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Self-fulfilling currency crises

Outline

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Managing macroeconomic variables

- Policy makers have the ability to directly or indirectly influence key macroeconomic variables, such as interest rates, inflation, or economic performance
- These macroeconomic variables will affect the exchange rate, hence policy makers can indirectly affect exchange rates
- They could implement policies that keep the exchange rate stable, or it devalues its currency
- Abandoning a stable exchange rate can be an optimal policy

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Crashes without information

- A currency crisis emerges if the exchange rate undergoes a sudden change without the change of economic fundamentals
- It is comparable to a market crash, but the causes of the currency crisis are that the economic fundamentals are weak
- While a market crash is the result of a small amount negative information becoming public, a currency crisis does not need new information
- Expectations about the future policy decisions and hence exchange rates are an important aspect in the emergence of currency crises

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Minimizing costs from inflation and taxation

- People prefer low inflation and low taxes, which a policy maker should be minimizing, giving weights to their relative importance
- Fixed costs from changing inflation rates are also incurred
- $\Pi = \alpha\pi^2 + T^2 + C$
- If a country has debt, its interest payments must be covered by tax revenue
- Expected inflation will be priced into the interest rate, but a higher inflation reduces the value of debt and is an indirect tax that can be used to cover these payments
- $rB = T + \theta\left(\pi - \mathsf{E}\left[\pi\right]\right)$

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Optimal inflation and taxation

- The objective function is $\mathcal{L} = \alpha\pi^2 + T^2 + C + \lambda\left(rB - T - \theta\left(\pi - \mathsf{E}\left[\pi\right]\right)\right)$
- Minimizing these costs requires $\frac{\partial\mathcal{L}}{\partial\pi} = \frac{\partial\mathcal{L}}{\partial T} = \frac{\partial\mathcal{L}}{\partial\lambda} = 0$

$\Rightarrow$ $T = \frac{\alpha}{\theta}\pi$

$\pi = \frac{\theta}{\alpha+\theta^2}\left(rB + \theta\mathsf{E}\left[\pi\right]\right)$

$\Rightarrow$ $\Pi = \frac{\alpha}{\alpha+\theta^2}\left(rB + \theta\mathsf{E}\left[\pi\right]\right)^2 + C$

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Inflation and exchange rate

- Using purchasing power parity, a change in inflation is equivalent to a change in the exchange rate

$\Rightarrow$ Inflation can be interpreted as a change in the exchange rate

- If there are benefits of a stable exchange rate, then the fixed costs are the costs of abandoning the fixed exchange rate
- $\Pi = \frac{\alpha}{\alpha+\theta^2}\left(rB + \theta \mathsf{E}\left[\Delta e\right]\right)^2 + C$

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Minimizing costs from taxation

- Suppose the policy seeks to keep the exchange rate fixed and hence inflation identical to that of the foreign country
- $\hat{\Pi} = T^2$
- There are no fixed costs as the exchange rate is kept fixed
- $rB = T - \theta \mathsf{E}\left[\pi\right]$
- The interest on debt needs to be paid fully from taxation, but expectations about inflation (exchange rate changes) can still be formed

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Optimal taxation

- The objective function is $\mathcal{L} = T^2 + \lambda \left(rB - T + \theta \left(\mathsf{E}\left[\pi\right] \right) \right)$
- Minimizing these costs requires $\frac{\partial \mathcal{L}}{\partial T} = \frac{\partial \mathcal{L}}{\partial \lambda} = 0$

$\Rightarrow$ $T = rB + \theta \mathsf{E}\left[\pi\right]$

$\Rightarrow$ $\hat{\Pi} = \left(rB + \theta \mathsf{E}\left[\pi\right] \right)^2$

- With purchasing power parity this again becomes $\hat{\Pi} = \left(rB + \theta \mathsf{E}\left[\Delta e\right] \right)^2$

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Abandoning the fixed exchange rate

- Exchange rates are changed if the losses are of doing so are smaller than keeping them fixed, $\Pi \leq \hat{\Pi}$

$\Rightarrow$ $rB + \theta \Delta e \geq \frac{\sqrt{(\alpha+\theta^2)C}}{\theta}$

- If the costs of debt service is high, $rB \geq \frac{\sqrt{(\alpha+\theta^2)C}}{\theta}$, the fixed exchange is always abandoned

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Retaining the fixed exchange rate

- The optimal depreciation (inflation) was $\Delta e = \frac{\theta}{\alpha+\theta^2}\left(rB + \theta \mathsf{E}\left[\Delta e\right]\right)$
- If expectations are rational, then $\Delta e = \mathsf{E}\left[\Delta e\right]$

$\Rightarrow$ $\Delta e = \mathsf{E}\left[\Delta e\right] = \frac{\theta}{\alpha} rB > 0$

- The fixed exchange rate is retained if $rB + \theta \Delta e = \frac{\alpha+\theta^2}{\alpha} rB < \frac{\sqrt{(\alpha+\theta^2)C}}{\theta}$

$\Rightarrow$ $rB < \frac{\alpha}{\alpha+\theta^2}\frac{\sqrt{(\alpha+\theta^2)C}}{\theta}$

- If the debt burden is sufficiently small, the fixed exchange rate is retained

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Self-fulfilling expectations

- For intermediate debt burdens, $\frac{\alpha}{\alpha+\theta^2}\frac{\sqrt{(\alpha+\theta^2)C}}{\theta} \geq rB > \frac{\sqrt{(\alpha+\theta^2)C}}{\theta}$, the optimal decision depends on the expectations of the exchange rate change
- If the exchange rate is expected to remain fixed, $\mathsf{E}\left[\Delta e\right] = 0$, the exchange rate will remain fixed
- If the exchange rate is expected to change, $\mathsf{E}\left[\Delta e\right] = \frac{\theta}{\alpha} rB$, the exchange rate will change
- A change in the exchange rate becomes self-fulfilling
- As $\Delta e = \mathsf{E}\left[\Delta e\right] = \frac{\theta}{\alpha} rB > 0$, this will be a depreciation of the exchange rate such that inflation is induced to reduce the real value of debt

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- The importance of expectations
- Flexible exchange rate
- Fixed exchange rate
- Optimal exchange rate regime
- Summary

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Occurrence of currency crises

- A sudden and discrete devaluation of a currency is commonly referred to as a currency crisis
- A depreciation is inevitable if the debt burden of a country is high as the resulting inflation will reduce the debt burden
- A depreciation is not rational if the debt burden of a country is low as the costs of abandoning the fixed exchange rate does not outweigh the reduced debt burden from higher inflation
- With intermediate debt burdens, a currency crisis can become self-fulfilling, only if people expect a currency crisis will it occur

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Managing expectations

- A currency crisis emerges if the current exchange rate regime is expected to change
- If the current exchange rate regime is not expected to change, a currency crisis is avoided as long as it is feasible to maintain the status quo
- In such a situation managing expectations is of importance

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