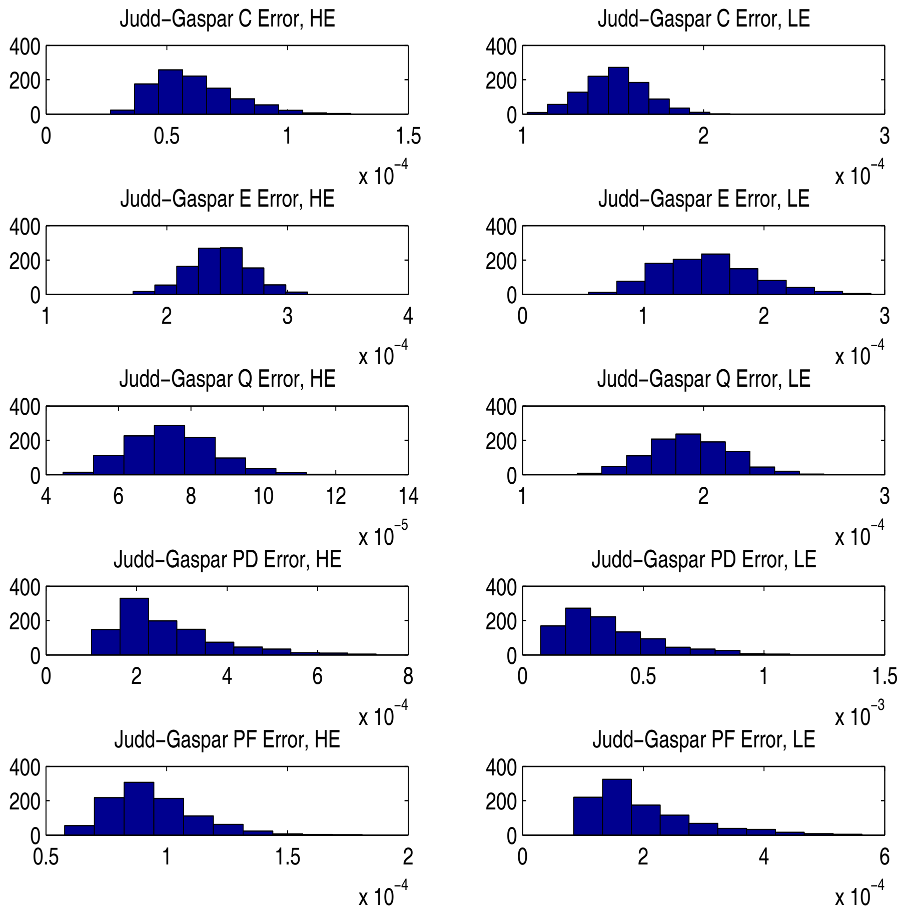

Figure 4: Judd-Gaspar Statistics for the case of high export elasticity (HE) and the case of low export elasticity (LE): shocks to government expenditure

be similar to the underlying theoretical chi-square distributions. Table 1 presents the percentage of realizations (out of 1000) in which the Den Haan-Marcet statistics fell in the upper or lower critical regions of the chi-squared distribution, for each simulation regime, under alternative export elasticities.

Table 1: Distribution of Den-Haan Marcet Statistic Percentage in Lower/Upper 5% Critical Region		
	Export Elasticity	
Simulation Shocks	$\chi = 2.0$	$\chi = 0.2$
productivity	1.9/2.9	3.9/9.6
government expenditure	4.4/2.5	8.0/6.2

4.2 Correlations

The impulse response paths suggest that the fiscal and current account balances are positively correlated under productivity shocks for both high and low export elasticities. The stochastic simulations in Figure 5 for the case with recurring productivity shocks show that the correlations between the two balances are indeed positive. The difference lies with the dispersion - under high export elasticity the correlations are more tightly centered, whereas under low export elasticity the dispersion is wider.

Figure 6 shows the correlations for the case of recurring shocks to government spending. Under high export elasticity, the correlations are very high and positive as expected from the impulse response functions. Under low elasticity, the correlations switch sign. This switch is due to the crowding out effect of government spending on imported investment goods, which actually improves the current account balance as the fiscal balance deteriorates. We thus find, under high export elasticity, a strong positive correlation between fiscal and current account balances, for recurring expenditure shocks. However, under low elasticity, the correlation is negative, as the current account improves due to the crowding out of imported investment goods.

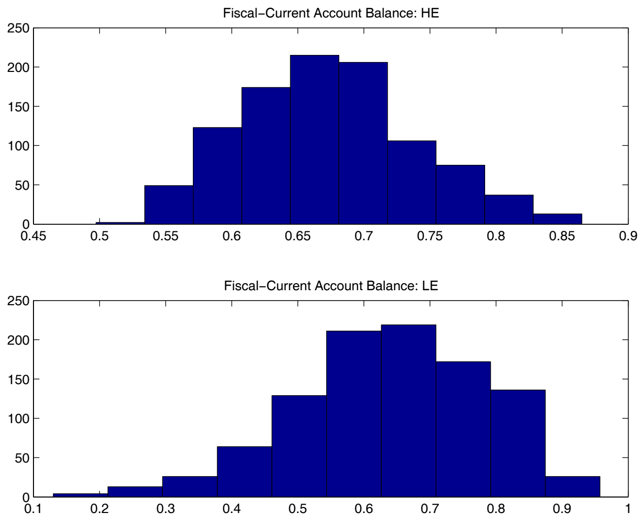

Figure 5: Correlations between the Fiscal and Current Balances: Recurring Productivity Shocks

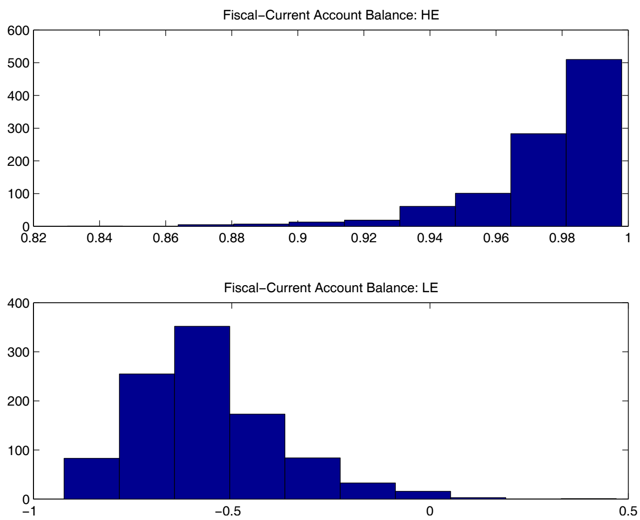

Figure 6: Correlations between the Fiscal and Current Balances: Recurring Government Expenditure Shocks

5 Concluding Remarks

Why are some current account and budget deficits positively and some negatively related? The simulations in this paper suggest that the type of shock matters. Positive correlations result from productivity shocks because both the fiscal and current account balances *improve*; positive correlations can also result from government expenditure shocks because both the fiscal and current account balances *deteriorate*. However, more interestingly, the elasticity of exports can influence the sign of the correlation. In the event of a productivity shock, the balances can be expected to be positively correlated, but in the event of a government spending shock, the balances may be positively or negatively related depending on the sensitivity of exports to changes in the real exchange rate. However, this improvement in the current account comes as a result of a crowding out effect on imported investment goods. This effect, of course, has implications for the growth of the economy.

In our simulations we have treated the shocks to productivity and government spending as separate cases to highlight the role of each. As economies are subject to both recurring productivity and government expenditure shocks, these results suggest that we will observe correlations between fiscal and current account balance that may switch signs as productivity or government expenditure shocks take on different magnitudes and as export elasticities change through time and across countries.

In reality, government spending and productivity shocks are also likely to be correlated. Whether this correlation is positive or negative is a matter of empirical assessment. Manasse (2006), for example, finds that fiscal policy in developing countries is likely to be more pro-cyclical in bad times than in developed countries. Thus, a more extensive model, capturing the pro-cyclical or counter-cyclical nature of government expenditure shocks, could give further insight into the behavior of fiscal-current account relationships.

6 Appendix: Calibration of the Model

Parameters	Definitions	Calibrated Values
β	discount factor	0.99
η	coefficient of relative risk aversion	1.5
ϖ	elasticity of marginal disutility with respect to labor	0.25
θ	intratemporal elasticity of substitution	1.25
γ	share of imported consumption goods	0.3
α	coefficient of capital	0.15
κ	substitution parameter	-0.1
δ	quarterly rate of depreciation of capital	0.0125
ϕ	adjustment cost parameter	0.025
ρ	autoregressive parameter for the shock process	0.9
σ_{ε}	standard deviation for the innovations	0.01
ξ	persistence factor in the Calvo pricing equation	0.85
ζ	elasticity of substitution between differentiated goods	6
τ	income tax rate	0.15

The steady state is computed conditional on the parameters of the model and such that at $t = 0$, $F_0 = B_0 = 0$. We normalized the initial conditions so that $S = 1$. In the stochastic simulations, the effect of initialization is mitigated by discarding the first 15% of the sample size.

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