DEFLATION TRAP AND MONETARY POLICY

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Money & Banking
WESS 2016
DEFLATION TRAP

• CB adjusts the nominal interest rate in order to affect the real interest rate
  - It must take into account expected inflation

\[ i = r + \pi^e \]

• Nominal interest rate cannot be below zero
  - Zero lower bound (ZLB)

\[ \min r \geq -\pi^e \]
THE 3-EQUATION MODEL AND MACROECONOMIC POLICY

Inflation in Industrialised Economies
2000-2015

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DEFLATION TRAP

\[ r = r_e \]

\[ \pi = 2\% \]

\[ PC(\pi^E = 2\%) \]

\[ IS \]

\[ MR \]
Large permanent negative AD shock

\[ \pi = 2\% \]

\[ r = r_e \]

\[ y_e \]

\[ \text{PC}(\pi^e = 2\%) \]
Large permanent negative AD shock

\[ i = r + \pi^E \]

\[ i = r_s - 0.5\% \]

\[ \min r \geq -\pi^E \]

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Large permanent negative AD shock

\[ i = r + \pi^E \]

\[ \min r \geq -\pi^E \]

\[ \text{PC}(\pi^E = 2\%) \]

\[ \text{PC}(\pi^E_1 = \pi_0) \]

\[ \text{MR} \]
Large permanent negative AD shock

\[ i = r + \pi^E \]

\[ \min r \geq -\pi^E \]
Large permanent negative AD shock

\[ \min r = r_0 = -\pi_1 \]
\[ \min r = r_0 = -\pi_0 \]

\[ i = r + \pi^E \]
\[ \min r \geq -\pi^E \]

Deflation trap!
Macroeconomic Policy after the Crisis
Figure 13.5 Nominal interest rates implied by Taylor rules vs. observed central bank policy rates: 1999 Q1–2011 Q4.
DEFLATION TRAP

Alternatives

- Fiscal Policy
- Quantitative Easing
- Influence on expectations
- Negative interest rates
Macroeconomic Policy after the Crisis
Quantitative Easing

- not clear channels
- majority of channels work through raising asset prices
- increase in total wealth and reduction in the cost of borrowing (bond prices are inversely related to the interest rate)
- aimed to affect long-term rates (set by financial markets) 
  QE is aimed at altering the term structure of interest rates and flattening the yield curve
- QE helps to reduce the interest rate wedge by boosting market confidence and increasing market liquidity
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Quantitative Easing

The yield curve

The yield curve and the ZLB

The yield curve and QE

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Quantitative Easing

Joyce et al. (2011) “The UK quantitative easing policy”
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Quantitative Easing: Transmission Channels

- Confidence
  improve public perception of the economic outlook

- Policy Signalling
  signals the CB’s commitment to meeting inflation targeting

- Portfolio rebalancing
  push up the price of government bonds, but also indirectly increase the price of other assets

- Market liquidity
  actively encourage trading in times of financial market distress

- Money
  higher level of liquid assets could induce the financial institutions to lend more
Quantitative Easing: Does it work?

- We do not know what would happen in the absence of QE
  - Ahamed (2009): The fearsome counterfactual was the Great Depression itself!

- QE brought down long-term government bond yields by 1 percentage point
  (see Joyce et al. (2011) for UK and Gagnon et al. (2011) for US)

- Government asset purchases can restore confidence in a credit crunch when asset prices are collapsing
  Del Negro et al. (2011), Driffield and Miller (2013)

- Difficult to predict the effect on output and inflation
  (Kapetanios et al. (2012) - QE did have an impact on real GDP and CPI in UK)

- Equivalent to a 150-300 basis point cut in the policy rate in UK (Joyce, 2011), and 200 basis point in the US (Chung et al. 2012)
Quantitative Easing: Dangers?

• **Central bank independence and credibility:**
  this may affect inflation expectations (i.e. less firmly anchored to the inflation target) and stabilisation policy could become more costly

• **Inflation expectations:**
  QE - huge expansion of CB’s balance sheets. Potential future danger of higher inflation (along the lines of the QTM) - it was intended to boost inflation expectations

• **Excess reserves:**
  Banks with high reserves can quickly create large amounts of new loans and deposits without any change in central bank policy. Inflationary risks

  *In the years that immediately followed the crisis, none of these dangers materialised - inflation remain low and stable across the developed world*
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Quantitative Easing: Dangers?

• The crisis revealed major shortcomings in the use of monetary and fiscal policy

• UK banking system:
  - high concentration: the top six banks account for 88% of retail deposits
  - high profits (Haldane et al. 2010)
What next?

- Reform of banking system in order to dampen financial cycles and minimise the chance of crises happening (Vickers 2012)
  - Role of financial institutions and markets is efficiently to manage risks - FAIL
  - Big banks can act strategically
  - Rent-seeking behaviour through the use of market power and to moral hazard problems arising from asymmetric information (Stiglitz, 2012)
  - Bailout expectations can undermine disciplining devices
  - Tax-payer end-up “on the hook” (Miller, Zhang, Li, 2012)
  - Gai & coauthors use network theory to capture the systemic features of financial systems
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What next?

• Changing Monetary policy approach
  We are not in the Great moderation era any more!

• During the recession the Taylor rule was largely ignored as non-operational

• Forward guidance
  (BoE, 2013 “Monetary policy trade-offs and forward guidance”)
  - pre-commitment designed to assist the private sector
  - e.g. ruling out a rate rise until an unemployment threshold is reached
  - reminder that inflation targeting is symmetric
  - US and UK has started the recovery
  - the Eurozone?
  (see Eichengreen (2014) and Miller, Zhang (2014))
Macroeconomic Policy after the Crisis
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Government Spending

• general government consumption and investment

• includes spending by both local and central government on goods and services
  - 20% of GDP in the UK

• an increase in government spending increases aggregate demand

• government spending is usually stable
  (it does not fluctuate with capacity utilisation or move with business confidence)
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Government Spending

- transfer payments (not included in G - these are not made in exchange of goods or services)
  - unemployment benefits
  - state pensions
- these have an indirect effect on aggregate demand (included in taxation - T)
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The size of the Government


Source= Core-econ, 2014
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The size of the Government

Main Components of Government Expenditure, EU-2013 (% total expenditure)

Data extracted on 21.10.2014.

Source: Eurostat (online data code: gov_10a_main)
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Government Finances

• Government Revenue

The government raises taxes from the economy (income tax, tax on spending, taxes on goods)

\[ T = \text{Taxation revenue} - \text{transfers} \]
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Government Finances

Government primary budget

balanced primary budget $\rightarrow$ $G = T$ $\rightarrow$ $G - T = 0$

primary budget deficit $\rightarrow$ $G > T$ $\rightarrow$ $G - T > 0$

primary budget surplus $\rightarrow$ $G < T$ $\rightarrow$ $G - T < 0$
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Government Finances

Governments Revenues and Expenditure, EU-2013 (%GDP)

(*) Data extracted on 21.10.2014. Data ranked in descending order according to the average of total revenue and expenditure.
Source: Eurostat (online data code: gov_10a_main)
Chart 1: Public sector spending 2015-16

Debt interest – £35 billion
Other (including EU transactions) – £48 billion
Public order and safety – £34 billion
Housing and environment – £28 billion
Industry, agriculture and employment – £24 billion
Defence – £45 billion
Education – £99 billion
Transport – £29 billion
Health – £141 billion
Social protection – £232 billion
Personal social services – £30 billion

Source: Office for Budget Responsibility 2015-16 estimates. Illustrative allocations to functions are based on HMT analysis including capital consumption figures from the Office for National Statistics. Figures may not sum due to rounding.
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Chart 2: Public sector receipts 2015-16

- Income tax – £170 billion
- National Insurance – £113 billion
- Excise duties – £47 billion
- Corporation tax – £42 billion
- VAT – £131 billion
- Business rates – £28 billion
- Council tax – £28 billion
- Other (taxes) – £62 billion
- Other (non-taxes) – £45 billion

Source: Office for Budget Responsibility, 2015-16 estimate. Figures may not sum due to rounding.
Other (taxes) includes capital taxes, stamp duties, vehicle excise duties and other smaller tax receipts. Other (non-taxes) includes interest and dividends, gross operating surplus and other smaller non-tax receipts.
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Government Budget

\[ G_t + r_t D_t \equiv T_t + \Delta D_{t+1} + \Delta H_{t+1} \quad (1) \]

\[ \Delta H_{t+1} = 0 \]

\[ G_t + r_t D_t \equiv T_t + \Delta D_{t+1} \quad (2) \]

\[ \Delta D_{t+1} = r_t D_t + G_t - T_t \quad (3) \]

total deficit/surplus = \( r_t D_t + G_t - T_t \)
FISCAL POLICY

Government Budget

Government Budget as % of GDP 2013

TAXES

SPENDING

TRANSFERS

BUDGET DEFICIT

Share of income
Share of use
Transfers
Deficit

Sweden
Norway
UK
Eurozone
Italy
Germany
Australia
Austria
US

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Government Budget

• Total budget
Difference between current government spending on goods and services, including interest payments on the debt, and total current revenue from taxation (net of transfers)

\[ \Delta D_{t+1} = r_t D_t + G_t - T_t \]  \hspace{1cm} (3)

total deficit/surplus = \( r_t D_t + G_t - T_t \)

- \( r_t D_t + G_t > T_t \) → total deficit
- \( r_t D_t + G_t < T_t \) → total surplus
FISCAL POLICY

Total Debt

\[ \Delta D_{t+1} = r_t D_t + G_t - T_t \]  \hspace{1cm} (3)

\[ D_{t+1} = (1 + r_t) D_t + G_t - T_t \]  \hspace{1cm} (4)

- **Total debt**
  The stock of debt at the start of the next year is equal to (i) the stock of debt this year including the required interest payments, plus (ii) the primary budget deficit/surplus

- Budget deficits cause the government debt to increase

- Budget surpluses cause the government debt to decrease
FISCAL POLICY

Total Debt

\[ D_{t+1} = (1 + r_t)D_t + G_t - T_t \] (4)

- government debt / national debt / public debt

A country’s outstanding debt is the total outstanding borrowings of a nation’s central government both to domestic residents and foreigners due to its past borrowing
FISCAL POLICY

Total Debt

\[ D_{t+1} = (1 + r_t)D_t + G_t - T_t \]  \hspace{1cm} (4)

In 2014 the amount of national debt in the UK was £1.45 trillion. That is around £22k per person.

Is this a lot or a little?
FISCAL POLICY

Total Debt

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Debt to GDP ratio

\[ d_t \equiv \frac{D_t}{Y_t} \]  

- amount of debt that is brought into period \( t \) relative to GDP in that period
- by considering the debt-to-GDP ratio we can have a much better idea about the sustainability of a country’s debt
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Debt to GDP ratio

Governments debt-to-GDP ratio OECD countries
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Debt to GDP ratio

\[ d_t \equiv \frac{D_t}{Y_t} \tag{5} \]

- remember the rule for growth rates:

\[ \frac{\Delta d_{t+1}}{d_t} = \frac{\Delta D_{t+1}}{D_t} - \frac{\Delta Y_{t+1}}{Y_t} \tag{6} \]

- multiplying both sides by \( d_t \)

\[ \Delta d_{t+1} = \frac{\Delta D_{t+1}}{Y_t} - g \frac{D_t}{Y_t} \tag{6} \]
FISCAL POLICY

Debt to GDP ratio

\[ \Delta d_{t+1} = \frac{\Delta D_{t+1}}{Y_t} - g \frac{D_t}{Y_t} \]  \hspace{1cm} (6)

• substitute equation (3) in (6):

\[ \Delta d_{t+1} = \frac{r_tD_t + G_t - T_t}{Y_t} - g \frac{D_t}{Y_t} \]

\[ \Delta d_{t+1} = \frac{G_t - T_t}{Y_t} + (r - g)d_t \]  \hspace{1cm} (7)
How does the debt-to-GDP ratio evolve over time?

- A higher primary deficit to GDP raises the debt-to-GDP ratio
How does the debt-to-GDP ratio evolve over time?

- A higher primary deficit to GDP raises the debt-to-GDP ratio
- A higher real interest rate raises the debt-to-GDP ratio (the effect is proportional to the debt ratio at the beginning of the period)
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Debt to GDP ratio

\[ \Delta d_{t+1} = \frac{G_t - T_t}{Y_t} + (r - g) d_t \] (7)

**How does the debt-to-GDP ratio evolve over time?**

- A higher primary deficit to GDP raises the debt-to-GDP ratio
- A higher real interest rate raises the debt-to-GDP ratio  
  (the effect is proportional to the debt ratio at the beginning of the period)
- A higher growth rate reduces the debt-to-GDP ratio  
  (the effect is proportional to the debt ratio at the beginning of the period)
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Debt Stabilisation

\[ \Delta d_{t+1} = \frac{G_t - T_t}{Y_t} + (r - g)d_t \]  

\[ \Delta d_{t+1} = 0 \]

\[ \frac{T_t - G_t}{Y_t} = (r - g)d_t \]

- When \( g < r \), stabilising the debt-to-GDP ratio requires a primary budget surplus

- When \( g > r \), stabilising the debt-to-GDP ratio is compatible with a primary budget deficit
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Debt Stabilisation

\[ r > g \] 

- debt-to-GDP ratio will be raising unless the primary deficit ratio is negative
- government should run a primary budget surplus

\[ r < g \] 

- growth of the economy is sufficient to reduce the impact of interest payments on the debt burden
- some level of primary deficit is consistent with a constant ratio of debt to GDP ratio
TEST YOUR UNDERSTANDING:

QUESTION:

Consider a country where the public debt stands at 60% of GDP. The real interest rate is 3% and the trend growth rate is 2%.

What is the primary budget required to stabilise:

(a) the debt level?

(b) the debt-to-GDP ratio?
Government debt and inflation

\[ \Delta d_{t+1} = \frac{G_t - T_t}{Y_t} + (i_t - \pi_t - g)d_t \]

- Inflation contributes to reducing the change in debt ratio
- Inflation reduces the real value of debt
- Government may be tempted to use this
  - When the debt level is high, governments may be tempted to allow inflation to rise and erode the real debt burden
- Causality?
  - NO!
  - for a given debt burden, higher inflation will reduce it
  - but... higher inflation may be a consequence of a policy response to a higher debt burden
FISCAL POLICY

UK government debt to GDP ratios: current vs constant prices 1830 - 2010

Source: Debt data from the IMF Historical Public Debt Database (see Abbas et al. 2010). Consumer prices data from the ONS (accessed June 2010).

Note: The constant price data was calculated by multiplying the nominal debt data (from the IMF) by the consumer price index in the current year relative to that in the base year (for each chart separately).
# Fiscal Policy

## Government debt and inflation

<table>
<thead>
<tr>
<th>Period</th>
<th>Events and Debt Ratio</th>
</tr>
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<tbody>
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debt-ratio would have risen to over 250% with no inflation
The cost of rising public debt

- it differs according to whether the real interest rate is higher or lower than the GDP growth rate

- risk premium matters too

\[
\Delta d_{t+1} = \frac{G_t - T_t}{Y_t} + \left( r_t^{\text{risk-free}} + \rho - g \right) d_t
\]

\[
r_t = r_t^{\text{risk-free}} + \rho
\]
The cost of rising public debt

\[ r_t > g \]

• primary surplus is required to reduce the debt burden

• painful cuts in expenditure or unpopular increases in taxation (effects on equilibrium unemployment)

• high level of debt may trigger concerns that the government may default on its debt - risk premium increases
  - higher interest rate worsen the debt burden
  - investment decreases

• Credit to government may be cut off
  - government may resort to monetising the debt

• Ex: Eurozone
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The cost of rising public debt

\( r_t > g \)

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The cost of rising public debt

UK and Euro-zone Debt-to-GDP ratio

2000s

%  
90
80
70
60
50
40
30
20
10
0


United Kingdom

Euro area (15 countries)
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The cost of rising public debt

Figure 14.7 Government debt to GDP ratios for selected Eurozone members: 1995–2011.

Source: OECD Economic Outlook, June 2012.

Note: Variable used is gross public debt, Maastricht criterion, as a percentage of GDP.

debt explosion in Ireland (25% in 2007 to 108% by 2011)
The cost of rising public debt

Debt-GDP ratio in various countries Euro-zone 2000s
The cost of rising public debt

Debt-GDP ratio in various countries Euro-zone 2000s

Greek debt compared to Eurozone average

- Greece
- Eurozone average

Source: Eurostat (1/2013)
*estimates
**estimates from Ernst & Young using data from Oxford Economics (3/2013)
The cost of rising public debt

UK and US Debt-to-GDP ratio (1830 - 2010)
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The cost of rising public debt

• Empirical relation between high debt & GDP growth
  • Reinhart & Rogoff (2010): Periods when gov’t Debt/GDP exceeded 90% were associated with ~1% lower annual growth → used to justify austerity in the EU.
  • Problems with R&R: 1. Spreadsheet errors which overestimated –ve relation btw debt/GDP ratio and high debt; 2. Possible reverse causality (i.e. slow growth causing debt build-up).
  • Instrumental variables & distributed lag models were used to disentangle causality, but the literature has yet to come to a consensus.
The cost of rising public debt

- Can fiscal consolidation \((FC)\) be expansionary?

- Assumed so far that primary surplus reduces short run \(AD\) & \(y\) \((IS\) shifts left).

- But fiscal consolidation can stimulate \(AD\) if econ. is in a state of ‘fiscal stress’ (an unsustainable fiscal position) \(\rightarrow\) \(\rho\) & govt' borrowing costs high.

Moreover during fiscal stress, \(C\) & \(I\) ↓ due to expectations of crisis (↓ H/hold wealth) & econ. uncertainty \(\rightarrow\) . Credible fiscal consolidation may boost \(C\) & \(I\).

Composition of \(FC\), not just size matters: e.g. ↓ \(G\) more credible in signaling l/term commitment to fiscal reform than ↑ \(T\) \(\rightarrow\) Boosts priv. expectations more.
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The cost of rising public debt

IMF (2010) findings:

• Fiscal consolidation is typically contractionary
• Pain of consolidation is eased by accommodative $MP$, e.r. depreciation and larger reliance on spending cuts than tax rises.
• Consolidations are less contractionary in countries with high perceived default risk, but expansionary effects are still unusual.
• Consolidation will be most painful under fixed e.r. (e.g. Eurozone economies!) and when there is little scope for monetary stimulus such as at the ZLB
Is Discretionary FP a useful tool?
Discretionary FP for stabilisation

• Effectiveness depends on (1) initial state of economy, (2) model used, (3) timescale – short or medium run.

• ‘The Multiplier’ of $FP$ differs depending on the timescale.

• Short-run (Keynesian) multiplier: how output changes when $G$ changes, holding all else constant.

• But general equilibrium effect of $G$ depends on the model (e.g. response of $MP$) and the initial conditions of the economy.
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Discretionary FP for stabilisation

(1) Deep recession
- Permanent negative demand shock
- ZLB is hit → $MP$ does not work → Role for the $FP$
  - Now inflation below target, output gap is negative. MR cannot be implemented
  - Value of multiplier $>1$: $\Delta y = k \Delta G$

(2) Over-ambitious $y$-target
- medium run multiplier=$0$
- inflation bias
the government can only get a short-term gain but in the longer-term there is no increase in output.

Full multiplier effect depends on the model, context and CB behaviour:
If there is spare capacity, gov’t can boost $AD$ and $y$ to improve welfare.
If $y = ye$, expansionary $FP$ will lead to higher $\pi$ and gov’t debt, while $y$ will stay unchanged.
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Discretionary FP for stabilisation

• Balanced budget multiplier = 1 \( G \) is fully tax-financed \( G=T \)
  In this case, spending power is redistributed from taxpayers to the providers of goods and services
  → Aggregate consumption remains unchanged, and the only impact on \( y \) is the initial \( \Delta G \).

• Balanced budget expenditure may be useful if gov’t wants to boost \( AD \) in a recession and is unable/unwilling to use debt financing.

• Empirical studies: No firm consensus on multiplier size; Difficult to isolate \( \Delta G’s \) effect from other factors.

• Size depends on context:
  - larger multiplier in developed countries, closed economy (lower leakages), fixed e.r. regimes;
  - Negative multiplier in high debt countries.

• Our 3-eqn model: \( FP \) can be used to boost \( AD \) and return economy to equilibrium in a recession, especially when the ZLB is hit.
**FISCAL POLICY**

**Government debt and inflation**

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Macroeconomic Policy after the Crisis
"If the cost of holding money can be neglected, it will always be profitable to hold money rather than lend it out, if the rate of interest is not greater than zero. Consequently the rate of interest must always be positive”

Hicks, 1937
NEGATIVE INTEREST RATES

Less Than Zero

Paying to Save

Government bonds in Japan and Germany pay a negative yield, so investors holding to maturity won’t get all their money back.

Data as of April 29, 2016
NEGATIVE INTEREST RATES

Less Than Zero

• Act of desperation?

• Punishment for banks?

• Draghi (Jan 2016): There are no limits on what he will do to meet his mandate

• http://www.bloomberg.com/graphics/2016-central-banks/#1
NEGATIVE INTEREST RATES

Less Than Zero

• Four CBs in Europe since 2014 (Denmark, ECB, Sweden, Switzerland) + Japan

• for different reasons (hence - different policy implementation)
  - deflation
  - currency appreciation pressures
NEGATIVE INTEREST RATES

Less Than Zero

• ECB - Draghi (2014).
  “Underpin the firm anchoring of medium to long-term inflation expectations”
  - negative deposit rate

• Sveriges Riksbank (2015)
  “Safeguarding the role of the inflation target as a nominal anchor for price
  setting and wage formation”

• Bank of Japan (2016)
  “in order to achieve the price stability target of 2% at the earliest possible time”
  - remuneration of -0.10% to any future increases in reserves

• Negative interest rates complemented other unconventional measures
NEGATIVE INTEREST RATES

Less Than Zero

• Swiss National Bank
  appreciation pressure on the Swiss Franc
  - 2014 negative interest rates on sight deposit account balances to
discourage capital inflows (-0.25% → -0.75%)

• Danmarks Nationalbank
  - 2015 negative interest on the rate on certificates on deposit
  -0.75%
  (-0.65% in 22016)

• see BIS’s report on negative rates
NEGATIVE INTEREST RATES

Less Than Zero: Why?

• i = 0.05%, inflation = -0.6%, 
  \[ r = 0.05 - (-0.6) = 0.65\% \]
if deflation gets worse then real interest rates will rise even more - bad for recovery!

• Reduce borrowing costs for households and firms
  (commercial banks will lend more money rather than maintaining large balances with the CB)

• Effects on confidence
  - CBs may convince consumers that they are serious about beating deflation

• Depreciation of the currency
  - increase in the price of imports
  - growth-enhancing boost to exporters
NEGATIVE INTEREST RATES

Less Than Zero

• transmission channels to the money market similar to the conventional monetary policy

• to the wider economy?
  - decrease in longer maturity and higher-risk yields (but... CB asset purchases also in place)
  - negative wholesale deposit rates
  - retail deposits still positive
  - Swiss Bank has increased the lending rate on mortgages!

• Debilitating impact on the profitability of the banking sector
Key policy and money market rates

In per cent

Graph 3

Euro area

Sweden

Switzerland

Denmark

1 The overnight Swiss average rate (SARON) replaced the repo overnight index (SNB) in August 2009.
2 Charged on the portion of sight deposits exceeding the exemption threshold.
3 Shaded corridor represents the SNB target range for the three-month Libor rate.
4 Twenty-day moving average.

Sources: Bloomberg; national data.
NEGATIVE INTEREST RATES

Graph 5

Banknotes and coins in circulation

In billions of national currency units

Sources: European Central Bank; Datastream.
NEGATIVE INTEREST RATES

Less Than Zero: Risks?

• (historically - very inflationary policy)

• commercial banks decide to pass this to the savers
  - savers will hold cash
  - decrease source of funding
  - bank runs!

• if banks absorb the cost of negative rates - decrease profits for the banks
  (in the Eurozone - put downward pressure on the majority of banks stocks which in turn has depressed the European and global equity markets)
  - Building societies in the UK have assets with interest payments contractually linked to the interest rate (erosion of capital)

• impact on foreign exchange market
  - decrease in the value of the currency (low interest rates make the currency less attractive to investors)
  - currency war of competitive devaluations
NEGATIVE INTEREST RATES

Is there an effective lower bound?

- transport, storage, insurance and other costs associated with holding cash in size make the effective lower bound on nominal interest rate somewhere below zero

- likely to move up if interest rates remain (or are expected to remain) negative for a long time
  - innovation that reduces the costs associated with physical currency use (McAndrews, 2015)

- retail bank customers have been so far shielded from negative rates
SOME READINGS

- Carlin & Soskice, Chapter 3 & 13
  
  
  
  
  
  
  - Miller, M., Zhang L. & Li H. (2013) ’When bigger isn’t better: bailouts and bank reform’ (with Lei Zhang and Hanhao Li), Oxford Economic Papers, vol. 65 (suppl 1): i7-i41
  
  - Miller, M. & L. Zhang (2014) "To exit the Great Recession, central banks must adapt their policies and models", VoxEU, CEPR's Policy Portal
  
  
  

Some recent articles on Debt:

http://www.nytimes.com/2015/08/21/opinion/paul-krugman-debt-is-good-for-the-economy.html?_r=0

On negative interest rates:


