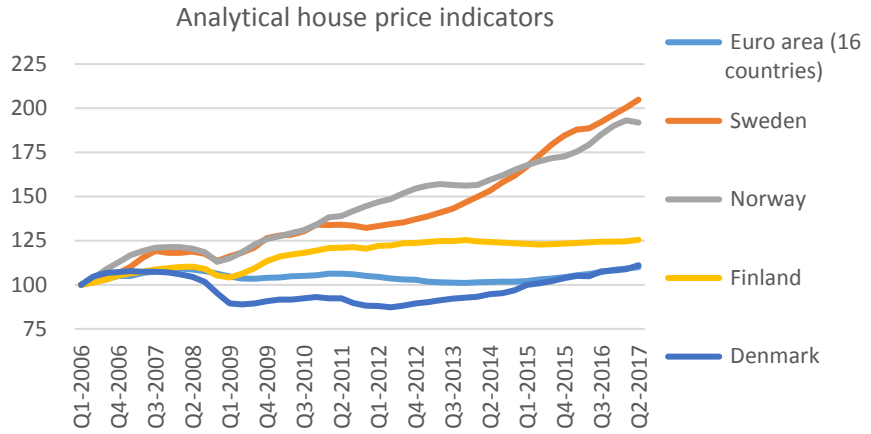
The Swedish housing market primer

The purpose of this article is to explain some drivers behind Swedish house prices and explore how these might change, with possible implications for the housing market. Please note that we intend this text to serve as an introduction to the assorted topics that we believe are most relevant rather than a complete survey. We cannot guarantee the accuracy of all information, but we will try and include sources where possible, using mostly data and charts from official sources. The exception will be our proprietary data on the leverage of newly built co-ops which has been gathered manually by one of the authors (RP). The authors wish to remain anonymous due to potential conflicts of interests with their employers, but will happily receive comments and feedback by email and will do their best to incorporate these in future versions[1].

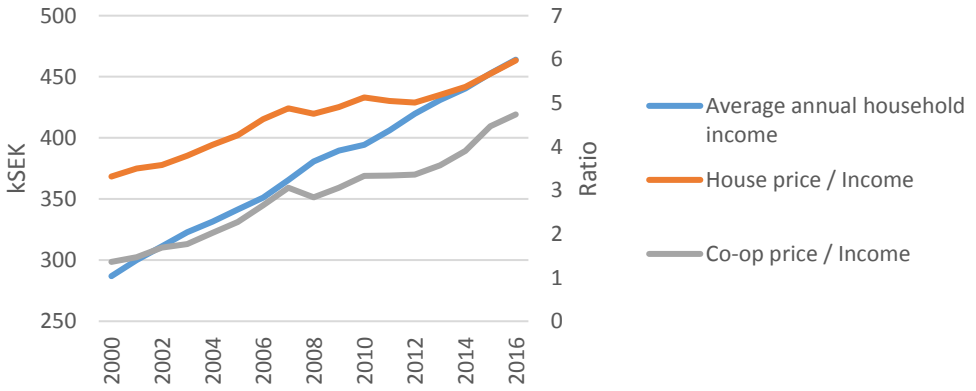
[1] RP & JN can be reached at swedishhousingmafia@gmail.com. Version: December 20, 2017

Introduction

Swedish house prices have been rising steadily over the last decade, the extent of which is illustrated by the chart from OECD below[2]. It shows that the ten-year increase exceeds that of most relevant peers. This purpose of this text is to explain some factors behind this trajectory, for Sweden in isolation. The topic is timely since we are currently (December 2017) in the early stages of a slowdown in the housing market, and interest in the subject has increased significantly in the last months. In general, we think the answer lies in credit expansion and, for Sweden in particular, in aggressive (possibly imprudent) lending, a suboptimal tax code, but also, partly, in economic fundamentals.



Economic fundamentals and a shortage of housing is frequently used to explain the rapid increase in prices. Although we agree that economic fundamentals support some increase in house prices, we think it is an overly simplistic explanation. Looking under the hood of the economic data we see that population growth has been mostly driven by low-income or unemployed immigration, who can never afford housing at current prices, the liquid savings rate is barely positive and GDP growth is largely driven by construction and consumption. Instead, leverage has grown more than can be explained by disposable income and population growth; and we are inclined to think that the reason lies there. As we can see in the graph below, price to income *ratios* for houses and co-ops have risen by 80%[3] and 250%[4] respectively since 2000, faster than income itself at 60%[5]! (We have used SCB data assuming 1.6 individuals per household and a 3% rise income between 2015 and 2016.)



[2] https://stats.oecd.org/Index.aspx?DataSetCode=HOUSE_PRICES

[3] http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__BO__BO0501__BO0501B/FastprisPSRegAr/?rxid=d48aafd4-03ee-497b-b355-13c5e02c7910

[4] http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__BO__BO0501__BO0501C/FastprisBRFRegionAr/?rxid=05148ccf-e484-415a-9dbd-18b06e60b1d4

[5] http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__HE__HE0110__HE0110A/InkAvTjanst/?rxid=e4b33e4f-58e9-4225-95da-1122fb398d02

As you can imagine the picture is even worse in Stockholm (Stockholms kommun, or council). There, the price of the average house is SEK 7.1m[6], while the average co-op costs 4.3m. With 10% of inhabitants in houses, 55% in co-ops and the rest in rentals the average dwelling price is roughly 4.75m[7]. The average annual household income in 2016 was 555k (again assuming 1.6 adults and an average annual income of 360k) meaning that the average price-to-household income ratio ends up at 8.25. Of course, some global city centres have a higher ratio, like Sydney (12) or Hong Kong (18), with Stockholm barely making the top 10. First of all, we're looking at price to *gross* income; Sweden has higher taxes than pretty much any other country, so looking at disposable income would push Stockholm higher. Also, these cities tend to have some form of foreign "safe-haven" status for offshore investors. Of course, we suspect the valuations in all these cities are unsustainable in the long-run.

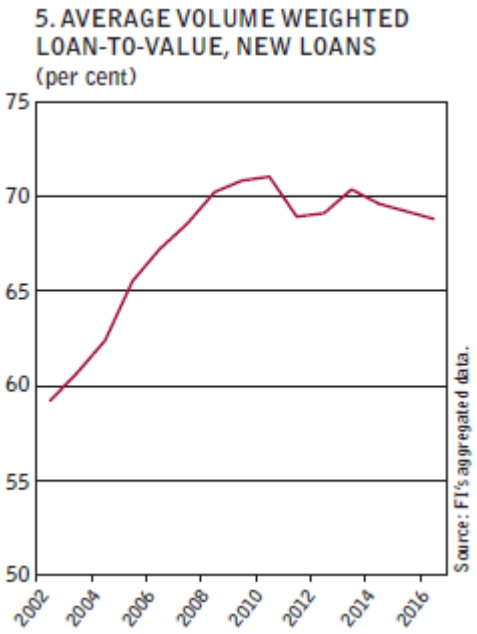
The overarching theme of this piece is that the system has been highly geared on multiple levels to maximise mortgage leverage. Low lending standards, poor mortgage regulation, with little or no regulation of loan duration, combined with efficient debt recovery enabled by a highly organised social security system, seasoned with tax incentives through interest deductibility and capital gains deferrals, creates an environment where banks are highly incentivised to provide leverage to consumers, while consumers are able and happy to take it on. And, as house prices have always gone up, everyone has been a winner! With rising prices, banks have seen an improvement in their collateral levels, allowing them to extract higher profit margins via cheaper funding, further increasing their appetite for mortgages, while consumers have either been forced to use more leverage due to higher prices, or happy to speculate in a 'sure thing'. Most households have watched their (paper) wealth go up uniformly, for many starting at almost non-existent liquid wealth, into the millions, driving consumer sentiment, spending and speculation. This self-reinforcing process can go on until prices become so high that the marginal buyer cannot afford the leverage, new marginal sellers appear due to unemployment, for example, or construction becomes so profitable that new-builds start exceeding demand. Regulation could also alter the equation in some other way. We believe there is a high likelihood we are at that point in the cycle where some, or all, of these forces start acting in concert to bring prices lower.

Our aim is to illustrate some of the system's excesses and hidden risks that we think are misunderstood, or even unknown. If we were to 'curate' the contents of this piece for the reader to grasp the narrative and find the most interesting ideas, we recommend 'lending standards' (which should be well-known), 'recourse', 'savings rate', 'the process and economics of new-builds' and 'covered bonds'. Some of the other sections, admittedly, are mainly included for completeness, such as 'tax code' and 'economic fundamentals'. However, we do believe that these sections also contain some clues to explain the global dynamic and should therefore be of interest.

[6] https://www.maklarstatistik.se/omrade/riket/stockholms-lan/#/villor/tabell available in Swedish only
[7] https://www.maklarstatistik.se/omrade/riket/stockholms-lan/#/bostadsratter/tabell available in Swedish only

Lending standards

The government bank[8]: One explanation for the low lending standards is the existence of the government mortgage bank, SBAB (English SCBC), which has been at the forefront of easy lending and low rates. The political argument has been that it should encourage competition in an otherwise consolidated, quasi-oligopolistic, market. As an example, up until the beginning of the 2000s, banks differentiated between co-ops and single-family houses, as the latter is tangible property while the former is just a membership in a club. Borrowers with a co-op were offered lower LTVs and higher interest rates. One reason is that the co-op association itself is often levered, which is an off-balance sheet liability for the member. SBAB was the first bank to ignore this differentiation, and the other banks soon followed suit to avoid losing market share.

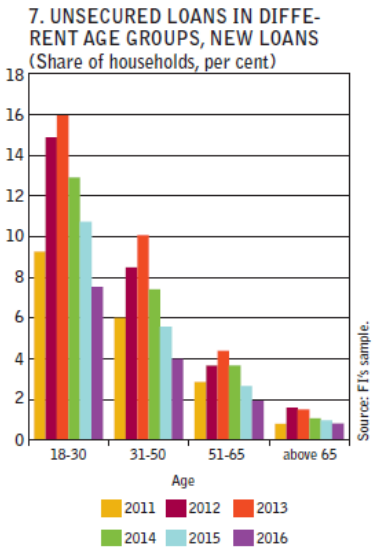


SBAB was also at the forefront of allowing higher LTVs, first increasing it from 70% to 75% in the summer of 2003. Then, in 2005 they increased it again to 95% while also lowering the interest rate on the entire loan. Before this, the mortgage usually consisted of two parts, the 'bottom' and the 'top'. If the property was worth 100, the bottom loan would be the first 75, with a lower rate of interest, while the 'top' 20 would have a significantly higher rate. SBAB removed this distinction and allowed the lower rate on the entire mortgage. Needless to say, the other banks quickly followed, again.

KALP: Swedish banks lend money based on a calculation called "KALP", an acronym for the Swedish words "Kvar att leva på" (what remains after basic expenses). The formula's output is the net income remaining after a borrower has paid necessary living expenses, which should cover a stressed interest rate of, say, 7%. It's up to the bank to decide the stress-rate (typically the five-year fixed rate plus 3%) and, also, which costs are considered necessities, as long as it meets the definition of minimum living expense as defined by the department of consumer protection. The banks submit their assumptions to the Financial Supervisory Authority (Finansinspektionen, FI) on a regular basis to ensure some level of realism, but the leeway is still significant.

Up until recently there was no consideration of loan-to-income ratios. Most banks claim that they apply a Debt-to-income maximum of around 5-600%, but the data tells a different story as we shall see shortly.

An LTV cap of 85% was introduced in October 2010, which means the mortgage cannot exceed 85% of the purchase price. The final 15% can still be borrowed, either in the same bank, or, separately, from another bank/consumer lender. The graph on the right shows the share of households per age group that have taken out an unsecured loan from the same provider that underwrote the secured loan. Hence these numbers underestimate the real picture[9]. Prior to the introduction of the LTV-cap, the mortgage was usually divided into two parts, as described



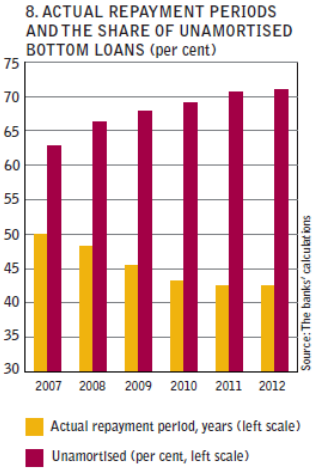
Note. Share of households in each age interval that have taken an unsecured loan.

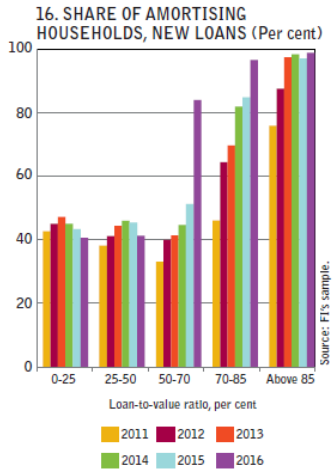
[8] https://www.riksgalden.se/globalassets/dokument_sve/om_riksgalden/rapporter/ovriga/drivkrafter-bakom-hushallens-skuldsattning.pdf

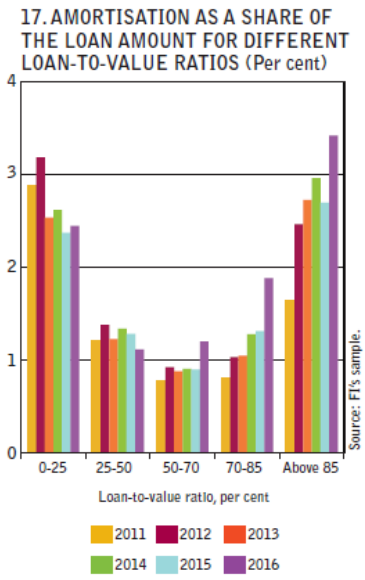
[9] http://fi.se/en/published/reports/swedish-mortgage-reports/the-swedish-mortgage-market-2017/

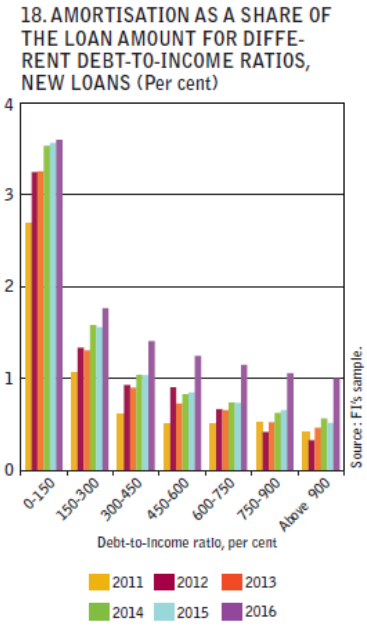
above, “top” and “bottom”. According to data from SCB, unsecured loans have increased from SEK100bn in 2002 to 231bn in 2017[10]:

According to the below figures from Finansinspektionen, interest-only “bottom” loans grew from 63% in 2007 to just above 70% in 2012 (Fig. 8). However, following the amortization requirement introduced in 2016, the share of amortizing households have risen significantly[11] (Fig. 16). Also, newly built properties are legally exempt from amortizations during the first 5yrs, but the banks can still demand amortization for them at their discretion.





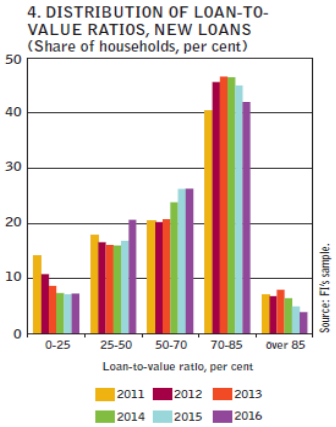


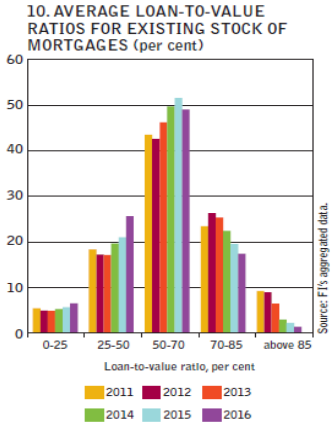


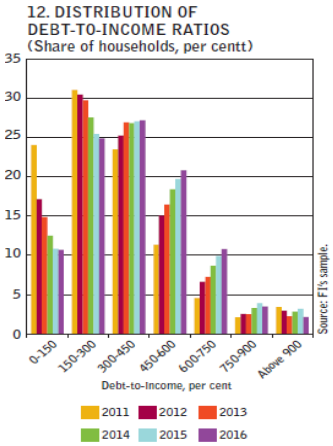
[10] https://www.scb.se/en/finding-statistics/statistics-by-subject-area/financial-markets/financial-market-statistics/financial-market-statistics/

[11] Figure 8: http://fi.se/en/published/reports/swedish-mortgage-reports/the-swedish-mortgage-market/
Figure 5 and 16: http://fi.se/en/published/reports/swedish-mortgage-reports/the-swedish-mortgage-market-2017/

The amortization requirement of 2016 stipulates an annual amortization of 2% for LTVs between 85% and 70%, dropping to 1% annually between 70% and 50%, and thereafter 0%. The LTV can be recalculated every five years. I.e. if the price has changed over the five years since the property was bought it is possible to "restrike" the LTV. While the share of amortizing households has increased, the level of amortization is still low as is evident from Fig 18[12]. While Fig. 17 is more encouraging as it indicates that high-LTV borrowers amortize the most, shortly followed by low-LTV-households. Fig. 18 paints a different picture. Households with high debt-to-income ratios amortize a lot less than those with lower debt-to-incomes (DTI) probably because their finance are already stretched. And of these two, DTI seems more relevant to us, as the asset value fluctuates wildly while the debt only shrinks via amortization. One would like to see the combination of Figs. 17 and 18; what sort of LTVs do high-DTIs have, and how much do they amortize. Unfortunately, that data is not readily available, but it would be surprising if high-DTIs with high-LTV are amortizing a lot, given their low income and constrained financial position. As can be seen in Fig. 12 DTI has risen recently [13]. From Figs. 4 and 12 we see the evolution of LTV for both existing and new loans. Encouragingly the share of new LTV loans above 85% seems to be going down, probably due to regulation, but the same effect for the existing stock is more questionable given the increase in collateral values. On an absolute level, about half of new loans have LTVs above 70%, which still seems rather high to us, especially since some of these loans are not genuinely new, but *refinanced* (which happens on average every 4-5 years), meaning that they are actually existing loans with a lower entry price for the collateral.







[12] http://fi.se/en/published/reports/swedish-mortgage-reports/the-swedish-mortgage-market-2017/

[13] http://fi.se/en/published/reports/swedish-mortgage-reports/the-swedish-mortgage-market-2017/

The graphs on the right are informative with respect to risks[14]. We have LTV on the x-axis and DTI on the y-axis; it is clear that banks are very aggressive on both measures, although 2016 looks a little better than 2015.

Each dot is one household. The graphs show that banks are willing to lend money on almost any debt/income and LTV-combination; even at 85% LTV there are quite a few dots above 600% debt-to-income ratio. We suspect strongly that these lending standards are a result of the almost negligible default risk, which is ensured by the fact that the bank can access all the borrower's future income in Sweden via the enforcement agency. However, the LTV is important in relation to bank's funding via covered bonds, more on that later.

From our perspective, you don't need to look at anything else to understand that lending standards in Sweden are not particularly strict, although there is likely large variation between different mortgage providers.

DIAGRAM B2. Sample 2016: Relationship between loan-to-value ratio and debt-to-income ratio, new loans

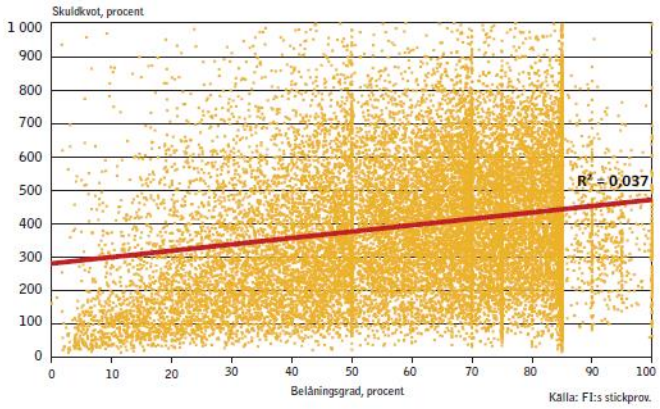
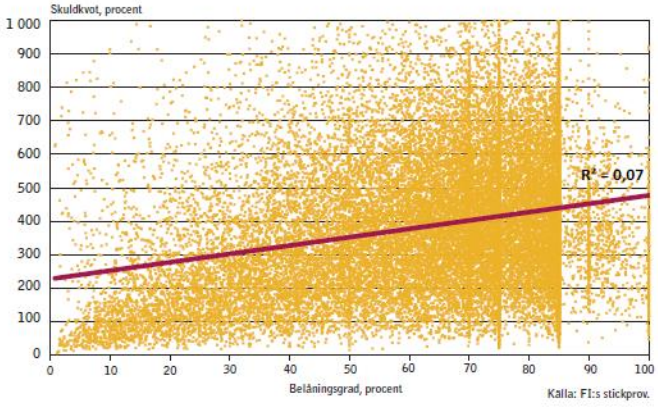
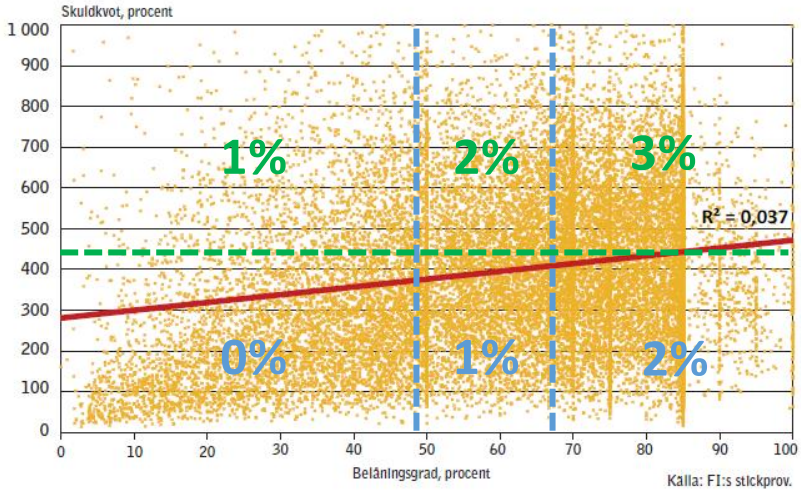


DIAGRAM B3. Sample 2015: Relationship between loan-to-value ratio and debt-to-income ratio, new loans



<u>The new amortization proposal:</u> In early November Finansinspektionen proposed a stricter amortization schedule which incorporates a DTI-parameter to the government. The essence of their proposal is that highly levered borrowers should delever faster. The government approved the proposal on Nov 30th.

The blue numbers in the figure to the right is the current legal requirement while green represents the new proposal, basically adding 1% of amortization for borrowers with loans exceeding 4.5x of their income. The proposal is due to become effective in April 2018.



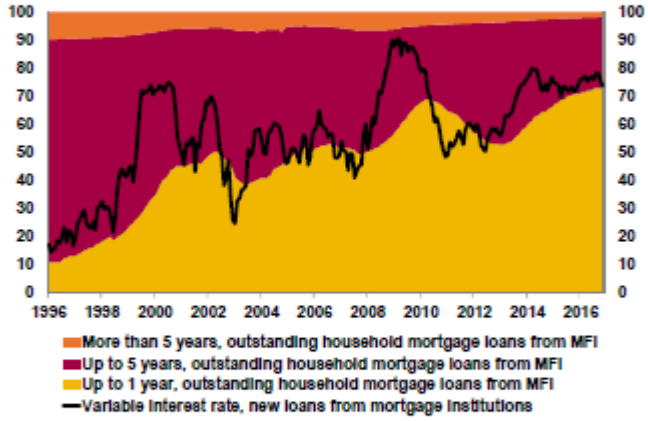
[14] http://fi.se/en/published/reports/swedish-mortgage-reports/the-swedish-mortgage-market-2017/

Form of credit: In 2006, roughly 50% of all mortgages were floating-rate; in 2017 that number is 73%. The remainder are fixed-rate, with up to 5yrs tenor, and almost none of longer tenor[15].

There is no requirement from the banks to have a portion of the mortgage at a fixed rate. In fact, borrowers are incentivized to take out floating rate mortgages as a fixed loan ties the borrower to the bank, and potentially incurs a hefty charge upon early termination. Also, there is no benefit given to the borrower should rates go up, creating an incentive asymmetry which pushes borrowers to floating rate agreements. Needless to say, interest rates having been "lower for longer" since the financial crisis has also discouraged most consumers to pay away the extra "insurance" premium to secure the level of their cash outflows via a fixed rate.

Diagram 1. Percentage of mortgages with different original interest rate adjustment periods

(Per cent)



Note: MFI is short for monetary financial institutions. The distribution of interest rate adjustment periods in the lending from MFIs prior to 2003 corresponds to the distribution in loans from mortgage institutions with constant shares of fixed loans with up to 5 years' and over 5 years' interest rate adjustment periods.

Source: Statistics Sweden and the Riksbank.

Loan recourse: Sweden has one of the most rigorous social security systems in the world and each citizen is identified by a personal ID-number, consisting of date of birth and a four-digit code, used by all government agencies and throughout the economy for identity verification. This number allows for individuals to be tracked very efficiently throughout their life.

A mortgage is not only secured by the collateral, as in many other countries, but also guaranteed by the borrower personally. As long as the bank can keep track of the borrower, through their personal ID, the risk for default is fairly low. That is, the bank can pursue the borrower until death does them part.

The Swedish Enforcement Authority is notoriously successful in collecting debts by liquidation, and only the Netherlands do it better[16]. The average liquidation period is 1 year, the cost is 9% of the estate and the efficiency is 86%. The enforcement agency can even collect money directly from the company paying the debtor's salary, again possible because of the personal ID-number.

For a debtor not able to meet payments there is one solution besides death or migration; reconstruction. This means living on minimum wage for 5 years, after which the debt is written off. This is, of course, a final resort and not something people would be willing to do in case there are other options.

Given the low likelihood of default, the banks can be very aggressive when lending money, which has led to a market where, in practice, the loan notional is determined by the KALP-calculation, more or less the same for all banks, with the floating interest rate as the only variable of negotiation.

[15] http://fi.se/en/published/reports/fi-analysis/2017/fi-analysis-9-households-interest-rate-adjustment-periods--an-economic-vulnerability/

[16] http://www.doingbusiness.org/~/media/WBG/DoingBusiness/Documents/Methodology/Supporting-Papers/DB-Methodology-Debt-Enforcement-around-the-World.pdf?la=en

Tax code

Income taxes: From 2006 to 2014 Sweden had a right-wing government (a coalition of right wing parties named Alliance for Sweden). An individual living in Stockholm earning SEK 30k pre-tax in 2006 received 20.5 post-tax, in 2014 that had increased to 23.5k, an annual increase of 1.7%. In 2016 the post-tax income decreased to 23.4k. Below average earners were the big winners of the right-wing tax reform; a person earning 100k per month pays an effective tax rate of 44%. This increase in disposable income is likely an important reason for why, especially low-income, households have increased their leverage lately, further enabled by low interest rates.

Property taxes: In 2008, the right-wing government removed the personal property tax which was an annual tax of roughly 0.75% of the property's value, capped at 4% of the household income. Currently, there is a municipal property tax which is capped at SEK 6k (ca $750) for single-dwellings and SEK 1.2k for apartments, annually. Stamp duty is only applicable for single-dwelling houses to the tune of 1.5% per transaction.

Deductibility of interest rate expenses: Interest rate costs are 30% tax deductible up to SEK 100k and 22% above SEK 100k. During 2017 this is deduction is expected to cost the government roughly SEK 20bn, highly correlated to the floating rate as 73% of all loans are floating. There have been political discussions of removing this deduction, but so far no decision has been made, nor is it imminent.

Capital gains tax: In combination with removing the personal property tax in 2008 the government raised the capital gains tax from 20% to 22%. However, capital gains can be deferred at an annual cost of 0.5% of the capital gain or, in effect, 2.25% (0.5%/22%) of the actual liability. Payment of the tax can be postponed as long as you buy a more expensive property. The annual rate of 2.25% is, higher than the average mortgage rate, but, since paying the taxes comes directly out of the equity, deferring the tax is still a popular option. In 2009 2.76million Swedes owned their property, of these 595k had deferred tax, averaging SEK 91k per person. In 2015 the equivalent numbers were 2.97million owners, 627k deferrals, with an average deferred tax liability of SEK 100k. Using an 85% LTV on deferred tax of 100k translates into roughly 670k in additional purchasing power. Through this tax deferral the government effectively acts as an unsecured equity lender to the housing market.

Forecast: According to SKL's ("Sveriges Kommuner och Landsting", i.e. "Sweden's Municipals and County councils) report[17] on municipal and county finances the structural challenges faced by the local government sector are greater than we have seen in the last period of fifty years. The base line is that debt as well as taxes needs to increase in order to finance the shortfall of income.

	Outcome		Forecast	Estimate		
	2016	2017	2018	2019	2020	2021
Average tax rate, %	**32.09**	**32.11**	**32.15**	**32.98**	**33.68**	**34.46**
municipalities, incl. Gotland	20.74	20.75	20.75	21.29	21.78	22.32
county councils*, excl. Gotland	11.41	11.42	11.46	11.76	11.96	12.21

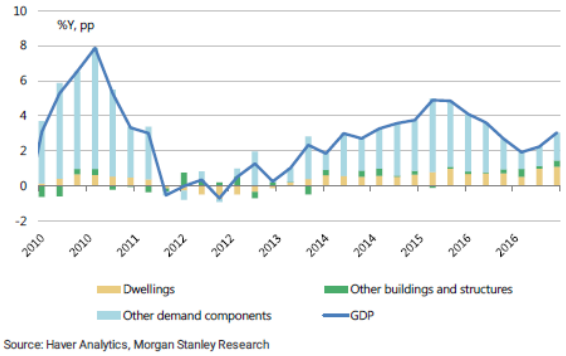
The interested reader may do well to read the SKL report as well as Kommunivest's report[18] on the debt. The total debt is circa SEK 600bn of which 35% has a maturity shorter than 1yr, the debt is expected to increase by 30 to 50bn annually in the coming years and set to reach 1000bn around 2025.

[17] http://webbutik.skl.se/sv/artiklar/the-economy-report-october-2017.html
[18] http://kommuninvest.se/wp-content/uploads/2017/11/Local-government-debt-2017.pdf

Economic Fundamentals

GDP growth: Sweden has shown impressive growth for the past couple of years outperforming most other developed countries. 2017Q3 GDP growth was 2.9% and is set for something similar for the full year. Roughly 1% comes from construction with construction investments up 20% yoy, but we think it's fair to assume that construction will not be up by 20% in 2018. Another 1% comes from consumer spending, which historically has had a very high correlation to real estate prices, possibly due to the wealth effect of property prices and the level of leverage of the average homeowner. Or, perhaps, simply because of general economic prosperity correlates with both. The final percent is made up of exports and other sectors. We don't think it's particularly unlikely that construction evens out at these high levels, i.e. no growth from that sector, while consumer spending could be flat to down, i.e. growth of 3.1% in 2017 could easily turn into 1% in 2018 and beyond.

Exhibit 17: Almost half of GDP growth in 1H this year was due to growth in construction investment



Source: Haver Analytics, Morgan Stanley Research

The Swedish labour market: As long as people are employed they will most likely pay their mortgage, especially with the low level of interest rates and amortization. In order to get a sense for how likely it is that people will lose their jobs we need to consider the composition of the labour market. In 2013 the labour force stood at 4.2m[19], 1.5m of these were, in one way or another, employed by the government, while around 1.3m, or 30%, were employed in either construction (525k) or consumer spending (785k). Given the high dependence of growth on construction and consumer spending it is possible that some of these jobs could disappear as the pace of construction slows and consumer spending follows the recent drop in property prices.

Population growth: At the beginning of 2006 Sweden's population stood at just above 9 million; at the end of 2016 this number was just short of 10 million[20]. Immigration accounts for a 1.240m increase (with 840k of these since 2010), emigration accounts for a 530k reduction, and the rest is explained by net

Country of Citizenship	Immigration	Emigration	Net	% of net	GDP per capita relative to Sweden
Syrian Arab Republic	120,355	666	119,689	16.9%	5.4%
Iraq	70,186	5,029	65,157	9.2%	8.8%
Somalia	54,681	3,619	51,062	7.2%	#N/A
Poland	59,525	12,346	47,179	6.7%	26.0%
Eritrea	34,440	403	34,037	4.8%	1.7%
Stateless	33,122	840	32,282	4.6%	#N/A
Afghanistan	30,568	610	29,958	4.2%	1.1%
Thailand	24,571	3,297	21,274	3.0%	11.7%
Iran (Islamic Republic of)	21,484	4,399	17,085	2.4%	8.4%
Romania	21,133	4,448	16,685	2.4%	20.5%
China (excluding Hong Kong)	27,336	11,845	15,491	2.2%	16.2%
Germany	28,371	13,587	14,784	2.1%	82.3%
Turkey	17,318	3,986	13,332	1.9%	19.3%
Serbia	14,026	995	13,031	1.8%	10.5%
India	24,444	12,117	12,327	1.7%	3.4%
Lithuania	13,056	2,737	10,319	1.5%	31.7%
Russian Federation	12,168	2,387	9,781	1.4%	18.4%
United Kingdom	18,208	9,311	8,897	1.3%	69.3%
Sum	624,992	92,622	532,370	75.3%	8.9%

[19] http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__NV__NV0101/FDBR07/?rxid=9a4366f9-8152-40fe-95ea-0cedfd12afc4

[20] https://www.scb.se/en/finding-statistics/statistics-by-subject-area/population/population-composition/population-statistics/

births. We can grasp the demographical changes by looking at the country composition of immigration/emigration in the table on the right, ordered by net immigration from 2006 to 2016. Swedes are the only citizens leaving Sweden, (immigration 210k, emigration 274k), more or less all other nationalities have a net inflow to Sweden.

As can be seen in the right most column[21] Sweden is mainly taking on immigrants from very poor countries compared to Sweden, none of the major immigrant groups come from a country with a higher GDP per capita than Sweden.

Immigrants entering the workforce: The majority of immigrants spend the first 2 years in school, learning Swedish and/or improving their skills. Of immigrants that arrived in 2000, 43% of men and 26% of women were employed by 2005. 50% of the men were employed by 2006, it took until 2012 for women to reach the same level of employment. At the end of 2015 64% of the men were employed and 59% of the women. The same numbers for indigenous Swedes were 83% for men and 82% for women[22]. In 2013 the average annual disposable income for immigrants above 20 years old was SEK 174k, while for native Swedes it was 230k, 32% higher[23]. According to SKL[24], up until 2025 the number of people aged between 15 and 74 years who live in Sweden and were born in the Nordic region will decrease by about 100,000 at the same time as the number of people in the same age group who come from other countries will increase by 455,000. Given what we saw above, with Swedes being the only net emigrants, we argue that it is fair to assume that the emigrants have been replaced by immigrants earning a lower income.

Disposable income and credit growth: 2006 to 2015 the median disposable income, per consumption unit, grew from SEK 173k to 220k. The bottom 10% grew from SEK 81k to 93k, the top 10% from SEK 421k to 584k[25]. In 2015 about 77 000 people, or about 1% of the population[26], had a taxable income above SEK 1m showing that the income distribution is rather flat. The total disposable income has grown more due to population growth. Since lending standards (KALP) only relies on

- Disposable income
- Living expenses
- Stressed interest rate
- Amortization (since 2016)

it is easy to deduce that, with a 58% increase in total disposable income since 2006, a 2% reduction in interest rates and an increase in living expenses of only 30%[27], the borrow capacity has more than doubled (+135%). In fact, the actual numbers are even worse; total mortgage debt in January 2006 was SEK 1210bn[28] while, as of November 2017, it stands at 3080bn, an increase of 155% (it doubled by July 2014). This difference can, of course, not be explained by the population growth of 10%.

[21] http://www.imf.org/external/pubs/ft/weo/2017/02/weodata/weoselgr.aspx Syria numbers since 2010, as no later data is available

[22] https://www.scb.se/sv_/Hitta-statistik/Artiklar/Flyktingars-vag-in-pa-svensk-arbetsmarknad/ Available in Swedish only

[23] https://www.scb.se/en/finding-statistics/statistics-by-subject-area/household-finances/income-and-income-distribution/income-and-tax-statistics/

[24] http://webbutik.skl.se/sv/artiklar/the-economy-report-october-2017.html

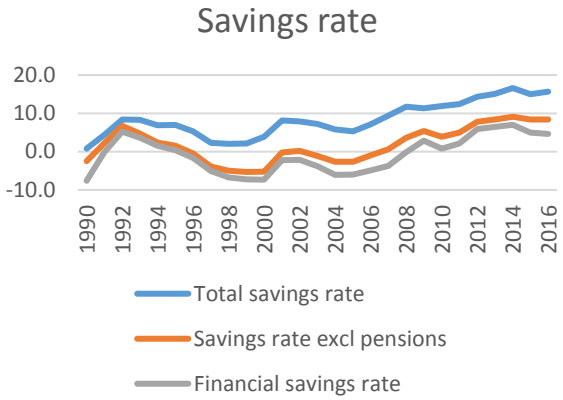
[25] https://www.scb.se/en/finding-statistics/statistics-by-subject-area/household-finances/income-and-income-distribution/income-and-tax-statistics/

[26] https://www.di.se/nyheter/lista-sa-manga-har-miljonlon-dar-du-bor/ available in Swedish only

[27] http://fi.se/sv/publicerat/rapporter/bolanerapporter/utvecklingen-pa-bolanemarknaden-20086/ available in Swedish only
http://fi.se/en/published/reports/swedish-mortgage-reports/the-swedish-mortgage-market-2017/

[28] https://www.scb.se/en/finding-statistics/statistics-by-subject-area/financial-markets/financial-market-statistics/financial-market-statistics/

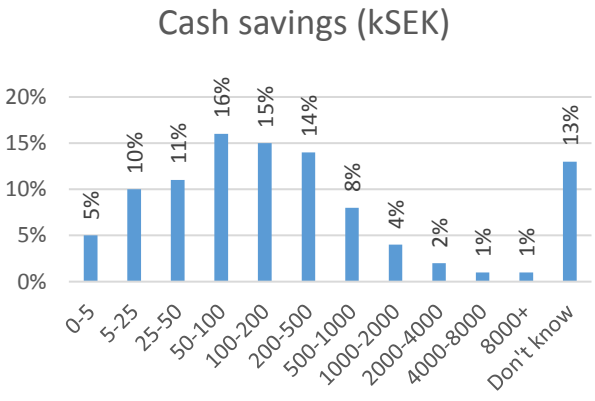
Savings rate: Sweden is often praised for its high savings rate; in fact the total savings rate is now at all time high[29]: Some commentators argue that this cushions any instability in real estate markets.



However, looking behind headline figures we are not convinced. First of all, we believe that the *financial savings rate* is most relevant out of the official metrics, i.e. the savings rate excluding pensions and houses but including co-ops. A pension, of course, cannot be easily liquidated to meet short term liquidity problems, neither can a house. In order to adjust this figure to exclude co-op memberships we can look at official statistics from SCB (Statistics Sweden, the official agency) showing that the total disposable income between 2016Q2 to 2017Q2 was around SEK 2100bn. From their data we also know that mortgages backed by co-ops have grown by SEK 100bn per year in 2015 and 2016. Given that new loans have an LTV of roughly 70% we can deduce that the total equity investment into co-ops is circa SEK 42bn, or 2% of the total disposable income. The financial savings rate for 2016 was 4.6%, but removing the co-op element we end up at 2.6%, which is a much lower number. This translates to an average of SEK 12k per household and year, but the distribution is probably quite skewed.

About 38% of Swedes live in rentals, the rest in houses or co-ops. If we assume that the "homeowners"[30] account for 75% of the savings (probably a conservative assumption given the tight wage distribution), the 2.6% in cash savings translates to 54.6bn, or for homeowners 41bn. Given the total mortgage debt of 3080bn (of which 73% is floating), unsecured debt of 75bn (300bn in total but we assume only 25% belongs to "homeowners") and floating co-op debt of 225bn adding to grand total floating rate debt of 2550bn we find that a mortgage rate increase of roughly 2.0% (i.e. from 1.5% to 3.5%, including a 30% deduction) would effectively wipe out all cash savings. If the tax deductibility is removed, without introducing other tax cuts, the 2% would drop to 1.5%. Even if we assume that the "homeowners" account for 100% of the savings they can still only manage an increase of 2.7% (1.8% without deductibility) before the cash savings rate turns negative.

Distribution of cash savings: The total savings rate is a useful metric, but we fear that looking at aggregate numbers can be misleading when determining the robustness of the marginal buyer/seller. To illustrate the distribution of savings we have found the following survey from SBAB[31]. We see that 42% of all respondents have less than SEK 100k in cash savings, and another 13% have no clue what their cash savings are; we are inclined to assume that their savings are below median. The points is that, while aggregate numbers for savings are (somewhat) positive, depending on your exact definition, there are many individuals or households with low, or no, liquid assets. These are the likely marginal sellers in a decreasing market, possibly due to unemployment.



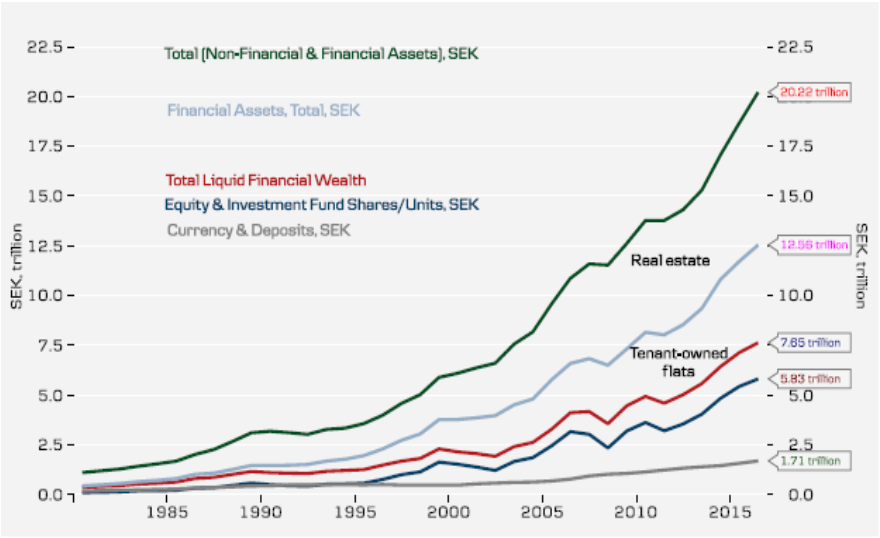
[29] http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__NR__NR0103__NR0103C/SektorENS2010KvKeyIn/?rxid=d569d6c7-b8fe-4033-bb36-6efe84e3ffbf

[30] Our view is that owning an asset financed with a high LTV, floating rate mortgage and 100yrs+ amortization period is more like renting from the bank rather than owning, hence quotation marks

[31] https://www.sbab.se/download/18.3a166f6515a1662498f1b3/1486568518795/170209+Inl%C3%A5ning+och+sparande.pdf available in Swedish only

Household balance sheet: This graph shows total assets for all households. The liquid assets account for roughly a third of total assets.

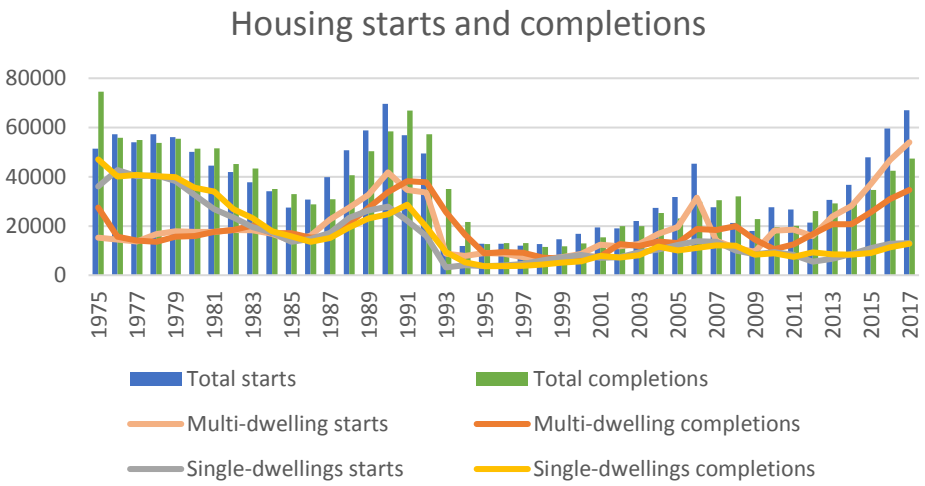
Since Sweden removed the taxation on wealth in 2007 there is currently no up-to-date data on wealth distribution. As of 2007 the top 1% owned 32%, the top 10% owned 71% of the financial assets, while the distribution of liquid financial assets were even more skewed. So while the aggregate numbers look good, we reiterate that it's the marginal buyer/seller who sets the price, not the average.



Source: SCB

Building starts and new builds

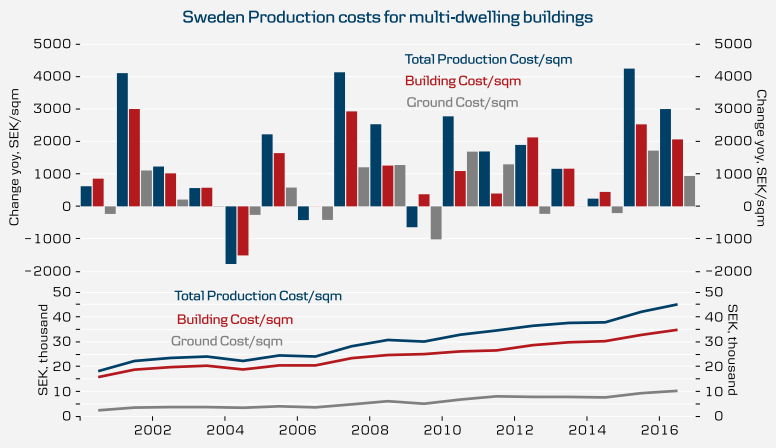
Building starts: In 2006 building starts were roughly 45k; 31.5k multi-dwellings and 13.8k single-dwellings. During the first three quarters of 2017 building starts reached 49.8k, of which 40.1k were multi-dwelling and 9.7k single-dwelling. If we assume building starts are linear over the year (they are not, usually they are larger in Q4) that would mean an annual pace of 54k and 13k respectively, summing up to 67k[32]. Housing starts lead completions by about 12-24mths so have only yet begun to see the effects of the increase in supply



As can be seen in the graph above multi-dwelling starts are outpacing single-dwelling starts by roughly a factor of 3.5x. Urbanisation is part of the answer, but a more sinister thought is that builders, and less informed prospective buyers, prefer multi-dwellings because of the double balance sheets of the individual and the co-op association. This enables the builder to extract a higher price, but with a low

[32] http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__BO__BO0101__BO0101A/LagenhetNyKv16/?rxid=3d664f4e-2e2c-453d-9770-542eeb4f27da

price tag to the prospective buyer, by piling up debt in the housing cooperative. The same feature makes it attractive to the prospective buyer as the price tag is lower and the debt of the co-op association is not accounted for in the KALP calculations, more on this below.



Construction costs: From 2006 to 2016 the construction cost per square meter increased from SEK 22k to 42k, with Stockholm leading at 49k. Since Stockholm accounts for roughly 40% percent of all new builds, that means that the average price ex Stockholm is around 37k, effectively prohibiting the production of any sort of affordable housing. From 2006 to 2015 the construction cost decreased in 21 of EU's 28 members, but not in Sweden. Sweden currently holds the top spot as the most expensive country for construction in the EU with a staggering price level of 66% above the average[33]. Building in the notoriously expensive Norway is cheaper than in Sweden, with Norway clocking in at 54% above the EU average[34]. Some of this increase reflects an increase in the price of land, which is currently circa 10k on average per sqm. But we suspect that the bulk of the cost differential reflects above-average margins for construction companies and their suppliers (including land owners) due to the elevated pricing of their end-product, as we cannot obviously see why input costs should be meaningfully higher than the EU average given the free mobility of labour and goods.

Process for buying a newly built property: The prospective buyer usually signs a booking agreement roughly 2 years before the expected move-in date and pays a booking fee in the order of SEK 10-100k depending on the size of the object. When the builder has signed up 60% of the properties, banks extend construction loans. The down payment of 10% is usually not paid until a couple of months before the move-in date, which is when the sale agreement is signed. The booking agreement between the builder and the buyer is, in theory, legally binding, but this has proven hard to exercise in practice. Hence there are examples of builders reporting negative numbers of sold units (e.g. Oscar Properties).

Consider the leverage of entering a booking agreement, paying SEK 50k upfront, to get long an apartment with a fixed price of SEK 5m (at a slight discount to prevailing market prices), with delivery in 2 years - in a market that has been going up by 10% a year! There is very little data about this kind of speculation, but given the incentives, and a few anecdotes, we would be surprised if there haven't been a few clever punters exploiting this opportunity on a large scale[35].

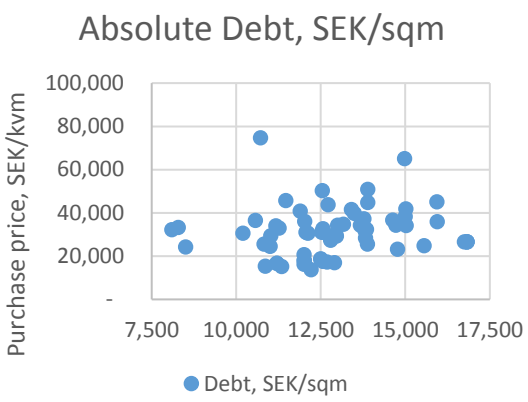
Economics of newly built co-ops: Multi-dwellings account for 80% of all housing starts; half are co-ops and the other half rentals. The Swedish version of a co-op is like a member's club were the members are jointly and severally liable for the debts of the co-op. (There are also other forms of ownership in a multi-dwelling, but these are negligible in comparison.) The buyer of a co-op does not buy the housing unit as such, but rather a membership in the club. The membership fee is determined by the financial situation of the co-op, driven by two major items, maintenance and interest rate costs. The developer presents an economic plan for prospective buyers to read before deciding on whether to buy the membership. The membership fee is almost always decided so that the co-op will have a zero liquidity

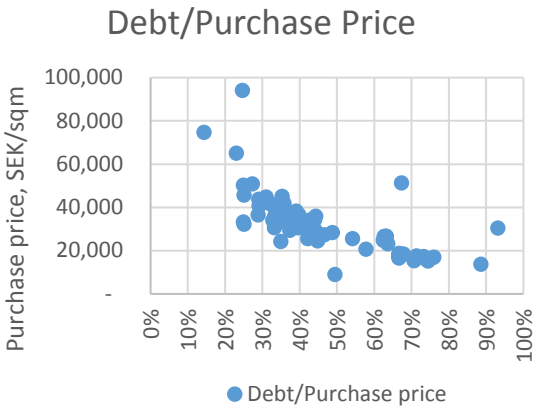
[33] http://www.gp.se/nyheter/sverige/sverige-bygger-dyrast-bost%C3%A4der-i-eu-1.4163461 available in Swedish only

[34] http://www.gp.se/nyheter/sverige/f%C3%A4rska-siffror-sverige-v%C3%A4rst-i-byggklassen-1.4591028 available in Swedish only

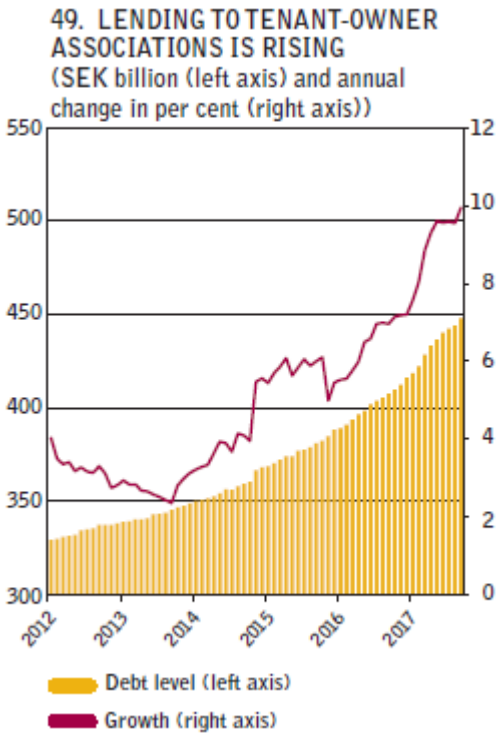
[35] ALM Equity CEO Joakim Alm estimates that they had speculative buyers of up to 40% in some projects, interview at Erik Penser Bank: https://www.youtube.com/watch?v=-C1gFYweAts watch from 15:30, available in Swedish only

position at the end of the year, i.e. the membership fees pay all the running costs. This, of course, means that the actual result of the co-op is negative as depreciation do not affect the liquidity. Hence, almost all new coops are running deficits. The co-op association can also have significant leverage of its own, and our investigation[36] shows that this is, on average, around 40% of the property value, or SEK 13k per square meter, for new-builds. It's also worth noting that both the developer-appointed interim board of the co-op and the accountant that approves the economic plan are paid by the builder. Does this sound familiar? Banks and rating agencies, perhaps.





Each dot represents a co-op. The absolute debt is interesting, but from a KALP-perspective we find the Debt/Purchase price-ratio more interesting, as this provides information about how large the co-op debt is in relation to the personal debt. The highly simplified KALP formula only takes personal debt into account, while the interest rate sensitivity of the co-op's debt is not included. A co-op leverage of SEK 15k/sqm is a lot, regardless of location, but in relative terms it matters less if the bank has approved a loan of SEK 85k/sqm for the individual, i.e. only neglecting 15% of the total debt burden. However, if the bank approved a loan of SEK 25k/sqm and neglected the15k/sqm of debt at the co-op level, that means they have ignored 37.5% of the total debt burden. In Denmark and Norway, the builder is legally obliged to state the "technical price" of a housing unit, i.e. including the co-op debt, which is not the case in Sweden. Hence, most prospective buyers are unaware of this hidden debt burden. In general, the chart confirms the intuition that cheaper apartments have a larger proportion of debt on the co-op level. On an absolute scale, however, we see that most observations fall in the 20-50% range of co-op debt-to-purchase price, which indicates that the KALP-lending frequently ignores 50% of the buyer's total debt-burden, assuming a 70% LTV. We suspect that this hidden leverage is a strong reason for the popularity of new builds and the construction boom, and also a potential source of instability in a downturn. Of course, we cannot claim that all banks ignore this off-balance sheet leverage; some in fact don't. But the marginal buyer only needs one, or perhaps a handful, of banks to receive financing at competitive rates.



[36] https://kortsikt.com/2017/09/08/gastkronika-dubbel-balansrakning-dubbel-risk/ available in Swedish only

Including the extra debt in the simplistic KALP formula, assuming a Debt-to-purchase price of around 40% for the co-op and a mortgage LTV of 85%, would reduce the average buyer's purchasing power by 32%!

The graph[37] shows that lending to tenant-owner associations (the members club) have risen quite a bit recently and annual growth has more or less doubled since 2016. Part of this increase is of course due to increased construction but we cannot help to consider why this coincides so well with the initial amortization requirement which increased the expense for the buyer, perhaps builders understood that piling debt into the co-op reduces the buyer's expense while maintaining high profit margins.

Even at these low rates, the interest rate cost (around 2.5% in our investigation) of the debt in the co-op accounts for about half the membership fee. These loans are hardly ever amortized; our investigation shows that the median repayment time is above 300yrs, with the distribution heavily skewed to even higher numbers; 30% of the investigated newly built co-ops have a repayment period above 1000yrs. One argument for this is that the co-ops have much longer fixed-rate loans than the members of the coop, but this is not really what we found; most of them have around 30-50% of their loans on floating and the remainder with a 3-5yrs tenor.

In general, the consumer protection in buying a co-op membership is virtually non-existent. During the spring of 2017 the results of a government investigation illustrated exactly these shortfalls and proposed a number of improvements:

1. The debt of the co-op must be clearly stated in the prospectus
2. Comparable key metrics, e.g. debt/sqm, interest rate sensitivity, amortizations etc
3. Standardized depreciation periods (as is the case for commercial properties)
4. Longer economical plan which has to be approved by an independent advisor
5. No more booking agreements, only sales agreements with down payment

All of these suggestions aim to increase the transparency of the transaction and to shelter the prospective buyer against unforeseen risks. In practice this will most likely increase membership fees for newly builds even higher and potentially reduce their attractiveness. If the proposal is approved it will come into force in the beginning of 2019[38].

Housing mismatch: One recurring argument against a price fall is that Sweden suffers from a housing shortage. We have not investigated this in detail, but Nordea offers a very good piece on the subject[39]. Their conclusion is that, while population has grown quite fast, the growth has mainly been through immigration and, as we have seen, these take longer to enter the workforce and, when they do, they earn less. So, while the population growth could support the argument that there is a lack of housing, the population growth happens mostly at the lower end of the disposable income distribution, which does not support higher prices. We cannot say whether there is a total surplus or deficit in housing, but either way there is a mismatch. Intuitively, given housing completions of ca 30k annually for ten years (totalling 300,000 new housing units), and a net increase in population in of 1 million over the same period, we don't see how the shortage could have increased meaningfully across the country, especially since immigrants tend to live in larger households (than the national average size of 2.7). Furthermore, since 70% of this population increase most likely are low-income immigrants, while the production cost of housing exceeds 40,000 per sq m (ie. far from affordable), it seems obvious to us that Sweden is only capable of producing the housing equivalent of a Rolls Royce, while the prospective buyer can likely only afford a second-hand Volvo. Of course, a supply shortage in lower priced housing can push prices higher across the spectrum, but if the corresponding supply response comes at the higher end, it leads to both lower prices and a misallocation of space, i.e. homelessness at the same time as empty apartments.

[37] http://fi.se/en/published/reports/stability-report/2017/stability-in-the-financial-system-20172/

[38] https://privatapengar.sevenday.se/2017/07/bostadsrattsutredningen-fem-forandringar-for-bostadsratter/
Avaiable in Swedish only

[39] https://e-markets.nordea.com/api/research/attachment/60876

Sweden has a set of laws regulating how much a landlord can charge a tenant in a rental[40] which, in essence, can be divided into two parts:

- Utility value analysis (sv Bruksvarde): The property is evaluated from a utility standpoint (accessibility, location, size etc. all affecting the valuation) and compared to similar objects. The rent cannot deviate too much from comparable objects. The rent is most often negotiated between the landlord and the tenant association (sv Hyresgästföreningen). Neither production, service nor management costs are included when deciding the utility value, meaning that it is rather unattractive for the private sector to build rental units.
- Temporary pricing of newly built rentals (sv Presumtionshyra): In July 2006 a new set of rules were introduced to increase construction of rental units by allowing higher rents during a fixed period, initially set to 10 years, later increased to 15 years in 2013. Under these rules the landlord has much more flexibility to charge higher rent for the first 15 years, which has led to increased production of rental units (now effectively half of all building starts). The rent still needs to be negotiated with a tenant association, but without forced utility value regulation. After the 10 or 15 years the utilityvalue-pricing will come back into play.

In essence the utility value rent is applicable for all rentals produced before 2006 (1.775m) while later production most likely has market pricing. Since 2006 about 110k rental units have been produced meaning that market rents at most account for 6% of all contracts. The annual pace between 2000 and 2005 was 6.6k while between 2006 and 2016 it increased to 10k, and for 2016 is stands at 17k. The new regulation has indeed led to increased production of rentals, but it is still a very small part of the total.

Looking at the bigger picture, the regulation of rents have led to a situation where demand for rentals far exceeds supply at the given price (for the pre-2006 stock). Also, the temporary nature of market rents for new builds has led to a disincentive to build rentals, resources instead being directed towards the construction of single family houses or co-ops that are tenant-owned. This construction has been financed by the banking system, thereby making banking system a surrogate landlord to a large part of the population. In that sense, this regulation has forced a lot of people to take out mortgages, essentially *renting* from the bank. The big losers are, as always, the weakest individuals of the economy; those that can neither access rental housing, nor receive financing from the banking system. Looking at numbers, Sweden's share of home ownership is roughly average around 70%, contrary to what one would think. But the point is that the regulation has created an important incentive asymmetry; mortgage debt has been the only way for many to get access to housing, which has pushed it beyond the optimal point.

Covered bonds and other financing

Covered bonds: One of the key sources of funding for the mortgage books of Swedish banks is the covered bond market. A covered bond is a secured instrument, guaranteed by the issuing bank, where the investor also has first lien on a pool of mortgages. It is therefore safer than an unsecured investment in the bank and, as such, commands a lower interest. It is almost like an asset-backed security, with the (big) difference that the bank is still liable for any losses. By Swedish law, the covered bond must meet certain criteria; for example the face value of mortgages pledged to the bond must exceed 102% of the face value of the bond, and the loan-to-value cannot exceed 75% for any of the individual mortgages. For curious readers the Riksbank has written an excellent survey of the market and its players[41]. In practice the banks typically define a pool of mortgages for their covered bonds, ensure that all these have LTVs below 75%, and then issue/retire covered bonds freely to meet their funding needs.

For one particular bank, Swedbank[42], the pool consists of mortgages with face value SEK 900bn, with an average LTV of ca 50%, and an outstanding amount of covered bonds of ca 520bn. The pool is

[40] http://www.boverket.se/globalassets/publikationer/dokument/2014/det-svenska-hyressattningssystemet.pdf available in Swedish only
[41] http://www.riksbank.se/Documents/Rapporter/POV/2013/2013_2/rap_pov_artikel_2_130918_eng.pdf
[42] https://www.swedbank.com/investor-relations/debt-investor/funding/covered-bonds/cover-pool/

therefore 73% over-collateralised (900/520=173%), well above the 102% legal requirement. The bank's total balance sheet amounts to ca 2000bn, with covered bonds constituting the second most important source of funding after deposits (800bn).

The structure is excellent for the profitability of banks, i.e. the ability to pay debtors and equity holders, as long as the collateral value is stable or increasing, because it reduces the cost of funding and therefore improves profit margins. Of course, the added margin for the more junior parts (debt and equity) of the capital structure could also be viewed as reflecting this leverage at the senior level. But we believe this is largely ignored due to the small first-order effect of a move in house prices. However, as the authors are permanently scarred by trading derivatives, we prefer to investigate higher-order risks as well.

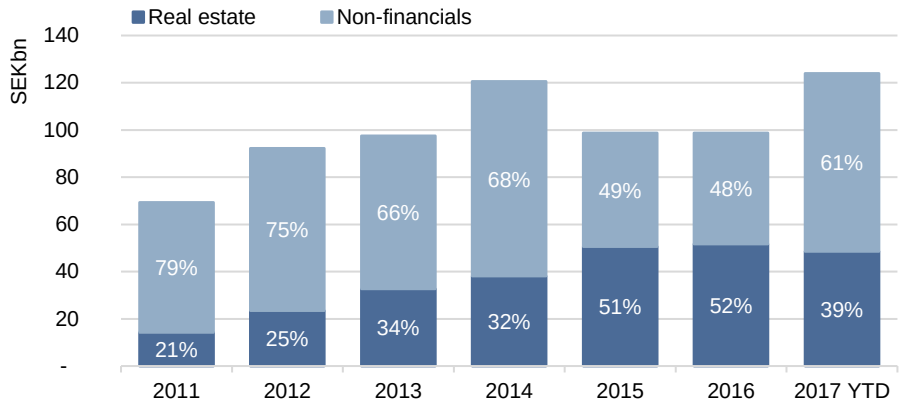
Let's investigate what happens to the covered bond pool of Swedbank when house prices fall. Right now, the average LTV in the pool is around 50%, so the total value of all properties underlying the pool is 900/0.5=1800bn. To illustrate the higher-order-effect, we will assume that house prices drop by 50% (and the collateral value to 900bn), which means the pool's average LTV will surpass 100%. (A 50% drop would erase the gain over the last decade or so.) At this point the bank would have to remove the part of the loans that exceeds 75% LTV. This might be difficult to visualize so let's first take the example of an individual loan of SEK 1,000,000 for a property worth 2,000,000 at inception. Initially, the LTV is 50% but, after a 50% drop in prices, the LTV goes to 100%. In order to keep the covered bond pool LTV below 75%, the bank would have to remove 250,000 of loan notional from the covered bond pool onto their own balance sheet, and fund it in other ways. But note that the 750,000 in the covered bond pool still has full recourse on the 1,000,000 house, while the 250,000 outside the pool is now a junior claim on the collateral.

Let's go back to the real example of Swedbank's pool after a 50% drop. Now the majority of mortgages will have an LTV exceeding 75%, all of which will have to be "cut" down to 75% and funded in other ways. If we assume that every single mortgage is identical, which means that each one is now at 100% LTV, we would have to cut 25% of the loans. But these "cuts" now represent unsecured consumer loans to the capital structure below the covered bonds, in Swedbank's case amounting to 225bn (0.25*900bn). Assuming, conservatively, that deposits stay roughly constant, this 225bn would have to be funded by other means, like senior unsecured debt or equity, now proud owners of unsecured junior mortgage claims to the tune of a couple hundred billion (similar to the size of the bank's equity), getting larger for every tick lower in property prices. Simultaneously, the covered bond holders will demand a higher risk premium on their investments due to the deterioration of collateral quality. Looking at current pricing (comparing Swedbank AB 1% 2022 with Swedbank Hypotek 0.375% 2022) the 5y senior unsecured funding is about 15-20bps more expensive per annum, vis-a-vi covered, at present collateral levels. We conjecture that this differential will be significantly wider if collateral deteriorates, perhaps hundreds of basis points, while both covered and senior unsecured funding will be wider. Compared to Swedbank's net interest income of 20bn annually this is perhaps not critical, and some of the cost can be passed on to the consumer via their floating rate mortgage. But that is highly unlikely to aid a recovery in a housing market on a downward path! It is therefore clear that covered bond funding gives the banking system a negatively convex exposure to house prices on the downside, making it unlikely that it will aggressively increase their exposure at lower prices to support the market. Of course, the 50% hypothetical drop was merely used to illustrate the dynamic, the effect exists even for small drops. With our background as derivative traders, having seen the impact of large concentrated open interests in the option markets, we worry about these things.

Of course, it also doesn't help that one of the biggest holders (after pension funds and insurance companies) of these covered bonds are the banks themselves (at about 20%), due to favourable regulatory treatment for liquidity portfolios. We will not analyse this further, but believe it adds another layer of instability. However, we also prefer to not overestimate this effect as we think that the Riksbank can deal with this instability by widening accepted collateral or directly purchasing covered bonds.

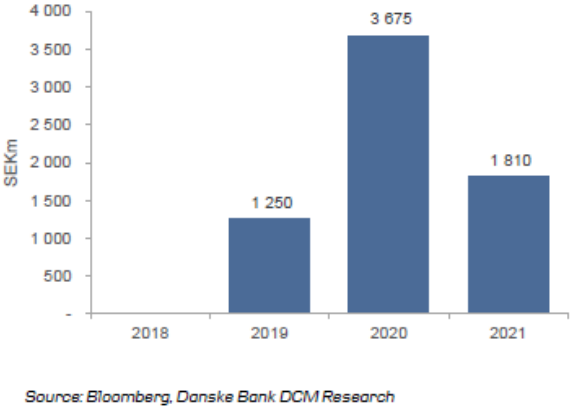
Without using technical arguments to prove why, we can also just guess that banks will be less willing to provide leverage in a falling market, while consumers will be less willing to take it, for the same psychological reasons – loss aversion, recency bias and so on.

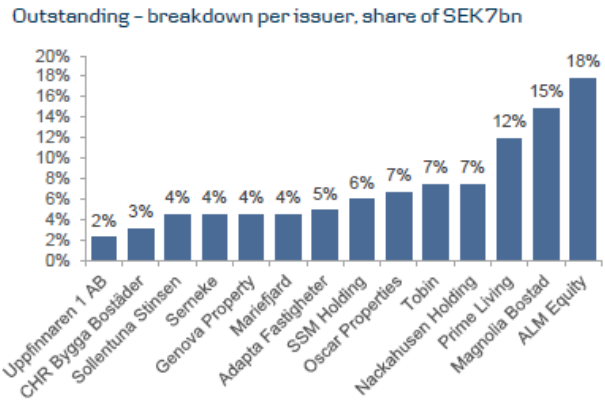
Financing environment: Basel III led to stricter capital requirements for banks in general and for their lending businesses in particular by way of increased risk-weights. Following these changes, banks have been offloading their balance sheets to other parts of the financial system. One example is the booming corporate bond market which now is a major source of funding for Swedish companies, in particular for builders and real estate companies:



The Swedish corporate bond market has SEK 620bn outstanding, of which real estate accounts for 37% (including developers, commercial and non-commercial property owners etc.). There has been a strong shift by real estate companies to fund themselves in the bond market instead of the banking system. Since 2015 real estate companies have issued about SEK 50bn per year. (This figure includes only SEK-denominated bonds, so we are underestimating the actual size of the debt as some real estate companies have issued in foreign currency.)

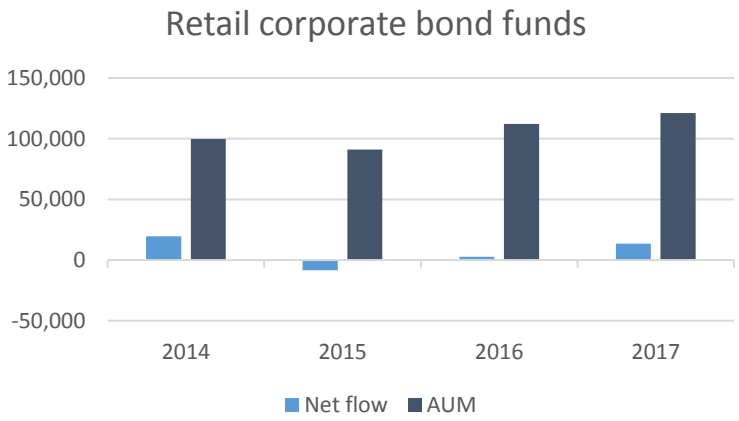
Property developers have SEK 7bn in outstanding bonds with the following maturity profile:





Source: Bloomberg, Danske Bank DCM Research

The buyers of this debt have mostly been retail corporate bond funds which have grown significantly with deposit rates close to zero. One can only guess what will happen with the assets of these funds if credit spreads widen.



One often quoted example is that of Tobin Properties; its share price has more than halved since its IPO, about a year ago, at SEK 80. The market cap of this small developer is now around SEK 300m.

Tobin also participated in the bond market bonanza by issuing a SEK 500M FRN just before their IPO. One might wonder what will happen with the refinancing of this debt as it currently yields around 20%; it's questionable whether Tobin has the cash flow to afford this kind of interest level going forward. On Dec 6th 2017 Klövern AB (Swedish commercial real estate company) announced that they are buying 40% of Tobin, potentially rescuing them. We expect continued consolidation in this sector.

Concluding remarks

As we observe the end of the house price rally, with an awareness of recent excesses in both lending and the construction of newbuilds, where does this leave the Swedish financial system?

Our view is that it is hard to argue that, like Ireland for example, the four major banks face insolvency as a result of credit losses, as they are currently cushioned by SEK 750bn of equity, while any actual defaults, even taking an extremely grim view on developers and mortgages, will unlikely reach the hundreds of billions.

We can estimate the current debt exposure to housing construction by assuming a 2 year construction period, 25% project equity, 50,000 multi-dwelling starts annually, and an average construction cost of SEK 40,000 per square meter for an average size of 100 sqm. The magnitude is SEK 300 billion. To us, it seems highly unlikely that this debt can get impaired by more than a quarter. We also know that personal defaults are rare due to the efficiency of debt collection, so realized credit losses from households will likely be low. However, bank's profitability, and the market's perception of them, will likely suffer due to lower (maybe even negative) loan growth, some credit losses, more expensive funding and, possibly, new regulation. The self-reinforcing cycle where higher house prices have improved the quality of mortgage books, driving high credit growth, as well as cheaper funding, can

easily be reversed, with an associated reduction in earnings. We have presented the argument that there is potential for self-reinforcing dynamics on the downside via an increase in the cost of covered bond funding, transmitted to consumers via floating rate mortgages. Down the line this could even lead to banks having to raise capital, but we find it very hard to gauge that probability.

On a micro level, however, we believe there will be quite a few casualties. Sadly, some over-indebted households that have taken on excessive leverage either because the market has rallied too much, or because of pure speculation, will see a lot of pain, in many cases augmented by unemployment due to a contraction in construction- and consumer spending. Some real estate developers will also default due to grave miscalculations of the environment and misallocation of resources; building high end real estate at the peak of the market, at world record cost, with significant leverage, "sold" to buyers putting up one or two percent of the consideration, without any real demographic trend to support fundamentals; easily a recipe for disaster. Also, some consumer finance companies providing unsecured loans for both real estate and other consumption will likely suffer too. We currently hear very little about the risk to commercial real estate, for example, but we find it likely that the second-order effects of lower economic activity and higher funding cost can easily impact this highly levered sector. In our view, the mechanism of transmission will be wider risk premia in credit and equity markets, impacting most Swedish businesses. The reason is partly that the financial sector, which is the largest individual borrower in credit markets, will have pay more for funding given their deteriorating fundamentals, dragging others with them, but also that other funding vehicles, like retail corporate bond funds, will shrink and/or demand higher risk premia. Of course, the fall in construction spending and the associated higher order effects like consumer sentiment could easily reverse GDP-growth from positive to negative, as well as lowering inflation. In this case, the Riksbank must keep their accommodative monetary policy for a very long period; we know from their comments that they are monitoring developments closely. We believe it will be difficult to stimulate credit growth in an environment where the leverage is already elevated while the regulation of credit is getting tighter, so their main mechanism of stimulus will be currency depreciation, which would boost Sweden's strong export sector. We can only speculate that the recent weakness in the krona reflects some of this elevated risk.

Looking at neighbours Denmark and Norway may also provide some guidance as to potential outcomes. Denmark had a sharp correction in house prices during the great financial crisis and a prolonged period of low prices for over five years. We think it is reasonable to assume that Sweden will experience the same slow repricing, as there is little room to stimulate demand by lowering interest rates from current levels. More recently, Norway started seeing a drop in house prices about a year before Sweden, following a large increase in construction and the implementation of tougher lending standards in the beginning of 2017. If there are any lessons to be had there it is that the weakness has spread from being isolated to Oslo and that, despite no real credit constraints for marginal buyers, there is a lack of demand simply due to prices going lower[43].

Given the complexities of the market, and the non-linear relationships at play, our view is that analysing a drop in prices in isolation, keeping everything else constant, underestimates the risks. With recent increases in leverage, small aberrations will likely propagate disproportionately. One such aberration, already under way, is the increased construction of new builds. While we cannot predict the exact impact, we know that it represents a meaningful increase in the supply of housing, which counteracts higher prices. We can only speculate as to the relative strength of this force, which depends on the risk appetite of banks and real demand, but we know that we have, so far, only seen a small amount of the marginal supply coming in the coming years, accompanied by an adjustment lower in prices. Another possible disturbance to the marginal buyer could be the new amortization proposal which is planned to enter in force by March 2018. Other potential frictional forces include increased consumer protection, the negative feedback loop between higher funding costs and higher mortgages rates and a reversal in consumer sentiment from house lower prices themselves. Based on our analysis of higher-order risks, we can, in contrast to most commentators, envisage a very aggressive reversal in house prices and severe balance sheet impairment; a full "boom-bust" cycle. Although we ascribe some probability to this

[43] Norway: After the downturn in oil, here comes the downturn in housing (pdf)

outcome given the system's high leverage and the unpredictable psychological effects involved, we still consider it to be the outlier rather than the base case.

If we were to put our money on the table, we find it most likely that Sweden will experience a Denmark-style long-term decline until the market starts clearing at a level where leverage is sustainable and affordable to the marginal buyer, which is likely not as well-off as current owners. Up until the amortization requirement of 2016 Swedish housing has essentially been a market funded by (close to) perpetual, floating-rate debt, which just represents an infinite lease with variable rent to the consumer. And common sense dictates that the cost of owning such a lease needs to reflect the pricing throughout the economic and interest rate cycles. Due to regulatory failure on many fronts and myopia of market participants, pricing mostly reflects only the part of the cycle with high growth, low interest rates and tax benefits. Encouragingly, the regulatory trend seems to be in the right direction; altering the nature of the market from infinite leases towards some kind of duration constraint (by amortization down to 50% LTV and thereafter allowing "infinite" leases). In effect it will more closely resemble fixed-tenor mortgage countries like the US or UK, for part of the loan, while maintaining its "infinite lease"-nature for the rest. We strongly believe, however, that there is still need for significant improvements in regulation to protect potential buyers from predatory lending and hidden debt, on both parts of the loan.