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Highlights in this issue:

- Focus: Assessing the dynamics of house prices in the euro area
  - Fiscal decentralisation and fiscal discipline
  - Taxation of housing
  - Risk and uncertainty in euro area sovereign debt markets
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## EDITORIAL

In the past months the perception of integrity of the euro area has improved substantially. Predictions of a disintegration of the euro area, which were rife a year ago, have been proven wrong and we now face an altogether more stable perspective. The challenge going forward now consists of complementing the measures taken so far in fighting the crisis with action for completing Economic and Monetary Union.

A stepwise realisation of a deeper and genuine EMU is required in order to resolve the incompleteness and potential instability of the EMU's original design. The current stagnation in economic activity is also a reflection of the aggravation of the sovereign debt crisis caused by confidence losses. The partly self-fulfilling ebb of credit from vulnerable countries can only be reversed if market fears of a fundamental fracture within the euro area are allayed. Research presented in this edition of the Quarterly Report confirms that a significant part of the surge in sovereign spreads in vulnerable countries cannot be explained by fundamental factors alone but also reflects an increase in uncertainty surrounding the stability of EMU.

Significant progress has been made in recent weeks and months to formulate the requirements for a coherent and dependable framework for an 'EMU 2.0'. A complete vision for a deep and genuine EMU is developed in the Blueprint published by the Commission on 28 November. It aims to rectify the shortcomings of EMU's original setup by proposing essential actions necessary in the short, medium and long term so that stability and prosperity become a lasting feature of EMU. In the short term, it suggests that immediate priority should be given to the full deployment of the new economic governance tools under the six-pack and two-pack regulations, as well as the Single Supervisory Mechanism (SSM) in the banking field. Proposals will also be made for a Single Resolution Mechanism (SRM) which will be in charge of the restructuring and resolution of banks of the Member States participating in the Banking Union. The Blueprint also proposes the creation of a common financial instrument through which economic reform plans agreed in advance between Member States and the Commission can be supported.

In the medium term, it suggests closer economic and budgetary policy integration, notably by

developing a dedicated fiscal capacity for the euro area, as well as by establishing a debt redemption fund and the common issuance of eurobills. In the longer term, a Banking Union should be completed and a common fiscal capacity could gain in power so as to help stabilise and smooth the adverse impact of asymmetric shocks within the euro area. This vision for a deep and genuine EMU is the Commission's input into the ongoing process of redesigning EMU and, in particular, into the final 'Four Presidents Report' which was published on 5 December.

Rebuilding confidence in the euro area also means addressing specific challenges at the Member State level. In the prominent case of Greece, the Eurogroup of 13 December formally approved the second disbursement under the second adjustment programme, following the finalisation of the relevant national procedures and after having reviewed the outcome of the debt buy back operation conducted by Greece. This, together with the initiatives agreed by the Eurogroup on 27 November and full implementation of the adjustment programme, should bring Greece's public debt back on a sustainable path, to 124% of GDP in 2020. On that basis, Member States have authorised the EFSF to release the next programme instalment for a total amount of EUR 49.1 billion.

Early action on a key building block of a new EMU framework has come from the Commission in the form of its September proposals for a Banking Union. If we are to break the vicious circle between banks and sovereigns and reconstruct an integrated financial system in the euro area that is robust enough to deal with the challenges of large cross-border markets, a Banking Union is key.

In December, EU finance ministers made an important step in that direction by agreeing on the SSM. When an effective supervisory mechanism is established, the European Stability Mechanism will have the possibility to recapitalise banks directly. December's European Council added further political momentum to the Banking Union by asking the Commission to submit, in the course of 2013, a proposal for a single resolution mechanism.

Swift move towards Banking Union is essential to overcome the financial fragmentation seen

over the course of the year. Fragmentation not only poses a risk for financial stability in affected economies, it also undermines the very goal of open and integrated financial markets in Europe. Overcoming financial fragmentation is key to ensuring a proper allocation of savings. When combined with fundamental reforms of EMU's functioning, renewed financial integration will lead to falling spreads and much more supportive monetary and financial conditions in vulnerable countries.

I see two further main challenges for economic policy in the year ahead. First, ensuring fiscal sustainability continues to be testing but also necessary. Over the course of 2012 government debt as a share of GDP was still on an increasing path in every single euro area Member State, and only from 2013 onwards are the first Member States expected to see declining debt trajectories. When further considering that public debt in the euro area has risen from 70% in 2008 to 90% in mid-2012, one realises that the tide of adverse fiscal dynamics is hard to turn. As argued in our latest Fiscal Sustainability Report, short-term risks of fiscal stress have decreased since 2009 but long-term challenges due to the legacy of the crisis and an ageing population remain significant.

It is true that, in the current downturn, the adverse impact of consolidation on economic activity may be larger than usual. But business is no longer 'as usual' – the last months and years have shown us how easily market access can be lost, and how hard it is to maintain financial stability when confidence collapses. I would argue that this bleak scenario is the alternative that would await us if we do not take consolidation needs seriously.

Of course budgetary consolidation should be as growth-friendly as possible. As argued in our report on the "Quality of public expenditure in the EU", there is a need to make sure that consolidation does not undermine expenditure in growth-friendly items such as education, R&D and human capital investment and that it takes advantage of available scope for efficiency gains. Consolidation should also take into account evolving economic conditions. This is precisely what the EU's reformed Stability and Growth Pact (SGP) does. Each Member State's consolidation effort is specified in structural terms and takes into account the country's fiscal space and macroeconomic conditions. Accordingly, if macroeconomic circumstances

call for it, a Member State may receive extra time to correct its excessive deficit when growth conditions deteriorate. This has been the case in Spain, Portugal and Greece this year.

A second major challenge lies in ensuring a continued and lasting unwinding of the macroeconomic imbalances that built up in the pre-crisis decade. As the Commission's Autumn Forecast of November makes clear, much of the recent economic weakness is also a reflection of the deep ongoing adjustment of external and internal imbalances and 2013 will be a year of little growth in the euro area.

But progress with imbalances is becoming tangible. Competitiveness is being regained where it was lost over the last decade, and labour markets and industrial landscapes are reordering and reforming where unsustainable boom periods skewed the economy's entire structure. We are also seeing clear reduction in current account imbalances, which have fallen considerably in countries with high former deficits. Some surplus countries are also supporting the adjustment. Their surplus with vulnerable countries is falling substantially at the same time as their trade balance with non-euro area countries is improving. This shows that euro area rebalancing need not come at the cost of overall competitiveness. A recent Commission study provides further in-depth analysis on the role of surplus countries in the rebalancing process.

Tackling the challenges of an improved EMU framework, fiscal sustainability and the correction of macroeconomic imbalances will ultimately allow the conditions for sustainable long-term growth to be established. Close macro-financial surveillance and economic policy coordination are the leading tools for working towards these long-term goals. If in future these tools can be fitted into a more robust EMU framework, the crisis of confidence that has caused market panic and fragmentation in the euro area can be overcome.

MARCO BUTI

DIRECTOR - GENERAL

## Focus

### I. Assessing the dynamics of house prices in the euro area

*This focus section presents a housing market imbalance ‘toolkit’ to identify unsustainable housing market developments early on. It combines a house price cycle analysis and a range of valuation methods. The house price cycle analysis identifies over- or under-valuation of house prices by comparing actual prices with an estimated filtered trend, and then detecting local peaks and troughs. Unsustainable developments (boom/bust episodes) are separated from milder cyclical ups (bull phase) and downs (bear phase) by looking at their amplitude and duration (and severity as a combination of both dimensions). As a result, Member States can be grouped according to any unsustainable developments identified in the last upswing as those with: (i) long and ample booms, (ii) sudden and sharp booming periods, (iii) long and mild developments above the trend, with lower average house price growth rates and, (iv) no identified booming episodes. The outcome of the cyclical analysis is supplemented with valuation methods to obtain confirmation signals coming from affordability and price-to-rental ratios as well as equilibrium house price estimates based on economic fundamentals, such as total population, real disposable income and long-term interest rates. None of the methods used is exempt from caveats and technical challenges but the combination of all the relevant dimensions allows a comprehensive approach.*

#### I.1. Introduction

Developments in housing markets can have widespread macroeconomic effects on economic activity, the functioning of the labour market, macro-financial stability and general welfare (including redistribution of resources within and across generations, or exposure of citizens to credit and market risk). Moreover, inappropriate institutional, regulatory and fiscal settings in housing can foster macro-financial risks and vulnerabilities in the banking sector and inefficient allocation of resources, crowding out tradable sectors.

Against this background, a key challenge for policy makers in the euro area is to identify unsustainable developments in house prices (boom-bust episodes) early on. Assessing those imbalances and their associated risks is, however, technically challenging and multiple dimensions need to be taken on board, reflecting heterogeneous institutional frameworks in mortgage and housing markets across Member States as well as dissimilar macroeconomic conditions.

The objective of this focus section is to present an attempt at building a comprehensive approach to gauging the dynamics and sustainability of house price developments in the euro area. The analysis provides an overall assessment of the degree of imbalances at Member State level.

Identifying unsustainable developments in house prices is not a straightforward task. A range of

methods can be used, from simple descriptive statistics to more complex econometric modelling approaches. No method is exempt from limitations and should therefore be used in isolation.

In order to cover all the relevant dimensions and compensate for the limitations of individual methodologies, the analysis presented in this section is based on an encompassing approach, a housing imbalance toolkit which combines:

- **A house price cycle analysis**, which identifies booms and busts as episodes of protracted/sharp movements in house prices away from their trend. It also relates house price dynamics to developments in macroeconomic conditions.
- **Confirmation signals from valuation methods**. The identification of unsustainable housing developments can benefit from confirming signals based on: (i) indicators of affordability and rental ratios and (ii) econometric estimations of house prices, considering housing as a consumption good and relating prices to housing demand (income, demographic pressures, credit developments, etc.) and/or supply (existing stock of housing, building permits, unsold houses, land availability or construction costs, etc.) factors.

Sections 2 and 3 describe these two approaches in some detail. Section 4 presents an overall assessment of housing imbalances derived from



the use of this toolkit and concludes by sketching out the way forward.

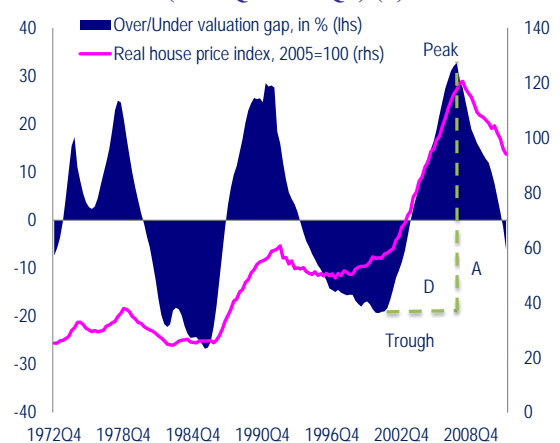
## I.2. The housing imbalance toolkit: a house price cycle analysis

### General principles

Following Agnello and Schuknecht (2009),<sup>(1)</sup> the analysis of house price cycles rests on Hodrick-Prescott (HP) detrending techniques. This makes it possible to extract the cyclical component of house prices, namely the house price gap (i.e. the actual price minus the trend). Indicators of the severity of house price cycles are computed on the basis of the magnitude and duration of the different phases of the housing cycle. More specifically, severity in the dynamics of house prices over the cycle is estimated via a multi-step approach (see Graph I.1 for an example):

- Relative (or deflated) housing prices are detrended and troughs and peaks are identified for the resulting house price gap.
- The duration (D) and cumulated change or amplitude (A) are computed over the different trough-peak and peak-trough phases.
- The severity (S) of the bull/bear phases is then estimated by the area of a triangle with base given by the duration and height given by the amplitude ( $S = (A \times D) / 2$ ).
- The main data source is the Experimental House Price Index built by Eurostat and supplemented with ECB, OECD and BIS data.<sup>(2)</sup> The Eurostat index has a short time coverage (it goes back to only 2005) but is the only harmonised and thus consistently comparable indicator for euro area Member States. Overall, the data sample covers euro area countries from 1972Q2 to 2012Q2 although the panel is very incomplete and just a handful of Member States present the total 162 data points.

Graph I.1: Relative house price gap, Spain (1972Q4-2012Q2) (1)



(1) The overvaluation or relative price gap is calculated as the difference between actual prices and their filtered trend.

Source: Eurostat and DG ECFIN calculations.

### First step: estimating deviations from the trend

House prices are decomposed into trend and cycle terms using the HP filter. The HP filter, although easy to interpret and in widespread use, has several well-known drawbacks. It poses problems at the end of the sample and the choice of the smoothing parameter ( $\lambda$ ) substantially influences the outcomes. Moreover, the HP filter and its variants generally tend to overestimate the number of boom/bust episodes as they also detect short-lived developments.

In order to minimise the end-point problem, ARIMA models are first fitted to the logs of the real house price series. The series are then extended with the forecasts given by the univariate models. Finally, the HP filter is applied in order to detrend real house prices and obtain the house price gap, calculated as the difference between actual prices and the trend.<sup>(3)</sup>

Results are presented in Graph I.2. It can be noted that the peak of the last cycle took place around 2008 for most countries. The analysis also suggests that only Germany is currently presenting a positive gap with respect to its trend, as relative house prices are growing again, after a protracted period of decline in the years preceding the crisis. In contrast, the adjustment taking place in most other countries since 2008 has driven their house price gaps into negative territory.

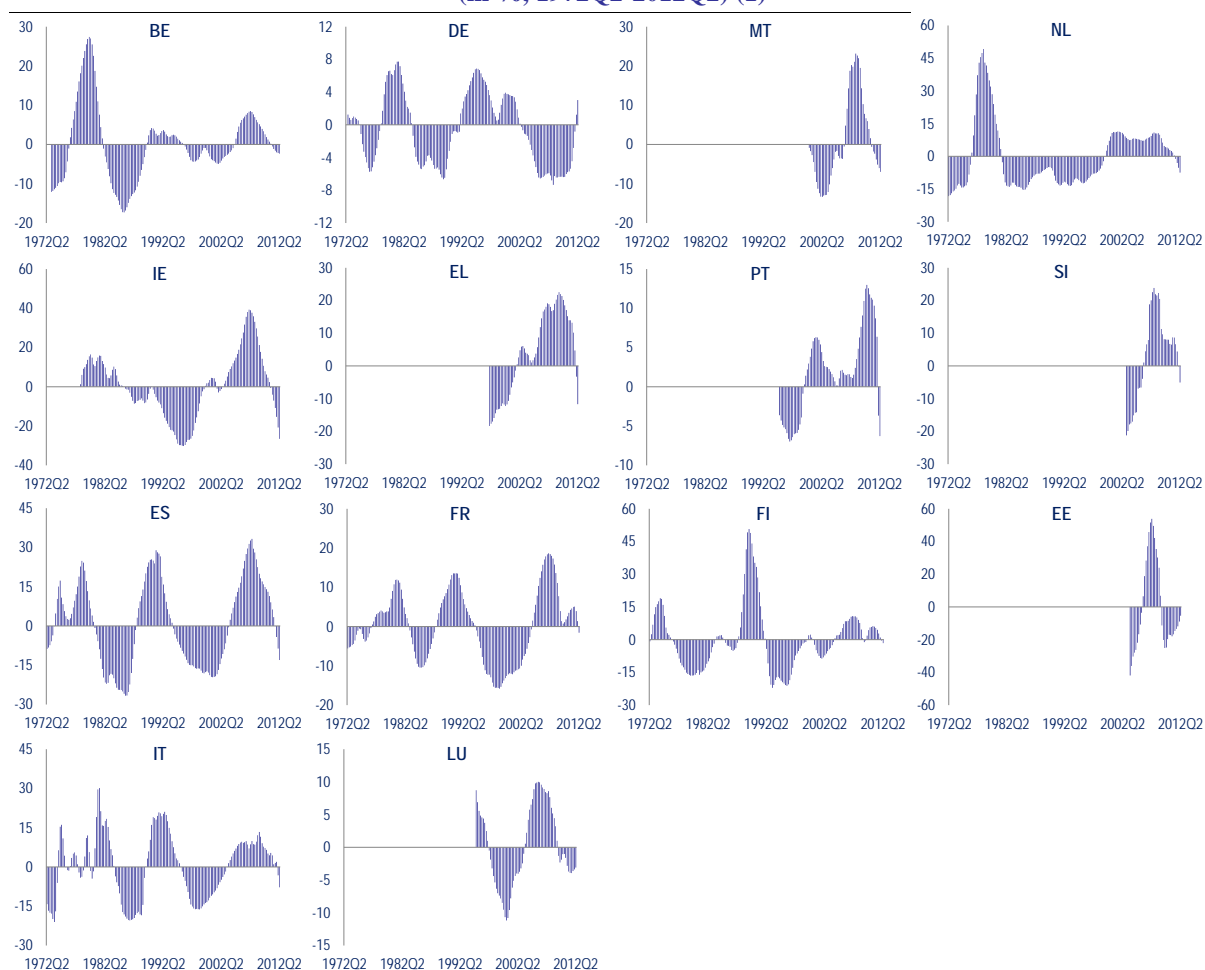
<sup>(1)</sup> Agnello, L., and L. Schuknecht (2009), 'Booms and busts in housing markets: Determinants and implications', *ECB Working Paper*, No 1071.

<sup>(2)</sup> Eurostat (2010), 'Experimental house price indices for the euro area and the European Union', Research Paper, December 2010.

<sup>(3)</sup> The smoothing parameter is set to 100000 as in Goodhart, C. and B. Hofmann (2008), 'House prices, money, credit and the macroeconomy', *ECB Working Paper Series*, No 888, and Agnello and Shuknecht (2009).



Graph I.2: Relative house price gap, selected euro area countries  
(in %, 1972Q2-2012Q2) (1)



(1) The overvaluation of relative price gap is calculated as the difference between actual prices and their filtered trend.

Source: DG ECFIN.

The results presented in the graph should not, however, be interpreted as evidence of price misalignments in the euro area. Countries experiencing housing adjustment episodes are now below their trend. The trend should not be interpreted as a floor, however. During a downswing, house prices naturally evolve below the trend without necessarily indicating significant misalignment. In contrast, prices in Germany present a positive gap. Prices are now experiencing an upward cyclical phase after reaching a trough in 2008. Continuous monitoring will be needed to determine whether and when this cyclical upward movement becomes unsustainable.

### Second step: identifying and analysing the house price cycle

A classical NBER analysis is applied to detrended house price data, first detecting peaks and troughs with the Bry and Boschan (1971) algorithm<sup>(4)</sup> and then discarding small fluctuations that cannot be considered as genuine cyclical developments.<sup>(5)</sup> Following this approach makes it possible to obtain information on the amplitude, duration and severity of the house price cycle for euro area countries. The phases of the cycle are presented in Table I.1.

<sup>(4)</sup> Bry, G. and C. Broschan (1971), 'Cyclical analysis of time series: Selected procedures and computer programs', UMI publisher.

<sup>(5)</sup> Restrictions imposed to eliminate minor fluctuations include using a rolling window of 12 quarters of the price series, eliminating episodes with two consecutive peaks or troughs and imposing a change in the sign of the relative price gap (going from over- to under-valuation or vice versa) in order to confirm a change in the phase of the cycle.

In addition, unsustainable boom-bust developments are separated from more moderate changes in house prices by applying restriction criteria to the severity indicator. These consist in either removing the first three quartiles of the distribution or allowing only fluctuations above a certain threshold (two standard deviations). Both methods produce relatively similar results, with the corresponding characteristics of the boom and bust episodes shown in the last two rows of Table I.1. <sup>(6)</sup>

A first look at the data reveals some important features of the latest housing cycle in the euro area.

First, average duration, amplitude and also severity are fairly symmetrical across the house price gap cycle. Indeed, bear periods tend to match bull periods. Bear episodes lasted on average 22 quarters, with a cumulated drop in relative prices from peak to trough of 31 pp (relative to trend) <sup>(7)</sup> while bull episodes lasted on average 26 quarters, with cumulated price gains of 32 pp. Moreover, the latest upswing was longer and more exuberant than previous episodes, lasting on average 33 quarters, with an amplitude of 39 pp. Given the symmetry between bull and bear periods, the severity of bull periods may be used as a benchmark for assessing the required adjustment in the current bear period. When assessing the potential for further house price corrections, what matters is not the distance with respect to the trend (traditionally known as over- or under-valuation) but rather net severity, measured as the severity accumulated over the build-up phase minus its counterpart accumulated over the correction.

Second, when gauged against the full sample, nine euro area Member States (IE, EL, ES, FR, IT, NL, PT, SI and EE) presented boom features over the last decade, according to at least one of the three cyclical indicators (amplitude, duration or severity). <sup>(8)</sup> The case for Ireland and Spain is clear-cut as they surpass the thresholds for the three cyclical indicators, presenting a long and ample upswing in house prices relative to trend

that can be regarded as a boom. Both countries have experienced strong price corrections in recent years that can be classed as busts according to the metrics used here. Estonia and, to a lesser extent, Slovenia witnessed a short and sudden upswing, which was more than offset in cumulative terms in a short period of time since the peak. Lastly, France, Italy, the Netherlands and Portugal witnessed long albeit more moderate deviations of prices from the trend. <sup>(9)</sup> Indeed, developments in their relative house prices are signalled as unsustainable due to the long duration of the upswing rather than to cumulated price change. Interestingly, these countries are among those which have not experienced sizeable corrections so far, suggesting that the amplitude criterion (i.e. cumulated price changes) might be a better proxy than the duration criterion for detecting price rises that are likely to turn into damaging busts.

It is important to interpret these findings on house price cycles in the broader context of macroeconomic developments. Member States which followed strong bull house price dynamics over the past cycle, such as Ireland, Spain and to some extent Estonia and Slovenia, have all recently undergone a strong correction of their residential investment rates, while their economic activity was contracting. In these countries, the housing boom of the previous decade was associated with various degrees of external imbalances which have since been to some extent reversed. Moreover, a strong accumulation of household debt came hand-in-hand with housing imbalances. Rapid credit growth fuelled housing market activity, leaving households with a substantial debt overhang in several Member States. In the downturn, protracted deleveraging processes will most likely accompany house price adjustments. In 2012Q1 household deleveraging was already under way in countries such as Estonia, Ireland and Spain.

By contrast, in Member States with a protracted but more moderate house price upswing, such as France, the Netherlands and Italy, the increase and subsequent correction in residential investment were more moderate. Household indebtedness has not receded after the onset of the global economic and financial crisis and current account dynamics have also been little affected by the crisis.

<sup>(6)</sup> Bull or bear periods during which at least one of the three cyclical indicators (amplitude, duration, severity) exceeds the average level found during boom or bust episodes are shaded in grey in the table.

<sup>(7)</sup> As correction is ongoing in most Member States, bear figures might be slightly biased upwards.

<sup>(8)</sup> Booms are defined as discussed previously, i.e. bull periods for which the severity indicator exceeds either the 3rd quartile of the distribution or 2 standard deviations, with both thresholds yielding similar results.

<sup>(9)</sup> Even more so for the Netherlands, where the 1989Q3 peak could be considered as local, with the latest bull phase starting already in 1985Q2.

Table I.1: Identification of boom/bust episodes out of bull/bear cyclical developments  
In relative house price gaps, euro area (1)

Country	Bull phases			Bear phases				
	[Trough-Peak]	Amplitude (% of trend)	Duration (quarters)	Severity	[Peak-Trough]	Amplitude (% of trend)	Duration (quarters)	Severity
BE	Q1 1973-Q3 1979	39.5	26	128.2	Q3 1979-Q3 1985	44.7	24	134.0
	Q3 1985-Q2 1990	21.5	19	51.0	Q2 1990-Q4 2001	9.1	46	52.3
	Q4 2001-Q2 2007	13.4	22	36.9	Q2 2007-Q2 2012	10.8	20	27.1
DE	Q2 1976-Q2 1981	13.5	20	33.8	Q2 1981-Q1 1989	14.4	31	55.8
	Q1 1989-Q4 1994	13.5	23	38.8	Q4 1994-Q1 2008	14.2	53	94.1
	Q1 2008-Q2 2012	10.4	17	22.1				
IE	Q1 1978-Q4 1979	17.8	7	15.6	Q4 1979-Q4 1995	46.6	64	372.8
	Q4 1995-Q1 2007	69.4	45	390.4	Q1 2007-Q2 2012	65.8	21	172.7
EL	Q1 1997-Q1 2009	40.9	48	245.4	Q1 2009-Q2 2012	34.2	13	55.6
ES	Q2 1972-Q2 1978	33.6	24	100.8	Q2 1978-Q4 1985	51.5	30	193.1
	Q4 1985-Q1 1991	55.6	21	146.0	Q1 1991-Q4 2000	48.5	39	236.4
	Q4 2000-Q3 2007	52.8	27	178.2	Q3 2007-Q2 2012	46.2	19	109.7
FR	Q2 1972-Q4 1980	17.5	34	74.4	Q4 1980-Q1 1985	22.4	17	47.6
	Q1 1985-Q1 1991	24	24	72.0	Q1 1991-Q3 1998	29.4	30	110.3
	Q3 1998-Q1 2007	34.4	34	146.2	Q1 2007-Q2 2012	20.2	21	53.0
IT	Q1 1980-Q2 1981	34.6	5	21.6	Q1 1975-Q1 1980	15.3	20	38.3
	Q3 1986-Q3 1992	41.5	24	124.5	Q2 1981-Q3 1986	50.6	21	132.8
	Q3 1998-Q4 2008	29.6	41	151.7	Q3 1992-Q3 1998	37.3	24	111.9
LU					Q4 2008-Q2 2012	21.1	14	36.9
	Q2 2000-Q4 2005	21.2	22	58.3	Q1 1995-Q2 2000	19.9	21	52.2
					Q4 2005-Q3 2011	13.9	23	40.0
MT					Q1 2000-Q2 2002	14.2	9	16.0
	Q2 2002-Q1 2008	36.5	23	104.9	Q1 2008-Q2 2012	30.1	17	64.0
NL	Q2 1972-Q2 1978	67.4	24	202.2	Q2 1978-Q2 1985	64.6	28	226.1
	Q2 1985-Q3 1989	20.3	17	43.1	Q3 1989-Q2 1993	18.4	15	34.5
	Q2 1993-Q4 2007	25	58	181.3	Q4 2007-Q2 2012	18.6	18	41.9
PT	Q4 1996-Q1 2010	19.9	53	131.8	Q1 1995-Q4 1996	10.6	7	9.3
					Q1 2010-Q2 2012	19.2	9	21.6
SI	Q1 2003-Q4 2007	45	19	106.9	Q4 2007-Q2 2012	28.9	18	65.0
FI	Q2 1979-Q3 1984	18.6	21	48.8	Q1 1974-Q2 1979	35.5	21	93.2
	Q3 1986-Q2 1989	55.8	11	76.7	Q3 1984-Q3 1986	7.2	8	7.2
	Q2 1993-Q4 1999	24.4	26	79.3	Q2 1989-Q2 1993	72.8	16	145.6
	Q4 2001-Q1 2007	19.5	21	51.2	Q4 1999-Q4 2001	11	8	11.0
	Q1 2009-Q3 2010	7.3	6	5.5	Q1 2007-Q1 2009	11.9	8	11.9
EE	Q3 2003-Q2 2007	95.7	15	179.4	Q2 2007-Q3 2009	78.9	9	88.8
	Q3 2009-Q2 2012	30.4	11	41.8				
Mean		31.7	25	102.8		30.5	22	87.1
Threshold (3rd quartile)		41.1	26	146.0		45.8	24	111.5
Threshold (2 std. dev.)		38.4	26	161.7		39.8	26	158.9

(1) No analysis could be conducted for Cyprus, Austria and Slovakia due to the short data sample, starting in 2005Q1.

Source: DG ECFIN.

### I.3. The housing imbalance toolkit: confirmation signals from valuation methods

In order to identify unsustainable developments in housing markets, house price cycle analysis can be supplemented with affordability (price-to-income) and dividend (price-to-rental) ratios. These ratios can be compared to their long-term averages, with the gap between the latter and the actual value providing information on over- or under-valuation.

Conclusions based on these indicators have to be considered with caution due to their simplifying assumptions. Comparisons with the long-term average are only valid for stationary series.

However, traditional unit root tests point to non-stationary properties of affordability and dividend ratios in many countries; see for example Caporale and Gil-Alana (2010).<sup>(10)</sup> Moreover, as pointed out in André (2010),<sup>(11)</sup> affordability ratios can be affected by changes in the distribution of income across age groups or changes in the average size of households, while rentals can be highly regulated, distorting the interpretation of price-to-rental ratios.

<sup>(10)</sup> Caporale, G.M. and L.A. Gil-Alana (2010), 'US disposable personal income and housing price index: A fractional integration analysis', *Discussion Papers of DIW Berlin 1070*, DIW Berlin, German Institute for Economic Research.

<sup>(11)</sup> André, C. (2010), 'A bird's eye view of OECD housing markets,' *OECD Economics Department Working Papers*, No 746, OECD Publishing.

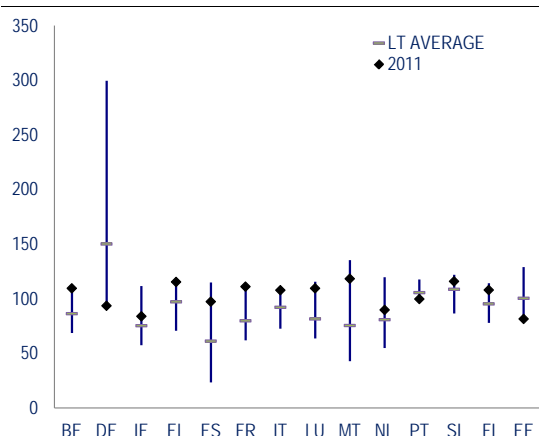
### I.3.1. Affordability ratios

Housing upswings need to be checked against affordability pressures for the average buyer. Indeed, an increase in households' real disposable income can potentially accommodate rising house prices. On the other hand, prolonged and rapid increases in the price-to-disposable income ratio or even deviations from its long-term average could be interpreted as a sign of overvaluation.

#### Construction of the series for the euro area

Affordability ratios for the euro area are constructed, according to the OECD definition,<sup>(12)</sup> as the ratio of the nominal house price index to gross disposable income per capita.<sup>(13)</sup> This ratio is rebased to 100 in 2005, and therefore it cannot be compared across countries, but to each Member State's long-term average.

Graph I.3: Ratio of price to disposable income, euro area countries (2005=100) (1)



(1) Data for DE up to 1990 refer to West Germany. Sample max. and min. values are depicted by the blue bars.

Source: AMECO, OECD, Eurostat, ECB, BIS.

As shown in Graph I.3, Germany stands out with a current price-to-income ratio well below its long-term average and at a historical low. Estonia and Portugal also currently appear at very low levels. Ireland, the Netherlands and Slovenia are currently close to their long-term average, following their recent adjustments. These

<sup>(12)</sup> 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, OECD Publishing.

<sup>(13)</sup> The house price index is calculated as in the previous section. For Bulgaria and Malta, GDP is used instead of gross disposable income per capita.

countries could be regarded as subject to only limited downward pressures in house prices, according to the indicator.

On the other hand, Belgium, Spain, France, Luxembourg and Malta currently present large deviations from their long-term benchmark, suggesting higher adjustment potential. Finland, Italy and Greece are also among those with a price-to-income ratio above the historical average, although in these countries the gap is smaller in relative terms and therefore the scope for correction seems lower (classed as medium pressures).

#### Additional analysis using effort ratios

Findings based on the price-to-income ratio have to be considered with caution due to their simplifying assumptions. There appears to be no cointegration relationship between house prices and disposable income in the long run, possibly due to time-varying mortgage costs (see Girouard *et al.* 2006). It is therefore useful to look at other affordability indicators, such as the interest burden, in combination with the total debt figures.

As shown in Table I.2, indebtedness has reached record-high levels over the last cycle, leaving households with a large debt overhang. However, in most Member States this did not translate into a lower ability to service debt due to the prevailing low-interest environment.

Table I.2: Household debt and interest burden against disposable income (in %)

Household debt to disposable income (%)					Interest burden to disposable income (%)				
	1995	2000	2007	2011		1995	2000	2007	2011
BE	54.3	62.6	79.8	85.2	BE	2.4	2.5	3.0	1.5
DE	89.7	108.0	92.1	88.4	DE	5.4	5.2	4.0	2.9
IE (1)	n.a.	112.1	201.7	202.5	IE (1)	n.a.	4.9	8.1	3.1
EL	n.a.	50.2	71.1	84.6	EL	n.a.	0.2	2.3	2.7
ES	n.a.	69.1	127.7	123.6	ES	n.a.	2.3	5.3	3.0
FR	51.5	54.2	74.7	82.9	FR	3.1	2.2	3.6	2.0
IT	24.3	34.0	58.3	65.4	IT	2.1	1.0	2.2	0.8
CY (2)	95.9	115.7	154.9	173.0	CY (2)	5.9	7.3	4.4	5.1
LU	n.a.	n.a.	126.7	132.2	LU	n.a.	n.a.	5.9	2.5
NL	n.a.	163.7	249.8	266.0	NL	n.a.	9.2	11.7	6.5
AT (2)	106.0	73.7	86.7	90.5	AT (2)	6.9	2.4	2.8	1.6
PT	63.1	84.5	127.8	125.6	PT	2.2	2.6	8.0	2.9
SI (2)	35.4	0.0	42.0	47.2	SI (2)	4.9	1.7	2.2	1.4
SK (2)	0.0	9.5	47.9	56.1	SK (2)	1.3	0.7	2.1	1.1
FI	8.5	61.2	98.1	103.5	FI	1.0	2.6	4.7	1.6

(1) 2002 first data available. (2) 2010 latest annual data available.

Source: Eurostat.

## I. Assessing the dynamics of house prices in the euro area

In absolute levels, the Netherlands stands out as presenting the highest interest burden. This feature represents undoubtedly a manifestation of its particular institutional features in mortgage markets (and related tax arrangements),<sup>(14)</sup> but nevertheless points towards additional risks in the event of increases in interest rates. The interest burden has recently increased in Greece: although still low in relative terms, it could continue to rise as the disposable income prospects are poor. In contrast, Belgium, France and Italy have benefited from a low interest rate environment. This reduced interest burden alleviates somewhat their affordability analysis.

### I.3.2. Price-to-rental ratios

Housing prices can also be assessed against the cost of renting. Following the asset price modelling literature, house price changes are expected to be driven by changes in expected capital gains or in future housing services (rental yields). In equilibrium, agents should be indifferent between buying/selling and renting. Thus, movements in the price-to-rental ratio could be interpreted as a sign of overheating (higher ratio) or cooling (lower ratio) markets. When prices gain ground relative to rentals, there will be downward pressures on the former through lower demand, and vice versa.

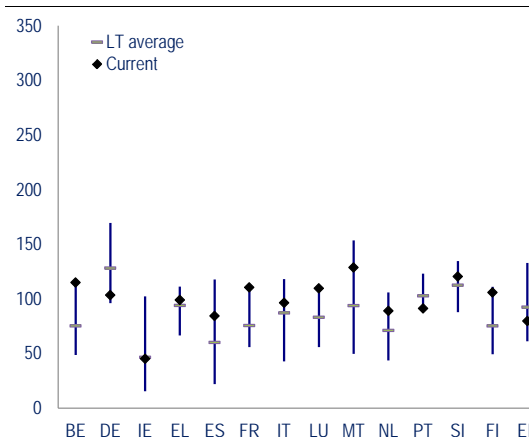
#### Construction of the series for the euro area

Price-to-rental ratios are constructed, using the OECD definition, as the nominal house price index divided by the rental component of the consumer price index.<sup>(15)</sup>

In broad terms, the price-to-rental ratio shows a significant increase in the cost of owning versus the cost of renting in the last 10 years for most Member States, pointing to the existence of imbalances in the housing sector (Graph I.4). More specifically, Belgium, Spain, France, Luxembourg, Malta and Finland represent examples of high potential for correction, given that their current index is well above its long-term

average. The opposite appears to be the case in Germany, Ireland, Portugal and Estonia, which are subject to low pressures according to the price-to-rental ratio. Greece, Italy, the Netherlands and Slovenia could be regarded as in-between cases as their current level stands above but close to the benchmark.

Graph I.4: Price-to-rental index, euro area countries (2005=100) (1)



(1) Sample max. and min. values are depicted by the blue bars.

Source: Eurostat, OECD, ECB, BIS.

This simple descriptive analysis suffers, however, from an important drawback. As in the case of the affordability ratios, taking the long-term average as a benchmark equilibrium value assumes stationarity, which contradicts the empirical evidence in many cases.<sup>(16)</sup>

#### Additional analysis using imputed rents

In order to overcome these caveats, theoretical ways of estimating equilibrium prices can be introduced. The user cost of owning a house, known as the imputed rent, is a function of a number of components that include mortgage payments, forgone interest that the owner would have earned by investing in something other than the house (opportunity cost) and various other costs such as taxes and maintenance costs. These costs are offset by a number of benefits that accrue through owning a house, such as possible tax deductibility and expected capital gains.

Graph I.5 presents the gap between actual house prices and the estimated equilibrium values using the method of imputed rents. A high value for the gap reflects potential overvaluations in the

<sup>(14)</sup> The combination of a relatively large share of variable interest rate mortgages and high interest rate deductibility yields a substantial gap between gross and net (after-tax) servicing costs for Dutch households.

<sup>(15)</sup> The house price index is derived from Eurostat's Experimental House Price Index combined with other sources. The rental component of consumer price index is derived from the OECD Main Economic Indicators database, except for Malta, where Eurostat data are used.

<sup>(16)</sup> See Krainer, J. and C. Wei (2004), 'House prices and fundamental value', FRBSF Economic Letter 2004-27.

*Box I.1: Deriving equilibrium house prices*

**A Theoretical approach (following Bolt *et al.* 2011)**

The imputed rent  $H_t$ , i.e. the user cost of owning a house, is a function of a number of parameters (Himmelberg *et al.* 2005) <sup>(1)</sup>, for example:

$$H_t = m_t P_t + \varphi_t P_t - (\delta E_t P_{t+1} - P_t),$$

where  $P_t$  is the price of the house,  $m_t$  is the mortgage rate and hence  $m_t P_t$  is the mortgage the owner has to pay,  $\varphi_t$  is a factor that captures costs that the owner incurs (such as maintenance costs) and  $\delta E_t P_{t+1} - P_t$  is the expected capital gain, with  $(1-\delta)$  the physical depreciation of the house. Note that this is a simplified version of the factors affecting imputed rents as described in the main text. Re-arranging this in terms of the house price, we have:

$$P_t = \frac{H_t + \delta E_t P_{t+1}}{R_t}$$

where  $R_t = 1 + m_t + \varphi_t$ . Assuming rational expectations we can iterate forward and replace the forward-looking price with its infinite sum, i.e.

$$P_t = E_t \left( \sum_{i=0}^{\infty} \frac{\delta^i H_{t+i}}{\prod_{j=0}^i R_{t+j}} \right).$$

In equilibrium, and following the no-arbitrage condition, agents should be indifferent between buying and renting. This implies that in equilibrium the cost of owning and using a house is the same as the cost of renting one and imputed rents equal actual rents. We can replace one for the other in the equation above to obtain an explicit form for equilibrium prices:

$$\bar{P}_t = E_t \left( \sum_{i=0}^{\infty} \frac{\delta^i Q_{t+i}}{\prod_{j=0}^i R_{t+j}} \right).$$

**Linearising the equations (following Hott and Monnin 2008) <sup>(2)</sup>**

We need to linearise the price equation in order to transform it into a linear function of stationary variables. We define  $X_t = P_t/H_t$  as the price to imputed rent ratio. We can then rewrite the price equation as:

$$X_t = \frac{\delta X_{t+1} (H_{t+1}/H_t) + 1}{R_t}.$$

After linearising through first-order Taylor expansion, iterating forward and taking conditional expectations, we substitute imputed rents with actual rents through the arbitrage condition, arriving at an equilibrium equation that can be estimated:

$$\bar{x}_t = \sum_{i=1}^{\infty} \rho^i E_t \left( \Delta q_{t+i} - \frac{1}{\rho} m_{t+i} \right) - m_t + c,$$

$$\bar{x}_t = \bar{p}_t - q_t$$

**Estimation**

Consider the following VAR specification  $z_t = Az_t - I + u_{t-1}$ , where  $z_t$  is the vector of observables and  $A$  a set of estimated coefficients. Variable  $u_t$  is a set of iid errors. Estimating this VAR allows us to forecast the future values of  $z_t$ .

For the equilibrium model discussed so far the relevant vector is:

$$\bar{z}_t = [x_t \ \Delta q_t \ m_t \ \dots \ x_{t-k} \ \Delta q_{t+k} \ m_{t-k}].$$

We can therefore re-write the equilibrium price to imputed rent ratio as

$$\bar{x}_t = \sum_{i=1}^{\infty} \rho^i g_1 E_t (\bar{z}_{t+i}) + g_2 \bar{z}_{t+c},$$

where  $g_1 = [0 \ 1 \ -1/\rho \ 0 \ \dots \ 0]'$  and  $g_2 = [0 \ 0 \ -1 \ 0 \ \dots \ 0]'$ . Once we have the fitted values for the equilibrium price to imputed rent ratio, we can back out the equilibrium prices.

(estimation routine provided by Marco van der Leij, University of Amsterdam, gratefully acknowledged)

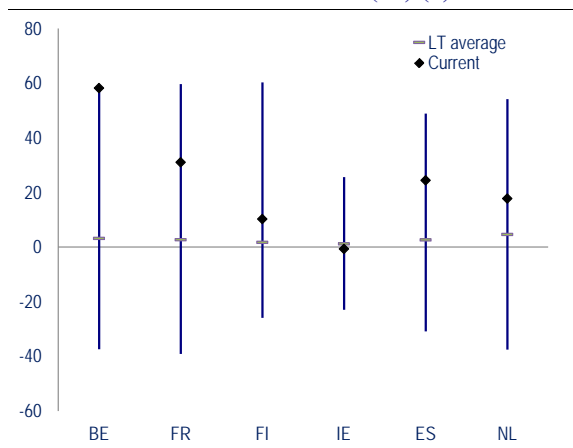
<sup>(1)</sup> Himmelberg, C., C. Mayer and T. Sinai (2005), Assessing high house prices: Bubbles, fundamentals and misperceptions, *Journal of Economic Perspectives*, 19(4), pp. 64-92.

<sup>(2)</sup> Hott C. and P. Monnin (2008), Fundamental real estate prices: An empirical estimation with international data, *The Journal of Real Estate Finance and Economics*, Springer 36(4), pp. 427-450



housing market. In qualitative terms, figures are roughly in line with the information reflected in Graph I.4, although current overvaluation seems more contained when compared to equilibrium levels instead of long-term averages. Moreover, looking at the almost negligible long-term average of the estimated gap, these series could be thought of as stationary, presenting mean-reverting properties.

**Graph I.5: House price valuation gap based on imputed rents, selected euro area economies (%) (1)**



(1) Current date is 2011 Q4 and the starting point differs across countries: BE 1976Q4, IE 1987Q1, ES 1981Q1, FR 1973Q3, NL 1974Q2, FI 1980Q3, DK 1981Q1, SE 1980Q2, UK 1973Q3. Sample max. and min. values are depicted by the blue bars.

Source: DG ECFIN.

Belgium, Spain and France show the highest overvaluation figures and thus the biggest potential for correction according to this methodology. In the same manner, the adjustment witnessed so far in Ireland closed the gap, while more is to be expected in Spain and the Netherlands. Finland is above but close to the long-term average.

Two important caveats apply to this interpretation of upcoming price adjustments. On the one hand, it implies that all the correction will take place through actual prices, with equilibrium prices held constant. Obviously, this is not necessarily the case as large shifts in equilibrium prices also occur, especially during periods of economic stress, and therefore the necessary adjustment may turn out to be larger than the overvaluation gap. <sup>(17)</sup> On the other hand, a protracted period of

<sup>(17)</sup> The fact that the estimated equilibrium price is not constant needs to be taken into account. Spain is a natural example where, despite strong adjustment in the housing market, the gap has been almost unchanged due to falling estimated equilibrium prices.

undervalued prices generally follows booming episodes. Therefore, prices could go beyond closure of the gap. The absence of long time series makes it difficult to estimate equilibrium prices for most of the euro area Member States.

### I.3.3. House prices and market fundamentals

The aim of this section is to provide estimates of the deviations of house prices from equilibrium values justified by fundamentals. The empirical literature is based on various methods of estimation of the effects of supply and demand factors on housing and mortgage markets. These include simple time series methods, single-country multivariate approaches (structural vector auto-regressive models (VAR) or vector error correction models (VECM)), <sup>(18)</sup> multi-country panel approaches, or a combination of the latter two (panel VECM or VAR). <sup>(19)</sup>

VAR- and VECM-based models can take into account the dynamic interplay between house prices, disposable income, demographic developments, housing investment, and credit conditions. In addition, VECM models can distinguish between short-term and long-term variations of real house prices in response to changes in other variables. In this setting, house prices can be assessed by comparing the actual prices to estimated fundamental values.

Miles and Pilonca (2008) <sup>(20)</sup> decompose house price changes into their main driving factors. They identify as the main demand shifters real disposable income, real interest rates and demographics, while changes in the housing stock are generally taken as a proxy for the impact of the supply side. According to the authors, changes in income per capita and real interest rates explain around 40% of house price changes on average.

Population growth and particularly immigration flows provided an important spur to house prices in Ireland, Spain and the United States in pre-crisis years. In some countries, the increase in

<sup>(18)</sup> See Girouard *et al.* (2006) for a literature survey, updated by Borowiecki (2008), 'A macro view of the Swiss real estate market: an empirical study of the housing economy', Diploma thesis at the Swiss Banking Institute at the University of Zürich.

<sup>(19)</sup> See Goodhart, C. and B. Hofmann (2007), 'House prices and the macroeconomy: Implications for banking and price stability', *Oxford University Press*, Oxford.

<sup>(20)</sup> Miles, D. and V. Pilonca (2008), 'Financial innovation and European housing and markets', *Oxford Review of Economic Policy*, Vol. 24. No 1, 2008, pp. 145-175.



Graph I.6: Pooled estimate of long-run equilibrium house prices (1)



(1) Equilibrium house prices are derived from equations relating house prices to their fundamental (see text).

Source: DG ECFIN.

house prices came hand-in-hand with rapid developments in residential investment, leading to an increase in the housing stock. This provided at least some counterweight to the demand increase, especially in Ireland, Spain, Greece and Portugal. Finally, the authors identify a residual factor related to the prospects of future capital gains. The general feeling that house prices would rise indefinitely was fuelling demand through a drop in the expected user costs of owning a house, and relaxing to some extent the restrictions to accessing the mortgage market faced by households due to the collateral role of houses.

Along these lines, André (2010) provides a detailed classification of mortgage market developments that also contributed to real house price increases during the years preceding the crisis: the extension of loan terms, an increase in the share of flexible-interest vs fixed loans, increased loan-to-value ratios, developments of housing equity withdrawal and development of subprime loans with their securitisation schemes,

among others. Finally, country-specific factors, such as demand by non-residents for seasonal occupation, were especially relevant for Mediterranean countries such as Spain and France.

It appears from these studies that the separation of house price shifters into fundamental and non-fundamental variables is a complex task. Indeed, structural changes in the mortgage and house markets (e.g. increased average LTV, longer mortgage maturity, tax incentives) may lead to changes in housing demand, and therefore push the equilibrium house price upwards. However, if these structural changes turn out to be unsustainable, the equilibrium house prices may also need to revert to past levels.

In order to estimate the equilibrium values for house prices justified by fundamentals, a VECM system has been designed building on a previous

study by ZEW.<sup>(21)</sup> The authors construct for a panel of 14 advanced economies four VECM models, each using a system of four fundamental variables, the real house price being in all cases one of them. The other variables are chosen from among: total population, urban population share, real housing investment, real disposable income per capita, real short-term interest rate and real long-term interest rate.<sup>(22)</sup> The authors show that these variables tend to follow integrated processes and that there is a cointegrating relationship among them.

Following the same approach, a four-variable system of the real house price, the total population, the real disposable income per capita and the long-term interest rate is estimated for the period 1972-2011 on pooled data with country fixed effects.<sup>(23)</sup> The house prices and the estimates of the long-run equilibrium are presented in Graph I.6.

A house price adjustment is under way in countries that were identified previously as following strong bull/bear dynamics. Fundamental trend house prices are retreating as disposable income and interest rates adjust in Greece, Ireland and Portugal, and similar developments are to be expected in Spain and Slovenia. In countries where current prices are above or at the currently declining trend (Greece, Spain, Slovenia) house price pressures seem rather high. House prices are well below their long-term trend in Ireland and, to a lesser extent, in Portugal: medium to high future price pressures are expected as fundamentals continue to adjust.

According to the overvaluation estimates, adjustment seems to be at an earlier stage in the Netherlands, Belgium, Malta and Italy. The adjustment of prices in France was short-lived and the estimated overvaluation gap has increased recently. All these countries could experience moderate downward pressures in the near future.

Estonia had a strong adjustment below trend in the early stages of the crisis and house prices started to increase recently. Future upward

developments warrant close surveillance. Lower price pressures are currently estimated for Finland, Luxembourg and Slovakia.

These results should, however, be interpreted with caution as they are subject to considerable estimation caveats. First, identifying the effects of fundamentals on equilibrium prices is challenging. Moreover, it is important to bear in mind that in an overheating environment some fundamental determinants could be overshooting their long-term sustainable values. Possible developments in fundamentals that affect the long-term trend also need to be taken into account (e.g. currently Spain or Slovenia). Identification problems in the pooled fixed-effect estimation are severe for Member States with limited available data series, or where housing markets have been subject to significant structural changes during recent years.

### I.4. Overall assessment

The identification of unsustainable developments in house prices is surrounded by a high degree of uncertainty, affecting researchers' and policy makers' capacity to foresee the timing and extent of house price cycles. No methodology is exempt from caveats and technical challenges. The combination of the relevant dimensions presented in this paper nevertheless permits a comprehensive approach helping, on the one hand, to identify booms followed by busts and, on the other hand, to assess the dynamics of undergoing adjustment processes.

The identification of unsustainable developments requires confirming signals from the different methods. At this stage one of the main challenges remains pooling the information and the results coming from the various tools. The crossing of the cyclical identification of a boom with a confirming signal from any (or several) of the other overvaluation methods might be a way forward, as suggested in Dreger and Kholodilin (2011).<sup>(24)</sup> The dynamics of the ongoing correction phase in most housing markets in the euro area can also be proxied through the proposed toolkit. First, as stated above, severity indicators in the boom give a first-hand quantification of the extent of the required adjustment, in terms of both duration and amplitude. Second, VECM models might help forecast developments in house prices conditional on the evolution of their determinants.

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<sup>(21)</sup> ZEW (2011), 'Housing markets and intra-euro area macroeconomic imbalances: Identifying policy instruments', Unpublished study for the European Commission.

<sup>(22)</sup> The modelling approach builds on Gattini and Hiebert (2010), 'Forecasting and assessing euro area house prices through the lens of key fundamentals', *European Central Bank Working Papers Series*, No 1249, October.

<sup>(23)</sup> Germany and Austria are excluded due to specific housing market dynamics; Cyprus is excluded for reasons of data availability.

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<sup>(24)</sup> Dreger and Kholodilin (2011).

All in all, comparative cross-country analysis covering the main relevant dimensions gives an insight into housing market imbalances and provides a first approximation to existing divergences between euro area countries. Table I.3 presents an overview of the housing market pressures as signalled by the different methods.

**Table I.3: Overall downward pressures (1)**

		Price-to-income		Price-to-rental		Econometric model	
		Pressures	Qualifier (a)	Pressures	Qualifier (b)	Pressures	Qualifier (c)
Group I	IE	Low	+	Low	=	Medium	+
	ES	High	=	High	=	High	=
Group II	SI	Low	=	Medium	na	High	-
	EE	Low (2)	+	Low	na	Low	=
Group III	EL	Medium	+	Medium	na	High	=
	FR	High	-	High	=	Medium	=
	IT	Medium	-	Medium	na	Medium	=
	NL	Low	+	Medium	=	Medium	=
Group IV	PT	Low	+	Low	na	Medium	+
	LU	High	=	High	na	Low	=
	MT	High	=	High	na	Medium	+
	FI	Medium	=	High	-	Low	=
	BE	High	-	High	=	Medium	=
	DE	Low (2)	=	Low	na	na	na

(1) The qualifiers indicate higher (+), unchanged (=), or lower (-) downward pressures than those given by the basic pressures indicator. (a) Effort ratio; (b) Imputed rents; (c) Fundamentals dynamics.

(2) Estonian and German house prices have recently been on an upward path.

Source: DG ECFIN.

Countries are grouped according to the unsustainable developments in the last upswing identified in the housing cycle analysis of Section 1.1. **Group I** corresponds to Member States having experienced long and ample booms. **Group II**, in turn, refers to sudden and sharp booming periods, while **Group III** includes countries where house prices stayed above their trend for a prolonged period of time, averaging lower house price growth rates. Finally, **Group IV** stands for countries where no booming episodes were identified. <sup>(25)</sup>

Three valuation indicators, together with their respective qualifiers, also allow us to classify countries according to low/medium/high downward price pressures. Among Member States in Group I and II, and given confirming signals from valuation methods, the adjustment process in Spain might continue further. On the other hand, current valuation indicators for Ireland and Estonia signal low or moderate pressures, although potential adverse developments in the fundamental determinants of Irish house prices and the recent turnaround of prices in Estonia should be followed carefully. Signals from valuation methods for Slovenia are somewhat equivocal, but the risk of adverse fundamental developments potentially points to medium-to-high price pressures. Within Group III, Greece and France signal medium-to-high price pressures, but current economic conditions in the former would imply higher risks. Finally, among Group IV countries possible downward pressures are signalled in Malta, Luxembourg and Belgium. Downward pressures in Germany seem low and house prices have recently been increasing. Despite the absence of a clear house price boom in these countries before the crisis, these signals deserve further inspection.

These results should be interpreted as warning signals pointing to countries where the housing market requires more in-depth analysis, also looking at institutional specificities and sub-national developments. There is a need to better understand how structural features of the housing and mortgage markets, including tax incentives (see the specific contribution on housing taxation in this volume), affect real estate and credit developments and facilitate or hinder the emergence of imbalances on these markets. This should also be supplemented with an analysis of the disparities in housing valuation between regions/cities given that factors at play might differ between urban and rural or coastal areas. Assessing vulnerabilities stemming from the institutional and regulatory frameworks in the housing and mortgage markets and depicting local housing market specificities can help in designing sensible and specific policy responses in a consistent and comparable way.

<sup>(25)</sup> Portugal qualifies as a non-booming country due to its downward sloping trend.

## II. Special topics on the euro area economy

### *Fiscal decentralisation and fiscal discipline*

*This section presents new empirical evidence on the relationship between fiscal decentralisation and fiscal discipline. The analysis shows that fiscal decentralisation can have significant impacts on general government fiscal outcomes. Decentralising expenditure generally tends to improve the fiscal balance of the general government through moderating expenditure. However, much of the final impact depends on how subnational expenditure is financed, especially on the extent to which subnational revenues consist of transfers from central government, as well as on the degree of effective autonomy in setting subnational tax rates and the tax base. Overall, the analysis suggests that decentralisation works best when subnational authorities are largely self-reliant, drawing their revenues mainly from subnational taxes and fees rather than from central government transfers, thereby creating incentives for responsible fiscal behaviour.*

### *Taxation of housing*

*This section describes the current state of housing taxation in the euro area and looks at some design principles for housing taxation systems. The low ratio of property taxes to GDP in most of the euro area indicates that there is room for shifting from personal and corporate income tax towards property taxes. A shift could lead to stronger growth in the short-to-medium run. Several euro area countries should move away from (high) taxes on residential property transactions to a recurrent tax on residential property, since the latter is less distortive and forms a more stable revenue base. Many euro area tax systems allow mortgage interest deductibility, which often provides tax incentives for households to take on debt. In the absence of a sufficient level of taxation of imputed rents from housing, mortgage interest deductibility introduces an implicit subsidy to property investment and may increase the risk of over-investment in housing.*

### *Risk and uncertainty in euro area sovereign debt markets*

*The crisis has brought a rise in risk premia on euro area financial markets, with a surge in sovereign bond yields in some Member States. This section analyses euro area sovereign bond spreads in an econometric framework that relates spreads to macroeconomic fundamentals (e.g. the debt to GDP ratio) and liquidity risks. The econometric analysis suggests two main conclusions. First, investors' risk behaviours have changed since the beginning of the crisis. For example, investors now ask higher spreads for a given level of public debt or deficit and they have also become more aware of implicit sovereign liabilities related to banks. Second, a significant part of the recent surge in sovereign spreads in some Member States cannot be explained by traditional macroeconomic variables. Further analysis indicates that this unexplained part of spreads is related to common euro area risk factors and a rise in policy-related uncertainty. The surge in spreads could therefore be partly reversed by a consistent implementation of EMU reforms, as proposed in the European Commission's recent Blueprint for a deep and genuine Economic and Monetary Union. The analysis shows that consistent policies, leading to a reduction of the component of spreads that is driven by policy uncertainty, will have positive effects on growth, given in particular the spillovers of sovereign borrowing costs to the private sector.*

## II.1. Fiscal decentralisation and fiscal discipline

This section analyses the relationship between fiscal decentralisation to the subnational level and fiscal outcomes for general government.<sup>(26)</sup> The purpose is to assess whether devolving expenditure functions and revenue sources to subnational entities, as has generally occurred across the euro area, may have adverse consequences on overall government fiscal balances. Such consequences might be due to loss of central government control over subnational fiscal behaviour and to weaker incentives for fiscal discipline at that level.

### Some theoretical considerations on the impact of fiscal decentralisation on fiscal outcomes

The literature on fiscal federalism provides some theoretical priors regarding the effects of different aspects of fiscal decentralisation on the main fiscal aggregates of the general government.<sup>(27)</sup> However, in most cases, the net impact is *a priori* ambiguous.

**Decentralising expenditure** could have either positive or negative effects on the fiscal balance. The government balance may improve, with lower expenditure due to efficiency gains, as public services can be tailored to subnational needs and preferences. Furthermore, competition and sharing best practices among decentralised entities regarding the provision of public goods and services may result in savings. On the other hand, decentralising expenditure might harm the government balance by reducing economies of scale and by leading to work being duplicated at national and subnational levels. Ties between subnational authorities and constituent interest groups may also be more direct, possibly giving the latter more lobbying power, leading to more expenditure.

Theoretical considerations are thus inconclusive and the impact may not even be particularly significant in either direction. A significant part of subnational government expenditure is likely to be mandated by national directives and legislation, so local influence on spending may in any case be limited.

**Decentralising sources of revenue** may also affect fiscal balances. Subnational revenue has two main components. First, subnational authorities manage ‘own revenues’, taxes and fees levied at the subnational level, though the extent to which they can influence tax rates and the tax base varies. Second, transfers from central government can make up part of subnational revenue. Although the amount of such revenue is often beyond subnational control, it is classed as subnational revenue and is thus considered as part of fiscal decentralisation.

Theoretical arguments are quite clear-cut as regards decentralising revenue. On the one hand, the literature makes clear that if subnational government can finance most of its spending with its own sources, it has strong incentives to behave in a fiscally responsible way. This has positive effects on the fiscal balance of the general government. This occurs because subnational government is more directly accountable to its constituents regarding spending, as there is a direct link between locally-levied taxes and locally-provided public goods or services. Moreover, if subnational government’s own resources are sufficient in principle, central government can more easily resist pressure to cover revenue shortfalls.

On the other hand, if transfers from central government are a relatively large part of subnational budgets, the constraints on subnational government are ‘soft’, with adverse effects on the general government’s fiscal balance. This may occur because subnational government can justify substantial unfunded spending with the lack of own revenue sources. It may even threaten to scale down public services, eventually obliging central government to intervene with a bailout. In short, theoretical considerations alone cannot settle the fiscal case for decentralisation (especially on the expenditure side), hence the need for an empirical investigation.

<sup>(26)</sup> For a more detailed analysis see Part IV of European Commission (2012), ‘Report on Public finances in EMU’, *European Economy*, No 4-2012 [http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2012/public-finances-in-emu-2012\\_en.htm](http://ec.europa.eu/economy_finance/publications/european_economy/2012/public-finances-in-emu-2012_en.htm)

<sup>(27)</sup> See among others Oates, W. (2006), ‘On theory and practice of fiscal decentralisation’, *IFIR Working Paper Series*, 2006–05 (Lexington: Institute for Federalism & Intergovernmental Relations); Blöchliger, H. and O. Petzold (2009), ‘Taxes or grants: what revenue source for sub-central governments?’, *OECD Economics Department Working Papers* 706, OECD Publishing; IMF (2009), ‘Macro policy lessons for a sound design of fiscal decentralisation’, Paper prepared by the IMF Fiscal Affairs Department.



### Testing the impact of decentralisation with a regression analysis

The rest of this section discusses the results of an econometric analysis of the impact of fiscal decentralisation on fiscal outcomes of the general government. <sup>(28)</sup>

The model used is the fiscal reaction function, an equation which tests the impact of the outstanding government debt ratio on the primary balance, after controlling for a number of macroeconomic and institutional variables.

The basic underlying assumption is that governments are fiscally responsible and hence react to increasing (or decreasing) levels of accumulated debt by increasing (or decreasing) the primary balance. This methodology has become quite widespread in the empirical literature on fiscal policy <sup>(29)</sup> and has also been used recently to investigate the budgetary impact of fiscal decentralisation. <sup>(30)</sup>

The regressions in Table II.1.1 alternatively use the primary balance, primary expenditure and total revenues of the general government as the dependent variable. In each case, the sample includes all 27 EU Member States and covers the years 1995–2010.

The preceding discussion of the effects of fiscal decentralisation on fiscal behaviour suggests a number of hypotheses based on theoretical considerations that can be tested empirically.

First, the net effect of decentralising expenditure on the primary balance should depend on how it is combined with decentralising revenue. If decentralised spending is combined with giving subnational government responsibility for covering spending with its own resources (i.e. taxes and fees assigned to subnational government) and if taxes, rather than transfers,

account for most subnational revenue, there should be no adverse effect on the primary balance. There may even be a positive effect if subnational government is encouraged to raise more revenue as it seeks to cover more expenditure.

On the other hand, if spending is decentralised while subnational government relies strongly on transfers from central government, this is likely to affect fiscal balances adversely. Subnational government is less likely to be concerned about balancing spending with revenue in this case.

Overall, as fiscal balances are shaped by trends in both revenue and expenditure, these always need to be analysed in conjunction.

### Primary balance

The first set of estimations tests the impact of decentralisation on the general government primary balance (as a share of GDP). The explanatory variables combined in these regressions are shown in Table II.1.1 and include the lagged debt-to-GDP ratio, the lagged primary balance (because of its persistence), the lagged output gap to control for the budgetary effect of cyclical fluctuations, as well as a dummy for the occurrence of a legislative election. <sup>(31)</sup> Additionally, the following indicators are included, which together provide a detailed characterisation of the degree and composition of revenue and expenditure decentralisation:

- Expenditure decentralisation, defined as the percentage of subnational government expenditure in total expenditures of the general government;
- Own revenue decentralisation, defined as the percentage of subnational taxes and fees (i.e. subnational own revenue) in general government revenue;
- Tax revenue as a percentage of subnational revenue; <sup>(32)</sup>

<sup>(28)</sup> For further details, see Governatori, M. and D. Yim (2012), 'Fiscal decentralisation and fiscal outcomes', *European Economy Economic Paper* 468.

<sup>(29)</sup> See for instance Bohn H. (1998), 'The behavior of US public debt and deficits', *Quarterly Journal of Economics*, Vol. 113, pp. 949–63 and European Commission (2011), 'Fiscal reaction functions and debt thresholds for the EU', Public finances in EMU 2011, chapter IV.4, pp. 167–176).

<sup>(30)</sup> (Eyraud, L. and L. Lusinyan (2011), 'Decentralising spending more than revenue: Does it hurt fiscal performance?', *IMF Working Paper* 226, International Monetary Fund and Escolano, J., L. Eyraud, M.L. Moreno Badia, J. Sarnes and A. Tuladhar (2012), 'Fiscal performance, institutional design and decentralisation in European Union countries', *IMF Working Paper* 45, International Monetary Fund.).

<sup>(31)</sup> This is systematically found to have good explanatory power of the developments of fiscal balances (see among others Mendoza, E.G. and J.D. Ostry (2008), 'International evidence on fiscal solvency: is fiscal solvency 'responsible'?', *Journal of Monetary Economics* 55, 1081–1093, and Gali, J., and R. Perotti, 2003, 'Fiscal policy and monetary integration in Europe', *Economic Policy*, Vol. 18, No. 37, pp. 533–72).

<sup>(32)</sup> This does not include fees, which are also part of own resources. .

- Transfers from central government as a percentage of subnational revenue;
- The extent to which subnational spending is covered by own revenue, defined as the percentage of subnational expenditures covered by subnational taxes and fees.<sup>(33)</sup>

Moreover, to test some of the hypotheses mentioned previously concerning the impact of varying combinations of decentralisation, the following interactive terms (i.e. the product of two variables) are also included in the regressions:

- Expenditure decentralisation and the share of transfers in subnational revenue;
- Expenditure decentralisation and the share of subnational taxes in subnational revenues;
- Own-revenue decentralisation and the share of transfers in subnational revenue;
- Own-revenue decentralisation and the share of taxes in subnational revenue.

Results of estimates for the primary balance are shown in Table 1. Regarding the control variables, some general features of the fiscal reaction function (i.e. with no direct relationship with decentralisation) are worth noting. A central result is that the lagged debt has the expected statistically significant positive coefficient in all specifications of the model, suggesting that the authorities' desire to ensure debt sustainability influences fiscal policies. The lagged output gap has a negative and mostly significant coefficient, suggesting some degree of pro-cyclicality of fiscal policy across the EU. Elections tend to have a negative impact on the primary balance, but this is not always significant.

- As for indicators of decentralisation, **decentralising expenditure** has a positive and statistically significant effect on the primary balance. Subnational expenditure coverage — i.e. the extent to which subnational expenditure is 'self-financed' via own resources — has a positive and significant effect on the primary balance, as would be expected on the basis of the disciplining effect

of reliance on own resources (see Column 7). Similarly, decentralising expenditure has a (further) positive effect if interacted with the share of taxes in subnational revenue (Column 3). This confirms the expectation that decentralising expenditure has a more favourable impact on the primary balance if subnational governments raise a large proportion of their revenue as own taxes.

Conversely, when decentralised expenditure is combined with subnational revenue dependent to a large extent on transfers from central government, the effect on the primary balance is negative (Columns 2, 10, 12 and 13).

The overall impact of **decentralising revenue** on the primary balance is negative and statistically significant across all model specifications. The overall effect, however, depends on the way in which decentralisation is organised. The shares of taxes and transfers have, respectively, a positive and negative effect on the primary balance when included individually (Columns 4 and 5). These effects are confirmed when combining tax and transfer indicators with the revenue decentralisation indicator (Columns 6 and 8 for taxes and Column 9 for transfers). The effect of the interactive term with taxes and revenue decentralisation more or less offsets the negative direct effect on the primary balance of revenue decentralisation.

Finally, a robustness check of the impact of subnational taxation on the fiscal balance was carried out by estimating the effect of 'true' tax autonomy, i.e. the share of taxes for which subnational governments can change the rate and/or base.<sup>(34)</sup> This is captured via three interactive terms (Columns 13, 11 and 12).<sup>(35)</sup>

<sup>(33)</sup> This indicator measures the decentralisation of revenues relative to expenditures. A gap between expenditures and own revenues must be covered by transfers or subnational borrowing. A lower gap should indicate a 'harder budget constraint' for subnational governments.

<sup>(34)</sup> Figures on the shares of taxes in subnational revenues do not distinguish autonomous taxes, i.e. on which subnational governments are allowed to change main tax parameters, from the assignment of revenues from national taxes to subnational governments. This may prevent to fully capture the 'true' degree of subnational financial autonomy. Hence, robustness checks were carried out with an indicator of 'true' subnational tax autonomy compiled by the OECD Secretariat. The OECD indicator is unfortunately only available for a relatively small sample of countries and for the years 1995, 2002, 2005 and 2008.

<sup>(35)</sup> (i) Share of subnational tax revenues on which subnational governments can exert autonomy multiplied by the share of taxes in total subnational revenues (Column 13);  
(ii) Expenditure decentralisation times the term (i), in order to test the joint impact of large decentralisation on the spending side and large 'true' revenue autonomy (Column 11);  
(iii) Share of subnational expenditures covered by subnational taxes and fees times the share of subnational tax



Table II.1.1: Regressions on the effect of fiscal decentralisation on the primary balance of general government (LSDVC estimator, EU27, 1995-2010) (1)

VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13
	Pb												
L.D	0.03*	0.03***	0.03**	0.03*	0.03**	0.03**	0.02*	0.03**	0.03**	0.03***	0.04**	0.04***	0.04***
L.log	-0.1**	-0.12***	-0.1**	-0.09*	-0.09**	-0.08*	-0.06	-0.05	-0.06	-0.09	-0.08	-0.1**	-0.1**
Expdec	0.12**	1.19***	0.13**	0.22***	0.28***	0.22***	0.4***	0.47***	0.52***	1.22***	0.57***	1.2***	1.2***
Revdec	-0.12*	-1.15***	-0.43***	-0.36***	-0.45***	-0.81***	-0.73***	-1.27***	-0.5***	-1.48***	-1.34***	-1.7***	-1.7***
Expcov							0.19***	0.18***	0.16***	0.17***	0.37***	0.3***	0.3***
Expdec* trsf		-1.12***								-0.89***		-0.76***	-0.74***
Ele	-0.45*	-0.43*	-0.44*	-0.44*	-0.37	-0.42*	-0.29	-0.28	-0.25	-0.3	-0.31	-0.26	-0.26
Expdec* tax			0.34**								-0.02		
% tax				0.08***									
% trsf					-0.11***								
Revdec* tax						0.87***		0.73***					
Revdec* trsf									-1.15***				
Tax*auton													0.06**
Expdec*tax*auton											0.04***		
Expcov* auton												0.05***	
Obs.	405	405	405	405	405	405	405	405	405	405	297	297	297
Number of panel	27	27	27	27	27	27	27	27	27	27	21	21	21

(1) List of variables: pb = primary balance of general government (% of GDP), L.D = lagged stock of debt of general government (% of GDP), L.log = Lagged output gap (% of potential output), Expdec = expenditure decentralisation, Revdec = own revenue decentralisation, Expcov = coverage of subnational expenditures by own resources, Expdec\*trsf = expenditure decentralisation\*share of transfers in subnational revenues, Ele = legislative elections (1 if elections occurred in the year, 0 otherwise), Expdec\*tax = expenditure decentralisation\*share of taxes in subnational revenues, % tax = share of taxes in subnational revenues, % trsf = % of transfers in subnational revenues, revdec\*tax = own revenue decentralisation\* share of taxes in subnational revenues, revdec\*trsf = own revenue decentralisation\* share of transfers in subnational revenues, tax\*auton = share of taxes in subnational revenues\*share of autonomous taxes in subnational tax revenues, expdec\*tax\*auton = expenditure decentralisation\*share of taxes in subnational revenues\*share of autonomous taxes in subnational tax revenues, expcov\*auton = coverage of subnational expenditures by own resources\* share of autonomous taxes in subnational tax revenues.

\*\*\*, \*\*, \*: coefficient estimates statistically significant at the 1, 5 and 10% level, respectively.

Source: Commission services.

Results again confirm expectations, in that greater tax autonomy improves the primary balance.

## Expenditure

Further regressions were also estimated, including general government primary expenditure as the dependent variable, instead of the primary balance (results not shown, see Governori and Yim, 2012). This enables investigation of whether decentralisation has any systematic bearing on the absolute level of spending, as opposed to the balance of spending and revenue. The model is adapted relative to that for the primary balance, with the addition of inflation and trade openness as further control variables. The main results in

terms of the impact of decentralisation aspects are as follows:

- Decentralising expenditure *per se* is associated with lower levels of general government expenditure, whereas decentralising tax revenue to the subnational level tends to increase expenditure.
- Decentralising expenditure in combination with higher shares of central transfers in subnational revenue typically increases spending levels, but, if combined with relatively higher shares of taxes, lowers expenditure.
- Similar results are found for the interaction between own-revenue decentralisation and the share of transfers and taxes in subnational revenue, respectively.

These findings support the theoretical argument that decentralising expenditure should increase public sector efficiency, as public goods and services can be tailored to subnational

revenues on which subnational governments can exert autonomy; this would capture the coverage of subnational expenditures by autonomous revenues (Column 12).

When the term (ii) is included the interactive term of expenditure decentralisation and the share of taxes in subnational revenues is no longer significant (Column 11), suggesting that it is the true tax autonomy rather than the share of tax revenues assigned to subnational governments as such which improves fiscal balances.

needs/preferences, while ‘healthy’ competition and mutual learning take place to find more efficient ways to provide public goods and services. The results suggest that the positive effect of a high level of financial responsibility and high subnational taxes/low transfers on the primary balance stems at least partly from the a restraining effect on expenditure, as the literature would predict.

## Revenue

In analogy to the preceding section, the impact of fiscal decentralisation on revenue levels was also estimated through regressions. General government revenue and the tax burden (both as shares of GDP) were alternatively used as the dependent variable as a further robustness check.

The main findings are that decentralising expenditure does not appear to have a significant effect on revenue or on the tax burden. By contrast, own-revenue decentralisation generally lowers revenue and the tax burden. Both for expenditure and revenue decentralisation, the interaction with the share of taxes in subnational revenue is positive and significant.<sup>(36)</sup> Thus, the degree of subnational expenditure coverage through own resources has a positive and significant impact on revenues and the tax burden.

Overall, it appears that the impact of decentralisation is stronger on expenditure levels than on the revenue side. Two particular aspects of these findings complement the initial analysis, based on the primary balance. First, the general result that decentralisation of own revenues lowers the fiscal balance appears to be driven both by higher spending and lower revenue. Second, covering subnational spending to a greater extent from own resources (‘self-dependence’) positively affects fiscal balances, from both the revenue and expenditure side.

## Conclusions

The analysis in this special topic shows that fiscal decentralisation in its various forms can have significant impacts on general government fiscal outcomes.

Decentralising expenditure *per se* is associated with better fiscal balances compared to cases of

low decentralisation. This primarily reflects a

negative effect on expenditure, lending support to theoretical arguments that subnational government should be more able to tailor public goods and services to subnational needs/preferences and that competition and mutual learning among subnational governments should help them find more cost-effective ways of producing public goods and services.

Furthermore, the interaction between expenditure and revenue decentralisation is crucial in determining overall fiscal performance. A case in point is the combination of decentralising expenditure with revenue arrangements that create perverse effects.

For instance, if own resources finance decentralised expenditure only to a small extent, the fiscal balance tends to suffer. This result reflects effects on both the expenditure side and, to a lesser extent, the revenue side. It also confirms predictions in the literature that the more subnational government relies on central transfers, the more likely it is to experience ‘soft’ budget constraints that fail to foster responsible, and prudent fiscal behaviour.

Conversely, greater reliance on revenue raised locally makes subnational government more accountable to subnational voters, as the link between subnational taxes and subnational services is stronger. This exerts a disciplining effect on subnational governments’ fiscal behaviour. The empirical results further show that having greater subnational autonomy in setting tax rates and tax bases tends to improve the overall fiscal balance even further.

Overall, the analysis clearly shows that fiscal decentralisation matters for fiscal outcomes and that the interplay between expenditure and revenue is crucial to determine the net effect on fiscal balances. Criticisms that general fiscal deterioration across the euro area are being caused *inter alia* by a trend towards fiscal decentralisation do not seem to find support in the data. While such a link may hold in some Member States, the empirical analysis presented here suggests that this is not because decentralisation *per se* is bad. Rather, it is likely to be due to decentralisation being poorly designed, especially if it does not foster a sense of strong fiscal self-reliance at subnational government level.

<sup>(36)</sup> In the case of revenue decentralisation only for the tax burden.

## II.2. Taxation of housing

There are several reasons for macroeconomists to monitor developments in the taxation of housing. There is evidence of property taxes<sup>(37)</sup> being the least distortive tax source, making a case for property taxes to play a greater role in tax systems than today. Taxation of housing furthermore influences investment and consumption decisions, and can thereby have implications for macroeconomic stability and labour mobility.

This section describes the current state of taxation of housing in the euro area and looks at some design principles for taxation of housing. It also points to the favourable tax treatment of housing in the euro area, which encourages debt-building and over-investment in housing, and argues that there is a potential for shifting taxes towards recurrent taxes on property.<sup>(38)</sup>

### The contribution of recurrent property tax to overall revenue is low

Property taxes generally play a relatively small role in the euro area in terms of revenue collected. While the average tax burden in the euro area in 2010 was 38.9%, the revenue from recurrent property taxes was on average 0.96% of GDP. Adding other property-related taxes (including transaction taxes) the revenue amounted to 1.84% of GDP.<sup>(39)</sup>

The reliance on recurrent property taxes varies considerably between countries (Graph II.2.1). Recurrent taxes on property range from 2.3% of GDP in France to nil in Malta. Belgium has the second highest income from recurrent property taxes, with 1.27% of GDP. Revenues are below the euro area average in all but three euro area Member States.<sup>(40)</sup>

<sup>(37)</sup> In this text property taxes only refers to taxes on immovable property.

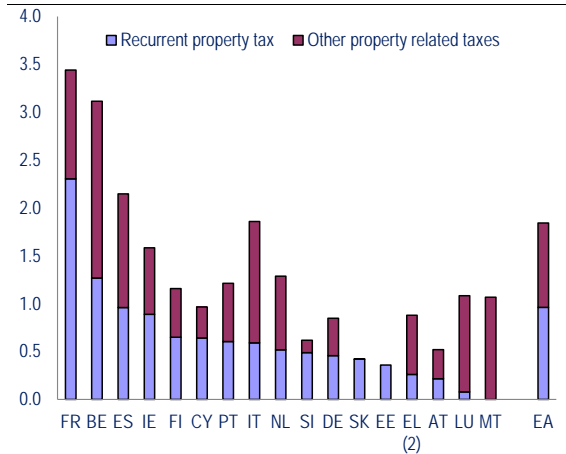
<sup>(38)</sup> The work draws, to a large extent, on the paper by Johannesson Linden, Å. and C. Gayer (2012), 'Possible reforms of real estate taxation: Criteria for successful policies', European Economy, Occasional Papers No 119 (October); and Chapter 5 of the report: European Commission (2012a), 'Tax reforms in EU Member States 2012', *European Economy*, No 6 (written jointly by DG ECFIN and DG TAXUD).

<sup>(39)</sup> Data come from the report European Commission (2012b), 'Taxation trends in the European Union'.

<sup>(40)</sup> The data do not cover taxation of imputed rents, which falls under personal income taxation. This underestimates revenues from taxation of housing in Luxembourg and the Netherlands.

Recurrent tax revenue tends to be fairly stable over time. Revenues from recurrent property taxes as a share of GDP have amounted to between 0.85% and 0.97% of GDP over the last 15 years for the euro area as a whole (Graph II.2.2).

Graph II.2.1: Revenues from property taxes (in % of GDP, 2010) (1)



(1) Ordered by revenues from recurrent property taxes. Other property-related taxes include taxes on net wealth, inheritance, gifts and other property items and on financial and capital transactions. Data do not include personal income tax on imputed rents.

(2) Data for Greece are provisional.

Source: Commission services.

Graph II.2.2: Revenue from property taxes (in % of GDP, 1995-2010) (1)



(1) Averages are weighted. Other property-related taxes include taxes on net wealth, inheritance, gifts and other property items and on financial and capital transactions. Data do not include personal income tax on imputed rents.

Source: Commission services.

Tax revenue can be increased by broadening tax bases and/or by increasing tax rates. The relative stability of revenue observed in Graph II.2.2 partly reflects the fact that the tax base, i.e. the

cadastral value<sup>(41)</sup>, has often not been revised over the last two decades, drifting sometimes far away from property market values.

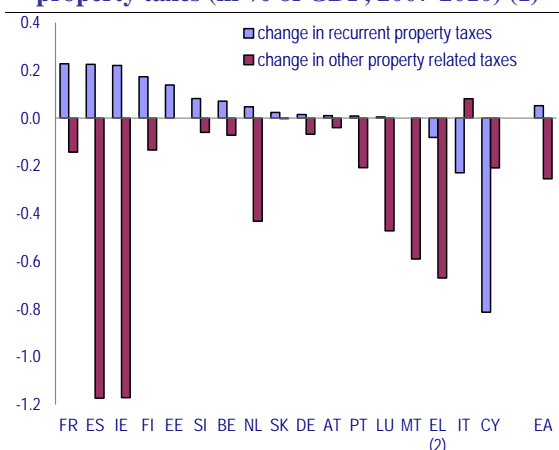
Many euro area countries have not updated property values for many years. Examples include Austria, which applies cadastral values from 1973, and Cyprus, with values from 1980. Belgium (1975) and Germany (mainly 1964) adjust cadastral values with inflation or a corrective factor not linked to house-price developments. According to the information available, at least ten euro area countries (BE, DE, EE, EL, ES, FR, IT, CY, LU and AT) apply outdated property values. The Netherlands undertakes annual updates and some countries are currently reassessing their cadastral values.<sup>(42)</sup>

**The share of transaction taxes in property taxes is high despite their more distortive and volatile nature**

Other property-related taxes generated in 2010 on average about as much revenue as the recurrent tax on property. One of the main items in this category is transaction taxes on property. As indicated in Graph II.2.1, there are significant variations between countries in the ratio of the revenue from other property-related taxes to GDP. The revenue also fluctuated quite a lot over the period 1995-2010, from approximately 0.71% of GDP in 1995 to 1.15% of GDP in 2006 in the euro area (Graph II.2.2).

Graph II.2.3 presents the changes in revenue from property taxes in euro area countries between 2007 and 2010, a period of severe economic downturn. It shows that revenues from other property-related taxes (transaction taxes) were adversely affected, especially in Spain and Ireland, but also in Greece, Malta, Luxembourg and the Netherlands. In Spain and Ireland revenue fell by approximately 1.2% of GDP. By contrast, revenues from recurrent taxes proved to be much less sensitive to the recent crisis, even increasing slightly over the period in a number of countries (ES, IE, FR, FI and EE).<sup>(43)</sup>

**Graph II.2.3: Changes in revenue from property taxes (in % of GDP, 2007-2010) (1)**



(1) Other property-related taxes include taxes on net wealth, inheritance, gifts and other property items and on financial and capital transactions. Data do not include personal income tax on imputed rents.

(2) Data for Greece are provisional.

Source: Commission services.

The ranges of tax rates applied to property transactions in the euro area are presented in Table II.2.1. All but two countries apply transaction taxes on property. Belgium, Italy and Greece even apply tax on property transactions at rates of more than 10%.<sup>(44)</sup> A second group of countries (FR, ES, LU, CY and PT) apply relatively high rates, in the range of 5-8%.

A drawback with transaction taxes is that they tend to discourage transactions that would allocate properties more efficiently, thereby making the market thinner. These taxes also have a negative impact on labour mobility given the high transaction costs incurred by changing property. The higher the rate, the more distortions will be created. Recurrent taxes are therefore preferable to transaction taxes on property.

As indicated above, transaction taxes also tend to be more volatile than a recurrent tax. This volatile nature of transaction taxes is due to the fact that both the volume and the price of transactions tend to follow the business cycle. Significant revenue from transaction taxes in boom phases tends to lead policy makers to assess the budgetary situation too optimistically. Conversely, major revenue falls in downturns can produce an extra and unanticipated challenge for budgetary consolidation, aggravating the effect of business cycles. Thus, the volatility of transaction taxes contrasts with the more stable nature of recurrent

<sup>(41)</sup> The cadastral value refers to the valuation of a property in a public register used for taxation purposes.

<sup>(42)</sup> Johannesson Linden, Å. and C. Gayer (2012), op. cit.

<sup>(43)</sup> Figures for Cyprus must be interpreted with caution as there might be some errors in the data.

<sup>(44)</sup> Some of these structures are progressive, thus the rates do not reflect average tax levels.

taxes on property. Low predictability of tax revenue complicates budgetary planning, which is especially important for indebted countries. <sup>(45)</sup>

**Table II.2.1: Tax rates on property transactions in the euro area (2012) (1)**

Tax level	Member State
≥10%	BE, EL*, IT*
5-8%	FR, ES, LU, CY*, PT*
<5%	AT, DE, IE, MT, NL, SI, FI
None	EE, SK

(1) \* indicates a progressive or multiple rate structure. In Italy some rates are levied on cadastral values rather than transaction values.

Source: Commission services.

A tax on real property transactions could potentially deter speculation and thus help reduce the risk of housing market bubbles. However, this relationship remains empirically ambiguous. It could also prove to be politically difficult to use the transaction tax as a timely policy response to mitigate price increases in the housing market. Moreover, other policies are available that can deal more effectively with housing market bubbles, such as capital requirements and loan-to-value limits. <sup>(46)</sup>

### Some design principles for optimal taxation of housing

Several approaches to designing taxes on residential property have been discussed in the literature. <sup>(47)</sup> A distinction should be made between business property, owner-occupied housing and rental housing. A company's building assets are an input into the production process. Therefore the taxation of those business assets could severely distort resource allocation. In any event business building assets should not be taxed more than other inputs into production. Taxation of residential housing could be considered as part of the taxation of both consumption and the return

from investment/savings. <sup>(48)</sup> There are also good arguments for taxing land values, in the case of both business and residential properties.

As housing is an asset, a natural starting point is that housing should be treated in the same way as other capital investments in the tax system. A house that is rented out will generate rental income that can be seen as capital income and taxed at the same rates as other capital income. If the owner alternatively chooses to live in the house, he or she will benefit from the return on the investment, in the form of an imputed rent, which should be taken into account and measured. When imputed rent payments are taxed, deductibility for depreciation allowances and mortgage interest payments should apply so that the net capital investment is taxed. Consistent with the treatment of other financial assets, capital gains from housing transactions should also be taxed in order to achieve neutrality vis-à-vis investment in other assets. A tax on imputed rental income could be approximated through an annual recurrent tax on the property. This assumes that imputed rents are proportional to property values. Property values should then be set as close as possible to actual market values.

At the same time, housing provides a service. It provides accommodation and a place to store goods, eat and socialise, which is a set of consumable services. Like other consumption goods and services, it could be covered by value added tax. The tax would then be regarded as a levy on the present value of the stream of services that the house will generate in the future. It means that VAT should be applied when the house is sold the first time. This would be in line with the treatment of other durable goods, e.g. cars or refrigerators. Another alternative is to apply a tax on the flow of services from housing over time. That translates into taxing the rent or the imputed rent for owner-occupied housing, preferably at the standard VAT rate. Estimating the imputed rent for owner-occupied housing properly and fairly involves some practical difficulties and most countries do not apply this approach. To achieve equal treatment between owner-occupied and rental housing they do not levy VAT on rental payments either.

<sup>(45)</sup> See European Commission (2012b), op. cit. Revenues from transaction taxes are more cyclical than recurrent taxes as revenue depends not only on market prices, but also on the number of transactions. Moreover, a recurrent tax will still be more stable than taxation of real-time transactions, especially if cadastral values are updated periodically, e.g. after a few years instead of every year.

<sup>(46)</sup> See Crowe C., G. Dell'Ariccia, D. Igan and P. Rababal (2011), 'How to deal with real estate booms: Lessons from country experiences', *IMF Working Papers*, No 11/91.

<sup>(47)</sup> See for instance Mirrlees, J., S. Adam, T. Besley, R. Blundell, S. Bond, R. Chote, M. Gammie, P. Johnson, G. Myles and J. Portaba (2011) 'Tax by design, the Mirrlees review', *Oxford University Press for Institute for Fiscal Studies* or OECD (2010), 'Tax policy reform and economic growth', *OECD Publishing*.

<sup>(48)</sup> In the Mirrlees review recommendations build on both an asset approach and a consumption approach. OECD (2010) (op. cit.) note that return on investments other than housing is normally taxed first at corporate and personal level and then taxed with VAT when the return is consumed. For housing, applying VAT and the asset approach would mean that such taxation takes place in the reverse order.



Land is an especially attractive tax base. The supply of land is fixed (i.e. price-inelastic) and will not be affected by a tax. A tax on land will therefore reduce the selling price by the same amount and only reduce earnings to landowners. Land buyers will face the same (tax-augmented) prices of land after the introduction of the land tax. There is therefore no distortion arising from this tax, which makes it especially attractive for revenue purposes. Taxing landownership translates simply into taxing an economic rent and involves a transfer of earnings from landowners to local or central governments. It is, however, hard to distinguish land values from properties (buildings and other structures) built on it. The markets for land without any buildings will tend to be narrow, at least in some areas, and prices could be difficult to observe. As market prices for properties will normally include land values and as there are other good reasons for taxing residential property, property taxes could act as a proxy for taxing land values and thereby avoid the additional complexity of valuing land separately.

Globalisation has implications for policy design. Capital and labour have become increasingly mobile and less efficient to tax. This might imply that countries need to rethink their tax structures. Taxation of property is regarded as the tax least affected by globalisation and should therefore gain momentum in a country's tax structure. Another advantage of immovable property as a tax base is that property ownership is generally easy to establish and identify, and thus the tax is difficult to evade.

#### **Favourable tax treatment of housing in the euro area: debt-bias and over-investment risk**

In most countries owner-occupied housing receives favourable tax treatment compared to taxation of other forms of investment.

Firstly, capital gains on residences are often exempted from capital gains tax, in particular when gains are on primary residences. In some countries the exemption is made dependent on how long the owner has lived in the house before sale.

Secondly, there are only a few countries that apply taxation to imputed rental income on main residences in the euro area. These are the Netherlands and Luxembourg. In Belgium, Spain and Italy, taxes on imputed rents apply to residences other than the main dwelling. Even if recurrent property taxes are regarded as a proxy

for a tax on imputed rents, the rates and the tax bases are normally too low in comparison with the tax treatment of other capital assets. Valuation of properties is, as indicated earlier, often outdated and can be far below market prices.

Thirdly, ten euro area countries apply some form of mortgage interest deductibility for owner-occupied properties.<sup>(49)</sup> In the presence of mortgage interest deductibility, a tax on imputed rents and/or a recurrent property tax are essential to balance the tax subsidy provided by the deductibility. The tax is needed to achieve neutral tax treatment of various investment possibilities. If interest deductibility is provided to homeowners while imputed rental income is either (i) not taxed (or taxed too low) or (ii) approximated with a recurrent property tax which is generally low, an implicit tax subsidy is provided which favours investments in owner-occupied housing and household indebtedness through mortgage loans. Hence there is a risk that households will be encouraged to invest too much in housing in relation to other assets, which could contribute to higher private-sector debt and an over-allocation of capital to the housing sector, which is normally not considered to be the most productive economic sector.

Empirical studies also indicate that reduced interest costs due to interest deductibility are capitalised into higher house prices.<sup>(50)</sup> Tax subsidies for mortgage interest payments have also been found to be correlated with price volatility on the housing market.<sup>(51)</sup>

In this context, a first-best solution is either to tax imputed rents, but these rents are difficult to measure in practice. An alternative is to increase

<sup>(49)</sup> A detailed overview of the current treatment of mortgage interest deductibility in Europe is given in European Commission (2012a), op. cit.

<sup>(50)</sup> See for instance Capozza, D.R., R.K. Green and P.H. Hendershott (1996), 'Taxes, mortgage borrowing, and residential land prices', In 'Economic effects of fundamental tax reform', ed. Aaron, H. and W. Gale, *Brookings Institution*, pp. 171-198; Harris, B. (2010), 'The effect of proposed tax reforms on metropolitan housing prices', Tax Policy Center, Urban Institute and Brookings Institution. Other results indicate that demand shocks (e.g. through financial deregulation) have a greater likelihood of being capitalised into real house prices when the country provides interest deductibility. Andrews, D. (2010) 'Real house prices in OECD countries: The role of demand shocks and structural and policy factors', *OECD Economics Department Working Papers*, No 831, OECD Publishing.

<sup>(51)</sup> Van den Noord, P. (2003), 'Tax incentives and house price volatility in the euro area: Theory and evidence', *OECD Economics Department Working Papers*, No 356, OECD Publishing; Andrews, D. (2010), op. cit.

## II. Special topics on the euro area economy

the recurrent tax on property, which can be seen as an approximation of a tax on imputed rents. A second-best design of the taxation of owner-occupied housing could be: (i) not to allow mortgage interest deductibility and (ii) to levy a (lower) recurrent tax on property. In this way, housing investments would still be taxed and the tax system would not favour debt.

The application of VAT on housing also varies across euro area countries, which means that consumption of housing services in the euro area is only partly exposed to VAT. <sup>(52)</sup> More than half of these countries apply VAT on the sale of new dwellings, but many countries apply lower rates than the standard rate. Different practices apply to the VAT treatment of construction, alteration and maintenance of property. The rental of residential properties is normally exempt or zero-rated. Overall, only part of the consumption of housing services is taxed.

### Shifting the tax burden towards recurrent property tax

Empirical studies by the OECD rank the type of taxes according to their effect on economic growth and find recurrent property taxes to be the least harmful type. <sup>(53)</sup> This suggests that a rise in property taxes should play an important role when considering an increase in revenue or a shift in the tax burden.

A reform shifting the tax burden from more distortive taxes (e.g. labour taxes) towards property taxes could then enhance growth. The same is true for tax shifts within property taxes, moving the tax burden from high transaction taxes to recurrent taxes on property. Table II.2.2 identifies the countries in the euro area where such shifts appear particularly attractive. <sup>(54)</sup>

Many euro area countries (DE, EE, EL, IT, CY, MT, AT, PT, SI, SK and FI) have low recurrent taxes on property and might have potential for increases. Of these countries, Germany, Italy,

<sup>(52)</sup> Information has mainly been collected from OECD (2011), 'The taxation of residential property: Background note for the November Roundtable at Working Party No 2, (3 November).

<sup>(53)</sup> See for instance OECD (2010), op. cit.; Johannesson Linden, Å. and C. Gayer. (2012), op. cit., also gives an overview of empirical results on tax shifting and its impacts on GDP.

<sup>(54)</sup> A country is considered to face a challenge related to a high tax burden on labour and is evaluated to have low recurrent taxation of housing if the respective indicator is significantly worse than the weighted EU27 average. For more information see chapter 5 in European Commission (2012a, ibid).

Austria and Finland also have a high tax burden on labour, which might indicate both a need and room for shifting taxes from labour to recurrent property taxes. The Netherlands, which applies taxation of imputed rents in addition to recurrent taxes on property, might also have potential for shifting tax from labour to housing. <sup>(55)</sup>

Table II.2.2: Potential for tax shifts (1)

Country	Potential for tax shift from labour to property			Potential for tax shift within property taxes
	High tax burden on labour	Low recurrent taxes on property	Potential for tax shift	High transaction taxes
BE	X			X
DE	(X)	X	(X)	
EE		X		
IE				
EL		X		X
ES				X
FR	X			X
IT	X	X	X	X
CY		X		X
LU				X
MT		X		
NL	(X)			
AT	(X)	X	(X)	
PT		X		X
SI		X		
SK		X		
FI	(X)	X	(X)	

(1) A euro area country displaying both a fairly high tax burden on labour and low recurrent taxes on property may consider a tax shift from labour to property. (X) depicts borderline cases reflecting relatively high employment rates in some countries.

Source: Commission services.

Raising revenues from recurrent property taxes to the euro area average of 0.96 % of GDP would for instance correspond to an increase of around 0.5 % of GDP in the case of Slovenia, Germany and Slovakia.

Tax shifts within property taxes would also be particularly relevant for countries with high transaction rates. A gradual shift from a tax on property transactions to a recurrent tax on property could potentially improve the functioning of the housing market in several countries (particularly BE, EL and IT but also ES, FR, LU, CY and PT). <sup>(56)</sup>

<sup>(55)</sup> This analysis does not take into account the application of VAT or a capital income or capital gains tax to housing, which preferably also should be considered.

<sup>(56)</sup> A country is considered to have a particularly high transaction tax if the country has a tax rate equal to or above 5 %.



## Conclusion

The low ratio of property taxes to GDP in most of the euro area indicates that there is room to shift taxation towards property taxes. Many euro area countries could consider shifting from personal and corporate income taxes to consumption and property taxes in order to increase GDP per capita in the long run. A shift could result in stronger growth in the short-to-medium run.

A transaction tax reduces the number of transactions and thereby makes the market thinner. It can adversely affect labour mobility, and discourages transactions that would allocate the housing stock more efficiently. A recurrent tax on residential property is less distortive and forms

a more stable revenue base. Thus, many euro area countries should consider shifting away from (high) taxes on residential property transfers to a recurrent tax on residential property. A way to do that would be to reduce transaction taxes and update cadastral values according to market values.

The tax systems in the euro area generally allow mortgage interest deductibility without taxing imputed rents sufficiently, which often provides tax incentives for households to over-invest in housing and to take on debt. Euro area countries should consider measures to ensure that such an implicit subsidy to housing investment does not take place.

### II.3. Risk and uncertainty in euro area sovereign debt markets and their impact on economic activity

#### Introduction

Risk and uncertainty are two important concepts in economics and finance. Risk is understood to be measurable, while uncertainty is not.<sup>(57)</sup> Finance and economics have traditionally emphasised the role of quantifiable risk. For example, in modern portfolio theory risk is calculated using statistical probability of asset returns. Another example is borrower default risk, which is estimated by credit score calculations including quantitative elements. The word uncertainty, on the other hand, is often used to describe situations where risks are difficult to quantify, for instance because the chances that they occur are extremely slim. The financial crisis has refocused attention on so-called ‘tail risks’, which relate to events with little historical record of occurrence and unknown (but potentially large) impact. Tail risks are, therefore, to a large extent immeasurable. When the presence of incalculable uncertainty is acknowledged, investors start hoarding liquidity for self-insurance and drive up risk premia.<sup>(58)</sup>

Both calculable risk and uncertainty are present in risk premium determination and thus affect economic activity. For example, during the pre-crisis years lower risk premia contributed to keeping long-term interest rates down and supported housing markets and consumer spending. Conversely, risk premia have surged in some countries since the onset of the crisis, with a negative impact on the economy.

The purpose of this section is to shed some light on the drivers of the changes in risk premia since the crisis. It first reviews a number of indicators of measurable risk and immeasurable uncertainty. It then quantifies the relationship between euro area sovereign bond spreads and their determinants, trying to identify the respective roles of calculable risk and uncertainty. Last, the

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<sup>(57)</sup> There is a body of literature on the difference between the two concepts; see Knight, F. (1921): Risk, uncertainty and profit, Boston: Houghton Mifflin, on the concept of Knightian uncertainty, and Ellsberg, D. (1961): Risk, ambiguity, and the savage axioms, *The Quarterly Journal of Economics* Vol. 75, No 4, on its application in finance.

<sup>(58)</sup> Risks arising from financial crises are difficult to insure because often it is impossible to calculate the likelihood of a crisis. Moreover, the consequences of a crisis are frequently modified by those affected. Hence it is difficult to determine whether the crisis is the cause or the consequence.

section investigates the impact of falling sovereign risk premia on the real economy, including spillover effects into the corporate bond market.

#### Various measures of risk

The risk premium is the extra compensation for holding an asset which carries anticipated and measurable asset-specific and economy-specific risk but also non-measurable uncertainty. Risk premia are well reflected in the spreads between various risky and risk-free asset returns. Spreads can give information about the magnitude of the underlying risk and its possible macroeconomic impact. For example, the Euribor-OIS spread is a proxy of counterparty risk on the wholesale banking markets,<sup>(59)</sup> while the spread between government bonds and the swap rate represents the bonds’ default risk.

Non-spread measures of risk are also widely used. The health of the financial system can be measured by bank borrowing costs, and by capital and profitability ratios. In the non-financial corporate sector, risk indicators are linked to corporate profitability and leverage. Stock market volatility reflects risk in economy-wide outcomes.

Derivative markets are a distinct source of risk indicators, having recently become especially popular in measuring risk on sovereign debt markets. Spreads in credit default swaps (CDS) are similar to an insurance premium, offering protection against bond default by the issuer. The more risky the underlying bond, the higher the CDS spread, as bond investors become more likely to purchase default insurance.

Indicators to gauge investors’ appetite for accepting risks also exist. A global measure of risk aversion can be tracked looking at the VIX index, which is used to predict the likelihood of large swings in equity prices solely based on investors’ risk attitude.<sup>(60)</sup>

Gauging the presence of immeasurable macroeconomic uncertainty is (by definition) considerably more difficult. Ex-ante forecast disagreement and ex-post forecast errors can provide an aggregate measure of macroeconomic

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<sup>(59)</sup> OIS stands for overnight indexed swap.

<sup>(60)</sup> The VIX index is a forward-looking measure of near-term volatility conveyed by the S&P 500 stock index option prices. Since it is derived from market prices of traded options, it signals market expectations of future volatility and changes in risk preference.

uncertainty.<sup>(61)</sup> Surprise movements in either measure are often associated with significant changes in output and employment. In recent years, a number of risk indicators linked to policy surprises and economic and political news have also been proposed. Graph II.3.1 shows that an increase in uncertainty, as captured by the higher values of the EPU index' news component, is associated with higher sovereign bond spreads.<sup>(62)</sup>

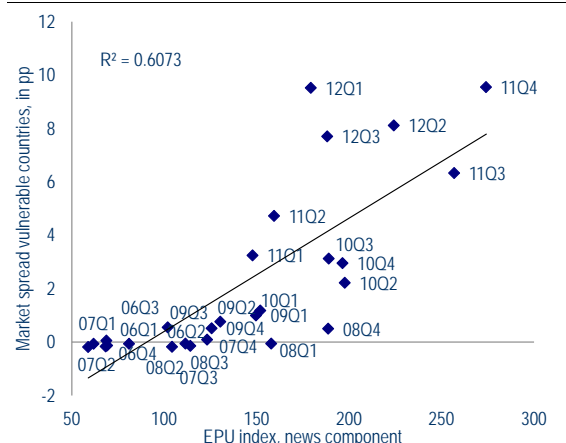
### Estimating risk and uncertainty in the euro area sovereign bond markets

Econometric analysis of sovereign spread determinants can be used to better understand the large rise in sovereign borrowing costs observed in several euro area Member States since 2010. The econometric analysis presented in Box II.3.1 shows that recent changes in risk premia cannot entirely be explained by calculable measures of risk and that immeasurable uncertainty plays an increasingly important role in determining risk premia.<sup>(63)</sup>

Most of the available empirical studies find a statistically significant relationship between sovereign bond yield spreads and country-specific fundamentals, such as the debt-to-GDP ratio, government deficit and growth outlook.<sup>(64)</sup> However, research covering the period after the crisis shows that the actual increase in sovereign spreads in some euro area countries cannot be fully explained by models that contain only country-specific measurable variables. This remains largely true even if changes in liquidity conditions, investor risk attitudes, the size and leverage of the national banking system and

contagion effects among euro area Member States are controlled for.<sup>(65)</sup>

**Graph II.3.1: News component of the European EPU index versus sovereign spreads of the vulnerable euro area countries (2006Q1-2012Q3) (1)**



(1) The news component of the Economic Policy Uncertainty Index is on the horizontal axis, the weighted average of 10-year sovereign bond spreads in the vulnerable countries is on the vertical axis. GR, IT, ES, IE and PT are the vulnerable euro area Member States.

Source: DG ECFIN.

This conclusion is supported by the econometric analysis presented in Box II.3.1, which reveals that investors' risk behaviours have changed since the beginning of the crisis. More specifically, the econometric analysis shows that since the crisis the role of public debt in determining spreads (i.e. its estimated coefficient) has increased. Furthermore, changes in the fiscal balance and bond market liquidity have had a statistically meaningful impact on sovereign bond spreads only since the start of the crisis and not earlier.

In addition, the negative feedback loop between the performance of the countries' banking sectors and their sovereign risk premia became evident during the crisis as investors started to require a higher premium to cater for the risk that governments may have to step in to support domestic banks under stress. As a proxy for the health of the banking sector, the analysis includes a measure for lending to euro area credit institutions by the Eurosystem. The econometric

<sup>(61)</sup> The utilisation of dispersion indexes of expectations as proxies for uncertainty has a long tradition in the literature, mainly in the context of inflation expectations; see for instance Bachman R., S. Elstner and E. Sims (2010): Uncertainty and economic activity: Evidence from business survey data, NBER Working paper 16143; Bomberger, W. (1996): Disagreement as a Measure of Uncertainty, *Journal of Money, Credit and Banking*, Vol. 28, No 3.

<sup>(62)</sup> The Economic Policy Uncertainty (EPU) Index consists of two components: one quantifies newspaper coverage on economic policy uncertainty, while the other evaluates disagreement among economic forecasters. A European version of the index exists. See Baker, S., N. Bloom and S. Davis, (2012): Measuring economic policy uncertainty, Stanford University, mimeo.

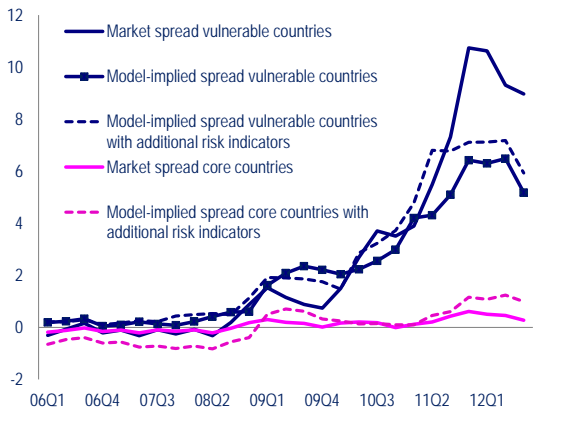
<sup>(63)</sup> Coefficients are similar to those in Barrios S., P. Iversen, M. Lewandowska and R. Setzer (2009): Determinants of intra-euro area government bond spreads during the financial crisis, *European Economy*, No 388.

<sup>(64)</sup> For an evaluation of sovereign bond yield determinants, see Poghosyan, T., (2012): Long-run and short-run determinants of sovereign bond yields in advanced economies, IMF Working Paper, No 12/271.

<sup>(65)</sup> See Favero, C., A. Missale (2011): Sovereign spreads in the euro area: Which prospects for a Eurobond? CEPR Discussion Paper, No 8637; Gerlach, S., A. Schulz and G. Wolff (2010): Banking and sovereign risk in the Eurozone, CEPR Discussion Paper, No 7833; and Beime, J and F. Fratzscher (2012): The Pricing of Sovereign Risk and Contagion during the European Sovereign Debt Crisis, ECB Working Paper.

results show that higher bank dependence on central bank lending is associated with higher home-country bond spreads.

**Graph II.3.2: Market spreads versus model-based spreads in the vulnerable and core euro area Member States (in pp, 2006Q1-2012Q3) (1)**



(1) Model-based spreads are fitted values from a panel regression of sovereign spreads on public debt, GDP growth and current account balance. The additional risk indicators are debt dynamics, liquidity, systemic risk, the crisis regime and post-crisis official lending to banks.

Source: DG ECFIN.

Nevertheless, even if changes in the role of certain sovereign spread determinants are introduced into the model, a significant part of the recent surge in sovereign spreads in some Member States remains unexplained. This suggests that movements in sovereign bond spreads are not only affected by country-specific macroeconomic developments but also by non-measurable risk factors, in particular in relation to economic policy and EMU.

More precisely, the spreads predicted by the model track actual market spreads before the crisis very closely. However, a gap between actual and predicted spreads is evident as from 2010 and has become especially large and persistent since the beginning of 2011 (Graph II.3.2). The movements differ in direction and magnitude among Member States. In vulnerable countries, such as Italy, Portugal and Spain, market spreads exceed their respective model-based spreads. Movement in the opposite direction can be observed in Member States, such as France, Germany and the Netherlands, where the flight to safety by bond investors pushed yields below levels suggested by the model.

**Assessing the role of non-measurable risk**

A closer look at the sovereign spread regression residuals in those Member States which have been

under intense market pressure reveals that they are moving together. This suggests that investors are pricing a common risk factor, perhaps related to a potential redenomination of public debt or to economic governance uncertainty in parts of the euro area. To try to reduce this gap, two additional indicators are included in the estimation.

The first additional indicator is related to spread co-movement across euro area Member States. The common variability of sovereign bond spreads (a common euro area risk factor) is extracted out of country-specific sovereign bond spreads (via a principal component analysis) and added to the model as an explanatory variable. The indicator is significant, confirming the hypothesis of a commonality present in the euro area sovereign bond markets. <sup>(66)</sup>

The second additional indicator is the news component of the Economic Policy Uncertainty Index, which tracks the coverage of economic and political uncertainty in euro area newspapers that is not country-specific. This indicator is also statistically significant, validating the hypothesis that euro area-wide policy uncertainty affects sovereign bond risk premia.

The introduction of the common euro area risk factor or the common policy uncertainty news index decreases the unexplained part of the sovereign bond risk premia but does not completely eliminate it. This result is in line with recent literature, suggesting a decoupling of observed spreads from information that can be derived from macroeconomic fundamentals and the emergence of an immeasurable component of the risk premia, i.e. uncertainty, which is only partially controlled here with the introduction of the common euro area risk factor or the policy uncertainty news index.

**Macroeconomic impact**

Whereas the econometric analysis points to a significant role for uncertainty in explaining the remaining difference between market spreads and model-based spreads, the rest of this section assesses the impact of this uncertainty on economic activity. DG ECFIN’s dynamic stochastic general equilibrium (DSGE) model

<sup>(66)</sup> Similar conclusion has been reached, for instance, by Di Cesare, A., G. Grande, M. Manna and M. Taboga (2012): Recent estimates of sovereign risk premia for euro area countries, Banca d’Italia Occasional Paper No 128.

*Box II.3.1: Risk and uncertainty behind rising sovereign bond spreads in the euro area: panel estimations***Data**

The risk determinants driving the dynamics of euro area sovereign bonds are assessed via a panel regression model of 10-year sovereign bond spreads. The model contains quarterly data for eleven euro area Member States: Austria, Belgium, Finland, France, Germany, Greece Ireland, Italy, the Netherlands, Portugal and Spain, between 1999Q1 and 2012Q3. The dependent variable is the sovereign bond spread, defined relative to the corresponding interest rate swap. Variables used to represent investors' assessments of country-specific sovereign credit risk are: government debt stock, change in the fiscal balance (both as a share of GDP), the current account balance and real GDP growth rate. The squared debt-to-GDP ratio is used to reflect non-linearities in the relationship between sovereign spreads and public debt-to-GDP ratio. In order to estimate the role of liquidity risk the bond-specific bid-ask spreads of the corresponding maturities are used as regressors. The VIX index is used to reflect changes in overall investor confidence in global financial markets. Lending to banks by the Eurosystem is included to capture the impact of financial system support on spreads. A time dummy for the financial crisis between 2008Q3 and the end of the sample is inserted, in interaction with the intercept and some of the explanatory variables in order to indicate a regime switch in risk determination. The first principal component of the eleven yield spreads is used to represent the common euro area risk factor. Alternatively, the news component of the European Policy Uncertainty index is included in order to estimate the share of sovereign risk premia that is common to all Member States and is at least partially based on non-fundamentals. The news component is a composite of articles that contain keywords published in ten large European newspapers and is not country-specific. Therefore the impact of the idiosyncratic country uncertainty remains in the estimated error.

**Methodology and results**

The panel regressions quantify the degree of divergence of market-observed bond spreads from the value justified by macroeconomic fundamentals and common variability. The approach follows Barrios et al (2009) and Di Cesare et al (2012). Various specifications of the model result in the optimal representation:

$$\text{spread}_{i,t} = \alpha + \lambda_1 \text{debt}_{i,t} + \lambda_2 \text{debt} * \text{crisis}_{i,t} + \lambda_3 \text{debtsq} * \text{crisis}_{i,t} + \lambda_4 \text{gdp}_{i,t} + \lambda_5 \text{deficit} * \text{crisis}_{i,t} + \lambda_6 \text{bidask} * \text{crisis}_{i,t} + \lambda_7 \text{banklend}_{i,t} + \lambda_8 \text{news}_{i,t} + \lambda_9 \text{crisisdum}_{i,t} + \varepsilon_{i,t}$$

where sub-indexes  $i=1, \dots, N$  and  $t=1, \dots, T$  stand for country and time. The equation is estimated by a panel estimator with fixed-effects and robust standard errors.

The obtained coefficients are similar to the ones in Barrios et al (2009) whose sample ends in mid-2009. The introduction of the crisis interaction dummy improves the fit and demonstrates the change in the significance of public debt, fiscal balance and liquidity on the sovereign debt market since the beginning of the crisis. Specifically, from the crisis onwards, debt has a growing impact on spreads as it becomes bigger in relation to GDP. The change in the fiscal balance and the bond market liquidity has an impact on spreads only from the start of the crisis.

Two alternative approaches are used to address the common risk factor in the spreads. Based on the methodology in Di Cesare et al. (2012) and IMF (2012) the first principal component of the spread is included as an independent variable in one of the regression specifications. It accounts for around 60% of common spread variability and captures co-movement that might stem from within the set of countries or from a common outside factor. In an alternative regression specification, the news component of the European Policy Uncertainty index is used to reflect common changes in both fundamentals and uncertainty as reported in newspaper articles. Both of these measures improve the fit, capturing at least part of the increase in the importance of immeasurable uncertainty. Neither of these measures, however, can precisely calculate how much of the increase in sovereign bond risk premia is due to an increase in incalculable uncertainty.

The regression results are given in the following table.

*(Continued on the next page)*

Box (continued)

	Model with economic fundamentals only	Model with debt dynamics	Model with liquidity and systemic risk	Model with crisis regime	Model with crisis regime and common euro area factor	Model with crisis regime and news index
	(1)	(2)	(3)	(4)	(5)	(6)
Debt	0.089*** (4.44)	-0.137*** (-3.34)	-0.041* (-1.74)	0.014* (1.78)	0.007 (0.62)	0.013* (1.43)
Debt*Crisis				-0.089*** (-10.04)	-0.077*** (-6.44)	-0.083*** (-9.52)
Debt <sup>2</sup>		0.002*** (5.18)	0.001*** (3.16)			
Debt <sup>2</sup> *Crisis				0.0007*** (14.14)	0.0006*** (5.92)	0.0006*** (-11.15)
ΔFiscal*Crisis				-0.024*** (-3.55)	-0.022*** (-3.26)	-0.023*** (-3.31)
Current acct balance	0.052* (1.54)	0.068 (1.18)				
ΔGDP	-0.199*** (-1.91)	-0.14*** (-2.86)	-0.125** (-2.63)	-0.133*** (-2.70)	-0.116** (-2.33)	-0.120** (-2.53)
Bid-ask spread			0.110*** (8.03)			
Bid-ask spread*Crisis				0.103*** (11.75)	0.097*** (8.5)	0.101*** (10.63)
VIX			0.08* (1.65)			
Post-crisis official lending to banks				0.215*** (4.61)	0.169*** (4.93)	0.195*** (4.83)
Common euro area factor					0.219*** (2.82)	
News index						0.473** (1.84)
Crisis dummy				1.311** (2.47)	1.18** (2.3)	1.190* (2.37)
Const	-5.555 (-4.33)	2.047 (1.37)	0.031 (0.971)	-0.786 (-1.24)	-0.14 (-0.16)	-0.88 (-1.44)
R <sup>2</sup>	0.22	0.34	0.65	0.77	0.80	0.79
No obs	604	604	604	604	604	604

## References

Baker, S., N. Bloom and S. Davis, (2012): Measuring economic policy uncertainty, Stanford University, mimeo

Barrios S., P. Iversen, M. Lewandowska and R. Setzer (2009): Determinants of intra-euro area government bond spreads during the financial crisis, European Economy, No 388

Di Cesare, A., G. Grande, M. Manna and M. Taboga (2012): Recent estimates of sovereign risk premia for euro area countries, Banca d'Italia Occasional Paper No 128

International Monetary Fund, 2012 Spillover Report, Background paper 4: Commonalities, mispricing, and spillovers: euro area sovereign risk

QUEST is employed to quantify the effects on economic activity of a decrease in risk premia that could follow a decrease of uncertainty related to the functioning of EMU and the ongoing adjustment processes in some Member States (Box II.3.2).

The fall in uncertainty is modelled as a decrease in risk premia equal to the weighted average of the differences between market-based spreads and estimated spreads in vulnerable Member States. The differences are obtained from the fourth regression in the table of Box II.3.1, where sovereign risk premia are modelled as a function of fundamental variables, market liquidity,

systemic risk and a country's potential support for banks and where shifts in coefficients during the crisis are accounted for. The resulting size of the risk premia shock is 177 basis points.

The direct macroeconomic effects of changes in sovereign risk premia are quite small in the model. A higher risk premium on sovereign debt only affects new and rolled-over debt, and thus the average interest rate that governments pay is only increased incrementally. Therefore, the model predicts relatively small changes to public spending and no material impact on general economic activity.



*Box II.3.2: The macroeconomic impact of falling sovereign bond spreads in the euro area*

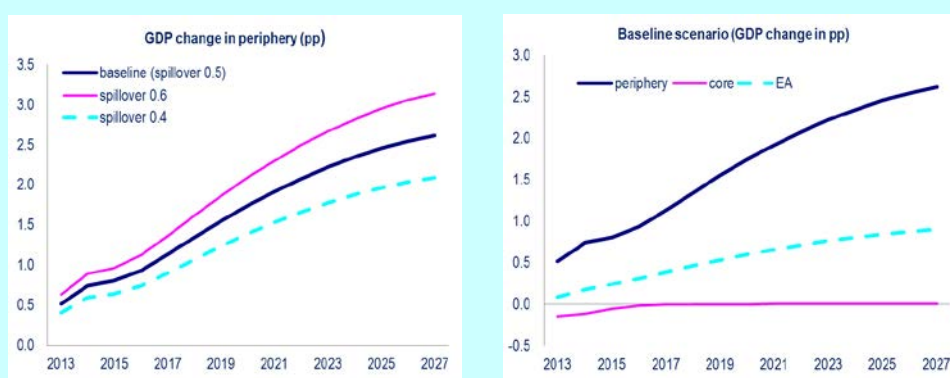
The macroeconomic impact of falling sovereign bond spreads is found using QUEST, a dynamic stochastic general equilibrium (DSGE) model developed by the European Commission which incorporates various real, nominal and financial frictions. First, it is acknowledged that lower sovereign borrowing costs are likely to spill over to financing costs in the private sector. The spillover effect is calculated by comparing the evolution of sovereign and corporate CDS for euro area non-financial companies. Both series are found to display substantial comovement, particularly in countries that face fiscal strain. A median spillover coefficient of 0.6 is obtained by running a number of regressions of corporate CDS spreads on sovereign CDS spreads, controlling for changes in sector-specific risks.

The analysis was carried out for all euro area companies having with liquid CDS quotes. However, given the relatively short sample with observations only covering the period since the crisis intensified in 2010, a spillover coefficient of 0.6 may well be overvalued. Moreover, spillovers from sovereign to private debt markets might be reinforced in a positive spiral when governments are made to pay more because a negative growth outlook is caused by tighter private-sector credit conditions. A spillover coefficient of 0.5 has therefore been chosen as the baseline scenario.

Simulations of the QUEST model give the macroeconomic impact of decreasing sovereign risk premia. In this analysis a three-region variant of the model divides the euro area into core and vulnerable countries and includes the rest of the world.<sup>(1)</sup> The model introduces a number of risk premia on various assets that may reflect generalised risk perceptions, such as the risk perceptions of a country (sovereign risk) and sectoral risk premia (e.g. a risk premium on housing or corporate investment). A scenario in which sovereign bond spreads that are temporarily above their fundamental-based value revert to the fundamentals can then be modelled as a fall in the sovereign risk premium. These are then likely to spill over into the corporate sector as decreasing sectoral risk premia.

In all the scenarios considered in this box it is assumed that the sovereign risk premia in the periphery are reduced permanently by 1.77 percentage points (the weighted average of the differences between market and model-based yields for vulnerable countries in the euro area in 2012Q3). In the baseline scenario this reduction is accompanied by a 0.5 spillover coefficient to risk premia in the housing, traded goods and services (non-traded goods) sectors. As a sensitivity analysis, higher (0.6) and lower (0.4) spillover factors are also considered. The higher factor is closer to the estimate obtained from regressing sovereign on corporate CDS spreads.

As can be seen in the graph below, a risk premium reduction in the baseline scenario (a spillover coefficient of 0.5) leads to an immediate increase of 0.5 percentage points (pp) in the periphery’s output. Output continues to rise over the next years, reaching a 2.5 pp increase after 15 years. However, the size of the effect is highly sensitive to the spillover coefficient. For a stronger spillover of 0.6, the output may increase by more than 0.6 pp following the shock and is almost 3 pp higher than a constant-spread scenario after 15 years. Smaller spillovers from the government to corporate sector borrowing costs lead to smaller output effects. The impact of eliminating the spillover entirely is only 10% of the impact when a spillover is included.



While a reduction in spreads in the periphery has positive output effects for the more vulnerable euro area Member States, it is initially accompanied by a marginal output loss in the euro area core countries. This could happen as falling financing costs in the periphery create an investment opportunity for the rest of the world, including the core

<sup>(1)</sup> For the purposes of the empirical analysis in this section, euro area Member States are divided into two groups: core countries (Austria, Belgium, Finland, France, Germany, the Netherlands) and more vulnerable countries: (Greece, Ireland, Italy, Portugal and Spain).

*(Continued on the next page)*



*Box (continued)*

euro area countries. Hence, there could be an increased capital outflow from the core to the periphery, with temporary negative GDP effects in the former. Nevertheless, the overall effect for the euro area as a whole remains positive, with a simulated output gain within the euro area as a whole reaching between 0.5 and 1 pp.

### References

Ratto, M., W. Roeger and J. in't Veld (2009): QUEST III: An estimated DSGE model of the euro area with fiscal and monetary policy, *Economic Modelling*, Vol. 26, No 1

Roeger, W., and Jan in't Veld (2010): Fiscal stimulus and exit strategies in the EU: a model-based analysis, *European Economy*, No 426

However, there are several ways through which drops in uncertainty and sovereign risk premia may have more sizeable macroeconomic effects if they spill over to risk premia in the private sector. Since uncertainty increases the value of waiting for new information (higher physical adjustment frictions), firms respond to a drop in uncertainty by resuming investment.<sup>(67)</sup> Financial frictions also play a role. Gilchrist et al. (2009) argue that decreases in firm risk, for example, after the fall in uncertainty, would lead to a drop in the cost of capital, which in turn would release previously postponed investment activity and hiring decisions.<sup>(68)</sup> Finally, a fall in uncertainty may also affect households by supporting spending on durable goods and housing.

In the baseline scenario presented in Box II.3.2, the reduction in the sovereign risk premium is allowed to spill over to the corporate sector, as reflected in decreasing corporate risk premia.<sup>(69)</sup> A 50% spillover to risk premia in the housing

market and the markets for traded goods and services is assumed. This is roughly in line with regressions of corporate CDS spreads on sovereign CDS spreads which point to a spillover effect from the sovereign to the corporate sector of about 60%.

The results imply that a reduction in uncertainty does indeed have prolonged positive effects on economic activity and that it triggers a persistent rise in aggregate employment and consumption. In order to grasp the intuition behind the real impact sensitivity, it is crucial to notice that a reduction in risk premia in the corporate sector implies a decrease in the cost of capital for firms. In effect, corporate investment increases. This has a twofold effect on the aggregate output. Higher demand for goods and services increases output directly. Moreover, the build-up of corporate capital raises the production capacity of the economy.

These findings are in line with the existing literature, showing that a negative shock to sovereign spreads affects economic activity positively. They suggest that, in order to bring sovereign spreads down, policies aimed at improving government macroeconomic fundamentals through fiscal consolidation need to be complemented with policies to reduce the general level of uncertainty.

### Concluding remarks

This section has analysed recent developments in sovereign bond risk premia in the euro area in the light of a distinction between risk, which can be calculated, and uncertainty, which cannot. Even if macroeconomic fundamentals linked to the perceived riskiness of sovereign issuers continue to explain an important part of government bond risk premia, the analysis reveals that investors'

<sup>(67)</sup> See Bernanke, B. (1983): Irreversibility, Uncertainty and Cyclical Investment, *Quarterly Journal of Economics*, Vol. 98; Bloom, N. (2009): The Impact of Uncertainty Shocks, *Econometrica*, Vol. 77; Bachmann, R., S. Elstner and E. Sims (2011): Uncertainty and Economic Activity: Evidence from Business Survey Data, NBER Working Paper No 16143; and Dixit, A. and R. Pindyck (1994): *Investment Under Uncertainty*, Princeton University Press. .

<sup>(68)</sup> Gilchrist, S., V. Yankov and E. Zakrajsek (2009): Credit Market Shocks and Economic Fluctuations: Evidence from Corporate Bond and Stock Markets, *Journal of Monetary Economics*, Vol. 56, No 4.

<sup>(69)</sup> Many studies examine the dynamics of sovereign debt crises and the channels of transmission from sovereigns to firm's costs of financing, showing that episodes of intense fiscal and sovereign debt pressure are associated with a significant widening of corporate bond spreads; see Dailami, M. (2012): Looking beyond the Euro Area Sovereign Bond Crisis, *World Bank Economic Premise*, No 76; Gilchrist, S., V. Yankov and E. Zakrajsek (2009): Credit Market Shocks and Economic Fluctuations: Evidence from Corporate Bond and Stock Markets, *Journal of Monetary Economics*, Vol. 56, No 4; and Pastor, L., P. Veronesi (2012): Uncertainty about Government Policy and Stock Prices, *Journal of Finance*, No 67, Vol. 4.

risk behaviours have changed during the crisis. For example, investors now behave more cautiously with regard to certain macroeconomic fundamentals and they are more aware of implicit liabilities related to banks. Moreover, the results indicate that a significant part of the recent surge in sovereign spreads in some Member States cannot be fully justified by measurable risk factors. The unexplained part turns out to be related to common euro area risk factors and to a rise in policy-related uncertainty.

Over the last two years, the elevated level of economic policy uncertainty has had a negative impact on sovereign risk premia in some Member States. A reversal of this trend could have a significant positive effect on economic growth in the countries concerned. Ongoing efforts to create a deep and genuine EMU will be instrumental in this respect. A consistent implementation of structural reforms and fiscal plans by euro area Member States will also help to eliminate uncertainty regarding economic policies.

### III. DG ECFIN publications

#### *1. Latest Publications*

EUROPEAN ECONOMY. 8. December 2012

Fiscal Sustainability Report 2012

[http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2012/pdf/ee-2012-8\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2012/pdf/ee-2012-8_en.pdf)

EUROPEAN ECONOMY. 9. December 2012

Current account surpluses in the EU

[http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2012/pdf/ee-2012-9\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2012/pdf/ee-2012-9_en.pdf)

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 125. December 2012

The Quality of Public Expenditure in the EU

[http://ec.europa.eu/economy\\_finance/publications/occasional\\_paper/2012/pdf/ocp125\\_en.pdf](http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp125_en.pdf)

#### *2. Occasional Papers*

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 123. December 2012

The Second Economic Adjustment Programme for Greece – First Review December 2012

[http://ec.europa.eu/economy\\_finance/publications/occasional\\_paper/2012/pdf/ocp123\\_en.pdf](http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp123_en.pdf)

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 122. December 2012

Progress towards meeting the economic criteria for EU accession: the EU Commission's 2012 assessments

[http://ec.europa.eu/economy\\_finance/publications/occasional\\_paper/2012/pdf/ocp122\\_en.pdf](http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp122_en.pdf)

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 121. November 2012

Financial Assistance Programme for the Recapitalisation of Financial Institutions in Spain. First review - Autumn 2012

[http://ec.europa.eu/economy\\_finance/publications/occasional\\_paper/2012/pdf/ocp121\\_en.pdf](http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp121_en.pdf)

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 120. November 2012

EU Balance-of-Payments assistance for Latvia: foundations of success

[http://ec.europa.eu/economy\\_finance/publications/occasional\\_paper/2012/pdf/ocp120\\_en.pdf](http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp120_en.pdf)

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 119. October 2012

Åsa Johannesson Lindén, Christian Gayer

Possible reforms of real estate taxation: Criteria for successful policies

[http://ec.europa.eu/economy\\_finance/publications/occasional\\_paper/2012/pdf/ocp119\\_en.pdf](http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp119_en.pdf)

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 118. October 2012

The Financial Sector Adjustment Programme for Spain

[http://ec.europa.eu/economy\\_finance/publications/occasional\\_paper/2012/pdf/ocp118\\_en.pdf](http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp118_en.pdf)

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EUROPEAN ECONOMY. OCCASIONAL PAPERS. 116. October 2012

The Balance of Payments Programme for Romania. Second Review - Spring 2012

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Economic Adjustment Programme for Ireland — Summer 2012 Review

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EUROPEAN ECONOMY. OCCASIONAL PAPERS. 113. July 2012  
Fiscal Frameworks in the European Union: May 2012 update on priority countries - Addendum to:  
Occasional paper 91

[http://ec.europa.eu/economy\\_finance/publications/occasional\\_paper/2012/pdf/ocp113\\_en.pdf](http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp113_en.pdf)

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### *3. Economic Papers*

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EUROPEAN ECONOMY. ECONOMIC PAPERS. 471. November 2012  
Andreas Breitenfellner, Jesús Crespo Cuaresma, Philipp Mayer  
Energy Inflation and House Price Corrections

[http://ec.europa.eu/economy\\_finance/publications/economic\\_paper/2012/pdf/ecp471\\_en.pdf](http://ec.europa.eu/economy_finance/publications/economic_paper/2012/pdf/ecp471_en.pdf)

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Robert Kollmann ECARES, Université Libre de Bruxelles, Université Paris-Est and CEPR, Marco Ratto,  
Werner Roeger, Jan in't Veld  
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Alessandro Turrini

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Statistical annex to European Economy. Autumn 2012 – November 2012

[http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2012/pdf/2012-11-07-stat-annex\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2012/pdf/2012-11-07-stat-annex_en.pdf)

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Labour market developments in Europe, 2012 – September 2012

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Convergence report 2012 – May 2012

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The 2012 Ageing Report: Economic and budgetary projections for the 27 EU Member States (2010-2060)

[http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2012/pdf/ee-2012-2\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2012/pdf/ee-2012-2_en.pdf)

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Business and Consumer Surveys (harmonised surveys for different sectors of the economies in the European Union (EU) and the applicant countries)

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Business Climate Indicator for the euro area (monthly indicator designed to deliver a clear and early assessment of the cyclical situation)

[http://ec.europa.eu/economy\\_finance/publications/cycle\\_indicators/2011/pdf/4\\_en.pdf](http://ec.europa.eu/economy_finance/publications/cycle_indicators/2011/pdf/4_en.pdf)

Key indicators for the euro area (presents the most relevant economic statistics concerning the euro area)

[http://ec.europa.eu/economy\\_finance/db\\_indicators/key\\_indicators/documents/key\\_indicators\\_en.pdf](http://ec.europa.eu/economy_finance/db_indicators/key_indicators/documents/key_indicators_en.pdf)

Monthly and quarterly notes on the euro-denominated bond markets (looks at the volumes of debt issued, the maturity structures, and the conditions in the market)

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Focus: Assessing the dynamics of house prices in the euro area

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