

World Economic and Financial Surveys

Regional Economic Outlook

**Europe**

**Domestic Expansion Running into  
External Turbulence**

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# Contents

<b>Executive Summary</b>	<b>vi</b>
<b>1. Domestic Expansion Running into External Turbulence</b>	<b>1</b>
The Pace of Economic Expansion Has Slowed in Many European Economies	1
Several Headwinds Are at Play	2
Outlook: Slower but Above Potential Growth with Increased Downside Risks	4
Policy Priorities	5
References	7
<b>2. Macroprudential Policies and House Prices in Europe: An Overview of Recent Experiences</b>	<b>9</b>
Macroprudential Measures in European Countries	9
What We Learned from Country Experiences	12
Impact on Riskier Mortgages	14
Impact on House Prices and Credit Growth	15
Further Considerations for Effectiveness: Circumvention and Interaction with Other Policies	17
Conclusions and Policy Lessons	18
References	21
<b>Boxes</b>	
2.1 The Impact of MaPPs in Norway and Sweden—Counterfactual Analyses	19
<b>Figures</b>	
1.1 Private Sector Consumer Confidence and New Orders	1
1.2 Global Trade and Foreign Demand	2
1.3 Terms-of-Trade Windfall Gains and Losses, 2018–19	2
1.4 Factors Limiting Production	3
1.5 Euro Area Industrial Activity—The Top Five Longest Expansion Periods since 1997	3
1.6 Real GDP Growth: Contributions and Forecast Revisions	4
1.7 Global Value Chains	5
2.1 Real House Price Index	10
2.2 Household Debt	10
2.3 Household Credit Growth	11
2.4 Adoption of Macroprudential Measures by Region	11
2.5 Number of Measures and Change in Household Credit	11
2.6 Number of Measures and Change in House Prices	11
2.7 Policy Objectives	12

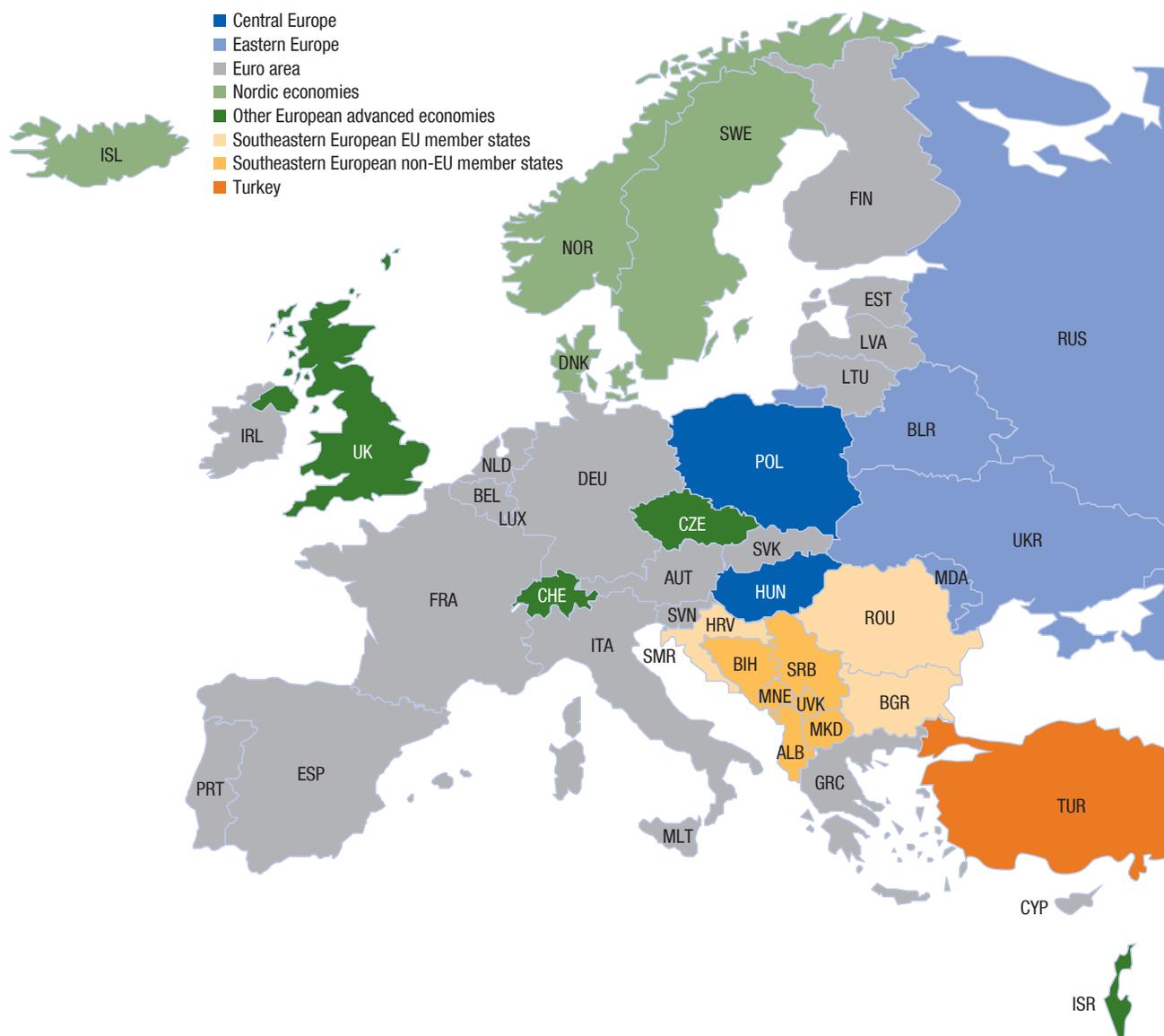
2.8	Adoption of Key Macroprudential Measures	12
2.9	Share of High LTV Loans in Selected Countries	13
2.10	MaPPs, Household Credit Growth, and House Prices in Select Countries	16
2.1.1	The Impact of MaPPs on Household Credit Growth in Norway, and Sweden— Counterfactual Analyses	19

**Tables**

	Annex Table 1.1. GDP Growth	8
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# Fall 2018 Regional Economic Outlook: Europe

## Europe: Country Groups



Note: The boundaries, colors, denominations, and any other information shown on the maps do not imply, on the part of the International Monetary Fund, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries. In this report, statistical data on Crimea and the city of Sevastopol are included as part of the data for Russia. EU = European Union.

## Executive Summary

Economic activity continued to expand in the first half of 2018, albeit at a slower-than-expected pace, mainly in advanced Europe. Domestic demand, supported by stronger employment and wages, remains the main engine of growth. However, the external environment has become less supportive and is expected to soften further in 2019 owing to slowing global demand, trade tensions, and higher energy prices. Tighter financial conditions in vulnerable emerging market economies and maturing business cycles are also weighing on activity. Accordingly, growth is projected to moderate from 2.8 percent in 2017 to 2.3 percent in 2018 and 1.9 percent in 2019. That said, it is expected to remain above potential in most countries in the region.

Risks to the outlook have increased. In the short term, escalating trade tensions and a sharp tightening in global financial conditions could undermine investment and weigh on growth. In the medium term, risks stem from delayed fiscal adjustment and structural reforms, demographic challenges, rising inequality, and declining trust in mainstream policies. Also, a “no-deal” Brexit would lead to high trade and non-trade barriers between the United Kingdom and the rest of the European Union with negative consequences for growth.

Policymakers should seize the opportunity offered by continued above-potential growth to implement structural reforms and rebuild room for fiscal policy. Countries with significant vulnerabilities should seek to reduce high levels of public debt and rebuild fiscal buffers to ensure they have policy space to cope with future shocks. In contrast, countries with ample fiscal space and stronger-than-warranted external positions should raise public investment to lift the potential of their economies and promote external rebalancing.

Monetary policy priorities differ across countries. In emerging Europe, where inflation pressure is generally building, central banks should gradually normalize monetary policy in a well-communicated manner to ensure a smooth adjustment. In advanced European economies, where underlying inflation pressures are generally subdued, monetary policy should remain supportive to ensure durable increases in inflation toward targets. Structural and financial sector reform priorities remain unchanged from those discussed in previous *Regional Economic Outlook* reports for Europe.

Well-targeted macroprudential policies can be useful in addressing specific financial stability risks. As discussed in Chapter 2, such policies have mainly aimed at building financial resilience, containing house price increases and credit growth. The analysis suggests that borrower-side measures, supported by lender-side measures, helped reduce the share of riskier mortgages, thereby contributing to improved financial resilience. Evidence is more mixed when it comes to the ability of macroprudential policies to contain house price and overall credit growth in the context of monetary policy that remains accommodative.

# 1. Domestic Expansion Running into External Turbulence

Activity continued to expand in the first half of 2018, but at a slower-than-expected pace, mainly in advanced Europe. The external environment has become less supportive, with slowing global demand, escalating trade disputes, and higher fuel prices. Tighter financial conditions in vulnerable emerging market economies and maturing business cycles act as additional headwinds. With weakening forward-looking indicators, growth is now projected to slow from 2.8 percent in 2017 to 2.3 percent in 2018 and 1.9 percent in 2019, down from respective projections of 2.6 percent and 2.2 percent in the May 2018 *Regional Economic Outlook: Europe*. Near-term risks to the outlook have shifted to the downside. As growth is expected to continue to exceed potential, policymakers should continue to focus on structural reforms and rebuilding policy buffers to prepare for the next downturn.

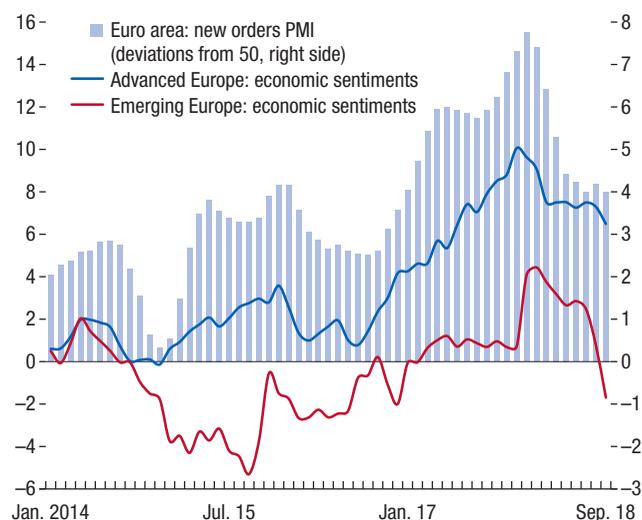
## The Pace of Economic Expansion Has Slowed in Many European Economies

Europe has seen strong growth over the past couple of years, as many downside risks have not materialized. On the back of supportive macroeconomic policies, economic activity continued to expand in the first half of 2018, driven by domestic demand. However, there are signs of softening in Romania, Turkey, and the United Kingdom. Also, in the euro area, GDP growth cooled further to 0.2 percent in the third quarter (quarter-on-quarter, annual rate), from 0.4 percent in each of the first two quarters. The

This chapter was prepared by a staff team composed of Vizhdan Boranova, Kamil Dybczak, and Sylwia Nowak, with input from Raju Huidrom and Nemanja Jovanovic. The team was led by Emil Stavrev under the general guidance of Jörg Decressin. Laura Papi provided useful advice and comments. Nomelie Veluz provided administrative support. The chapter reflects data and developments as of October 15, 2018.

**Figure 1.1. Private Sector Consumer Confidence and New Orders**

(Deviation from long-term mean; weights are based on purchasing power parity GDP)

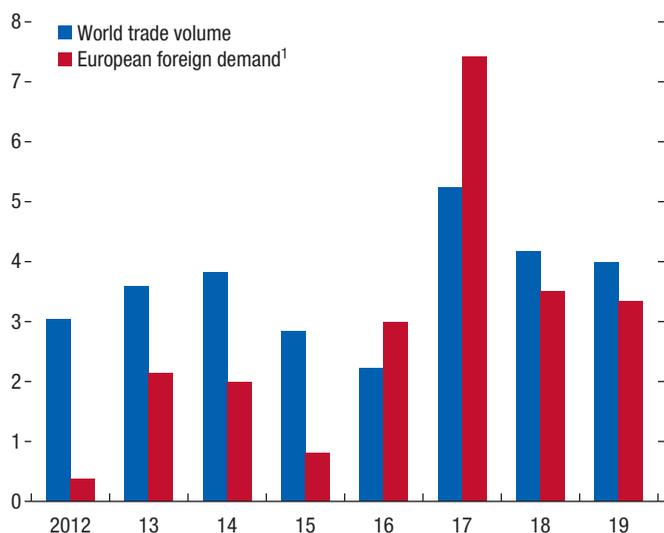


Sources: Haver Analytics; IMF, *World Economic Outlook*; and IMF staff calculations.

Note: PMI = purchasing managers' index.

deceleration was mainly due to weaker external demand (especially for goods), special factors (inclement weather, car production), and base effects in the first quarter of 2018. In most Central, Eastern, and Southeastern European (CESEE) countries, the expansion remained robust thanks to a higher absorption of EU funds and strong private consumption growth on the back of increasingly tight labor markets. Nordic and Baltic economies, the Czech Republic, and Switzerland also continued to perform well. With most confidence indicators down to pre-2017 levels (Figure 1.1), forward-looking indicators suggest moderation of growth. Only a few indicators hint at stronger growth in the second half of 2018.

**Figure 1.2. Global Trade and Foreign Demand**  
(Year-over-year percent change)



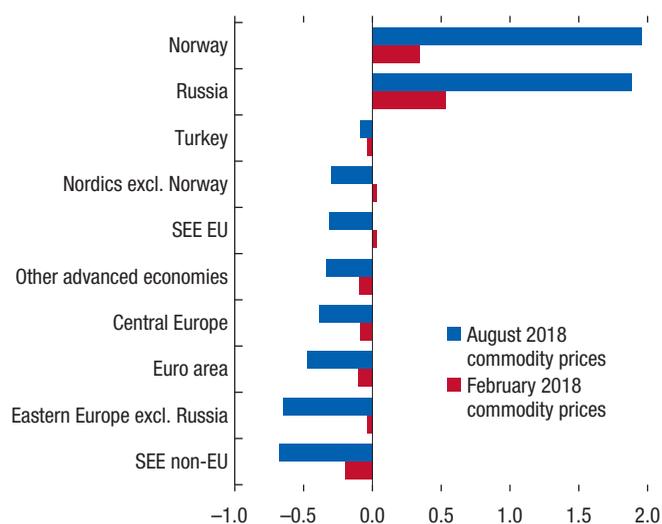
Sources: IMF, *World Economic Outlook*; and IMF staff calculations.

<sup>1</sup>Measured by volume of global imports of European goods and services.

## Several Headwinds Are at Play

The external environment has become less supportive. European exporters enjoyed exceptionally strong export growth in the fourth quarter of 2017. Global imports of European goods and services grew by 7.5 percent in 2017, up from 3 percent a year earlier. However, foreign demand for European exports moderated in 2018 and is expected to remain soft in 2019 (Figure 1.2). In the *euro area*, the slowdown of exports is driven by intermediate and capital goods, which account for two-thirds of goods exports from the *euro area* to the rest of the world. Also, some of the slowdown in the third quarter reflects lower car production, notably in Germany, as carmakers adapt to comply with new pollution tests. Trade tensions are another factor. Thus far, the direct impact of already-implemented US tariffs on steel and aluminum has been limited, given low exports of these items from Europe to the *United States*, but there are concerns that they could weigh appreciably on growth ahead (see risks below).

**Figure 1.3. Terms-of-Trade Windfall Gains and Losses, 2018–19<sup>1</sup>**  
(Average annual gains and losses, percent of GDP)



Source: IMF staff estimates.

Note: SEE EU = Southeastern European EU member states;

SEE non-EU = Southeastern European non-EU members states.

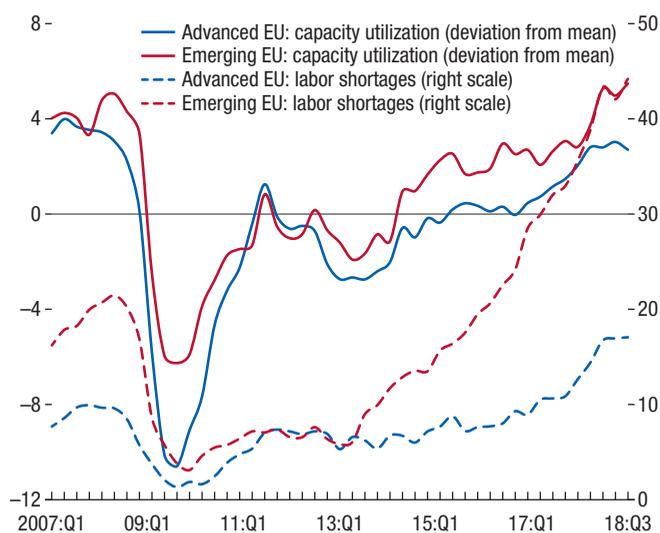
<sup>1</sup>The windfall is an estimate of the change in disposable income arising from commodity price changes compared to the previous year. See Figure 1.9 in October 2018 *World Economic Outlook* (WEO) and Gruss (2014).

Higher energy prices have dampened real incomes in most of Europe. Commodity prices have increased 7 percent since the spring of 2018, as oil prices climbed to \$79 a barrel in September, the highest level since 2014. This increase in fuel prices has lifted headline inflation by an average of about ½ percentage point across Europe. For *Norway* and *Russia*, the terms-of-trade windfall gains are estimated at about 1.5 percent of GDP each year (Figure 1.3). In the rest of Europe, higher fuel prices have dampened real disposable incomes by up to 0.7 percentage point of GDP, a worsening of about a third of a percentage point of GDP compared with the April 2018 *World Economic Outlook* estimates. In the *newer EU member states*, the impact of higher energy prices has been offset by the increased absorption of EU funds and strong wage growth. The increase in fuel prices is also expected to further strengthen current account surpluses for oil exporters.

Additional headwinds come from maturing business cycles. Output gaps are estimated to be mostly closed or positive. Production capacity

**Figure 1.4. Factors Limiting Production**

(Labor shortages, percent balance; capacity utilization, percent of full capacity; seasonally adjusted)<sup>1</sup>



Sources: European Commission, *Quarterly Business and Consumer Survey*; Haver Analytics; IMF, *World Economic Outlook*; and IMF staff calculations.

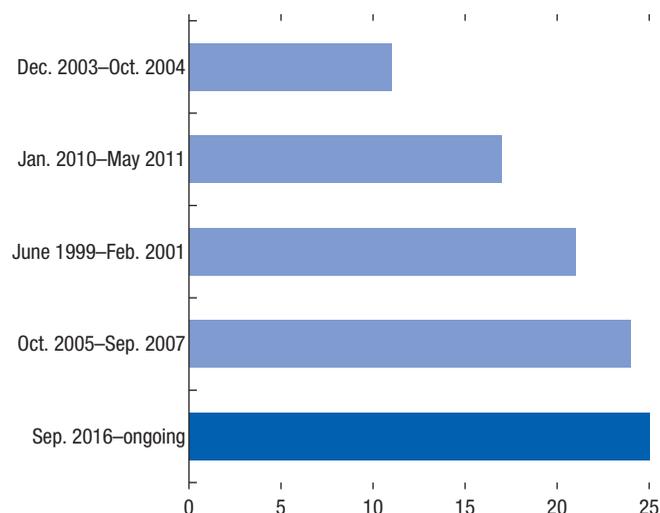
<sup>1</sup>Percent balance equals percent of respondents reporting an increase minus the percent of respondents reporting a decrease. Capacity utilization is measured as the capacity at which the company is operating at the time of the survey.

constraints and labor shortages are becoming more binding, mostly in *emerging Europe*, but also in selected *advanced European economies* (Figure 1.4). Accordingly, in several *CESEE countries*, these tight labor market conditions have translated into continued fast wage growth, exceeding 10 percent annually in the first half of 2018. Wage growth has also moved upward in the *euro area*, but much more slowly than in the *CESEE countries*, consistent with a flatter wage Phillips curve as discussed in the May 2018 *Regional Economic Outlook: Europe*. The current manufacturing expansion is one of the longest in the past two decades (Figure 1.5). Bank credit to the private sector is growing at moderate rates, but there are signs of asset price overvaluations in selected markets, especially in housing markets (for example, the *Czech Republic* and some of the *Nordics*; see Chapter 2).

Policy rates have been adjusted upward in some economies to offset the potential inflationary impact of the exchange rate depreciation (*Turkey*, *Russia*) and high wage growth (*Czech Republic*, *Romania*). Yet in most countries core inflation

**Figure 1.5. Euro Area Industrial Activity—The Top Five Longest Expansion Periods since 1997**

(Cumulative number of months the PMI stayed above its long-term average)

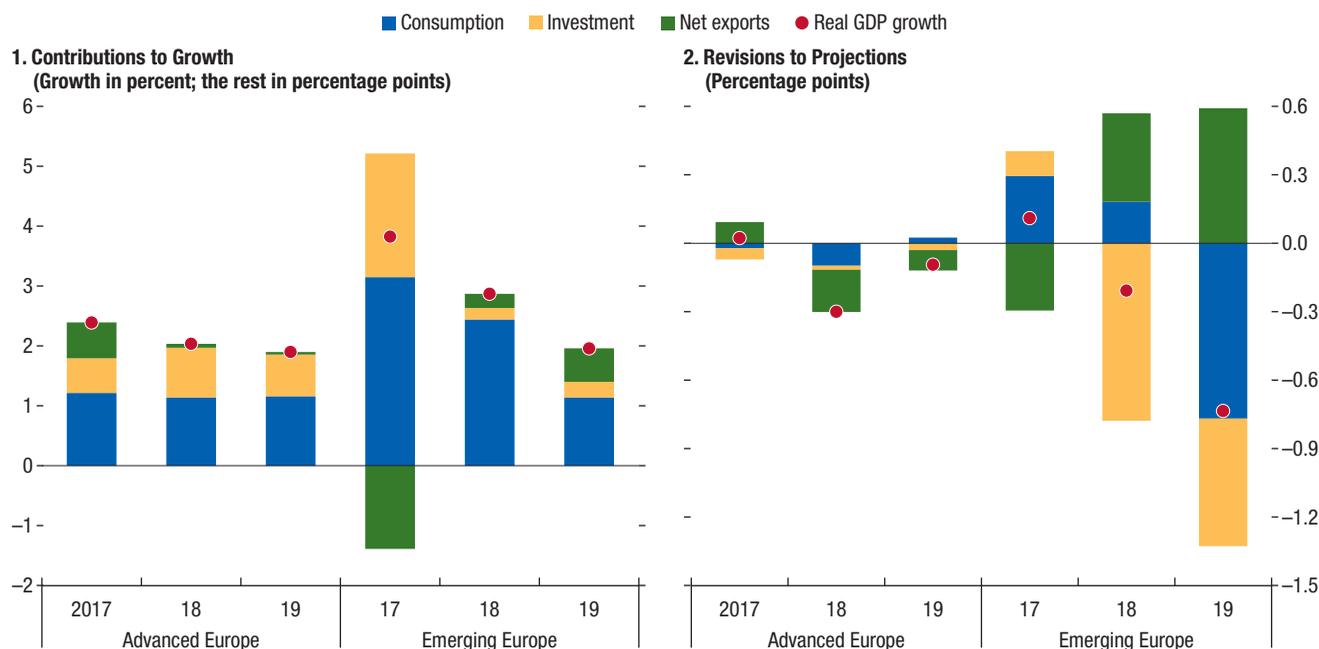


Sources: Haver Analytics; and IMF staff calculations.

Note: PMI = purchasing managers' index.

has remained low for now, with the notable exception of *Turkey*.

Financial conditions have tightened somewhat, especially in vulnerable countries. Financial conditions remain accommodative in *advanced Europe* and tightened only moderately in most of *emerging Europe* due to higher interest rates in the *United States* and the appreciation of the US dollar. However, in *Turkey*, concerns over economic policy credibility and geopolitical tensions have, alongside a worsening of sentiment toward emerging markets, led to a sharp lira depreciation by about 40 percent since the beginning of the year. In *Italy*, sovereign bond yields jumped to a four-year high due to difficulties in forming a government and policy uncertainties. So far, spillovers to other markets have been fairly contained, but there is appreciable uncertainty, and contagion from future stress could be notable, especially for economies with weaker macroeconomic fundamentals and limited policy buffers.

**Figure 1.6. Real GDP Growth: Contributions and Forecast Revisions**

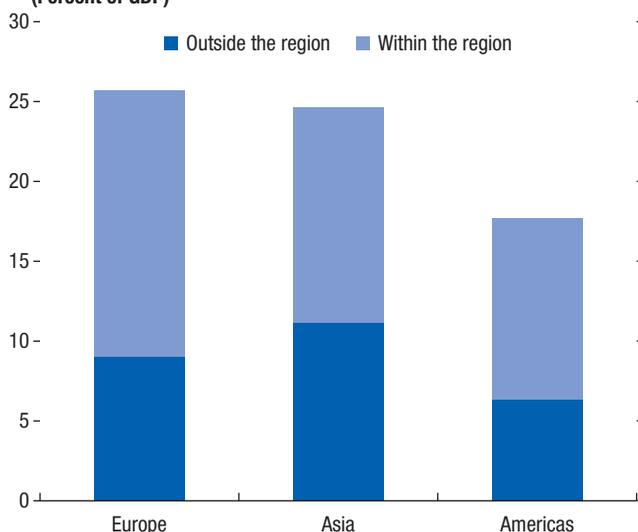
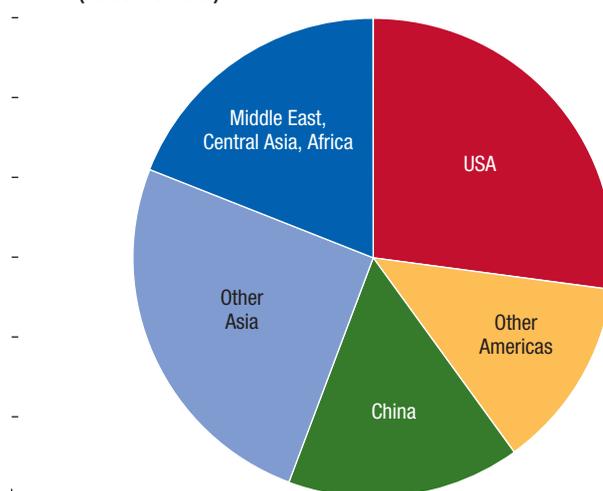
Sources: IMF, *World Economic Outlook*; and staff calculations.

## Outlook: Slower but above Potential Growth with Increased Downside Risks

Real GDP growth in Europe is expected to moderate from 2.8 percent in 2017 to 2.3 percent in 2018 and 1.9 percent in 2019 (Figure 1.6, panel 1; Table 1.1), but to remain above potential in most countries in the region. Domestic demand will continue to be the main engine of growth, supported by rising employment and wages. Growth has been revised downward in about half of the countries compared with projections in the May 2018 *Regional Economic Outlook: Europe*. The downward revisions reflect mainly weaker external demand and higher energy prices (Figure 1.6, panel 2). In *advanced Europe*, growth is revised down by 0.3 percentage point in 2018 and 0.1 percentage points in 2019, compared with the previous forecast. The downward revision to *Germany's* growth in 2018 is particularly large at 0.6 percentage point, reflecting disappointing exports and historical revisions. In *emerging European countries excluding Turkey*, growth

projections are unchanged in 2018 and are revised up by 0.2 percentage point in both 2019 and 2020. *Macedonia, Romania, and Turkey* saw large downgrades of about 1 percentage point each in 2018. In *Turkey*, growth is expected to weaken further from 3.5 percent in 2018 to only 0.4 percent in 2019 before recovering in 2020, as the weaker lira, higher borrowing costs, and elevated uncertainties weigh on investment and demand.

Headline inflation is expected to increase across European countries on the back of higher energy prices and positive output gaps. In *advanced Europe*, inflation has been revised up by 0.1 percentage point in both 2018 and 2019 to 1.8 percent. In *emerging Europe*, the revisions have been much larger, at 0.8 percentage point in 2018 and 2 percentage points in 2019. The new forecast primarily reflects the worsened inflation outlook for *Turkey*, due to sizable pass-through from the lira depreciation, higher energy prices, high wage growth, and unanchored inflation expectations. In 2019, the IMF staff also expects a pickup in inflation in *Russia*, due to the recently passed

**Figure 1.7. Global Value Chains****1. Value-Added Exports of Goods and Services, 2013  
(Percent of GDP)****2. Value-Added Exports of Goods and Services Outside of Europe, 2013  
(Percent of total)**

Sources: Eora Multi-Region Input-Output database; and IMF staff calculations.

increase in the main value-added-tax rate and additional debt-financed infrastructure spending.

The balance of risks is tilted to the downside both in the short term and beyond. Escalating trade tensions and the potential shift away from a multilateral, rules-based trading system could disrupt supply chains, with a significant impact on growth, notably if confidence is affected, as illustrated by market jitters over potential US tariffs on car imports. As discussed in Scenario Box 1 in the October 2018 *World Economic Outlook*, escalating trade tensions could impact global economic activity through a combination of higher trade costs, lower business confidence, weaker private sector investment, and tighter financial conditions. Given Europe's trade openness and deep integration into global value chains (Figure 1.7), an intensification of trade tensions could have a significant impact, especially if accompanied by tighter financial conditions.<sup>1</sup> A sharp tightening in global financial conditions would expose existing vulnerabilities,

<sup>1</sup>IMF staff estimates suggest that an increase in trade policy uncertainty could appreciably reduce investment in the euro area, with a higher impact on countries more deeply integrated into global value chains (Ebeke and Siminitz, forthcoming).

dent confidence, and weigh on investment and growth. Separately, the possibility of a “no-deal” Brexit raises the risk of a disruptive exit and of high trade and nontrade barriers between the *United Kingdom* and the rest of the European Union (IMF 2018). In the medium-term, risks stem from the possibility of shifts in policy agendas and the implementation of politically popular but unsustainable macroeconomic policies, delays of structural reforms, demographic challenges, rising inequality, and declining trust in mainstream policies.

## Policy Priorities

The policy stance should be tailored to the maturing cyclical positions. The procyclical fiscal stance, prevailing in many European countries, should be scaled back. Policymakers should seize the opportunity of above-potential growth and low unemployment to advance growth-friendly policies to reduce high levels of public debt and rebuild fiscal buffers to facilitate coping with future shocks. Countries should prioritize measures that reduce fiscal deficits toward their medium-term targets and lower debt. The urgency is greater in

countries with significant vulnerabilities, such as *Italy* and *Turkey*. In contrast, countries with ample fiscal space and stronger-than-warranted external positions (*Germany*, *Netherlands*) should use available space to raise potential output through more public investment and promote external rebalancing.

Monetary policy priorities differ across countries. As core inflation has picked up and headline inflation has reached or is approaching targets in *emerging Europe*, central banks should gradually normalize monetary policy in a well-communicated manner to ensure a smooth adjustment. In countries where underlying inflation pressures remain subdued (mostly *advanced Europe*) monetary policy should remain supportive to ensure durable increases in inflation toward targets. In the *euro area*, as asset purchases come to an end, forward guidance on interest rates becomes more important in order to keep policy rates at their current, extraordinarily low levels at least through next summer.

Regarding financial sector policies, targeted macroprudential measures can be particularly useful in addressing specific financial stability risks. As discussed in Chapter 2, borrower-based measures can be effective in containing the share of high-risk loans. Also, further progress is needed in cleaning bank balance sheets, including continued reduction in nonperforming loans. In the *euro area*, the increased debt in corporate balance sheets warrants close monitoring, especially among lower-rated companies.

As capacity constraints are becoming more binding on the back of weaker productivity growth, countries are urged even more than before to implement policies to boost labor force participation and foster higher potential growth.

Structural reform priorities remain unchanged (May 2018 *Regional Economic Outlook: Europe*). In *advanced Europe*, countries should introduce further reforms of labor and product markets to boost competitiveness and improve productivity at the national level. In *emerging Europe*, enhancing institutions (November 2017 *Regional Economic Outlook: Europe*), improving the investment environment and boosting labor participation by women and the elderly remain top policy priorities. In *Russia*, further steps should be taken to continue to improve the investment climate, boost infrastructure investment and human capital, and improve the efficiency of goods markets.

To help increase the *euro area's* resilience to future shocks, architectural reforms should be implemented to further reduce risks and improve risk sharing. Completing the banking union, with common rules and backstops, and advancing the capital markets union would support private cross-border risk diversification. Equally important is the pressing need for fiscal institutional reforms. A central fiscal capacity that supports macroeconomic stabilization, and that embeds strong safeguards against permanent transfers and moral hazard, should be developed in conjunction with a revamping of fiscal rules to make them simpler and easier to enforce. While all likely Brexit outcomes will entail costs, an agreement that minimizes the introduction of new tariff and nontariff barriers would best protect growth and income in the *United Kingdom* and the EU. Separately, the *European Union* and its partners should work together constructively to reduce trade barriers and, whenever possible, to resolve disagreements through the World Trade Organization.

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**Annex Table 1.1. GDP Growth**  
(Year-over-year percent change)

	October 2018 WEO				April 2018 WEO			Difference <sup>1</sup>		
	2017	2018	2019	2020	2018	2019	2020	2018	2019	2020
<b>Europe</b>	2.8	2.3	1.9	1.9	2.6	2.2	2.0	-0.3	-0.3	0.0
<b>Advanced European Economies</b>	2.4	2.0	1.9	1.7	2.3	2.0	1.7	-0.3	-0.1	0.0
<b>Euro Area</b>	2.4	2.0	1.9	1.7	2.4	2.0	1.7	-0.4	-0.1	0.0
Austria	3.0	2.8	2.2	1.6	2.6	2.0	1.5	0.2	0.2	0.0
Belgium	1.7	1.5	1.5	1.5	1.9	1.7	1.5	-0.4	-0.1	0.0
Cyprus	3.9	4.0	4.2	3.3	3.6	3.0	2.6	0.4	1.3	0.7
Estonia	4.9	3.7	3.2	3.0	3.9	3.2	3.0	-0.2	0.0	-0.1
Finland	2.8	2.6	1.8	1.6	2.6	2.0	1.5	0.1	-0.2	0.1
France	2.3	1.6	1.6	1.6	2.1	2.0	1.8	-0.5	-0.4	-0.2
Germany	2.5	1.9	1.9	1.6	2.5	2.0	1.5	-0.6	-0.2	0.1
Greece	1.4	2.0	2.4	2.2	2.0	1.8	1.8	0.0	0.5	0.4
Ireland	7.2	4.7	4.0	3.5	4.5	4.0	3.5	0.2	0.0	-0.1
Italy	1.5	1.2	1.0	0.9	1.5	1.1	0.9	-0.4	-0.1	0.0
Latvia	4.5	3.7	3.3	3.1	4.0	3.5	3.3	-0.3	-0.2	-0.2
Lithuania	3.9	3.5	2.9	2.7	3.2	3.0	2.8	0.4	-0.1	0.0
Luxembourg	2.3	4.0	3.5	3.3	4.3	3.7	3.3	-0.3	-0.2	0.0
Malta	6.7	5.7	4.6	4.0	5.7	4.6	4.0	0.0	0.0	0.0
Netherlands	2.9	2.8	2.6	2.3	3.2	2.4	2.1	-0.4	0.2	0.2
Portugal	2.7	2.3	1.8	1.5	2.4	1.8	1.5	-0.1	0.0	0.0
Slovak Republic	3.4	3.9	4.1	3.8	4.0	4.2	3.8	-0.1	-0.1	0.0
Slovenia	5.0	4.5	3.4	2.8	4.0	3.2	2.7	0.5	0.2	0.1
Spain	3.0	2.7	2.2	1.9	2.8	2.2	1.9	-0.1	0.0	0.0
<b>Nordic Economies</b>	2.1	2.2	2.1	1.9	2.3	2.1	2.0	-0.1	0.0	0.0
Denmark	2.3	2.0	1.9	1.8	2.0	1.9	1.8	0.0	0.0	-0.1
Iceland	4.0	3.7	2.9	2.8	3.2	3.0	2.8	0.5	-0.1	0.0
Norway	1.9	2.1	2.1	1.9	2.1	2.1	1.9	0.0	0.0	0.0
Sweden	2.1	2.4	2.2	2.0	2.6	2.2	2.1	-0.2	0.0	0.0
<b>Other European Advanced Economies</b>	2.0	1.9	1.8	1.8	2.0	1.9	1.8	-0.1	0.0	0.0
Czech Republic	4.3	3.1	3.0	2.5	3.5	3.0	2.5	-0.5	0.0	0.0
Israel	3.3	3.6	3.5	3.3	3.3	3.5	3.0	0.3	-0.1	0.3
San Marino	1.9	1.4	1.0	0.8	1.3	1.3	1.3	0.1	-0.3	-0.5
Switzerland	1.7	3.0	1.8	1.7	2.3	2.0	1.9	0.7	-0.2	-0.2
United Kingdom	1.7	1.4	1.5	1.5	1.6	1.5	1.5	-0.3	0.0	0.0
<b>Emerging European Economies</b>	3.8	2.9	2.0	2.4	3.1	2.7	2.5	-0.2	-0.7	-0.1
<b>Central Europe</b>	4.5	4.3	3.5	2.9	4.0	3.4	2.9	0.3	0.0	0.0
Hungary	4.0	4.0	3.3	2.6	3.8	3.0	2.6	0.2	0.3	0.0
Poland	4.6	4.4	3.5	3.0	4.1	3.5	3.0	0.3	0.0	0.0
<b>Eastern Europe</b>	1.7	2.0	1.9	1.9	1.9	1.7	1.7	0.1	0.3	0.2
Belarus	2.4	4.0	3.1	2.5	2.8	2.4	2.0	1.1	0.6	0.5
Moldova	4.5	3.8	3.8	3.8	3.5	3.8	3.8	0.2	0.0	0.0
Russia	1.5	1.7	1.8	1.8	1.7	1.5	1.5	0.0	0.3	0.3
Ukraine	2.5	3.5	2.7	3.0	3.2	3.3	3.5	0.3	-0.5	-0.4
<b>Southeastern European EU Member States</b>	5.7	3.7	3.3	3.0	4.5	3.3	3.0	-0.8	0.0	0.1
Bulgaria	3.6	3.6	3.1	2.8	3.8	3.1	2.8	-0.2	0.0	0.0
Croatia	2.8	2.8	2.6	2.4	2.8	2.6	2.4	0.0	0.0	0.0
Romania	6.9	4.0	3.4	3.3	5.1	3.5	3.1	-1.1	-0.1	0.2
<b>Southeastern European Non-EU Member States</b>	2.4	3.5	3.4	3.7	3.4	3.5	3.8	0.1	0.0	0.0
Albania	3.8	4.0	3.7	3.9	3.7	3.8	3.9	0.3	-0.1	0.0
Bosnia and Herzegovina	3.0	3.2	3.5	3.7	3.2	3.5	3.7	0.0	0.0	0.0
Kosovo	3.7	4.0	4.0	4.0	4.0	4.0	4.0	0.0	0.0	0.0
Macedonia, FYR	0.0	1.6	2.6	2.8	2.8	3.0	3.2	-1.2	-0.4	-0.4
Montenegro	4.3	3.7	2.5	3.0	3.1	2.4	3.0	0.6	0.1	0.0
Serbia	1.9	4.0	3.5	4.0	3.5	3.5	4.0	0.5	0.0	0.0
Turkey	7.4	3.5	0.4	2.6	4.4	4.0	3.6	-0.9	-3.6	-1.0
<b>Memorandum</b>										
World	3.7	3.7	3.7	3.7	3.9	3.9	3.8	-0.2	-0.3	-0.1
Advanced economies	2.3	2.4	2.1	1.7	2.5	2.2	1.7	-0.1	-0.1	0.0
Emerging market and developing economies	4.7	4.7	4.7	4.9	4.9	5.1	5.1	-0.3	-0.4	-0.1
European Union	2.7	2.2	2.0	1.8	2.5	2.1	1.8	-0.3	-0.1	0.0
United States	2.2	2.9	2.5	1.8	2.9	2.7	1.9	0.0	-0.1	0.0
China	6.9	6.6	6.2	6.2	6.6	6.4	6.3	0.0	-0.2	0.0
Japan	1.7	1.1	0.9	0.3	1.2	0.9	0.3	-0.1	0.0	0.0

Sources: IMF, *World Economic Outlook* (WEO); and IMF staff calculations.

<sup>1</sup>Numbers in this column may differ from the difference between October and April projections due to rounding.

## 2. Macroprudential Policies and House Prices in Europe: An Overview of Recent Experiences

This chapter documents the increasing use of macroprudential policies (MaPPs) in Europe in recent years to build financial resilience, contain general and sectoral credit growth, and limit house price increases. Considering these objectives and drawing from case studies, the chapter finds evidence that borrower-side measures, supported by lender-side measures, helped limit the share of riskier mortgages, thereby building resilience. Evidence is more mixed as to the ability of MaPPs to contain house price and overall credit growth against the backdrop of a still-accommodative monetary policy and other factors.

### Macroprudential Measures in European Countries

The recent reacceleration in house prices has prompted the adoption of MaPPs in several European countries. Though credit and house price concerns are not yet generalized, house prices have increased substantially in several European countries over the past few years (Figure 2.1).<sup>1,2</sup> In most of these countries, higher house prices have been accompanied by rising household debt (Figure 2.2) and rapid household credit growth (Figure 2.3).

To contain the buildup of systemic risks, especially in the residential housing market, many European countries have strengthened their

MaPPs (Figure 2.4). While MaPPs have been implemented across Europe, countries with larger postcrisis increases in house prices and household debt tended to adopt more MaPPs (Figures 2.5, 2.6).

The main objectives of the recently introduced MaPPs, as stated by country authorities, were improving financial stability, building financial resilience, and containing general and sectoral credit growth. Within these broader objectives, policies were generally focused on protecting borrowers, strengthening banking systems, and slowing down house price increases (Figure 2.7). The latter was an objective in most economies, but particularly in the *Czech Republic, Estonia, Norway, and Sweden*.

In some countries (*Estonia, Norway, Switzerland*), the relaxation of lending standards was a major concern. Constraining the rise in the share of loans denominated in foreign currency was a prominent goal in *Hungary*. The various capital buffers adopted beginning in 2013, in line with the EU Capital Requirements Directive (CRD IV), were aimed at containing not only housing sector imbalances, but also credit cycle swings.

Reflecting these objectives, various macroprudential measures, with different design and calibration, were implemented across countries (Figure 2.8):

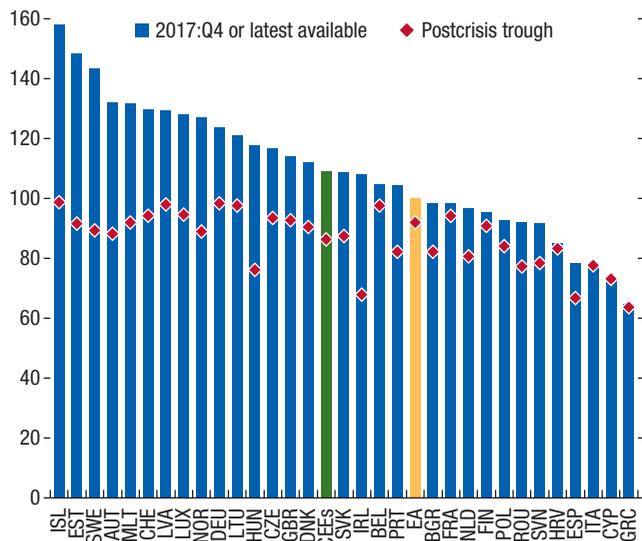
- Loan-to-value (LTV) caps. In response to the fast growth of mortgage lending, several countries introduced LTV caps ranging from 35 to 100 percent, but mostly between 60 and 95 percent. Caps are often differentiated, with less binding ceilings on primary residences (*Cyprus*), for first-time buyers (*Finland, Ireland*), or for mortgages with collateral, guarantees, or insurance (*Estonia, Latvia, Poland, Romania*). Mortgages in foreign currencies (*Hungary, Poland, Romania*) or for nonprimary residences in the capital city

This chapter was prepared by an IMF staff team composed of Cheikh Anta Gueye, Marco Arena, Tingyun Chen, Seung Mo Choi, Nan Geng, Tonny Lybek, and Evan Papageorgiou. The team was led by Thomas Dorsey and Cheikh Anta Gueye under the overall guidance of Jörg Decressin and Enrica Detragiache. Laura Papi provided useful advice and comments. Hannah Jung and Nomelie Veluz provided administrative support.

<sup>1</sup>Euro Area Policies—IMF Staff Report for the 2018 Article IV Consultation with Member Countries.

<sup>2</sup>There is evidence that growing household incomes and wealth, rising population, lower interest rates, and structural factors behind the uptrends in house prices. See Girouard and others (2006), Égert and Mihaljek (2007), Kholodilin and Ulbricht (2015), and Geng (2018).

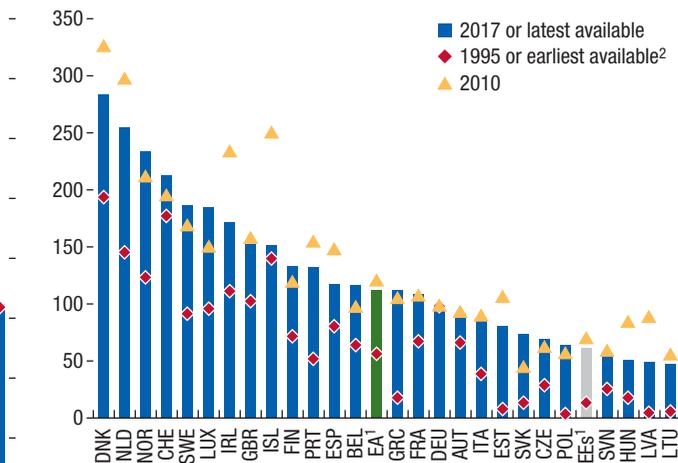
**Figure 2.1. Real House Price Index**  
(Index, 2010 = 100)



Sources: Country authorities; Haver Analytics; Organisation for Economic Co-operation and Development; and IMF staff calculations.

Note: Data labels in the figure use International Organization for Standardization (ISO) country codes.

**Figure 2.2. Household Debt**  
(Percent of household net disposable income)



Sources: Organisation for Economic Co-operation and Development; and IMF staff calculations.

<sup>1</sup>Due to data availability, CYP and MLT are excluded for EA average, and BGR, HRV, and ROU are excluded for CEE.

<sup>2</sup>Earliest available dates: IRL: 2001; LUX: 1999; ESP: 1999.

(Norway) are subject to more stringent caps. Since their initial adoption, LTV caps have been tightened in several countries (Czech Republic, Netherlands, Norway, Poland, the Slovak Republic).

- Debt-to-income (DTI)/loan-to-income (LTI) and debt service-to-income (DSTI) caps. To contain potential vulnerabilities in households' balance sheets, many countries have introduced either DTI/LTI or DSTI caps (the Slovak Republic adopted both LTI and DSTI caps). DSTI caps vary by borrower income level (Czech Republic, Hungary, Poland, Portugal, the Slovak Republic, Slovenia), currency of denomination (Cyprus and Hungary), LTV level (Lithuania), or interest fixing period/debt service frequency (Hungary and Slovak Republic). Romania's DSTI caps are determined by scenario analysis that considers currency, interest rate, and income risks. In the Czech Republic, Ireland, Norway, the Slovak Republic, the DTI/LTI caps were introduced as a complement to LTV

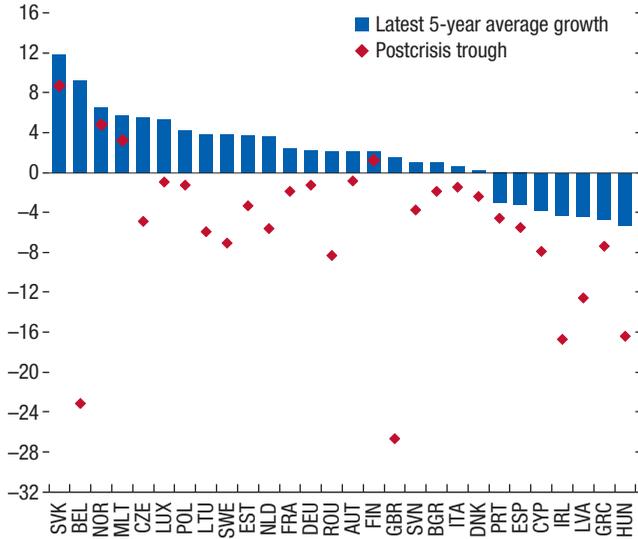
caps. In the United Kingdom, only LTI caps have been implemented.

- Capital Requirements. So far, half of the EU countries have adopted the full Basel III capital conservation buffer (CB) of 2.5 percent of risk-weighted assets, while others are phasing it in gradually. All countries have introduced the countercyclical capital buffer (CCB), but only the Czech Republic, France, Iceland, Norway, the Slovak Republic, Sweden, Switzerland, and the United Kingdom have nonzero buffers. A total of 13 countries have adopted the systemic risk buffer (SRB).<sup>3</sup> Some countries have also imposed sectoral risk-weight floors on commercial real estate (Croatia, Finland, Ireland, Norway, Romania, Sweden) and residential mortgages (Belgium, Croatia, Norway, Slovenia, Sweden). Among this group, Norway and

<sup>3</sup>In July 2017, Hungary introduced a systemic risk buffer for banks with large portfolios of nonperforming commercial real estate loans. At the end of 2017, only two banks were affected, and currently only one bank is subject to this charge. The initiative had been announced to give banks time to reduce their exposure.

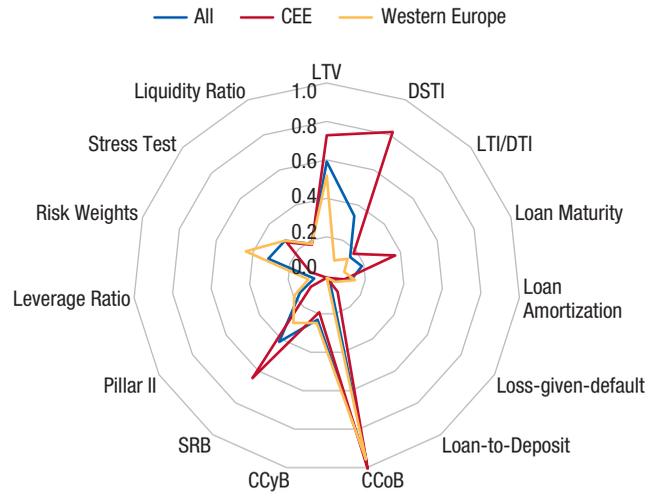
2. MACROPRUDENTIAL POLICIES AND HOUSE PRICES IN EUROPE: AN OVERVIEW OF RECENT EXPERIENCES

**Figure 2.3. Household Credit Growth**  
(Year-over-year percent change)



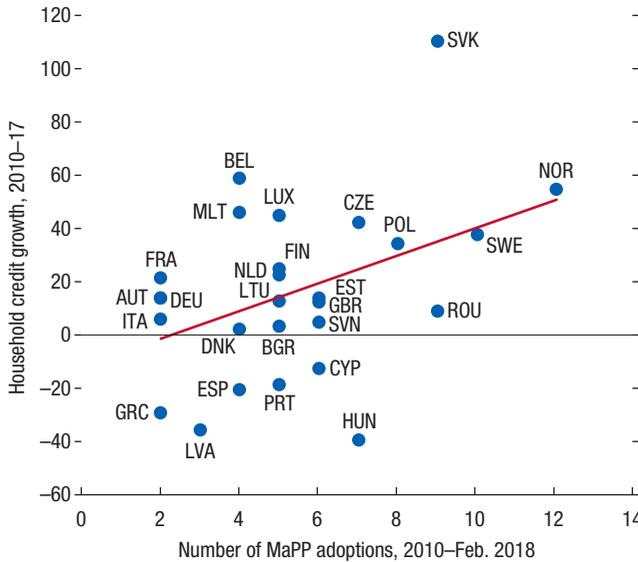
Sources: Eurostat; and Haver Analytics.

**Figure 2.4. Adoption of Macroprudential Measures by Region**  
(Share of countries adopting the measures)



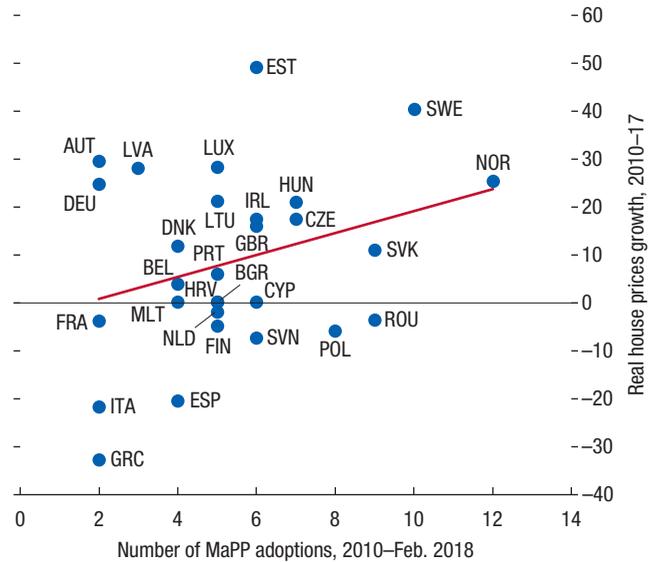
Sources: European Systemic Risk Board database; and IMF staff calculations.

**Figure 2.5. Number of Measures and Change in Household Credit**<sup>1</sup>



Sources: European Systemic Risk Board database; Eurostat; Haver Analytics; and IMF staff calculations.

**Figure 2.6. Number of Measures and Change in House Prices**<sup>1</sup>



Sources: European Systemic Risk Board database; Organisation for Economic Co-operation and Development; and IMF staff calculations.

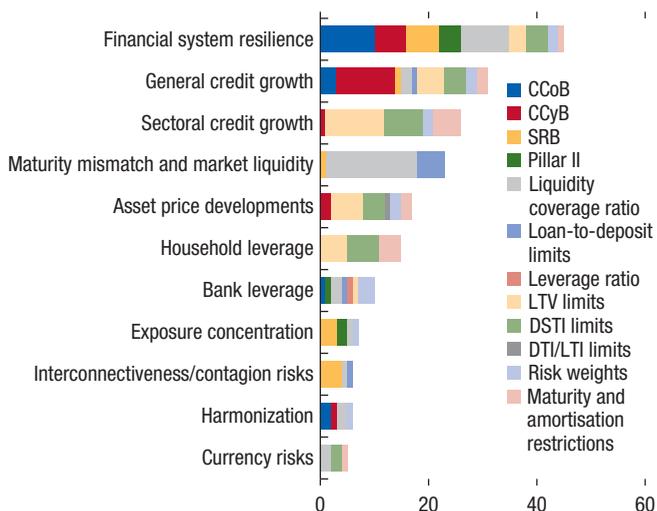
Note: Data labels in the figure use International Organization for Standardization (ISO) country codes.

<sup>1</sup>Comparability of number of policies implemented across countries might not be possible in all cases since some countries implement MaPP as packages, for example, Denmark.

*Sweden* have applied the most measure, and their required aggregate capital buffers are among the highest in Europe. *Poland*

has imposed a risk weight of 150 percent on foreign-exchange-denominated household mortgages.

**Figure 2.7. Policy Objectives**  
(Number of measures)



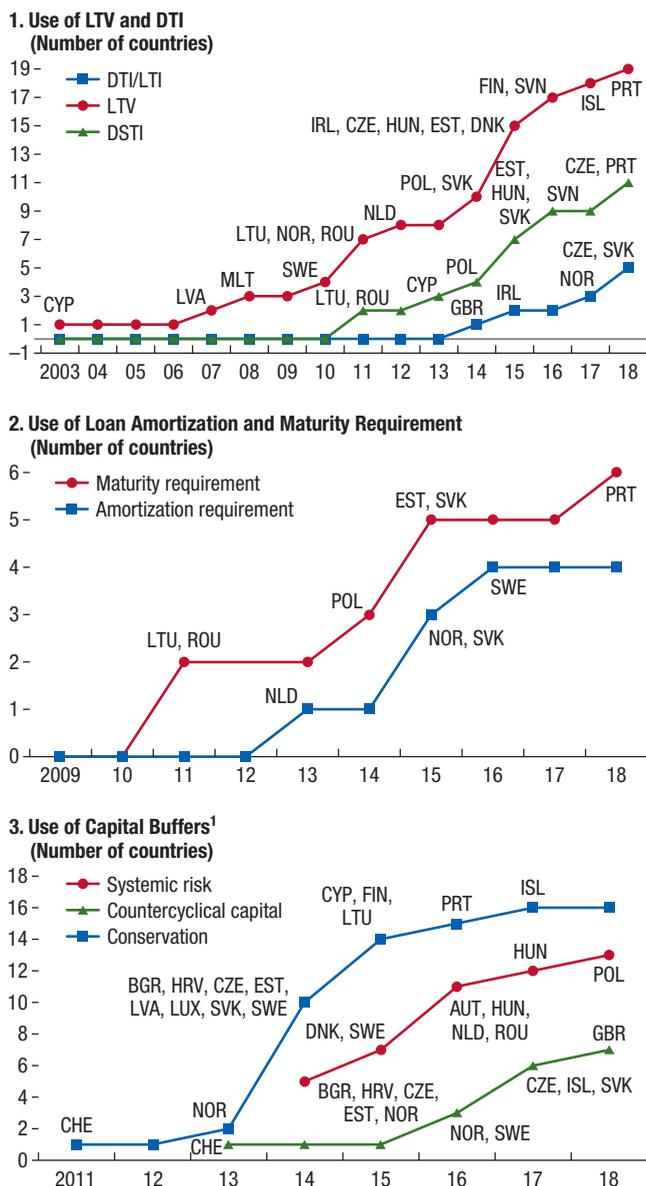
Sources: European Systemic Risk Board database; and IMF staff calculations.

## What We Learned from Country Experiences

Thoroughly assessing the effectiveness of MaPPs is challenging. A simple before-after comparison suggests that the introduction of borrower-based MaPPs, supported by lender-based measures, influenced the dimensions directly targeted by the measures, while their impact on house prices and overall credit growth was mixed. That said, a more conclusive evaluation of the effects of these policies has to await the completion of a full economic and financial cycle. In addition, country experiences indicate that circumvention needs to be addressed.

In this section, we draw on eight case studies to assess the MaPPs' effectiveness by analyzing the evolution of the specific target variables these measures were meant to affect, as well as the dynamics of house prices and credit. Analysis of the relative effectiveness of different macroprudential instruments/measures is beyond the scope of this chapter.

**Figure 2.8. Adoption of Key Macroprudential Measures**  
(As of July 2018)



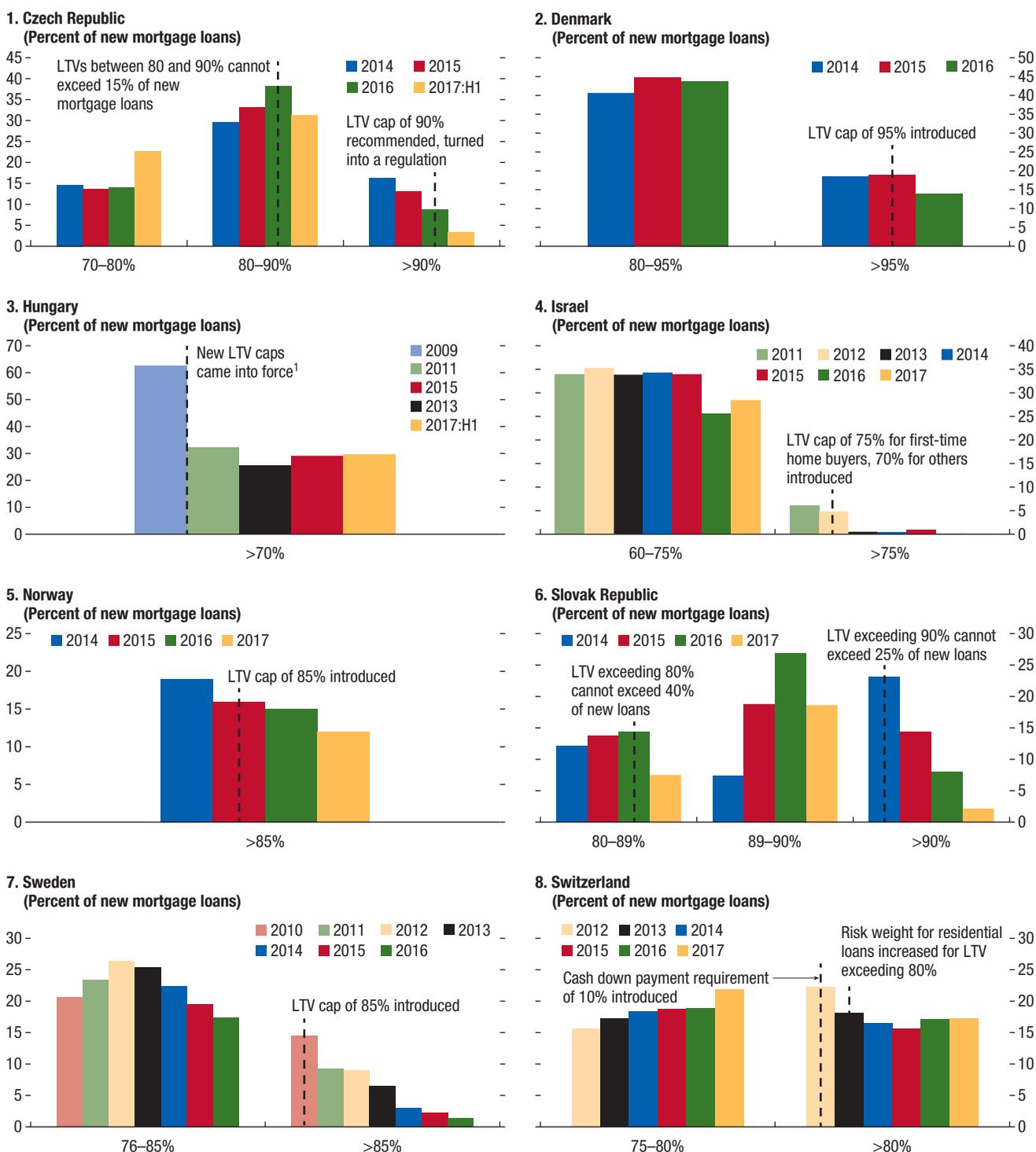
Sources: European Systemic Risk Board database; and IMF staff calculations.

Note: Data labels in the figure use International Organization for Standardization (ISO) country codes.

<sup>1</sup>Countries with full implementation of capital conservation buffer of 2.5 percent is shown in the figure. The rest have adopted the measure which is gradually phasing in. All countries have adopted countercyclical buffers, but only countries that appear here have adopted non-zero buffers. Finland adopted SRB in June 2017, but it will not be activated until July 2019.

**Figure 2.9. Share of High LTV Loans in Selected Countries**

After limits on LTV ratios were imposed, the share of mortgage loans with LTVs exceeding these limits has decreased in the Czech Republic, Israel, Norway, Slovak Republic, Sweden, and Switzerland.



Sources: Bank of Israel; Central Bank of Hungary; Czech National Bank; Danmarks Nationalbank; Finansinspektionen; National Bank of Slovakia; the Norwegian FSA; Swiss National Bank; and IMF staff calculations.

<sup>1</sup>Effective March 2010, the following maximum LTV (loan-to-value) ratios came into force: 75 percent for retail mortgages in domestic currency, 60 percent for euros and 45 percent for other currencies. The ratios were 5 percentage points higher on loans for residential leasing. The LTV caps on retail mortgage loans have since been adjusted to, respectively 80 percent, 50 percent, and 35 percent. Regarding financial leases, 5 percentage points higher LTV limits can be applied.

## Impact on Riskier Mortgages

Macroprudential measures had some effects on reducing high-LTV mortgage loans to households (Figure 2.9):<sup>4</sup>

- **Czech Republic.** Macroprudential measures included lender-based measures (CB at 2.5 percent, CCB at 1 percent, and SRB ranging within 1 to 3 percent) in place since 2014, as well as a tightening of the maximum recommended LTV ratio in the second quarter of 2017. Their implementation was followed by a clear decline in the share of new mortgages with LTVs above 80 percent and an increase in those with an LTV between 70 and 80 percent. This outcome, however, should be assessed carefully as it may have been partly offset by a more favorable valuation of collateral. Meanwhile, debt-servicing and loan-to-income ratios did not show a meaningful improvement over the period.
- **Denmark.** Restrictions on the borrowing capacity of households relative to their disposable income and their interest rate sensitivity have been in effect since 2014. A consumer protection clause was introduced in 2015 mandating at least a 5 percent down payment for residential real estate purchases, translating into a 95 percent maximum LTV. After these measures, the share of new borrowers with LTV above 95 percent declined markedly, while the share of borrowers with LTV between 80 and 90 percent declined slightly. These measures were supplemented by guidelines on good business practices for housing credit (2017), which helped increase the resilience of borrowers, for instance by promoting a higher share of fixed-rate mortgages, and by limiting excessive leverage by households with lower incomes.
- **Hungary.** Since the global financial crisis, the authorities have been implementing a variety of borrower-based MaPPs. In March 2010,

<sup>4</sup>The definitions of LTV, DTI, and DSTI vary widely within the European Union.

75/60/45 percent maximum LTV ratios were adopted for mortgage loans denominated in, respectively, local currency, euros, and other currencies. In early November 2014, the central bank and the banks' association agreed on a fast and orderly conversion of foreign exchange mortgage loans to local currency, in order to reduce the exposure of household balance sheet to exchange rate risk. Beginning in 2015, the maximum LTV ratios were, respectively, 80, 50, and 35 percent and were complemented with payment-to-income ratios (PTIs, akin to DSTIs). For borrowers with a net monthly income below Ft 400,000 (about €1,250), the PTI ratios are 50/25/10 percent. For borrowers with a higher income, the ratios are 60/30/15 percent. Effective October 2018, and to be further tightened beginning in July 2019, the PTI ratios have been modified to encourage longer interest rate fixing periods. In April 2017, the mortgage funding adequacy ratio was introduced to ensure stable long-term funding for long-term mortgage lending. The above measures—together with the central bank certified consumer-friendly housing loans introduced in 2017—have likely helped the quality and sustainability of housing loans. The share of new housing loans with an LTV ratio over 70 percent more than halved, to about 30 percent in the first half of 2017, compared with 2009. Also, the authorities' assessment is that “the regulations contribute to preventing excessive household indebtedness and to mitigating banks' future losses” (MNB 2017, page 11).

- **Norway.** In response to high house prices and growing household debt, the authorities implemented higher capital and liquidity requirements (CB, CCB, SRB, domestically systemic important institutions [D-SIISs]), leverage ratios in 2013–17, and borrower-based measures targeted to the mortgage market (LTV limit, DTI limit, amortization requirements). Following the implementation of the LTV cap, the share of new loans with an LTV ratio above 85 percent has declined. The DTI measure that went

into effect at beginning of 2017 also led to a decline of about 7 percentage points in the share of new mortgages with a DTI cap of more than 500 percent in 2016. This share was 2 percent in 2017.

- **Israel.** Measures included LTV caps adopted in November 2012 (75 percent for first-time buyers and 50 percent for mortgages for investment properties) and an increase in risk weights adopted in March 2013 (to 50 percent for those with an LTV ratio of 45–60 percent, and to 75 percent for those with an LTV ratio above 60 percent). The measures appear to have been effective, as the proportion of new mortgages with an LTV of more than 75 percent declined from 6 percent in October 2012 to 0.5 percent by February 2014, and the proportion of mortgages with an LTV between 60 and 75 percent also declined modestly. A significant drop in the latter in 2016 likely related to new regulatory requirements fully implemented in 2015 and to fiscal measures that aim to discourage investor demand.
- **The Slovak Republic.** Several MaPPs have been introduced to contain increasing household indebtedness, high concentration of residential mortgages in bank portfolios, and rapidly growing house prices. LTV measures implemented in 2014 and the recent decision to set the CCB to 0.5 percent have helped to improve lending standards and credit quality. Specifically, the share of new loans with an LTV ratio of more than 90 percent fell to below 20 percent by the second quarter of 2015 and continued to decline to 6.3 percent by the third quarter of 2016. The proportion of new mortgages with an LTV ratio of 80 to 90 percent initially increased but has since come down noticeably.
- **Sweden.** To counteract unhealthy lending practices and strengthen consumer protection, the authorities introduced a mortgage cap in 2010, mandating that new mortgage loans not exceed 85 percent of the value of the home. The share of high-LTV

mortgages declined after these measures. In addition, a study by the authorities using a difference-in-differences approach found that households limited by the mortgage cap borrowed approximately 13 percent less and purchased homes that were approximately 10 percent less expensive than they would have otherwise (Finansinspektionen 2017). The mortgage cap has had the greatest effect outside the metropolitan regions.

- **Switzerland.** Facing strong and prolonged growth in house prices, risk weights were raised for the part of a residential mortgage in excess of an 80 percent LTV ratio at the beginning of 2013. The proportion of new mortgages with an LTV ratio higher than 80 percent declined by about 5 percentage points in 2013. In addition, *Switzerland* was the first country in Europe to activate the CCB in 2013, targeting mortgage-backed positions secured by residential property. The buffer was set at 1 percent initially and raised to 2 percent in 2014. Following these measures, capital-constrained or mortgage-intensive banks raised their mortgage rates, and as a result, new mortgage loans were shifted to better-capitalized and less-mortgage-intensive institutions.

## Impact on House Prices and Credit Growth

Our assessment, however, provides a more mixed picture of the impact of macroprudential measures on house prices and overall credit growth (Figure 2.10). In some countries (for example *Denmark*), house price growth on a national level was not accompanied by rapid growth in bank credit. Thus, measures that targeted mortgage credit were not likely to affect house price dynamics in these countries. In addition, circumvention may have played a role in some cases (see next section).

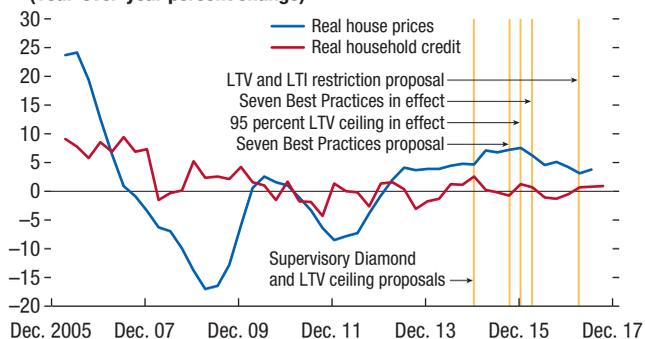
In *Switzerland*, following several macroprudential measures, real estate price growth and the pace of mortgage lending have gradually eased. In

**Figure 2.10. MaPPs, Household Credit Growth, and House Prices in Select Countries**

Among other factors, measures in 2014–15 may have contributed in moderating credit growth.

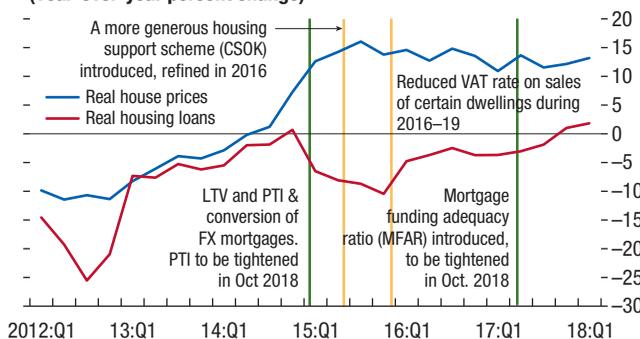
House price growth in Hungary appears to have stabilized, following the measures.

**1. Denmark: House Prices and Household Credit (Year-over-year percent change)**



Sources: Statistics Denmark; and IMF staff calculations.

**2. Hungary: House Prices and Housing Loans (Year-over-year percent change)**

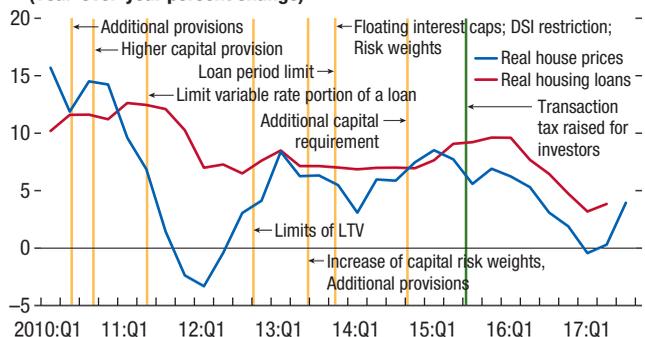


Sources: Hungarian Central Bank; Hungarian Ministry for National Economy; and IMF staff calculations.

Growth rate of house prices has decelerated since late 2016, reflecting changes in the regulatory requirements since 2015 and some fiscal measures ...

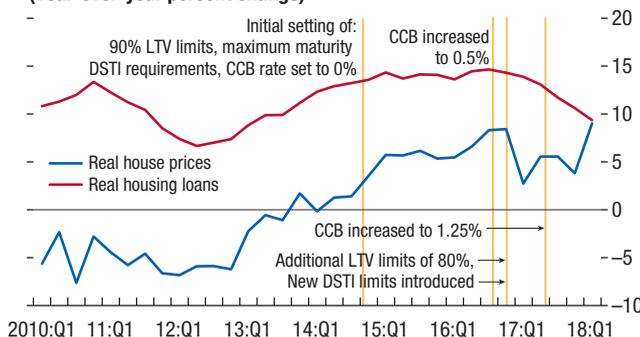
... while the impact of measures in the Slovak Republic on credit growth seems to have been limited.

**3. Israel: House Prices and Housing Loans (Year-over-year percent change)**



Source: Bank of Israel.

**4. Slovak Republic: House Prices and Housing Loans (Year-over-year percent change)**

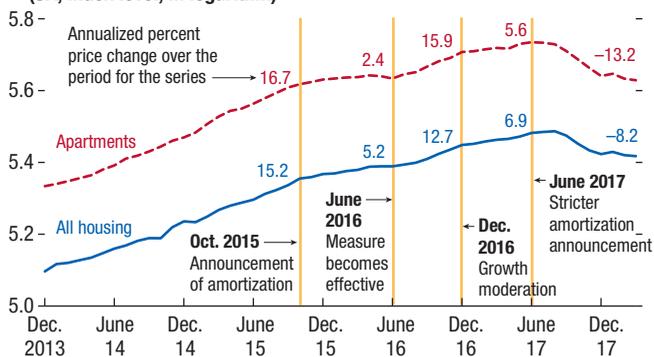


Sources: Haver Analytics; and National Bank of Slovakia.

Sweden's amortization requirement measures seem to have dampened house prices at least initially, but other factors such as prospects for increased housing supply may have also played a role.

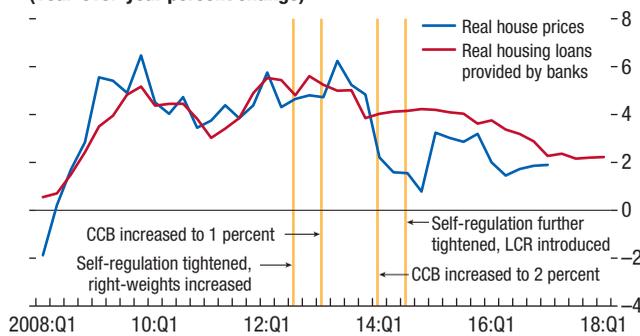
MaPPs have had a lasting moderating effect on the level of household debt, but only a transitory impact on the level of house prices in Switzerland.

**5. Sweden: Amortization Measure Effect on Property Prices (SA, index level, in logarithm)**



Sources: OMX Valueguard; and IMF staff calculations.

**6. Switzerland: House Prices and Housing Loans (Year-over-year percent change)**



Sources: Haver Analytics; IMF Global Housing Watch; and IMF staff calculations.

contrast, house prices in the *Czech Republic*, *Hungary*, and the *Slovak Republic* continued to grow rapidly after macroprudential measures were introduced, though the measures may have helped to contain faster increases. In *Israel*, credit to households continued to rise gradually relative to GDP, even as MaPP succeeded in reducing the share of risky loans. House prices—which were not a MaPP target in this case—continued to rise, partly reflecting low interest rates and housing supply impediments. A deceleration in house prices observed since late 2016 reflects a combination of proposed fiscal measures to discourage investor demand, a rise in mortgage interest rates linked to capital surcharges on mortgage lending, and market uncertainty associated with the Buyer’s Price program. In *Norway*, the impact on house prices appears to have been only transitory. This is also in line with the recent experience of *Sweden*, where amortization requirements and LTV requirements curbed credit growth, but had less of an impact on house prices. Amortization requirement measures seem to have dampened house prices at least initially, but other factors, such as prospects for increased housing supply, may have also played some role.<sup>5</sup>

While a simple before-after analysis shows that in a number of cases house prices and credit growth trends did not appear to change after the implementation of MaPP measures, a deeper assessment using counterfactual analysis indicates that macroprudential measures may have contributed to contain household credit and house price growth in *Norway* and *Sweden* (Box 2.1), although counterfactual paths are imprecisely estimated.

### Further Considerations for Effectiveness: Circumvention and Interaction with Other Policies

There is evidence that macroprudential measures were partly circumvented by nonbank financing

and other avenues in some countries. For instance Dimova, Kongsamut, and Vandebussche (2016) show that some measures imposed on banks in *Bulgaria* and *Romania* to contain credit growth before the global financial crisis were partly circumvented through loan booking with nonbank financial institutions.

More recently, in *Switzerland*, mortgage loans by pension funds and insurance companies, albeit small, are growing faster than bank mortgage loans, warranting careful monitoring. In the *Czech Republic*, consumer credit may have substituted for mortgages. Fortunately, jurisdictions are seeking to broaden the application of MaPPs to avoid circumvention. Recently, *Iceland* introduced a binding LTV for new mortgage loans applicable to all institutions providing mortgages (July 2017). The *Slovak Republic* also introduced binding limits on the DSTI ratio (80 percent) and on the maturity (eight years) for new consumer loans, which apply to all providers, whether domestic or foreign.

Cross-border loans have also been an avenue for circumvention.<sup>6</sup> For instance, *Estonia* implemented several macroprudential measures in the mid-2000s during the financial upswing, which are believed to have been less effective due to cross-border circumvention (Kang and others 2017; and Sutt, Korju, and Siibak 2011). This led to the creation of networks among the authorities in the region to, among other objectives, counter circumvention (for example the Nordic-Baltic Macroprudential Forum [Farelius and Billborn 2016]). Currently, within the countries that belong to the European Systemic Risk Board (ESRB) there is a framework to ensure that the macroprudential instruments envisioned under the European CRR/CRD IV directive are reciprocated, and indeed reciprocation

<sup>6</sup>Kang and others (2017) find evidence of cross-border circumvention in European countries. Also, Cerutti, Claessens, and Laeven (2015), Akinci and Olmstead-Rumsey (2015), Reinhardt and Sowerbutts (2015), and Buch and Goldberg (2017) broadly find that macroprudential tightening is associated with lower domestic credit but often with higher cross-border borrowing. Choi, Kodres, and Lu (2018) document unintended consequences of macroprudential measures in a cross-country setup.

<sup>5</sup>Næss-Schmidt and others (2017).

has occurred in several instances.<sup>7,8</sup> However, reciprocity of other instruments, including LTV and DTI limits, remains voluntary.

Supplementing MaPPs with other policies could also help their effectiveness. MaPPs have a stronger effect when reinforced by monetary policy (Gambacorta and Murcia 2017), but monetary policy needs to target price stability. Therefore, it may not be always available to support MaPPs and, at times, may even operate in the opposite direction. Nonetheless, several policy instruments in addition to MaPPs affect the housing market and have been used in the countries under study. For instance, in *Hungary*, covered bond funding was restricted to low-LTV loans after the crisis to improve the stability of banks' funding sources (IMF 2011). Similarly, the reduction in the scope of mortgage interest tax deductibility planned in *Denmark*, *Finland*, *Netherlands*, and *Sweden* will help contain imbalances in the housing market.<sup>9</sup> Taxes on real estate ownership or transactions can be also used to pursue policy goals like those of MaPPs. For instance, in *Israel*, a proposed tax on owners of more than two apartments likely resulted in a decline in housing transactions in 2017 (Baudot-Trajtenberg, Tzur-Ilan, and Frayberg 2018).

## Conclusions and Policy Lessons

With monetary policy remaining accommodative in most countries and house prices on the rise, many European countries have stepped up the implementation of MaPPs. Among the

most-used measures are borrower-side measures (LTVs, DTIs/LTIs, stepped-up amortization requirements) as well as bank capital requirements (countercyclical capital buffers, systemic risk buffers, systematically financial institution buffers, floors on risk weights). While some countries have introduced a comprehensive set of measures, potential leakages and circumvention seem to pose challenges, as even borrower-based measures are not always applied to all types of loans.

There is evidence that borrower-side measures, supported by lender-based measures, help limit the share of riskier mortgages, which makes economies more resilient. Specifically, in most countries following the introduction of MaPPs, the growth of high-LTV mortgages slowed down, suggesting that the measures may have been helpful. But whether MaPPs can contain the formation of house price and credit bubbles as monetary policy remains accommodative is more difficult to establish. In some countries, household credit and house price growth slowed down following the introduction of borrower-based measures, but in other cases they did not. Implementation of MaPPs is recent, and most countries have not gone through a full economic and financial cycle, so a comprehensive evaluation of the effects of these policies is still premature. Another open question is to what extent countries should rely on MaPPs rather than on complementary policy instruments (that is, tax policy, mortgage interest deductibility, zoning, construction, and planning restriction), which can also have strong effects on the housing and credit markets. The answer, presumably, should be a function of the specific forces that are driving excessive lending and house price increases.

<sup>7</sup>The ESRB goes beyond CRR/CRD IV to recommend the reciprocation of buffer rates higher than 2.5 percent (ESRB 2018).

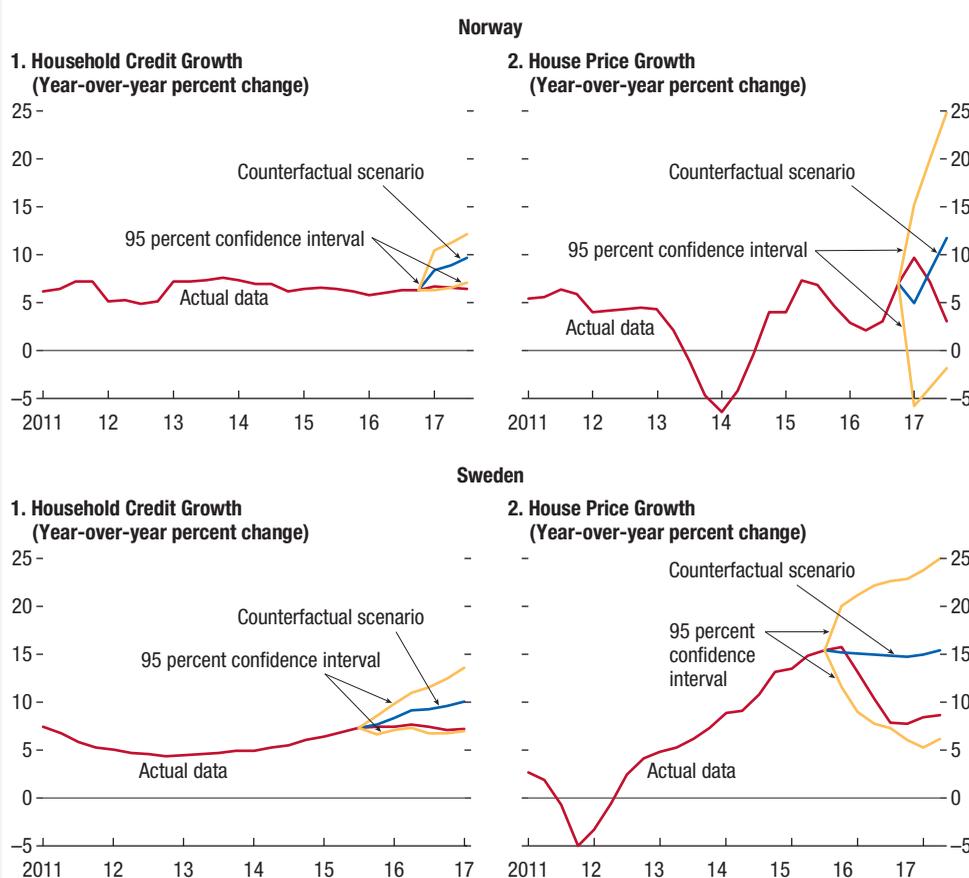
<sup>8</sup>In terms of implementation, 14 member states reciprocated the Estonian risk buffer in 2016. Nine member states reciprocated the Belgian national flexibility measure in 2016 (5 percentage point risk weight add-on applied to Belgian mortgage loan exposures of credit institutions using the internal ratings based [IRB] approach). Also, in late 2017, the Finnish national flexibility measure (a credit-institution-specific average risk weight floor of 15 percent for IRB banks, at the portfolio level, of residential mortgage loans secured by housing units in Finland) was recommended by the ESRB for reciprocation. See ESRB (2018).

<sup>9</sup>See IMF (2018a) for Denmark, IMF (2018b) for the Netherlands, and IMF (2017a) for Sweden, for discussions on mortgage interest deductibility.

### Box 2.1. The Impact of Macroprudential Policies in Norway and Sweden—Counterfactual Analysis

To assess the effectiveness of macroprudential policy (MaPP) measures, counterfactual analysis is used to gauge the impact of MaPPs specifically targeted at the housing market on containing household credit in *Norway* and *Sweden*. Following Price (2014), we estimated the effectiveness of these measures by projecting counterfactual growth rates of household credit and house prices using data from the first quarter of 2003 for *Norway* and from the first quarter of 1981 in the case of *Sweden*. The estimation proceeded in two steps. First, a vector autoregression model was estimated consisting of housing-specific variables (household credit growth, house price growth, housing starts/completions, house sales) and macroeconomic variables (household income growth, output gap, net immigration rate, population growth, mortgage interest rate) using data prior to the implementation of the measures. Second, based on model predictions, the dynamics of housing-specific variables were projected conditional on the actual behavior of macroeconomic variables in the periods after the measures became effective.

**Figure 2.1.1. The Impact of MaPPs on Household Credit Growth in Norway and Sweden—Counterfactual Analyses**



Source: IMF staff estimates.  
Note: MaPP = macroprudential policy.

**Box 2.1** *(continued)*

The analysis suggests that household credit growth would have been higher without the measures, but statistical significance is borderline. Actual credit growth paths are found to remain below counterfactuals in both cases, with the difference becoming statistically significant at the 95 percent confidence level in *Norway* starting several quarters after the introduction of MaPPs. In *Sweden*, actual credit growth is close to—but still within—the lower bound of the confidence interval. Not surprisingly, MaPPs appear to affect house prices and household credit with delays, so over time the mitigating impact may become larger. Turning to house prices, counterfactuals are above actual values in *Sweden*, but not significantly so. In *Norway*, the difference is positive only in 2017, and the estimated confidence interval is very large. While these results are suggestive of some effect on household credit, they should be interpreted with care, bearing in mind the relatively short time since the implementation of some measures and the well-known empirical challenge in isolating the impact of policy changes from that of other intervening factors

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