**EUROPEAN CENTRAL BANK**

EUROSYSTEM

Benoît Cœuré

Member of the Executive Board
European Central Bank

The transmission of the ECB's monetary policy in standard and non-standard times
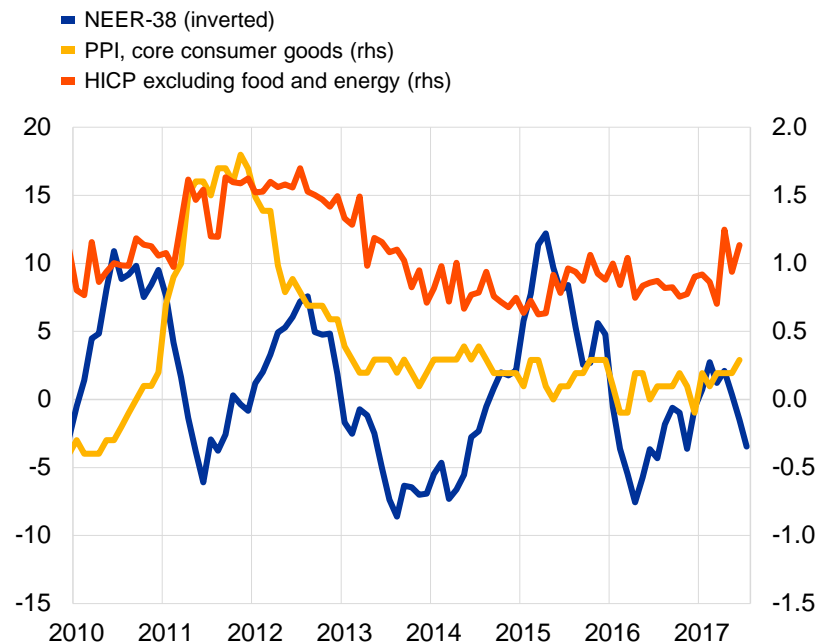
Frankfurt am Main,
11 September 2017

Transmission of exchange rate movements along the pricing chain

## Import price inflation and the nominal effective exchange rate
(annual percentage points)
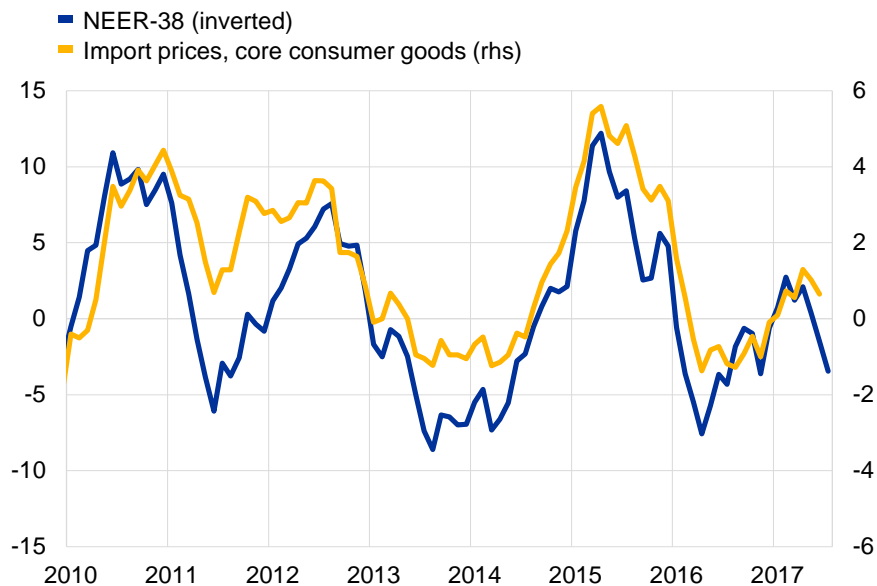
- NEER-38 (inverted)
- Import prices, core consumer goods (rhs)

Core HICP and PPI inflation and the nominal effective exchange rate
(annual percentage points)

- NEER-38 (inverted)
- PPI, core consumer goods (rhs)
- HICP excluding food and energy (rhs)

Sources: Haver Analytics and ECB staff calculations.
Latest observation: June 2017, NEER-38: July 2017.

Sources: Haver Analytics and ECB staff calculations.
Latest observation: June 2017, NEER-38: July 2017.

**Exchange rate pass-through to
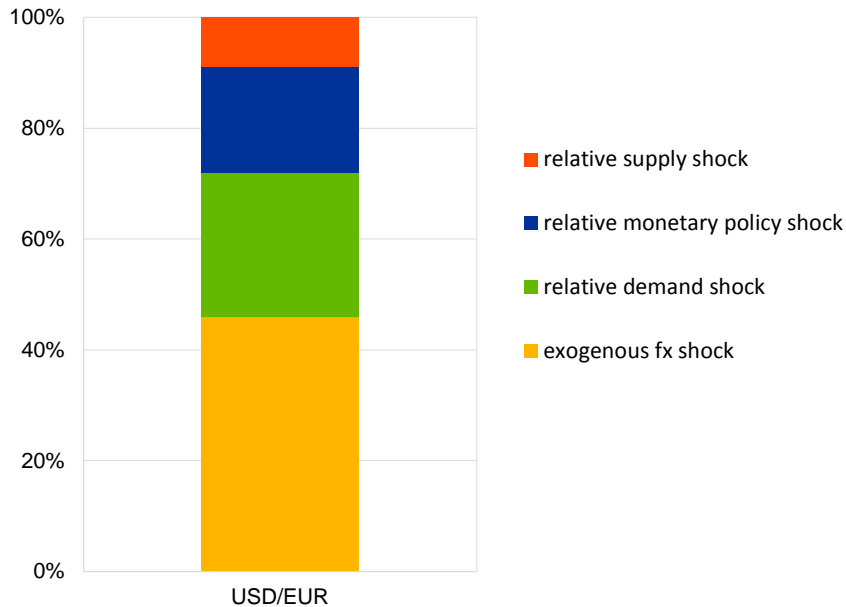HICP inflation over time**
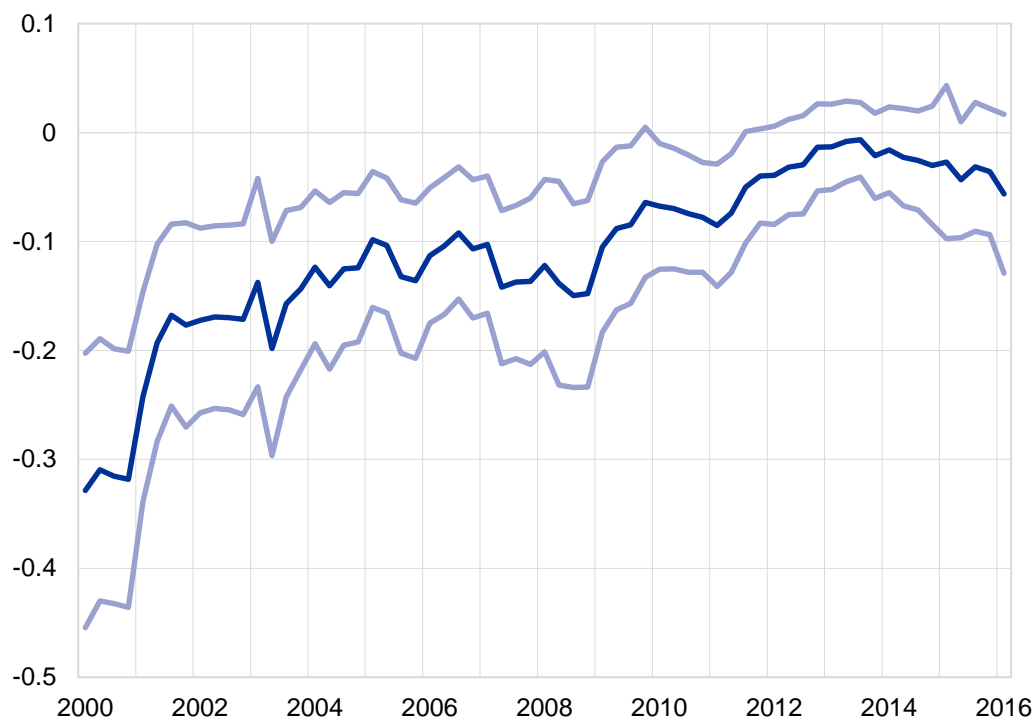
Sources: Eurostat and ECB staff calculations.
Notes: The chart shows the cumulated impulse response (dark blue line) of HICP inflation to a 1% appreciation in the NEER after three years over time and the respective 95% confidence bands (light blue lines). The cumulated impulse response is based on the updated estimation of Hahn (2003) over a 20-year rolling window from the first quarter of 1980 to the first quarter of 2016. Each point on the dark blue line refers to the end point of each 20-year rolling sample, with the first sample referring to the period from the second quarter of 1981 to the first quarter of 2000 and the last sample to the period from the second quarter of 1996 to the first quarter of 2016.

A state-dependent exchange rate pass-through

Historical variance decomposition of USD/EUR: 1999Q1-2017Q3
(percentage share)

Legend:
- relative supply shock
- relative monetary policy shock
- relative demand shock
- exogenous fx shock

Source: ECB staff calculations.
Notes: Estimates are based on a quarterly BVAR model of the USD/EUR exchange rate, relative euro area - US GDP, relative euro area - US CPI and relative shadow interest rates, identified via sign restrictions over the period 1999Q1-2017Q3 (with 2017Q3 proxied by July data and nowcast estimates of GDP).
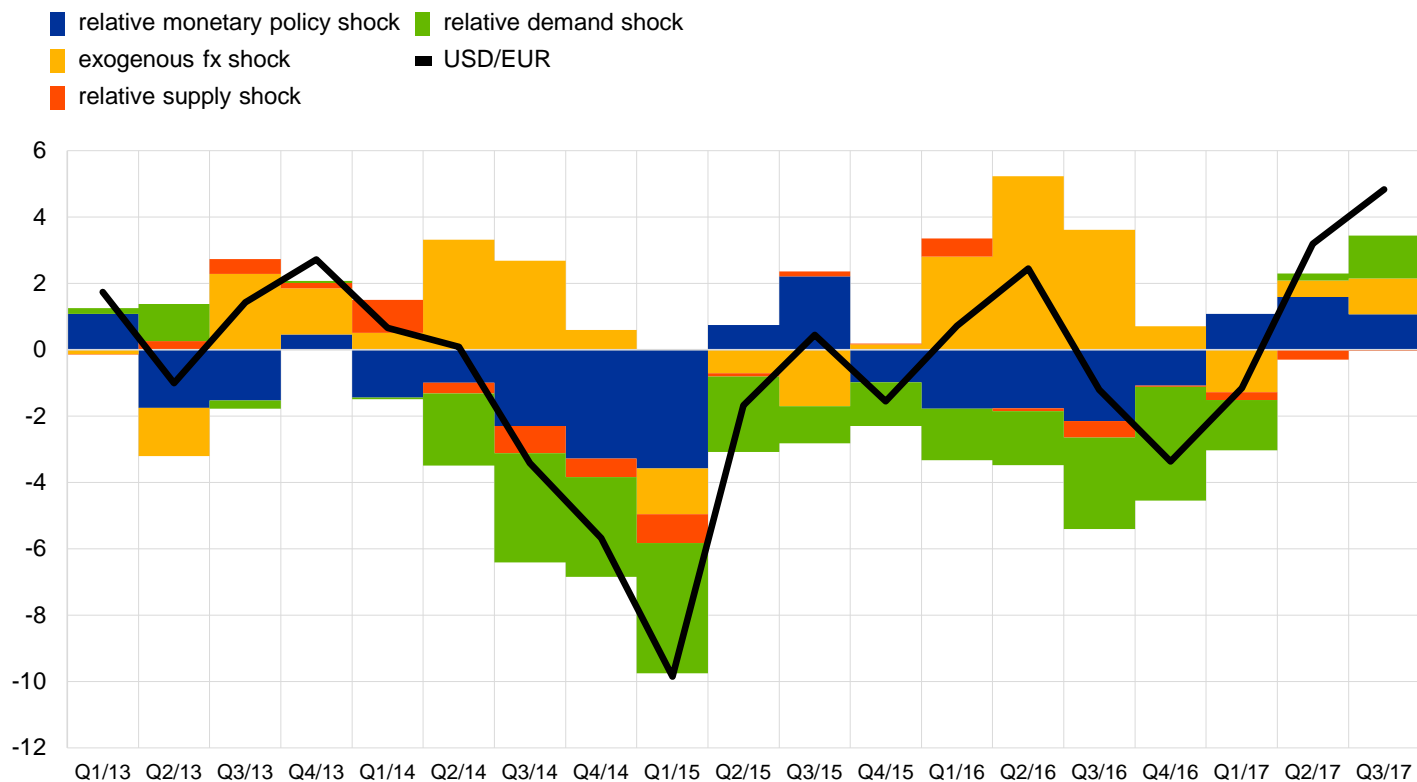
Response of core HICP to different shocks normalized to a 1% appreciation of USD/EUR
(yoy percentage changes, not cumulated)
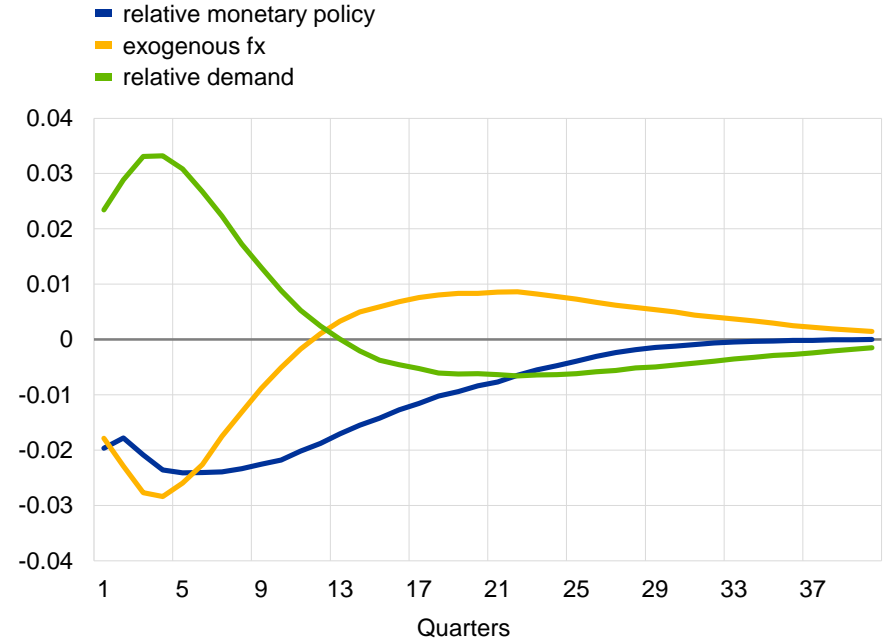
Legend:
- relative monetary policy
- exogenous fx
- relative demand

Source: ECB staff calculations.
Notes: Estimates are based on a quarterly BVAR model of the USD/EUR exchange rate, relative euro area - US GDP, relative euro area - US CPI, relative shadow interest rates and core EA HICP, identified via sign restrictions over the period 1999Q1-2017Q2.

Historical decomposition of euro exchange rate against the US dollar
(percentage quarterly contributions, not cumulated)

Legend:
- relative monetary policy shock
- exogenous fx shock
- relative supply shock
- relative demand shock
- USD/EUR

Source: ECB staff calculations.
Notes: Estimates are based on a quarterly BVAR model of the USD/EUR exchange rate, relative euro area - US GDP, relative euro area - US CPI and relative shadow interest rates, identified via sign restrictions and estimated over the period 1999Q1-2017Q3.
Latest observation: Q3 2017 (proxied by July data and nowcast estimates of GDP).

**Response of core HICP following the
2017Q3 appreciation of USD/EUR**
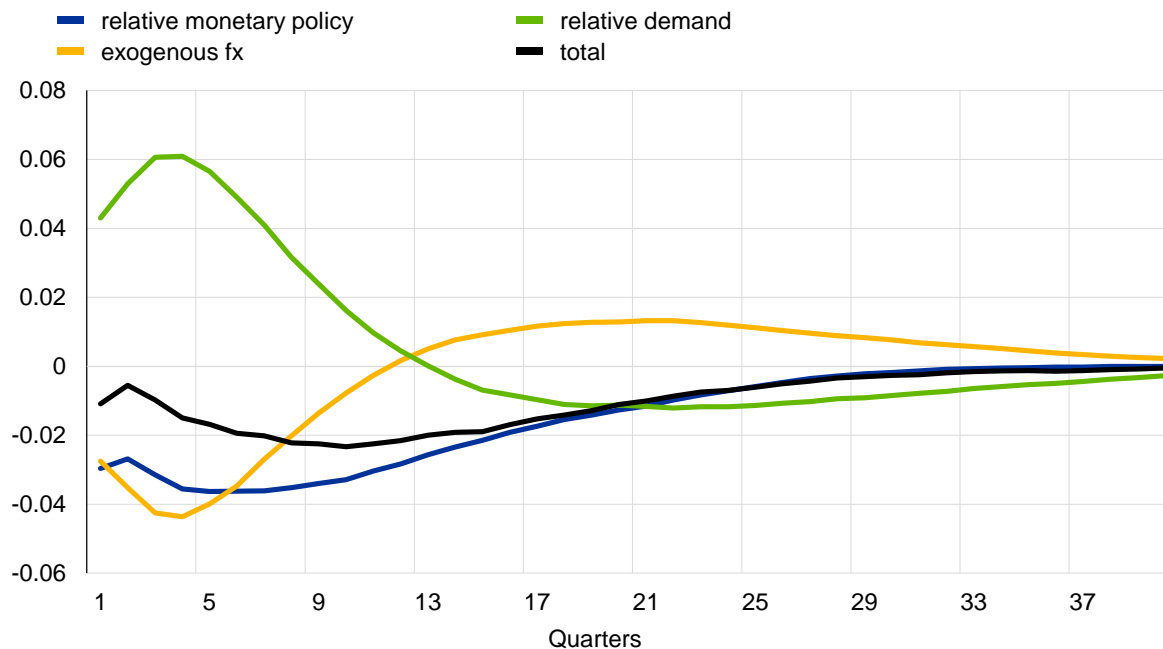*(yoy percentage changes, not cumulated)*

Source: ECB staff calculations.
Notes: Estimates are based on a quarterly BVAR model of the USD/EUR exchange rate, relative euro area - US GDP, relative euro area - US CPI, relative shadow interest rates and core EA HICP, identified via sign restrictions over the period 1999Q1-2017Q2. The impulse response functions are rescaled to reflect the appreciation of the euro exchange rate on impact by a magnitude consistent with the contribution of the specific shocks in driving the euro appreciation in 2017Q3 based on the historical decomposition estimates for that quarter. The '2017Q3 appreciation' refers to the change in the USD/EUR from July 2017 compared to its average in 2017Q2.

US Treasury and Bund yield differential (inverted) and USD/EUR

- 10-year US Treasury-Germany bund (lhs; basis points, inverted scale)
- USD/EUR
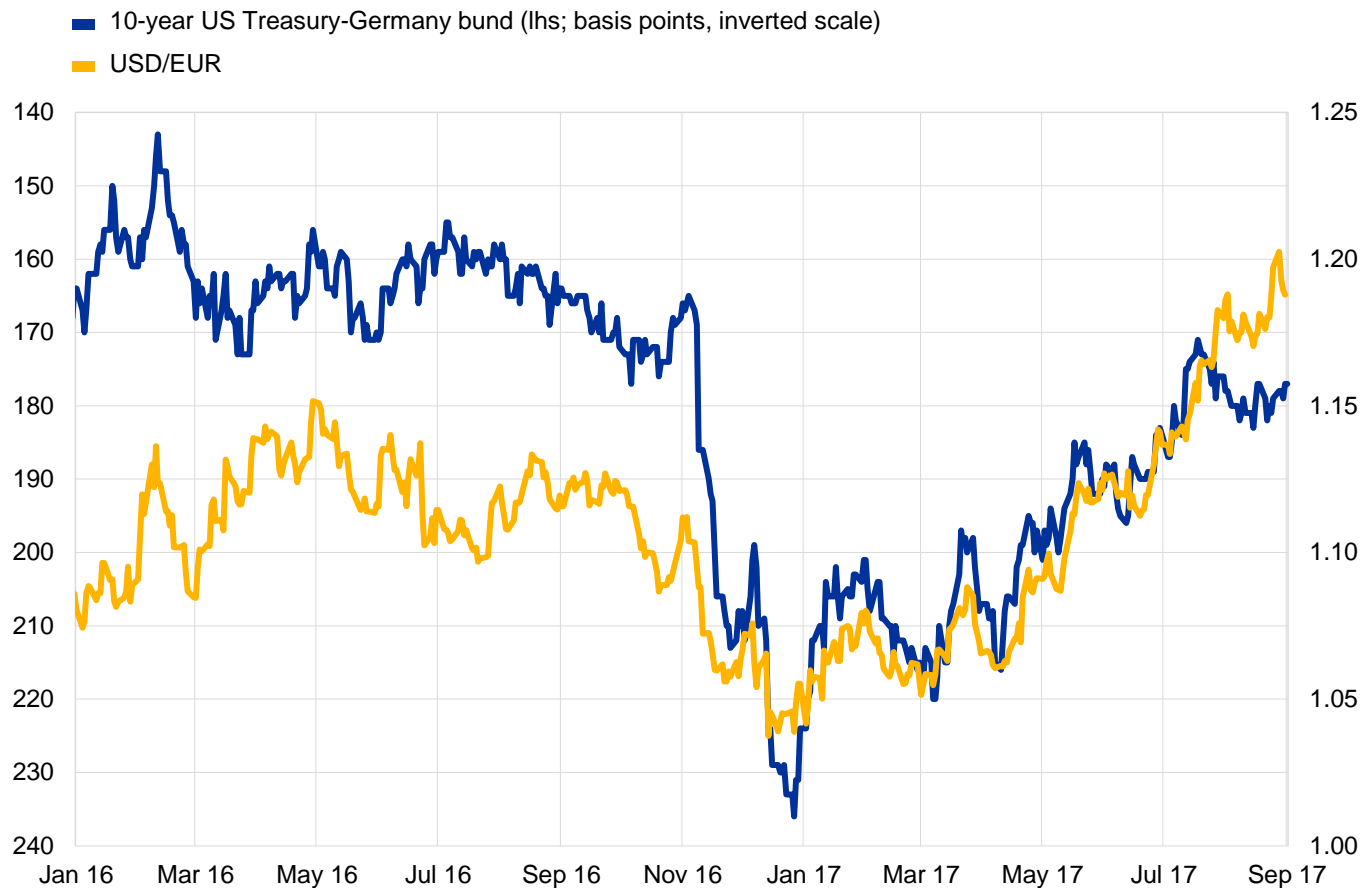
Sources: Haver Analytics and ECB staff calculations.
Latest observation: 01/09/2017.

Estimated coefficients of a euro area New Keynesian IS curve

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lagged output	0.98***	0.96***	0.97***	0.98***	0.96***	0.96***	0.96***	0.91***	0.98***	0.98***
	(0.04)	(0.03)	(0.07)	(0.04)	(0.05)	(0.03)	(0.03)	(0.07)	(0.04)	(0.04)
Output expectations							0.11**	0.07		
							(0.04)	(0.08)		
Real ex ante interest rate gap	-0.06			-0.02						
	(0.07)			(0.08)						
Real ex post interest rate gap		-0.01								
		(0.06)								
Real ex ante interest rate			-0.01							
			(0.11)							
Real ex ante shadow rate gap					0.00					
					(0.04)					
Real ex ante bank rate gap						-0.13*	-0.31***	-0.31**		
						(0.07)	(0.10)	(0.13)		
FCI									0.19***	0.09*
									(0.05)	(0.05)

Source: ECB staff calculations.
Notes: Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Sample: 1999Q1 to 2017Q2 except specifications (4) and (8), which are 1999Q1-2008Q2 and 2010Q1-2017Q2 respectively and specifications (9) and (10), which are 2005Q1 to 2017Q2 due to data availability.