



EUROPEAN CENTRAL BANK

EUROSYSTEM

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Financial accounts and monetary and economic analysis at the ECB

Banca d'Italia Conference: How
financial systems work: evidence from
financial accounts

Rome, November 30th – December
1st, 2017.

Presentation outline

- 1 Financial projections in the context of the Eurosystem (B)MPEs
- 2 NFC leverage and gross indebtedness
- 3 Real financial linkages
- 4 NFC liquid asset holdings
- 5 Financial intermediation

1 Financial projections in the context of the Eurosystem (B)MPEs

2 NFC leverage and gross indebtedness

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4 NFC liquid asset holdings

5 Financial intermediation

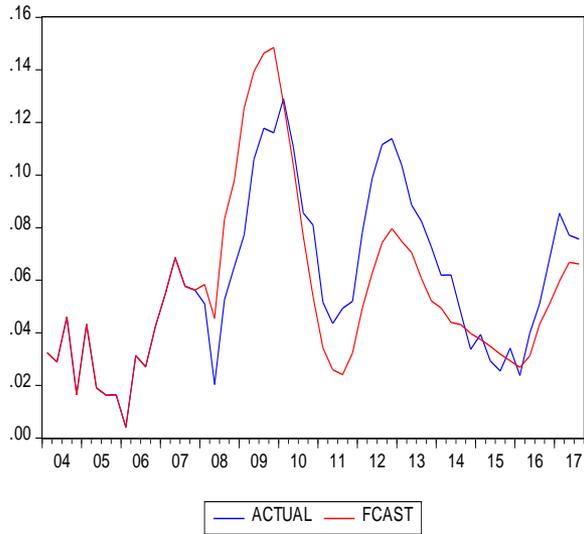
- **Part of the ESCB/ECB projection exercises since mid-2003** (*framework streamlined in Sep-2015 MPE; for the earlier more detailed system see Annex 6 in Chapter 7, Papademos & Stark 2010*).
- **Projections cover now:**
 - *all new transactions (net) occurring between the non-financial corporate (NFC) and household sectors vis-à-vis other sectors of the economy (MFIs, OFIs, ICPFs, GG and RoW);*
 - *balance sheet positions of the NFC and household sectors for each instrument for which data exist in the EAA;*
 - *both on the assets and liabilities sides.*
- **Full set of financial projections produced for the euro area as a whole only** (*based on quarterly data*).
- **Financial projections derived post-recursively in the forecasts** (*conditional on growth and price projections as well as forecast technical assumptions*).

- **NFA sectoral net lending/net borrowing implied by macro-projections taken as starting point** (*real-financial bridge* → *assets side not modelled except deposits*).
- **No direct feedback from the financial projections to the other parts of the forecast.**
- **Potential risks to baseline growth and price forecasts highlighted regularly in the presentations and risk assessments** (*qualitatively not in a formalized way*).
- **Referred to when explaining factors affecting baseline projection in the forecast report.**
- **Occasionally used to analyze rebalancing of EA economies in the context of medium-term reference scenarios and for conducting monetary-financial scenarios around baseline.**

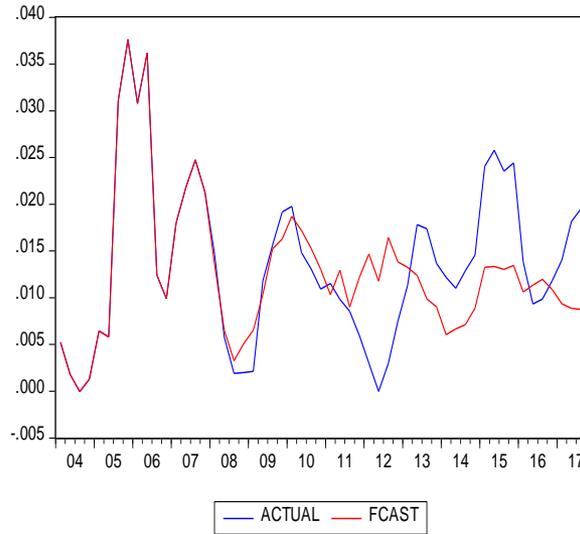
- **14 time series models:** *Bayesian vector-autoregressive models, error-correction models, difference equations;*
- **scale variables:** *real GDP, nominal business investment, nominal GDP, nominal fixed assets, NFC nominal gross value added, household nominal gross disposable income;*
- **price variables:** *GDP deflator, house prices;*
- **cost variables:** *short-term and long-term nominal market interest rates, cost of market-based debt, cost of equity, cost of equity – cost of market-based debt, opportunity costs for holding liquid assets;*
- **other variables:** *median NFC EDFs, bond market volatility, NFC credit supply shocks, proxy for M&A activity, stock market volatility (VSTOXX), interest bearing assets/liabilities.*

In sample forecasts: 2008Q1 until 2017Q2

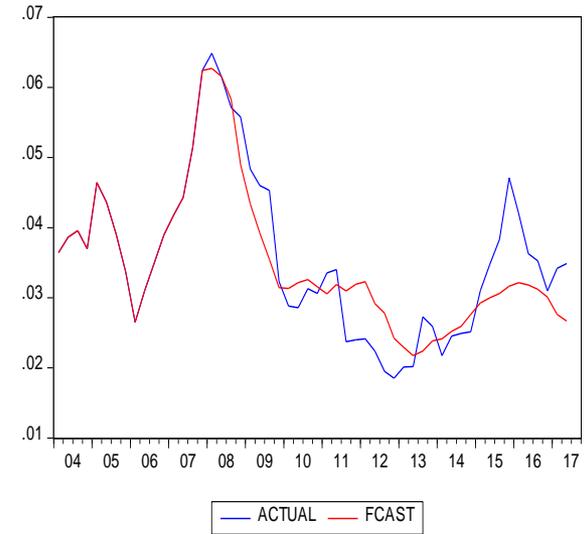
Debt securities issued by NFCs



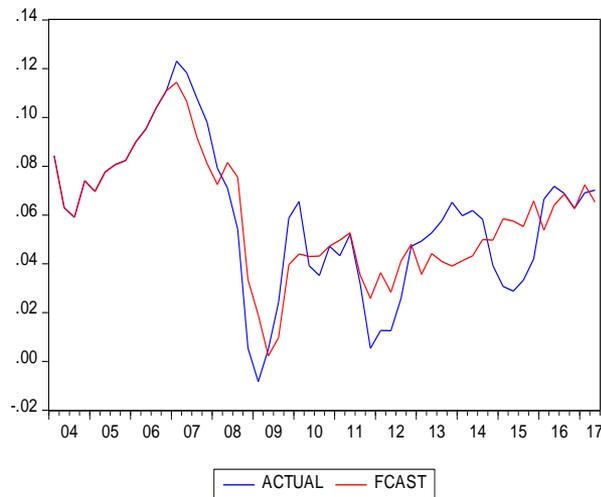
Quoted shares issued by NFCs



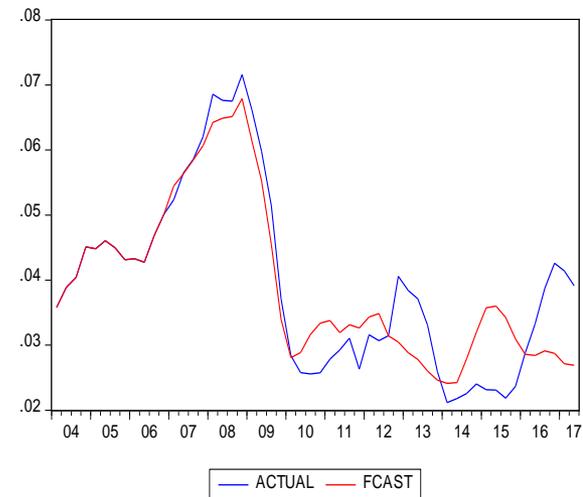
Unquoted shares issued by NFCs



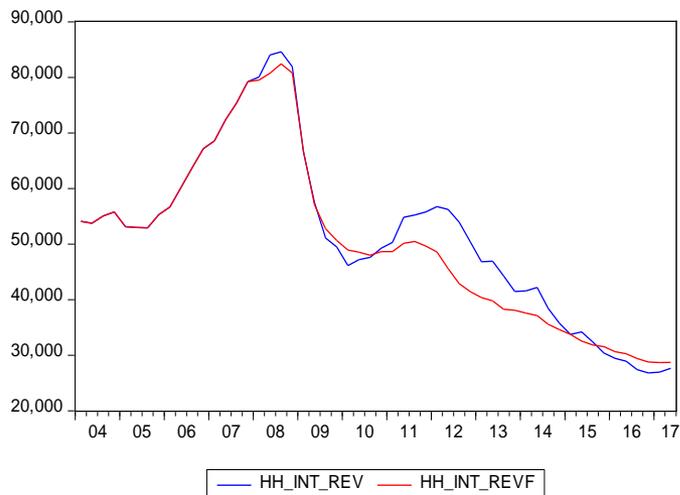
Deposits held by NFCs



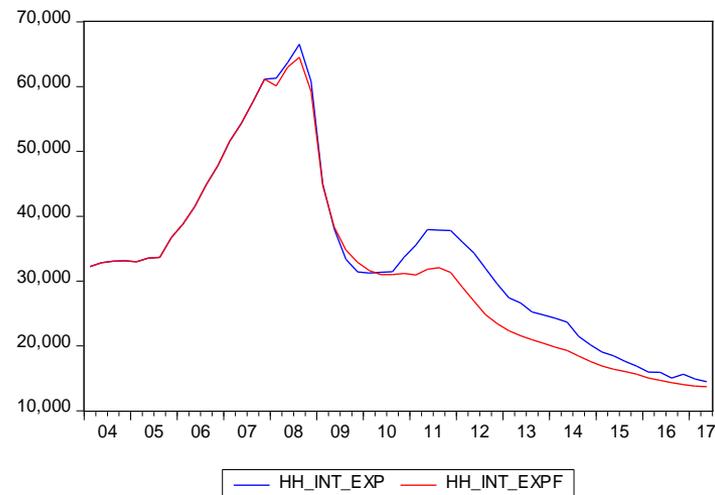
Deposits held by households



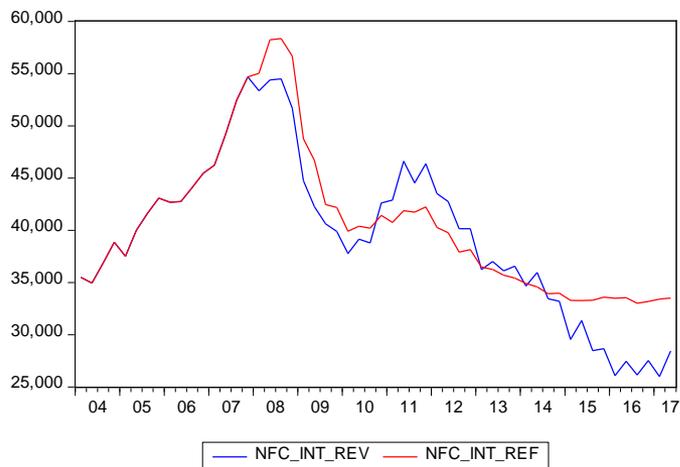
Interest received by households



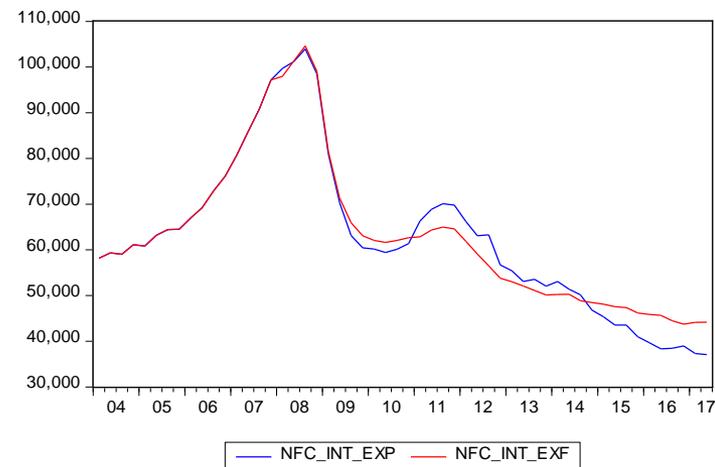
Interest paid by households



Interest received by NFCs



Interest paid by NFCs



1 Financial projections in the context of the Eurosystem (B)MPEs

2 NFC leverage and gross indebtedness

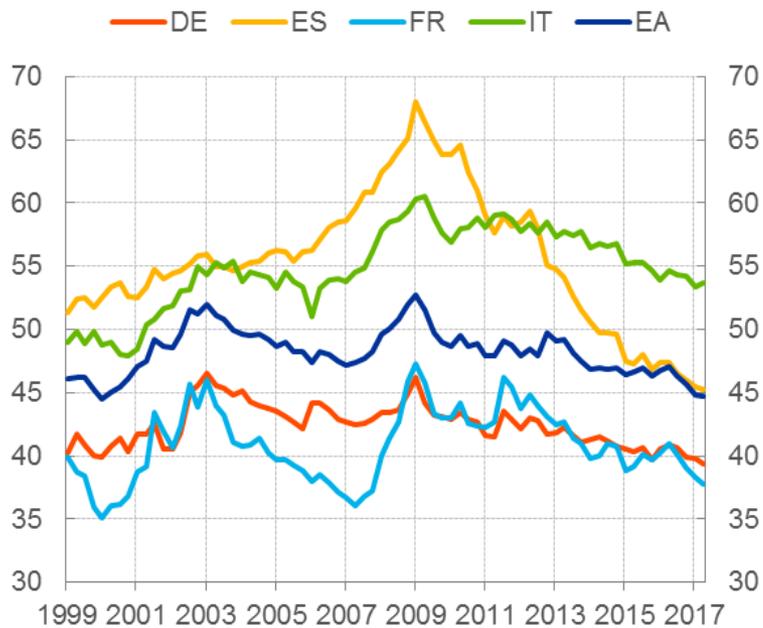
3 Real financial linkages

4 NFC liquid asset holdings

5 Financial intermediation

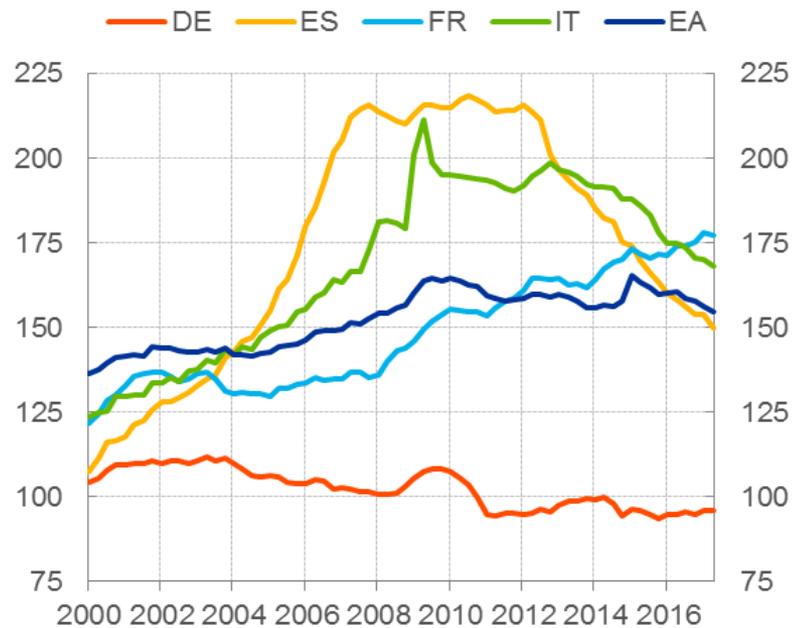
Dynamics of balance sheet adjustment in the NFC sector

NFC leverage at market value in selected EA countries (percent of NFC total assets)



Sources: Eurostat, ECB and ECB calculations.
 Notes: Leverage is defined as total liabilities net of listed shares and unquoted shares and other equity divided by total assets which is the sum of financial and fixed assets. Latest observation: 2017 Q2.

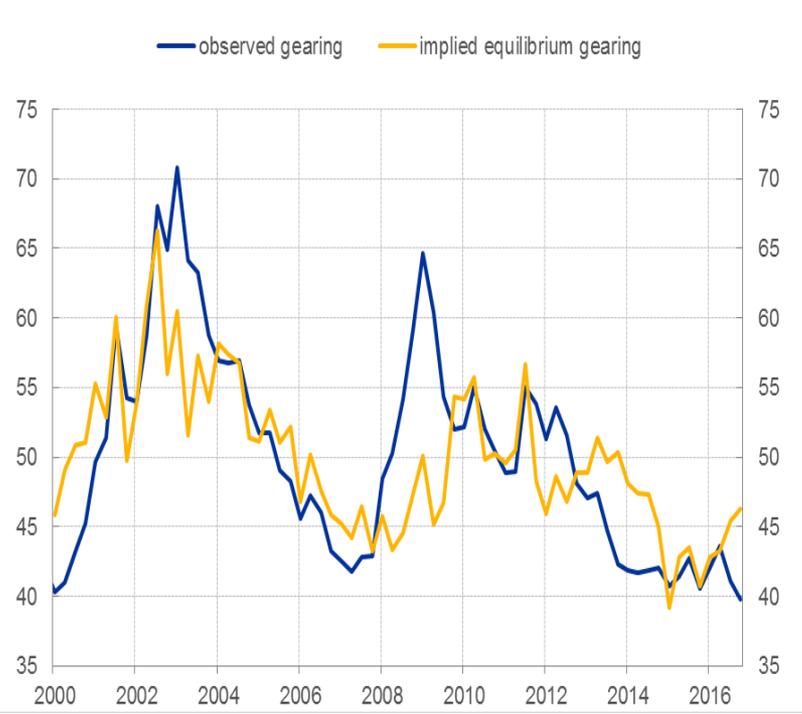
NFC consolidated gross debt in selected EA countries (percent of NFC gross value added)



Sources: Eurostat, ECB and ECB calculations.
 Notes: Consolidated gross debt includes total loans granted to NFCs net of intra-sectoral loans, debt securities issued and pension liabilities. Latest observation: 2017 Q2.

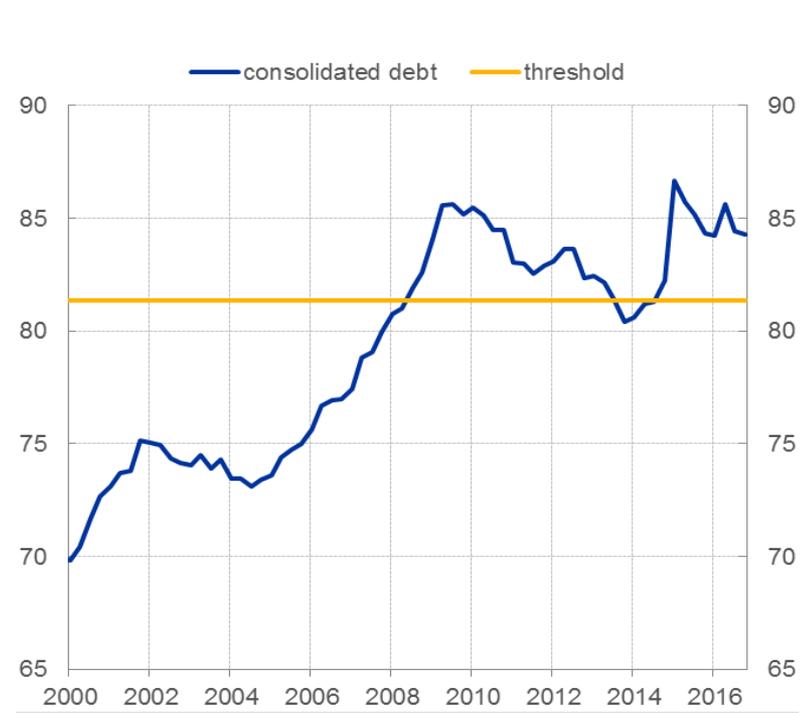
Possible remaining deleveraging needs

NFC actual and implied equilibrium gearing at market value in the euro area (percentages)



Sources: Eurostat, ECB, OECD, KMV Moody's, ECB staff estimates.
 Notes: Estimates are based on an error-correction model which relates consolidated NFC gross debt net of liquid asset holdings to tax gains on gearing and corporate distance to default (see Bunn, P. and Young, G. (2004)). Estimation sample: 1999 Q1 to 2016 Q4. Latest obs: 2016 Q4.

NFC consolidated gross debt in the euro area: actual and "excess" levels (percent of GDP)



Sources: Eurostat, ECB, Datastream, OECD, ECB staff estimates.
 Notes: Threshold computed with Bayesian TVAR of five variables incl. NFC consolidated gross debt, business investment, commodity prices, HICP and corporate bond spreads (see Alessandri, P. and H. Mumtaz (2013)). Estimation sample: Jan 1990 to Sep 2016. Latest obs: Dec 2016.

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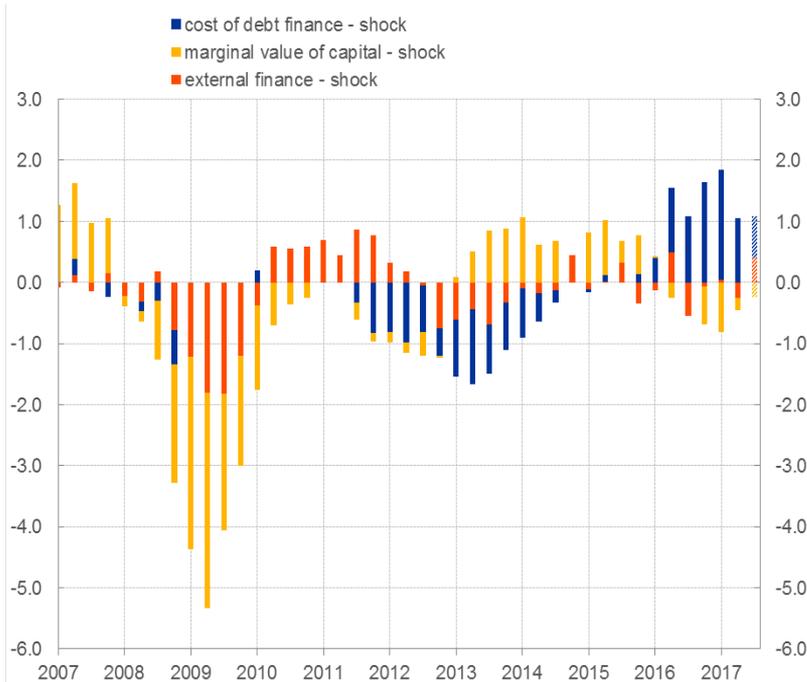
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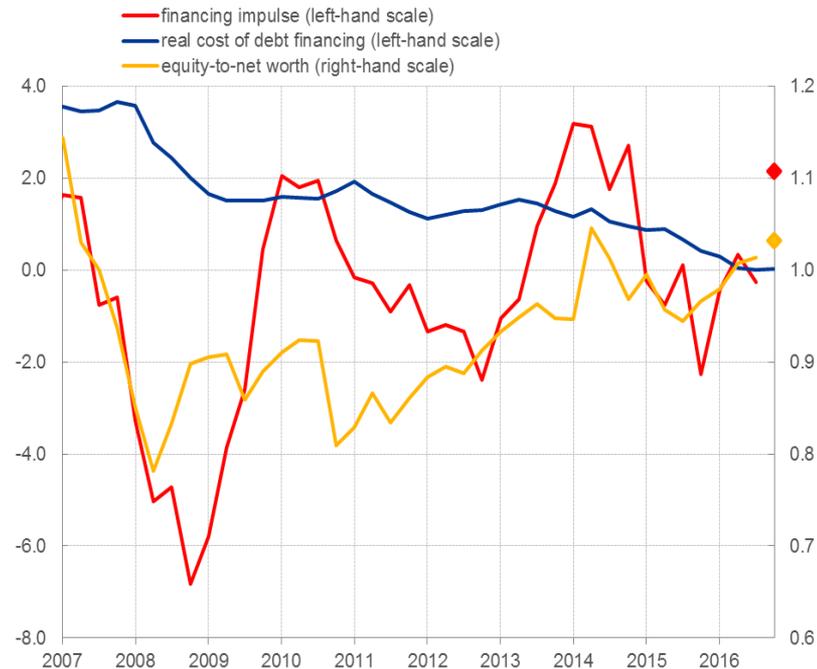
Real-financial linkages: BVAR & VAR models

Contribution of balance sheets and financing conditions to business investment growth in the euro area (percentage points)



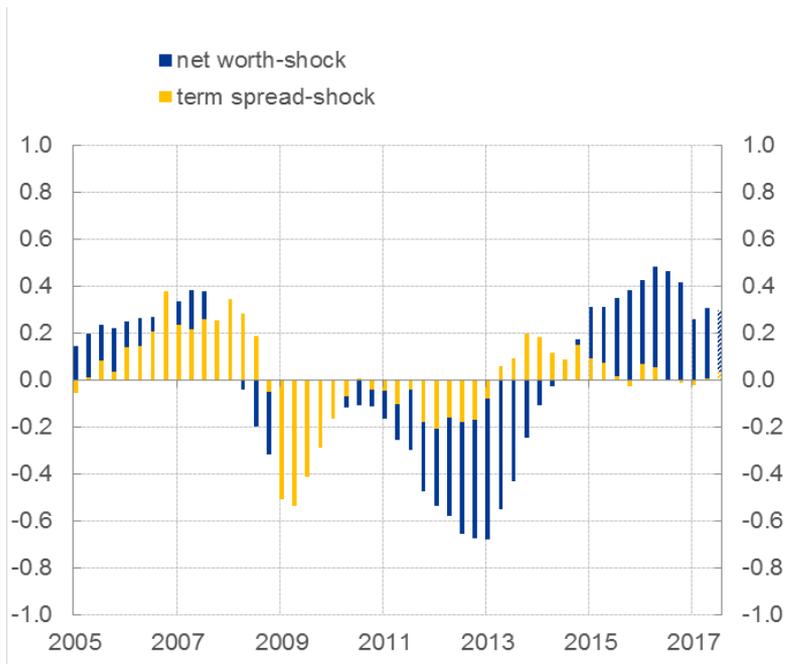
Source: ECB calculations. Notes: The estimated contributions are based on a BVAR incl. EA foreign demand, oil price, real gross operating surplus, real business investment, inflation, EURIBOR, real cost of debt financing, equity-to-net worth, financing impulse and debt-to-equity ratio. The shocks have been identified with sign restrictions using the Bear toolbox. Sample period: 2000 Q1 to 2017 Q2. Latest observation: 2017 Q2. 2017 Q3 based on own estimates.

Tobin's Q, financing impulse and real cost of debt financing in the euro area (LHS: percent per annum, 4-qtr mov. av. of y-o-y changes; RHS: ratio)



Sources: Eurostat, ECB, Merrill Lynch, Bloomberg, Thomson Reuters, ECB calculations. Notes: Financing impulse is computed as $FIt = 100 * ((Dt - Dt-1) / YENt-1 - (Dt-4 - Dt-5) / YENt-5)$, where D is the stock of external financing and YEN is nominal GDP. NFCs' external financing is defined as total liabilities of NFCs net of unquoted shares and other equity, financial derivatives and other accounts payable. Cost of debt financing is calculated as a weighted average of the cost of bank lending and the cost of market-based debt, based on their respective amounts outstanding derived from the euro area accounts. Latest observation: 2017 Q3 for the financing costs and 2017 Q2 for the financing impulse.

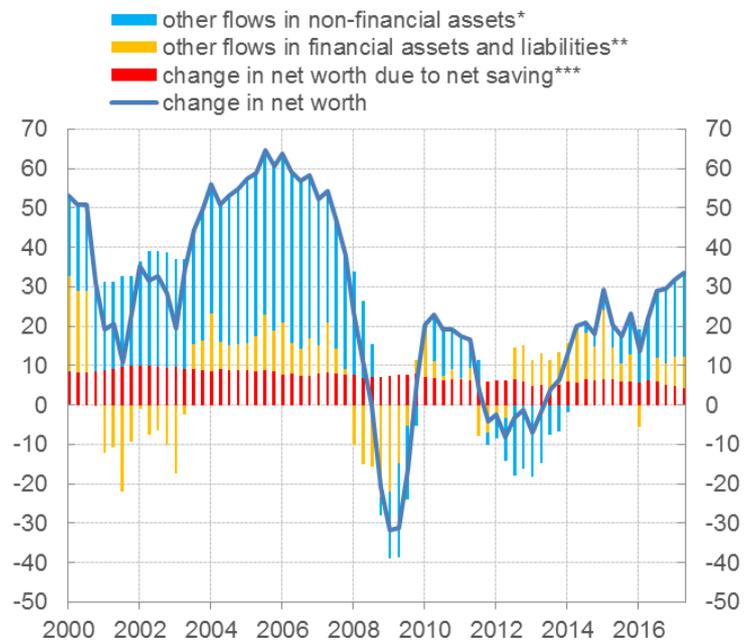
Contribution of balance sheets and term spread to private consumption growth in the euro area (percentage points)



Source: ECB estimates.

Notes: The estimated contributions are based on a BVAR incl. unemployment rate, real household gross disposable income, real private consumption, inflation, EONIA, term spread and real household net worth. The shocks have been identified with sign restrictions using the Bear toolbox. Sample period: 2000 Q1 to 2017 Q2. Latest observation: 2017 Q2. 2017 Q3 based on ECB estimates.

Change in the net worth of households (four-quarter sums; percentages of gross disposable income)



Sources: ECB, Eurostat.

Notes: * Mainly holding gains and losses on real estate (including land). ** Mainly holding gains and losses on shares and other equity. *** This item comprises net saving, net capital transfers received and the discrepancy between the non-financial and the financial accounts. Latest observation: 2017 Q2.

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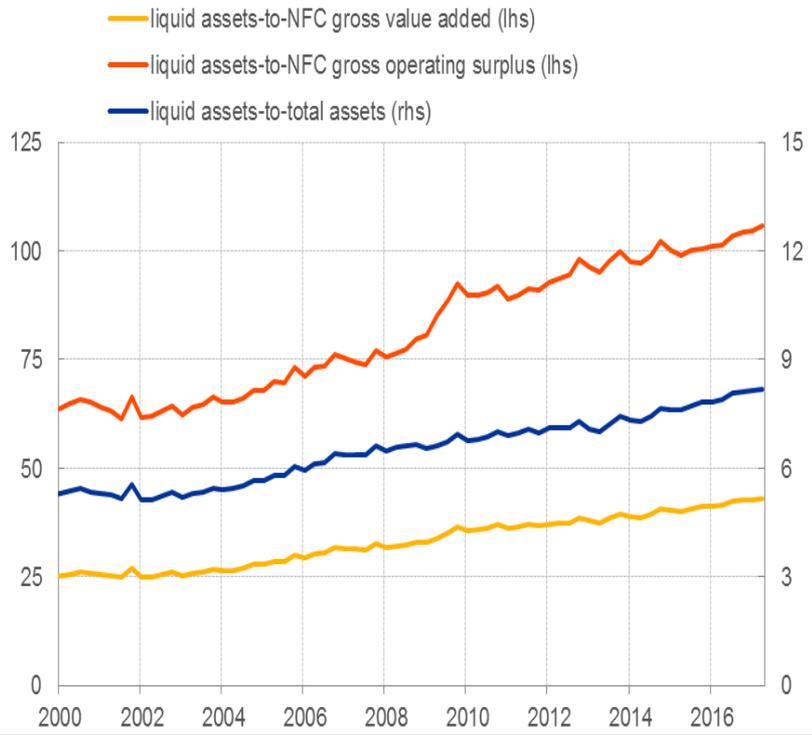
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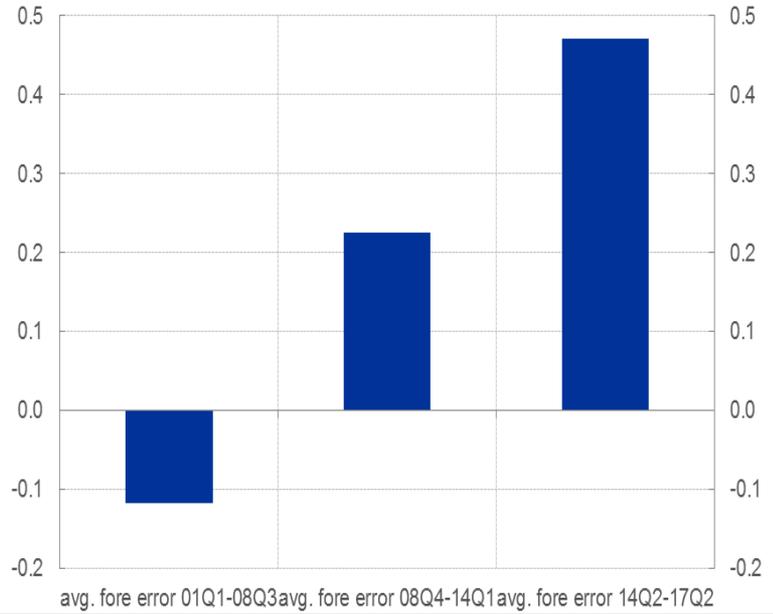
Strong growth in NFC liquid asset holdings: how it can be explained?

NFC liquid assets in the euro area
(percentages)



Sources: Eurostat, ECB.
Notes: Liquid assets include currency and deposits. Latest observation: 2017 Q2.

Model forecast errors for the euro area
(percentage points)



Sources: Eurostat, ECB, ECB estimates.
Notes: Forecast errors of liquid asset holdings based on an error-correction model relating currency and deposit holdings to total assets, gross value added, opportunity cost for holding liquid assets and a measure of financial market uncertainty (VSTOXX). Latest observation: 2017 Q2.

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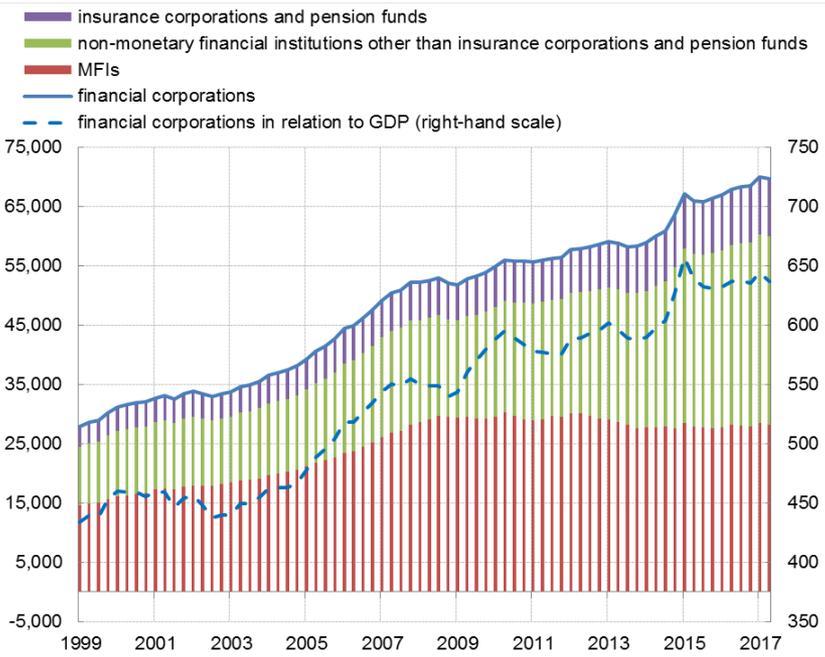
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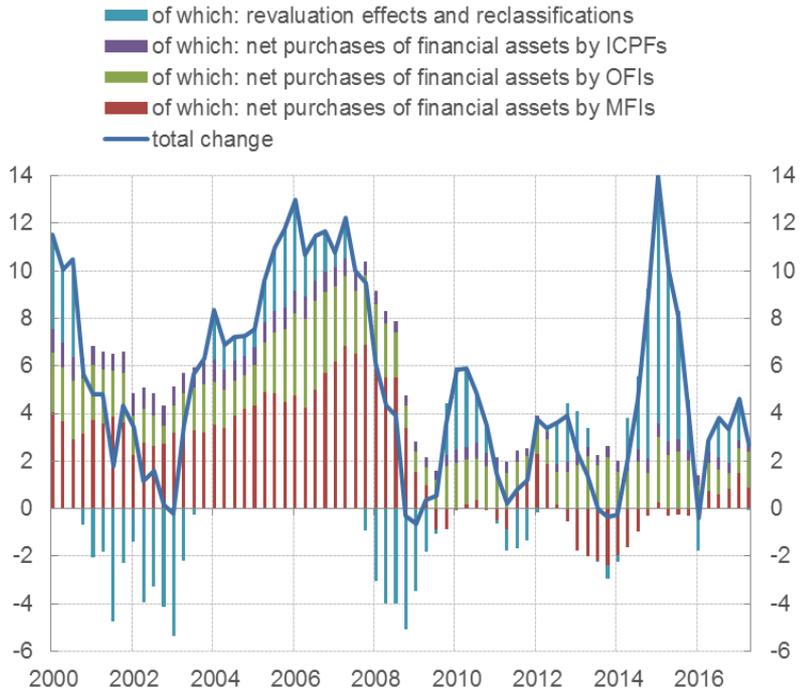
The role of euro area non-MFIs in financial intermediation

Total financial assets held by euro area financial corporations (outstanding amounts; left-hand scale: EUR billions; right-hand scale: percentages of nominal GDP)



Source: ECB.
 Notes: Financial corporations and MFIs excluding the Eurosystem. Latest observation: 2017 Q2.

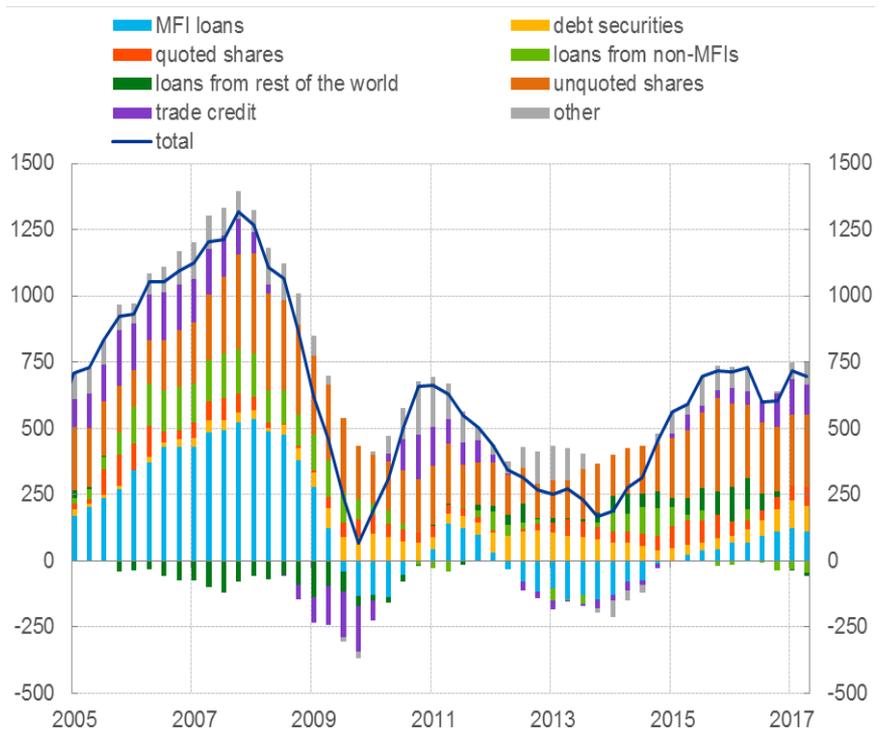
Changes in total financial assets held by euro area financial corporations (outstanding amounts; annual percentage changes; percentage point contributions)



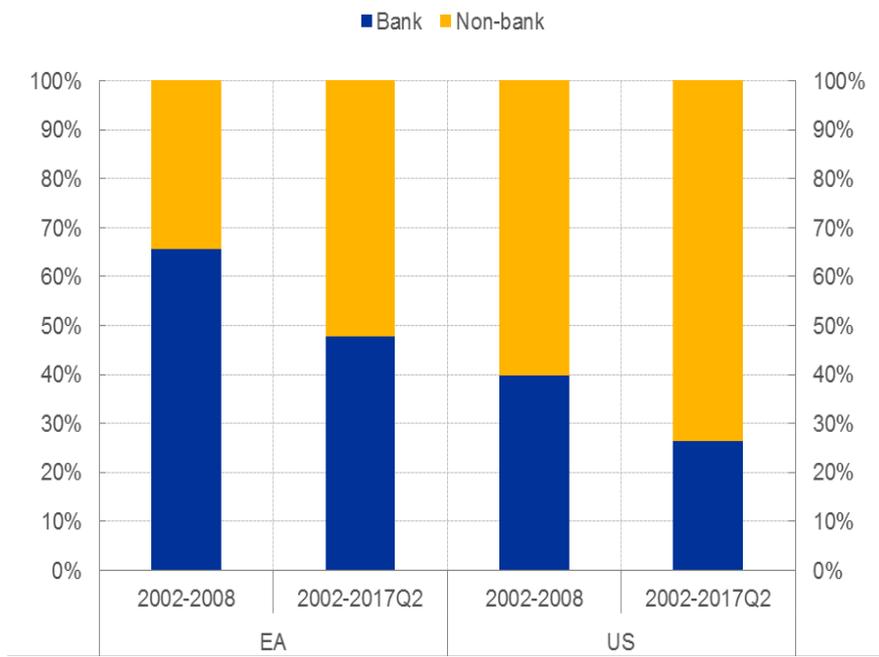
Source: ECB.
 Notes: Financial corporations and MFIs excluding the Eurosystem. Latest observation: 2017 Q2.

Trends in the external financing structure of euro area NFCs

Total external financing of euro area NFCs
(annual flows; EUR billions)



Share of bank and non-bank financing in total NFC financing in the euro area and the United States (cumulated net transactions, percentages)



Source: ECB.

Notes: MFI loans are adjusted for loans sales and securitization and cash pooling activities. Non-MFIs include OFIs and ICPFs. Loans from non-MFIs exclude securitized loans. "Other" is the difference between the total and the instruments included in the chart and includes inter-company loans and the rebalancing between non-financial and financial accounts data. Latest observation: 2017 Q2.

Sources: ECB, Federal Reserve System.

Note: Latest observation: 2017 Q2.

- **Financial projections:** *focusing on key sectors and indicators sufficient => typically some variables included in more encompassing models.*
- **Balance sheet analysis:** *needs to rely on a number of indicators and models to complement the assessment of the state of the economy.*
- **Real-financial linkages:** *VAR (and structural) models can help to quantify potential impacts / best to integrate to main projection models.*
- **The rising role of non-MFIs:** *changes the balance sheet structure of NFCs and the transmission mechanism / provides new investment opportunities for households.*

Thank you very much for your attention!

Background slides

The level of details reported in the forecast report annex table: sectoral net lending

	average in 1999-2016	2012	2013	2014	2015	2016
Net lending/net borrowing of euro area* (% of GDP)	0.4	1.2	2.4	2.5	3.0	3.3
Households**	2.7	2.6	2.4	3.4	3.2	2.3
Non-financial corporations	-0.8	-0.1	1.8	0.6	1.2	1.9
General government	-2.8	-3.6	-3.0	-2.6	-2.1	-1.5
Financial corporations	1.2	2.3	1.1	1.1	0.7	0.7
* Based on financial accounts in euro area sectoral accounts						

The level of details reported in the forecast report annex table: household sector

HOUSEHOLDS**		2012	2013	2014	2015	2016
Financial Assets (annual rate of growth, in percent)	% share in total in 2016	1.6	1.1	1.9	2.2	1.9
Deposits	33.3	3.4	2.6	2.4	2.7	4.1
Debt securities	3.2	-6.4	-13.7	-17.0	-15.6	-11.4
Shares and other equity	27.3	1.5	1.9	2.6	4.1	0.8
Insurance and pension schemes	34.1	2.3	2.8	4.1	3.1	2.9
Other	2.1	-6.7	-7.7	-0.5	-4.5	-10.7
Liabilities (annual rate of growth, in percent)	% share in total in 2016	0.5	-0.5	0.6	1.9	2.4
Loans	88.6	0.3	-0.5	0.1	1.3	2.2
of which: MFI loans	76.4	0.5	-0.1	-0.3	1.9	2.3
of which: loans from other sectors	12.2	-0.9	-3.1	2.4	-2.0	1.5
Other	11.4	2.9	0.1	4.6	6.5	4.5
Housing wealth (annual rate of growth, in percent)***		5.0	-3.2	-1.5	1.0	2.8
Net worth (annual rate of growth, in percent)***		4.3	-0.3	0.8	2.8	3.7
Leverage ratios (in percent)	average in 1999-2016					
Debt to GDP	57.0	62.3	61.1	60.0	58.6	58.1
Debt to disposable income	89.2	97.8	96.4	95.3	94.6	94.2
Net worth to disposable income	635.0	653.8	655.7	664.6	676.7	692.7
Debt to financial assets	31.9	34.7	33.2	32.0	31.2	30.8
Debt to housing assets	23.2	24.4	24.6	24.5	24.2	23.5
Gross interest payments to disposable income	2.5	2.1	1.7	1.4	1.1	0.9
Net interest receipts to disposable income	1.4	1.4	1.2	1.1	0.9	0.8
Debt reimbursements to disposable income	7.5	8.2	8.0	7.9	7.8	7.8

The level of details reported in the forecast report annex table: corporate sector

NON-FINANCIAL CORPORATIONS		2012	2013	2014	2015	2016
Financial assets (annual rate of growth, in percent)	% share in total in 2016	1.5	2.0	2.9	4.4	3.9
Deposits	11.2	4.6	5.0	1.8	4.7	6.7
Debt securities	0.9	-4.2	-9.6	-12.0	-15.1	-6.2
Shares and other equity	49.7	1.8	1.1	3.2	4.1	4.1
Other	38.2	0.8	2.8	3.3	5.5	3.2
Liabilities (annual rate of growth, in percent)	% share in total in 2016	1.1	0.6	1.6	2.4	1.9
Loans	30.6	-0.3	-1.3	2.6	2.0	1.5
of which: MFI loans	12.4	-3.4	-3.1	-0.1	0.1	2.3
of which: inter-company loans	7.9	1.9	-1.5	3.0	3.6	1.3
of which: loans from other sectors	10.2	3.3	1.9	6.4	3.2	0.5
Debt securities	4.0	13.4	7.7	3.7	3.4	7.0
Shares and other equity	52.6	1.3	1.8	1.7	3.0	1.7
of which: quoted shares	16.3	0.9	1.4	1.3	2.0	0.9
Other	12.8	0.8	-0.6	-1.5	1.2	2.2
of which: trade credits	8.7	na	-1.2	-0.7	1.2	4.7
Non-financial assets (annual rate of growth, in percent)***	3.4	2.2	1.0	1.5	1.0	1.1
Leverage ratios (in percent)	average in 1999-2016					
Debt to GDP	78.8	82.6	81.2	82.6	84.5	83.9
Debt to gross operating surplus	375.8	404.0	393.2	396.0	390.5	385.7
Debt to financial assets	80.1	82.4	77.8	75.7	72.5	70.5
Debt to equity	107.0	110.8	99.5	96.7	91.4	90.1
Net worth to gross operating surplus	678.1	715.3	755.0	768.7	768.3	782.1
Equity to net worth****	0.92	0.90	0.95	0.97	1.02	1.01
Gross interest payments to operating surplus	13.8	12.4	10.4	9.5	7.6	6.6
Net interest payments to operating surplus	5.4	4.1	3.3	3.0	2.4	2.1
Debt reimbursements to operating surplus	44.7	51.4	49.6	49.1	50.3	50.0

The level of details reported in the forecast report annex table: other variables

MEMORANDUM (annual rate of growth, in percent):	average in 1999-2016	2012	2013	2014	2015	2016
Total economy: net external asset position of euro area (% of GDP)	-17.5	-21.0	-19.3	-16.6	-15.4	-10.6
MFIs: loans to the non-financial private sector (annual rate of growth, in percent)	4.2	-1.3	-1.5	-0.2	1.1	2.3
MFIs: deposits held by the money-holding sectors (annual rate of growth, in percent)	4.9	3.6	1.1	1.9	2.8	3.0
MFIs: loans-to-deposits ratio (in percent)*****	88.9	84.0	79.9	77.5	75.7	74.6
MFI loans to the non-fin. private sector adjusted (annual rate of growth, in percent)	4.5	-0.6	-1.6	-0.6	1.0	2.2
MFI loans to households adjusted (annual rate of growth, in percent)	4.6	0.1	-0.3	0.1	1.4	2.0
MFI loans to non-financial corporations adjusted (annual rate of growth, in percent)	4.4	-1.5	-3.1	-1.5	0.5	2.3

** Includes also non-profit institutions serving households (NPISHs).

*** Average growth in 1999-2016.

**** Equity at market value and net worth at book value.

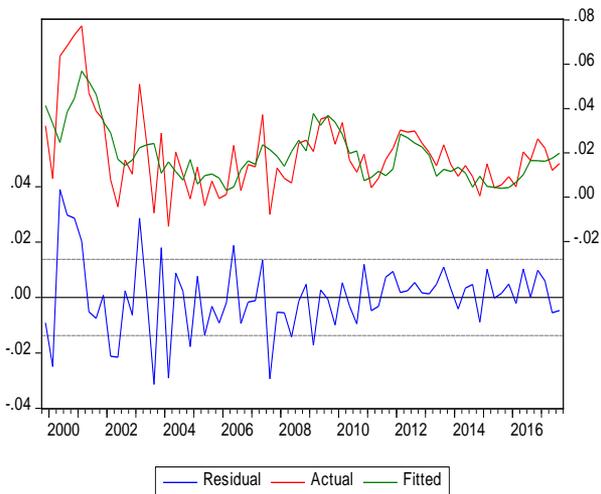
***** Including only money-holding sectors.

- **MFI loans to HHs & NFCs (BVAR):** *real GDP, GDP deflator, long-term and short-term nominal interest rates, loans to HHs, loans to NFCs, house prices, median NFC EDFs, bond market volatility;*
- **dlog nst of debt securities issued by NFCs:** *f(log nominal business investment(-1), log nst of debt securities(-1), change in cost of market-based debt, NFC credit supply shocks(-1), dlog nst of debt securities(-1));*
- **dlog nst of quoted shares issued by NFCs:** *f(log nominal GDP(-1), log nst of quoted shares(-1), change in cost of equity, NFC credit supply shocks(-1), dlog nst of M&A(-1), dlog nst of quoted shares(-1));*
- **dlog nst of unquoted shares issued by NFCs:** *f(dlog nominal GDP, cost of equity – cost of market-based debt, dlog nst of M&A(-1), dlog nst of unquoted shares(-1));*

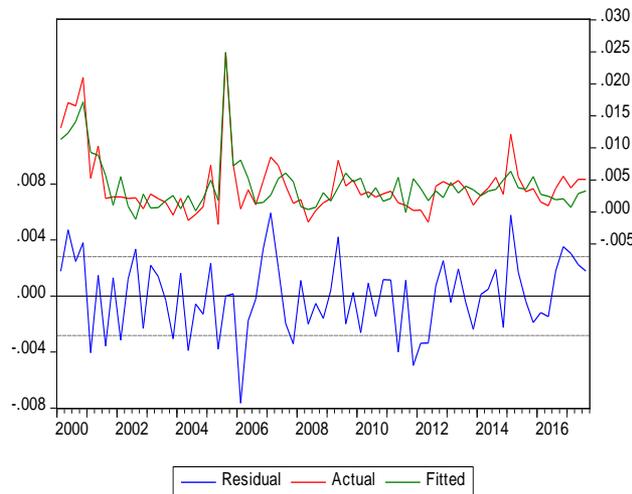
- **dlog nst of intercompany loans:** $f(\text{dlog nominal GDP, change in overall cost of financing, NFC credit supply shocks}(-1), \text{dlog nst of intercompany loans}(-1))$;
- **dlog nst of trade credit receivable/payable:** $f(\text{dlog nominal GDP, dlog nst of trade credit receivable/payable}(-1), \text{dlog nst of trade credit receivable/payable}(-2))$;
- **dlog nst of deposits held by NFCs and HHs:** $f(\text{log nominal fixed assets}(-1), \text{opportunity cost for holding liquid assets}(-1), \text{dlog NFC nominal gross value added}(-1) / \text{HH nominal gross disposable income}(-1), \text{change in opportunity cost for holding liquid assets}(-1), \text{change in financial market uncertainty}(-1), \text{dlog nst of deposits}(-1),$
- **dlog HH & NFC interest revenue/expenditure:** $f(\text{dlog interest bearing assets/liabilities, changes in short-term \& long-term market interest rates, lagged changes in interest revenue \& expenditure})$.

Models: actual and fitted values

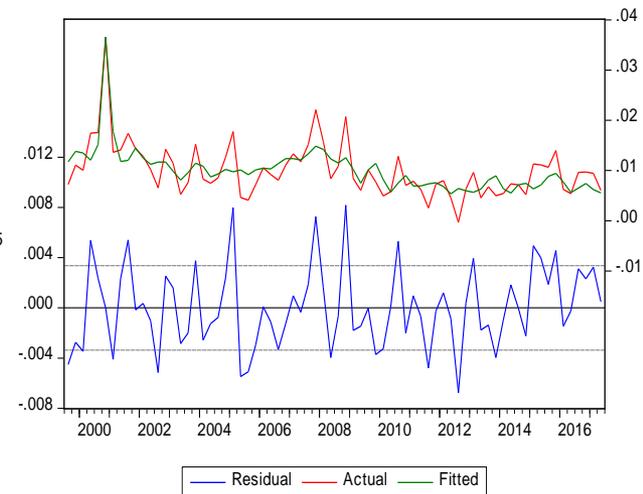
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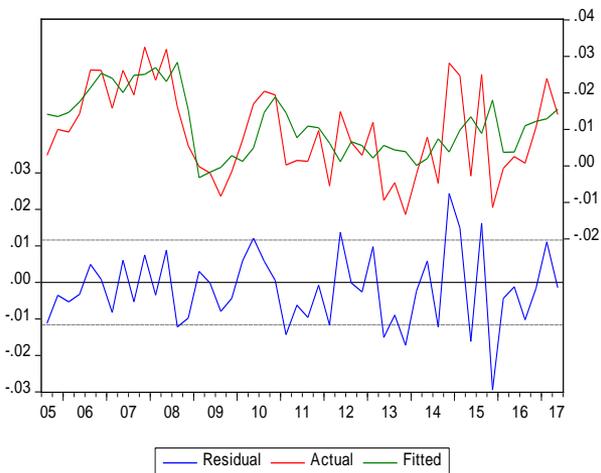
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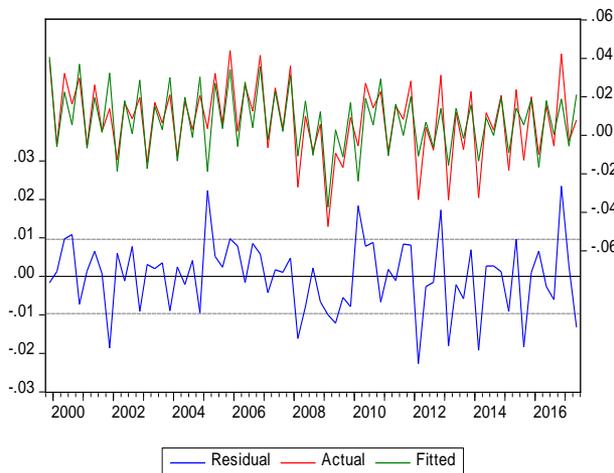
Unquoted shares issued by NFCs



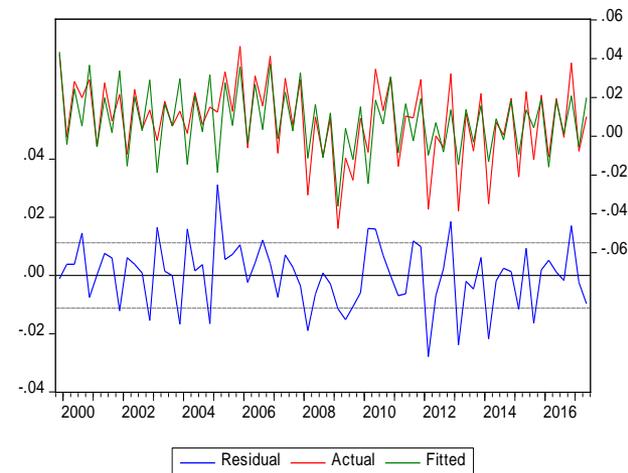
Intra-sectoral loans



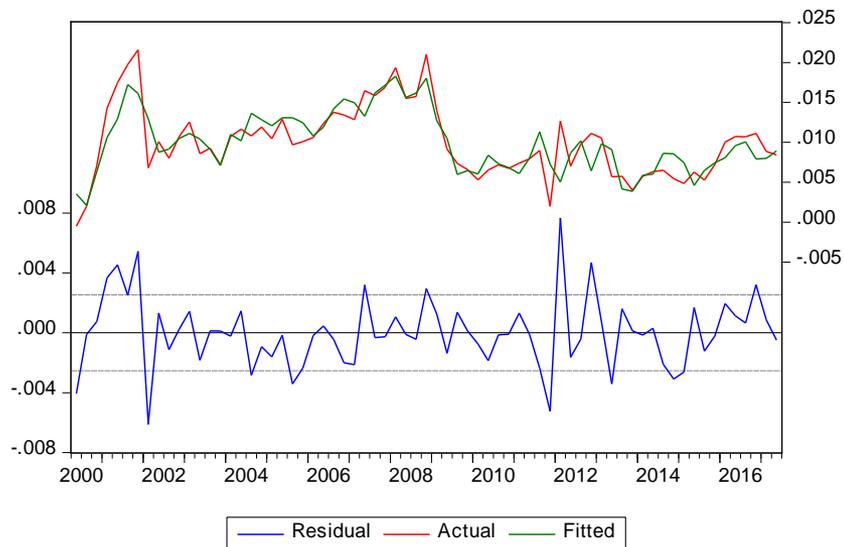
Trade credit receivable



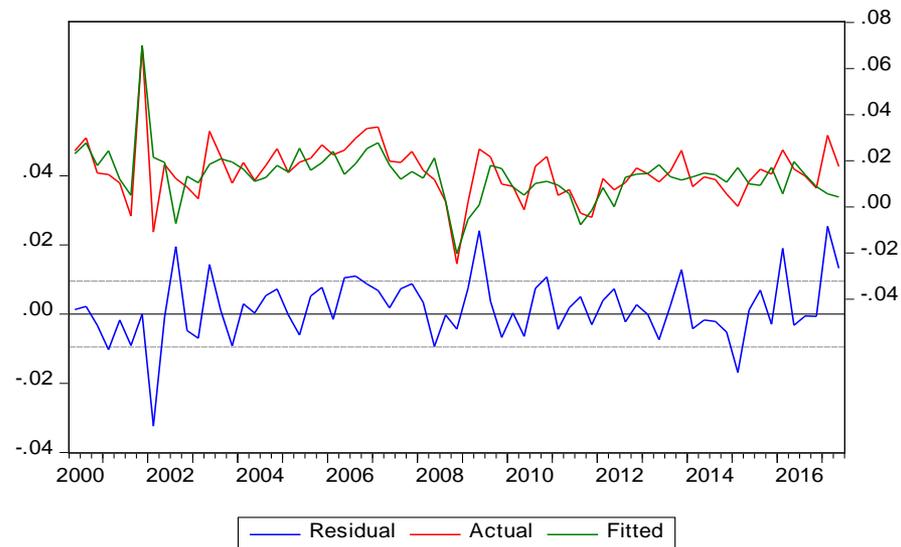
Trade credit payable



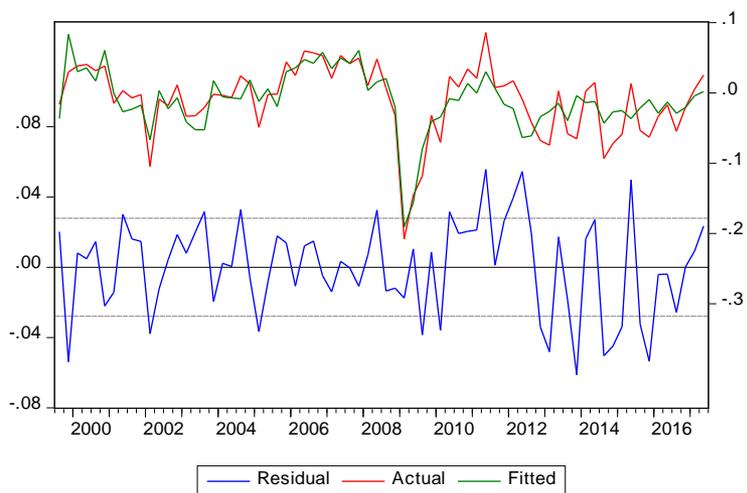
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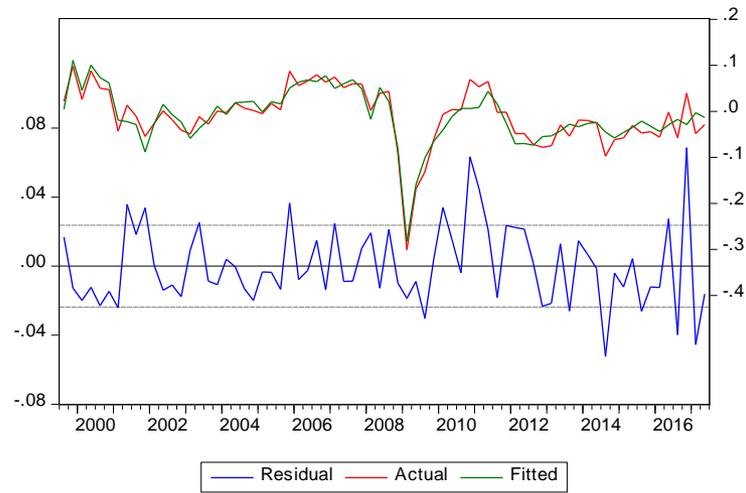
Deposits held by NFCs



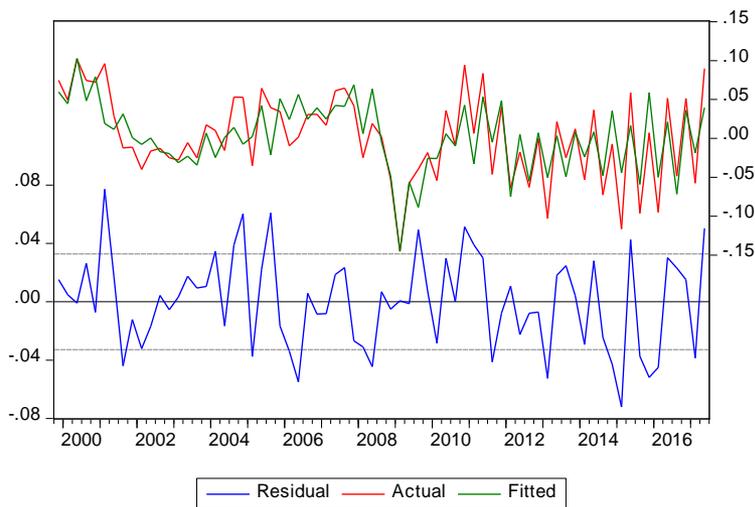
Interest received by households



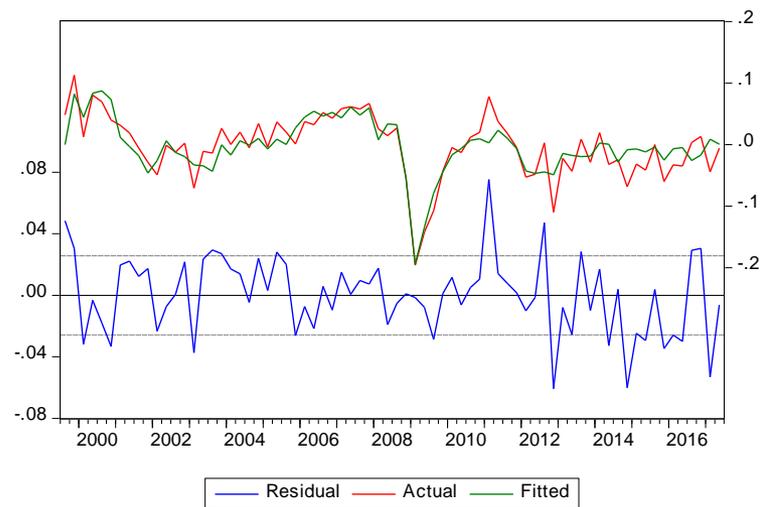
Interest paid by households



Interest received by NFCs

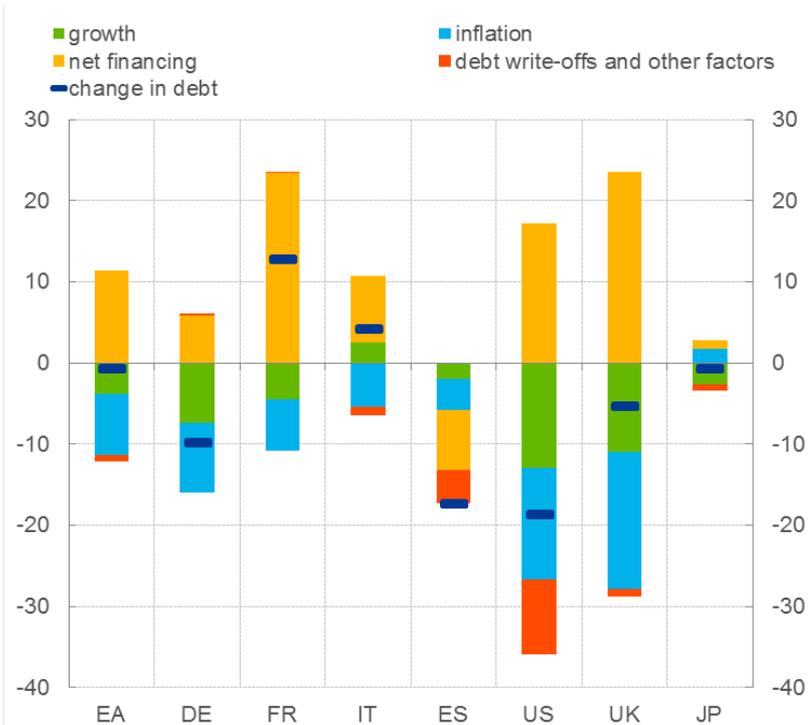


Interest paid by NFCs



Changes in private sector indebtedness in the EA and other major economies

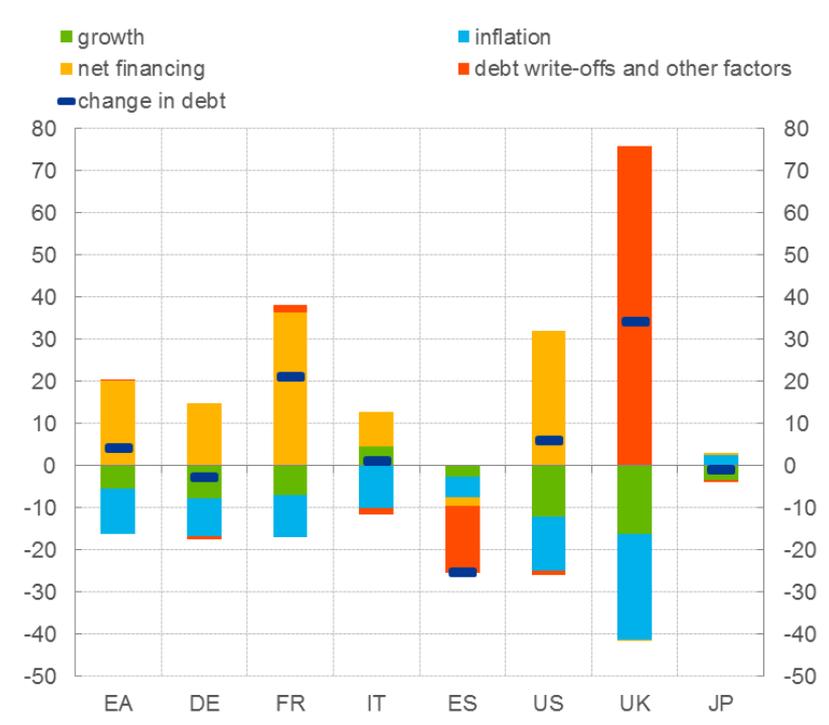
Change in household gross debt since mid-2007
(as a percent of nominal GDP; percentage point contributions)



Sources: Eurostat, ECB, Fed, ONS, Bank of Japan, ECB calculations.

Notes: Household debt includes total loans granted to households. Other factors include possible valuation effects and reclassifications. Latest obs: 2017 Q2 for the EA and 2017 Q1 for JP and the UK.

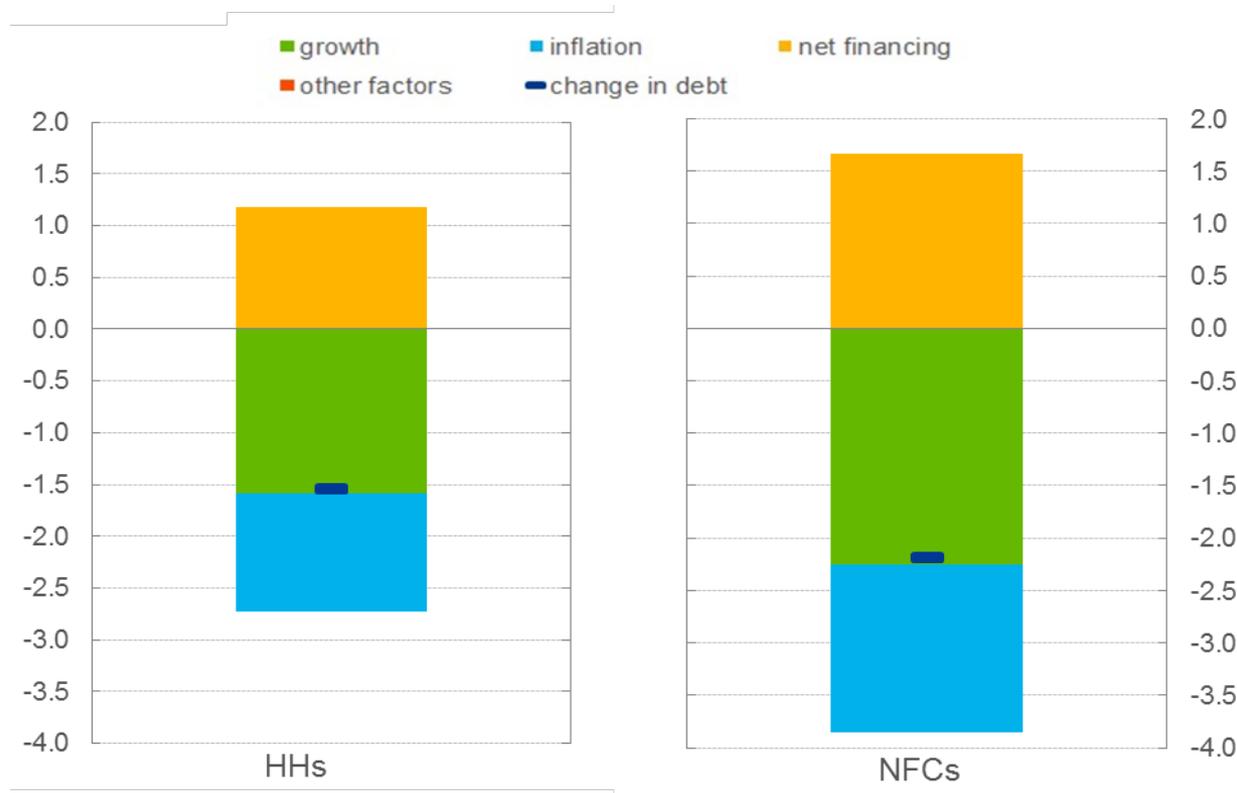
Change in consolidated NFC gross debt since mid-2007
(as a percent of nominal GDP; percentage point contributions)



Sources: Eurostat, ECB, Fed, ONS, Bank of Japan, ECB calculations.

Notes: Corporate debt and financing are defined as the sum of total loans granted to NFCs net of inter-company loans, debt securities issued and pension liabilities. Other factors include possible valuation effects and reclassifications. Latest obs: 2017 Q2 for the EA and 2017 Q1 for JP and the UK.

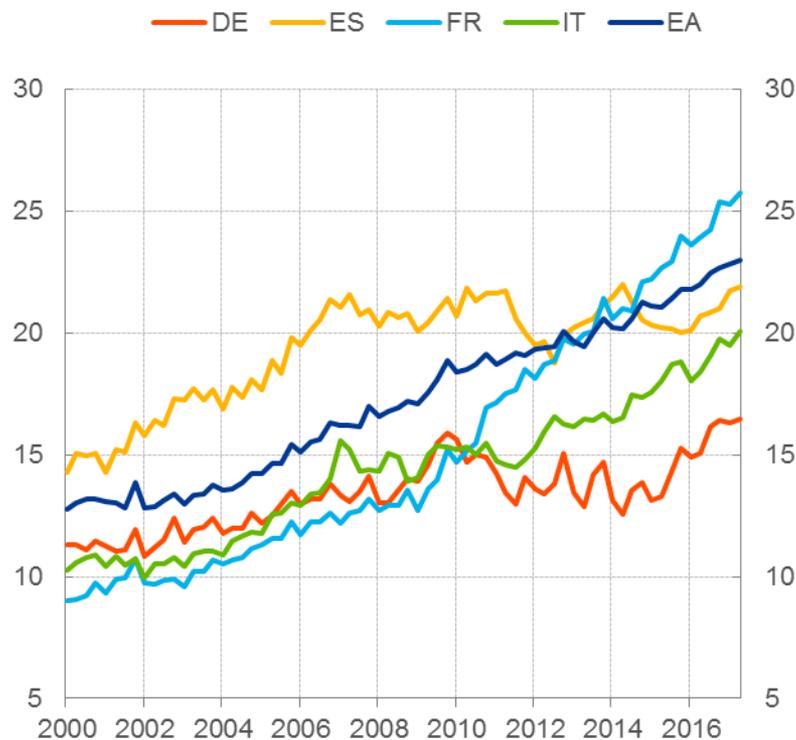
The estimated cumulative impact of ECB measures on the euro area private sector gross debt in 2015-19
(percentage points)



Source: ECB estimates.

NFC liquid asset holdings

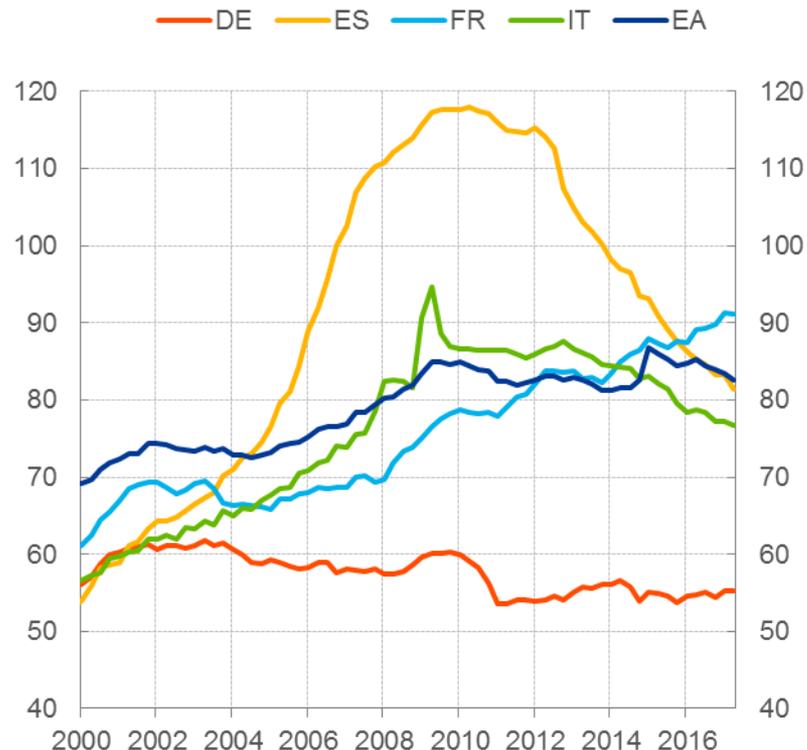
Liquid assets holdings of NFCs in selected EA countries
(percent of nominal GDP)



Sources: Eurostat, ECB.

Notes: Liquid assets include currency and deposits. Latest observation: 2017 Q2.

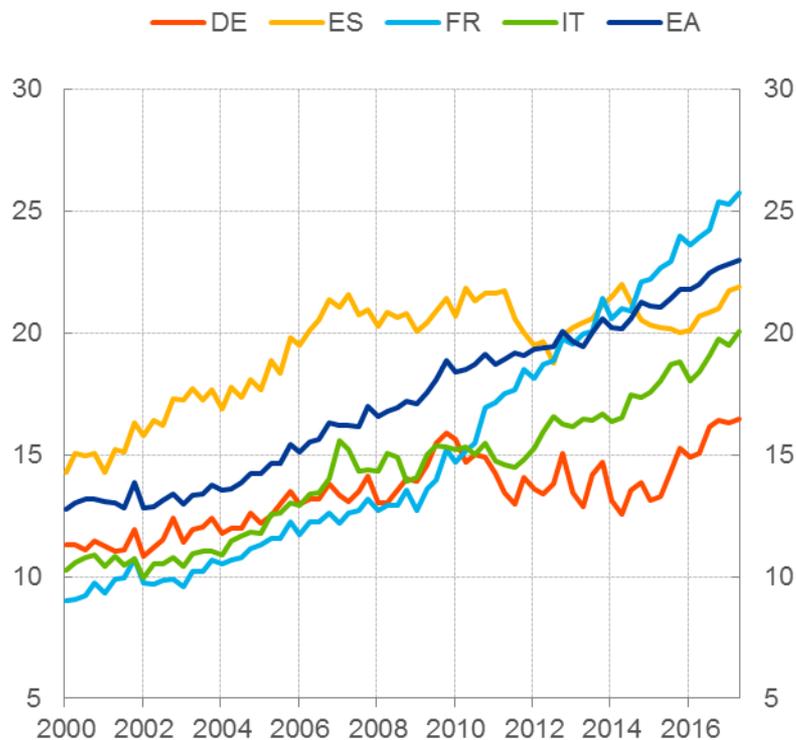
Consolidated gross debt of NFCs in selected EA countries
(percent of nominal GDP)



Sources: Eurostat, ECB.

Notes: Consolidated gross debt is defined as the sum of total loans granted to NFCs net of intra-sectoral loans, debt securities issued by NFCs and pension liabilities of NFCs. Latest observation: 2017 Q2.

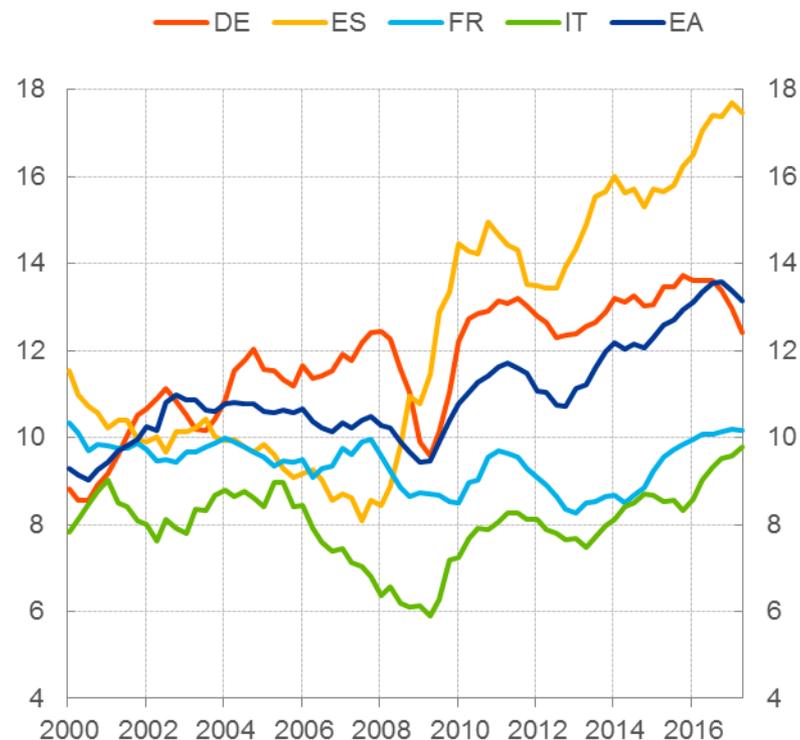
Liquid assets holdings of NFCs in selected EA countries
(percent of nominal GDP)



Sources: Eurostat, ECB.

Notes: Liquid assets include currency and deposits. Latest observation: 2017 Q2.

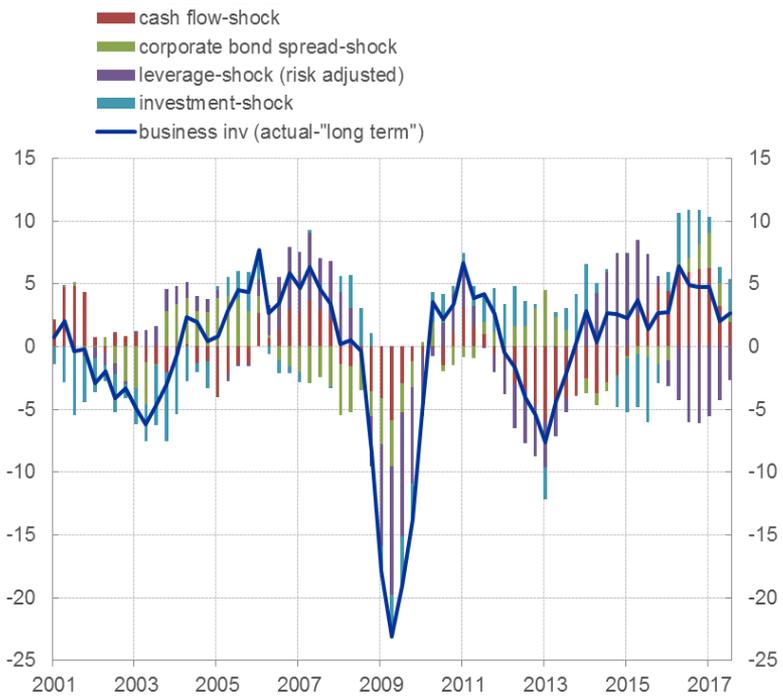
Retained earnings of NFCs in selected EA countries
(percent of nominal GDP)



Sources: Eurostat, ECB.

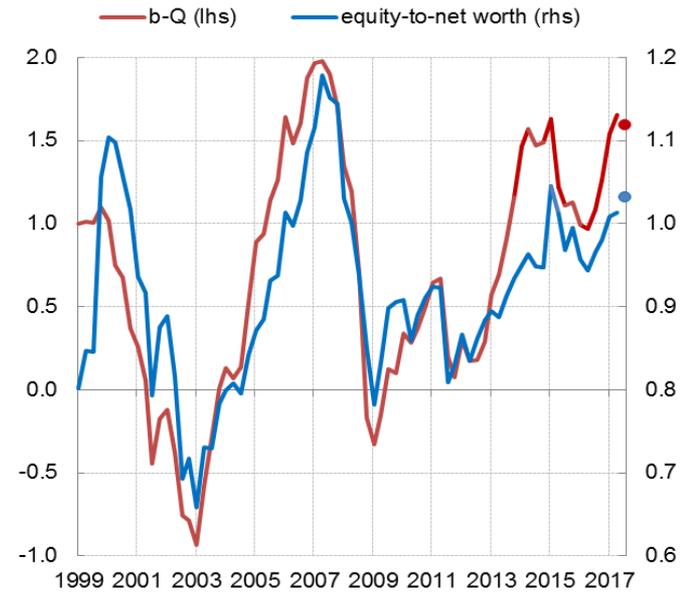
Notes: Retained earnings equals gross savings. Latest observation: 2017 Q2.

Historical decomposition of business investment in the euro area (annual percent changes; pp contributions)



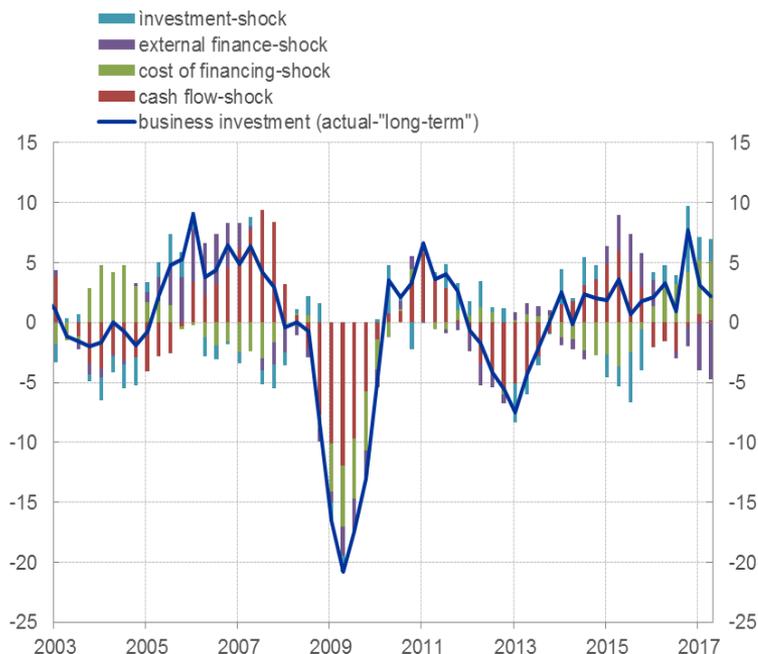
Source: ECB estimates.
 Notes: The chart reports the estimated contributions based on a VAR with four variables including real business investment, real NFC gross operating surplus, corporate bond spreads and risk-adjusted leverage with shocks identified with a Choleski decomposition. Sample period: 1999Q1-2017Q2. Latest observation: 2017 Q2. 2017 Q3 based on own estimates.

B-measure of Tobin's Q and equity-to-net worth for the euro area firms (lhs: index 1999Q1 =1; rhs: ratio)



Sources: Eurostat, ECB, Bloomberg (Merrill Lynch), Moody's KMV, ECB calculations.
 Notes: B-measure is based on Philippon QJE (2009). In both measures equity and debt are computed at market value, while net worth and real assets are calculated at book value. Latest observation: 2017 Q2. 2017 Q3 based on own estimates.

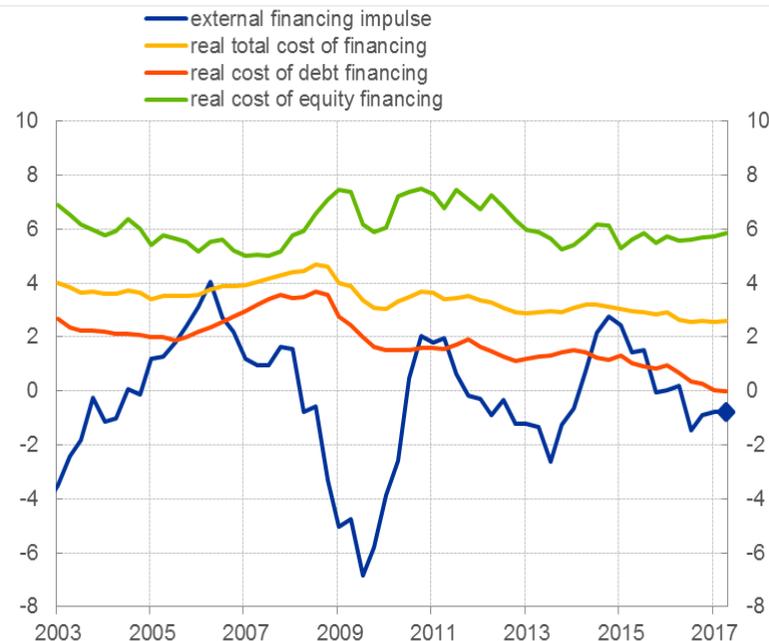
Historical decomposition of business investment in the euro area (annual percent changes; pp contributions)



Source: ECB estimates.

Notes: The chart reports the estimated contributions based on a VAR with four variables including real business investment, real NFCs' gross operating surplus, real overall cost of financing and external financing impulse with shocks identified with a Choleski decomposition. Sample period: 1999Q1-2017Q2. Latest observation: 2017 Q2.

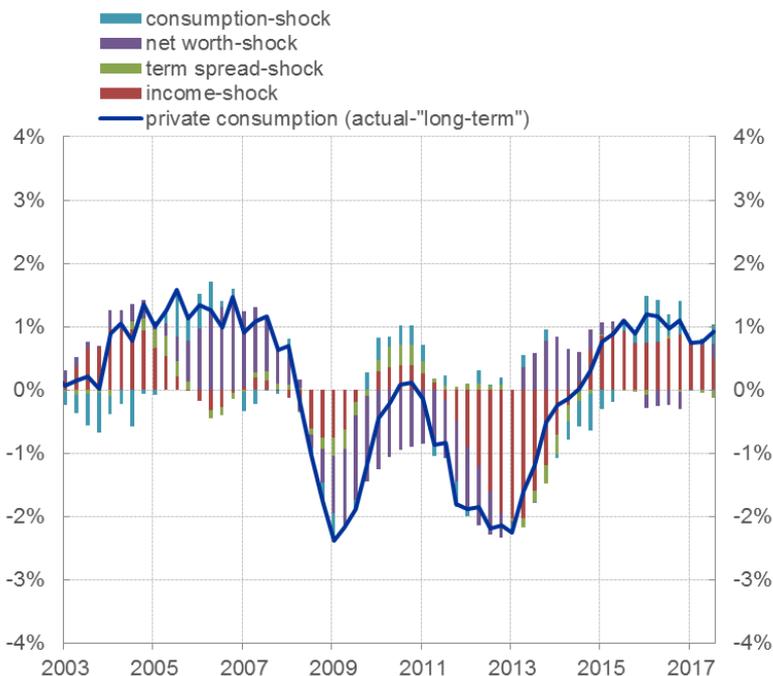
NFC external financing impulse and cost of financing (4-qtr mov. av. of y-o-y changes, percent per annum)



Sources: Eurostat, ECB, Merrill Lynch, Bloomberg, Thomson Reuters, ECB calculations.

Notes: Overall cost of financing for NFCs calculated as a weighted average of the cost of bank lending, the cost of market-based debt and the cost of equity, based on their respective amounts outstanding derived from the euro area accounts. Financing impulse is calculated as $Fl_t = 100 * ((Dt - Dt-1) / YEN_{t-1} - (Dt-4 - Dt-5) / YEN_{t-5})$, where D is the stock of external financing and YEN is nominal GDP. NFC external financing is defined as total liabilities of NFCs net of unquoted shares and other equity, financial derivatives and other accounts payable. Latest observation: 2017 Q3 for the financing costs and 2017 Q2 for the financing impulse.

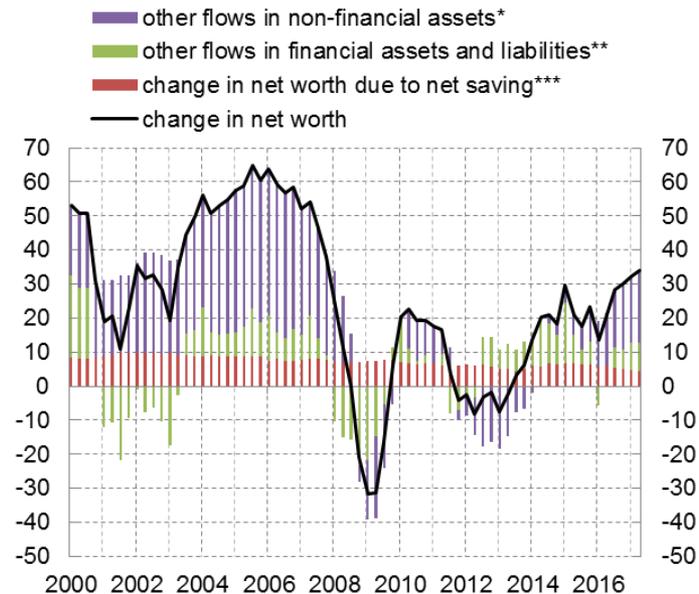
Historical decomposition of private consumption in the euro area (annual percent changes; pp contributions)



Source: ECB estimates.

Notes: The chart reports the estimated contributions based on a VAR with four variables including real private consumption, real household gross disposable income, term spread and household net worth with shocks identified with a Choleski decomposition. Sample period: 1999Q1-2017Q1. Latest observation: 2017 Q2. 2017 Q3 based on own estimates.

Change in the net worth of households (four-quarter sums; percentages of gross disposable income)



Sources: ECB, Eurostat. Notes:

* Mainly holding gains and losses on real estate (including land).
 ** Mainly holding gains and losses on shares and other equity.
 *** This item comprises net saving, net capital transfers received and the discrepancy between the non-financial and the financial accounts. Latest observation: 2017 Q2.