Non-standard monetary policy, asset prices and macroprudential policy in a monetary union

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Banca d’Italia

Unconventional monetary policy:
Effectiveness and risks
Banca d’Italia
Rome, October 21, 2016
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“Should any threat to financial stability materialise, specific macro-prudential measures should be implemented by national authorities to deal with local risks, without the need to alter the expansionary stance of monetary policy.”

Motivation

- “Should any threat to financial stability materialise, specific macro-prudential measures should be implemented by national authorities to deal with local risks, without the need to alter the expansionary stance of monetary policy.”


- “We are closely monitoring risks to financial stability, but we do not see them materialising for the moment. Should this be the case, macroprudential policy not monetary policy would be the tool of choice to address these risks.”

Mario Draghi, Brussels, 23 September 2015.
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Motivation

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- reduction in long-term yields generated by the Asset Purchase Programme (APP)
Motivation

**Concern**: in the euro area, the combination of

- announced intention to keep short-term interest rates at low levels for a prolonged period of time (forward guidance, FG) and

- reduction in long-term yields generated by the Asset Purchase Programme (APP)

may induce region-specific **excessive** increases in asset prices and private-sector borrowing.
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may induce region-specific excessive increases in asset prices and private-sector borrowing.

**Risks** for region-specific financial stability.
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Goal

- We build up, calibrate and simulate a large-scale multi-country New Keynesian DSGE model of the Euro area and the world economy to evaluate
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  - the macroeconomic and financial effects of APP,

  - the APP interaction with region-specific macroprudential policy.
Main results

- The increase in households borrowing in one region during the APP can be further magnified by
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  - irrational, overly optimistic expectations on real estate prices.
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  - a high loan-to-value (LTV) ratio,
  - irrational, overly optimistic expectations on real estate prices.

- Region-specific macroprudential measures can stabilize private sector borrowing, with limited negative effects on economic activity.
Main model features
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  - region-specific real estate markets and collateral constraints (Iacoviello 2005) $\implies$ allow for region-specific amplification effects of APP,

  - irrational, overly optimistic expectations about real estate prices (Dupor 2005) $\implies$ excessive increase in households borrowing, role for macroprudential intervention.
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- In each EA, there are three types of households:
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  - unrestricted,
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- In each EA, there are three types of households:
  - unrestricted,
  - restricted,
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- In each EA, there are three types of households:
  - unrestricted,
  - restricted,
  - borrowers.
Unrestricted households
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- Unrestricted households hold
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  - domestic short- and long-term sovereign bonds (perpetuity à la Woodford 2001), an internationally traded riskless bond,
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- Lend to domestic borrowers.
Restricted households
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Rationale for restricted households: APP lowers long-term yields and stimulates restricted households’ consumption and investment (as in Chen et al. 2012).
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Borrowers
• Indebted households ("Borrowers") are subject to the borrowing constraint: they can borrow an amount equal to a fraction of the expected value of their real estate (collateral):

\[-B^S_{D,t}R^S_t \leq m_t E_t \left( Q^{h}_{t+1} h_{D,t} \right),\]

where \(0 \leq m_t \leq 1\) is the LTV ratio.
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The housing demand implied by the first-order condition is (housing is a real asset)

\[\lambda_{D,t} Q_t^H = \frac{1}{h_{D,t}} + \beta_D E_t \left(\lambda_{D,t+1} Q_{t+1}^H\right) + \gamma_D t m_t E_t \left(Q_{t+1}^H\right).\]
Motivation and goal

Main features

Results

Conclusions

WRAPPING UP: MARKET CLEARING

Unrestricted

Restricted

Government

Borrower

Foreign Households

private short-term

sovereign long-term
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Non-fundamental shock to expectations on real estate price

- The borrowing constraint of borrowers is

$$-B^S_{D,t} R^S_t \leq m_t E_t \left( Q^h_{t+1} \theta_{t+1} h^D_{t} \right).$$
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\[-B_{D,t}^{S} R_{t}^{S} \leq m_{t} E_{t} \left( Q_{t+1}^{h} \theta_{t+1} h_{D,t} \right).\]

The housing demand implied by the (housing) first-order condition is

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In one scenario, it is assumed that a Home-specific macroprudential rule holds,

\[ m_t = \rho_m m_{t-1} + \rho_{BD} \left( \frac{B^S_{D,t}}{GDP_t} - \frac{B^S_{D,t-1}}{GDP_{t-1}} \right), \]

where \( 0 \leq \rho_m \leq 1 \) and \( \rho_{BD} > 0 \). The rule is in line with existing literature (e.g., Angelini et al., 2014, Brzoza-Brzezina et al., 2015).
Calibration

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Calibration

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  - Home GDP is 20% of EA GDP (REA GDP is 80%),
  - Home LTV ratio is 90%, REA LTV is 50%,
  - “great ratios” are matched.

- Remaining parameters set in line with literature and with Eurosystem evidence on long-term interest rate response to APP.
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Simulations
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- Scenario 1: APP (purchases of EA sovereign bonds, euro 180 billion per quarter, for 7 quarters, bonds are held to maturity (8 years); 2-year FG; Home and REA LTV ratios set at their steady-state values (90% and 50%, respectively).
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- **Scenario 2**: scenario 1 + Home-specific non-fundamental expectational shock.
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- **Scenario 3**: same as scenario 2, **but** Home LTV ratio is modified by the Home macroprudential authority to stabilize households borrowing.
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Scenario 1: APP

APP: quarterly purchases of euro 180 billion, for 7 quarters, bonds held to maturity (8 years); 2-year FG; Home LTV: 90%.
**Scenario 1: APP**

**Transmission mechanism:**
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Transmission mechanism:

- restricted households sells long-term sovereign bonds to the central bank, invest in physical capital and consume; there is an initial positive effect on aggregate demand and inflation;
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- borrowers face low short-term (real) interest rate; they increase their demand for consumption and for real estate;
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- borrowers face low short-term (real) interest rate; they increase their demand for consumption and for real estate;

- the implied increase in the real estate value favors further borrowing and consumption by borrowers, because of the borrowing constraint (collateral effect);

- the collateral effect is larger in the Home region than in the REA, because of the larger Home LTV ratio.
APP. Effects on interest rates

 QE purchases

 Interest rates

 Euro area Short

 Home Long

 REA Long
APP. Effects on Home real estate and borrowing

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Housing prices

Borrowers financial position

Borrowers real estate holdings

Borrowers consumption
APP. Macroeconomic effects
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**Scenario 2: APP + Home-specific non-fundamental expectational shock**
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- The non-fundamental shock is calibrated to get, on top of the APP-induced increase in Home real estate price, an additional increase equal to around 5% of the baseline (steady-state) level on average in the first year.
Scenario 2: APP + Home-specific non-fundamental expectational shock

- The non-fundamental shock is calibrated to get, on top of the APP-induced increase in Home real estate price, an additional increase equal to around 5% of the baseline (steady-state) level on average in the first year.

- Such value is line with evidence provided by Hartmann (2015): average increase in the overvalued component of housing prices of around 5% per year over the 2002-2007 run-up in the EA.
Scenario 2: APP + Home-specific non-fundamental expectational shock

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Transmission mechanism:

- the real estate overvaluation is an additional incentive for borrowers to increase debt and, thus, consumption and real estate demand;

- larger collateral effect than in scenario 1.
APP and Home expectation shock. Effects on Home real estate and borrowing
APP and Home expectation shock. Effects on Home macroeconomic variables
APP and Home expectation shock. Effects on EA macroeconomic variables
Scenario 3: APP, Home expectation shock and macroprudential policy
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- The Home macroprudential authority can modify LTV ratio to limit the increase in borrowing, according to the feedback rule

\[ m_t = \rho_m m_{t-1} + \rho_{BD} \left( \frac{B_{D,t}^S}{GDP_t} - \frac{B_{D,t-1}^S}{GDP_{t-1}} \right). \]
### Scenario 3: APP, Home expectation shock and macroprudential policy

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\]

- We calibrate the parameters in the rule to obtain a situation in which, under the combination of APP and non-fundamental shock, an increase in household debt is in line with the one observed in the benchmark scenario.
Scenario 3: APP, Home expectation shock and macroprudential policy
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- GDP and inflation not greatly affected.
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- Macroprudential policy is the silver bullet:
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- Macroprudential policy is the silver bullet:
  - the Home LTV ratio is decreased to counterbalance the increase in borrowing;
  - demand for consumption and real estate increases to a lower extent;
  - unrestricted households substitute investing in physical capital for lending to borrowers;
  - larger increase in investment compensates for the lower increase in consumption.
APP, Home expectation shock and macroprudential policy. Home LTV ratio
APP, Home expectation shock and macroprudential policy. Effects on Home real estate and borrowing
APP, Home expectation shock and macroprudential policy. Effects on Home macroeconomic variables
APP, Home expectation shock and macroprudential policy. Effects on EA variables.
During APP and FG implementation, region-specific macroprudential measures can stabilize excessive private sector borrowing (i.e. not reflecting fundamentals), with limited negative effects on regional economic activity and almost no impact on inflation.
Conclusions

- During APP and FG implementation, region-specific macroprudential measures can stabilize excessive private sector borrowing (i.e. not reflecting fundamentals), with limited negative effects on regional economic activity and almost no impact on inflation.

- Possible synergies between non-standard monetary and macroprudential policies in a monetary union: monetary policy necessarily focuses on the union-wide economic conditions, region-specific macroprudential policies pursue financial stability at regional level.