



ISSN 2443-8030 (online)

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ECONOMIC BRIEF 031 | DECEMBER 2017

EUROPEAN ECONOMY

*Economic and
Financial Affairs*



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Luxembourg: Publications Office of the European Union, 2017

KC-BE-17-031-EN-N (online)
ISBN 978-92-79-64856-4 (online)
doi:10.2765/896803 (online)

KC-BE-17-031-EN-C (print)
ISBN 978-92-79-64855-7 (print)
doi:10.2765/65612 (print)

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By Norbert Gaál

Summary

Notwithstanding comparable macroeconomic and financial conditions, institutional settings and housing policy frameworks, Denmark's and Sweden's house price dynamics have differed markedly during the past decade. This note analyses recent housing market developments in these countries, explains the policy responses given by the authorities and provides policy conclusions. While there is a potential and growing overvaluation of house prices in Sweden accompanied by strong rise in household indebtedness and growing share of vulnerable mortgage loans; house prices in Denmark have been growing more in line with their fundamentals, accompanied by gradual deleveraging of households and a declining share of vulnerable mortgage loans. Related policy challenges appear to be more pressing for Sweden, but policy gaps exist in both countries with respect to mitigating the risk from excessive house price movements. Most importantly, both countries would benefit from the reduction of the high tax incentives for building up housing debt, from further measures to ease restrictions on the housing supply side and the revision of the property tax system in Sweden. Regional house price divergences need to be closely monitored particularly in Denmark. The large share of vulnerable mortgage loans, i.e. variable, interest-only (non-amortised) mortgage loans, particularly if combined with high debt-to-income levels poses a risk by making a significant proportion of households in both countries vulnerable to unexpected changes of macroeconomic conditions.

Acknowledgements: I am grateful to Hanna Aspegren, Patrick D'Souza, Albane Garnier Sauveplane, Duy Huynh-Olesen, Isabelle Justo, Stefan Kuhnert, Kristian Orsini, Nicolas Philipponnet, Geert Vermeulen and Christian Weise for support and helpful comments.

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Introduction

Dynamically growing house prices are raising renewed concerns about a possible house price correction also in Nordic countries. The ESRB issued a warning to eight EU countries, including Denmark and Sweden, pointing at medium-term vulnerabilities in the residential real estate sector (ESRB 2016). Similarly to the IMF or other international organisations¹, the European Commission makes a distinction between Denmark and Sweden: while Sweden is considered to have a macroeconomic imbalance due to the developments related to the housing market and household indebtedness that needs to be addressed, the underlying developments in these areas do not give rise to such imbalance concerns in Denmark at this stage².

This brief compares recent housing market developments in Denmark and Sweden. It analyses the drivers of house prices in the two countries, highlights the differences in terms of risks and vulnerabilities, explains the policy responses of the authorities and provides policy conclusions.

House price developments

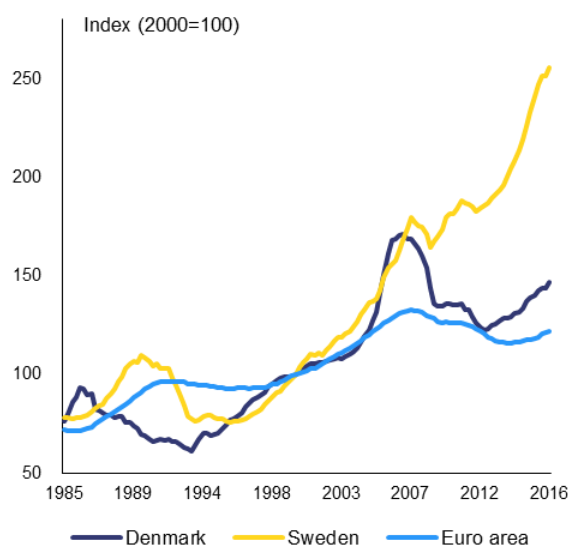
Denmark and Sweden experienced similar house price developments until 2008. Financial liberalisation in the 1980s resulted in high credit flow to real estates, which caused a boom-bust property cycle in the early 1990s. The bust was followed by a strong upward correction: between 1995 and 2008, real house prices³ more than doubled in both countries, while they increased on average by 30% in the countries that are now forming the euro area. House price increase was particularly steep in Denmark and Sweden compared to the euro area between 2004 and 2008 due to financial innovation and policy action.⁴

Between 2008 and 2012 house price dynamics began to differ markedly in Denmark compared to Sweden. The global financial crisis resulted in a sharp house price correction in Denmark with real house prices dropping by almost 30% in a very short period of time. Following the collapse of Lehman Brothers in autumn 2008, the Danish Central bank increased its policy rates to defend the currency peg. This led to a further adjustment of the housing market reinforcing the property bust (Financial Crisis Committee report 2013). By contrast, Swedish house prices remained relatively stable, and by the end of

2009 they had already exceeded their pre-crisis peak (Graph 1).

Property prices have rebounded since 2012 in both countries albeit the dynamics differ markedly. Between 2012 and 2016, real house prices surged by 38% in Sweden and by 19% in Denmark, while average real house prices were almost flat in the euro area in this period. Sweden experienced one of the steepest house price increases among EU Member States in this period, which has also been one of the highest in the country's recent history.

Graph 1: Real house price increase (index 2000=100)



Source: Eurostat

House price growth has been steeper in certain geographical areas in particular in Denmark. Prices in the Copenhagen region have surged by 43% compared to the national average of 19% between 2012 and 2016. House price dynamics in the Stockholm region have also outpaced the national average, although the difference is less significant: an increase of 46% versus 38% nationally (based on Statistics Sweden and Statistics Denmark data). Thus without the capital cities, the divergence of house price dynamics would be even more striking in the two countries. The house price increase deviation between the capital city and the rest of the country has been the starkest in Denmark compared to other EU countries (Bruegel 2017). Recently there are signs that house price increase is gradually spreading from Copenhagen to the neighbouring areas as property price increase has been more dynamic in the adjacent regions to Copenhagen and Aarhus than in those major cities since 2016.

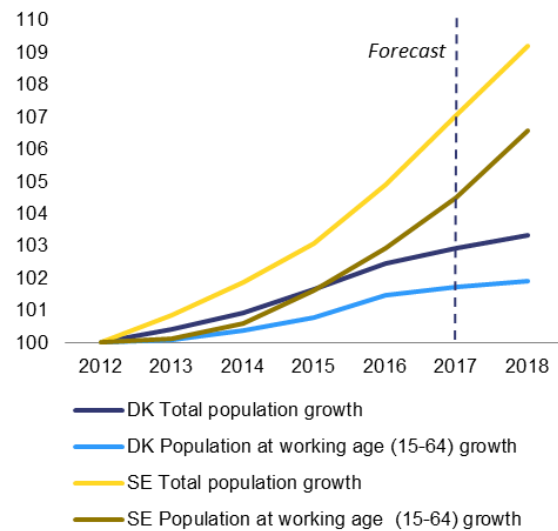
Main drivers of house prices

Although both countries display robust economic growth, supply side constraints, comparable financial conditions and institutional settings, house prices are at a more dynamic growth trajectory in Sweden than in Denmark. Inter alia stronger population growth, higher tax incentives, a persistent structural undersupply of dwellings across the country, as well as the lack of a recent housing burst provides a strong additional impetus for property prices in Sweden. Table 5 of the Annex provides an overview of these main drivers.

Both countries have shown a robust macroeconomic performance since 2012. Real GDP growth was stronger in Sweden with a cumulated increase by 19.8% between 2012 and 2016, against an increase of 11.6% in Denmark. Real gross disposable income, which is more relevant for short-term housing demand has developed more in line, expanding by 11% in Denmark and by 14% in Sweden during this period.

Population growth has been more robust in Sweden, particularly since 2012, partly reflecting higher immigration. The Swedish population is forecast to increase by 8% between 2012 and 2018, while Denmark's population is forecast to grow by 3% during the same period. The working age population (age group of 15-64 years), which is more relevant for short-term housing demand has also grown much more dynamically in Sweden than in Denmark (Graph 2).⁵ There are also strong urbanisation trends at work. Population growth has been most prominent in the capital cities: it increased by 17% in Copenhagen and by 13% in Stockholm between 2008 and 2015, compared with the national average population increase of 3% in Denmark and 6% in Sweden during the same period. Stockholm and Copenhagen are expected to remain among the fastest growing cities in the EU.

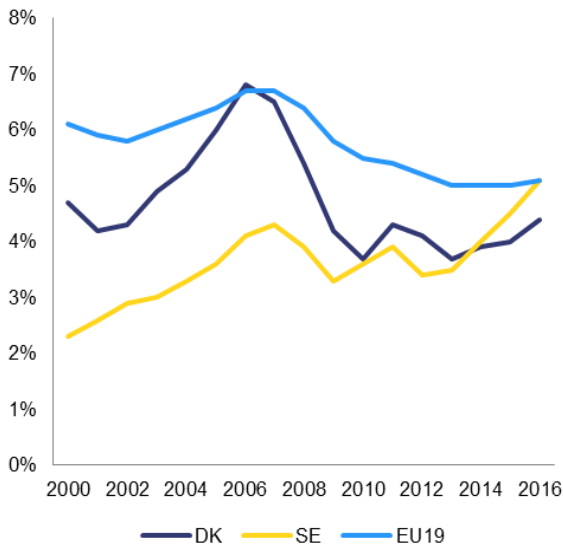
Graph 2: **Population growth (index 1998=100)**



Source: Eurostat, European Commission forecast

Housing investment has been particularly low in Sweden for a prolonged period despite almost continued strong house price increase. Residential investment relative to GDP has traditionally been higher in Denmark than in Sweden, even following the crisis after 2008 (Graph 3). In Denmark, following the burst of the housing bubble, residential investment has fallen back to its historical average of around 4% of GDP while this has been below 3.5% of GDP in Sweden. Residential construction has been growing dynamically since 2012 in both countries following the real house price increase, in particular in the main urban areas. Housing investment in Sweden has reached 5.1% of GDP in 2016, the highest in its recent history closing the gap with the euro area average. Nevertheless, due to a prolonged period of underinvestment, Sweden is facing a large accumulated housing shortage: a structural undersupply of dwellings has been identified as a key driver of Sweden's house price inflation (European Commission 2017b). While the shortage is geographically fairly widespread, it tends to be especially severe in the major urban centres.⁶

Graph 3: Residential construction as a share of GDP (%)



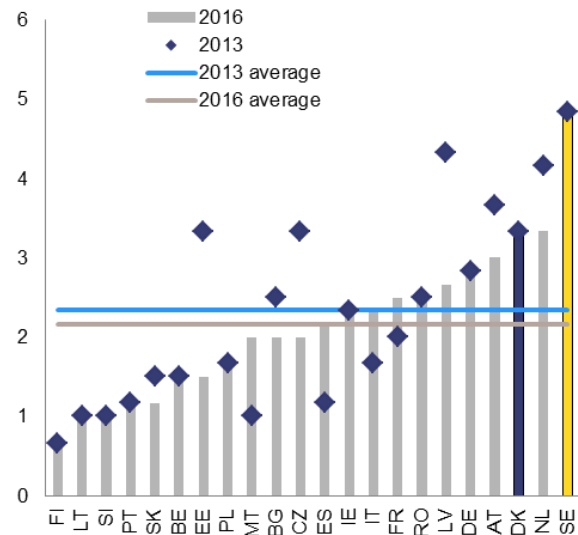
Source: Eurostat

Planning and zoning regulations are important supply side constraints to housing in both countries. Sweden is characterised by long and complex planning processes for new housing construction which prolong the start of a new construction. In Denmark, strict zoning codes and land use regulations combined with rapidly rising land prices are restricting new residential construction (IMF 2016, OECD 2016). Insufficient competition in the construction sector has been identified in both countries as a possible additional factor negatively impacting housing supply (European Commission 2017a and 2017b).

Both countries have a high proportion of rental dwellings, reaching approximately 40% of the total stock. Their rental markets are subject to a high degree of rent control⁷ (Graph 4). As a result, rental prices have deviated substantially from prices that would be available in the absence of rent control⁸, in particular in the capital cities (with the highest demand for housing). In areas, where prices outside the rent control systems exceed controlled rental prices, the availability of rental units becomes scarce. A widening price difference triggers excessive demand for rental units and creates a lock-in effect: existing tenants would not want to give up their favourable conditions for renting, while new entrants cannot access rental apartments. As a result, demand for owner-occupied houses increases, because people in search of housing have no other choice than purchase a property. Relatively low rental prices also incentivise conversion of rental units to owner-occupied dwellings which allows for

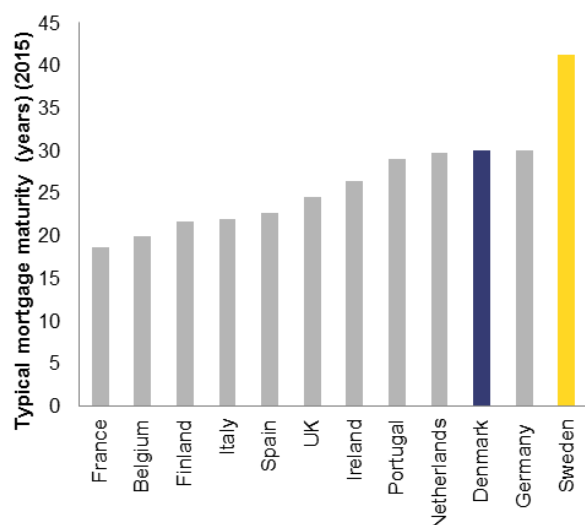
a higher financial return (as it happened in Stockholm). This puts further upward pressure on house prices in particular in the capital cities (European Commission 2017a, 2017b).

Graph 4: Rent control index in the EU27, 2016



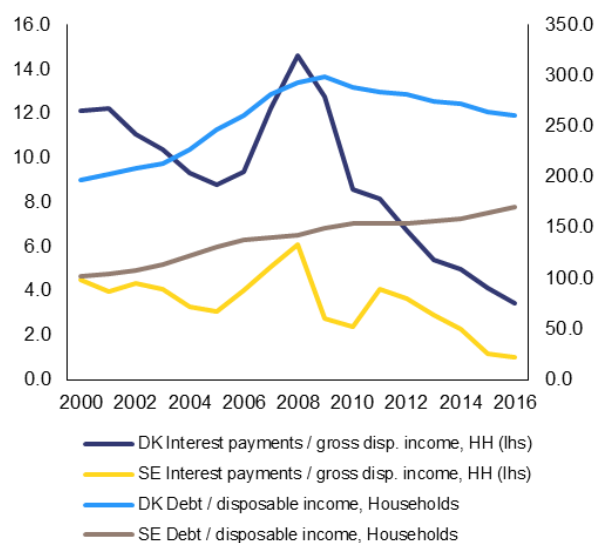
Source: European Commission calculations, in: Bricongne, J.-C. (forthcoming)

Financial innovations further improved terms of credit in both countries. Non-amortised mortgage loans started to spread in Sweden from the mid-1990s. Originally banks offered this possibility to reduce the debt burden of households (and to avoid non-payment) following the property market bust in the early 1990s, but these types of loans became widespread during the last decade. Danish banks were also permitted to provide mortgage loans with deferred amortisation for up to 10 years from 2003. However, mortgage loans can be refinanced and thus the 10 year interest-only period can be restarted, prolonging the average repayment period. The typical mortgage maturity in Denmark and Sweden is among the longest in the EU (Graph 5).

Graph 5: **Typical mortgage maturity (2015)**

Source: European Systemic Risk Board

Low interest rates have eased financing conditions and supported house price increases in both countries. Decreasing mortgage rates combined with the high share of mortgage loans with variable interest rates and the possibility of deferred amortisation has been translating into lower interest payments in both countries. Nevertheless, Denmark and Sweden followed different paths in mortgage credit developments. The robust house price increase in Sweden has been accompanied by similarly dynamic lending for house purchases with such loans increasing by 25.6% between 2012 and 2016. By contrast, credit developments remained subdued in Denmark: during the same period, lending for house purchases increased by mere 3.4% despite real house prices growing by 19%. As a result, Swedish households' indebtedness compared to disposable income has increased from 154% to 170% between 2012 and 2016, while Danish households are gradually deleveraging albeit from a much higher level. Despite these diverging trends in indebtedness, interest payments have been continuously and substantially decreasing in both countries compared to gross disposable income since their peak in 2008 (Graph 6). Danish households' interest payments of 3.4% of the disposable income in 2016 nevertheless remain well above the euro area average of 0.9% or of 1.0% in Sweden.

Graph 6: **Interest payment and indebtedness**

Source: Eurostat

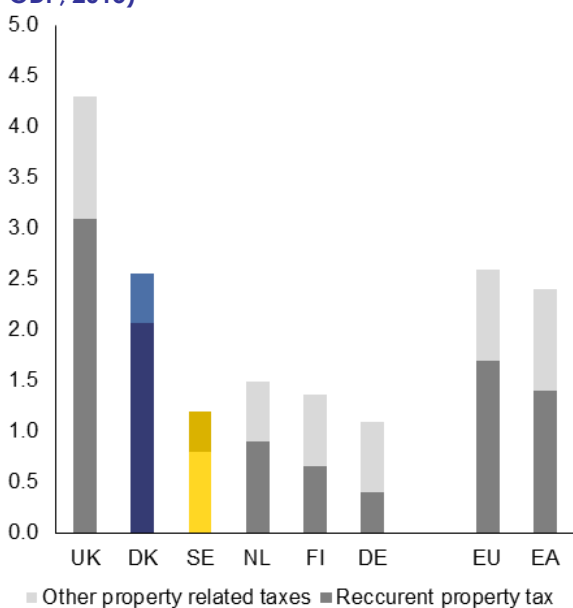
Sophisticated mortgage systems offer accessible debt financing in both countries. Danish and Swedish financial institutions have been able to provide households with a large volume of mortgage loans at a low cost. According to the European Mortgage Federation (2015), the lowest mortgage rates in the EU can be found in Denmark, Sweden and Finland. Mortgage-backed bonds (or 'covered bonds'⁹) play a prominent role in both countries. In Denmark, the banking sector comprises two main actors: traditional banks and specialised mortgage institutions. Mortgage institutions do not receive deposits from the public, but finance lending through the issuance of mortgage bonds. Most of the credit granted to the household sector is channelled through mortgages: mortgage banks account for around 75% of total lending. Mortgage bonds are bought by other financial institutions (notably pension funds) for their investment portfolios and liquidity management. In Sweden, mortgage loans are primarily channelled through traditional banks, which usually manage their mortgaging operations through separate subsidiaries known as mortgage institutions. Swedish banks generally also obtain funding by issuing covered bonds with mortgages as collateral.

The importance of mortgage financing in Denmark and Sweden exceeds other European peer countries. The total outstanding covered bonds backed by mortgages stood at 142% of GDP in Denmark (the largest market in the world in terms of volumes) and at 50% of GDP in Sweden far exceeding other EU countries (Danske bank 2016).¹⁰ Regarding the outstanding mortgage debt stock, the share of short-term securities is relatively high and a

growing share of market funding is provided by foreign investors, which warrant close monitoring in particular in Sweden (European Commission 2017a and 2017b).

Property tax systems create strong incentives for home ownership particularly in Sweden. In Denmark, the revenues from property taxes are in line with the EU average of 2.6% of GDP in 2015. Property tax revenues in Sweden only amounted to 1.2% of GDP in 2015 (Graph 7). Recurrent property taxes are somewhat decoupled from house prices in both countries. Both countries introduced a cap on property taxes so that a rise in the value of property will not increase tax payments for many home owners. As a result, the current property tax systems disproportionately favour areas with higher house prices (such as the main urban areas) which tend to fuel regional house price differences. Denmark has announced a property tax reform in May 2017 to remedy this situation (see more details in Section 4).

Graph 7: Revenue from property taxes (in % of GDP, 2015)



Source: European Commission

Both countries apply significant tax subsidies to mortgage interest payments. Mortgage interest deductibility in Sweden has been 30% below 100.000 SEK (approximately 10.500 EUR) and 21% above this amount since 1991. In Denmark, it has been gradually reduced from 46% in 1998 to 33% in 2007, and will be further reduced to 25% by 2019. Even when fully implemented, deductibility in Denmark would still be (and remain so in Sweden) among the most generous in the EU. Denmark and Sweden also belong to the few EU countries

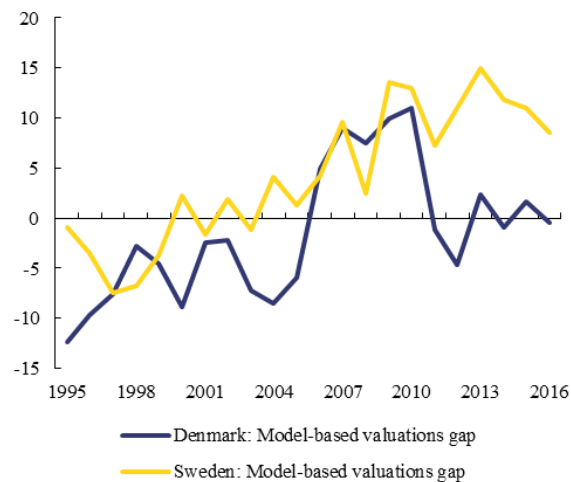
applying no ceiling to the total amount of deduction and there are no additional conditions for a mortgage loan to qualify for tax deduction.¹¹ The budgetary costs of the mortgage interest rate deductibility are estimated to be at the magnitude of 0.9% of GDP in 2016 in both countries and expected to increase further as inflation gradually picks up.

Vulnerabilities and risks

Housing market stability

Diverging house price trends imply varied macroeconomic vulnerabilities of Denmark and Sweden. Traditional indicators (price to income, i.e. affordability and price-to-rent i.e. dividend) suggest that Denmark's house prices are around 5-10% above their long term average, while in Sweden this value is in the range of 40-60%. European Commission's model-based analysis (Philipponnet and Turrini 2017) suggests that house prices in Denmark are currently broadly in line with their fundamental values, while there is a potential overvaluation of house prices in Sweden (Graph 8).¹²

Graph 8: Model based "valuation gap" with respect to the main fundamentals



Source: European Commission calculations

In both countries, the effects of a sudden and pronounced correction of house prices could be substantial. Analysis by the European Commission suggests that a sudden 10% decrease in house prices could cause a 1.4% decrease in GDP in Sweden and 2% in Denmark, while private consumption could decline by 2% and 2.6% respectively (European Commission 2015).¹³ Residential investment is much more sensitive to house price movements, decreasing

by as much as 27% in Sweden and 9% in Denmark and only marginally recovering afterwards. It appears that while in Sweden residential investment appears to be particularly vulnerable to house price shocks, its wider macroeconomic impact seems at the same time more contained (Table 1).

Table 1: Estimated maximum impact of 10% decline of house prices

	GDP	Consumption	Residential investment
Sweden	-1,4%	-2,0%	-27,1%
Finland	-2,9%	-2,8%	-5,9%
Norway	-0,3%	-0,5%	-8,1%
Denmark	-2,0%	-2,6%	-9,0%
Average	-1,6%	-2,0%	-12,5%

Source: European Commission (2015)

Denmark has taken measures to reduce high tax incentives for accumulating housing debt. The mortgage interest rate deductibility is being gradually reduced from 33% in 2007 to 25% (until 2019). The Danish authorities have announced a property tax reform in May 2017, taking full effect from 2021, which will re-establish the link between house price developments and property tax payments and thus eliminate the pro-cyclical nature of property taxation which fuelled regional house price booms. By contrast, no policy measures have been taken in Sweden since 2007 on housing taxation or mortgage interest rate deductibility that could have dampened the house price surge despite several calls by the Council in their Country Specific Recommendations¹⁴ and from international institutions, such as the IMF, OECD or the European Systemic Risk Board.

The Danish authorities have also proposed macroprudential measures targeted at regional house price divergence. Requirements on mortgage lending at high housing price growth areas (Copenhagen and Aarhus at this stage) have been proposed to be stricter (in particular on variable and interest-only loans) to further mitigate the risks arising from surging house prices. Although the original guidance has been revised since then, it will be applicable on a country-wide level (and not on regional level) and the implementation has been postponed from 1 October 2017 to 1 January 2018, it is still expected to put further dampening effect on risky loan taking primarily in the main urban areas.

Sweden and Denmark are taking several actions to tackle supply side constraints. Both countries introduced measures to streamline building and planning regulations and ease restrictions in zoning

and to increase competition in the construction sector. Sweden has also provided some direct budgetary support for municipalities to encourage more construction. None of the countries have recently taken significant measures on the rental market. Both countries have supported investment in transport infrastructure to improve connectivity around and within main urban areas which could help to spread house price growth more equally outside the core urban areas.

Household indebtedness

Gross household indebtedness in Denmark and Sweden has been among the highest in the EU. Due to strong tax incentives, households save in pension schemes and housing equity rather than reducing their gross debt. This has resulted in balance-sheet expansion with high assets and liabilities. The total outstanding residential mortgage loans per capita in 2015 stood at approximately 53.000 euros in Denmark and 48.000 euros in Sweden compared to the EU average of 17.000 euros (Danske bank 2016).

A high level of household indebtedness makes an economy more vulnerable to shocks. Although financial assets of households stand at roughly three times their liabilities (IMF 2016), most of those assets are relatively illiquid. High household debt also makes the economy more sensitive to changes in the macroeconomic environment. For instance, a sudden increase of interest rates can induce adjustments in borrowing, consumption and investment (Table 2¹⁵). High indebtedness can also make the economy vulnerable to asset price movements, which can amplify shocks and macroeconomic instability. For instance, a fall in the value of the collateral could negatively impact households' ability to borrow, and it can thereby induce further squeeze in consumption.

Table 2: Maximum impact of 1 pp. increase of interest rates

	Consumption	Residential investment	House prices
Sweden	-0,8%	-4,1%	-2,6%
Finland	-0,6%	-2,0%	-1,3%
Norway	-0,6%	-2,7%	-1,2%
Denmark	-0,2%	-1,2%	-0,2%
Average	-0,6%	-2,5%	-1,3%

Source: European Commission(2015)

Both countries have implemented several measures to mitigate the risk of mortgage borrowing. Macroeprudential measures have been mainly focusing on households with a high debt level in combination with non-amortised, variable loans, which are considered to be particularly vulnerable to sudden changes of macroeconomic conditions. Both countries implemented a loan-to-value (LTV) requirement: 80% in Denmark and 85% in Sweden. Denmark has also introduced an additional 5% down payment compulsory for new loan applications in 2015. As regards amortisation, Denmark sets limits on the share of interest-only mortgages with high LTV ratios as well as variable rate mortgages. Sweden has introduced a formal amortisation requirement linked to LTV ratios as of 1 June 2016: new mortgages must be amortised by a minimum of 2% per year until the LTV ratio drops below 70% and by 1% afterwards until the LTV ratio drops below 50%. In May 2017, the Swedish FSA proposed further stricter amortisation requirements (minimum 3%) for new mortgage holders with high debt-to-incomes (DTI) levels. The Danish FSA's forthcoming guidelines also contain additional measures to reduce risks for households with high DTI levels if combined with variable interest rates and non-amortisation. In addition, several soft measures were implemented in both countries to improve borrowers' understanding of the risks with the different mortgage credit instruments, and to further enhance banks' prudent lending policy.

Denmark and Sweden differ with respect to recent trends in household indebtedness. Lending for house purchases increased by 3.4% in Denmark and by 25.6% in Sweden between 2012 and 2016. Household debt to disposable income in Denmark has declined from its peak of 297% in 2009 to 274.5% in 2013 and to 260.1% in 2016 through passive deleveraging process (though still remains one of the highest in the EU). By contrast, household debt relative to disposable income in Sweden has increased from 149.2% in 2009 to 156.2% in 2013 and to 170.1% in 2016. Similar trends can be

observed if household indebtedness' are compared to GDP developments¹⁶. These trends might suggest higher financial stability risks in Sweden because financial crises are often preceded by a sharp increase of both house prices and credit flows to households, coupled with a surge in construction activity (Crowe et al. 2011).¹⁷ The average LTV ratios on the stock of outstanding mortgage loans have been decreasing steadily in both countries due to the LTV requirements introduced and the dynamically rising house prices (Table 3).

The shares of vulnerable mortgage loan types remains relatively high in both countries and keep building up in Sweden. The share of variable interest loans (up to 1 year initial rate fixation) in the stock of outstanding mortgage loans has decreased substantially from 47.1% to 37.8% in Denmark between 2013 and 2016, while this share has increased from 49.2% to 69.1% in Sweden during the same period (and typically having an interest rate fixation of 3 months). The share of non-amortised (interest-only) mortgage loans in the stock of outstanding mortgage loans has been decreasing gradually in both countries, albeit more than half of the mortgage loan stock has not yet been amortised in Denmark. In Sweden, the share of non-amortised loans is much lower than in Denmark. Despite these differences, the average amortisation rate remains relatively low in both countries.

Table 3: Change in the composition of mortgage loan stock to households 2013-2016

Outstanding loans <i>in %</i>	2013		2016	
	DK	SE	DK	SE
Household indebtedness (% of disposable income)	274.5	156.2	260.1	170.1
Household indebtedness (% of GDP)	133.3	82.3	129.3	85.1
Average LTV	74.1	53.8	67.4	46.9
Share of variable interest rate loans	47.1	49.2	37.8	69.1
Share of non-amortised loans	57	27	52	20
Amortisation rate	1.7	1.5	2.0	1.7

Source: Eurostat, European Mortgage Federation Report, FinansDanmark, Riksbank, Statistics Denmark¹⁸

Developments of new household mortgage loans suggest a further build-up of risks in Sweden and gradual reduction in vulnerabilities in Denmark. In Sweden, the share of variable interest rates keep increasing from an already high level reaching 77.1% of the new loans at the end of 2016. By

contrast, in Denmark this proportion fell to 18.1% by the end of 2016. The share of loans with very high debt-to-income (DTI) levels has been also increasing rapidly in Sweden, from 21% to 37% from 2013 and 2016, while decreasing in Denmark from 20% in 2013 to 17% by the end of 2016 (Riksbank 2016, European Mortgage Federation 2016).

Table 4: Developments in new mortgage loans to household

New mortgage loans <i>in %</i>	2013		2016	
	DK	SE	DK	SE
Share of variable interest rate loans	40	57.5	18.1	77.1
High DTI	20	21	17	37

Source: FSA, Riksbank, FinansDanmark 19

Financial stability

Both Danish and Swedish financial sectors are heavily exposed towards real estate markets. In 2015, the size of the mortgage markets was over 100% of GDP in Denmark and more than 90% of GDP in Sweden. Together with the Netherlands, these countries top the ranking for the bank's highest exposure towards house purchase loans (Graph 9).

Graph 9: Bank exposures to real estates



Source: ECB, ESRB

Note: X-axis: Loans for house purchases over GDP in %.

Y-axis: Loans for house purchases over Common Equity Tier 1 in %.

Financial soundness indicators suggest that the banking sectors are stable in both countries. Banks are well capitalised, non-performing loans remain among the lowest and profitability among the

highest in the EU. Although the non-performing loans ratio in Denmark is low and declining, the quality of bank assets in Denmark is outperformed by its Nordic peers, as some Danish banks are still suffering from legacies of the economic crisis.

Both Denmark and Sweden introduced a wide set of macroprudential measures over the last years to improve financial stability and to reduce vulnerabilities linked to the banks' growing household mortgage exposure. At this stage, the capital buffers appear higher for Swedish banks. Both countries introduced a Systemic Risk Buffer (SRB) on the systematically important banks in line with the Basel requirements. While the SRB requirement in Denmark varies between 1% and 3% of the capital depending on the level of systemic importance of each institution, it is set at 3% of the capital in Sweden for the four largest banking groups. Both countries implemented counter-cyclical capital buffers (CCCB), which provides a larger cushion to absorb losses and provides incentives for banks to avoid excessive or under-priced exposures. The buffer is a capital requirement that varies over time and is to be used to support credit supply in downturns. The risk buffer is currently set at 0% in Denmark, while it is set at 2% in Sweden since March 2017.

Denmark has introduced the so-called "Supervisory Diamond" for commercial banks as well as for mortgage credit institutions. This wide range supervisory tool set up a number of benchmarks to indicate banking and mortgage credit sector activities which initially should be regarded as having a higher risk profile. As regards mortgage loan portfolios, it aims to reduce risks measured against five benchmarks: large exposures, lending growth, interest rate risk of the borrower, interest-only lending and short term funding. The measure is gradually entering into force until 2020.

Danish and particularly Swedish banking groups are of systemic importance for the Nordic-Baltic financial market. Any shock to the Danish or particularly to the Swedish banking sector could have a wider impact on neighbouring countries. To mitigate these risks, the Nordic authorities have agreed on arrangements concerning information sharing, supervisory responsibility and cooperation, macro-prudential policy, depositor protection and recovery and resolution planning (European Commission 2017a).

Conclusions

Recent house price dynamics differ markedly in Denmark and Sweden. Inter alia stronger population growth, higher tax incentives, a persistent structural undersupply of dwellings across the country, as well as the lack of a recent house price bust provides a strong additional impetus for property prices in Sweden. House prices in Sweden are growing from already overvalued levels, coupled with a continued rise in household debt and dynamically growing share of vulnerable mortgage loans. By contrast, house prices in Denmark have been growing more in line with their fundamentals, accompanied by gradual deleveraging of households (although still remaining the highest in the EU) and a gradual decline of the share highly vulnerable mortgage loans. Thus recent house price trends in Denmark appear to be on a more sustainable path compared to Sweden at this stage. However, regional house price divergences need to be closely monitored in both countries, particularly in Denmark.

While related policy challenges appear to be more pressing for Sweden, policy gaps exist in both countries with respect to mitigating the risk from excessive house price movements despite several recent measures in these areas.²⁰ High tax incentives towards housing debt could be lowered by reducing tax deductibility for mortgage interest payments and/or by raising recurrent property taxes in Sweden.²¹ Higher recurrent property taxes in Sweden without the current caps could ensure less pro-cyclical and more equitable taxation. Further simplification of the complex planning and zoning regulations could support new construction, ensuring the housing supply meets increased housing demand in both countries. Supply side constraints could be eased by reducing the high level of rent control in both countries, in particular in the main urban centres. Investment in transport infrastructure to improve connectivity within and between urban areas could help to spread house price growth more equally outside the urban areas.

Risks related to the high shares of vulnerable mortgage loans remain a challenge in both countries. The main concerns are mortgage loans with variable interest rates and deferred amortisation - particularly if combined with high DTI levels. Such loans are highly sensitive to sudden changes in the macroeconomic environment (such as an interest rate hike). Incentivising debtors to fix interest rates for a longer time horizon (for instance by higher administrative fees on short term variable interest

rate loans or the introduction of a floor cap on how much variable mortgage interest rates could increase) would provide additional safeguards for households with such type of loans in case of sudden changes in the macroeconomic environment. Measures to incentivise amortisation (for instance by allowing mortgage interest deductibility for amortised loans only) or formal amortisation requirements with high DTI and LTV levels could further reduce vulnerabilities in household mortgages. The exposure of borrowers with high DTI levels should be monitored and their vulnerability can be further limited by reducing the availability of variable and deferred amortisation loans for them. The experience of the introduction of the Danish "Supervisory Diamond" could provide additional insights for the Swedish authorities if and to what extent such measures could be considered to reduce the high share of vulnerable mortgage loans in the country.

As regards financial stability, banks in both countries are well capitalised, with high asset quality and profitability. Nevertheless, banks remain heavily exposed to household debt. Bank capital requirements per se are not sufficient to withstand the risks of a potential sudden house price fall. The already implemented financial stability measures shall be complemented with other policy measures which increase the resilience of indebted households to sudden macroeconomic changes.

AnnexTable 5: **Overview on the main recent drivers of house prices**

DRIVERS	DENMARK	SWEDEN
Macroeconomic performance	Strong disposable income growth	
Demographic trends	<i>Moderately rising population</i>	<i>Strongly rising population</i>
Urbanisation trends	<i>Significantly higher population growth in Copenhagen compared to the national average</i>	
Supply side constraints	High level of rent control	
	Long and complex planning and zoning procedures	
	Insufficient competition in the construction sector	
		<i>Accumulated housing shortage</i>
Financing conditions	Low mortgage interest rates	
	High share of variable interest rates	
	Availability of interest-only (non-amortised) mortgage loans	
Mortgage systems	Sophisticated mortgage systems which ensure low mortgage interest rates	
Policy incentives	High interest deductibility for mortgage loans	
	<i>Recurrent property taxes above the EU average</i>	<i>Recurrent property taxes below the EU average</i>
Legacy	Property taxes capped fuelling regional house price differences (to be changed in Denmark)	
	<i>Burst of a housing bubble (2008-2012)</i>	<i>Almost uninterrupted growth of house prices since the early 1990s</i>

Table 6: **Summary of the main risks and policy responses**

MAIN RISKS	POLICY RESPONSES	
	DENMARK	SWEDEN
HOUSING MARKET		
High tax incentives for housing debt	<ul style="list-style-type: none"> Reduction in mortgage interest tax deductibility from 33% to 25% in 2019. Property tax reform (effective from 2021) could reduce the overall property tax level in the short term. 	<ul style="list-style-type: none"> <i>n/a</i>
Supply side constrains	<ul style="list-style-type: none"> Measures to streamline building and planning regulations and ease restrictions in building. Measures to increase competition in the construction sector. 	<ul style="list-style-type: none"> Measures to streamline building and planning regulations and ease restrictions in building. Measures to increase competition in the construction sector. Direct budgetary support for municipalities to encourage more construction.
Regional divergence of house prices	<ul style="list-style-type: none"> Property tax reform to re-establish link between house price changes and taxation (effective as of 2021). "Seven best practices": guidelines with credit rating recommendations on mortgaging of homes in high growth areas (including for instance caps on variable and interest-only loans). Support investment in transport infrastructure to improve connectivity around and within main urban areas. 	<ul style="list-style-type: none"> Support investment in transport infrastructure to improve connectivity around and within main urban areas.
HOUSEHOLD INDEBTEDNESS		
High mortgage credit demand	<ul style="list-style-type: none"> 80% limit on LTV ratio [note: 80% LTV for residential properties, 75% for secondary residences, 70% LTV for agriculture, 60% LTV for commercial properties and 40% LTV for plots]. Additional 5% compulsory down payment for new loan applications. The "Supervisory Diamond" contains limitations for the banks on interest-only and variable loans. 	<ul style="list-style-type: none"> 85% limit on LTV ratio: The LTV cap was applied to all new mortgages or extension to existing mortgages. Compulsory amortisation of new mortgage loans. New loans should be repaid in two steps; new mortgage holders with an LTV above 70% will repay at least 2% of their original loan each year. After that households will repay at least 1% each year until the LTV is 50%. New FSA proposal (under discussion): all new mortgage holders who borrow more than 4.5 times their gross income, must amortise one percentage point more of their mortgage (i.e. at least 3%) per year than what they need to amortise today.
Risky debt taking	<ul style="list-style-type: none"> Best practices for banks' risk management. Traffic light system to improve borrowers' understanding of risks. Affordability requirements, 	<ul style="list-style-type: none"> Banks are requested to suggest individually adapted amortisation plans to their borrowers thereby incentivising amortisation of mortgage loans.

	comparative credit assessment for different loan types (i.e. fixed vs variable interest rate; interest-only and amortised).	<ul style="list-style-type: none"> Government regulation on fairer rules for mortgage repayment.
FINANCIAL STABILITY		
High mortgage credit supply	<ul style="list-style-type: none"> Supervisory Diamond for commercial banks (gradually phased in until 2019) — a supervisory tool monitoring banks' performance against five benchmarks: large exposures, lending growth, exposure towards commercial property, funding ratio and liquidity. Supervisory Diamond for mortgage credit institutions (entry into force 2018-2020) — a supervisory tool monitoring the performance of mortgage credit institutions' performance against five benchmarks: large exposures, lending growth, interest rate risk of the borrower, interest-only lending and short term funding. 	<ul style="list-style-type: none"> 15% sectoral risk-weights for residential mortgages introduced in 2013. The risk weight was increased to 25% in 2014.
Financial sector resilience	<ul style="list-style-type: none"> Systemic Risk Buffer (phase in 2015-2019). The systemic risk buffer is set within a range of 1% – 3% of the banks' risk-weighted asset (RWA) for six systematically important banks (O-SII). The applicable buffer level for an institution depends on the subcategory of systemic risk. There are five subcategories depending on the calculated level of systemic importance. Countercyclical capital buffer (CCCB). The risk buffer is currently set at 0% but could be increased up to 0.5%. The capital conservation buffer is applied to all Danish institutions from January 1, 2015. It will be phased in gradually so the buffer is 0 in 2015, 0.625 per cent in 2016, 1.25 per cent in 2017, 1.875 per cent in 2018 and 2.5 per cent in 2019. 	<ul style="list-style-type: none"> Systemic Risk Buffer: The four major Swedish banks shall hold a systemic risk buffer of 30% in common equity Tier 1 capital as of 1 January 2015 and a further 2.0% in a common equity Tier 1 capital requirement within the framework of Pillar 2. Countercyclical capital buffer (CCCB) of 2.0%. The buffer is a capital requirement that varies over time and is to be used to support credit supply in down-turns. Total resolution fees amount to 0.125 percent of the total tax base for 2018, 0.09 percent for 2019 and 0.05 percent for 2020.
Cross-country spill-over	<ul style="list-style-type: none"> Nordic authorities' Memorandum of Understanding concerning stronger information sharing, supervisory responsibility and cooperation, macro-prudential policy, depositor protection and recovery and resolution planning regarding cross-border financial institutions in the Nordic region. 	
OTHER MEASURES		
Other macroprudential measures	<ul style="list-style-type: none"> Spreading of mortgage bonds auction over the year²². Compulsory maturity extension of mortgage bonds with maturity less than one year²³. 	<ul style="list-style-type: none"> Enhancing the macroprudential authority's mandate²⁴.

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¹ See for instance IMF 2017, OECD 2016, Hviid 2017.

² European Commission: Alert Mechanism Report 2017, COM (2016) 728 final. Sweden receives a Country Specific Recommendation from the Council to address this imbalance, see for instance Council recommendation of 22.5.2017, COM (2017) 526 final.

³ Real house prices refer to nominal house prices relative to the private consumption deflator from the national account statistics.

⁴ In both countries the availability of interest-only mortgage loans and the property reforms around 2006-2007 boosted house prices (see for instance Dam et al 2011). Bäckman et al (2016) argues that house prices increased an additional 35% in Denmark because of the availability of interest-only loans as of 2003.

⁵ Stronger population growth is to large extent due to higher migration to Sweden. However, new arrivals would less likely to invest in real estates; increased housing demand will likely be partly addressed by institutional/municipal actors.

⁶ Non-residents have to face several administrative hurdles to purchase property in both countries as well as limitations on a second home purchase, thus reducing the scope for speculative purchases of properties.

⁷ In Denmark, rent control has been abolished in 1991 for new private rental constructions, thus only buildings built before 1991 – which comprises approximately 80% of the private rental dwelling stock - are subject to rent control. In Sweden, the rental price (both private and public) is subject to the so-called 'utility value system' which sets the rental price. Since 2014, newly built rental houses are outside the scope of the rent control for a period of 15 years with the aim to support new rental constructions.

⁸ See also endnote 7. Since rental prices for new constructions are outside the scope of the rent control, they could provide a proxy for prices outside the rent control.

⁹ While an unsecured bond means that the investor only has a claim on the issuer, a covered bond means that the investor also has a priority right to collateral that is specifically linked to the bond. Consequently, the investors do not demand as high interest rates for the covered bonds as they do for the unsecured bonds.

¹⁰ The third largest market is Spain, where the total outstanding covered bonds stock stood at 23.3% of GDP in 2015.

¹¹ For instance, in the Netherlands only amortised loans are eligible for tax deduction as of 2013.

¹² This valuation gap is estimated as a deviation from equilibrium values justified by housing demand and supply fundamentals using a vector error correction model. Similar conclusions are reached in Bergman and Sørensen (2016) or in Bolt et al (2014).

¹³ A structural vector auto-regression model (VAR) was estimated to study the effect of house price shocks on the main macroeconomic variables such as GDP, private consumption and residential investment. The original model is described in detail in Igan and Loungani (2012). The results are comparable to the econometric analyses of the IMF (in: Nordic Regional Report, 2013) and NIER (in: NIER, 2014).

¹⁴ See for instance the latest Council recommendation of 22.5.2017. COM(2017) 526 final.

¹⁵ The impacts of the evolution of short term interest rates on the studied macroeconomic variables is analysed using the same model and methodology as described in endnote 13.

¹⁶ In Denmark, highly indebted agricultural businesses are also counted among households. Excluding them, actual household indebtedness could be approximately 25% of GDP lower according to Statistics Denmark thus comparable to that of Sweden.

¹⁷ Looking only at the overall level of indebtedness, Danish households might seem to be more exposed to risks than their Swedish peers. However, equilibrium household debt levels may significantly vary across countries depending on the size of households' financial assets and welfare indicators (Reiakovam and Solheim, 2013).

¹⁸ Notes: loans granted to households as a ratio of gross disposable based on ESRB data. DK LTV data is available from June 2014. Variable interest rate is up to 1 year initial rate fixation based on European Mortgage Federation Report (Q4 2016) data.

¹⁹ Notes: variable interest rates are up to 1 year initial rate fixation; high DTIs refer to values of 400% and 450% DTIs, respectively.

²⁰ For an overview, see Table 6 in Annex.

²¹ For the simulation of the macroeconomic impact for some these measures in case of Sweden, see Burgert et al (2016).

²² Mortgages are long-term, whereas most of Denmark's mortgage bonds have typically maturities of less than five years. The mismatch means that some bonds must be rolled over each year. Maturing bonds were refinanced at an annual auction in December until 2006. This is now spread more equally around the year to reduce re-financing risks.

²³ In the event of failure of a refinancing auction or if the interest rate at an auction increases by more than 5 percentage points compared with one year earlier, the term of bonds reaching maturity at that time will be extended by 12 months and the rate of interest on the bonds and corresponding mortgage loans will be raised by 5 percentage points.

²⁴ The introduction of the compulsory amortisation requirement has been delayed by almost 2 years, due to lack of clear mandate of the FSA. The Swedish authorities intend to enhance the macroprudential authority's legal mandate in 2017, with full implementation likely to follow in 2018. Further changes towards this direction were proposed in June 2017.

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