European
Commission

ISSN 2443-8022 (online)

Euro Area Housing Markets: Trends, Challenges & Policy Responses

Vítor Martins, Alessandro Turrini,
Bořek Vašíček and Madalina Zamfir

DISCUSSION PAPER 147 | SEPTEMBER 2021

EUROPEAN ECONOMY

Economic and
Financial Affairs

European Economy Discussion Papers are written by the staff of the European Commission's Directorate-General for Economic and Financial Affairs, or by experts working in association with them, to inform discussion on economic policy and to stimulate debate.

DISCLAIMER

The views expressed in this document are solely those of the author(s) and do not necessarily represent the official views of the European Commission.

Authorised for publication by Géraldine Mahieu, Director for Investment, Growth and Structural Reforms.

LEGAL NOTICE

Neither the European Commission nor any person acting on behalf of the European Commission is responsible for the use that might be made of the information contained in this publication.

This paper exists in English only and can be downloaded from
https://ec.europa.eu/info/publications/economic-and-financial-affairs-publications_en.

Luxembourg: Publications Office of the European Union, 2021

PDF ISBN 978-92-76-38748-0 ISSN 2443-8022 doi:10.2765/153276 KC-BD-21-004-EN-N

© European Union, 2021
Non-commercial reproduction is authorised provided the source is acknowledged. For any use or reproduction of material that is not under the EU copyright, permission must be sought directly from the copyright holders.

CREDIT
Cover photography: © iStock.com/shironosov

European Commission
Directorate-General for Economic and Financial Affairs

Euro Area Housing Markets:

Trends, Challenges and Policy Responses

Vítor Martins, Alessandro Turrini, Bořek Vašíček and Madalina Zamfir

Abstract

The paper discusses the relevance of housing markets for macroeconomic developments from a euro area perspective, reviews trends in house prices and mortgage credit, and discusses policy approaches to prevent housing booms and deal with busts. After years of unsustainably strong house price growth in several Member States in a context of easing credit conditions, downward house price corrections took place after the 2008 financial crisis. A recovery in house prices started after 2013 under different conditions compared with the pre-financial crisis context. The house price recovery appeared to be driven to a greater extent by structural factors and to a lesser extent by buoyant household loans, as credit growth has been lagging behind house price growth in most countries. Prospects for house price growth after the COVID-19 outburst are clouded by uncertainty in light of the changing outlook when economic fundamentals and policy responses play in opposite directions. The current context is also different compared with the period before the global financial crisis because macro-prudential frameworks have been strengthened and macro-prudential tools are increasingly used across the euro area. The effectiveness of policy tools needed to address risks linked to boom-bust dynamics in the real estate sector depends on their interaction, design and timely implementation. Policy composition and policy design also appear crucial in dealing with possible trade-offs among policy objectives, including between macro-financial stability and housing affordability.

JEL Classification: R21, R31, C32, E37, E58.

Keywords: House prices; Housing markets; euro area; macro-prudential policy.

Acknowledgements: The views in this paper are those of the authors only. They do not represent views of, and should not be attributed to, the European Commission. This paper, which was originally prepared as a background material for the Eurogroup thematic discussion on growth and jobs – Housing markets – on 11 March 2019, was substantially revised and updated to reflect recent developments, including the COVID-19 shock. We would like to thank Ramona Jimborean and Daniel Monteiro for their useful comments.

Contact: Vítor Martins (vitor.martins@ec.europa.eu, Bořek Vašíček (borek.vasicek@ec.europa.eu), European Commission, Directorate-General for Economic and Financial Affairs.

CONTENTS

1. Introduction....5

2. The relevance of real estate developments for macroeconomic stability....6

3. Housing market developments in the euro area....9
   3.1. Main developments in euro -area housing markets since the early 2000s....10
   3.2. Recent trends and post-COVID prospects for housing prices and household credit in the euro area....13

4. Assessing housing market conditions in the euro area....14
   4.1. Co-movements between housing and credit cycles in the euro area....14
   4.2. Assessing valuation gaps in housing markets....18

5. Policy responses to address housing-related risks....21
   5.1. Monetary policy....21
   5.2 Taxation....21
   5.3. Macro-prudential policy....24
   5.4. Housing supply regulations and rental markets....30

6. Conclusions....32

LIST OF TABLES

1. Effectiveness of macro-prudential summary of evidence from existing studies....28

LIST OF GRAPHS

1. Bank exposure to real estate (mortgage credit as % of GDP)....7
2. Distribution of population by tenure status in euro-area countries, 2019 (% of population)....10
3. Real house price growth in 2000-2007 vs. 2008-2013....11
4. Real house price growth in 2008-2013 vs. 2014-2020....11

5. Mortgage credit growth and lending standards in the euro area 12
6. New mortgage credit in different periods and euro area countries 12
7. Evolution of deflated house price growth 13
8. House prices growth and valuation gaps in 2020 13
9. Real house price growth and mortgage credit growth in the euro area 15
10. Cyclical components of house prices and credit to households in the euro area 16
11. Real house price growth and real mortgage credit growth in euro-area countries 16
12. The interaction between house prices and credit (results from panel BVAR analysis) 17
13. Valuation gaps for housing prices in euro-area countries 19
14. Affordability ratios based on house price indexes in euro-area countries 20
15. Estimates of price per sqm and price-to-income in euro area countries, 2020 20
16. User cost of owner-occupied housing in the euro area 23
17. User cost of owner-occupied housing (% of house value) and contribution of taxes to user cost in euro-area countries 24
18. Number of euro area countries using macroprudential measures addressing risks in the housing sector ... 27
19. Limits to loan-to-value (LTV) in the euro area (binding limits and recommendations) 28
20. Social rental housing stock, 2018 or latest, (number of social rental dwellings as a share of the total number of dwellings, %) 32

1. INTRODUCTION

House prices have a key relevance for macroeconomic developments. First, house price dynamics have a close correlation with the economic cycle and contribute significantly to swings in economic activity. Second, the possible formation of house price bubbles and their subsequent sudden burst may have relevant macro-financial stability implications. The bursting of housing bubbles is normally associated with a deterioration in the quality of banking sector balance sheets and higher risk of banking sector bankruptcies, which are followed by subdued credit growth, deep recessions or protracted slumps in economic activity (e.g., Crowe et al., 2011; Jordà et al., 2013; Claessens et al., 2013; Jordà et al., 2015). Third, housing accounts for a large share of household investment, spending and wealth. House price developments have also important social implications through housing affordability.

Housing market developments have a significant euro area dimension. Due to their relevance for the euro area-wide business cycle and inflation, house price dynamics matters for the conduct of the single monetary policy. At the same time, a single monetary policy induces commonality in housing cycles across the euro area. House price dynamics matter also for the valuation of collateral pledged to banks and for developments in mortgage finance, thus having implications for the euro area's increasingly integrated financial system, particularly as regards regulation and supervision. Moreover, by having an impact on the lending behaviour of the banking sector, house price and market characteristics also affect the effectiveness of the single monetary policy via its transmission mechanism.[1]

The boom-bust cycle in the housing sector was a key underlying factor of the global financial crisis. The years before the global financial crisis were characterised by easy monetary conditions, significant cross-border financial flows, light regulation in the financial sector and the use of financial products allowing the financing of increasingly risky mortgages. These factors were at the origin of strong house price dynamics in a number of advanced economies that became persistent and delinked from fundamentals. Once these unsustainable developments came to a halt amid generalised risk reappraisal and softening house price dynamics, distress in bank balance sheets in several developed countries was followed by a major liquidity crisis and ultimately by solvency crises of several banks, including systemic ones.

After the global financial crisis, housing prices underwent a significant downward correction in a number of Member States, and their recovery took place under conditions that differed from the pre-crisis period. In the aftermath of the global financial crisis, housing markets in most of the countries witnessing housing booms in previous years, including some euro-area Member States, experienced a significant downward correction. This housing price decline was in some countries coupled with broader adjustment in the banking sector that needed to re-build capital buffers and deal with large stocks of non-performing loans in a context of reformed regulatory, supervisory and prudential frameworks. House prices started to recover in a majority of euro area countries as the economic recovery was consolidating after 2013, mainly on the back of growing household incomes and increased confidence. Credit developments in the post financial crisis period played instead no comparable role to that of the pre-crisis years. In many euro area countries household credit resumed only gradually and after the recovery of house prices, after years of subdued dynamics driven by deleveraging in the financial and household sector.

The house price recovery has been monitored from a macroeconomic stability perspective and raised questions for policy. As the housing market recovery gained momentum in a number of Member States, such dynamics were increasingly monitored from an economic surveillance viewpoint, including in the EU context, notably the European Semester and the Macroeconomic Imbalance Procedure and recommendations have been issued to several EU Member States. The

---

[1] It has been shown that structural features of housing market, e.g. home ownership rates, induce heterogeneity of monetary policy transmission (see e.g., Koeniger and Ramelet, 2018).

ESRB issued warnings and recommendations to a number of EU Member States in 2016 and 2019 to signal the building up of medium-term vulnerabilities linked to house price and household credit dynamics. Moreover, affordability issues came increasingly to the fore, notably linked to rapid growth of house prices in selected urban areas in a context of worsened income distribution.

Prospects for house price growth are clouded by uncertainty after the COVID-19 crisis. House price growth has been accelerating in the years preceding the COVID-19 outbreak, with indication of possible overvaluation in several Member States. The COVID-19 shock had unambiguously negative impact on employment prospects (despite some localised labour shortages) and household incomes across the euro area. However, the pandemics has also induces an accumulation of household savings, governmental income support programmes, expansionary fiscal policies and loosening of monetary and macro-prudential policies. These factors together with supply-side restrictions could be the reasons why house prices has not decreased after the COVID-19 shock as originally expected, but in several Member States even increased. The future price developments may be also affected by changes in working methods and housing preferences whose quantitative relevance is still difficult to judge.

A number of policy responses can potentially help to address real estate-related risks, i.e. to tame boom-bust dynamics and to deal with its consequences. Unsustainable developments in housing markets are hardly identifiable in real time. In addition, the prevention of housing booms can be costly when it implies the adoption of measures with contractionary effects on the real economy. Nonetheless, there is growing consensus (e.g. Arslan and Upper, 2017, Crowe et al., 2011, Hartman, 2015) that the cost of inaction justifies the use of selected measures aimed at taming booms and dealing with busts. This applies especially to targeted macro-prudential policy tools and certain tax reforms. Over the past decade, macro-prudential measures have been increasingly in use across the euro area, notably to prevent the risk of excessive mortgage credit growth. In addition, recent tax reforms in a number of euro-area Member States went in the direction of reducing fiscal incentives linked to mortgage financing.

The present paper discusses relevant macro-financial implications of housing markets in the euro area context, reviews developments and ongoing trends, and discusses policy approaches to prevent housing booms and deal with the associated busts. The remainder of the paper is structured as follows. Section 2 discusses the relevance of residential real estate developments for macroeconomic and financial stability.[2] The third section analyses housing developments in the euro area and individual Member States since 2000s, including the recent developments since the COVID-19 shock. The fourth section analyses links between house prices and mortgage credit at the euro area level and assesses valuation gaps for individual euro area countries. The fifth section reviews the policy responses to prevent and deal with the consequences of housing boom and bust cycles, covering monetary policy, macro-prudential policy, taxation, and housing supply regulation. Section 6 concludes.

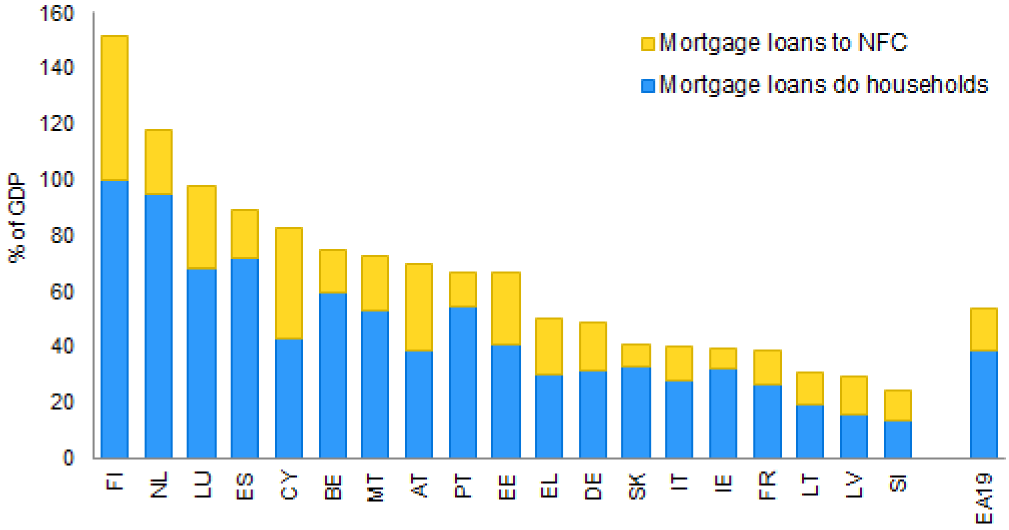
2. THE RELEVANCE OF REAL ESTATE DEVELOPMENTS FOR MACROECONOMIC STABILITY

The housing sector is of particular relevance for macro-financial stability. The macroeconomic relevance of the housing sector is linked to the fact that housing accounts for a substantial share of investment and GDP, represents a major component of household wealth and household consumption, and serves as collateral for a substantial share of loans, the main asset in the balance sheets of banks. As the supply of housing is relatively inelastic, particularly in the short run, economic development is often associated with a growing real price of housing, a growing share of income absorbed by the cost of housing services, growing household indebtedness and growing exposures by banks. The share of mortgages on banks' balance sheets in major advanced economies has roughly doubled during the twentieth century (e.g., Jordà et al., 2016) and in some euro-area countries attains 100% of the GDP (see Graph 1). In light of the macroeconomic relevance of the housing sector, monitoring house price developments has become standard practice in macro-financial surveillance.

---

[2] Developments in commercial real estate markets (CRE) can be also crucial for financial stability, due to its cyclicality and because bank loans to CRE are a significant part of bank lending. However, some issues make the assessment of this potential source of risks more challenging, (1) data on CRE are in general scarce, incomplete or inconsistent, (2) significant proportion of financing is provided by non-banks and (3) cross-border financing can be significant. Therefore, CRE deserve a specific treatment.

Graph 1: **Bank exposure to real estate (mortgage credit as % of GDP)**



Note: Reference period: Q3 2020. For ES and PT, mortgage loans to households were proxied by loans for house purchase and mortgage loans to NFCs were proxied by total mortgage net of loans for house purchase. For FI, mortgage loans to NFC were proxied by total mortgage loans net of mortgage loans to households, and for MT mortgage loans to households were proxied by total mortgage loans net of mortgage loans to NFC.
Source: ECB CBD and Eurostat.

Large fluctuations in house prices are a well-documented feature of the business cycle. Demand for housing and the level of house prices depend crucially on the availability of credit. Given the importance of house prices for collateralised lending, their swings have major repercussions for credit markets and the banking sector. The housing sector is therefore an important component of the transmission channels between the credit and the business cycles and can act as a propagation mechanism for shocks.[3] The link between house price fluctuations and business cycles has been well documented empirically (e.g., Stock and Watson, 1999). Given that housing represents the major component of household wealth, house price fluctuations also affect consumption dynamics via "wealth effects". Moreover, since, house price dynamics are strongly linked to dynamics in the construction sector, which accounts for a volatile component of GDP, they impact the business cycle by affecting housing supply.[4] In general, house price cycles and mortgage markets tend to lead business cycles, and recessions that coincide with house price busts tend to be more severe (e.g., Igan et al., 2009, Iacoviello and Neri, 2010).

---

[3] The collateral role of property magnifies business fluctuations by virtue of a two-way amplification process between rising house prices and credit boom during the upswing, and declining prices and a credit crunch during the downturn, which give rise to a "financial accelerator" mechanism (e.g., Bernanke, Gertler and Gilchrist, 1999; Kiyotaki and Moore, 1997).

[4] Residential investment exhibits higher volatility compared to other components of GDP (ECB, 2018a).

The housing sector is prone to the formation of bubbles. The strong degree of persistence in house price changes is indicative of the possible presence of bubbles, namely large increases in prices delinked from fundamentals (Case and Shiller, 1990; 2003). Bubbles are driven by expectations that are self-fulfilling up to the point in which events occur that lead agents to suddenly revise their expectations and behaviour. A number of intrinsic distinguishing features explain why bubbles are typical characteristics of housing markets. First, there are long lags for the adaptation of housing supply to changing demand conditions, which underpins large and persistent house price swings (e.g., Ball et al., 2010). Second, bubbles can become self-sustaining in light of the key role of house prices as collateral, because expectations of house price growth create the conditions for easier financing conditions. Third, as opposed to bubbles in financial assets, real estate bubbles cannot be mitigated by short sales and bear speculation

Housing market bubbles are closely associated to banking crises. The bursting of housing bubbles may be associated with sharp and large price corrections leading to mortgage distress and deterioration in the quality of banking sector balance sheets.[5] Banking sector bankruptcies are normally followed by deep and long recessions, and the weakening of banks' balance sheets may imply subdued credit growth and very protracted slumps in economic activity (Jordà et al., 2015). Most countries that experienced a twin boom in real estate and credit markets ended up suffering a financial crisis and a severe contraction of GDP (e.g., Crowe et al., 2011, Jordà et al., 2013, Claessens et al., 2013). Major housing bubbles were at the heart of the boom-bust dynamics in credit and output in a number of euro area countries over the crisis period, including Ireland, Latvia and Spain.

There is now awareness that appropriate policies need to be put in place to prevent and contain the macro-financial implications of real estate boom-bust dynamics. Notwithstanding the large risks involved, for a long time the policy approach to real estate booms has often been one of “benign neglect”, in light of the difficulty to identify unsustainable real estate booms in a timely manner, and also because the costs associated with preventing a boom have often been deemed to outweigh the costs of cleaning up after a bust (e.g., Crowe et al., 2011). The global financial crisis, highlighting the major potential dangers of real estate busts, has challenged this conventional wisdom. In particular, there is growing awareness that real estate-related episodes of macro-financial instability could have been avoided or mitigated in the presence of more appropriate monetary policy measures, fiscal incentives, regulation and supervisory frameworks (e.g., Arezki et al., 2015).

Policies affecting housing markets are also motivated by objectives other than addressing boom-bust dynamics, notably to ensure housing affordability. Societal and distributional considerations are at the basis of policies aimed at ensuring affordable housing to low-income households (e.g., by means of social housing supply or regulation of private housing supply, including rent control). Moreover, public authorities often encourage homeownership, as this is argued to be associated with a higher rate of wealth accumulation, better educational achievement of children, more community engagement and neighbourhood stability, improved property condition and maintenance (e.g., Andrews and Sánchez, 2011). A number of policies may impact on overall housing affordability (i.e. with respect to the medium income households), including the regulation of rents, the supply of social housing or fiscal measures, such as the deductibility of mortgage interest payments that reduce the marginal cost of acquiring housing (see section 4). Conflicts may arise between the different objectives of policies affecting housing markets, including for instance between policies to prevent boom-bust dynamics and fiscal measures aimed at promoting home ownership.

---

[5] Housing market crashes are phenomena that spread widely throughout the economy and that cannot easily be insured in light of the largely undiversifiable risk involved. The US sub-prime mortgage crisis in 2008 illustrated the limits associated with financial products involving insurance against default in the presence of a marked and widespread correction in real estate prices.

3. HOUSING MARKET DEVELOPMENTS IN THE EURO AREA

Housing market developments have a relevant euro area dimension. House price dynamics commove quite closely across euro area countries. The correlation of (the cyclical component of) real house prices across the euro area is only slightly lower than for the business cycle (0.50 vs. 0.65),[6] largely due to idiosyncratic housing developments in a few countries. In light of their relevance for the euro area-wide business cycle and inflation, house price dynamics matter for the conduct of the single monetary policy. House price dynamics also matter for the valuation of bank collateral and for developments in mortgage finance, thus having implications for an increasingly integrated financial system of the euro area. Finally, by having an impact on the lending, house price and market characteristics also affect the effectiveness of the single monetary policy.[7]

Housing markets present significant differences across euro area countries. Despite the considerable correlation of housing cycles across the euro area, housing markets differ across euro area countries in several important aspects. The rate of home ownership varies significantly (from 50% in Austria and Germany to 90% in Lithuania and Slovakia, see Graph 2) and this may be one reason why housing cycles are relatively less synchronised across countries than business cycles (Rünstler and Vlekke, 2018). Rental markets differ across Member States as well, both in terms of size and in terms of regulatory framework (more details can be found, e.g., in Cuerpo and Pontuch, 2014). The ratio of household mortgage debt to GDP shows wide dispersion (20% in Latvia and Lithuania to more than 100% in Cyprus and the Netherlands) as does the ratio of financial assets held by households (80% of GDP in Slovakia to 340% of GDP in the Netherlands). There are also relevant differences in mortgage contracts, both for what concerns average loan-to-value ratios (LTV), which range from 50% in Italy to 90% in the Netherlands, and as regards the nature of mortgage contracts, with predominance of fixed interest rates in some countries (e.g., Germany, France) and variable interest rates in others (e.g., Greece, Spain).[8] While the dispersion of these characteristics across Member States is substantial, their changes over time are relatively minor, and thus significant structural differences across the euro area tend to persist. The interplay between diverse structural features of housing markets in the euro area countries can be linked to their distinct developments across time, as discussed below.

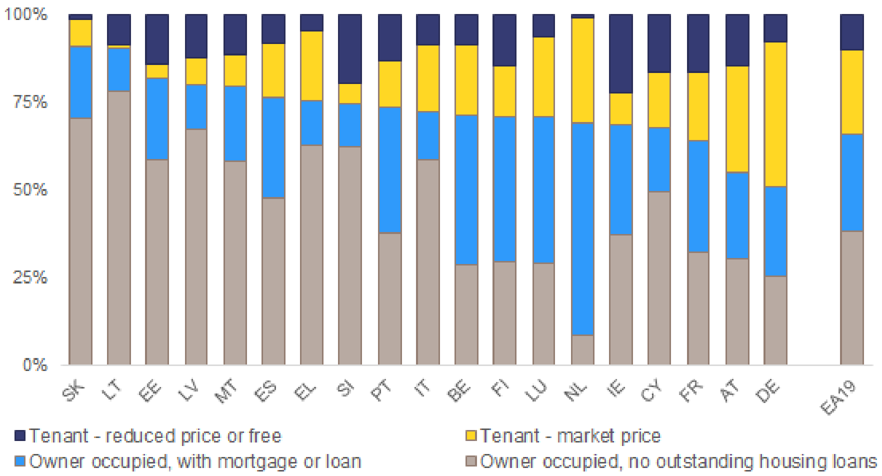
---

[6] See Monteiro and Vašíček (2018).

[7] It has been shown that structural features of housing market, e.g. home ownership rates, induce heterogeneity of monetary policy transmission (see e.g., Koeniger and Ramelet, 2018).

[8] Data from European Commission, ECB and national statistical offices and central banks.

Graph 2: **Distribution of population by tenure status in euro area countries, 2019 (% of population)**



Source: Eurostat.

3.1. MAIN DEVELOPMENTS IN EURO -AREA HOUSING MARKETS SINCE THE EARLY 2000S

Before the global financial crisis, housing booms in the euro area occurred especially in countries where credit conditions eased the most. While during the 2000-2007 period real house price growth was subdued or even negative in a number of euro area countries (e.g., Austria, Germany, Cyprus, Portugal), in other countries (e.g., Estonia, Latvia, Lithuania, Malta, Spain) it was very strong and sustained, with growth rates above 50% over the whole period (Graph 3). This latter group of countries was also characterised by strong credit dynamics associated with financial development and integration (notably, Latvia and Lithuania) and reduced interest rates on mortgages ensuing from interest rate convergence associated with the process of monetary integration.[9]

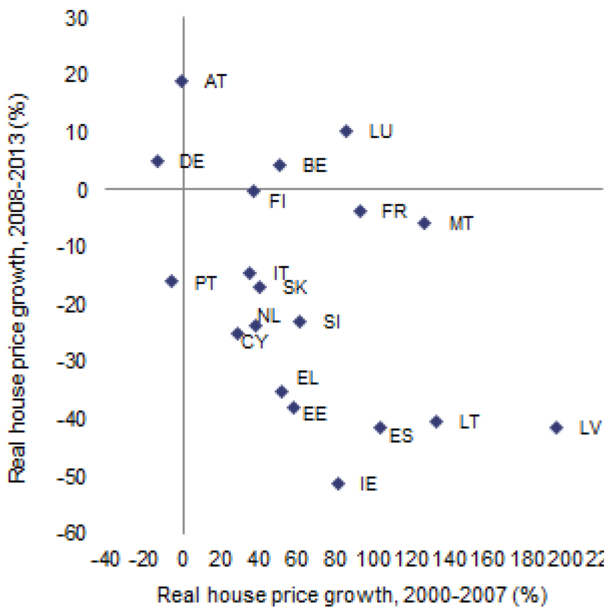
After the global financial crisis, dynamics in house prices reflected the need to correct unsustainable trends in a number of Member States. In the aftermath of the financial crisis real house prices embarked on a decreasing path, especially in countries characterised by booms in the pre-crisis period (Ireland, Latvia, Lithuania, Spain), while growth continued in a handful of countries (Austria, Belgium, Germany, Luxemburg).

The post financial crisis recovery in house prices started in 2013 and gradually acquired momentum. The recovery of prices started timidly in 2013 but in more recent years several Member States recorded very dynamic price growth (Ireland, Luxembourg, Portugal, Estonia, Lithuania, Slovakia; see Graph 4) in some cases even offsetting the post-crisis declines. Resuming house price growth reflected the economic recovery and protracted very low interest rates. Moreover, in some countries such as Germany net migration flows also played a role. Conversely, there were several countries where prices have been stagnant (Finland, Greece) or even declined (Italy) over this period.

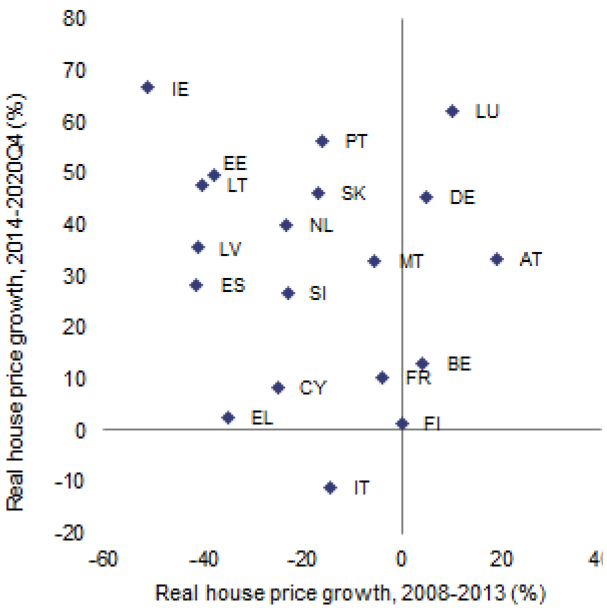
---

[9] It is to be remembered that several of the current euro area members were not part of the euro area in the pre-crisis period.

Graph 3. **Real house price growth in 2000-2007 vs. 2008-2013**



Graph 4. **Real house price growth in 2008-2013 vs. 2014-2020**



Note: Due to missing data, the initial period is 2005-2007 for EE, 2002-2007 for CY, 2003-2007 for SI and 2006-2007 for SK. Real house prices are nominal housing prices that are deflated by final consumption expenditure of households deflator.
Source: Eurostat, own calculations.

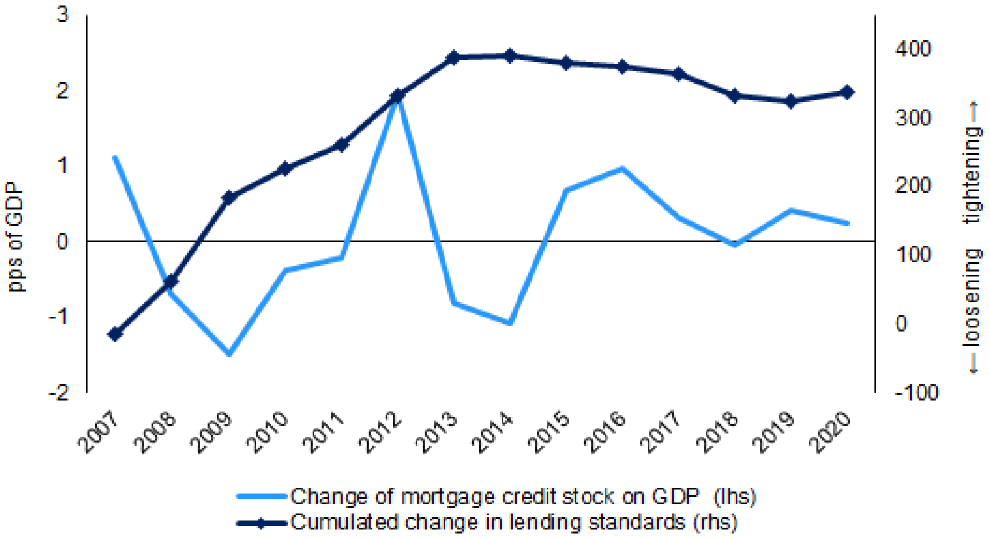
The household sector underwent a significant deleveraging process in most euro area countries, but a debt pick up has become visible in a few Member States more recently, especially regarding new mortgages. The outstanding amount of mortgage credit in the euro area doubled between 2000 and 2007 (e.g., Philiponnet, 2017). Credit conditions tightened after the global financial crisis and deleveraging by households resulted in a sudden reduction of mortgage credit as a share of GDP, with a recovery in 2010 which proved only temporary (Graph 5). While banks started to ease credit standards in 2013, such relaxation was not sufficient to compensate for the tightening of credit standards put in place in the years following the financial crisis.[10] The stock of mortgage credit as a share of GDP was still falling in 2013 but at a decelerated pace, and started growing moderately since 2014. Data relating to changes in the overall mortgage stock do not permit to disentangle dynamics linked to the repayment of outstanding debt or to the creation of new mortgages. Graph 6 reports data relating to new mortgages only, and compares developments in recent years with those prevailing before and during the period of the global financial crisis for the euro area countries (for which data are available). It appears that new mortgage credit dynamics in the countries that underwent booms in the pre-financial crisis period are more contained (notably in Ireland and Spain), while in the other countries the opposite holds.[11]

---

[10] The quarterly Eurosystem bank lending survey assesses changes in lending standards. A "tightening bias" is defined as a situation where banks report more often a tightening than a loosening of credit conditions. This definition limits the interpretation of cumulated changes in credit conditions. However, specific questions where introduced on the level of credit standards since 2014.

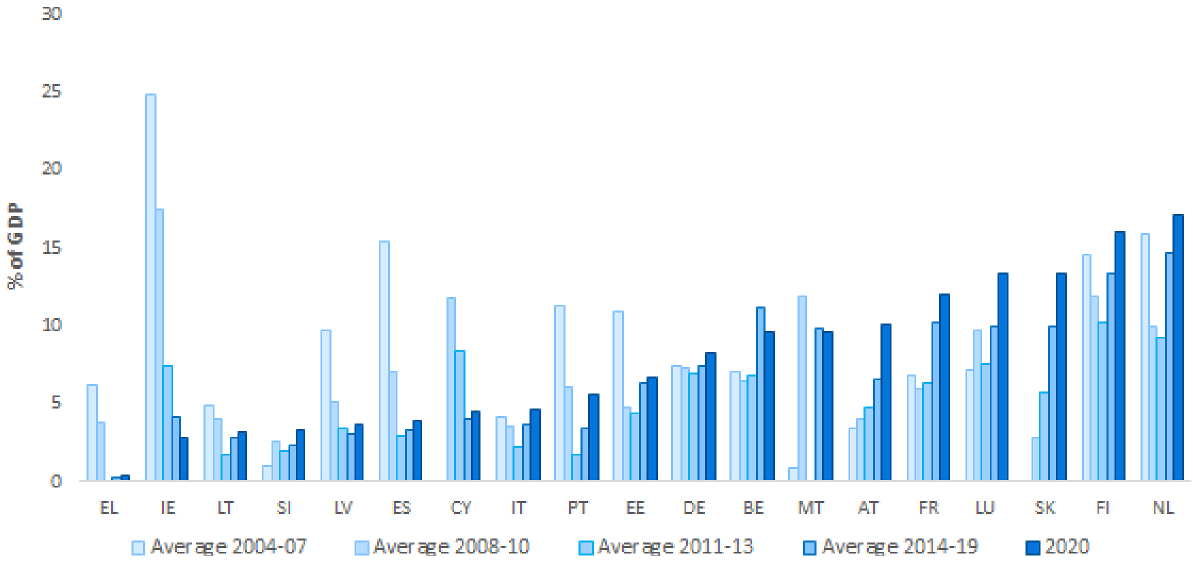
[11] However, a significant share of new mortgages reported (approximately 20% in most Member States but almost 50% in Finland and the Netherlands) represents renegotiations of existing mortgage loans. See also ECB (2018b).

Graph 5: **Change of mortgage credit (on GDP) and lending standards in the euro area**



Note: Mortgage credit is measured as a share of GDP. LV is included in the aggregate for the first year in 2010, EE in 2008, SK in 2006, MT and CY in 2005. Together, these Member States represent 0.9% of total mortgages in the EA. The cumulated change in lending standards is measured as the cumulated net percentage change in lending standards for the euro area since 2003. Net percentage changes are defined as the difference between the share of responding banks reporting a tightening of credit standards and the share reporting a loosening.
Source: ECB, European Commission.

Graph 6: **New mortgage credit in different periods and euro area countries**



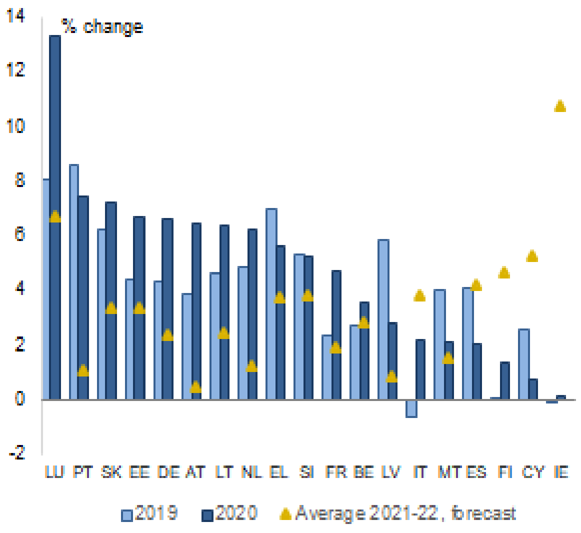
Note: Loans for house purchase, new business (pure new business and renegotiations). Data unavailable for for EL (2011-2016), LU (2005 and 2008), MT (2005-2006 and 2009-2013).
Source: ECB.

3.2. RECENT TRENDS AND POST-COVID PROSPECTS FOR HOUSING PRICES AND HOUSEHOLD CREDIT IN THE EURO AREA

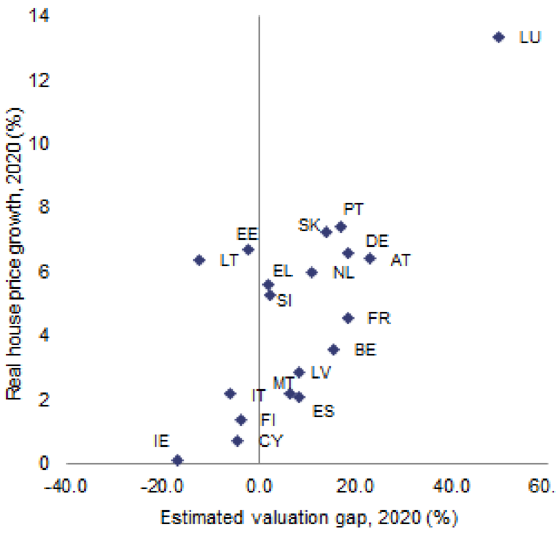
House prices kept increasing in most euro area countries in 2020 despite the pandemic. In spite of strong recession, house price growth did not markedly slow down in 2020, and in half of the euro area countries it even accelerated (Graph 7). A number of possible explanations for this evidence are as follows. First of all, house price data for 2020 may not fully reflect the impact of the COVID crisis as the transactions were in many cases agreed before the COVID outbreak. The price formation could be also affected by lockdowns of both housing markets and construction sector.[12] Apart from delays in data collection, house prices may have not cooled down like during the previous recessions for additional reasons. While the pandemic brought about a contraction in market incomes, the shock was increasingly perceived by households as temporary as progress with vaccinations was becoming evident. Hence, permanents incomes and consumption patterns, including the consumption of housing services, were not hit as much as current incomes. Moreover, most countries adopted income support schemes and restricted layoffs, which contributed to contain income losses. Additionally, standard fundamental variables affecting house prices such as real interest rate and house supply did not change due to the COVID-19 shock. Finally, the monetary and fiscal policy mix has been highly supportive as have macroprudential and regulatory policies, which had positive impact on income, inflation expectations and credit provision in 2020.

In several countries, sustained house price growth has taken place from values that were already in overvalued territory (Graph 8). Protracted strong price growth in past years in some countries, notably in Latvia, Portugal and Slovakia, have gradually moved them from negative towards positive valuation gaps (details on valuation are provided in Sect. 4.2). Strong price growth has been also recorded in Estonia, Lithuania and Greece, which show no sign of overvaluation.

Graph 7. **Evolution of real house price growth**



Graph 8. **Real house prices growth and valuation gaps in 2020**



Note: Real house prices are nominal housing prices that are deflated by final consumption expenditure of households deflator. The valuation gap is estimated as an average of three metrics: the deviations of the price-to-income index from its long-run average, the deviation of the price-to-rent index from its long-run average, and the deviation of the real house price index from a benchmark derived from multivariate regressions on fundamental economic factors.
Source: Eurostat, ECFIN calculations.

---

[12] While the most stringent lockdowns took place in Q2 2020, there is no common pattern in terms of quarterly growth rates of house prices in 2020. While in a few countries (Estonia, Latvia, Cyprus, Slovakia, Greece) house prices growth significantly slowed down in Q2 compared to previous quarters, in most euro area countries they were no affected and in some of them (even slightly accelerated).

House price dynamics is likely to moderate going forward, mainly in light of weak labour income growth, though major downward corrections are unlikely. House prices are expected to be affected by countervailing forces. While the GDP growth in 2021 and 2022 is expected to be sufficient to compensate for the loss in 2020 (European Commission, 2021), wages and employment may recover only slowly resulting in still weak growth of household income (European Commission, 2020a, European Commission, 2021). House price forecasts based on a multivariate regression model (Philiponnet and Turrini 2017, European Commission, 2020b) point out to softening housing markets through 2021 and 2022 in a majority of Member States (Graph 7).[13] A weak labour income growth explains the large part of the expected decelerations. However, as discussed above, it is hard to judge the extent to which income weakness is perceived as permanent, therefore affecting household demand behaviour. Increased household savings would support for some time housing demand. Moreover, there are additional long-term structural factors that go beyond the standard drivers considered in standard empirical house price models that may play a role going forward, including new working models affecting demand for non-residential dwellings, geographical patterns for house price growth (e.g., urban decongestion may lower pressures in cities, which have been important historical drivers of the evolution of aggregate price indices), and shifts in the housing characteristics being demanded.

Mortgage credit has remained rather resilient during the pandemic, unlike in previous crises. The lending for house purchases remained resilient in 2020 consistently with relatively resilient labour market conditions, supported by short-time working schemes. After some slowdown in the first half of 2020, likely due to confinement measures, mortgage credit picked up in second half of 2020 (particularly in Cyprus, Germany and France) amid some relaxation of lending standards. Loan repayments in turn slowed in 2020 compared to previous years, notably in some Member States where payment moratoria were also extended to residential mortgage loans (Austria, Belgium, Germany, Spain, Italy, Latvia, Malta and Portugal). Going forward, there is still some uncertainty regarding mortgage credit growth as the tightening of the credit standards for households in the second half of 2020 was followed by slight easing in early 2021.[14]

4. ASSESSING HOUSING MARKET CONDITIONS IN THE EURO AREA

The assessment of housing market conditions from the macroeconomic surveillance perspective require linking house prices to other key variables. The evaluation of the likelihood of boom-bust dynamics in the real estate sector needs to take into account the interaction of dynamics in house prices with those in household credit (subsection 4.1). Understanding housing price valuation requires assessing house price levels vis-à-vis their long-term fundamentals such as income or housing stock (subsection 4.2).

4.1. CO-MOVEMENTS BETWEEN HOUSING AND CREDIT CYCLES IN THE EURO AREA

Housing price developments are closely linked to mortgage dynamics in the euro area. There is a close co-movement between housing prices and mortgage credit, both at the euro-area level (Graphs 9 and 10) and in individual Member States (Graph 11). The literature has found large and long cycles in credit and house prices, which are highly correlated with a medium-term component of GDP cycles (e.g., Rünstler and Vlekke, 2018). Recent literature documents that shocks in credit and housing prices are sometimes the autonomous driver of the business cycle (e.g., ECB, 2018a, Monteiro and Vašíček, 2018).

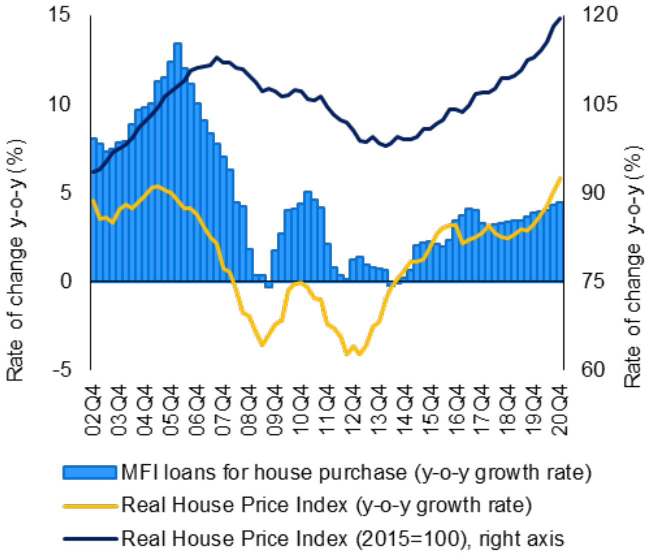
---

[13] The house price forecasts reported are based on predictions from an error correction specification of a panel cointegration framework where nominal house prices are in a long-run cointegration relation with the consumer price deflator, population, the real disposable income per capita of households, interest rate, the stock of residential dwellings expressed in squared meters. The model is estimates across EU countries over the 1970-2019 period.

[14] ECB (2021): The euro area bank lending survey – First quarter of 2021.

Before the crisis, easing credit conditions contributed to buoyant house price growth. In the decade preceding the global financial crisis, the combination of liquidity available in the banking sector, easy credit conditions and positive housing price outlook were at the ground of a rapid increase in mortgage credit. At euro-area level, a sustained expansion of mortgage credit characterised the whole period 2000-2008, with particularly strong dynamics at the beginning of the decade and again starting from 2004. Over that period, real house price growth at euro-area level was constantly positive, with peaks close to 5% per year (Graph 9). With a view to separate structural from cyclical developments, Graph 10 compares co-movements in the euro-area housing and credit cycle over a longer horizon, suggesting that the acceleration of the credit cycle in the early 2000s preceded that of the housing cycle, with a strong feedback loop between credit and mortgage cycle.[15] Similar dynamics are observed at Member State level (Graph 11).

Graph 9: **Real house price growth and mortgage credit growth in the euro area**



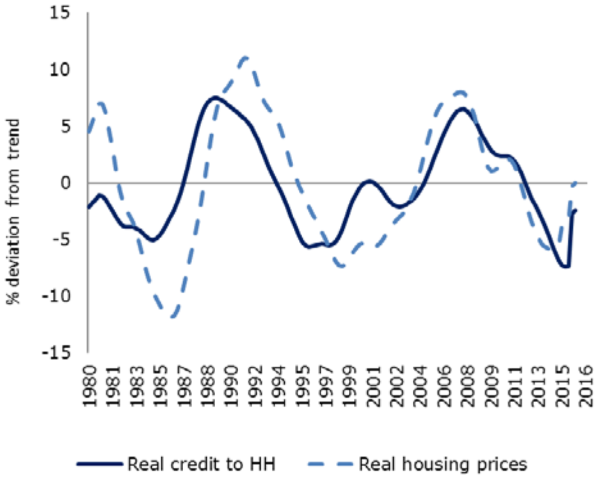
Source: Eurostat, ECB, own calculations.

With the crisis, mortgage credit contracted, followed by negative house price growth at euro-area level. Already before the collapse of Lehman, mortgage credit, still at very high historical levels, started decelerating on the back of an already ongoing moderation in house price growth (Graph 9). By 2008, mortgage credit virtually stopped growing, followed by growth in real house prices entering in negative territory. After the double-dip recession, credit and housing sector dynamics started to recover alongside the general economic recovery that started in 2013. House price growth for the euro-area aggregate resumed in 2013, initially in terms of house prices falling at lower rate, and subsequently with house price growth entering positive territory. From the viewpoint of timing, the recent recovery in house prices seems to have preceded that in household credit and was taking place on the back of credit growth which was relatively subdued compared with the pre-crisis period, which is evident both from euro-area aggregate figures and at country level (Graphs 9 and 11).

---

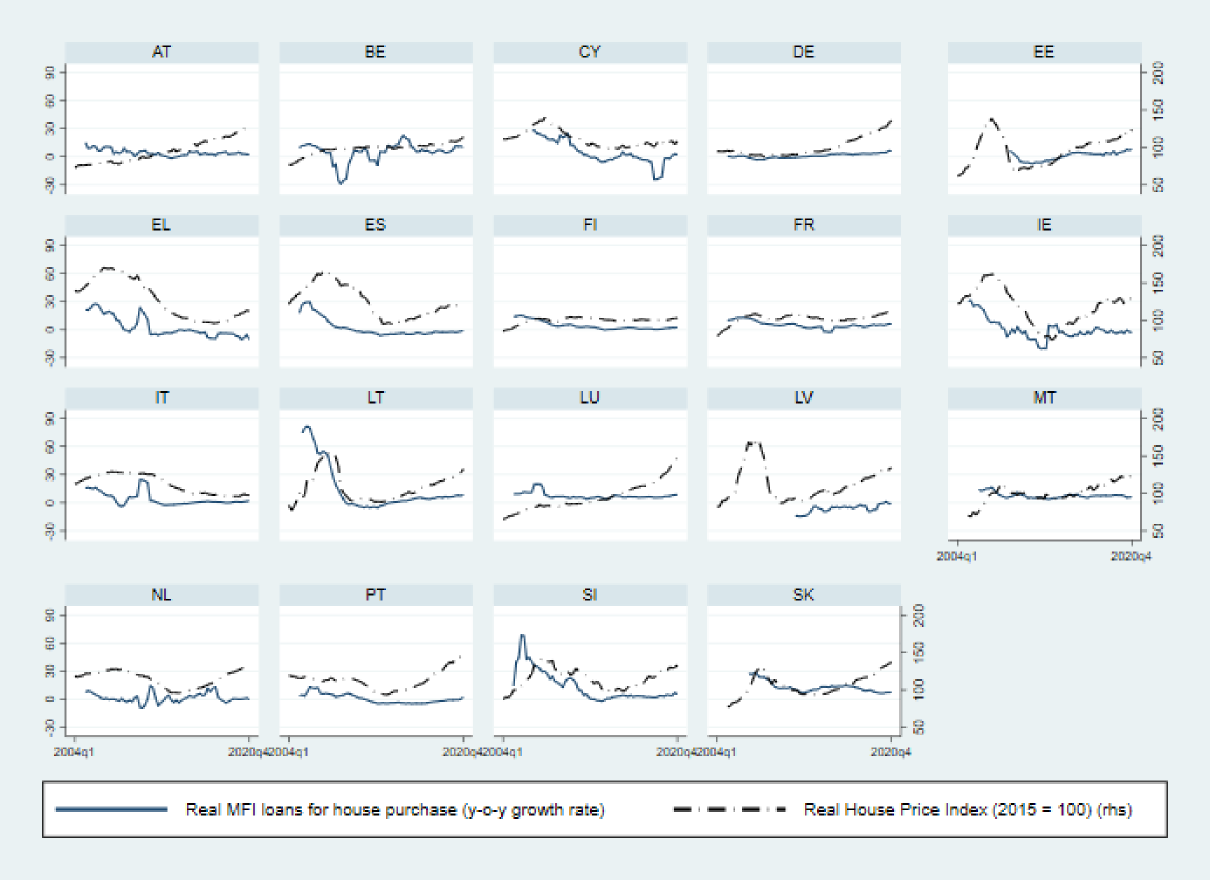
[15] It has been argued that cycles in financial variables are longer than business cycle (Borio, 2012). The same typically goes for real estate (Bracke, 2013). Therefore, trend vs. cycle decomposition of credit and housing prices is feasible only for 8 euro area countries whose data start in early 1980s, namely Belgium, Germany, Spain, Finland, France, Italy, Luxembourg and the Netherlands. The euro area aggregate is based on these 8 countries only.

Graph 10: **Cyclical components of house prices and credit to households in the euro area**



Note: The country-level cyclical component is derived (using a band-pass filter with a frequency band of 8-80 quarters) for two (logged) variables for each EA country (8 EA countries with sufficiently long time series: BE, DE, ES, FI, FR, IT, LU, NL). The aggregation of the country-level cyclical components is based on the share of GDP of each country in overall EA-8 GDP. The sample used for estimation is 1980-2016.
Source: ECB, BIS, own calculations.

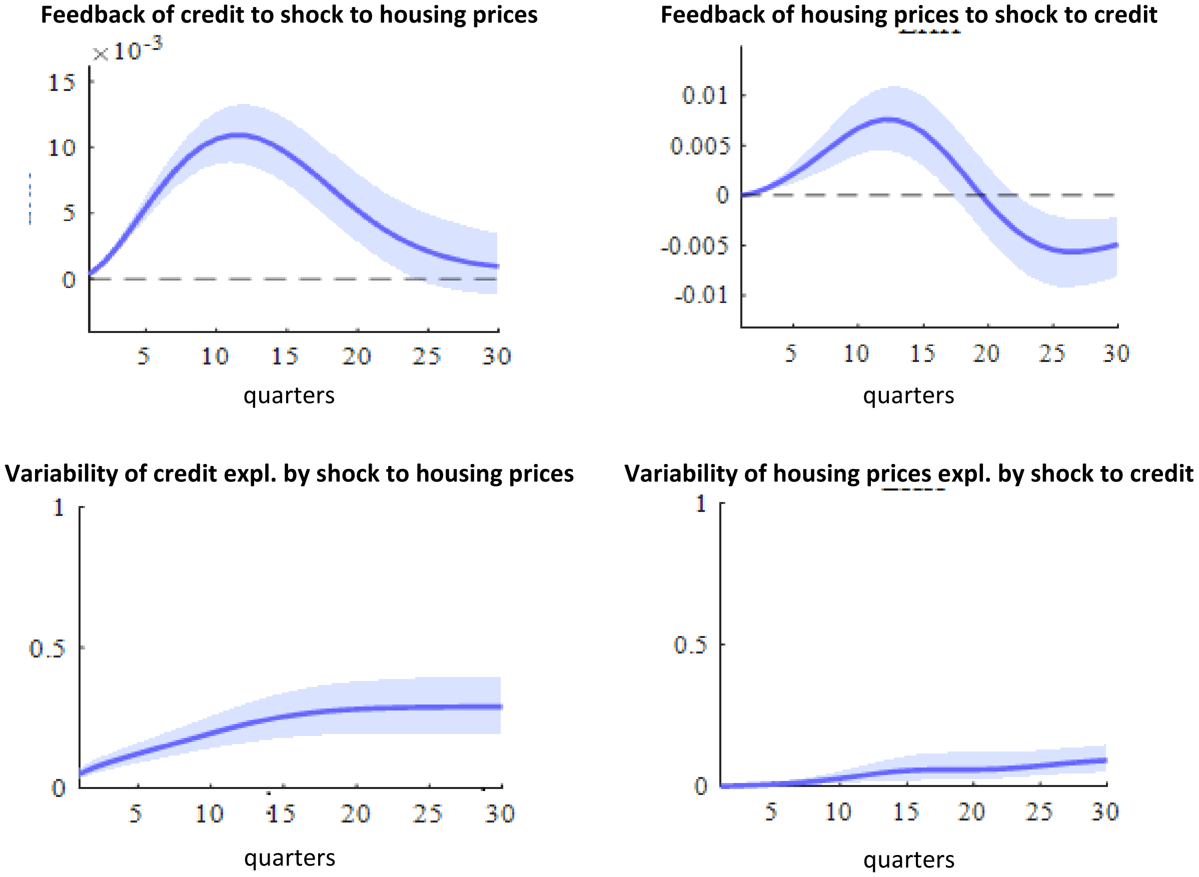
Graph 11: **Real house price growth and real mortgage credit growth in euro-area countries**



Source: Eurostat for house prices, ECB for MFI (monetary financial institutions) loans.

The post-2013 house price recovery seems to have mainly reflected fundamentals, with relatively limited unfolding of feedback loops between housing prices and credit. The post-2013 recovery in house prices preceded that of credit, and took place on the back of resuming income growth and favourable interest rate conditions and renewed confidence. Economic fundamentals are therefore likely to be the factor that triggered the recovery in prices. However, sustained house price dynamics may also set the conditions for stronger credit growth because households cannot afford house purchases without getting more indebted. The fact that credit generally becomes more available when the economic and housing cycle improves tends to feed back into an accelerating growth rate of house prices, thereby leading to a self-sustaining process, and an environment where house price bubbles can emerge in the absence of corrective measures. To shed light on the dynamic interaction between credit and house prices we have estimated a small bivariate vector autoregression (VAR). The evidence suggests that credit shocks can have a sizeable impact on house price growth, while the effects of house price shocks on mortgage credit kick in faster, tend to be more persistent, and explain a larger share of credit variation (Graph 12).[16] Country-level[17] data suggest that despite accelerations both in house prices and in mortgage growth, feed back loops in the period following the recovery after 2013 and up to the COVID-19 crisis outburst appear to have been limited.[18]

Graph 12: **The interaction between house prices and credit (results from panel BVAR analysis)**



Note: Results from bivariate panel Bayesian vector autoregression (BVAR) with real housing prices and real loans to HH. Data available for 9 EU countries (BE, DE, DK, ES, FI, FR, IT, LU, NL), quarterly (1980-2015). The variables are in deviations from trend values obtained by band-pass filter (see note to Graph 4). BVAR with 4 lags, impulse-response functions (IRFs) and forecast-error variance decompositions (FEVD) were derived using Cholesky ordering with housing prices ordered first.
Source: Eurostat, ECB, BIS, own calculations using BEAR toolbox.

---

[16] Similar evidence for the US is reported in Igan et al. (2009).

[17] Eurostat is the main source for house prices, and ECB for MFI (monetary financial institutions) mortgage loans.

[18] Integrated country-specific analyses are part of regular economic surveillance carried out by, inter-alia, the ESRB, the European Commission, the ECB and the IMF.

4.2. ASSESSING VALUATION GAPS IN HOUSING MARKETS

In order to assess valuation in housing markets, a number of specific metrics are routinely used. Assessing whether current housing valuations are in line with economic fundamentals and are likely to evolve over stable trajectories, or rather whether they can become subject to considerable adjustment, involves a number of difficulties, as it is the case for asset prices in general. In a nutshell, actual house prices need to be compared with appropriate benchmarks capturing the effect of fundamentals. Different benchmarks build on different concepts of 'house price equilibrium', i.e. on different requirements for house prices to be considered as sustainable in the absence of sharp corrections. Each of these benchmarks contributes to shape views on valuation gaps bringing insights from different perspectives. As such, the various approaches listed below provide complementary information:

- *The price-to-income ratio* provides insights into whether housing is becoming less affordable by comparing changes in the house price index to that of households' gross disposable income per capita. The ratio helps to identify potential risks of corrections. A sustained rise of the ratio can result in houses becoming increasingly unaffordable, possibly reflecting a mismatch between housing supply and demand, and leading at some stage to downward pressure on house prices.
- *The price-to-rent ratio* allows assessing whether the price of owning a property is becoming expensive compared to renting. The comparison of current price-to-rent ratio to its long-term average provides an assessment of the yield that investors can expect from housing investment. An increase in the ratio will induce agents to rent rather than to buy while a decrease will encourage them to buy instead, which will tend to bring the price-to-rent ratio back in line with its long-term average.
- *Model-based benchmarks* based on multivariate regression analysis permit to take into account the simultaneous impact of various fundamental drivers of house prices. These drivers can include population, real disposable income per capita, real housing investment and real long-term interest rates. The benchmarks are obtained as the predictions from these empirical models.[19]

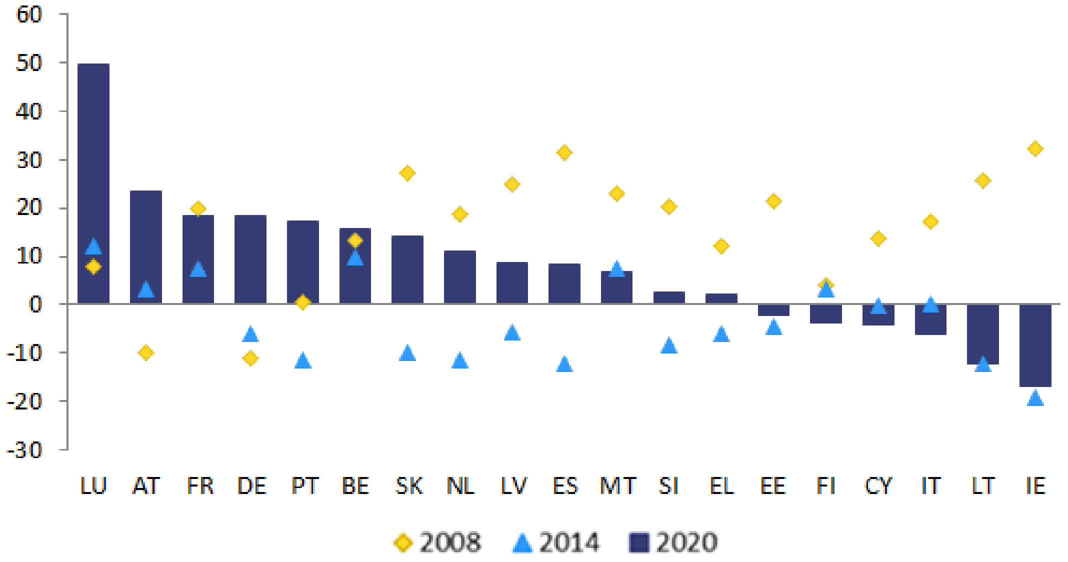
On the basis of a synthetic indicator of valuation gaps, overvaluation was widespread before the global financial crisis, while currently cases of overvaluation are less common and generally more moderate. Graph 13 displays valuation gaps computed according the methodology used by the Commission, which combines information from the three approaches reviewed above.[20] It is visible that while many euro area countries were characterised by positive overvaluations in 2008 (with overvaluations close to or above 20% observed in Ireland, Latvia, Malta, Spain, Slovakia), the valuation gaps were generally reduced in the post-crisis period. As of 2020 the picture was more differentiated. Several countries where house prices underwent considerable downward corrections still display evidence of undervaluation (e.g., Cyprus, Estonia, Lithuania, Italy, Ireland). The most evident overvaluations are observed in countries where the downward adjustment in prices has been moderate or nearly absent and where prices have grown very dynamically in the recent years, outpacing both income growth and rent growth (Luxemburg, Austria, France, Germany, Portugal). Whereas there are more countries moving into the overvaluation territory in the last years (e.g. Slovakia, the Netherlands), a number of countries exhibit broadly "fair" valuations (Slovenia, Greece, Estonia, Finland).

---

[19] For a survey of recent work applied to advanced economies see. e.g., Girouard et al. (2006). Recent examples of studies that estimate house price benchmarks for EU or euro-area economies include Annett (2005), Gattini and Hiebert (2010), Ott (2014), Philiponnet and Turrini (2017).

[20] The methodology was developed in cooperation with the EPC LIME Working Group and routinely used in the context of the European Semester and the Macroeconomic Imbalance Procedure. Its description is contained in Philiponnet and Turrini (2017).

Graph 13: **Valuation gaps for housing prices in euro-area countries**



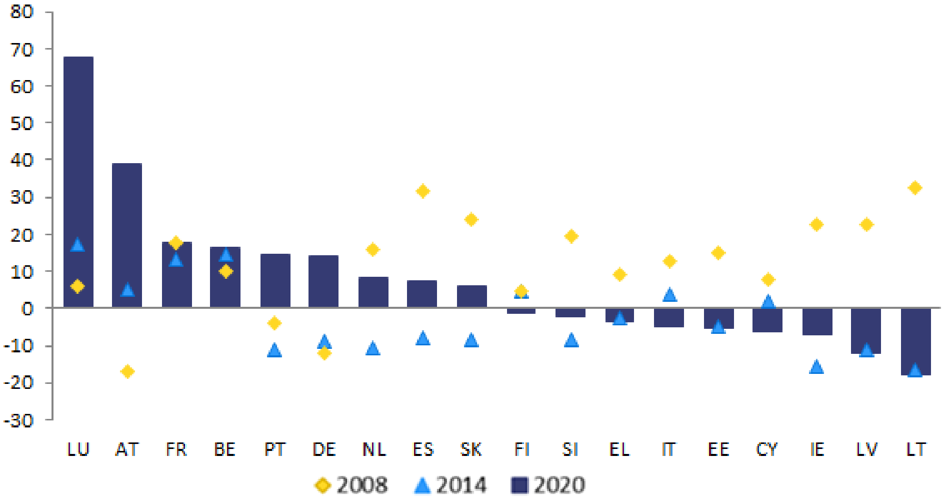
Note: The valuation analysis is based on an average of three metrics: (i) affordability gap (price-to-income deviation with respect to its long-term average); (ii) dividend gap (price-to-rent deviation from its long-term average); and (iii) estimates of deviations of house prices from equilibrium values justified by housing demand and supply fundamentals (see Philiponnet and Turrini, 2017).
Source: own calculations.

As house price indices do not allow for a direct cross-country comparison of valuation metrics, estimates of house prices in level could provide useful complementary information. All valuation metrics built from house price indexes rely on the assumption that country-specific averages of house prices and other explanatory variables are informative for the construction of house price benchmarks. However, for some countries such series are hardly representative as they are very short. Moreover, the different length of house price series creates an issue of cross-country comparability. Estimates of house price in levels therefore provide useful complementary information. Graph 14 displays affordability (price-to-income) ratios built from house price indices across euro area countries. Valuation gaps are generally broadly in line with those obtained with the synthetic method discussed above. Results change somehow when using as a gauge of affordability the estimates of house prices in levels. Graph 15 displays price-to-income in levels expressed as the number of years of disposable income necessary for an average household to purchase a 100 square meter dwelling. [21] It turns out that, a number of countries rank higher in terms of price to income in levels, as compared with results obtained from affordability ratios built from indices, notably Ireland and Cyprus, while some countries rank lower, in particular Belgium and Finland.

---

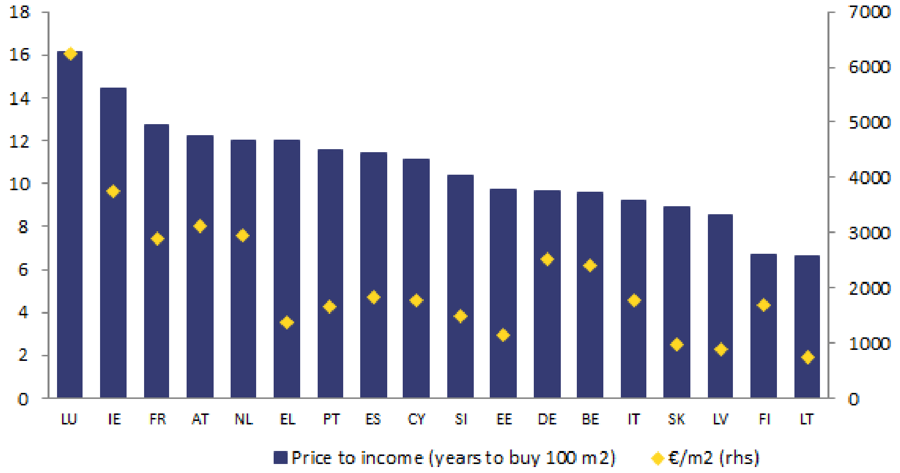
[21] These estimates are based on a number of hypotheses described in European Commission, 2016; Box. I.4 and Bricongne et al., (2019).

Graph 14: **House price affordability gaps in euro-area countries**



Note: The house price affordability indexis the ratio between the house price indix and the index of per capita gross disposable income of household and non-profit institutions serving households (NPISH). The house price affordability gap is the difference the house price affordability index for a specific year and the long-term average (see Philiponnet and Turrini, 2017). Data for Malta is missing.
Source: Eurostat, OECD, ECB, BIS, AMECO.

Graph 15: **Estimates of price per m² and price-to-income in euro area countries, 2020**



Note: The estimate is obtained from information on the value of total dwelling assets from national accounts and the total surface of dwelling assets from national censuses. When this information is not available estimates are based on price offers quoted on the websites of real estate agents and corrected for a factor capturing the upward bias compared with transaction data. (see Bricongne et al., 2019, and European Commission, 2016). Price to income figures refer to the ratio of per capita gross disposable income of household divided by the cost of 100 square meters of residential dwellings.
Source: BIS, OECD, Eurostat, WID.world, NSIs, central banks, censuses, other sources, own calculations.

All in all, available metric indicate that house prices may depart from levels justified on the basis of economic fundamentals. Irrespective of the specific methodology chosen, valuation gaps can be sizeable and persistent. Despite common patterns in house price developments across the euro area, valuation gaps are to a large extent country-specific. The following section discusses how policies can contribute to steer house prices in such a way to prevent adverse implications for macro-financial stability.

5. POLICY RESPONSES TO ADDRESS HOUSING-RELATED RISKS

5.1. MONETARY POLICY

The scope of monetary policy in terms of targets and instruments has been a debated topic during the recent years. One of the questions is whether monetary policy should also aim to ensure financial stability, although the debate on whether monetary policy should respond to asset prices in order to prevent bubbles is not new (e.g., Bernanke and Gertler, 2000; Bordo and Jeanne (2002).

Monetary tools do not allow for sufficiently targeted intervention to address real estate-related risks. The prevailing view remains that the policy rate controlled by monetary authorities does not permit a sufficiently targeted intervention to deal with risks and imbalances closely associated with real estate sector (Blanchard et al., 2013). It follows that alternative, more targeted tools could be preferable if the harmful dynamics originate exclusively or mainly from the real estate sector.

Monetary "leaning against the wind" to tame house price bubbles involves costs while offering uncertain benefits. Changes in policy rates affect the cost of mortgages and aggregate demand, thereby potentially having an impact also on house price dynamics. However, “leaning against the wind” (i.e. monetary tightening on top of what would be justified for price stability objectives for the sake of financial stability concerns) is costly in terms of short-term nominal output growth while benefits in terms of muted house price dynamics appear with lags and are of uncertain magnitude. The tightening required to prevent real estate boom-bust dynamics (with a reasonable probability) would thus likely entail costs so elevated that it does not generally seem like a recommendable rule of thumb (e.g., IMF, 2015; FOMC, 2016; Svensson, 2017).[22] Moreover, in the euro area the monetary policy is designed for the currency area as a whole and cannot respond to specific conditions, including real estate-related risks, of individual Member States.

5.2. TAXATION

Taxation is typically used to raise revenue and have an impact on housing market outcomes. Recurrent property taxation is based on the value of the property. Taxes and stamp duties on real estate transactions, as well as capital gains taxes, can additionally aim at deterring speculation. While imputed rent[23] is commonly untaxed, mortgage interest rate deductibility is often used to favour home ownership. Other tax types, including VAT on construction and renovation, inheritance taxes and measures with negative impact on public finances, including housing-related transfers and social housing, also contribute to shape supply and demand incentives in the housing market.

Housing taxation has relevant efficiency effects. In principle, an efficient tax system should not distort the choice between alternative ways of investing capital (Mirrlees, 1971), and between renting and owning properties (Poterba, 1984). However, ownership is often de facto incentivised by tax systems because homeownership is often considered as publicly desirable (see section 2), and because of the practical difficulties related to the full taxation of imputed rents and capital gains (e.g., Crowe et al., 2011). From the viewpoint of overall tax efficiency, housing taxation is generally considered less distortive and less detrimental to growth than other forms of taxation that have a stronger impact on capital and labour supply (e.g., OECD, 2010; Blöchliger, 2015).[24]

---

[22] For a different assessment see, e.g., BIS (2014).[23] Net imputed rent is an estimate of the value representing the benefit accruing to the household due to not paying full rent. Imputed rent can be useful to compare relative value of home ownership and renting. Imputed rents can be also understood as returns to investment in housing.

[23] Net imputed rent is an estimate of the value representing the benefit accruing to the household due to not paying full rent. Imputed rent can be useful to compare relative value of home ownership and renting. Imputed rents can be also understood as returns to investment in housing.

The design of housing-related taxation also matters for housing market dynamics. Tax *reforms affecting the tax burden on properties* have an impact on the demand of housing, house prices, and construction. For instance, increases in recurrent property taxation affect significantly subsequent house price growth (Crowe et al., 2011). The *design* and composition of housing taxation may also matter for house price dynamics.

- *Transaction taxes* and stamp duties can in principle reduce the risk of bubbles by curbing the incentives to speculate on further house price increases. Evidence is, however, mixed in supporting the view that higher levels of transaction taxes could lower house price volatility and the risk of bubbles.[25] Some theoretical arguments have been put forward in favour of frameworks where transaction taxes move automatically in line with house price growth (Allen and Carletti, 2010). However, transaction taxes will generate more volatile revenue and will tend to discourage property sales and purchases, which may result in a less active housing market and restrict workers' mobility. Along this line, measures taken after the 2008 crisis to address housing market busts by reducing transaction taxes (e.g., the suspension of stamp duties in the UK) appear to have achieved the desired effect.
- *Mortgage interest rate deductibility* impacts directly the incentives to take up debt, thereby possibly contributing to create the conditions for credit-fuelled housing booms.[26] The available cross-country evidence is not fully conclusive that more generous deductions are associated with a more likely build-up of excessive house price growth (Crowe et al., 2011), possibly due to the fact that, among other things, effects depend to a considerable extent also on how the deductions are designed and possibly adapted during housing cycles. The evidence however identifies significant effects from limiting and recalibrating mortgage tax deductions (e.g., Agell et al., 1995; Capozza and Seguin, 1996).

Tax instruments are generally not suited to fine tune house price dynamics over the short term. Despite having a potential significant impact on housing market outcomes, tax reforms have not traditionally been used to steer house price dynamics over the cycle. Fiscal policy making is notoriously subject to implementation delays. Moreover, housing taxation being aimed at a number of objectives that are generally not primarily linked to taming boom-bust dynamics, the tax reforms that could potentially help addressing unsustainable house price dynamics may not always be politically feasible when needed. All in all, in light of the above limitations, housing taxation reforms for macro-stability purposes have generally had a longer-term orientation and aim at defining framework conditions to reduce the risk of boom-bust dynamics in the housing sector.

Patterns of housing taxation across euro-area countries over the past decade reveal some association with housing cycles.

- The tax contribution to the user cost of owner-occupied housing (i.e. the annual tax-adjusted cost of owning and operating the main residence per additional euro invested in housing capital) in the euro area had been on a downward trend before 2008, and has been growing afterwards (Graph 16). Overall, it appears that, given a falling pre-crisis tax burden, housing taxation did not prevent the building up of real estate booms over that period, while the need to maintain government revenues in the post-crisis period implied an increased tax burden on housing which possibly contributed to downward corrections or subdued dynamics in housing prices.

---

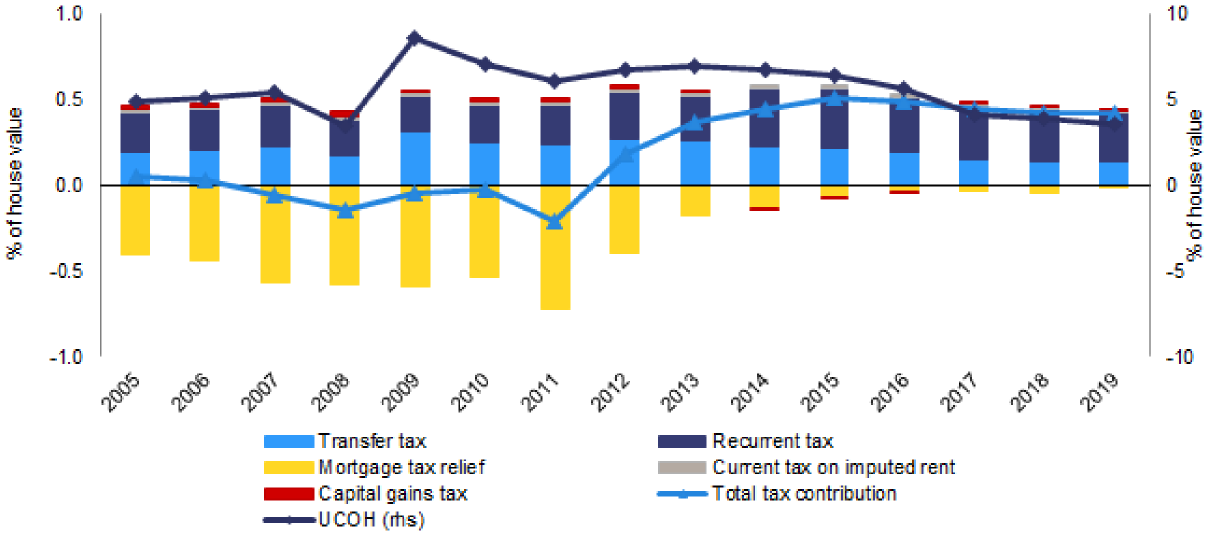
[24] Although taxation of immovable property is the least detrimental to growth (than prevailing labour taxation), it generates relatively little revenue. In 2016, revenue from property taxes was equivalent to 2.6% of GDP in the EU on average.

[25] For instance, while house price volatility has historically been relatively low in a country with high transaction taxes like Belgium, volatility has been relatively high in Japan, despite high taxes on real estate transactions.

[26] Mortgage interest deductibility is aimed at promoting housing ownership, but its effects are often regressive because they benefit only households with sufficient income to become owners and be given a mortgage, and because tax relief is a deduction against earned income. Additionally, generous tax relief tends to raise house prices and rents including at the expense of poorer households.

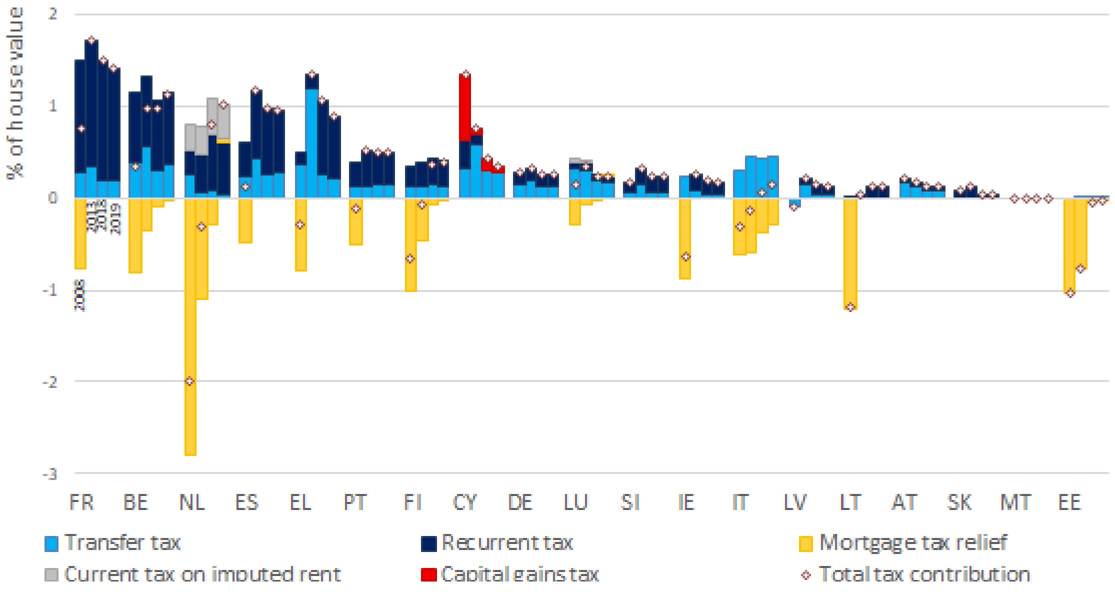
- In terms of tax composition**,** most euro area countries apply a transaction tax at the time of buying the property and a recurrent tax often levied on an annual basis. Only in a few Member States, are imputed rents or capital gains taxed. The overall tax burden is reduced by mortgage interest reductions that have been in use in a majority of euro area countries over the past decade (Graph 17).
- The composition of housing taxation has been changing over the housing cycle observed over the past decade. In particular, mortgage interest rate deductibility has been reduced or abolished in a number of countries in the course of the previous decade (e.g. the Netherlands reduced the high level of mortgage interest rate deductibility and adjusted transaction taxes). In some countries severely hit by the crisis mortgage-related tax deductions were temporarily increased to prevent house price busts (e.g., Ireland). As house prices started recovering, reforms aimed at limiting the scope of mortgage-related tax relief, including with the purpose of reducing the risk of new housing bubbles, have been implemented sometimes in line with recommendations by EU institutions (Council of European Union, 2018; ESRB, 2016, 2019).).

Graph 16: **User cost of owner-occupied housing in the euro area**



Source: https://ec.europa.eu/jrc/en/thematic-research-fiscal-policy/housing-taxation.

Graph 17: **User cost of owner-occupied housing (% of house value) and contribution of taxes to user cost in euro-area countries in 2008, 2013, 2018 and 2019**



Note: The countries are ordered by the total taxes contribution in 2019.
Source: Barrios et al (2019).

5.3. MACRO-PRUDENTIAL POLICY

Macroprudential policy aims at preserving the stability of the overall financial system. While microprudential policy aims at safeguarding the stability of specific individual financial institutions by preventing and mitigating their credit, market, operational and liquidity risks, macroprudential policy is oriented towards the preservation of the stability of the financial system as a whole by limiting systemic risk (i.e. the risk of widespread disruptions to the provision of financial services that have serious consequences for the real economy). Since countries in the euro area are diverse, risks often materialise only in some countries / sectors and there need for accountability, the conduct of macroprudential policies is to a large extent delegated to national authorities. The national macroprudential authorities are in most cases the central banks but can also take the form of a board or council composed of several institutions with powers to ensure financial stability.[27] The national authorities are requested to proceed to a prior notification of the measures decided to the European authorities in order to minimise the risks of regulatory arbitrage and cross-border effects. The experience with the implementation of macroprudential policies in developed economies has been gradually increasing, as awareness of the need to complement existing monetary and fiscal instruments with macroprudential tools has developed relatively recently, notably after the global financial crisis.

In contrast with monetary or fiscal policy, macroprudential tools can be used to specifically target the real estate-related risks. Macroprudential tools have the ability to address the real estate-related risks at source, as they are tailored to policy targets with a direct relation with objectives, namely i) to increase resilience of credit institutions, ii) to tackle sources of boom and bust dynamics themselves. For this reason, macro-prudential tools can in principle achieve higher effectiveness compared with alternative policy instruments while at the same time limiting the clash with competing policy objectives (Crowe et al., 2011). As macroprudential tools are comparatively narrow in scope, they are implemented by independent bodies and, therefore, should be less subject to implementation delays associated with fiscal policies.

---

[27] Such board or council can either be related to the central bank or can be independent, and that the institutions composing it are usually the central bank, the supervisory agencies, and the ministry of finance.

A number of macroprudential tools can potentially address real estate-related risks. A key distinction is between measures directly targeting the lenders versus those targeting borrowers. The first category usually takes the form of capital-based instruments; they improve the resilience of banks by increasing their ability to absorb losses but need not be explicitly aimed at the real estate-related risks. The second category relates mainly to borrower-based instruments that have a direct impact on the conditions at which mortgage loans are granted, affecting the maximum amount of a new mortgage loan and hence the flow of credit. They increase the resilience of borrowers by insulating them from the materialisation of risks related to house price reversals or to household income. And they equally have positive repercussions on the resilience of banks.

Macroprudential tools seeking to influence lenders' behaviour and increase their resilience include:

- *Countercyclical capital buffer* (CCyB): it is designed to counter procyclicality in the financial system. It is aimed at building a capital buffer during periods of excessive credit growth that is released when systemic risks materialise. Capital requirements that are adapted over the cycle can address the risk of pro-cyclical credit by both reducing the likelihood of mortgage booms and building buffers that mitigate the impact of real estate busts and that support renewed lending once they are released. There is currently no sectorial CCyB that would apply only for mortgage credit or real estate exposures.
- *Sectoral capital requirements* in the form of a capital surcharge, with the capital add-on depending on the exposure to the real estate sector. They are intended to increase banks' resilience to risky developments in a particular sector and may dampen sectoral credit growth. Their main advantage is that they are likely to be more effective than aggregate capital requirements, such as the Systemic risk buffer (SyRB), when the underlying boom is contained within a particular sector. However, they might also contribute to shifting risky developments to other parts of the financial system, namely towards borrowing from non-banking financial institutions or towards cross-border borrowing.
- *Risk weights increase to target asset bubbles in the residential property sector*. Targeting banks' real estate-related exposures, they aim to limit the impact of risks when they materialise by enhancing the loss-absorbing capacity of banks.

Macroprudential tools targeting the borrowers include:

- *Limits on loan-to-value ratios* (LTV), whereby borrowers can borrow up to a given maximum defined in terms of the value of the real estate collateral, which also reduces the impact of mortgage default on banks' balance sheets. When binding, LTV caps help both to curb booms in mortgage credit and to reduce hardship during busts, limiting in particular the indebtedness of borrowers.
- *Limits on debt-service-to-income ratios* (DSTI) restrict the amount that can be borrowed by limiting the monthly repayments of mortgage loans to a given proportion of the monthly income. They aim also at curbing booms and alleviating busts in real estate. Limits to DSTI could help in particular to contain speculative demand (as they help excluding borrowers that would be allowed mortgages only conditional on quickly re-selling their properties).
- *Limits on loan-to-income (LTI*) restrict credit in relation to the disposable income of the borrower.[28]
- *Maturity limits* restrict the duration of the mortgage loans to a given number of years have an offsetting effect on the probability of default of a borrower. They are likely to contain credit demand and household indebtedness.
- *Amortisation requirements* contribute to easing credit growth and household indebtedness.

The macroprudential instruments used in euro area countries have different legal bases, some are defined in the EU regulatory framework, while others are subject to the national regulatory framework.

---

[28] LTI/DSTI caps impact more directly the borrowers' probability of default, since they target their leverage by setting a constraint relative to their income. LTV and LTI/DSTI caps are often seen as complementary instruments, as caps on LTV can in certain cases be more effective if combined with an LTI/DSTI limit.

Instruments under the Capital Requirements Directive (CRD IV) are to be transposed into national law (e.g. CCyB), while those provided for in the Capital Requirements Regulation (CRR) become EU law with immediate effect (e.g. sectoral capital requirements). Some instruments are exclusively based on national law (LTV/DSTI/LTI).[29]

Despite having an advantage compared with monetary and fiscal tools as being more targeted to specific objectives, macroprudential tools are also subject to a number of specific drawbacks and implementation issues. The main objectives includes preventing excessive credit growth and leverage, excessive maturity mismatch and market illiquidity, direct and indirect exposure concentration, and misaligned incentives. The main drawback and challenges are: (i) the necessity of calibrating macroprudential measures over the cycle raises the inevitable difficulty of assessing in real time if house price and mortgage growth become delinked from fundamentals; (ii) exactly because the variables targeted by macroprudential policies are narrower and more specific, the measures defined by macroprudential policy can be circumvented. For instance, borrowers may circumvent LTV limits by combining more loans to purchase a single property (though working credit registers shall prevent this) or through expansion of credit by non-banks, less regulated financial institutions, and foreign banks (e.g., Crowe et al., 2011); a wide and protracted use of macroprudential limits could therefore result in growing costs to ensure compliance, in terms of administrative complexity and data granularity required to monitor and enforce the measures; how macroprudential tools are implemented and designed is therefore crucial to deal with the risk of circumvention; (iii) macroprudential instruments targeting excessive mortgage lending may have distributional consequences and impact home ownership affordability, affecting in particular younger debtors with low equity; (iv) interaction effects with other instruments in the policy mix cannot be easily predicted; (v) institutional issues such as inaction bias on the part of national authorities may affect the effectiveness of the macroprudential toolkit in practice.

Empirical evidence on the effectiveness of macroprudential policies aimed at real estate risks is relatively recent and thus limited, especially for the European countries, but existing findings tend to confirm a positive effect especially for LTV and DSTI limits. Assessing the impact of macroprudential policies aimed at real estate risks raises a number of difficulties, including the fact that many macroprudential instruments do not target specifically real estate-related risks. Moreover, macroprudential instruments are not implemented in isolation, and the interaction with microprudential measures and monetary and fiscal policies makes it more difficult to find a clear association of causes and effects (ESRB, 2018). Last but not least, the interaction with other policies depends on a country's financial sector structural and institutional frameworks, limiting the scope for generalisation of findings that are in any case rather indicative. Recent evidence is relatively positive about the effectiveness of macroprudential policies, possibly reflecting *inter alia* learning by experience as regards their implementation. In particular, many empirical studies (see Table 2) indicate that borrower-based measures, namely limits on LTV and DSTI ratio, help mitigating the boom-bust feature of housing cycles. Measures targeting lenders' behaviour were seen until recently as mainly effective in building buffers to increase resilience in the bust phase and reduce systemic risk in large upswings (Crowe et al., 2011), but according to recent evidence these measures are also found to exert some effect in slowing down credit growth (e.g., Akinci and Olmstead-Rumsey, 2018). Recent evidence suggests that macroprudential policies can have also cross-border spillover effects in the form of leakage and reallocation effect (Nocciola and Żochowski, 2016; Kang et al., 2017). The empirical evidence specific to euro area countries is limited, and draws only on the experience of the recent economic upturn.

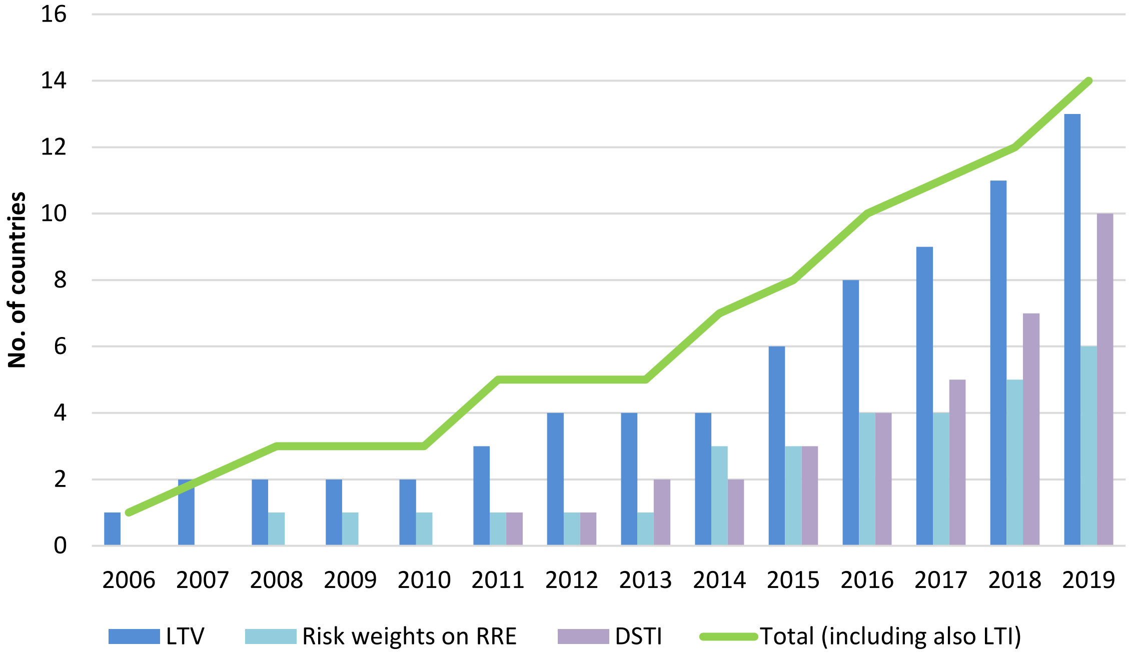
The global financial crisis highlighted gaps in the governance of financial system oversight at EU level. The global financial crisis revealed that authorities responsible for overseeing the financial system were lacking a clear mandate and appropriate analytical tools and instruments to address systemic risks. The European Systemic Risk Board (ESRB) was established in December 2010 as the authority responsible for macroprudential oversight of the financial system at EU level. The ESRB is set up as a coordination platform and information hub, which monitors risk from an EU-wide perspective across all sectors, and sets guidance on the use of macroprudential instruments in the hands of the bodies in charge of macroprudential policy at national level. From its very beginning, the ESRB has devoted attention to the assessment of vulnerabilities across EU countries relating to the real estate sector. In 2019 the ESRB issued warnings and recommendations relating to medium term risks in mortgage and real estate markets to 9 EU Member States, of which 6 belong to the euro area.[30]

---

[29] Source: https://www.esrb.europa.eu/pub/pdf/other/esrb.handbook_mp180115.en.pdf

The use of macroprudential tools has become more frequent and widespread across euro-area countries.[31] Most euro-area countries make use of macroprudential policy, with differences in the number and type of macroprudential instruments in use (Graph 18). 14 out of 19 countries implemented at least one instrument related to residential real estate (LTV limits, DSTI limits, heightened, risk weights on real estate exposures or LTI caps). Limits on LTV is the most common macroprudential tool used by euro area countries to address residential real estate risks, with y 13 countries applying a cap on the LTV ratio (Graph 19). The COVID-19 shock was followed by several supportive policy measures, which included also macroprudential policy. In all euro area countries, except Austria, Cyprus, Spain and Luxembourg, some easing of macroprudential measures was implemented. However, this meant mainly lowering CCyB and SyRB rates rather than the easing of borrower-based measures, which were relaxed only in Finland, Malta and Portugal (in any case, without concerning caps on the LTV ratio).

Graph 18: **Number of euro area countries using macroprudential measures addressing risks in the housing sector**



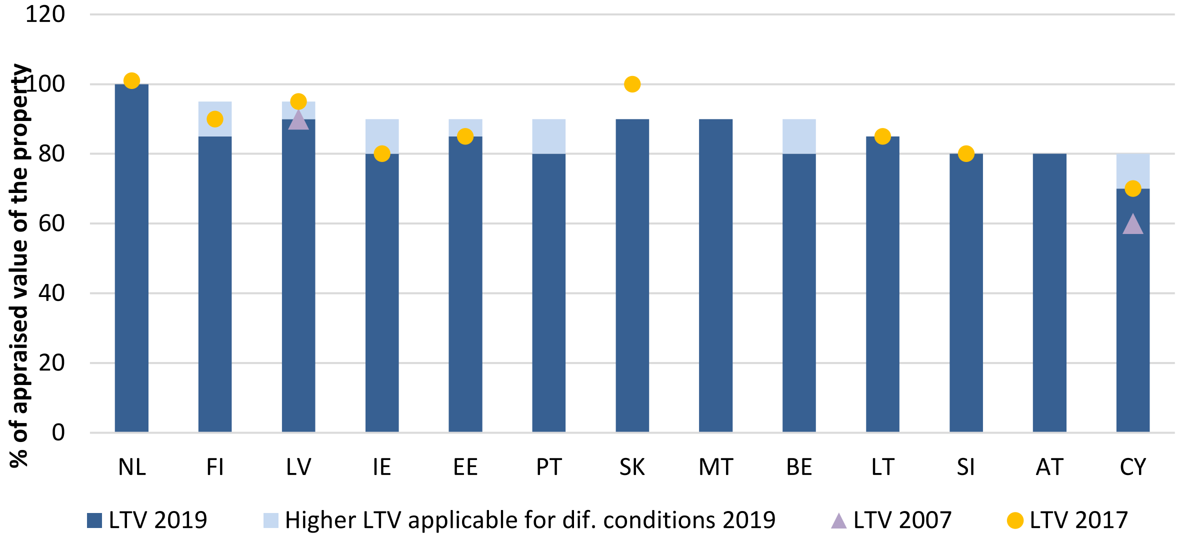
Note: The figure includes macroprudential measures most linked to the residential real estate sector (RRE). One should be wary of any cross-country comparison because of the absence of harmonised definitions. As shown, housing-related macroprudential measures has been used intensively in recent years, LTV limits being the most common tool for managing financial stability risks.
Source: ESRB.

---

[30] The warnings were issued for the Czech Republic, Germany, France (and also Iceland and Norway) and the recommendations were issued for Belgium, Denmark, Luxembourg, the Netherlands, Finland and Sweden.

[31] The information provided in this paragraph is from ESRB source, on the basis of macroprudential measures notified by national authorities.

Graph 19: **Limits to loan-to-value (LTV) in the euro area (binding limits and recommendations)**



Note: All the LTV limits are legally binding but in SI and SK where they take form of recommendations. In case one country applies more than one limit to LTV for different conditions (e.g. foreign currency loans, first-time house buyer), the graph above refers to the lowest level of LTV. **NL**: LTV limit for new mortgage loans decreased 1 percentage point per annum from 106% in 2012 to 100% in 2018. **FI**: LTV of 85% (95% for first-time house buyers). **LV**: LTV limit of 95% for all residential mortgage loans which equal or exceed 100 times the minimum monthly wage and which are supported by a State guarantee. The amount of the State guarantees is limited and differentiated according to the number of children in the family applying for the guarantee. **IE**: 80% for non-first-time buyers; 90% for first-time buyers of properties up to €220,000. **EE**: LTV limit of 85% (90% if guaranteed by KredEx) for new housing loans. **PT**: since 1 July 2018: LTV of 90% for credit for own and permanent residence, of 80% for credit for purposes other than own and permanent residence. **SK**: LTV cannot exceed 90% and the maximum share of new loans with LTV > 80% cannot exceed 30%. **LT**: LTV of new housing loans cannot be more than 85%. **CY**: LTV ratio shall not exceed: 80% in case the credit facility is granted for financing the primary permanent residence of the borrower and 70% for all other property financing cases.
Source: ESRB

Table 1. **Effectiveness of macro-prudential: summary of evidence from existing studies**

Paper	Policy instruments	Dependent variable	Sample and method	Main findings
Ahuja, A. and M. Nabar (2011).	LTV, DTI	Real GDP, consumer price index	49 countries (both AEs and EMEs), 2000Q1-2010Q4, panel regression	LTV caps have considerable reducing effects on credit and house price growth as well as capital/assets ratio and NPLs. The effect on bank capital is stronger for countries with fixed exchange rate regimes. DTI have slightly weaker effect on credit and price growth than LTV.
Akinci, O. and J. Olmstead-Rumsey (2017).	Macroprudential index (7 macroprudential tools)	Real housing credit, real house prices	57 countries (23 advanced), 2000-2013, Dynamic panel data model	In the absence of macroprudential tools, housing credit growth, house price appreciation, and average bank credit growth would have been significantly higher between 2011 and 2013. Targeted policies, e.g. those specifically intended to limit house price appreciation, seem to be more effective, especially in economies where bank finance is important.

Altunbas et al. (2017).	Macroprudential index	∆EDF (expected default frequency)	Bank-level data (3177 banks), from 61 AEs and EMEs, 1990-2012, GMM	MPPs have a significant reducing impact on bank risk. Responses to changes in macroprudential tools differ among banks, depending on their specific balance sheet characteristics (small, weakly capitalised banks and with higher share of wholesale funding react more strongly to changes in macroprudential tools). MPPs are more effective in a tightening than an easing cycle.
Cerutti, E., S. Claessens and L. Laeven (2017).	Macrorudential index (12 macroprudential tools)	Real credit growth / real prices growth	106 countries, GMM, panel regression	MPPs are generally associated with reductions in the growth rate of credit (weaker association in more developed and more financially open economies) and can have some impact on growth in house prices. MPPs are not necessarily sufficient to reduce the adverse effects of housing booms and subsequent busts. Targeted MPPs (LTV, DTI) are more effective in AEs, while FX-related policies in EMEs. The effects of MPPs vary by the intensity and phase of the financial cycle (MPPs may be more effective when the financial cycle is more intense: i.e., house price are greater).
Ferrari et al. (2017).	Risk weight add-on on residential real estate exposures for internal ratings based (IRB) banks	Mortgage loan rate, growth rate of mortgage loan stock	Belgium, 2012m1:2015m12, Diff-in-diff panel regression on bank-level data	Effect on mortgage loan growth: IRB banks with a larger share of affected mortgages loans in their balance sheet and facing a relatively larger additional capital requirement due to RW add-on reduce mortgage lending growth relatively more. In contrast, IRB banks with a larger voluntary management capital buffer exhibit stronger mortgage loan growth after the introduction of the measure (temporary effects). Effect on mortgage rates: IRB banks with a larger share of mortgage loans to BE households in their balance sheet increased mortgage rates relatively more in the first year after the introduction of the measure and charge relatively lower rates in the 2nd year.
Gambacorta, L. and A. Murcia (2017).	Dummy for changes in macroprudential variables	Value of loans, NPL	8 countries, 1990-2012, dif-in-dif analysis, meta-analysis techniques	MPPs is effective in dampening credit cycles and reducing banking sector risks. Policies used for countercyclical purposes have been highly effective in reducing credit growth. MPPs used as complements to monetary policy have had more significant effects on credit growth than any other kind of policy instrument. MPPs have helped reducing the procyclicality of credit and have acted as a stabilising tool for the economy.
Nymoen et al. (2018).	LTV, LTI, DTI, DSTI, risk weights, amortisation,	Credit growth, House price	4-8 developed countries, 1998-2017 (varies with	The estimated negative impact effects on credit growth and housing prices are most significant for LTV, LTI and RW.

	CCyB	change	instrument and country), dynamic panel regression	Amortisation and RW have impact on credit over the longer term. The results do not support that CCyB has reduced lending.
Richter et al. (2018).	LTV	Real GDP, consumer price index	56 countries (both AEs and EMEs), 1990Q1-2012Q2, OLS	Changes in LTV ratios have considerable effects on credit and house price growth, but relatively modest effects on output and inflation (more sizeable effects after LTV tightening than LTV loosening, as well as consistently larger effects in EMEs). The central banks in AEs could be in a position to use MPPs to manage financial booms without interfering with the monetary policy objectives in a major way.
Vandenbussche et al. (2015).	29 types of MPPs	Real housing prices	16 countries (Central, Eastern and Southeastern Europe) , 2000-2010, panel regression	Some MPPs did have a significant impact. Particularly, tightening of the minimum Capital Adequacy Ratio (CAR) seems to have affected development in housing price (as well as in credit to households). CCyB appears to have helped cool down housing price inflation although an effect on the volume of credit was not detected. Other two measures were effective: changes in marginal reserve requirements on foreign funding and changes in macroprudential tools linked to credit growth. MPPs targeting specific excesses (credit growth or resort to foreign funding) were found effective.
Zhang, Y. and T. Tressel (2017).	LTV	Mortgage loan growth, house price appreciation	EA, 2000q3:2010q4, Panel regressions (OLS, GLS) and panel VAR	Macroprudential instruments targeting the cost of bank capital are the most effective in slowing down mortgage credit growth and house price appreciation. Limits on maximum LTV are effective when monetary policy is excessively loose and complement capital-related measures.

Source: Own compilation.

5.4. HOUSING SUPPLY REGULATIONS AND RENTAL MARKETS

House price fluctuations and their implications on the economy depend on the elasticity of the supply of housing. On the one hand, rigid supply is associated with larger fluctuation in prices for a given shift in demand for housing. Large price fluctuations contribute to a volatile economic environment by having implications *inter-alia* for the risk of the formation of bubble dynamics, for the valuation of collateral and its consequences on bank balance sheets and for housing affordability. On the other hand, rigid supply elasticity implies also lower fluctuations in construction activity.

According to OECD estimates, housing responsiveness to price changes varies substantially across countries.[32]

The extent to which housing supply can easily adapt to changing demand conditions depends on the structural features of the economy but also on regulatory and policy settings. In addition to structural geographical and urbanistic characteristics, regulations and policies matter for housing supply bottlenecks. Administrative restrictions on land use are a key factor affecting the elasticity of housing supply, the effects being greater during boom than bust periods (e.g., Hilber and Vermeulen, 2014). In particular, new housing supply tends to be lower in countries where it takes longer to acquire a building permit**.**[33] Housing supply bottlenecks can also be linked to bottlenecks affecting relevant production factors, notably labour shortages (ECB, 2018b).

Rental market conditions also influence housing market developments. The availability and efficiency of rental housing can reduce the risk of house price bubbles by making the supply of available housing more elastic while constraints in the rental market increase incentives for debt-financed ownership (e.g., Czerniak and Rubaszek, 2017). During the past decade, generous tax treatment of owner-occupancy has likely determined a decline in the share of housing for private rent (OECD, 2011). Furthermore, rent controls may reduce the availability of rental housing, thereby contributing to a less elastic supply of housing services (e.g., Geng, 2018).

Social housing can contribute to release supply bottlenecks while improving affordability for low-income household segments. Social housing provides low-income households with housing services while protecting tenants from the effects of rising house prices. Social housing is a way for government to ensure housing supply to disadvantaged households and operate income redistribution. There are historically significant differences in the supply of social housing across euro-area countries (Graph 20) in terms of size, financing, entitlement conditions, often rooted in history, with social housing playing generally a more important role in countries with relatively generous welfare states (e.g., Whitehead, 2017).[34]

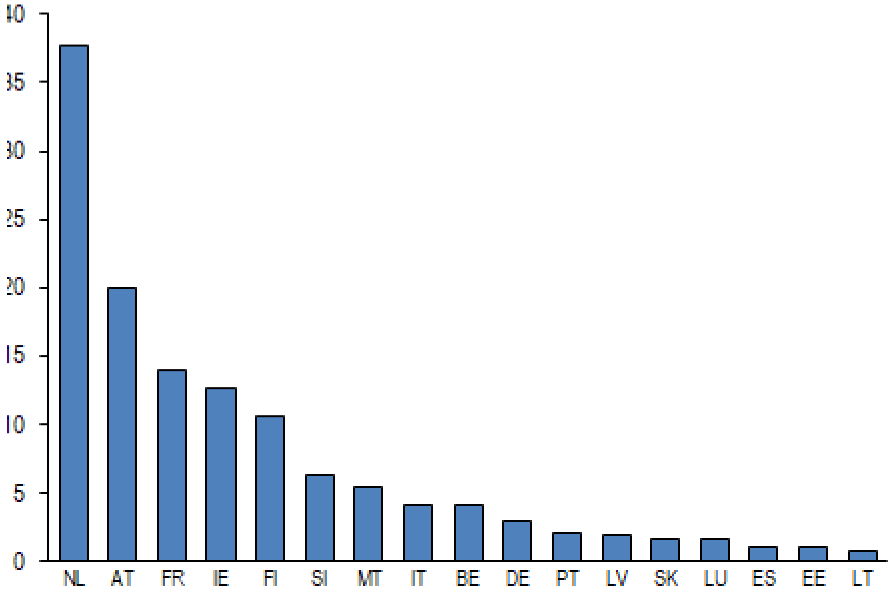
---

[32] Low elasticities being registered in countries like the Netherlands (0,19), Austria (0,23) or Italy (0,26), while in Sweden and Denmark are above unity, implying that in response to a demand shock, housing output will increase relatively more than prices (see e.g., Caldera Sánchez and Johansson, 2011).

[33] Data on regulations related to building and land-use are missing on a harmonised basis with a time series dimension. The World Bank doing business data (Building quality control index) cover a part of the dimensions of supply regulations. Information on direct measures ranging from the provision of social housing to the increase of residential land, and on regulations in general to influence supply, is usually not available in a harmonised way. An exception is the number of days to obtain a building permit, which is among the most harmonised data in this realm, being part of the World Bank Doing Business Indicators.

[34] Regarding trends in the supply of social housing, during the last decades the investment in this area has declined in most euro-area countries, but at a slower rate compared to the 1990s, the scale of change being greater in former socialist countries where it overlapped with restitution and privatisation policies. For evidence on different EU countries see e.g., Scanlon et al., (2015).

Graph 20: **Social rental housing stock, 2018 or latest, (number of social rental dwellings as a share of the total number of dwellings, %)**



Source: OECD.

6. CONCLUSIONS

House prices have a key relevance for macroeconomic developments, including at the level of the euro area. House price dynamics contribute significantly to swings in economic activity, and the risk of house price bubbles has key macro-financial implications. House price developments have an important societal element as they determine the extent to which households can afford access to housing services. Due to their relevance for the euro area-wide business cycle and inflation, house price dynamics matter for the conduct of the single monetary policy and matter for an increasingly integrated financial system like that of the euro area, particularly from the viewpoint of regulation and supervision.

The years before the global financial crisis were characterised by unsustainably strong house price dynamics in a number of euro area countries in a context of easing credit conditions. Easy monetary conditions, significant cross-border financial flows, light financial sector regulation and the use of financial products allowing the financing of increasingly risky mortgages contributed to fuel house price dynamics delinked from fundamentals.

In the aftermath of the global financial crisis, housing markets in most of the countries witnessing housing booms experienced a significant downward correction. This housing price decline was in some countries coupled with a broader adjustment of the banking sector that needed to re-build capital buffers and deal with a large stock of non-performing loans in a context of reformed regulatory, supervisory and prudential frameworks.

House prices started to recover in a majority of euro area countries as the economic recovery gained momentum after 2013, mainly on the back of growing household incomes, with credit developments not playing a major role, having resumed only gradually and after the pick-up in house prices. As house prices started accelerating in some countries, such trends were monitored in the context of EU surveillance, notably the European Semester and the Macroeconomic Imbalance Procedure. The ESRB issued warnings and recommendations to a number of EU Member States in 2016 and 2019 to signal the building up of medium-term vulnerabilities linked to house price and household credit dynamics. Moreover, affordability issues came increasingly to the fore, notably linked to the rapid growth of house prices in selected urban areas, sometimes in a context of worsened income distribution.

Prospects for house price growth are clouded by uncertainty after the COVID-19 crisis. While the COVID-19 shock is expected to impact negatively on employment prospects and household incomes, its effects are perceived as largely temporary. These have so far been mitigated by policies aimed at cushioning the economic impact of the pandemic which have indirectly supported demand for housing. Marked downward corrections in house prices have therefore not been observed since the COVID-19 crisis. Going forward, price developments will be affected by policy normalisation, including the phasing out of support measures such as payment moratoria, and by the build-up of affordability constraints. Moreover, new structural factors may start playing a role in the longer term, notably related to new working models and housing preferences, including possible de-urbanisation affecting demand for residential dwellings.

Policy frameworks to address the macro implications of house price developments have been adapted over the past decade across the euro area. Macroprudential measures have been used increasingly across the euro area, notably to prevent the risk of excessive mortgage credit growth. In addition, recent tax reforms in a number of euro area countries have gone in the direction of reducing fiscal incentives linked to mortgage financing.

Going forward, there is room to further adapt policy frameworks to address trade-offs and challenges emerging since the COVID-19 shock. Efforts to improve the understanding of the effectiveness of policy tools that can help steering house price developments should continue. In particular, a better understanding seems needed on how effectiveness is impacted by the interplay among different policy tools, by the specific design of policy instruments and the timeliness of their implementation. Additional relevant policy questions relate to how policy composition and policy design matter for possible trade-offs among policy objectives, including between macro-financial stability and housing affordability. House price dynamics following the COVID-19 shock appear characterised by substantial uncertainty linked to the economic context, the exceptional policy response and its progressive phasing out. The policy frameworks that can help to steer house prices should be used in a timely way to prevent new imbalances from building up.

REFERENCES

Agell, J., L. Berg and P.A. Edin (1995), 'The Swedish boom to bust cycle: tax reform, consumption, and asset structure', *Swedish Economic Policy Review*, Vol. 2(2), pp. 271-314.

Ahuja, A. and M. Nabar (2011), 'Safeguarding banks and containing property booms: cross country evidence on macroprudential policies and lesson from Hong Kong SAR', *IMF Working Paper*, No. 11/284.

Akinci, O. and J. Olmstead-Rumsey (2018), 'How effective are macroprudential policies? An empirical investigation', *Journal of Financial Intermediation*, Vol. 33, pp. 33-57.

Allen, F. and E. Carletti (2010), 'An overview of the crisis: causes, consequences, and solutions', *International Review of Finance*, Vol. 10 (S1), pp. 1-26.

Altunbas, Y., M. Binci and L. Gambacorta (2017), 'Macroprudential policy and bank risk', *Journal of International Money and Finance*, No. 81, pp. 203-220.

Andrews, D. and A.C. Sánchez (2011), 'Drivers of homeownership rates in selected OECD countries', *OECD Economics Department Working Papers*, No. 849.

Annett, A. (2005), 'House prices and monetary policy in the euro area', in Euro area policies: Selected issues, IMF Country report.

Arezki, R., T. Beck, R. Deyoung, J.V. Duca, P. Loungani and A. Murphy (2015), 'Conference on Housing, Stability, and the Macroeconomy: International Perspectives', *Journal of Money, Credit and Banking*, Vol. 47(S1), pp. 1-11.

Arslan, Y. and Ch. Upper (2017), 'Macroprudential frameworks: implementation and effectiveness', BIS Papers No. 94.

Ball, M., G. Meen and C. Nygaard (2010), 'Housing supply price elasticities revisited: Evidence from international, national, local and company data', *Journal of Housing Economics*, Vol. 19, pp. 255-268.

Barrios, S., V. Ivaškaitė-Tamošiūnė, B. Palma Fernández and E. Vázquez Torres (2019), 'Housing taxation: a new database for Europe', JRC Working Papers on Taxation and Structural Reforms, No. 08/2019.

Bernanke, B. and M. Gertler (2000), 'Monetary Policy and Asset Price Volatility', *NBER Working Paper*, No. 7559.

Bernanke, B.S, M. Gertler and S. Gilchrist (1999), 'The financial accelerator in a quantitative business cycle framework', *Handbook of Macroeconomics*, Vol. 1, pp. 1341-1393.

Bank for International Settlements (BIS) (2014), 84th Annual Report.

Blanchard, O., G. Dell'Ariccia and P. Mauro (2013), 'Rethinking Macro Policy II: Getting Granular', *IMF Staff Discussion Paper*, No. 13/03.

Blöchliger, H. (2015), 'Reforming the tax on immovable property: Taking care of the unloved', *OECD Economic Department Working Paper*, No. 1205.

Bordo, M.D. and O. Jeanne (2002), 'Monetary policy and asset prices: does 'benign neglect' make sense?', *International Finance*, Vol. 5(2), pp. 139-164.

Borio, C., 'The financial cycle and macroeconomics: what have we learnt?', *BIS Working Papers*, No. 395.

Bracke, P. (2013), 'How long do housing cycles last? A duration analysis for 19 OECD countries', *Journal of Housing Economics*, Vol. 22(3), pp. 213-230.

Bricongne, J-C, A. Turrini, and P. Pontuch (2019), ‘Assessing House Prices: Insights from HouseLev, a Dataset of Price Level Estimates’, *European Economy,* Discussion Paper no. 101.

Bricongne, J-C, L. Coutinho, A. Turrini, and S. Zeugner (2020), ‘Is Private Debt Excessive?’, *Open Economies Review,* Vol. 31, pp. 471-512.

Caldera Sánchez, A. and A. Johansson (2011), 'The price responsiveness of housing supply in OECD countries', *OECD Economic Department Working Paper*, No. 837.

Capozza, D. R. and P.J. Seguin (1996), 'Expectations, efficiency, and euphoria in the housing market', *Regional Science and Urban Economics*, Vol. 26(3-4), pp. 369-386.

Case, K. E. and R. J. Shiller (1990), 'Forecasting prices and excess returns in the housing market', *Real Estate Economics,* Vol. 18(3), pp. 253-273.

Case, K.E. and R.J. Shiller (2003), 'Is there a bubble in the housing market?', *Brookings Papers on Economic Activity,* Vol. 2003(2), pp. 299-342.

Cerutti, E., S. Claessens and L. Laeven (2017), 'The use and effectiveness of macroprudential policies: New evidence', *Journal of Finance Stability*, No. 28, pp. 203-224.

Claessens, S., A. Kose, L. Laeven, and F. Valencia (2013), 'Understanding financial crises: Causes, consequences, and policy responses', *CEPR Discussion Paper Series*, No. 9310.

Crowe, C., G. Dell`Ariccia, D. Igan and P. Rabanal (2011), 'How to deal with real estate booms: lessons from country experiences', *IMF Working Paper*, No. 11/91.

Council of the European Union (2018), ‘Council Recommendation of 13 July 2018 on the 2018 National Reform Programme of the Netherlands and delivering a Council opinion on the 2018 Stability Programme of the Netherlands’, No. 2018/C 320/18.

Cuerpo, C. and P. Pontuch (2014), 'Rental Market Regulation in the European Union', *European Economy*, *Economic Papers*, No. 515.

Czerniak, A. and M. Rubaszek (2017), 'The size of a rental market and housing market fluctuations', *Open Economic Review*, Vol. 29, pp. 261-281.

ECB (2018a), 'Real and Financial Cycles in EU countries: Stylised facts and modelling implications', *ECB Occasional paper,* No. 205.

ECB (2018b), 'Economic Bulletin', July 2018.

ECB (2018c), 'Economic Bulletin', August 2018.

ESRB (2016), 'Recommendation of the European Systemic Risk Board of 31 October 2016 on closing real estate data gaps', ESRB/2016/14.

ESRB (2018), 'A review of macroprudential policy in the EU in 2017'.

European Commission (2016), 'European Economic Forecast – Winter 2016', *European Commission Institutional Paper*, No. 20.

European Commission (2017), 'Benchmarks for the assessment of private debt', Note for the Economic Policy Committee, 11.10.2017.

European Commission (2020a), 'Alert Mechanism Report 2021', 18.11.2020, COM/2020/745 final.

European Commission (2020b), 'Refining the price valuation methodology: Using housing stocks and the nominal house price', Note for the attention of the Economic Policy Committee Working Group, 5.6.2020.

European Commission (2021), 'European Economic Forecast. Spring 2021', European Commission Institutional Paper, No. 149.

Ferrari, S., M. Pirovano and P. R. Kaltwasser (2017), 'The impact of sectoral macroprudential capital requirements on mortgage lending: evidence from the Belgian risk weight add-on', *MPRA Paper*, No. 80821.

Federal Open Market Committee (FOMC) (2016), 'Minutes of the Federal Open Market Committee', April 26-27, 2016, Federal Reserve Board.

Gambacorta, L. and A. Murcia (2017), 'The impact of macroprudential policies and their interaction with monetary policy: an empirical analysis using credit registry data', *BIS Working Paper*, No. 636.

Gattini, L. and P. Hiebert (2010), 'Forecasting and assessing euro area house prices through the lens of key fundamentals', *ECB Working Paper Series*, No. 1249.

Geng, N. (2018), 'Fundamental drivers of house prices in advanced economies', *IMF Working Paper*, No. 18/164.

Girouard, N., M. Kennedy, P. van den Noord and C. André (2006), 'Recent house price developments. The role of fundamentals', *OECD Economics Department Working Papers*, No. 475.

Hartmann, P. (2015), 'Real estate markets and macroprudential policy in Europe England', *ECB Working Paper*, No. 1796.

Hilber, C., and W. Vermeulen (2014), 'The impact of supply constraints on house prices in England', *The Economic Journal*, Vol. 126, pp. 358-405.

Iacoviello, M., and S. Neri (2010), ‘Housing Market Spillovers: Evidence from an Estimated DSGE Model’, *American Economic Journal: Macroeconomics*, No. 2(2), pp. 125-164.

Igan, D., A. Kabundi, F. Nadal-De Simone, M. Pinheiro, and N.T. Tamirisa (2009), 'Three cycles: housing, credit, and real activity', *IMF Working Paper*, No. 09/231.

IMF (2015), 'Monetary Policy and Financial Stability', IMF Staff Report.

Jordà, Ò., M. Schularick and A. M. Taylor (2013), 'When credit bites back', *Journal of Money, Credit and Banking*, Vol. 45, pp. 3–28.

Jordà, Ò., M. Schularick and A. M. Taylor (2015), 'Leveraged bubbles', *Journal of Monetary Economics*, Vol. 76, pp. S1-S20.

Jordà, Ò., M. Schularick and A. M. Taylor (2016), 'The great mortgaging: housing finance, crises and business cycles', *Economic Policy*, Vol. 31, pp. 107-152.

Kang, M.H., F. Vitek, M.R. Bhattacharya, M.P. Jeasakul, M.S. Muñoz, N. Wang and R. Zandvakil (2017), 'Macroprudential Policy Spillovers: A Quantitative Analysis', *IMF Working Paper*, No. 17/170.

Kiyotaki, N. and J. Moore (1997), 'Credit cycles', *Journal of Political Economy*, No. 105(2), pp. 211-248.

Koeniger, W. and M.-A. Ramelet (2018), 'Home Ownership and Monetary Policy Transmission', *CESifo Working Paper Series*, No. 7361.

Mirrlees, J. (1971), 'An Exploration in the Theory of Optimum Income Taxation', *Review of Economic Studies*, Vol. 38, pp. 175–208.

Monteiro, D. and B. Vašíček (2018), 'Financial cycle in the euro area', *Quarterly Report on the Euro Area*, Vol. 17, No. 2, pp. 17-30.

Nocciola, L. and D. Żochowski (2016), 'Cross-border spillovers from macroprudential policy in the euro area', *BIS Papers*, No. 86g.

Nymoen, R., K. Pedersen, J.I Sjaberg (2018), 'Estimation of effects of recent macroprudential policies in a sample of advanced open economies', *University of Oslo, Department of Economics*, Memorandum No.5.

OECD (2010), 'Tax Policy Reform and Economic Growth', *OECD Tax Policy Studies*, No. 20.

OECD (2011), 'Economic Policy Reform 2011: Going for Growth', OECD Publishing, Chapter 4.

Ott, H. (2014), 'Will euro area house prices sharply decrease?', *Economic Modelling*, Vol. 42, pp. 116-127.

Philiponnet N. (2017), 'The start of a new cycle: Recent housing price dynamics in Europe and their macroeconomic implications', *Quarterly Report on the Euro Area*, vol. 16(3), pp. 57-68.

Philiponnet N. and A. Turrini (2017), 'Assessing House Price Developments in the EU', *European Commission Discussion Paper*, No. 048.

Poterba, J. M. (1984), 'Tax subsidies to owner-occupied housing: an asset-market approach', *The Quarterly Journal of Economics*, Vol. 99(4), pp. 729-752.

Richter, B., M. Schularick and I. Shim (2018), 'The cost of macroprudential policy', *NBER Working Paper Series*, No. 24989.

Rünstler, G. and M. Vlekke (2018), 'Business, housing, and credit cycles', *Journal of Applied Econometrics*, No. 33(2), pp. 212-226.

Scanlon, K., M.F. Arrigoitia and C. Whitehead (2015), Social housing in Europe, *European Policy Analysis* (17), pp. 1-12.

Stock, J.H. and M.W. Watson (1999), 'Business cycle fluctuations in US macroeconomic time series', *Handbook of Macroeconomics*, Vol. 1, pp. 3-64.

Svensson, L. E. (2017), 'Re-evaluating the result that the costs of 'leaning against the wind' exceed the benefits', *Voxeu column*, 24.1.2017.

Vandenbussche, J., U. Vogel and E. Detragiache (2015), 'Macroprudential policies and housing prices: a new database and empirical evidence for Central, Eastern, and Southeastern Europe', *Journal of Money, Credit and Banking*, Supplement to Vol. 47 (1).

Whitehead, C. (2017), 'Social housing models: past and future', *Critical Housing Analysis*, Vol. 4, pp. 11-20.

Zhang, Y. and T. Tressel (2017), 'Effectiveness and channels of macroprudential policies: lessons from the euro area', *Journal of Financial Regulation and Compliance*, Vol. 25, Issue 3, pp. 271-306.

EUROPEAN ECONOMY DISCUSSION PAPERS

European Economy Discussion Papers can be accessed and downloaded free of charge from the following address:
https://ec.europa.eu/info/publications/economic-and-financial-affairs-publications_en?field_eurovoc_taxonomy_target_id_selective=All&field_core_nal_countries_tid_selective=All&field_core_date_published_value[value][year]=All&field_core_tags_tid_i18n=22617.

Titles published before July 2015 under the Economic Papers series can be accessed and downloaded free of charge from:
http://ec.europa.eu/economy_finance/publications/economic_paper/index_en.htm.

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct Information Centres. You can find the address of the centre nearest you at: http://europa.eu/contact.

On the phone or by e-mail

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696 or
- by electronic mail via: http://europa.eu/contact.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: http://europa.eu.

EU Publications

You can download or order free and priced EU publications from EU Bookshop at: http://publications.europa.eu/bookshop. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see http://europa.eu/contact).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu.

Open data from the EU

The EU Open Data Portal (http://data.europa.eu/euodp/en/data) provides access to datasets from the EU. Data can be downloaded and reused for free, both for commercial and non-commercial purposes.

Publications Office
of the European Union