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Research Report

The effects of ultra-loose monetary policies on inequality

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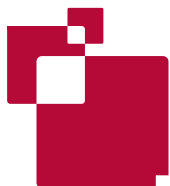
THE EFFECTS OF ULTRA-LOOSE MONETARY POLICIES ON INEQUALITY

GRÉGORY CLAEYS, ZSOLT DARVAS, ÁLVARO LEANDRO AND
THOMAS WALSH

Highlights

- Low interest rates, asset purchases and other accommodative monetary policy measures tend to increase asset prices and thereby benefit the wealthier segments of society, at least in the short-term, given that asset holdings are mainly concentrated among richest households.
- Such policies also support employment, economic activity, incomes and inflation, which can benefit the poor and middle-class, which have incomes more dependent on employment and which tend to spend a large share of their income on debt service.
- Monetary policy should focus on its mandate, while fiscal and social policies should address widening inequalities by revising the national social redistribution systems for improved efficiency, intergenerational equity and fair burden sharing between the wealthy and poor.

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GRÉGORY CLAEYS, ZSOLT DARVAS, ÁLVARO LEANDRO AND THOMAS WALSH, JUNE 2015

1 INTRODUCTION

Since 2008, all major central banks have engaged in monetary easing through conventional interest rate cuts, and through unconventional measures, such as asset purchases, long-maturity lending and forward guidance about intended future monetary policy actions. We call these unconventional measures 'ultra-loose monetary policies' (ULMP). Such measures have increased significantly the size, and changed the composition of, the central banks' balance sheets¹. The main reason for these various unconventional policies and low interest rates is that central banks try to set interest rates at, or around the so-called 'natural rate' of interest, a level consistent with low and stable inflation and with an economy near its potential. In the last few years, the too-low and below-target inflation, low inflation expectations, the low level of capital utilisation and the high level of unemployment suggest that the natural rate of interest has been well below the policy rate, which has been constrained by the zero lower bound.

While these various monetary easing measures are justified from a macroeconomic perspective, and in fact the European Central Bank should have adopted expansionary measures much earlier (Claeys *et al.*, 2014), they might have various side effects.

One possible concern is the impact on financial stability. By analysing various theoretical considerations and the current situation of the euro area, we (Claeys and Darvas, 2015) concluded that the risks to financial stability of ultra-loose monetary policy in the euro area could be low. We argued that monetary policy should focus on its primary mandate of area-wide price stability, and other policies should be deployed whenever the financial cycle deviates from the economic cycle or when heterogeneous financial developments in the euro area require financial tightening in some but not all countries. These policies include micro-

prudential supervision, macro-prudential oversight, fiscal policy and regulation of sectors that pose financial stability risks, such as construction.

Another potential concern is the impact of ultra-loose monetary policy on income and wealth distribution. Several observers, such as Cohen (2014), Stiglitz (2015) and Acemoglu and Johnson (2012), have accused central banks of favouring the rich and fuelling the increase in income and wealth inequality. Inequality is a concern from both social and economic perspectives (Piketty, 2014). The long-held view of economists that there exists an inherent trade-off between efficiency and equality (Okun, 1975) has recently come into question, with inequality itself being put forward as the potential cause of the crisis. High levels of inequality might urge households to rely on debt financing to maintain living standards, which might have been an important driver of the housing boom in the pre-crisis period in the US, and thereby the consequent bust (Rajan, 2010; Van Treeck, 2014). Ostry *et al.* (2014) claim that greater inequality could reduce the level and duration of periods of growth, while greater inequality can also be linked with greater financial instability (Skott, 2013; Vandemoortele, 2009). For the euro area, Darvas and Wolff (2014) showed that countries with greater inequality tended to have higher household borrowing prior to the crisis, resulting in more subdued consumption growth during the crisis. The resulting high private debt, high unemployment, poverty and more limited access to education undermine long-term growth and social and political stability.

The rise of inequality is mainly seen as a long-term trend resulting from deep structural changes that could be attributed to skill-biased technological change, globalisation, demography, institutional and political changes and in particular changes in fiscal, educational and labour institutions (Piketty, 2014). Using the Gini coefficient and the share of

1. See Claeys (2014) for an overview of such policies.

income going to the top one percent, Figure 1 shows that income inequality in major advanced countries declined somewhat after the second world war until about the 1970s, when it started to increase in most countries. Figure 1 also shows that there are major differences between countries. For example, Germany is more equal than the United States or the United Kingdom. Figure A1 in the Annex reveals significant differences between euro-area countries.

This Policy Contribution assesses the impact of ultra-loose monetary policies on income and wealth distribution in the euro area. Section 2 assesses the potential impacts through financial markets, while section 3 considers the impacts through changes in the macroeconomic situation. Section 4 concludes.

2 THE IMPACT OF ULTRA-LOOSE MONETARY POLICIES ON INEQUALITY THROUGH FINANCIAL MARKETS

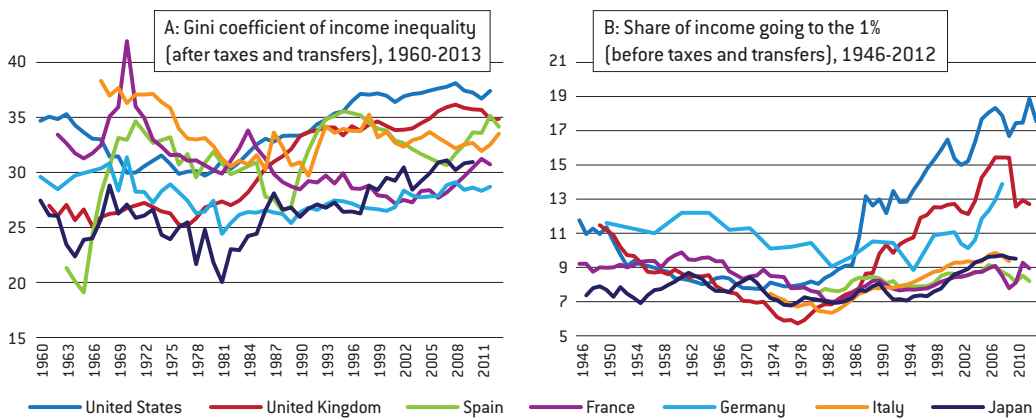
2.1 The impact through asset prices

One of the main channels through which ultra-loose monetary policies affect income and wealth distribution is changes in asset prices. First, lower central bank interest rates reduce the interest rates on securities (such as government and corporate bonds) and increase their prices. Second, asset purchases result in increases in the prices of the assets purchased, and a further fall in their yields. Third, sellers of the assets purchased by

the central bank might purchase other securities and thereby the prices of all kinds of assets can increase (portfolio rebalancing effect). Fourth, asset purchases by central banks can also improve market functioning and liquidity, thereby reducing liquidity premia, which can further raise asset prices. And finally, ultra-loose monetary policies can convince investors that interest rates will remain low for a long period, which can affect future corporate earnings and raise asset prices.

Empirical estimates for the United Kingdom and United States by Joyce *et al* (2011), Meier (2009), Gagnon *et al* (2011) and Baumeister and Benati (2010) found significant effects of asset purchases on the prices of the assets purchased, and also on other securities not included in the purchase programmes, including equity prices. However, as argued by Dobbs, Koller and Lund (2014), the effect of asset purchases on equity prices might not be as strong as is often reported, for both theoretical and empirical reasons. First, a rational investor should regard the current ultra-low interest rate environment as temporary, and thus should not reduce the discount rate to value future cash flows. As Figure 5 of Claeys and Darvas (2015) shows, P/E ratios have remained close to their long-term average in the US, UK and euro area, suggesting that share prices might not have been boosted extraordinarily, but might have primarily rebounded from extremely low levels. Second, according to calculations in Dobbs *et al* (2014), the implied real cost of equity, which represents the compensation investors require for

Figure 1: Measures of inequality



Source [Panel A]: Standardised World Income Inequality Database. Note: the Gini coefficient ranges from 0 to 100, with 100 indicating complete inequality. It is a function of the surface between the Lorenz curve (which is the cumulative distribution function of the probability distribution of income) and the line of equality. Source [Panel B]: Top World Incomes Database (<http://topincomes.parisschoolofeconomics.eu/>).

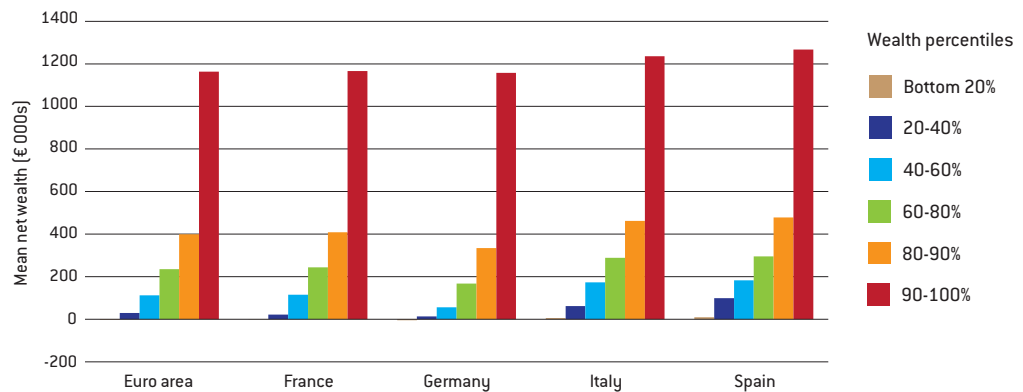
investing in equities instead of risk-free securities such as Treasuries, has not fallen to a level that would be expected in the context of a big boost in equity prices. Finally, in order for the portfolio-rebalancing channel to work, equity must be seen by investors as a close substitute for fixed-income assets. The authors give some reasons why this might not be the case: high volatility in the equity market, which should deter investment in equity, or the retreat by US retail investors from equity mutual funds and exchange-traded funds. Overall, Dobbs *et al* estimate that, if interest rates rise to their long-term historical average levels in five years, low rates will have resulted in an increase in equity prices of only about one percent.

More generally, the effects of monetary policy on asset prices should average out over the long term. First, the exit from quantitative easing and the tightening of monetary policy through interest rate rises should have the opposite downward effect on asset prices. Second, equity prices are

ultimately a function of the profitability of firms and even though they can diverge from their fundamental values in the short-term, they should not diverge permanently. While monetary policy should boost economic activity and thereby corporate profits in the short-term, the so-called 'long-run neutrality' hypothesis suggests that it does not have such an effect in the long-term.

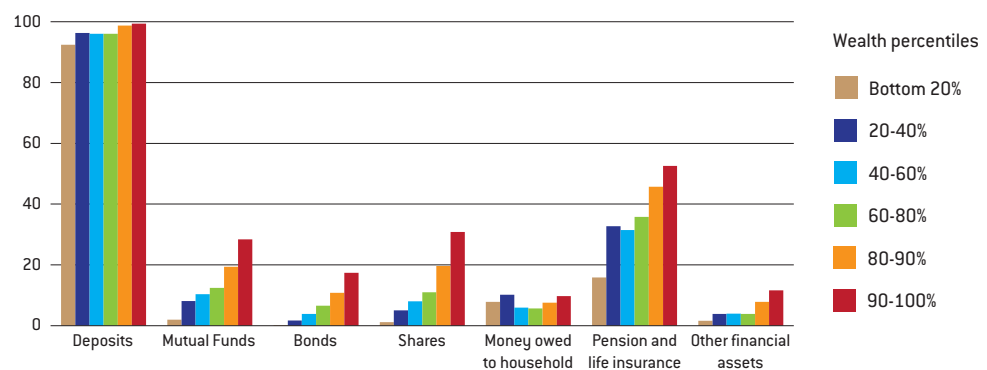
While the above literature review suggests some ambiguity about the extent and duration of asset price increases after asset purchases, asset price increases at least in the short-term can have significant distributional consequences given that asset holdings are very much concentrated among the richest households. The Household Finance and Consumption Survey (HFCS) of the European Central Bank², shows that differences in net wealth between the wealthy and the poor are huge (Figure 2 and Figure A2 of the Annex)³. Figure 3 also shows that poorer households hold generally fewer financial assets except deposits.

Figure 2: Net wealth by wealth percentiles in the euro area and its four largest countries



Source: ECB HFCS (2013) Note: Net Wealth is the difference between total household assets and total household liabilities. Total assets include real and financial assets. Euro area refers to the aggregate of the 15 countries included in the HFCS (see footnote 2).

Figure 3: Share of euro-area households with holdings of financial assets by wealth percentiles (%)



Source: ECB HFCS (2013). Note: Euro area refers to the aggregate of the 15 countries included in the HFCS (see footnote 2).

2. The Household Finance and Consumption Statistics (HFCS) survey by the European Central Bank collected household-level data on households' finances and consumption in 15 European countries (Belgium, Germany, Greece, Spain, France, Italy, Cyprus, Luxembourg, Malta, Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland). Data was collected in 2010 and 2011 in most countries. Henceforth, when we refer to the euro area, we refer to these 15 countries only.

3. Figures 2 and 3 show data according to the net wealth percentiles: the figures according to income percentiles are very similar.

However, while current asset price increases benefit those that have large holdings of assets today, they also make future buyers of these assets worse off, as they will have to purchase them at higher prices. In general, it is older households that tend to hold these assets and plan to sell them in the future in order to maintain their consumption, while younger households will buy these assets in the future in order to save for retirement. This will have distributional effects across generations.

Another important aspect is housing. By reducing long-term yields, ULMP can also have an impact on long-term mortgage interest rates. For example, for the United States, Bivens (2015) reports that a 100 basis points decline in mortgage interest rates boosts home prices by 7 percent. Similarly, the portfolio rebalancing channel could increase the demand for housing further⁴. As the cost of mortgages goes down, it should put some upward pressure on housing prices. As can be seen in Figure 6 of Claeys and Darvas (2015), house prices have been falling throughout the euro area since the bursting of the bubble in 2007. There was a minor increase in real house prices in Germany from 2010, but the level of real house prices in 2014 was still below the 2000 level. Earlier ECB monetary policy measures might have prevented a deeper fall in prices, while the more recent asset purchases might lead to house price increases.

As we can see from the HFCS, home ownership is prevalent even among intermediate income and wealth groups (see Figure 4 and Figure A4 of the Annex). There are however some differences

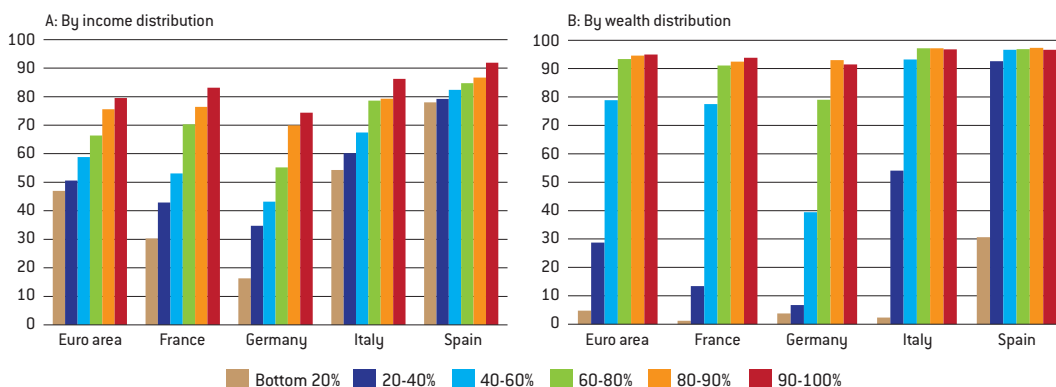
between countries and whether we consider income or wealth distributions. In most southern euro area countries and in Slovakia even among low-income households there is a high rate of home ownership, whereas in Austria, France and Germany home ownership is much more dependent on income (Panel A of Figure 4 and Figure A4 of the Annex). Since housing wealth constitutes a significant fraction of total net wealth, especially for low-wealth households, unsurprisingly low-wealth households tend not to be home owners (Panel B of Figure 4).

ULMP, by raising housing prices, will benefit all homeowners. For households with lower incomes, however, real estate assets represent a much larger share of their total assets than for richer households. Therefore it is possible that ULMP will reduce inequality through the housing channel we have just described.

As with other assets, rising housing prices will benefit current homeowners at the expense of future buyers, who will tend to be young people. As Figure 5 on the next page and Figure A5 of the Annex shows, home ownership tends to be dependent on the age of the head of the household, though in most southern euro-area countries and in Slovakia home ownership is relatively high even among the 16-34 age group.

These findings are confirmed by a recent working paper by Adam and Tzamourani (2015). Using data from the HFCS, they show that the median household strongly benefits from housing price increases, while capital gains from bond-price and

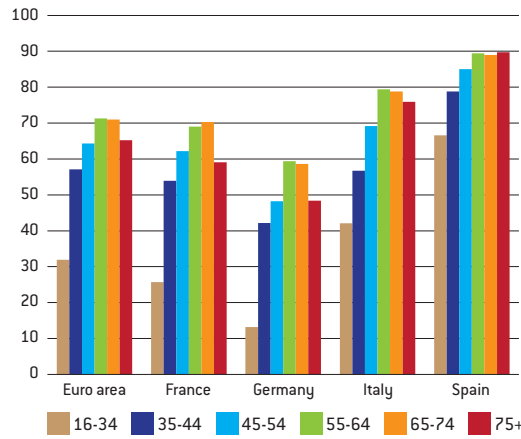
Figure 4: Home ownership by income and wealth percentiles in the euro area and its four largest countries (%)



Source: ECB HFCS. Note: the bars indicate the % of households in each income/wealth group that own their main residence.

4. In principle, supply can respond to increase in demand and leave housing prices unchanged. Yet experience suggests that sizeable expansions of the construction sector used to coincide with house price increases, suggesting that increased demand for housing used to have an impact on housing prices.

Figure 5: Home ownership by age of the head of the household in the euro area and its four largest countries (% households)



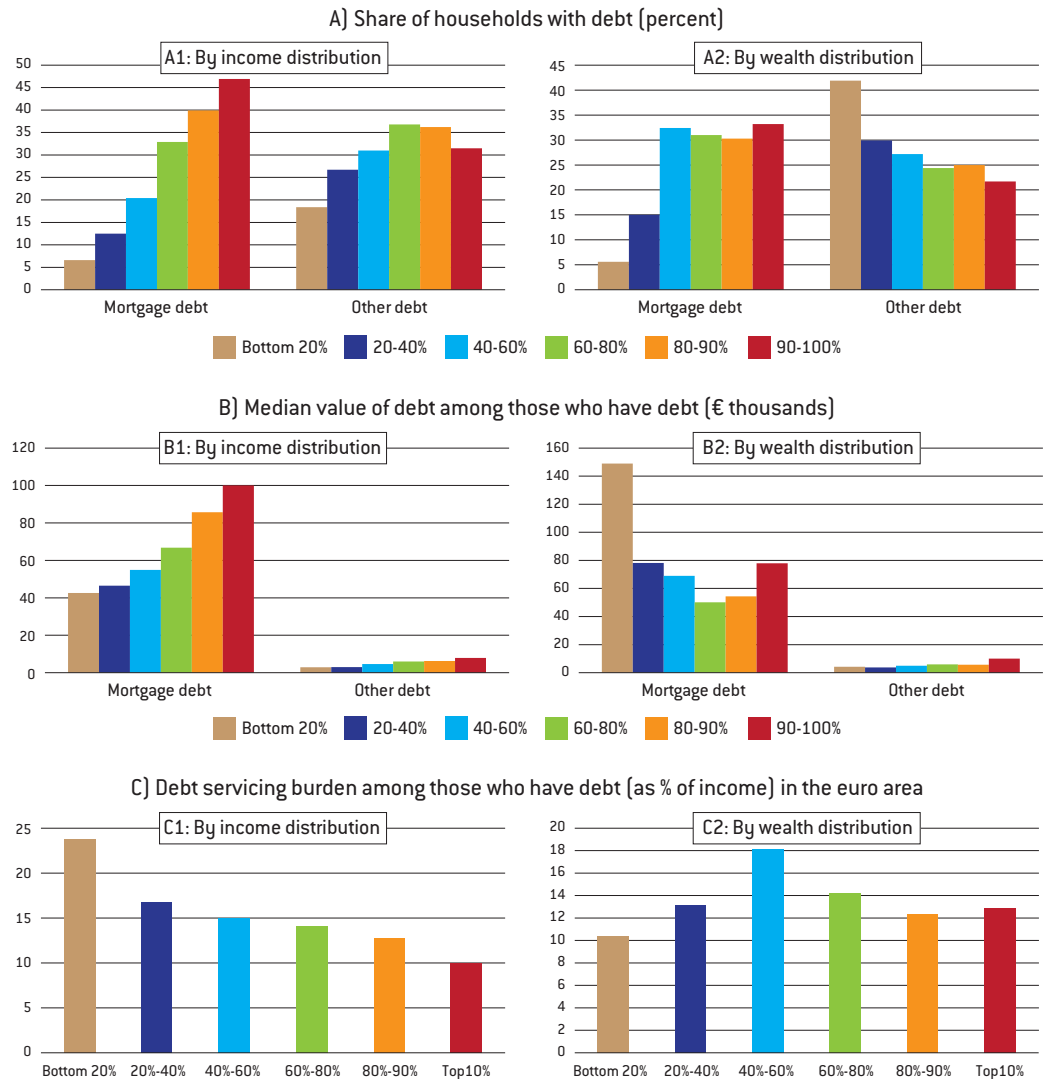
Source: ECB HFCS.

equity-price increases are shared among relatively few households.

2.2 The impact through interest rates

While ULMP has a positive impact on asset prices, which benefits those who are holding them when the measures are implemented, it also reduces the expected returns on these assets for those who are buying the assets at a high price. These two effects might affect different age groups within income and wealth groups differently. For example, the young generation of the rich, who are acquiring financial assets, might suffer relatively more from the reduced income than older rich generations, who will largely benefit from the stock effect.

Figure 6: Debt and debt service in the euro area

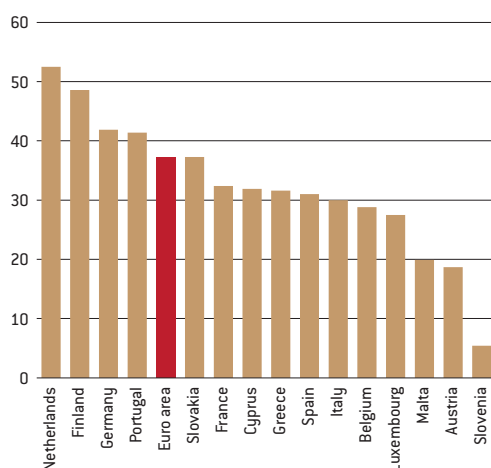


Source: ECB HFCS.

More generally, lower interest rates are likely to reduce the financial revenues of savers, who tend to be rich, and benefit debtors, which tend to be households from the middle-class to the rich. Panels A and B of Figure 6 show that very few low-income and poor households have mortgage debt and while many have other debts (such as overdrafts or credit cards), the median value of non-mortgage debt is very small relative to mortgage debt. However, the debt service to income ratio is the highest for low-income households (Panel C of Figure 6), implying that they would benefit the most from a reduced mortgage interest rate. Country-specific data reported in Figure A6 of the Annex underlines that this finding applies generally across the euro area.

Another important element, emphasised by Beraja *et al* (2015), is that ULMP can widen inequality not only between income quintiles but also between regions (or between countries in the case of the euro area). Beraja *et al* (2015) show that in the US, while in the aggregate asset purchases resulted in more mortgage originations, refinancing, cash-outs, and consequently consumer spending, these effects were much stronger in regions with lower mortgage loan-to-value ratios (LTVs). Regions with numerous homeowners whose house market price is below the value of their mortgage (ie in 'negative home equity'), however, do not benefit as much from these stimulative effects because it is more difficult and expensive for them to refinance their mortgages. This effect, which could lead to the

Figure 7: Median loan to value ratios of main residences in euro-area countries



Source: ECB HFCS.

amplification of regional inequality, could be important in the euro area, where there is significant disparity in median LTVs in different countries (Figure 7) and where there are differences in the evolution of house prices too. In countries in which LTVs are higher and house prices have fallen more (Figure 8 and Figure A8 of the Annex), the share of debtors facing difficulties in refinancing their loans should be higher and they should benefit less from the monetary policy accommodation.

The size of the effect of ULMP could therefore depend on whether homeowners have a fixed or variable rate mortgage, and how easy or costly it is to remortgage. In some countries most mortgages are fixed rate, which means that homeowners will have to refinance in order to benefit from lower interest rates, and refinancing can in some cases be very costly. According to the Bank of Spain (2009), the Research Institute for Housing America (2010), and the European Mortgage Federation (2012), Austria, Belgium, Denmark, France, Germany and the Netherlands mostly have fixed-rate mortgages, while Greece, Hungary, Ireland, Portugal, Spain, Sweden and the United Kingdom mostly have variable-rate mortgages. In Italy there is a mix of both. In the countries with dominantly variable-rate mortgages, households with a mortgage would benefit automatically from lower rates, while in countries with fixed-rate mortgages, only households that are able to refinance would benefit from the lower interest rates.

Again, it is important to distinguish between short-term and medium-term effects. In the short term, low rates and ULMP can have negative effects on net savers, but not in the medium term when interest rates normalise.

3 THE IMPACT OF ULTRA-LOOSE MONETARY POLICIES ON INEQUALITY THROUGH THE MACROECONOMY

Those claiming that ULMP is worsening inequality mainly focus on the fact that unconventional monetary policy works primarily by raising asset prices, as documented in the previous section, resulting in distributional effects in favour of those holding assets. However, one of the most important effects that unconventional monetary policy might have on inequality is its potential impact on

the general macroeconomic environment – boosting GDP, raising inflation back to target and supporting employment. Economic gains from these positive developments could again be unequally distributed, but possibly in a different direction to the benefits accruing from asset-price increases.

Households and firms make spending and saving decisions based on their expectations of future income. ULMP can affect the decisions of households and firms in several ways: through a virtuous cycle of higher revenues and incomes, higher asset prices and wealth effects, higher collateral values, and through higher expected inflation.

Higher expected inflation will induce households and firms to bring consumption spending forward to protect their purchasing power. Higher household and firm spending, in a more benign borrowing environment, should boost inflation and GDP and reduce unemployment. Higher asset prices will increase household and firm wealth, increasing spending, and will increase the value of assets that can be used as potential collateral for credit. By increasing nominal spending, ULMP can also have an indirect effect on equity prices, as companies face more demand and increase their profits, which in turn drives the more favourable macroeconomic environment.

3.1 Academic research on the impact of ULMP on the macroeconomy

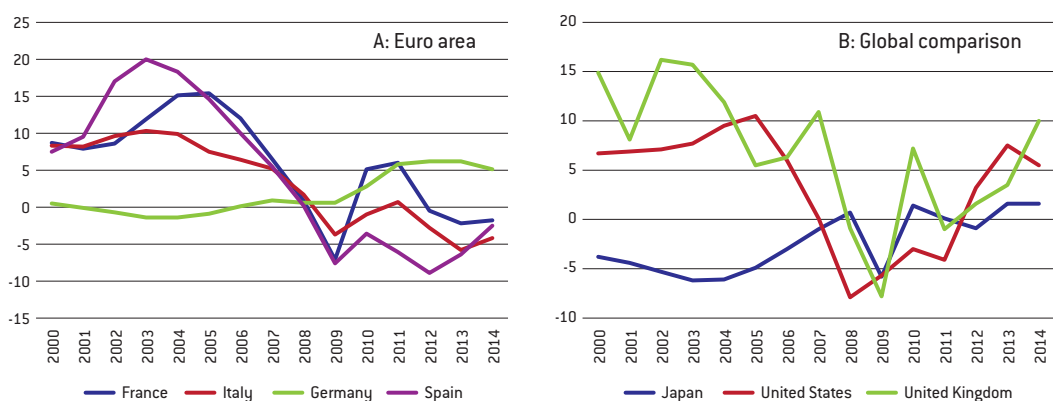
Research on the macroeconomic impact of the monetary policy measures implemented since the beginning of the crisis has generally produced consistent results: most papers find a significant

positive impact on inflation and GDP.

In terms of empirical evidence from past asset-purchase programmes in other major advanced economies, Chung *et al* (2011) found that the large-scale asset purchase programme by the US Fed had significant benefits for the macroeconomic situation in the US. Using an internal Federal Reserve Bank model, the authors found that asset purchases reduced long-term interest rates on treasuries by up to 50 basis points, while the unemployment rate was about 1.5 percentage points lower, GDP about 3 percentage points higher and core inflation about 1 percentage point higher than the counterfactual scenario without Fed purchases.

Wu and Xia (2014) develop a so-called ‘shadow rate’ – an interest rate that captures all the effects of the Fed’s unconventional monetary policy, even if the Federal Funds Rate (FFR) is constrained by the zero lower bound. They find that the shadow rate is a good representation of monetary policy in the pre-crisis period, because the shadow rate tracks the actual FFR very closely. The shadow rate turns strongly negative as a result of policies to ease credit and expand the Fed’s balance sheet. Using a Factor Augmented VAR model, they construct counterfactuals in which the shadow rate is set to the zero lower bound, thus negating the effects of unconventional monetary policy. They find that industrial production is more than 5 percent higher and unemployment 1 percent lower than in a scenario with no unconventional policies. Their model also predicts that forward guidance – the policy of communicating the path of future interest rates – was also successful. In their

Figure 8: Annual house price growth in selected countries (%)



Source: Thomson Reuters Datastream.

model, a 1-year extension of the expected zero lower bound period in the future reduces the unemployment rate by 0.25 percentage points.

Kapetanios *et al* (2012) at the Bank of England found that GDP was boosted by about 2 percent, and at its peak, CPI inflation was about 4 percentage points higher than would otherwise have been the case, averting a situation of outright deflation. The authors use three different vector autoregressive models, which allow for time-varying parameters. They construct their estimates of the effects of QE by creating carefully designed counterfactual scenarios in which there is no effect of QE on government yields. Hence, in their model, the primary effect of QE is through lower interest rates, and the second-order effects on output and inflation happen entirely through the effect on interest rates.

Similarly, Baumeister and Benati (2010) found that the compression in the long-term yield spread has had a strong positive effect on output and inflation in both the UK and US. They use Bayesian time-varying parameter structural VAR, and investigate the effects in reducing yield spreads (assuming a fixed short term rate to simulate the zero lower bound). In the US they find that the yield-compression seen as a result of asset purchases increased growth by about 2 percent and increased inflation by about 1 percent. Results for Japan and the UK are quantitatively similar. It should be noted that the Fed engaged in substantial rounds of further asset purchases after this point.

Focusing on the euro area, Lenza *et al* (2010) provide evidence, again using counterfactuals via a VAR model, that the ECB's early measures to ease credit in the euro area helped reduce spreads in money markets, which in turn had positive effects on output and inflation. Darracq-Paries and De Santis (2013) specifically focused on the ECB's LTRs of December 2011 and February 2012. They found, using Bank Lending Survey (BLS) data, that the LTRs substantially boosted euro-area lending, and through their VAR model, that GDP was 0.6 percentage points above its counterfactual level by 2013, inflation about 0.2 percentage points higher and outstanding loans 2 percentage points higher.

3.2 Implications for inequality

Recessions could potentially increase inequality through two channels: (i) the composition of income, and (ii) the differing impact on employment according to skill levels.

Since the poor rely much more heavily on wages for their income, any change in employment levels will affect them much more than the rich, who accrue income through more diverse channels, such as capital gains. If ULMP is successful in stimulating the economy, this will have net benefits for the poor and low-skilled relative to the rich, and will result in a reduction in inequality.

Furthermore, evidence from the literature shows that the poor and low-skilled are the most likely to lose their jobs in recessions. While Figure 9 on the next page and Figure A9 in the Annex indicate a structural change in the composition of employment, whereby the low-skilled employment tended to decline and high-skilled employment increased already before the crisis in almost every country, during the crisis low-skilled workers (which are at the bottom of the income distribution) suffered much more relative to higher-skilled workers. It is interesting to highlight that employment of high-skilled workers (those with tertiary education) continued to increase throughout the crisis, even in countries suffering from large increases in unemployment like Cyprus, Italy, Ireland, Lithuania, Portugal and Spain, while their employment remained broadly stable in Estonia, Latvia and Greece.

Bitler and Hoynes (2015), using data from the United States, show that those on lower incomes experience much greater income cyclicality than higher earners. Furthermore, this differential effect of recessions on low earners was steeper in the great recession compared to the previous 1980s recession. Therefore, any policy that helps to prevent or alleviate recessions will help to keep those at the bottom end of the income and wealth distribution in jobs and will therefore avoid a further widening of inequality.

The academic literature confirms that monetary policy might in fact reduce inequality. For example, Coibion *et al* (2012), taking a historical per-

spective and not considering unconventional policies specifically, document that contractionary monetary policy typically increases inequality, while accommodative monetary policy reduces inequality. Bivens (2015) argues that the view that ULMP benefits only the rich through higher asset prices is not correct. Although stock and house prices rose as a result of the Fed's policy measures, helping people who own their home or hold stocks, to the extent that the policies helped maintain employment and output, the Fed's measures reduced inequality. Bivens concludes that in the absence of the Fed's ULMP, wage growth would have been lower and more unequal. For the UK, the Bank of England (2012) makes a very similar case to Bivens (2015) in a review of the effects that its policy had on the distribution of wealth and income, arguing that ULMP in the UK benefited various segments of society through its impact on general economic conditions.

Yet the literature is not unanimous. For example, Saiki and Frost (2014) conclude, using impulse response functions from a VAR model with the Gini coefficient included, that ULMP increased inequality in Japan. Meanwhile Philippon and Reshaf

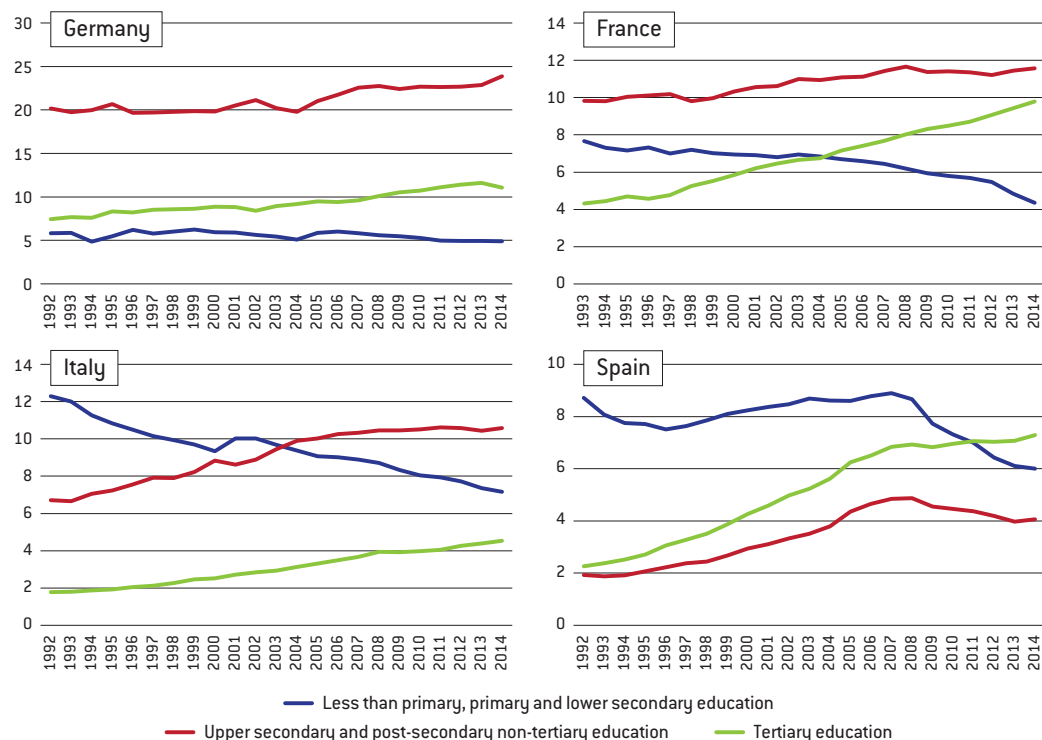
(2009) have shown that remuneration in the financial sector is extreme, even when one takes into account technological progress and the skill and education levels of employees. Therefore, to the extent that ULMP benefited the financial sector, it also benefited the wealthy owners and employees of the financial sector (Acemoglu and Johnson, 2012).

4 CONCLUSIONS

The widening of income and wealth inequality observed in many advanced countries in recent decades is a long-term trend and primarily the result of deep structural changes. Nevertheless, there are some concerns that current ultra-loose monetary policies (ULMP) could amplify that trend, at least in the short- and medium-term.

Since 2008, most major central banks have implemented various monetary easing measures. Given the macroeconomic situation in advanced economies and in the euro area in particular, these measures were justified and in fact the European Central Bank should have acted earlier. However, some of these measures and the unusual length

Figure 9: Employment (in millions) by educational attainment in the four largest euro-area countries, 1992-2014



Source: Eurostat 'Employment by sex, occupation and educational attainment level (1 000) [lfsa_egised]' dataset.

of the monetary accommodation could have side effects on income and wealth distribution:

- The impacts of ULMP through increases in financial asset prices tend to increase inequality between the wealthy and poor, between the young and old, and also between regions when they have different financial structures. Increases in the value of assets such as equities and government and corporate bonds will tend to favour the rich who hold them in higher proportions. Since older people tend to have higher savings and may sell them in the future in order to maintain their consumption, while younger households are usually the ones that will buy these assets in the future in order to save for retirement, ULMP may have distributional consequences across generations. ULMP can benefit households differently depending on the structure of their financial assets, since certain households could make better use of the opportunity offered by low-interest rate borrowing than others.
- The impacts of ULMP through an increase in housing prices and a fall in interest rates tend to decrease inequality. Housing is the main asset of the middle class and therefore housing price increases will tend to compress the wealth distribution. A fall in mortgage interest rates tends to benefit low-income people, who spend a larger share of their income on servicing their debts.
- The impacts of ULMP through stimulating the economy tend to reduce inequality. A large literature concluded that ULMP boosts inflation, output and employment. In the absence of ULMP, unemployment would be higher, which would lead to higher income inequality, because the poor and low-skilled are the most likely to lose their jobs in recessions and

because wages are the primary source of revenues for poorer and lower-income people.

The primary mandate of the European Central Bank is to maintain price stability, and considerations of inequality are not within its purview, unless inequality should prevent the transmission of monetary policy in some way. The ECB should focus on its price stability mandate and thereby support the fragile recovery now taking place in the euro area. This is the best way for monetary policy to contribute to the avoidance of an increase in inequality in times of recession. Yet we recommend the ECB to monitor the side effects of its monetary policy measures, including the potential distributional effects. The ECB has detailed internal datasets which should allow a comprehensive assessment.

The main policy question is how to tackle inequality in general, and whether governments should design special measures in a deep recession or in a situation in which central bank actions widen inequality. For example, in the United States, policies such as the Housing Affordable Refinance Programme (HARP), which helped homeowners with negative home equity to refinance their mortgages, might have helped dampen the rising inequality that resulted from the housing slump.

Fiscal and social policies are the right tools to fight inequality. As documented by Darvas and Wolff (2014), there are huge differences in the efficiency of social redistribution systems in EU countries. For their levels of social expenditure and personal income taxes, several southern European countries and Belgium achieve a much smaller reduction in inequality than other EU countries. Revising national tax/benefit systems for improved efficiency, intergenerational equity and fair burden sharing between the wealthy and poor is the right way to fight inequality.

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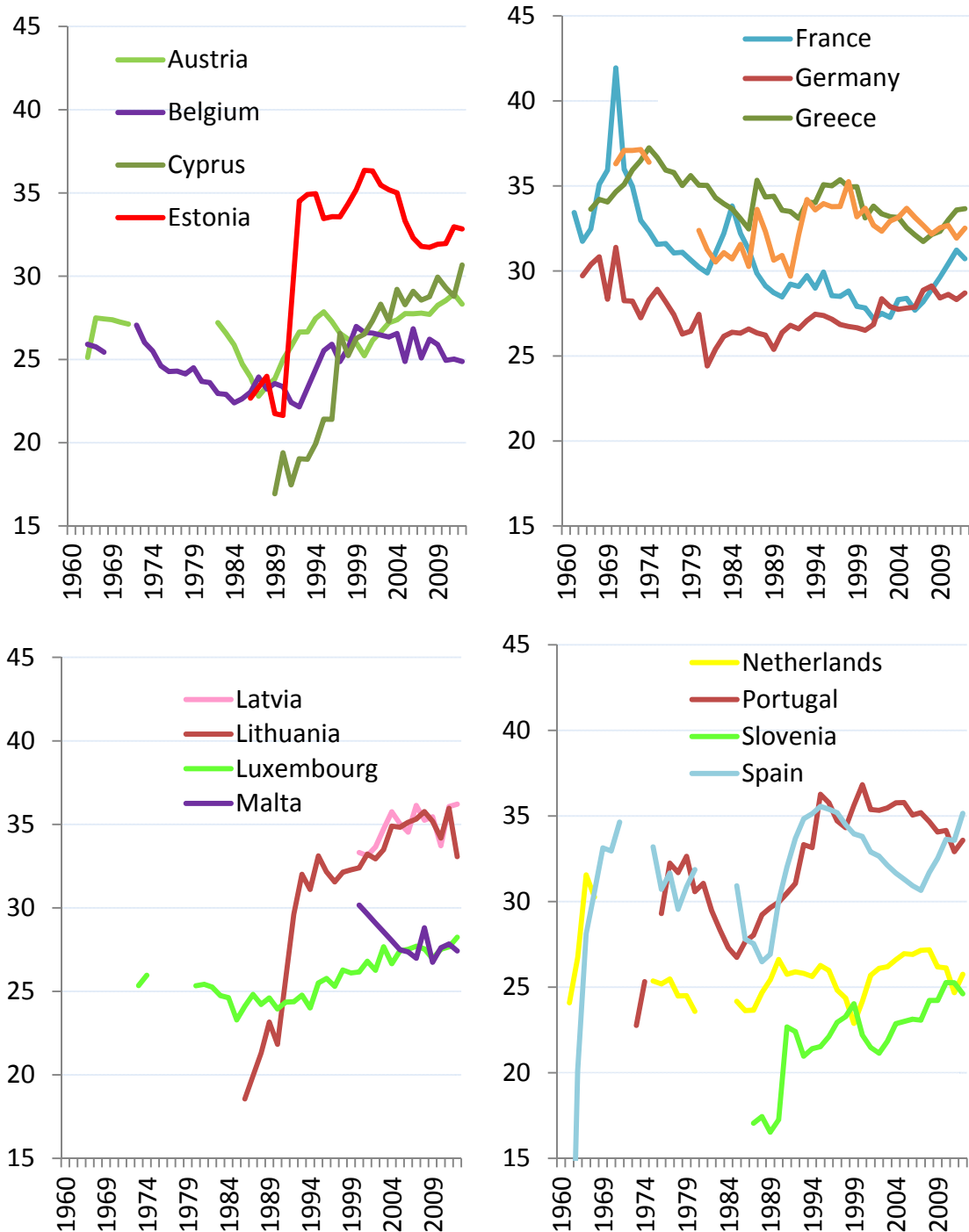
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ANNEX: COUNTRY-SPECIFIC DATA

This annex shows country-specific data for all euro-area countries (whenever available) for the figures reported in the main text. Figure numbering in this annex corresponds to numbering in the main text, eg Figure A1 in the annex reports country-specific data relating to Figure 1 in the main text.

Figure A1: Measures of inequality

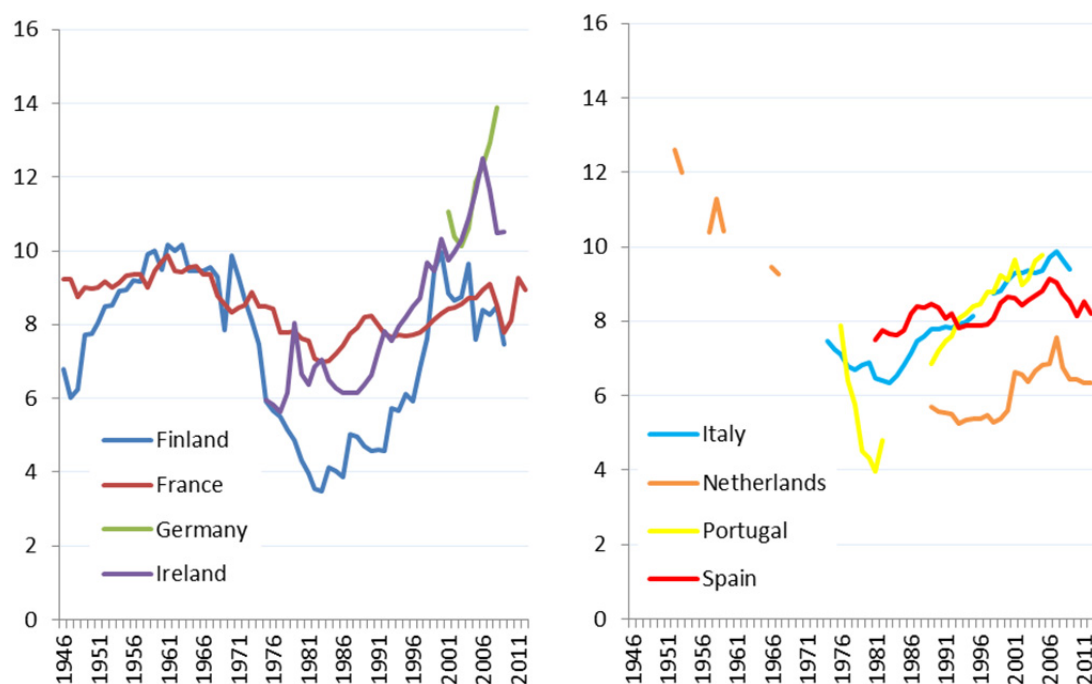
A) Gini coefficient of income inequality (after taxes and transfers), 1960-2013



Source: Standardised World Income Inequality Database

Note: The Gini coefficient ranges from 0 to 100, with 100 indicating complete inequality. It is a function of the surface between the Lorenz curve (which is the cumulative distribution function of the probability distribution of income) and the line of equality.

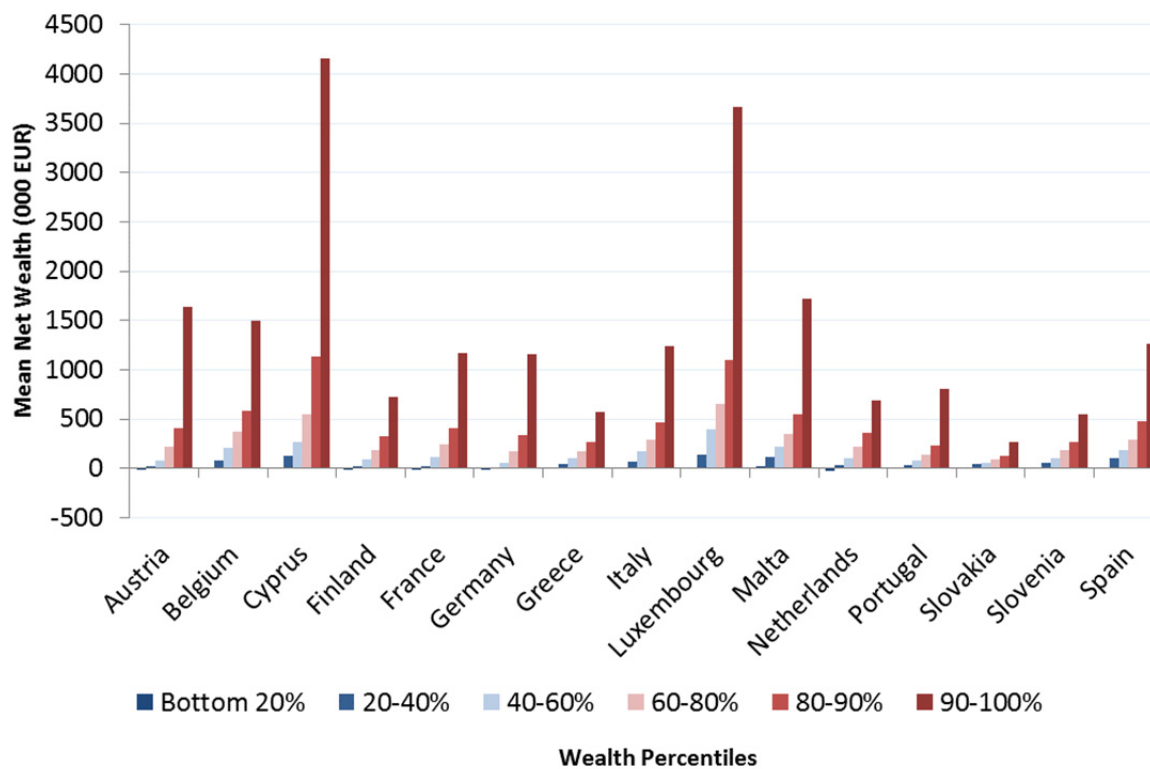
B) Share of income going to the 1% (before taxes and transfers), 1946-2012



Source: Top World Incomes Database (<http://topincomes.parisschoolofeconomics.eu/>)

Note: series for Finland contains break that merges two different data sources

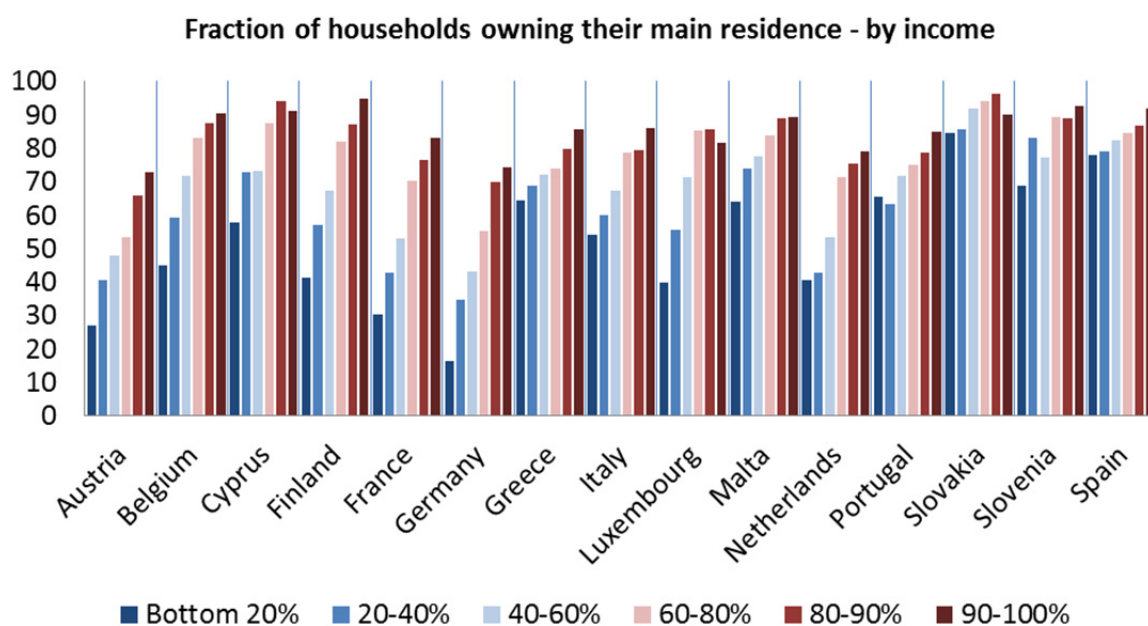
Figure A2: Net wealth by wealth percentiles



Source: ECB HFCS (2013)

Note: Net Wealth is the difference between total household assets and total household liabilities. Total assets include real and financial assets

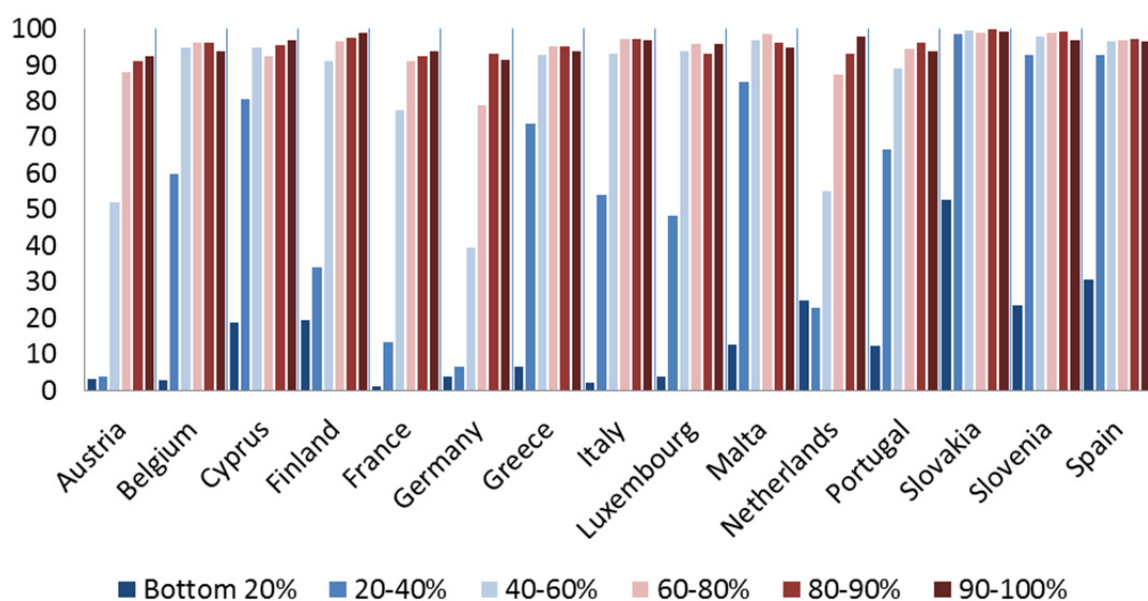
Figure A3: Home ownership across income percentiles (percent)



Source: ECB HFCS

Note: the bars indicate the percent of households in the income group owning their main residence.

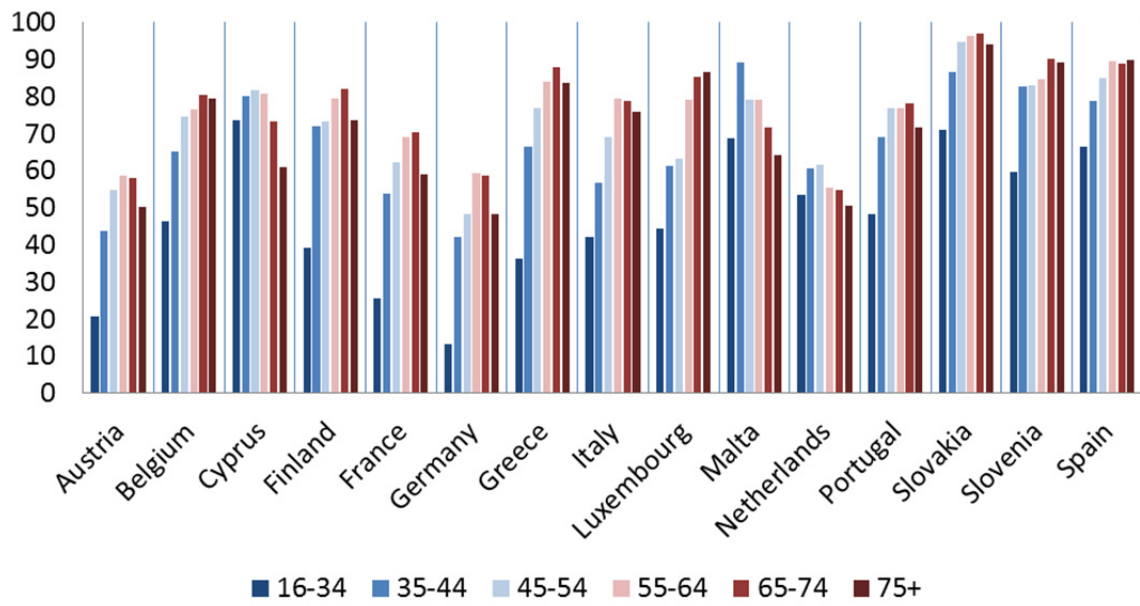
Figure A4: Home ownership across wealth percentiles (percent)



Source: ECB HFCS

Note: the bars indicate the percent of households in the wealth group owning their main residence.

Figure A5: Home ownership by age of the head of the household

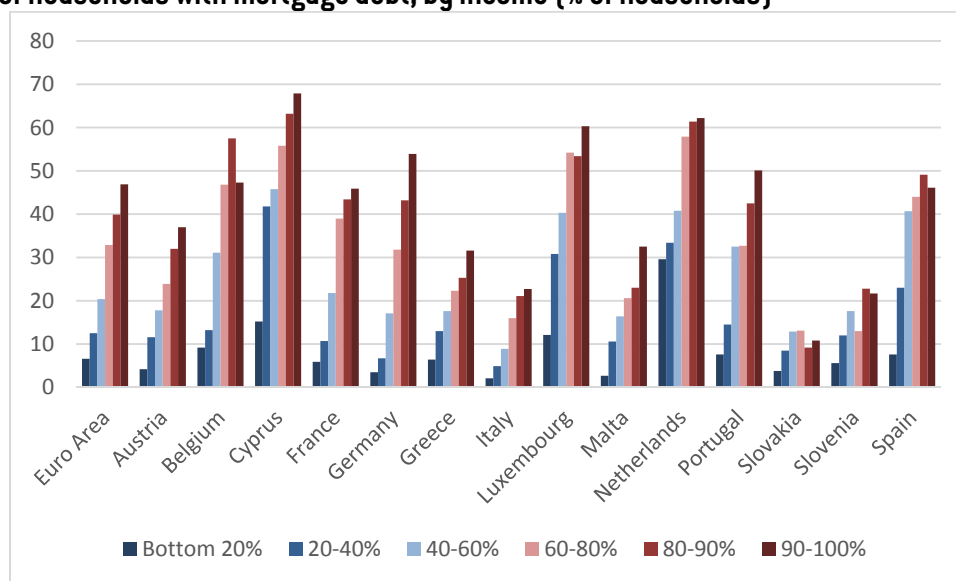


Source: ECB HFCS

Note: the bars indicate the percent of households in the age group owning their main residence.

Figure A6: Debt and debt service

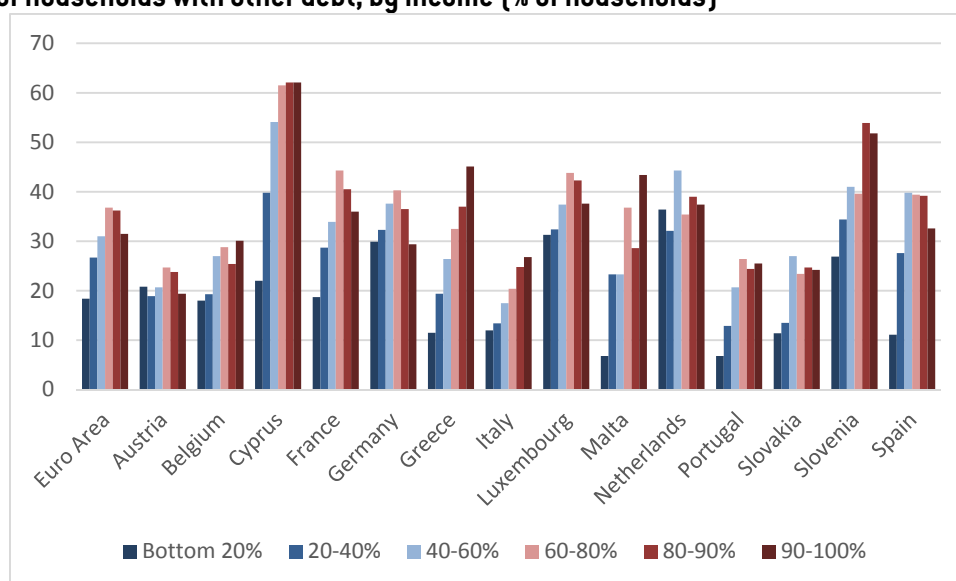
A) Share of households with mortgage debt, by income (% of households)



Source: ECB HFCS

Note: Data on Finland not available

B) Share of households with other debt, by income (% of households)



Source: ECB HFCS

Note: other debt denotes all debt other than mortgage debt. Data on Finland not available

C) Median value of mortgage debt among those who have mortgage debt, by income (€ thousands)

	Euro Area	Austria	Belgium	Cyprus	France	Germany	Greece
Bottom							
20%	43		45	84	28	44	32
20-40%	47	21	67	69	39	29	36
40-60%	55	33	63	81	47	78	33
60-80%	67	39	76	110	57	69	50
80-90%	86	36	86	89	56	92	49
90-100%	100	67	69	131	91	116	46

	Italy	Lux'bourg	Malta	N'lands	Portugal	Slovakia	Slovenia	Spain
Bottom								
20%	38			99	38			47
20-40%	50	133		79	55	23		50
40-60%	50	114		131	41	27		57
60-80%	60	114	55	131	43	25		58
80-90%	70	149		156	65			89
90-100%	75	240		160	65	18		83

Source: ECB HFCS

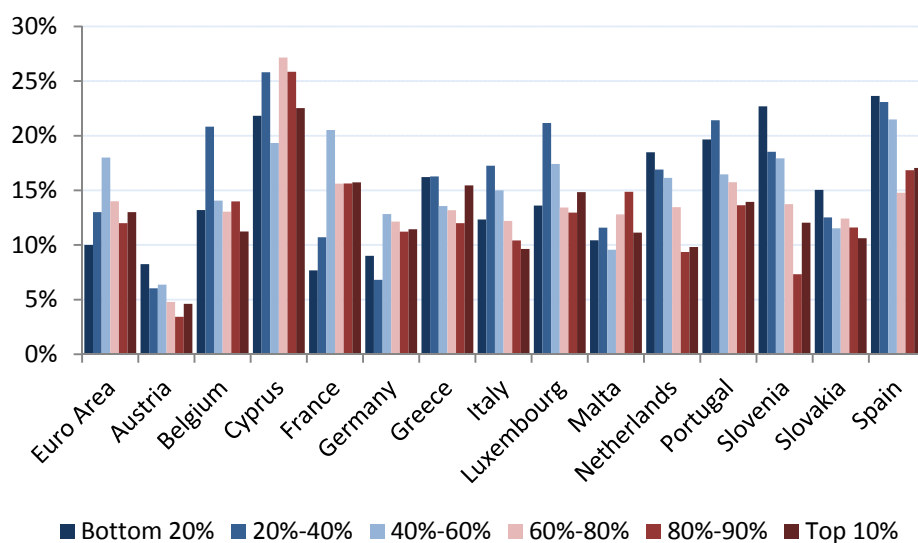
Note: Data on Finland not available. Empty cells indicate missing data.

D) Median value of other debt among those who have other debt, by income (€ thousands)

	Euro Area	Austria	Belgium	Cyprus	France	Germany	Greece
Bottom							
20%	3	3	2	6	2	2	4
20-40%	3	1	3	6	4	2	4
40-60%	5	2	5	8	5	4	5
60-80%	6	3	7	13	7	4	5
80-90%	6	3	8	11	8	4	4
90-100%	8	6	8	19	12	5	4

	Italy	Lux'bourg	Malta	N'lands	Portugal	Slovakia	Slovenia	Spain
Bottom								
20%	5	6		10	3	0		4
20-40%	4	9	3	10	2	1		5
40-60%	6	12	4	12	2	2	3	6
60-80%	7	11	5	16	4	1	5	8
80-90%	5	19	8	32	4	1		10
90-100%	8	16	6	18	6	3		13

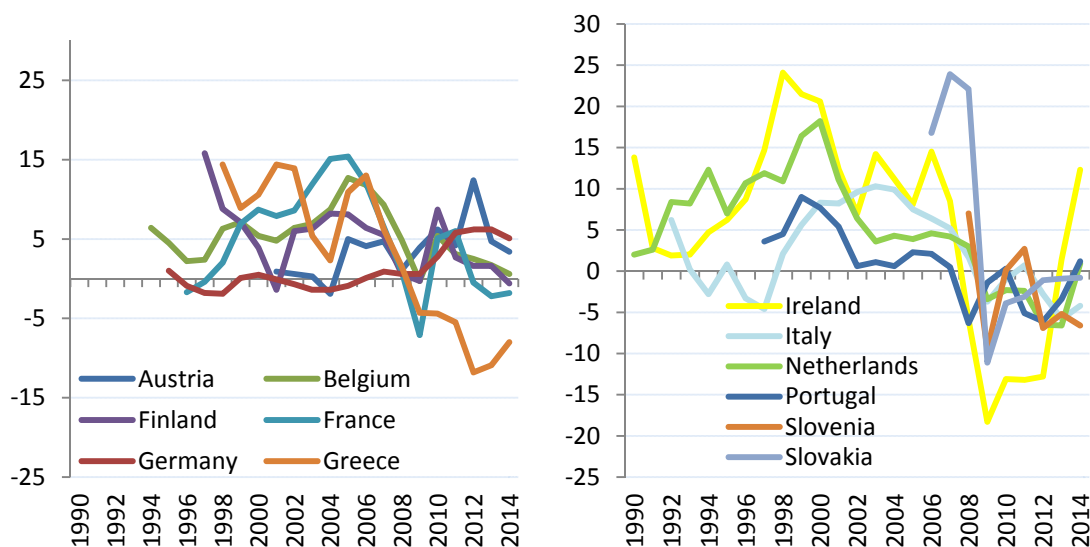
E) Debt service as a share of household income (%)



Source: ECB HFCS

Note: other debt denotes all debt other than mortgage debt. Data on Finland is not available.

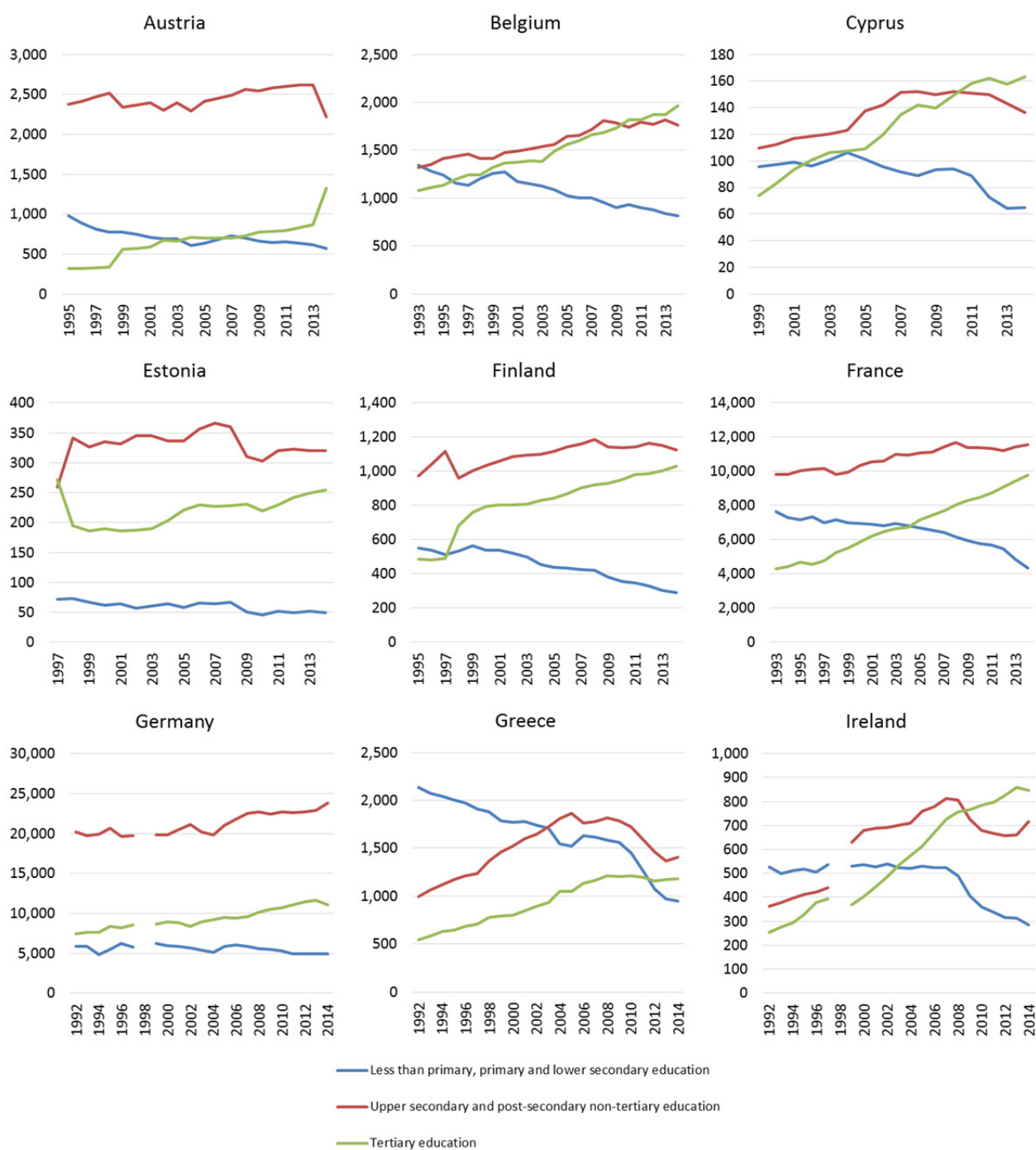
Figure A8: House Price Growth (annual percent change)

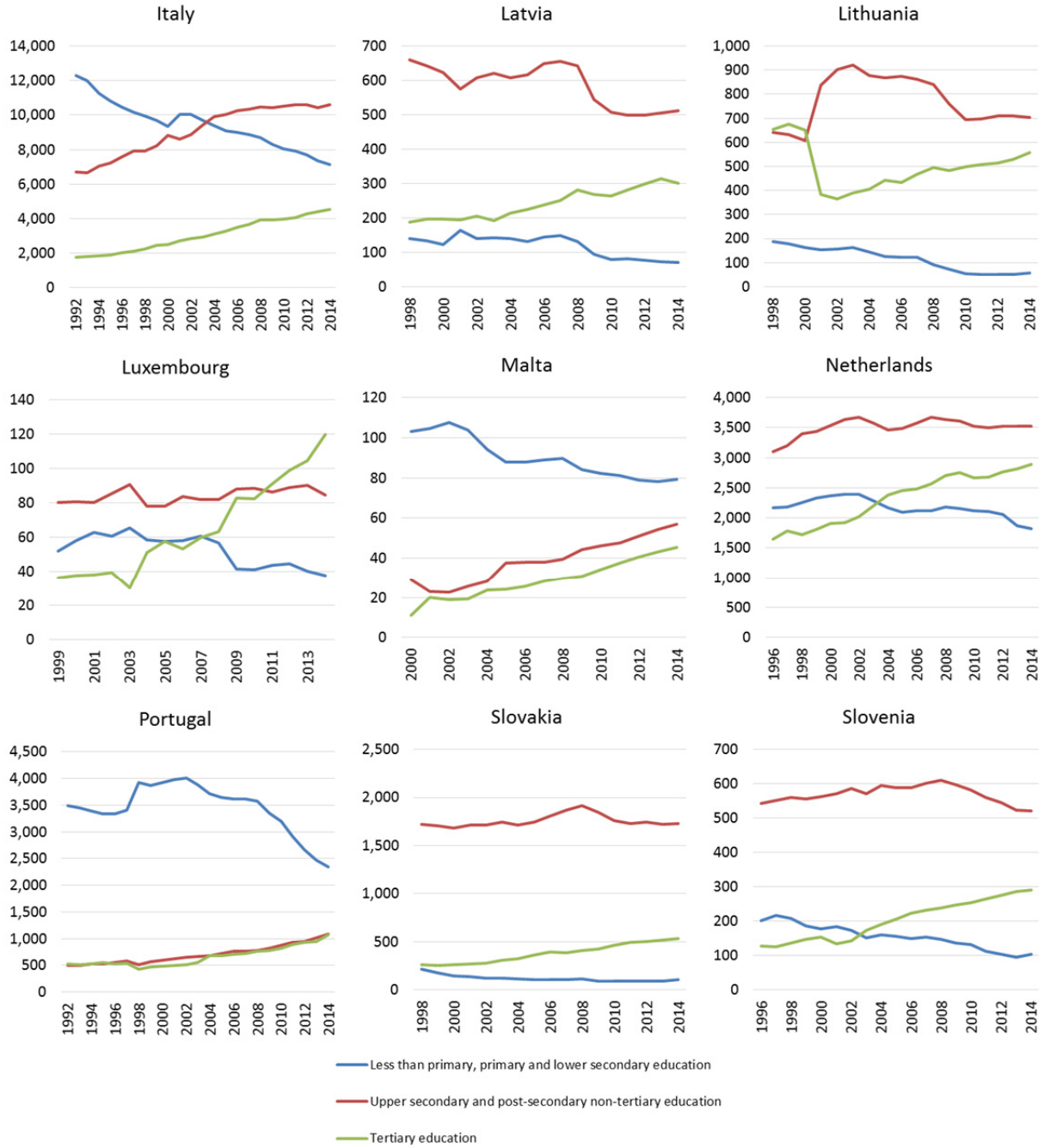


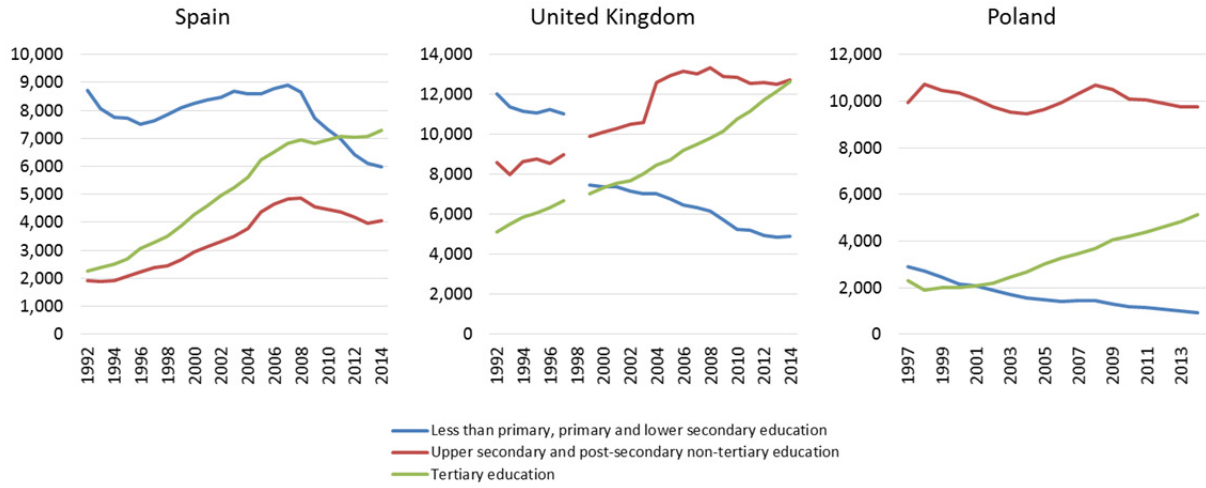
Source: Thomson Reuters EIKON and Datastream

Note: All countries with available data are shown

Figure A9: Employment by educational attainment (thousand people), 1992-2014







Source: Eurostat "Employment by sex, occupation and educational attainment level (1 000) [lfsa_egised]" dataset.