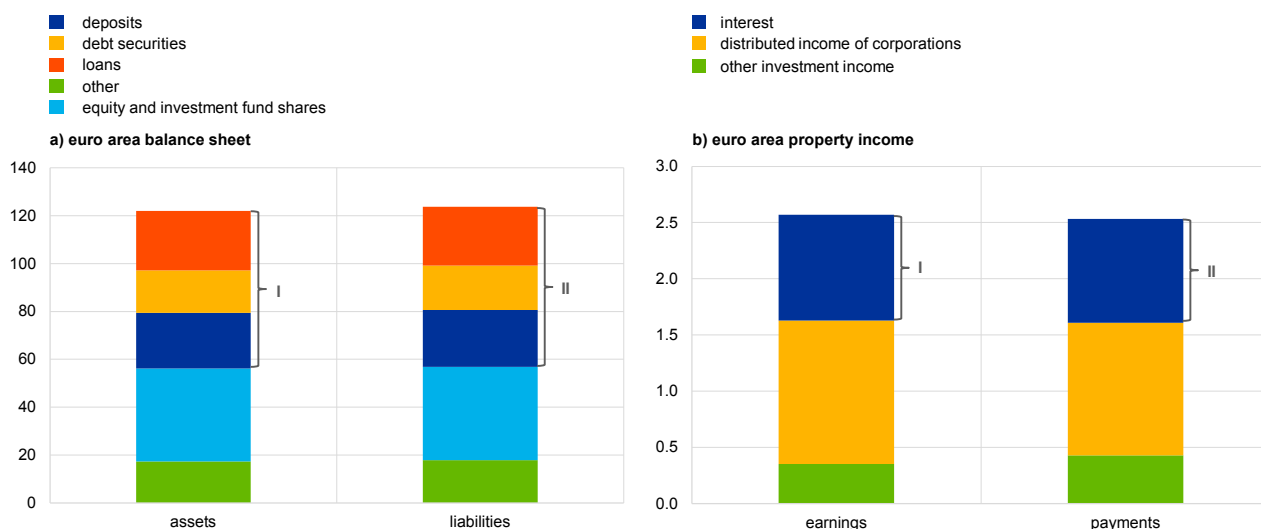


3 Lower interest rates and sectoral changes in interest income

This box describes the impact of the decline in interest rates on interest income across sectors since 2008. It focuses on interest-bearing assets and liabilities, such as deposits, debt securities and loans (Chart A).⁸

Chart A
Euro area balance sheet and euro area property income

(EUR trillions)



Sources: Eurostat and ECB calculations.

Notes: Data refer to 2016 for the euro area total economy. I and II in panels (a) and (b) indicate the interest-bearing assets and liabilities part of the euro area balance sheet and the corresponding interest earnings and payments of the euro area property income.

Sectoral holdings of interest-bearing assets/liabilities and interest earnings/payments allow sector-specific implicit interest rates to be computed.

Chart A shows the balance sheet of the total euro area economy and the interest earnings and payments of the total euro area economy.⁹ At the sectoral level (households, non-financial corporations (NFCs), financial corporations, government and the rest of the world), this information allows the calculation of sector-specific implicit interest rates on interest-bearing assets and liabilities. The implicit interest rate on assets, for example, is obtained by dividing interest earnings by the notional stock of assets, i.e. free of valuation effects. Notional stocks can be obtained by cumulating quarterly transactions over time. Owing to the way interest earnings and

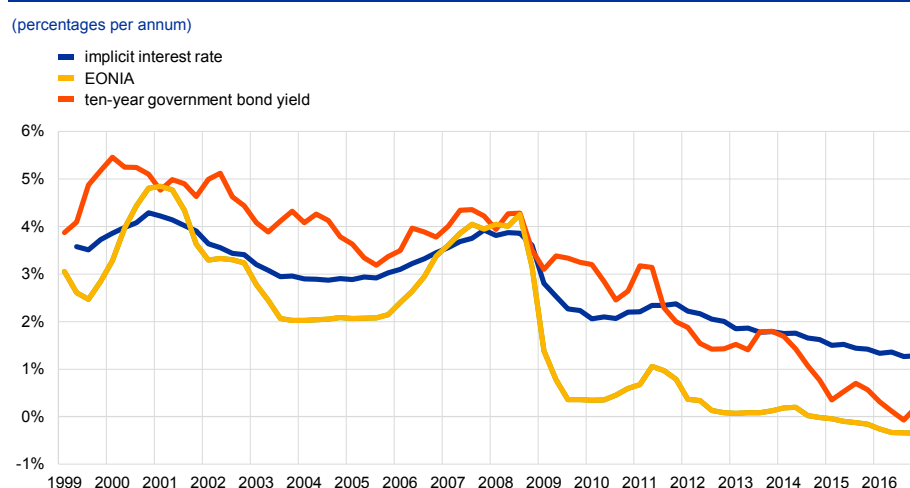
⁸ The analysis builds on an established literature using the sectoral accounts to assess the distributional impact of monetary policy. Bach and Ando (1957), Cukierman et al. (1985) and, more recently, Doepke and Schneider (2006), for example, assess the impact of fluctuations in prices and interest rates on income and wealth. See Bach, G. and Ando, A., "The Redistributive Effects of Inflation", *The Review of Economics and Statistics*, Vol. 39, No 1, 1957, pp. 1-13; Cukierman, A., Lennan, K. and Papadia, F., "Inflation-induced redistributions via monetary assets in five European countries: 1974-1982", in Mortensen, J. (ed.), "Economic Policy and National Accounting in Inflationary Conditions", *Studies in Banking and Finance*, Vol. 2, 1985; and Doepke, M. and Schneider, M., "Inflation and the Redistribution of Nominal Wealth", *Journal of Political Economy*, Vol. 114, No 6, 2006, pp. 1069-1097.

⁹ The analysis uses interest earnings and payments after allocation of financial intermediation services indirectly measured (FISIM). Conclusions do not depend on this choice.

payments are measured in the sectoral accounts, the implicit interest rate is conceptually close to a bond yield at issuance.¹⁰ Chart B shows that the implicit interest rate for the euro area's assets is closely related to the euro area overnight interest rate (EONIA) and the long-term government bond yield. Because monetary policy closely determines the current and expected overnight interest rate, the ECB's policy ultimately also influences interest rates on interest-bearing assets at the sectoral level. However, the extent to which changes in the current and expected overnight interest rate are transmitted to sectoral interest rates will also depend on developments in sector-specific risk premiums and the average duration of outstanding interest-bearing assets.¹¹

Chart B

EONIA, long-term government bond yield and an estimate of the implicit interest rate for the total economy



Sources: Thomson Reuters, ECB and ECB calculations.
 Notes: The latest observations are for the fourth quarter of 2016. The implicit interest rate shown is on the euro area total economy's assets. The implicit interest rate on the euro area total economy's liabilities coincides with the one on its assets. The ten-year government bond yield refers to the synthetic euro area rate from Thomson Reuters.

The implicit interest rate can be used to compute the contribution from lower interest rates to the observed changes in net interest income since 2008. This is obtained by multiplying the implicit interest rate by the notional stock of assets at the start of the period. In this way, one can ensure that the change in interest earnings since the start of the period under consideration depends only on changes in the interest rate ("price effect"). A similar calculation is done on the liability side of the balance sheet. Changes in the stock of assets also affect the overall change in interest income ("quantity effect"). The latter is excluded from the analysis in order to be able to measure how changes in interest rates alone have redistributed interest income across sectors. The starting point of the analysis is the third quarter of 2008, which marks the beginning of the current easing phase.

¹⁰ See *European system of accounts – ESA 2010*, Eurostat, 2013.

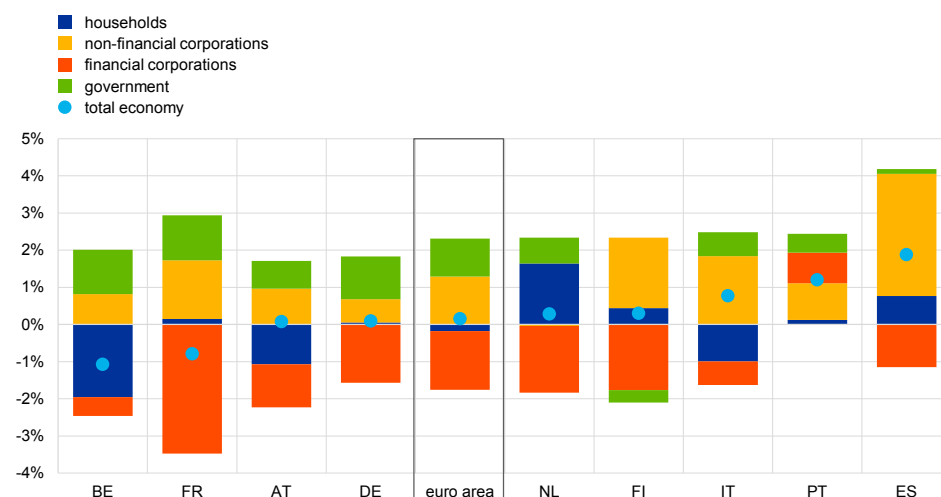
¹¹ From 2014 onwards, the ten-year government bond yield has been persistently below the total economy's implicit interest rate, since changes in the spot rate are only slowly reflected in the implicit interest rate on outstanding assets with a relatively long duration.

For the euro area as a whole, the impact of lower interest rates on net interest income has been positive. Chart C shows the change in net interest income from lower interest rates between the third quarter of 2008 and the fourth quarter of 2016 for the euro area as a whole and for nine euro area countries.¹² As households are also indirectly affected by lower interest rates via their investments in pension funds, their equity holdings in companies or as tax payers, it is worth looking at how the total economy has been affected with respect to the rest of the world. For the euro area as a whole, and for most euro area countries, the impact of lower interest rates on net interest income has been marginally positive at the total economy level. The sectoral analysis makes it clear that the size and composition of sectoral balance sheets are key factors in understanding the impact of lower interest rates on the total economy. Chart C shows that, for the euro area as a whole, the impact of lower interest rates on net interest income was positive for the NFC and government sectors, while it was negative for the financial sector. For the household sector, the impact was broadly neutral.

Chart C

Impact of lower interest rates on net interest income

(percentages of GDP; Q3 2008 to Q4 2016)



Sources: Eurostat and ECB calculations.

Notes: Countries selected on the basis of availability of quarterly sectoral accounts. The total economy refers to the changes in net interest income with respect to the rest of the world. Owing to different levels of aggregation, the sum of the sectoral changes in net interest income does not add up exactly to the change in net interest income with respect to the rest of the world. Calculations based on four-quarter moving averages.

The direct impact of lower interest rates on the household sector has been more heterogeneous across countries.¹³ Chart C shows that the household sector in Finland, the Netherlands and Spain has benefitted from lower interest rates, i.e. in these countries, net interest earnings attributable to falling interest rates increased. This is because the size of household debt has been particularly large in these countries compared to the size of assets held by households. Moreover, the

¹² The selection of countries is motivated by the availability of quarterly sectoral accounts over the sample period.

¹³ See the box entitled "Low interest rates and households' net interest income", *Economic Bulletin*, Issue 4, ECB, 2016.

prevalence of variable rate mortgages (e.g. in Spain) also increased the gains from lower interest rates. By contrast, in Belgium, Austria and Italy, households saw larger falls in net interest income. In these countries, households hold a relatively large share of their financial wealth in the form of interest-bearing assets. In Germany, France and Portugal, the change in net interest income of the household sector was negligible.¹⁴

While the NFC and government sectors are among the largest beneficiaries of lower interest rates, the financial sector generally lost interest income. In the NFC sector, gains above 1% of GDP in net interest income from lower interest rates occurred in France, Finland, Italy and Spain. The government sector benefited most from lower interest rates in Belgium, France and Germany. In the countries that were hardest hit by the sovereign debt crisis, the government sector gained relatively less from the drop in interest rates, owing to the simultaneous increase in sovereign risk premiums. Finally, with the exception of Portugal, the financial sector has generally been losing interest income since the third quarter of 2008, most prominently in France. This is due to the fact that the financial sector (including monetary financial institutions, insurance corporations and pension funds, and other financial institutions) has on average more interest-bearing assets than interest-bearing liabilities. When interest rates on assets and liabilities decline to the same extent, this reduces the sector's net interest income. Note, however, that interest income is not the only determinant of the profitability of the financial sector.¹⁵

Over the previous business cycle, sectoral changes in net interest income were largely neutral. This box has focused on the impact of the falling interest rates since 2008. It may be useful to compare these results with the previous business cycle from 2002 to 2008, as seen in Chart B. Chart D shows that, over the period 2002-2008, the redistribution of interest income was, ultimately, largely neutral across sectors.¹⁶ It also shows that, during the previous easing phase (2002-2005), the direction of changes in interest income across sectors was very similar to the pattern of changes since 2008. During the period 2002-2008, household and total economy net interest income was broadly unchanged. In the tightening phase (2006-2008), financial corporations recovered most of their net interest income losses, while NFCs saw a reversal of their gains. The government sector continued to benefit even beyond the end of the tightening phase. This is explained by the secular downward trend in government bond yields (see also Chart B), which started in the mid-1980s and is unrelated to the cyclical changes in interest rates from 2002 to 2008.

¹⁴ While the sectoral accounts contain useful information about the redistribution across sectors, they cannot answer questions about how low interest rates redistribute interest income across individual households. For this, microeconomic information on the size and composition of individual households' balance sheets is needed (e.g. from the Eurosystem's Household Finance and Consumption Survey). See "The Household Finance and Consumption Survey: results from the second wave", *Statistics Paper Series*, No 18, ECB, 2016.

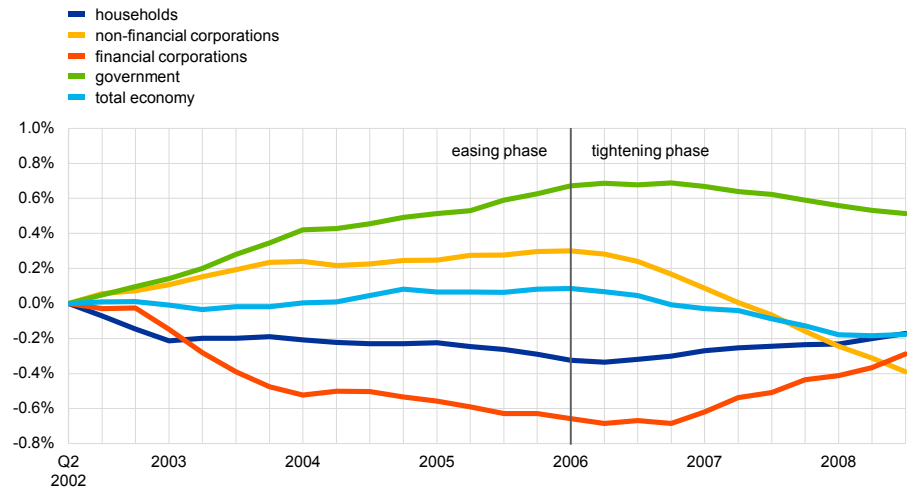
¹⁵ See the box entitled "The ECB's monetary policy and bank profitability", *Financial Stability Review*, ECB, November 2016.

¹⁶ The period covered contains both the previous easing phase (2002-2005) and the previous tightening phase (2006-2008).

Chart D

Cumulative interest income changes over the business cycle – 2002-2008

(percentages of GDP)



Sources: Eurostat and ECB calculations.

Notes: Cumulative change in the price effect derived from lower interest rates from the second quarter of 2002 to the third quarter of 2008 based on four-quarter moving averages. The total economy refers to the changes in net interest income with respect to the rest of the world. The vertical line separates the easing phase from the tightening phase.