Monetary Policy

Part 3: Monetary Policy at the Zero Lower Bound on Nominal Interest Rate

Exercise 9: Unconventional Monetary Policy, Natural Interest Rate, Zero Interest Equilibrium

Dominik Hecker
University of Würzburg

Task 1: ZLB on nominal interest rates

Task 1 (a)

Show algebraically how the IS-MP curve has to be adapted if we account for the ZLB.

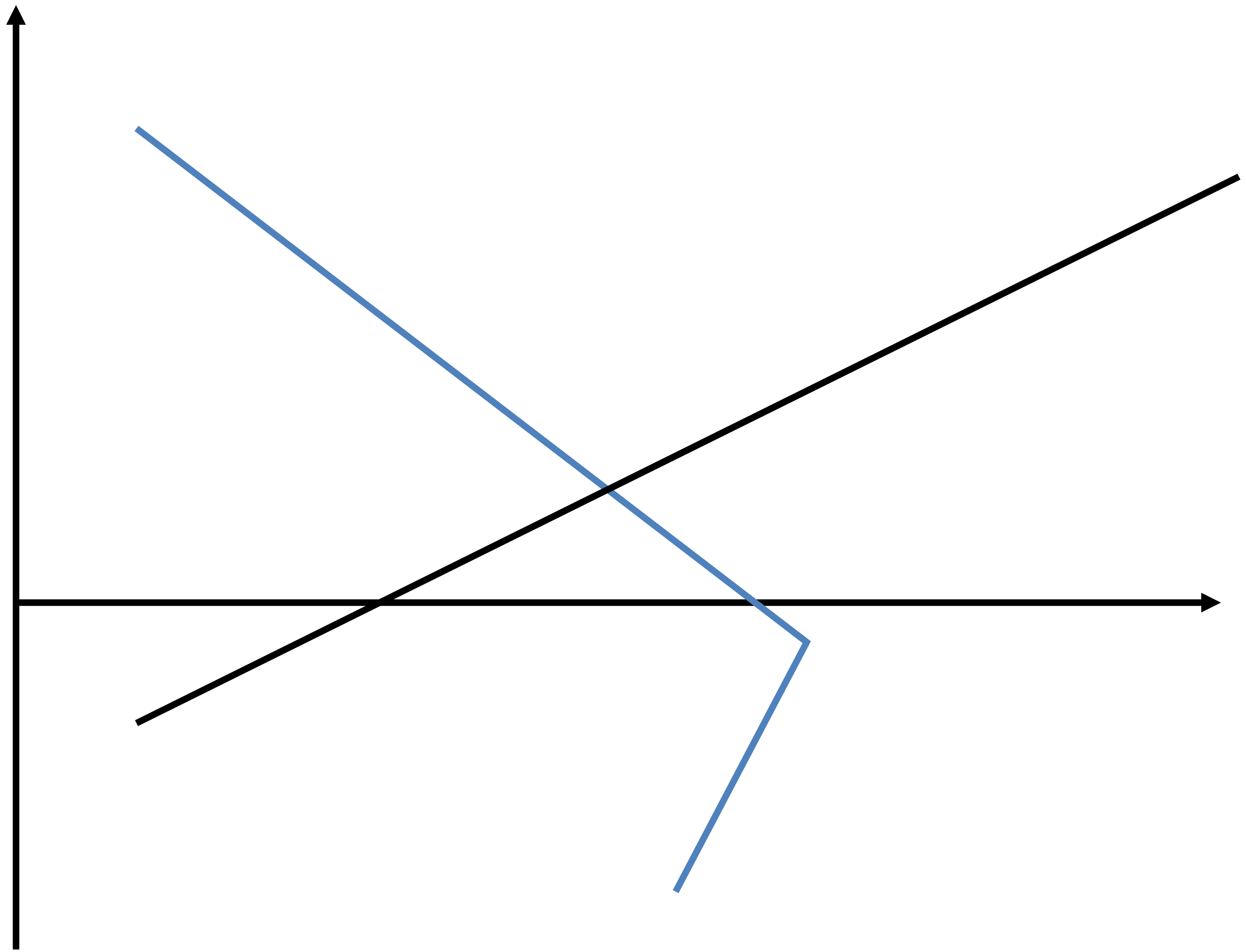
Task 1 (a)

$$y_t = y_t^* - \alpha(i_t - \pi_t - r^*) + \epsilon_t^y$$

Task 1 (b)

Show graphically the effect of a large, negative demand shock in the IS-MP-PC model if we account for a ZLB. What are the possible medium-run effects?

Task 1 (b)



Task 1 (c)

Derive the level of inflation at which the ZLB starts binding.

Task 1 (c)

$$i_t = r^* + \pi^* + \beta_\pi(\pi_t - \pi^*)$$

Task 2: Unconventional Monetary Policy

Task 2 (a)

Define Quantitative Easing and Forward Guidance in your own words. What are the associated transmission channels and goals?

Task 2 (a)

Quantitative Easing (QE):

- Central bank purchases assets/bonds from commercial banks on the secondary market.

Goals of QE:

- Increase asset prices, while decreasing various interest rates
- Increase liquidity in the banking system
- (Increase inflation)

Transmission channels:

- Portfolio rebalancing channel
- Signaling channel

ECB‘s Explainer: how QE works

How QE works:

- This increases the price of these bonds and creates money in the banking system.
- As a consequence, a wide range of interest rates fall and loans become cheaper.
- Businesses and people are able to borrow more and spend less to repay their debts.
- As a result, consumption and investment receive a boost.
- Higher consumption and more investment support economic growth and job creation.
- As prices rise, the ECB achieves an inflation rate below, but close to, 2% over the medium term.

Link: https://www.ecb.europa.eu/explainers/show-me/html/app_infographic.en.html

Task 2 (a)

Forward Guidance:

- A central bank provides information about its future actions.
- Typically: central bank makes statement to keep interest rates low for considerable period of time.

Goals of Forward Guidance:

- Influence the expectations and behaviour of economic agents
- Flatten the yield curve by engineering long-term interest rates
- Decrease the real interest rate by influencing inflation expectations

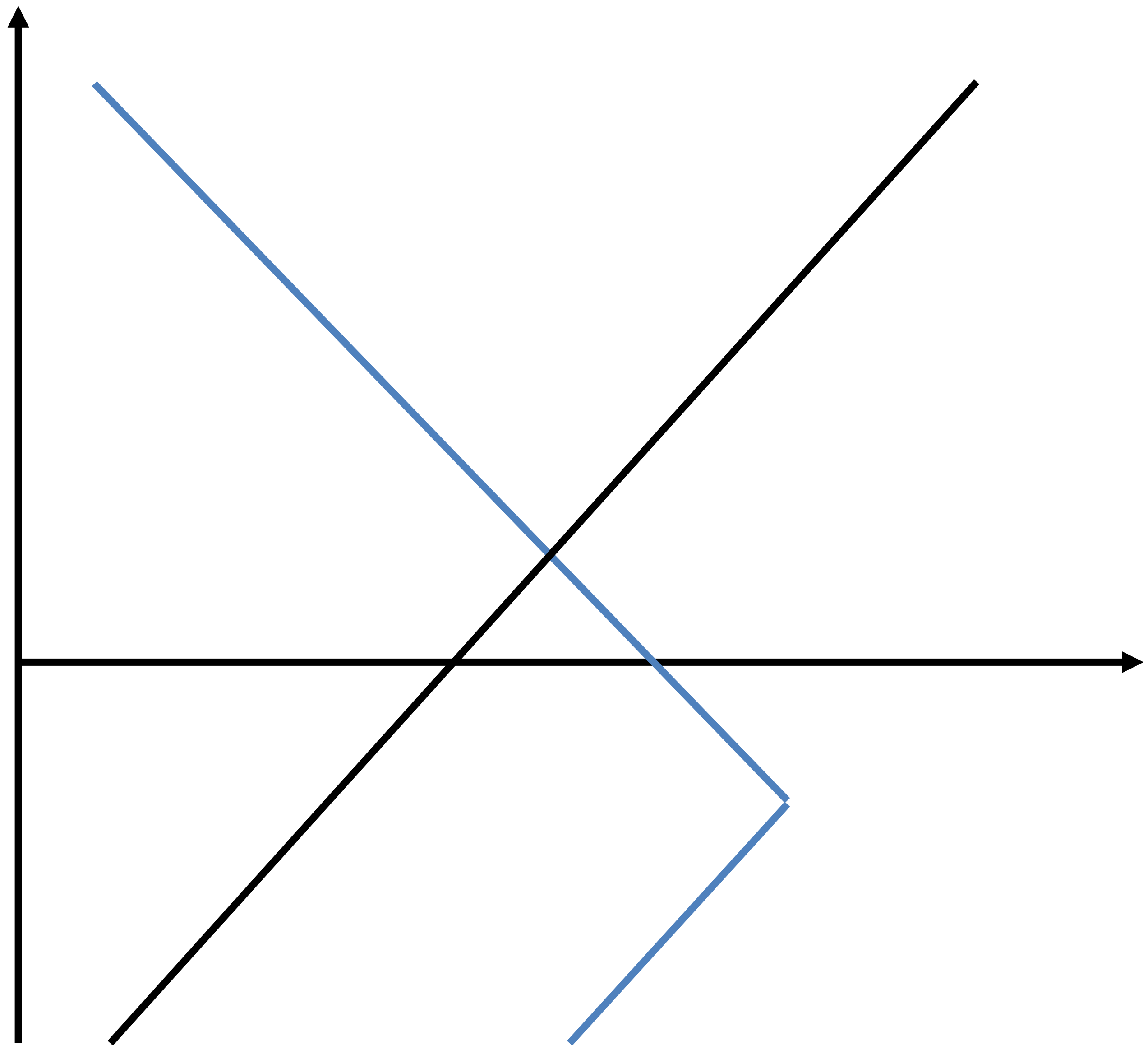
Transmission channels:

- Expectations channel
- Reduce term premia via reducing uncertainty about future interest rates

Task 2 (b)

Show graphically how the central bank can counteract a negative demand shock by employing unconventional monetary policy measures.

Task 2 (b)



Task 3: The Decrease in the Natural Interest Rate

Task 3 (a)

Show algebraically and graphically how a decreasing natural interest rate leads to a higher frequency of hitting the ZLB.

Task 3 (a)

Natural real rate of interest:

- It is the rate r^* which equates savings and investment at a level of output equaling potential output and inflation being stable.

$$i_t = r^* + \pi^* + \beta_\pi(\pi_t - \pi^*)$$

Task 3 (b)

Discuss the possible reasons behind the decline of the natural interest rate.

Task 3 (b)

Possible reasons for the decline in the natural interest rate:

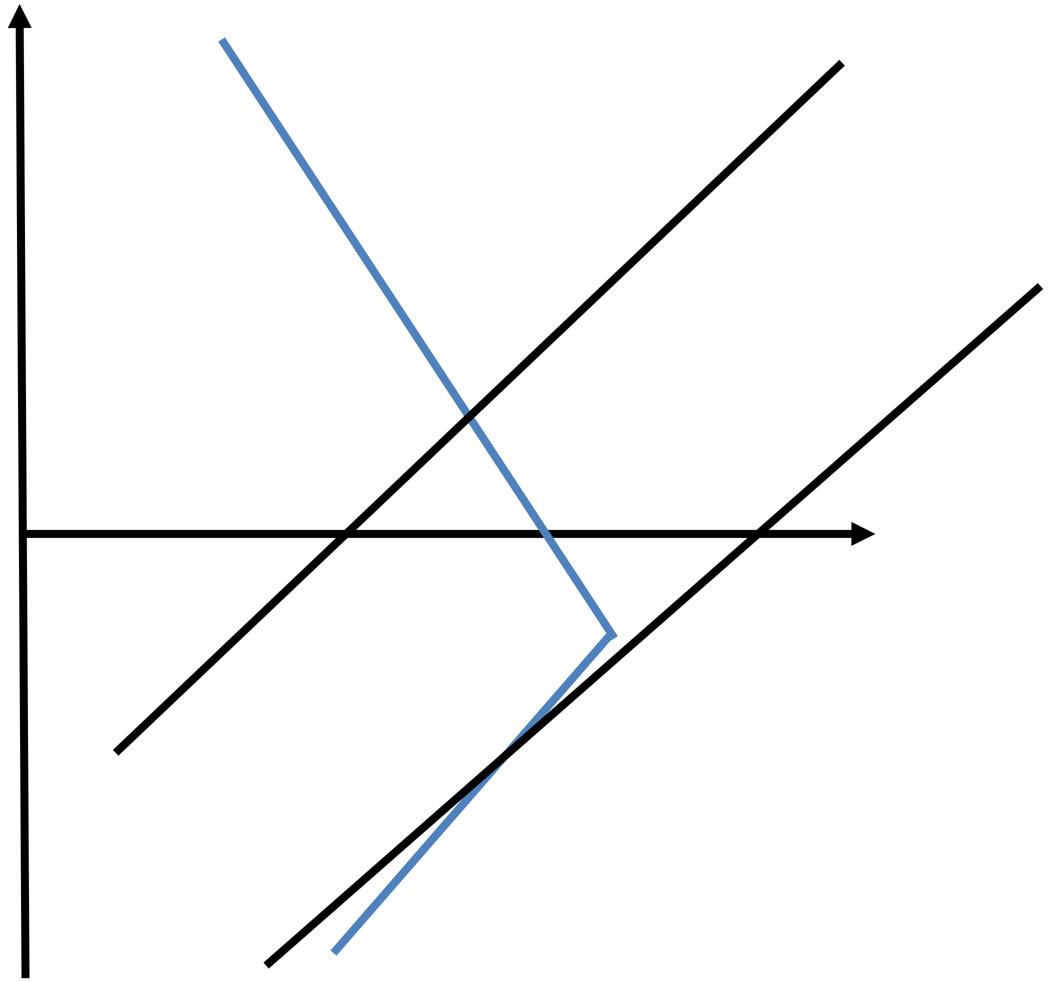
- Slowdown in long-run growth
- Surplus of global savings from export-based emerging market economies: savings glut
- Demographic factors tend to increase the supply of savings
- Increase in inequality might increase the supply of savings

Task 4: Zero Interest Rate Equilibrium

Task 4 (a)

Show graphically that by imposing the ZLB, the IS-MP-PC model may have two steady states.

Task 4 (a)



Task 4 (b)

Assume that the central bank increases its inflation target. Show graphically as well as algebraically how inflation and output are affected for the two equilibria we already imposed before.

Task 4 (b)

Task 4 (c)

Why is increasing the inflation target a problematic policy tool?

Task 4 (c)

In theory:

- Raising the inflation target works perfectly well.
- Inflation as well as output increases.

In practice:

- Not much and mixed evidence.
- Central bank announcement has to be credible and/or underlined by unconventional monetary policy measures.
- Credibility also depends on the central bank’s balance sheet. Large balance sheet combined with an increased target might not seem credible.