Financial Frictions and Unconventional Monetary Policy in Emerging Economies

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Motivation

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- This was the case in developed and emerging economies, including inflation targeters (see e.g. Chang 2007, Céspedes, Chang and Velasco 2014)

Some Questions

⇒What are the implications of unconventional policies in open economies?

⇒How do they compare and interact with conventional policies?

⇒Are unconventional policies effective all the time or only during crises?

⇒How can we reconcile unconventional policy with inflation targeting?

⇒Is the analysis the same in advanced economies *vis a vis* emerging ones?

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- Uses it to analyze the mechanics of conventional and unconventional policy and to derive answers to the preceding questions

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- Financial Intermediaries borrow abroad subject to a debt constraint
- *Domestic* Frictions as well: Equity Constraint
- The two constraints combine to give an economy-wide external debt limit

Implications for Equilibrium

1. Endogenous Spread
2. Amplification of Shocks
3. Financial Shocks, which can be both domestic or external, can lead to Sudden Stops
4. The *external balance* condition emerges as the main driver of the adjustment process

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- With *flexible* exchange rates and a policy of stabilizing the interest rate, consumption is constant, adverse shocks are met with a steep devaluation, and output and exports increase
- *Currency mismatches* affecting the equity constraint add amplification, persistence, and volatility under flexible rates (but make no difference under fixed rates)

Unconventional Policies

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4. Sterilized Foreign Exchange Intervention

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- Because of leverage, liquidity facilities are more powerful than direct lending
- Unconventional policies can be used to offset shocks completely, but are feasible only if FX reserves are sufficient
- In contrast, conventional policy always involves some trade-off between demand adjustment and real depreciation

Two Special Results

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2. Sterilized FX intervention is equivalent to either direct lending or liquidity facilities

The Model

Households, Production, Demand

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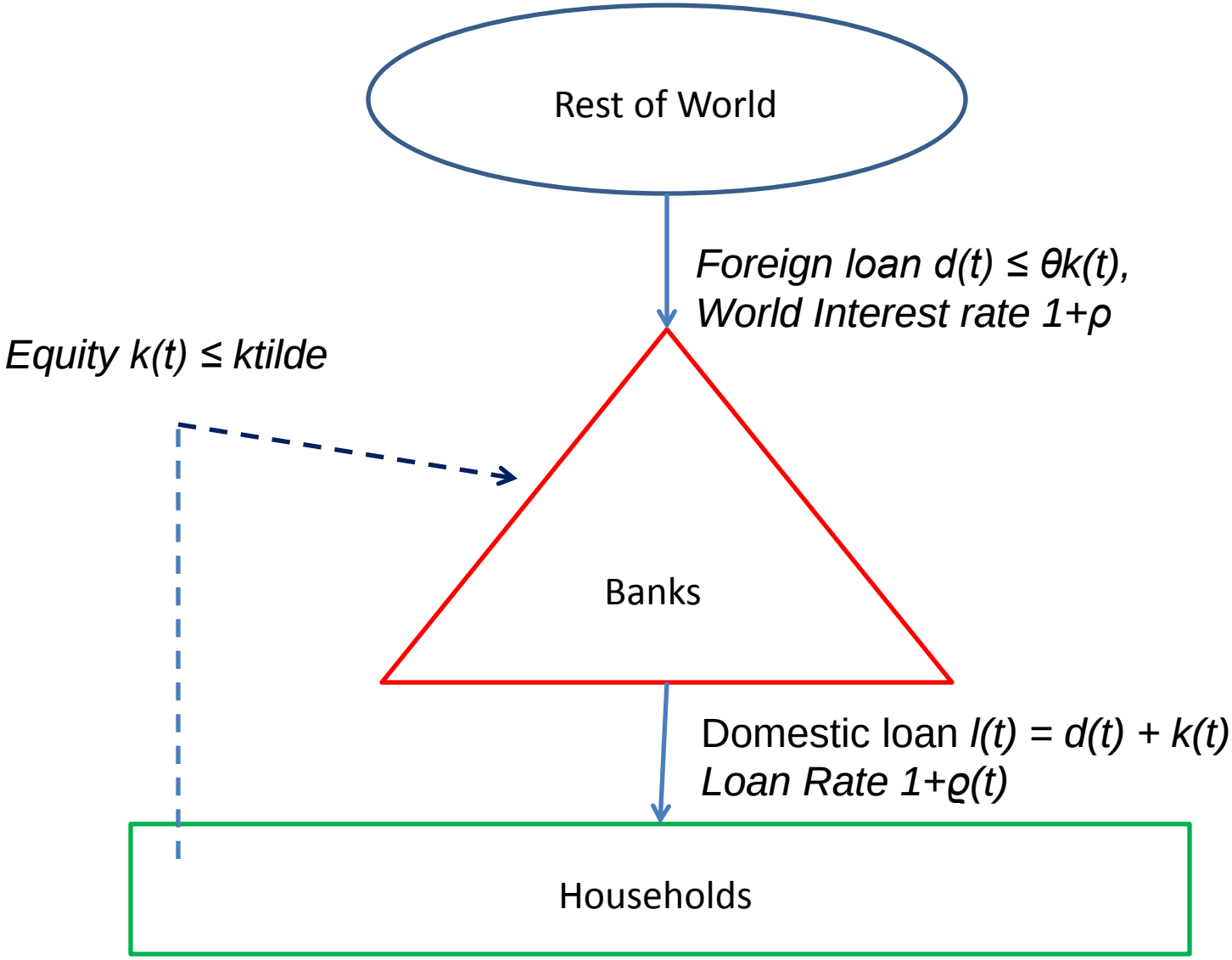
- Consumption an aggregate of those two goods
- Home good an aggregate of varieties produced with only labor (typical monopolistic competition setting)
- Foreign demand for the domestic good is xe_t^{χ}, where e_t is the *real exchange rate*

Hence market clearing for the home good is

$$y_t = \alpha e_t^{1-\alpha} c_t + x e_t^{\chi}$$



Financial Flows

Banks

- Banks lend to domestic households at loan rate ϱ_t

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- Bank loans = Funding from foreign lenders plus "equity":

$$l_t = d_t + k_t$$

Banks' Credit Limit

Simple constraint on the bank's debt:

$$d_t \leq \theta k_t$$

Equivalently,

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- The two constraints must bind if $\varrho_t > \rho$ (i.e. if there is a positive *spread*)

Households

Households maximize lifetime utility subject to the usual budget constraint, plus an *equity constraint*

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- The equity constraint reflects unmodeled domestic frictions
- It will bind if and only if $\varrho_t > \rho$
- So, the equity constraint binds iff the bank's external constraint binds as well

The household maximizes lifetime utility subject to

$$\begin{aligned} & e_t^{-\alpha} b_t + k_t - l_t \\ = \; & (1 + r_{t-1}) e_t^{-\alpha} b_{t-1} + (1 + \omega_{t-1})(1 + \rho) k_{t-1} \\ & -(1 + \varrho_{t-1}) l_{t-1} \; + e_t^{-\alpha} (w_t n_t + v_t) + z - e_t^{-\alpha} c_t \end{aligned}$$

and the *equity constraint*

$$k_t \leq \widetilde{k}$$

The household's solution is given by a labor supply condition

$$(1-\epsilon^{-1})e_t^{-(1-\alpha)}c_t^{-1} = \eta y_t, \tag{1}$$

the consumption Euler equation

$$c_{t+1} = c_t\beta(1+r_t), \tag{2}$$

and the arbitrage equation (between bonds and bank loans)

$$1+r_t = (1+\varrho_t)\left(\frac{e_{t+1}}{e_t}\right)^{\alpha}, \tag{3}$$

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$$\begin{aligned} 0 &\leq d_t \leq \theta\widetilde{k} \quad \text{if} \quad \varrho_t = \rho \\ d_t &= \theta\widetilde{k} \quad \text{if} \quad \varrho_t > \rho \end{aligned}$$

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- The foreign debt limit combines domestic and external frictions

Steady States

Focus on *constrained* steady states, in which $\bar{\varrho} > \rho$, so that

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$\Longrightarrow$ The ss amount of debt is determined *solely* by θ and $\tilde{k}$

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Note that the ss amount of debt is determined *solely* by θ and $\tilde{k}$

A necessary condition for a constrained ss is $\beta(1+\rho)<1$ since

$$1+\overline{r}=1+\overline{\varrho}=\beta^{-1}.$$

Real variables are given by

$$\bar{c}=-\overline{e}^{\alpha}\rho\overline{d}+\overline{e}^{-(1-\alpha)}\overline{y}+\overline{e}^{\alpha}z$$

$$(1-\epsilon^{-1})\overline{e}^{-(1-\alpha)}\overline{c}=\eta\overline{y},$$

$$\overline{y}=\alpha\overline{e}^{(1-\alpha)}\bar{c}+x\overline{e}^{\chi}.$$

Special case: $\rho=0$. Then the above eqs. do not depend on $\bar{d}$!

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1. A fall in flow endowment of foreign goods to $z' < z$
2. A fall in the bank's external constraint coefficient $\theta' < \theta$
3. A reduction in the equity bound to $\tilde{k}' < \tilde{k}$

The external balance constraint becomes

$$(1-\alpha)\, e^{-\alpha} c - \left(x e^{\chi-1} + z\right) = s$$

with

$$s \equiv \tilde{k}'(\theta' - \theta) + \theta(\widetilde{k}' - \widetilde{k}) + \left(z' - z\right) < 0$$

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- A *sudden stop*

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- But this is not possible, since the economy is financially constrained
- So the only possibility is to generate a trade surplus
- Financial shocks result in the need for immediate deleveraging and also require an immediate trade surplus

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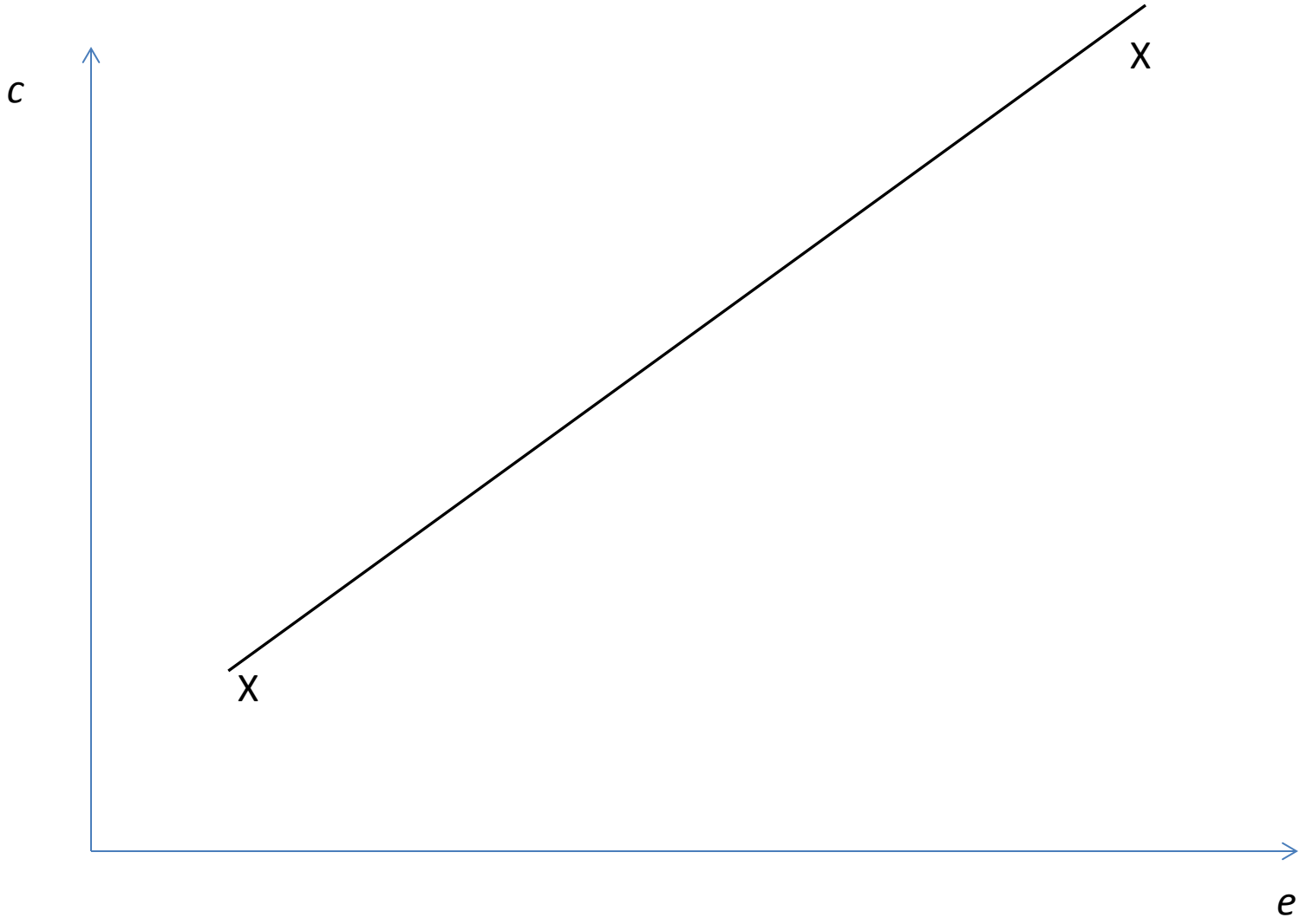
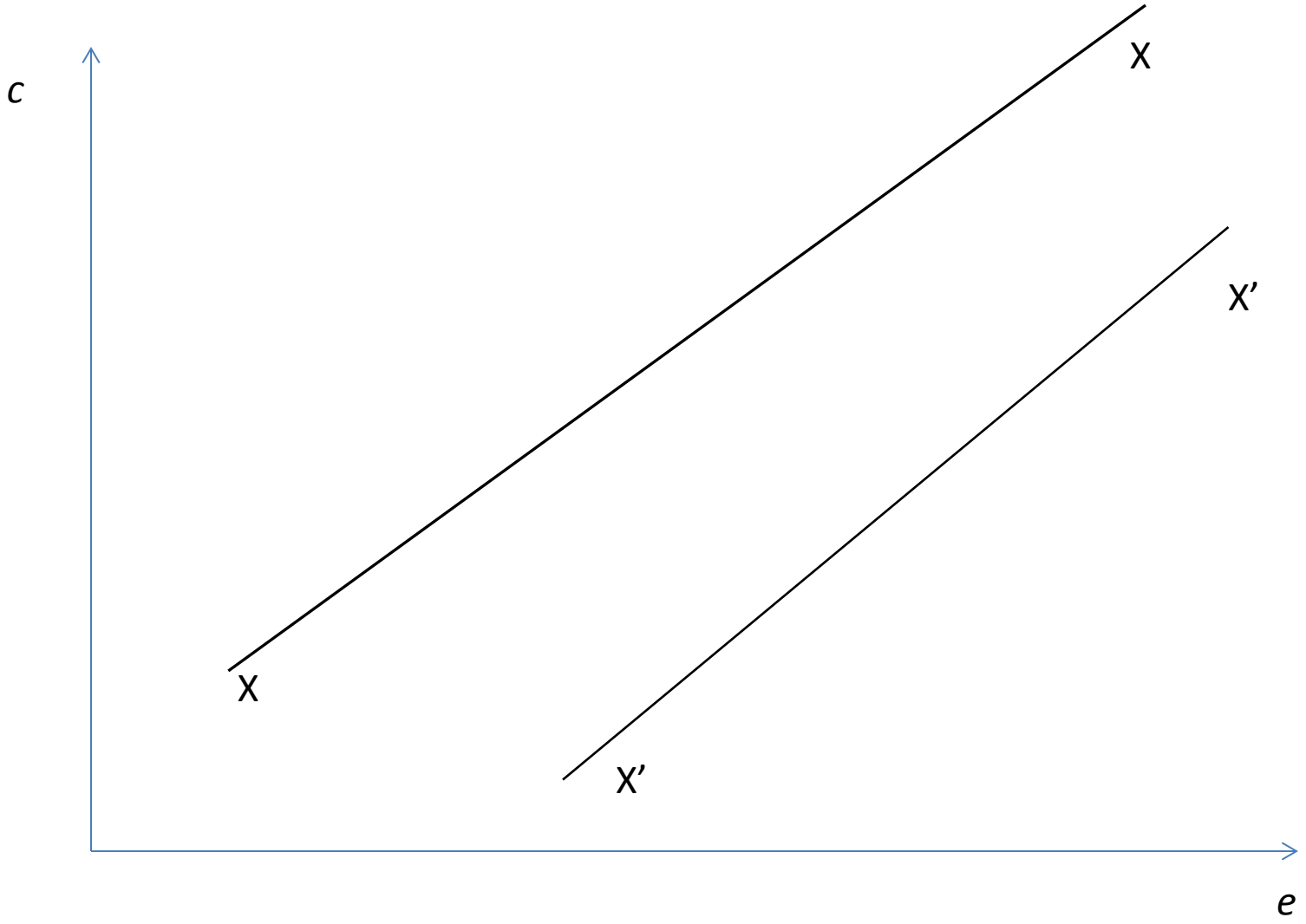
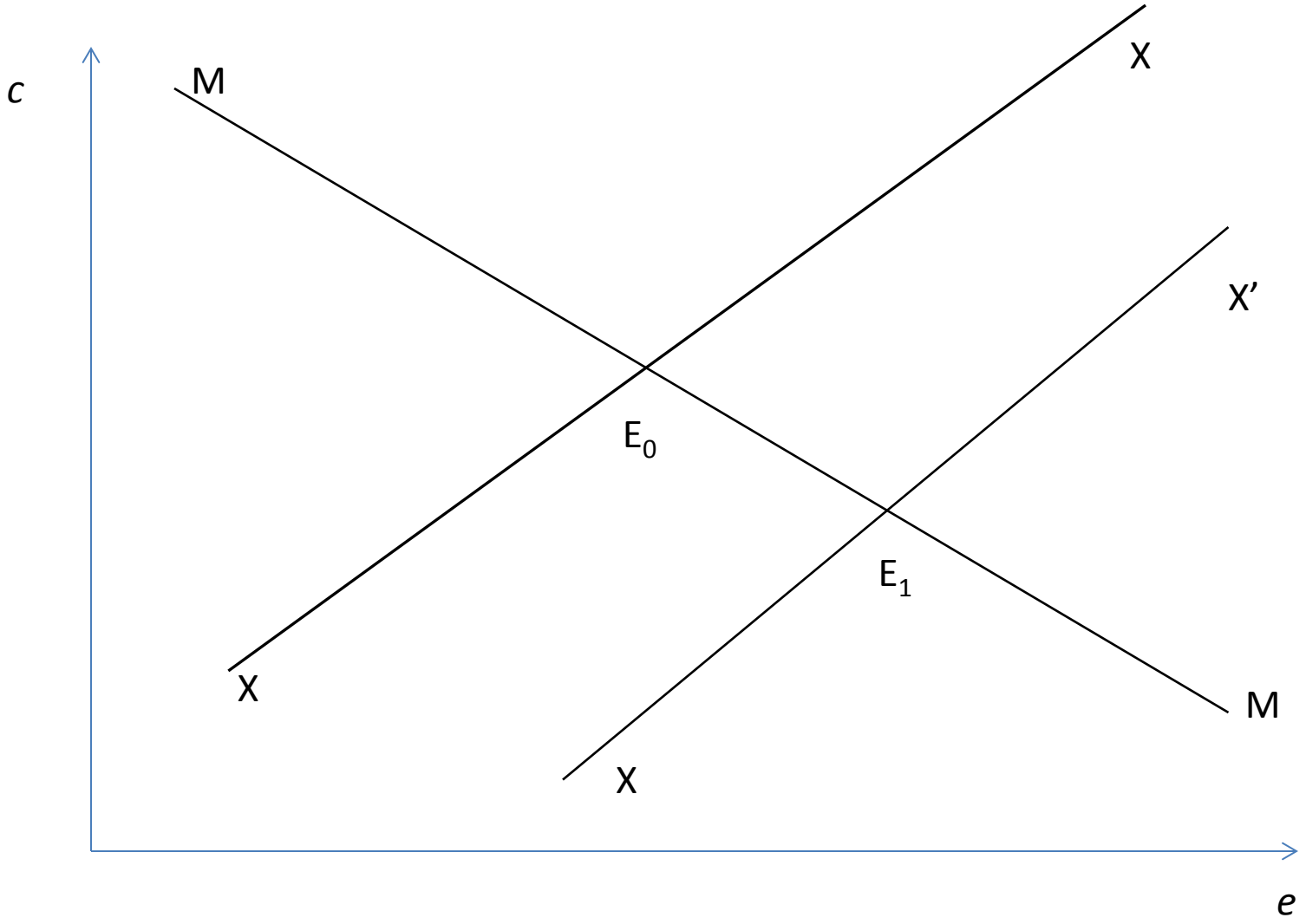
- Hence a negative s requires some combination of a fall in c or increase in e
- Assuming flexible prices, this is given by market clearing and optimal labor supply condition



External Balance



External Balance: An Adverse Shock



Adjustment With Flexible Prices

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In response to one of the shocks under analysis:

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- The loan rate ϱ goes up (to choke increased demand for loans)

A Word on Asymmetries

Adjustment to *favorable* shocks can be more gradual, since financial constraints can *cease* to bind.

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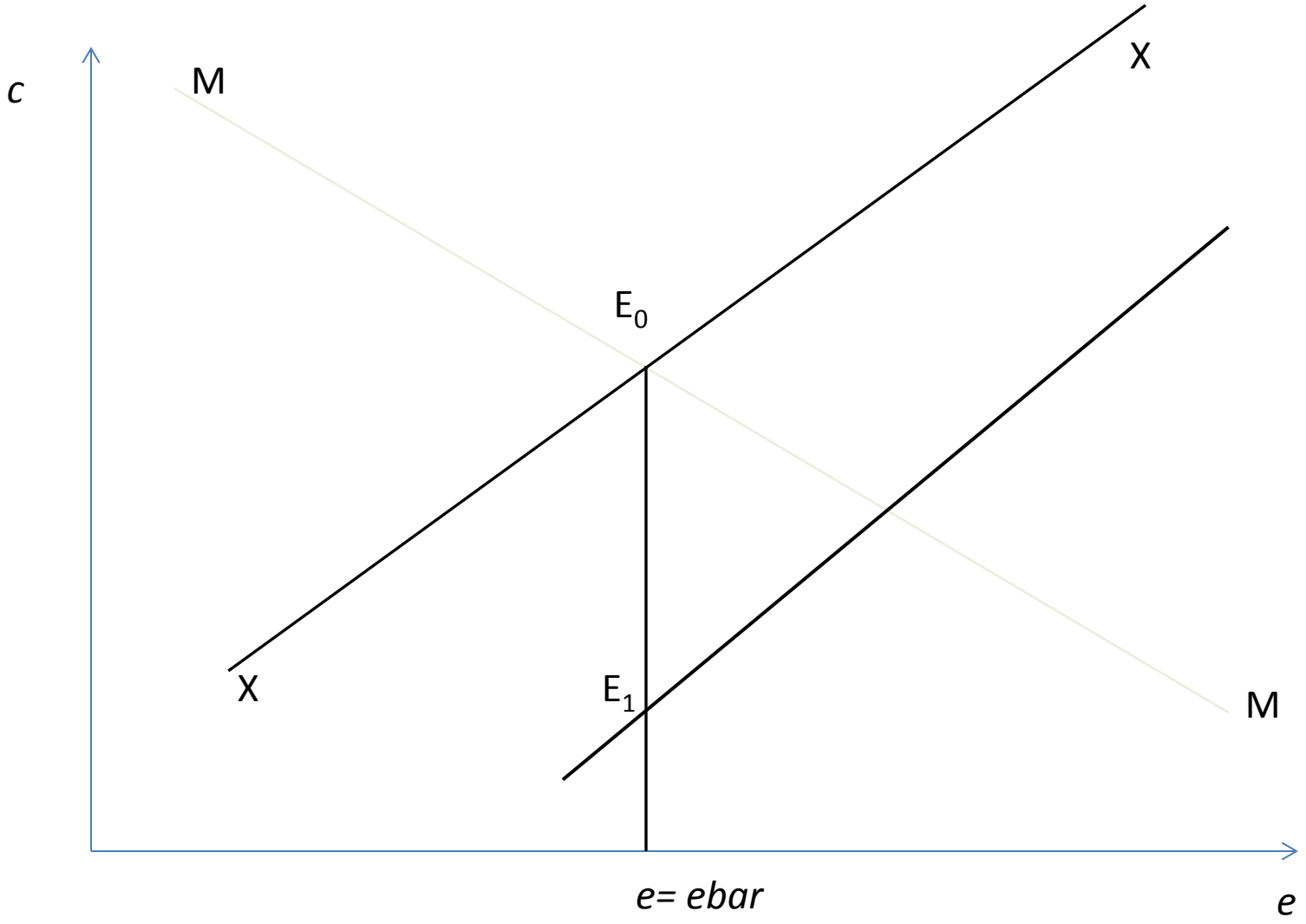
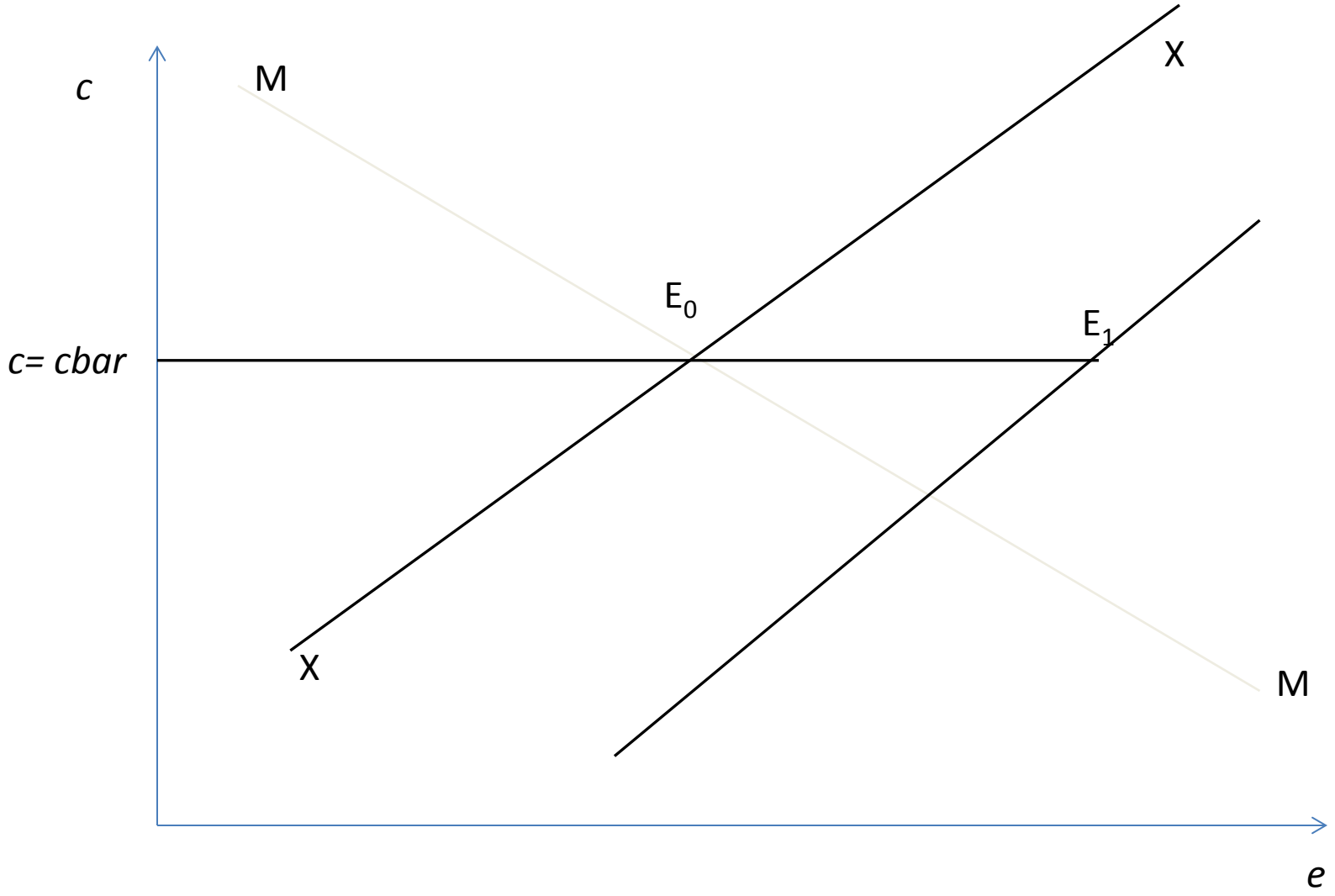
- In short, fixed exchange rates are contractionary



Adjustment Under Nominal Rigidities : Exchange Rate Peg



Adjustment Under Nominal Rigidities: Interest Peg

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- So flexible exchange rates (with a fixed real interest rate) are expansionary

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- Amplification and volatility
- The analysis of fixed exchange rates remains the same as before
- Currency mismatches make flexible rates relatively less appealing

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- And this is the *only* impact on the equilibrium conditions

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5. Limit to this: international reserves. ($I_t^g - I_{t-1}^g \leq f - I_{t-1}^g$ = amount of FX reserves)

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- This implies that

$$l_t \leq (1+\theta) k_t + (1+\phi) d_t^g$$

The external constraint becomes

$$(1-\alpha)\, e_t^{1-\alpha} c_t - e_t(d_t + d_t^g) = -e_t(1+\rho)(d_{t-1} + d_{t-1}^g) + x e_t^{\chi} + e_t(z + \rho f)$$

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$\Rightarrow$This is just as with direct lending

$\Rightarrow$But discount lending also implies

$$d_t \leq \theta k_t + \phi d_t^g$$

Implications

1. Just as direct lending, liquidity facilities matter if and only if financial constraints bind

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2. However, liquidity facilities are more effective than direct lending (they require a smaller amount of FX reserves)
3. Intuition: leverage

Equity Injections

If the central bank takes equity in the financial intermediary, the effect is the same as with liquidity facilities, except that $\phi = \theta$

Combining Unconventional and Conventional Policy

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On Sterilized FX Intervention

- Sterilized FX intervention always results in a change in international reserves offset by central bank credit

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- Hence it is equivalent to one of the operations discussed already (Céspedes, Chang, and Velasco 2015)

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2. Their effects depend only on the nature of the sterilizing operation
3. These arguments are independent of portfolio balance considerations or signaling effects

Final Remarks

Some Directions for Future Research

- Endogenizing the equity constraint

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- Allowing for the coexistence of direct finance as well as intermediated finance (Chang, Fernández, Gulan 2015)
- Optimal reserves accumulation and utilization