Andreas Krause

Self-fulfilling currency crises

Outline

■ The importance of expectations

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- **The importance of expectations**

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Managing macroeconomic variables

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▶ Policy makers have the ability to directly or indirectly influence key
  macroeconomic variables

Managing macroeconomic variables

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Crashes without information

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▶ Expectations about the future policy decisions and hence exchange rates are an important aspect in the emergence of currency crises

The importance of expectations
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Flexible exchange rate
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Minimizing costs from inflation and taxation

Minimizing costs from inflation and taxation

▶ People prefer low inflation

▶ $\Pi = \pi^2$

Minimizing costs from inflation and taxation

▶ People prefer low inflation and low taxes

▶ $\Pi = \pi^2 + T^2$

Minimizing costs from inflation and taxation

- ▶ People prefer low inflation and low taxes, which a policy maker should be minimizing

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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

▶ $\Pi = \alpha \pi^2 + T^2$

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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

▶ $\Pi = \alpha\pi^2 + T^2 + C$

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Minimizing costs from inflation and taxation

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- $rB = T$

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- 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

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

Minimizing costs from inflation and taxation

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Optimal inflation and taxation

Optimal inflation and taxation

▶ The objective function is $\mathcal{L} = \alpha\pi^2 + T^2 + C + \lambda\left(rB - T - \theta\left(\pi - \mathsf{E}\left[\pi\right]\right)\right)$

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Optimal inflation and taxation

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▶ Minimizing these costs requires $\frac{\partial\mathcal{L}}{\partial\pi} = \frac{\partial\mathcal{L}}{\partial T} = \frac{\partial\mathcal{L}}{\partial\lambda} = 0$

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

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

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Inflation and exchange rate

Inflation and exchange rate

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

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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

⇒ Inflation can be interpreted as a change in the exchange rate

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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

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► If there are benefits of a stable exchange rate, then the fixed costs are the costs of abandoning the fixed exchange rate

Inflation and exchange rate

- Using purchasing power parity, a change in inflation is equivalent to a change in the exchange rate
- ⇒ 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
- $\Pi = \frac{\alpha}{\alpha + \theta^2} \left(rB + \theta \mathsf{E}\left[\Delta e\right]\right)^2 + C$

Inflation and exchange rate

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Minimizing costs from taxation

▶ Suppose the policy seeks to keep the exchange rate fixed

Minimizing costs from taxation

▶ Suppose the policy seeks to keep the exchange rate fixed and hence inflation identical to that of the foreign country

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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

▶ $\hat{\Pi} = T^2$

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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

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Minimizing costs from taxation

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► The interest on debt needs to be paid fully from taxation, but expectations about inflation   can still be formed

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Minimizing costs from taxation

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- $\hat{\Pi} = T^2$
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Optimal taxation

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Optimal taxation

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

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Optimal taxation

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Abandoning the fixed exchange rate

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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

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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, $\Pi \leq \hat{\Pi}$

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

Abandoning the fixed exchange rate

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

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

Abandoning the fixed exchange rate

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Retaining the fixed exchange rate

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Retaining the fixed exchange rate

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

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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 $\Delta e = \mathsf{E}\left[\Delta e\right]$

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Retaining the fixed exchange rate

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

Retaining the fixed exchange rate

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

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

Retaining the fixed exchange rate

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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

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 $\Delta e = \mathsf{E}\left[\Delta e\right]$

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

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

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

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

Self-fulfilling expectations

Self-fulfilling expectations

► For intermediate debt burdens,   the optimal
   decision depends on the expectations of the exchange rate change

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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

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

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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

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

Occurrence of currency crises

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Occurrence of currency crises

▶ A sudden and discrete devaluation of a currency is commonly referred to as a currency crisis

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Occurrence of currency crises

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The importance of expectations
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