Target Zones and Exchange Rate Dynamics

Lecture Plan

- What is a TZ?, Why introduce a TZ in the first place? (motivation)
- Krugman's model: assumptions and intuition
- TZ implications

What is a TZ?

- First, need to establish a "target" exchange rate
- Define a zone (upper/lower bound)
- Usually: symmetric, the xr is freely floating as long as it stays in the band, monetary authorities engage only in **marginal interventions** (as opposed to intra-marginal)

Why introduce a TZ in the first place? (motivation)

- Lower costs of maintenance (compare to fixed exchange rate regimes)
- Exchange rate defending would become only an occasional problem rather than a continuous preoccupation

Note: *A major issue is how the xr will behave inside the band*

A naïve answer would be: *the xr behaves as if the regime were one of free-floating, until the xr hits the edge of the band, where the xr switches to a fixed rate*

However, the presence of a TZ **constraints** possible future paths of the xr. The market knows that, hence they should behave differently than they would if there was no TZ in place. So, the mere **existence** of a

band **should affect** the xr behaviour even if the xr is **inside the band**.

Krugman's model

- Monetary model (log-linear form, time is continuous)
- The xr is determined: $s = m + v + \gamma E\left[ds\right]/dt$
- m = domestic money supply
- v = shift term (velocity shocks)
- m + v = f , fundamentals
- upper band $\overline{s}$, lower band $\underline{s}$
- Monetary policy is passive. Becomes active only to defend the band
- Velocity exogenous, following a RW: $dv = \sigma dz$
- the TZ is **perfectly credible**

The naïve analysis

- given that m is locally held fixed, and v is RW, then no predictable changes in the xr, that is: $E[ds]/dt = 0$
- so, the xr inside the band is: $s = m + v$, behaving like under free-float
- if successive shocks push the xr to the edge of the band then the money supply will be adjusted to prevent the xr from drifting any further
- What is flawed, however with this story is that it fails to account for the asymmetric effect of money supply changes given the TZ. The closer we are to the edge, then a fall in v will reduce s more than a rise in v will increase s.
- The expected rate of change is negative, and this will affect the xr itself, so the relationship between v and s must be bend as we approach the edges.

- Once the xr behaviour near the edges is off the 45 degree line, this will affect xr expectations further inside the zone as well. Hence, the repeated revisions of xr expectations will lead to a relationship between v and s that looks like an S-shaped curve.

Main Results

- The xr dynamics relatively to the fundamental are given by an S-shaped curve, **whose slope is less than one at all times**
- This is the so-called **Honeymoon Effect**
- when the xr is closer, say, to the upper edge the probability that it will hit the band is higher
- hence, the probability of a future intervention is higher
- which leads to an expected currency appreciation is expected

- which the market turns into an immediate appreciation and therefore a lower xr
- the slope of the S curve flattens to a slope of zero at the edges of the band
- to be precise, the xr is tangential to the boundaries
- this is the so-called **Smooth-Pasting** condition
- What does it mean? Zero-slope means the xr is completely insensitive to the fundamental
- Why is so? Notice that at the edges of the band, there is a discontinuity in the expected change of the fundamental (inside the band $E[df]/dt = 0$, while at the edge f can either remain constant or drift back, so $E[df]/dt \neq 0$)
- In other words, the fundamental becomes predictable. Then if the xr were to depend on the fundamental then the xr would become predictable

- that would imply that arbitrage opportunities are present (everyone knows the future movement of the xr, leading to a one-way bet)
- The only way to avoid this is to force the xr be insensitive to the fundamental at the edges. This implies that if $E[df]/dt$ is discontinuous, while $E[ds]/dt$ is not, it must be the case that the first derivative of the xr with respect to f must be zero (asymptotically ever closer to the edge).

A bit more on the Honeymoon Effect

- The S-shaped curve implies that the xr is less than the rate predicted by the current fundamental because the expected currency appreciation is factored in.
- So the TZ xr is less than the free-float xr, for a given level of f.
- Hence, a perfectly credible TZ is inherently stabilising
- The expectation of future interventions makes the xr more stable that the underlying fundamental
- So, when the xr is weak (above target rate), it is still not as weak as it would be under the pure free float
- When the xr is strong (below target rate) still it is weaker that what the fundamentals imply

- So, comparing the behaviour of the xr within the TZ to a freely floating xr regime, then the TZ xr is less volatile.
- The TZ is an inherently stabilising factor, not only prevents the system from straying beyond the bounds but also has a stabilising effect in the interior of the zone (the xr's response to shocks in the fundamentals is dampened)
- Notice that the factor responsible for that is not an actual intervention or any xr management by the authorities BUT the sheer THREAT of intervention in the form of a credible commitment