Optimal Currency Areas

$$E\left(m_t^K - m_t^{KR}\right)^2 = \frac{1}{2}\sigma_K^2(1 - r_{KR})$$

The Euro

- The Euro is an example of a currency union.
- The nations abandoned independent monetary authority to get a common currency.

The Euro

- The Euro is an example of a currency union.
- The nations abandoned independent monetary authority to get a common currency.
- But how big? How many nations should join?

The Problem

- Suppose the city of Kent had its own currency (Kent \$, or $\$_K$) and its own monetary authority.
- The exchange rate against other currencies (such as Ravenna dollars, $\$_R$, floats)

The Proposal

- Should the cities of Kent and Ravenna merge their currencies and create a common currency, $\$_{KR}$?

The Proposal

- Should the cities of Kent and Ravenna merge their currencies and create a common currency, $\$_{KR}$?
- If they do, there will be a single monetary authority which will determine the optimal monetary policy for the Kent-Ravenna economy.

Advantages

- A single currency will mean lower transactions costs in so many ways.
- Persons in Ravenna can trade in Kent without having to worry about exchange fluctuations and without having to exchange $\$_R$ for $\$_K$
  - And vice versa.

Advantages

- Investors in the Kent-Ravenna can invest with reduced worries about exchange rate fluctuations.
- Or alternatively: projects in Kent and Ravenna can attract out of area investment without having to guarantee investors against exchange rate fluctuations.

Disadvantages

- Right now the Kent monetary authority sets the rate of monetary expansion m^K at m^K_t, the optimal rate for Kent.
- Ditto, in Ravenna where $m^R = m^R_t$.
- A single monetary authority will set

$$m_t^{KR} = \frac{1}{2}(m_t^K + m_t^R)$$

The Loss

$$m_t^{KR} = \frac{1}{2}(m_t^K + m_t^R)$$

The Loss

$$m_t^{KR} = \frac{1}{2}(m_t^K + m_t^R)$$

$$m_t^K - m_t^{KR} = \frac{1}{2}(m_t^K - m_t^R)$$

The Loss

$$m_t^{KR} = \frac{1}{2}(m_t^K + m_t^R)$$

$$m_t^K - m_t^{KR} = \frac{1}{2}(m_t^K - m_t^R)$$

$$\left(m_t^K - m_t^{KR}\right)^2 = \frac{1}{4}(m_t^K - m_t^R)^2$$

Some Analysis

- The optimal monetary policy at time t is

$$m_t^K = m_*^K + \varepsilon_t^K$$

Some Analysis

$$m_t^K = m_*^K + \varepsilon_t^K$$

$$\varepsilon_t^K \sim N(0, \sigma_K^2)$$

Some Analysis

- The optimal monetary policy at time t is

$$m_t^R = m_*^R + \varepsilon_t^R$$

Some Analysis

$$m_t^R = m_*^R + \varepsilon_t^R$$

$$\varepsilon_t^R \sim N(0, \sigma_R^2)$$

The Loss

$$\left(m_t^K - m_t^{KR}\right)^2 =$$

$$\frac{1}{4}(m_*^K - m_*^R + \varepsilon_{Kt} - \varepsilon_{Rt})^2$$

Assume $m^K_* = m^R_*$

Assume $\sigma^2_K = \sigma^2_R$

$$\left(m_t^K - m_t^{KR}\right)^2 =$$

$$\frac{1}{4}(m_*^K - m_*^R + \varepsilon_{Kt} - \varepsilon_{Rt})^2$$

The Loss

$$E\left(m_t^K - m_t^{KR}\right)^2 =$$

$$\frac{1}{4}(\sigma_K^2 + \sigma_R^2 - 2\,\mathrm{cov}(\varepsilon_{Kt}, \varepsilon_{Rt})) =$$

$$\frac{1}{2}\sigma_K^2(1 - r_{KR})$$

The Loss

r_{KR} = 1, no cost from merging

$$\frac{1}{4}(\sigma_K^2 + \sigma_R^2 - 2\,\mathrm{cov}(\varepsilon_{Kt}, \varepsilon_{Rt})) =$$

$$\frac{1}{2}\sigma_K^2(1 - r_{KR})$$

The Loss

r_{KR} = 0, a cost from merging

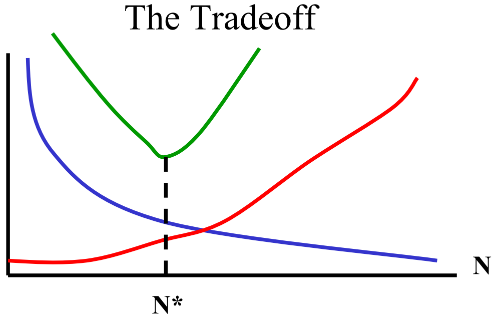
$$\frac{1}{4}(\sigma_K^2 + \sigma_R^2 - 2\,\mathrm{cov}(\varepsilon_{Kt}, \varepsilon_{Rt})) =$$

$$\frac{1}{2}\sigma_K^2(1 - r_{KR})$$

The Theorem

- There are gains in lower transactions costs.
- But, if the two economies are independent, there will be a loss from having a monetary authority that is focused on the local area.
  - The magnitude of the loss depends on the degree of independence

The Tradeoff



West Backwater

- West Backwater wants to join either the US dollar or the Euro.
- Gains in transactions costs but what about deviations from monetary policy?
- WB citizens do not vote in American elections and will get no say in FOMC.

West Backwater

- Do they do more trading with EMU or with US?
  - If US, use dollar.
  - If EMU use Euro.

The United Kingdom

- The UK does more trading with the EMU than with the US.
- Thus if they want to join, they should EMU but not use US $.
- Unlike West Backwater, they can get a seat on the board of the European Central Bank.

Canada

- If they want to join, they should use US $.
- But it seems unlikely that we would give Canada a seat on the FOMC.
- And they may be large enough that there are no gains in transactions costs.

Ecuador

- No hope of a seat on FOMC.
- But no one had confidence in domestic monetary policy.

End