Reviving the Salter-Swan

Small Open Economy Model

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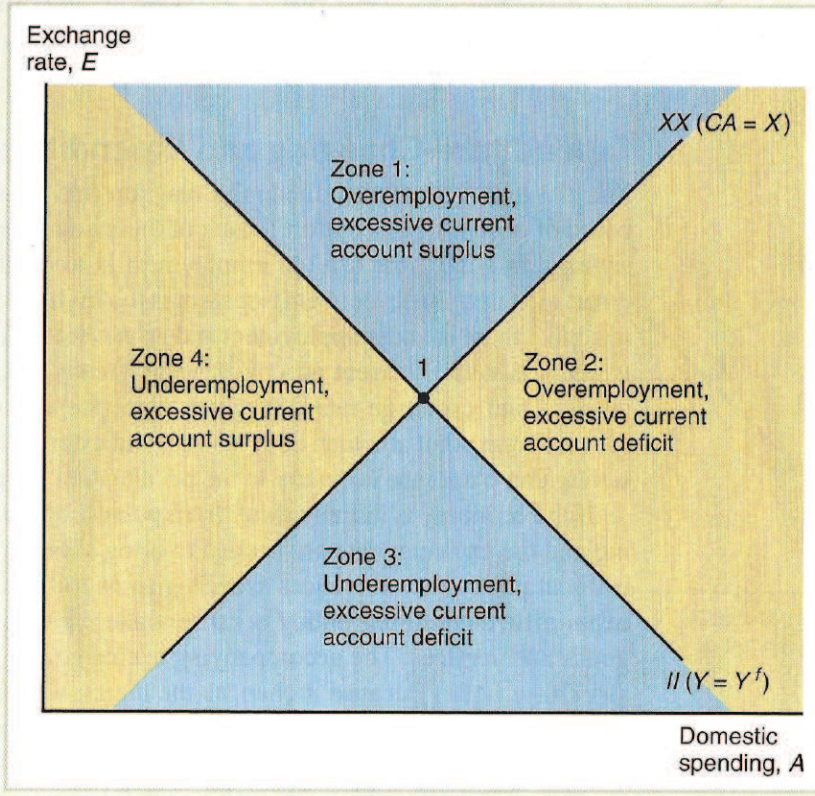
Motivation:

• The Salter Swan (1959) diagram is a graphical apparatus for the analysis of monetary and fiscal policy in small open economies in the classical Keynesian tradition. (ex: Krugman and Obstfeld, text)

Figure 19-2

Internal Balance (*II*), External Balance (*XX*), and the "Four Zones of Economic Discomfort"

The diagram shows what different levels of the exchange rate, *E*, and overall domestic spending, *A*, imply for employment and the current account. Along *II*, output is at its full-employment level, Y^f. Along *XX*, the current account is at its target level, *X*.



Motivation (ctd.):

• Salter-Swan diagram lacks microfoundations.

• This paper shows, using the Schmitt-Grohé and Uribe (2016) small open economy model with nominal wage rigidity (augmented with financial frictions), that a modified Salter-Swan diagram still exists in such a microfounded dynamic general equilibrium model.

The model: (SGU, 2016)

Household Preferences: $\sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\sigma}-1}{1-\sigma}$

with $c_t = A(c_t^T, c_t^N) \equiv \left[a(c_t^T)^{1-\frac{1}{\xi}} + (1-a)(c_t^N)^{1-\frac{1}{\xi}}\right]^{\frac{1}{1-\frac{1}{\xi}}}$ and $\xi = \frac{1}{\sigma}$

Budget constraint: $c_t^T + p_t c_t^N + d_t + \tau_t = W_t/\mathcal{E}_t h_t + \phi_t + \frac{d_{t+1}}{1+r_t}$
and a no-Ponzi game constraint

Production: $y_t^T = F_T(h_t^T); \quad y_t^N = F_N(h_t^N)$

Profit maximization: $p_t^x F_T'(h_t^T) = W_t/\mathcal{E}_t; \quad p_t F_N'(h_t^N) = W_t/\mathcal{E}_t$

Labor market: $h_t^T + h_t^N = h_t \leq \bar{h}$; $W_t \geq W_{t-1}$; $(\bar{h} - h_t)(W_t - W_{t-1}) = 0$

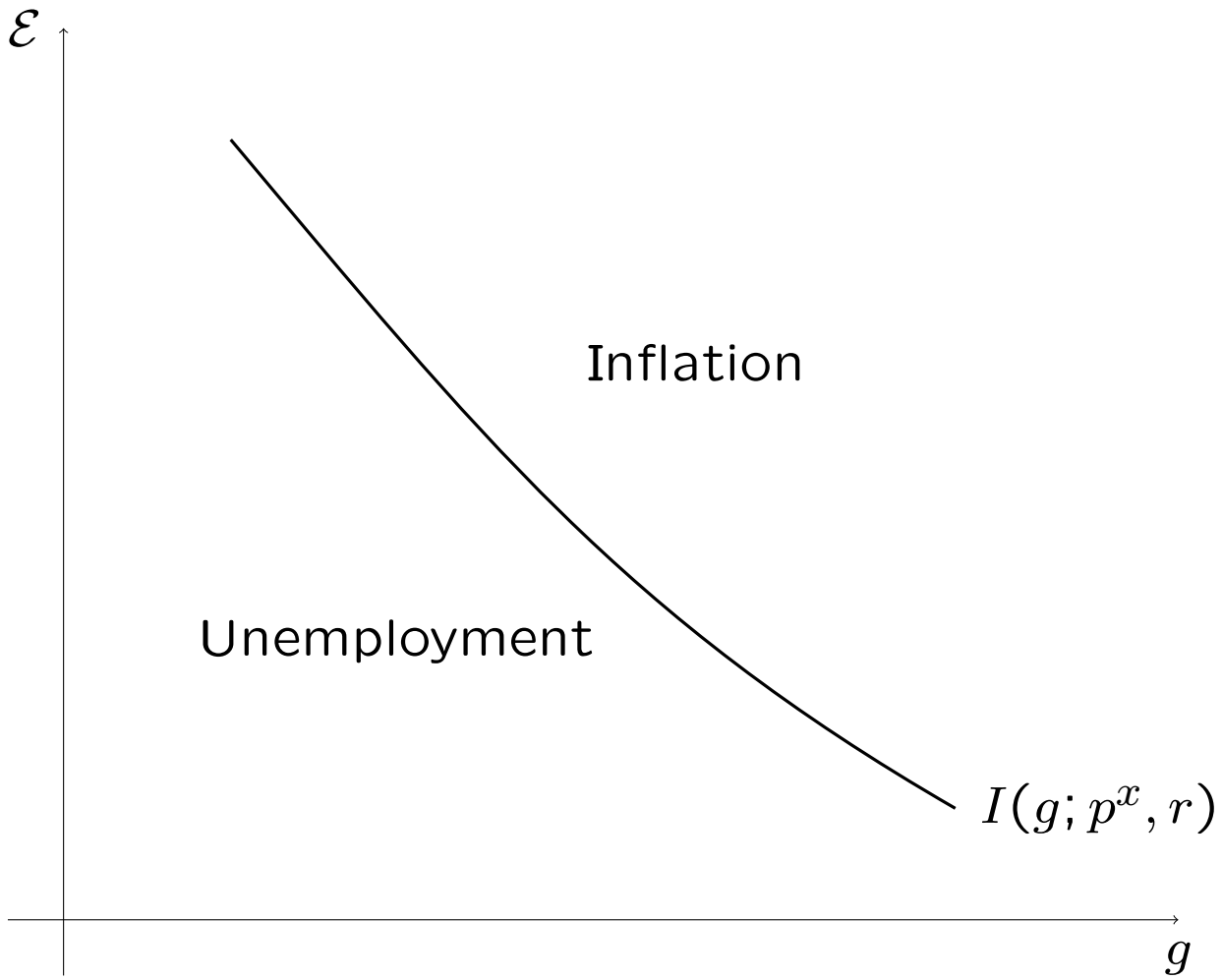
Market clearing, N: $c_t^N + g_t = y_t^N$

Market clearing, T: $c_t^T + \gamma g_t + d_t = p_t^x y_t^T + d_{t+1}/(1+r_t)$; $p_t^x \equiv \frac{P_t^x}{P_t^T}$

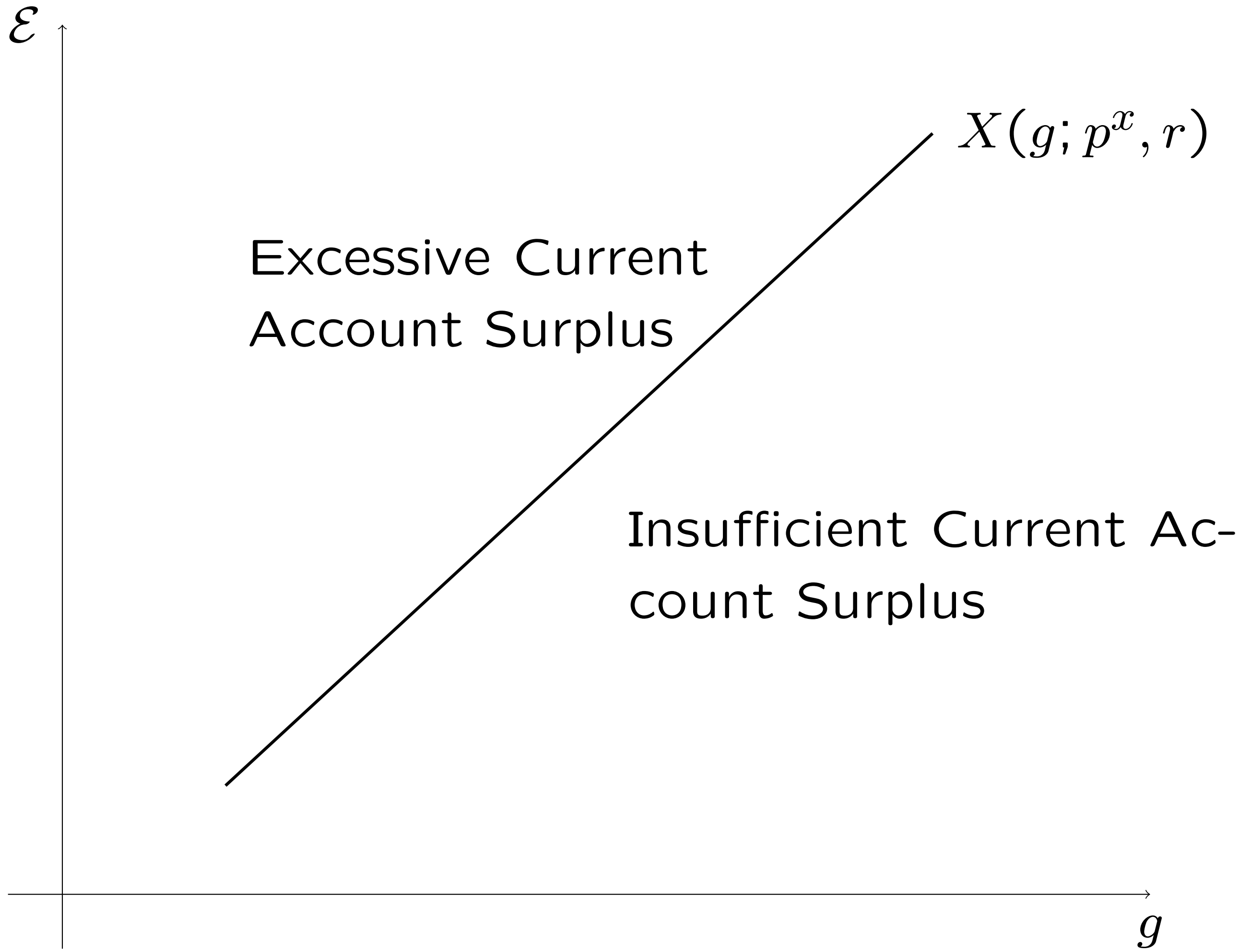
Collateral constraint: $d_{t+1}/(1+r_t) \leq \kappa p_t^x y_t^T$

The Internal Balance Schedule: policy mix $(\mathcal{E}, g)$ such that there is full-employment, $\bar{h} = h \equiv H(\underset{+}{\mathcal{E}}, \underset{+}{g}, \underset{+}{p^x}, \underset{-}{r})$ and price stability:

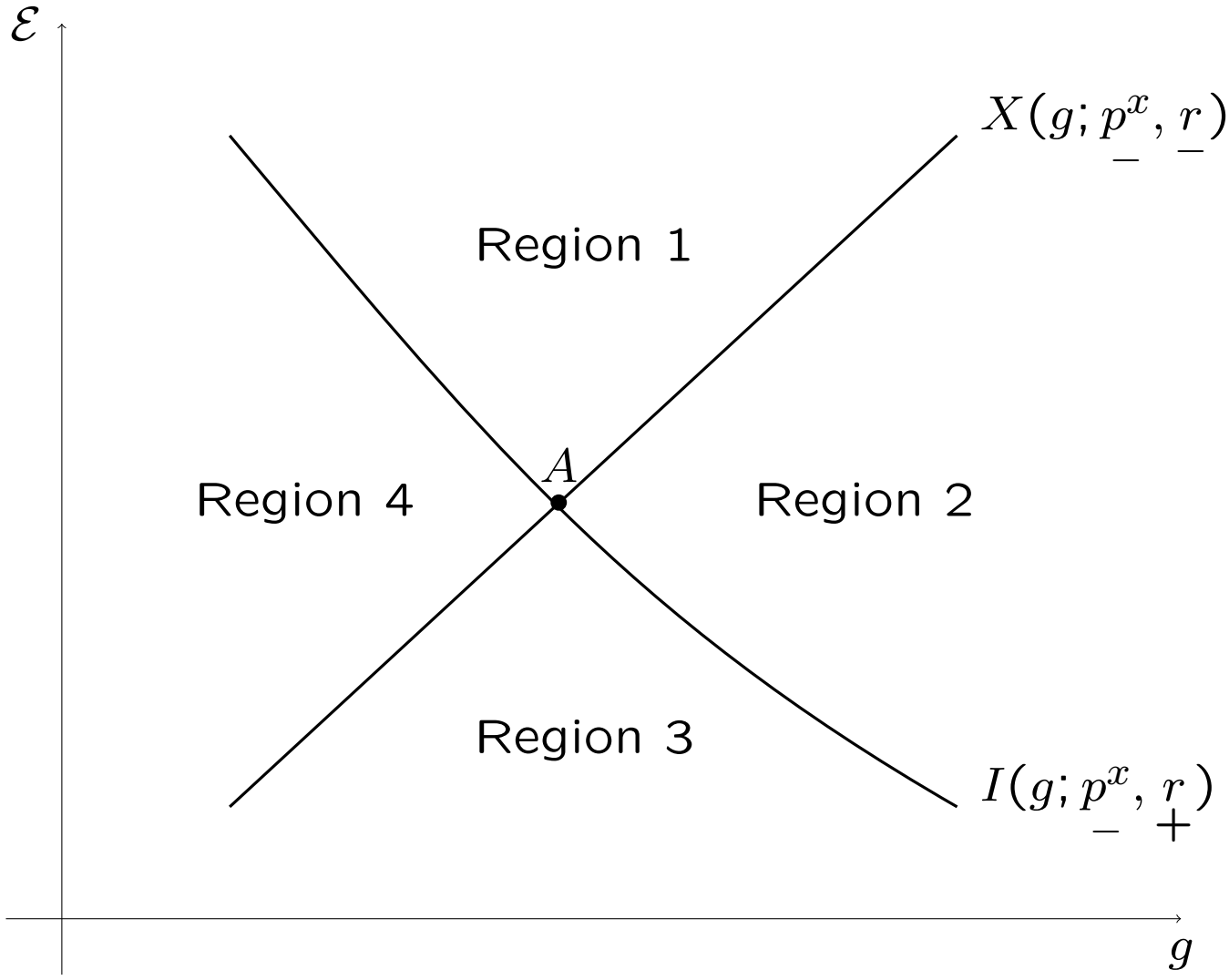
$$\mathcal{E} = I(\underset{-}{g}; \underset{-}{p^x}, \underset{+}{r})$$



The External Balance Schedule: Policy objective is $ca = \overline{ca}$. In eqm, $ca = CA(\underset{+}{\mathcal{E}}, \underset{-}{g}, \underset{+}{p^x}, \underset{+}{r})$, solving yields: $\mathcal{E} = X(\underset{+}{g}; \underset{-}{p^x}, \underset{-}{r})$

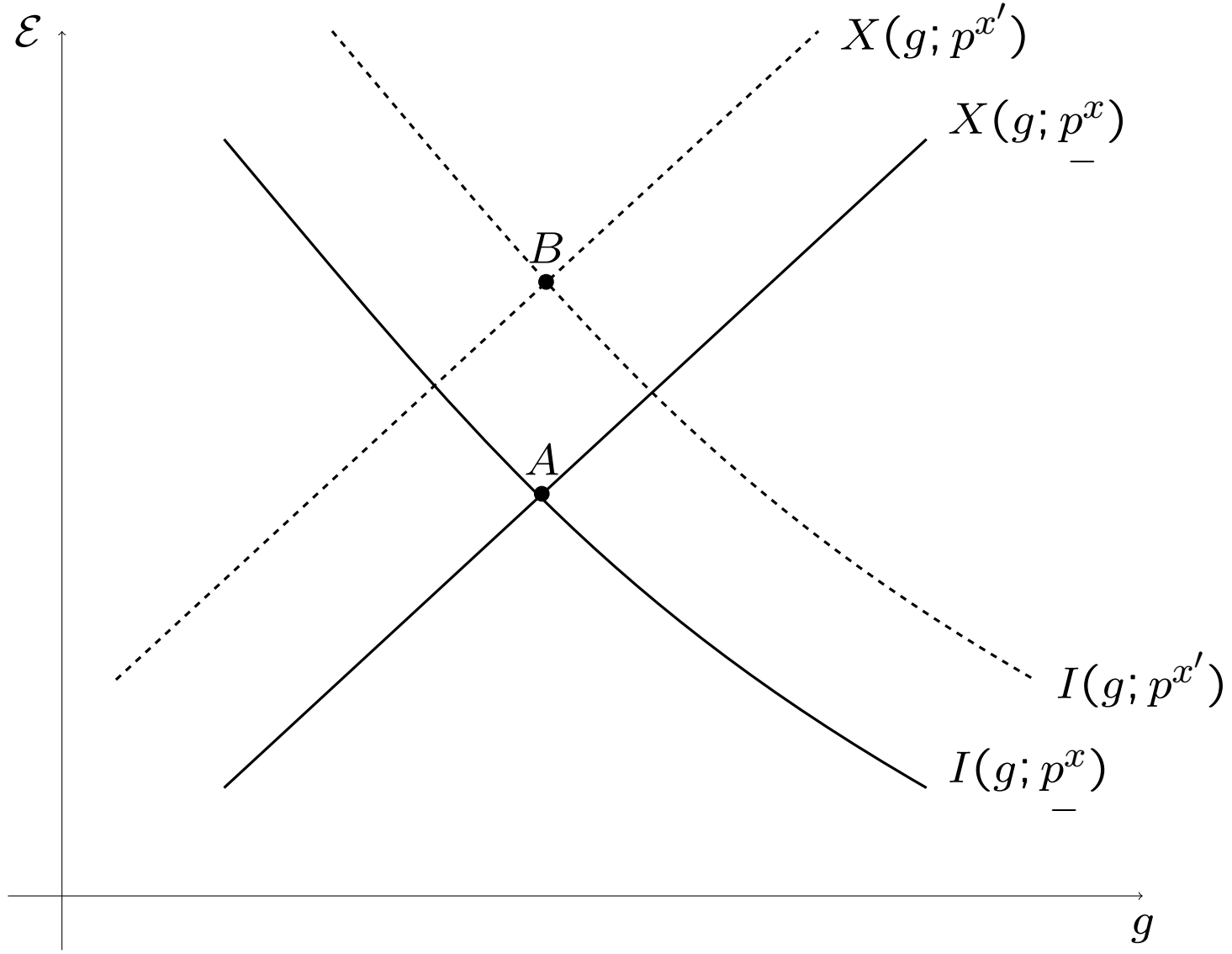


The Four Regions of Exchange-Rate Policy and Fiscal Policy



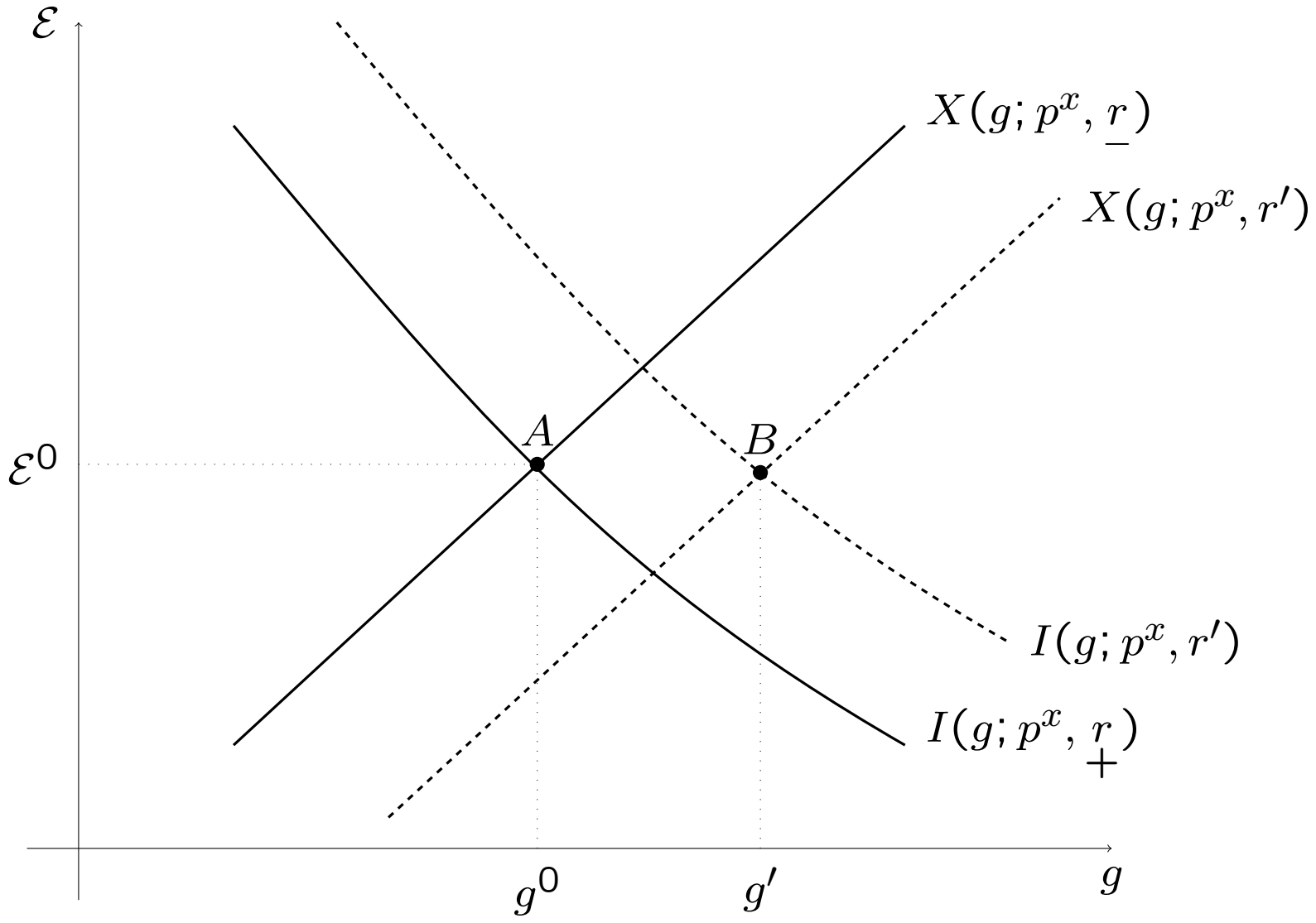
Notes. Region 1: Overheating and excessive current account surplus. Region 2: Overheating and insufficient current account surplus. Region 3: Unemployment and insufficient current account surplus. Region 4: Unemployment and excessive current account surplus.

Policy Response to a Negative ToT Shock: $p^{x'} < p^x$



- gov't must devalue, $\mathcal{E} \uparrow$
- fiscal response is ambiguous, $g \uparrow$ or $g \downarrow$

Policy Response to an Increase in the Country Spread: $r' > r$



- govt must $g \uparrow$
- exchange rate response is ambiguous, $\mathcal{E} \uparrow$ or $\mathcal{E} \downarrow$

Undesirable prediction: fiscal expansion with the sole purpose to erode current account

Remedy: replace external objective, $ca = \overline{ca}$, with collateral constraint (as in sudden stop literature)

$$\frac{d_1}{1+r_0} \leq \kappa\, p_0^x\, y_0^T$$

As in Uribe (2006, 2007), agents understand the constraint but do not internalize it, and behave as if unconstrained. Government must ensure its satisfaction.

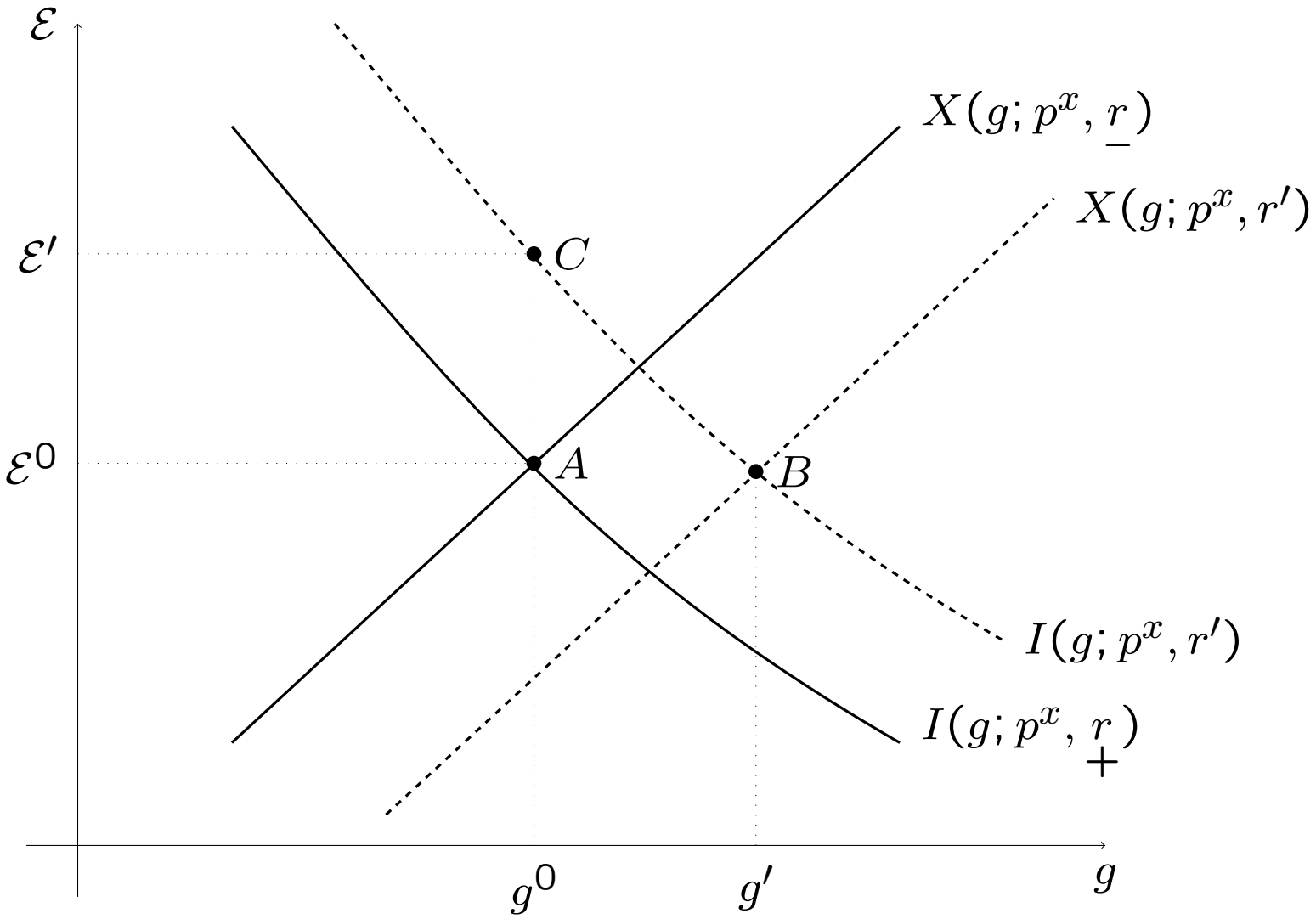
Use $d_0 = 0$, drop subscripts to denote period 0, and rearrange:

$$ca + \kappa\, p^x y^T \geq 0$$

$$\underset{+}{CA}(\underset{+}{\mathcal{E}}, \underset{-}{g}, \underset{+}{p^x}, \underset{+}{r}) + \kappa\, p^x \underset{+}{Y^T}(\underset{+}{\mathcal{E}}, \underset{+}{p^x}) \geq 0$$

External balance schedule becomes an inequality: $\boxed{\underset{+}{\mathcal{E}} \geq \underset{+}{X}(\underset{-}{g}; \underset{-}{p^x}, \underset{-}{r})}$

Response to Interest Rate Increase in the Collateral Constrained Economy, $r' > r$



Conclusions

• This paper provides micro foundations to the Salter Swan policy framework.

• Specifically, it derives the Salter Swan Diagram for exchange-rate and fiscal policy in the context of a dynamic general equilibrium small open model with nominal wage rigidities and financial frictions.

• To endogenize the external balance, or current account, objective, it assumes that the country is subject to a collateral constraint. This modification fixes a fundamental problem of the Salter-Swan framework as a fiscal expansion ceases to be necessary to achieve the country's external objectives in response to adverse world interest rate shocks.