Exchange Rate Controls As A Fiscal Instrument

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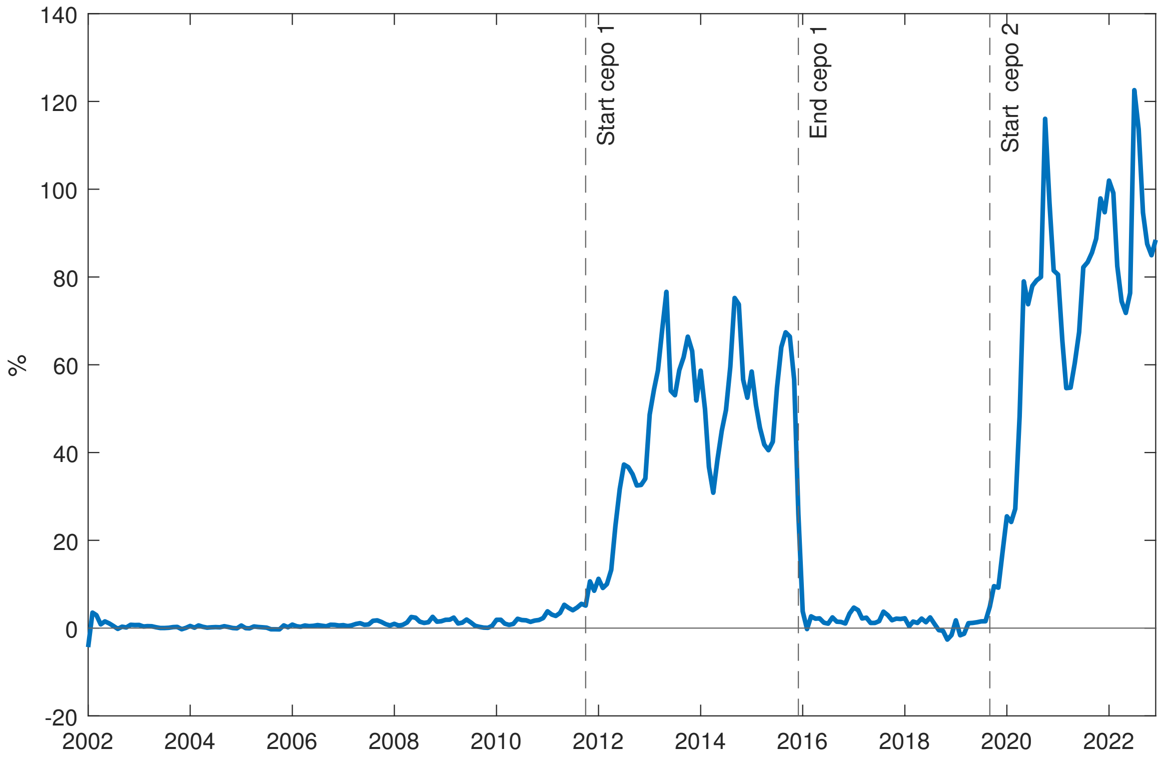
Exchange Rate Gap in Argentina

January 2002 to December 2022



Notes. The exchange-rate gap is the percent difference between the market exchange rate and the official exchange rate, both expressed as pesos per U.S. dollar. "Cepo cambiario" is the name given in Argentina to exchange-rate controls. The figure displays data over two spells of exchange rate controls: cepo 1, which ran from October 2011 to December 2015, and cepo 2, which started in September 2019 and was still in place at the end of the sample (December 2022). Sources: market exchange rate, Ámbito Financiero; official exchange rate, Banco Central de la República Árgentina; cepo dates, Ámbito Financiero (2020).

Households

$$\max \sum_{t=0}^{\infty} \beta^t [U(c_t) + V(m_t)]$$

subject to

$$c_t + \frac{i_t}{1+i_t} m_t + \frac{a_t}{1+i_t} = w_t \bar{h} + \tau_t + \phi_t + \frac{a_{t-1}}{1+\pi_t}$$

Notation: c_t =consumption; m_t =real money holdings; a_t =real value nominal asset holdings; τ_t =government transfer; ϕ_t =profits from firms; i_t =nominal interest rate; π_t =inflation rate.

Optimality Conditions

The demand for money

$$m_t = c_t \, L(i_t)$$

The Euler equation

$$U'(c_t) = \beta(1 + i_t)\frac{U'(c_{t+1})}{1 + \pi_{t+1}}$$

The exchange-rate gap

$$\gamma_t = \frac{\mathcal{E}_t - \mathcal{E}_t^o}{\mathcal{E}_t^o}$$

The market real exchange rate

$$e_t = \frac{\mathcal{E}_t}{P_t}$$

Notation:
$\mathcal{E}_t$ =market exchange rate (pesos per dollar)
$\mathcal{E}_t^o$ =official exchange rate.

Firms

Production of nontradables

$$F(h_t, q_t^n)$$

Production of exportable goods

$$X(q_t^x)$$

Notation:
q_t^n =imported inputs in production of nontradables
q_t^x =imported inputs in production of exportables.

Profit maximization problem

max $F(h_t, q_t^n) + \frac{e_t}{1+\gamma_t}(p_t^x x_t^o - q_t^o) + e_t(p_t^x x_t^s - q_t^s) - w_t h_t - C(q_t^s, \kappa) - C(x_t^s, \kappa)$

subject to

$$q_t^n + q_t^x = q_t^o + q_t^s,$$

$$x_t^o + x_t^s = X(q_t^x),$$

and

$$q_t^o \leq \overline{q}_t^o$$

Notation:
x_t^o, x_t^s =official and smuggled exports
q_t^o, q_t^s =official and smuggled imports
$\overline{q}_t^o$ =import restrictions
$C(\cdot, \kappa)$ =cost of smuggling
p_t^x =terms of trade

Legal Versus Illegal Trade

- Legal and illegal exports equally profitable at the margin

$$\frac{e_t p_t^x}{1+\gamma_t} = e_t p_t^x - C'(x_t^s, \kappa)$$

- Legal and illegal imports equally profitable at the margin unless import restrictions are binding

$$\frac{e_t}{1+\gamma_t} \leq e_t + C'(q_t^s, \kappa)$$

$$\left(e_t + C'(q_t^s, \kappa) - \frac{e_t}{1+\gamma_t}\right)(\bar{q}_t^o - q_t^o) = 0$$

The Government

Intertemporal budget constraint

$$\frac{a_{-1}}{1+\pi_0} = \sum_{t=0}^{\infty} \frac{m_t\left(\frac{i_t}{1+i_t}\right) + s_t - \tau_t - e_t i^* B^*/(1+i^*)}{\prod_{s=0}^{t-1} \frac{1+i_s}{1+\pi_{s+1}}}$$

Revenue from exchange-rate controls

$$s_t = \frac{e_t \gamma_t}{1+\gamma_t}(p_t^x x_t^o - q_t^o)$$

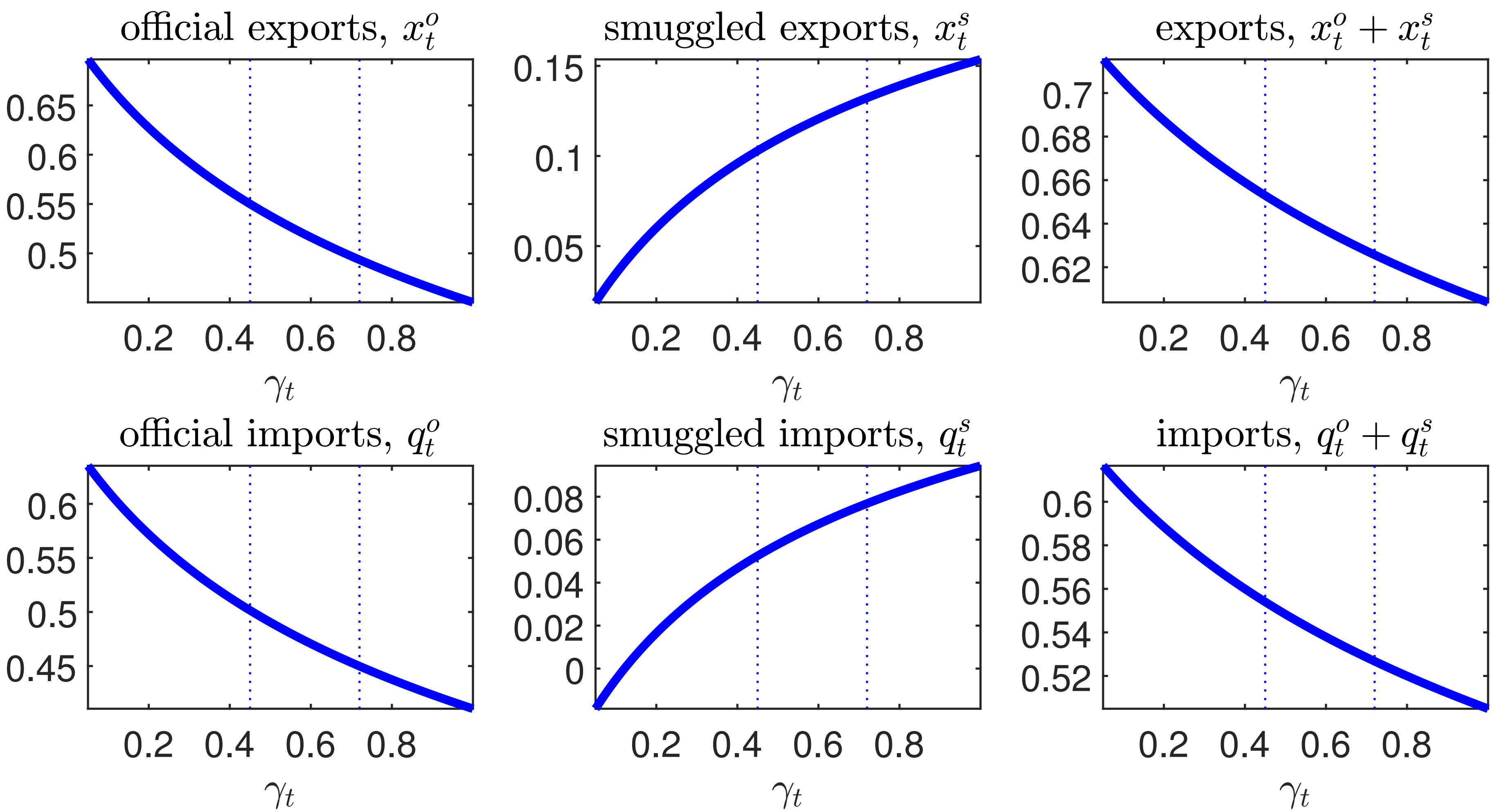
Import restriction

$$q_t^o \leq (1-\rho_t) p_t^x x_t^o,$$

where $\rho_t < 1$ is a policy instrument.

Notation: B^* =government's external debt; i^* =foreign interest rate; τ_t =exogenous primary fiscal deficit;

Exports and Imports as Functions of the Exchange Rate Gap



Notes. The vertical dotted lines mark the average value of γ_t during each of the two spells of exchange-rate controls that took place during the calibration period, 45 percent in the first episode and 72 percent in the second. The policy variable ρ_t, measuring the strength of import controls, is kept constant at its baseline value of 0.088.

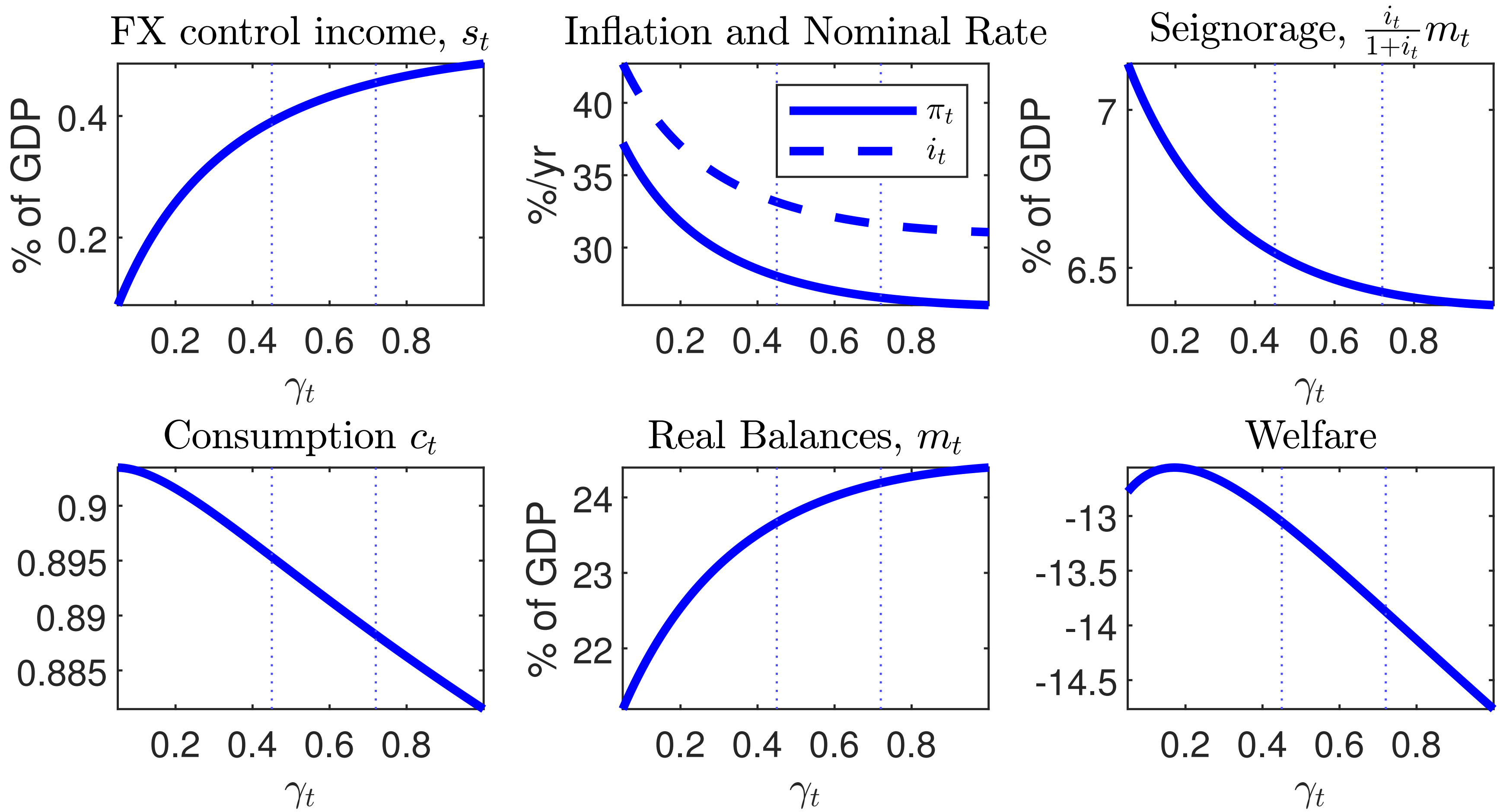
Competitive Equilibrium

Definition 1 *A competitive equilibrium is a scalar* π_0 *satisfying*

$$\frac{a_{-1}}{1+\pi_0}U'(c(\gamma_0)) = \sum_{t=0}^{\infty}\beta^t\left\{U'(c(\gamma_t))\left[c(\gamma_t)\ell(i_t)+s(\gamma_t)-\tau_t-\frac{e(\gamma_t)i^*B^*}{1+i^*}\right]\right\}$$

given the initial stock of real government liabilities a_{-1}*, a sequence of policy variables* $\{i_t, \gamma_t, \rho_t\}_{t=0}^{\infty}$*, and the exogenous sequences of primary deficits, terms of trade, and cost of external funding* $\{\tau_t, p_t^x, i_t^*\}_{t=0}^{\infty}$*.*

Inflation, Fiscal Revenue, and Welfare as Functions of the Exchange Rate Gap



Notes. The vertical dotted lines mark the average value of γ_t during each of the two spells of exchange-rate controls that took place during the calibration period, 45 percent in the first episode and 72 percent in the second. The policy variable ρ_t, measuring the strength of import controls, is kept constant at its baseline value of 0.088.

Conclusion

- The starting point of this study is an economy in which the government must finance a stream of primary deficits with seignorage revenue.

- We augment the model with exchange rate controls.

- Because exchange rate controls act as a tax on exports, they represent a fiscal instrument that competes with seignorage as a source of government revenue.

- Exchange rate controls discourage the production of exportable goods and divert trade toward smuggling.

- In financing the fiscal deficit, the government balances the distortions created by inflation with the distortions created by exchange-rate controls.

- We calibrate the model to Argentina over the period 2007-2021, during which the country had two spells of exchange rate controls.

- We find that the optimal exchange-rate gap is positive but small: 13% compared with averages of 45% and 72% in the first and second spells, respectively.