

Supply of housing in Sweden¹

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In recent decades, residential housing construction in Sweden has been low from an historical perspective, as well as in comparison with other countries and in relation to the needs arising from a rapidly-growing population and the process of urbanisation. Both quantitative and qualitative studies indicate that this has contributed to the housing shortages arising now in several parts of the country. At the same time, interest in why too little housing has been built in Sweden has intensified in recent years, with several inquiries and reports attempting to illustrate the problems on the supply side. This article reviews the relevant research in this field and gives a general description of the supply of housing in Sweden. The review shows that the low level of construction is the result of an interplay between several different factors.

Introduction

Throughout history, the development of the housing and property market has played a prominent role in economic crises. In several countries, heavy price falls on various types of property have been connected with major disruptions to both the financial sector and the economy as a whole. These crises have often been preceded by a long period of rising house prices and in many cases an increase in household debt.²

In Sweden, housing prices have risen sharply over a long period of time and Swedish households have become increasingly indebted in relation to their incomes (see Chart 1). However, housing prices in Sweden did not fall to the same extent as in many other countries in connection with the financial crisis in 2008-2009 and they have continued to rise in recent years. One possible reason why housing prices did not fall so much and that they are now rising rapidly is that the supply of housing has been low in relation to demand, partly due to the low level of housing construction since the early 1990s.³

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1 A large part of the contents of this article were reproduced in the report "The driving forces behind household indebtedness", which was used as a basis for the Financial Stability Council and published jointly by the Riksbank, the Swedish National Debt Office and Finansinspektionen, the Swedish Financial Supervisory Authority in 2015.

2 See, for instance, Reinhart and Rogoff (2010), Schularick and Taylor (2012) and also Jordà et al. (2014).

3 IMF (2009) and Swedish National Institute of Economic Research (2013) find, for instance, that large investments in housing increase the probability of a price fall on the housing market. Lind (2013) says that the low level of housing construction in Sweden is also one reason why housing prices did not fall more during the most recent financial crisis.

Chart 1. Real single-family dwelling prices and household sector debt in Sweden
 Index, 2000 Q1 = 100 and total debt as a percentage of disposable income



Note. Real single-family dwelling prices are defined as Statistics Sweden's real estate price index deflated by the CPI.

Sources: Statistics Sweden and the Riksbank

The interest in why more housing has not been built in Sweden, despite the sharp rise in housing prices, has intensified in recent years with more inquiries and reports from different bodies attempting to illustrate the problems on the supply side.⁴ There are many obstacles, but the factors that are often emphasised are high land prices and construction costs, demanding processes for land and planning, the municipalities' planning monopoly, a lack of competition in the civil engineering and construction industries, the regulations on the rental market and the current legislation that makes considerable demands regarding the quality of the housing built.

The Riksbank and international institutions such as the International Monetary Fund (IMF), the European Commission and the OECD have on several occasions emphasised the importance of remedying the structural problems on the housing market to increase construction.⁵ This concerns both increasing geographical mobility, so that it should be easy to move to areas where there are jobs or educational courses, and to ward off a potentially unsustainable development in housing prices and thereby reduce the risks linked to high household indebtedness.⁶

The purpose of this article is to provide an overall description of the supply side of the Swedish housing market, partly by reviewing the relevant research in this field. For instance, there is a discussion of factors often highlighted in the debate on why more housing

4 See, for example, Bergendahl et al. (2015), New Construction Commission (2014), and Swedish Housing Crisis Committee (2014).

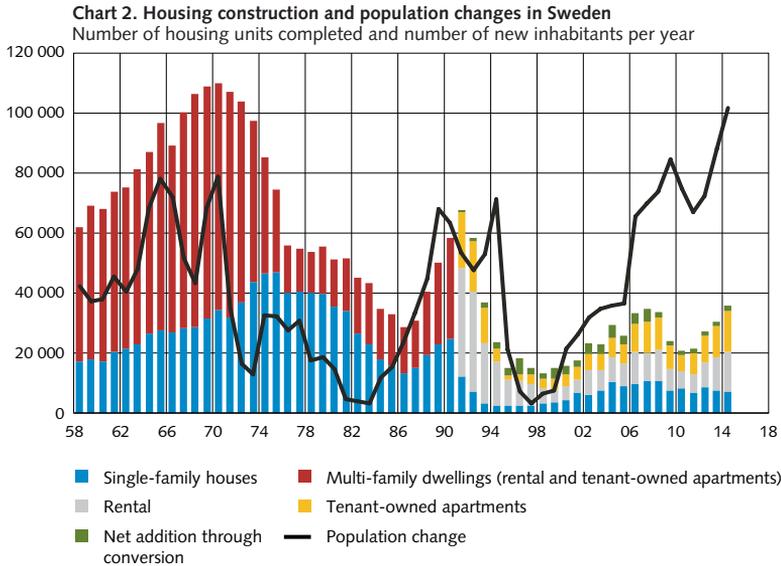
5 See Sveriges riksbank (2015), Flodén (2014), af Jochnick (2014), Jansson (2013), European Commission (2015), IMF (2014) and OECD (2013).

6 A low supply of housing is only one factor contributing to higher housing prices. Falling real interest rates, rising incomes and wealth in the household sector and changes in credit conditions also affect developments in prices and demand for housing. However, these factors are not analysed in this article.

has not been built in Sweden. The article also describes some of the measures taken to increase construction and make the use of the existing housing stock more efficient. The article begins with an analysis of how housing construction in Sweden has developed in recent decades in relation to the large increase in the population and the urbanisation that characterises many regions.

Housing construction has varied substantially and has been low in recent decades

Since the mid-1900s, the level of residential housing construction in Sweden has varied substantially, but after the crisis in the 1990s, it has been low from both an historical perspective and in comparisons with other countries.⁷ As shown in Chart 2, housing construction has also not increased to the same extent as the Swedish population over the past decade.



Note. Prior to 1991, it is possible to distinguish between different forms of occupancy in apartment buildings.

Sources: Statistics Sweden and the Riksbank

Housing investment in Sweden follows investment in the business sector to a large degree.⁸ The variations in housing construction are thus largely due to economic activity and the economic conditions for construction companies. However, the most important explanation

⁷ See Chart A1 in the Appendix. See also National Institute of Economic Research (2013), which studies housing investment as a percentage of GDP for several countries and over a long period of time. During the 1970s and 1980s housing investment in Sweden was more in line with other countries' investment rates.

⁸ See Chart A2 in the Appendix.

for the large variation in the amount of new homes being built is nevertheless the Swedish housing policy. This entails, for instance, taxes being changed or government subsidies being introduced for housing construction.⁹

One example of how much influence the government has had over housing construction in Sweden is the Million Homes Programme. Following a political decision, a large number of new homes were built in the 1960s and 1970s to resolve a housing crisis caused by the increasingly rapid urbanisation in Sweden.¹⁰ When the Million Homes Programme was complete, construction slowed down during a ten-year period and then began to increase again in the mid-1980s when the credit markets were deregulated and the conditions for financing housing construction changed.

One of the largest declines in housing construction took place in the beginning of the 1990s. This was partly due to the financial crisis in Sweden and the ensuing economic downturn, and also to the decline in interest subsidies and interest rate guarantees for construction projects in connection with the tax reform in 1993.¹¹ These changes meant, for instance, that the government-subsidised secondary mortgages disappeared and public housing companies were given similar funding conditions to private participants in the market.¹² The municipalities' costs for building housing thus increased substantially, which had a negative impact on construction of rented accommodation in particular. In recent decades, new builds have increasingly been aimed at tenant-owned housing and to some extent single-family houses, while the percentage of rented accommodation has declined.¹³

In recent years, construction has begun to increase again and several participants are assessing that it will continue to increase in the coming years.¹⁴ If the forecasts prove correct, this means that the number of new build homes will be at the same level as in the mid-1980s (see Chart 3). However, despite more homes being built, Swedish National Board of Housing, Building and Planning (2015a) assesses that the current rate of housing construction will not be sufficient to meet the coming increase in the population in Sweden.

9 See, for instance, Lind (2003).

10 The million homes programme meant that one million homes would be built over a ten-year period between 1965 and 1975. The programme had its roots in a social inquiry into housing made in Sweden during the 1940s. This inquiry concluded that the government should steer construction and reduce housing costs so that the general public would gain a better standard of housing.

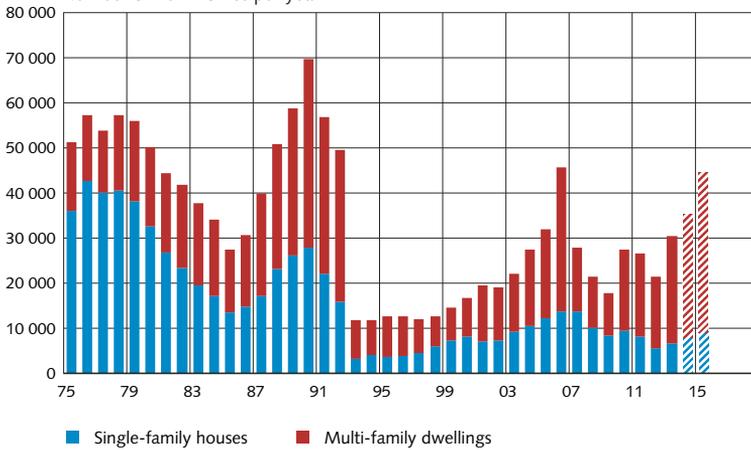
11 See, for example, Berg and Berger (2005).

12 Public housing companies are run on a non-profit basis, they are owned entirely or largely by the municipalities and they are only aimed at particular groups.

13 According to Evidens (2015) and Veidekke (2015), the main explanation as to why private construction companies are building more tenant-owned housing and single-family houses is that there is less risk in this type of new build project than when building rental properties. For example, a large share of apartment blocks with tenant-owned apartments is funded by the households themselves and not mainly through external capital.

14 See Swedish National Board of Housing, Building and Planning (2015b) and Swedish Construction Federation (2015).

Chart 3. Housing construction in Sweden
Number of new homes per year



Note. The broken lines represent the Swedish National Board of Housing, Building and Planning's forecasts. Net addition through conversion is not included in the forecast.

Sources: Statistics Sweden and Swedish National Board of Housing, Building and Planning

The population has increased faster than construction

One means of measuring how well housing construction has developed in relation to the needs prevailing over the past 40 years is to compare the number of completed homes with the development in the population. As mentioned earlier, and as shown clearly in Chart 2, the population has increased much faster than new builds over the past decade. This indicates that new builds have not been able to meet the needs of a rapidly-growing population.

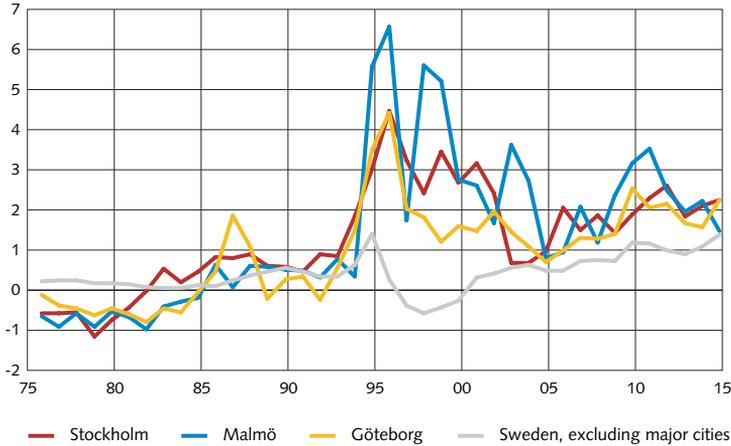
However, such a comparison can be misleading, for several reasons. Firstly, the aggregate population increase only provides a rough measure of the need for housing, as the population can increase through both immigration and an increase in births. An increase in immigration entails a greater need for housing in the near term, while a birth surplus makes greater demands in the longer run.¹⁵ Secondly, for example, a newly-built multi-family dwelling consists of apartments of different sizes. The size of a newly-built single-family dwelling can also vary. This can mean that the need for new housing is to some extent overestimated, as the actual new additional homes – or beds – are in actual fact larger than the aggregate statistics show.

To avoid the problems related to homes of different sizes being built, one can make certain assumptions regarding how many people live in homes of different sizes and then calculate the number of potential beds created over the past 40 years. If the increase in

¹⁵ Over the past decades, the Swedish population has largely increased through immigration (see Chart A3 in the Appendix). This means that the demand for housing has increased in the near term.

the population is greater than the number of new beds, one can claim that there is a deficit in the number of completed homes. Chart 4 shows the ratio between the increase in the population and the number of new beds. If the ratio is higher than 1, the increase in the population has been greater than the number of new beds, and vice versa. The chart shows that the ratio has been above 1 from the beginning of the 1990s and onwards. In other words, not enough new homes have been built to meet the increase in the population.

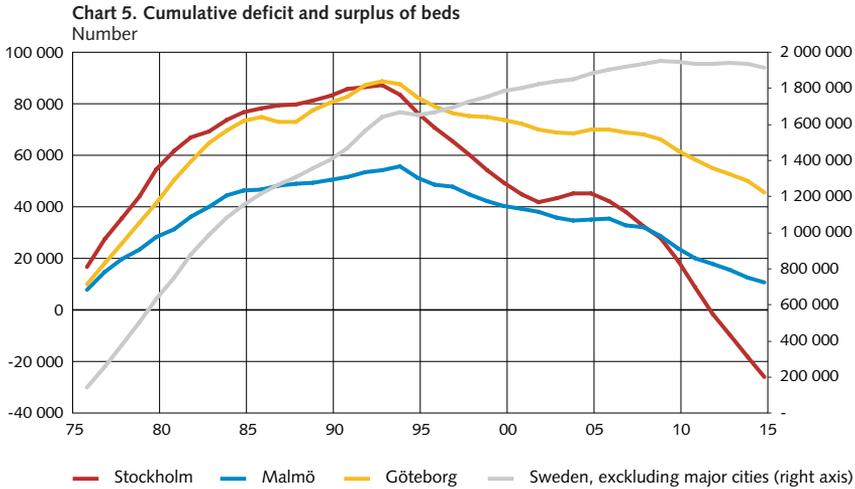
Chart 4. Population increase per newly-built bed
Ratio



Note. The number of beds is based on the assumption of how many people live in the different sized homes. An apartment is assumed to contain 1-3 people, while a detached house is assumed to contain 1-5 people.

Sources: Statistics Sweden and the Riksbank

However, these calculations do not take into account the expansive housing construction in connection with the million homes programme and the fact that in the 1970s and 1980s there was probably a surplus of housing and thereby of beds. However, it is reasonable to assume that the surplus will gradually be filled by newly-arrived people. If one compares the surplus and deficit of beds over time and adjusts for the homes that have been demolished, it is possible to see whether there is such a store of beds, or whether there is a shortage of beds. This cumulative total is illustrated in Chart 5, where one can see that it was not until 2011 that the surplus of beds in the Stockholm region, for instance, came to an end. In other metropolitan regions there is still a small surplus, even if this has quickly shrunk in connection with the large increase in the population and with urbanisation. In Sweden as a whole, on the other hand, there is a substantial surplus of beds.



Note. The number of beds is based on the assumption of how many people live in the different sized homes. An apartment is assumed to contain 1-3 people, while a detached house is assumed to contain 1-5 people.

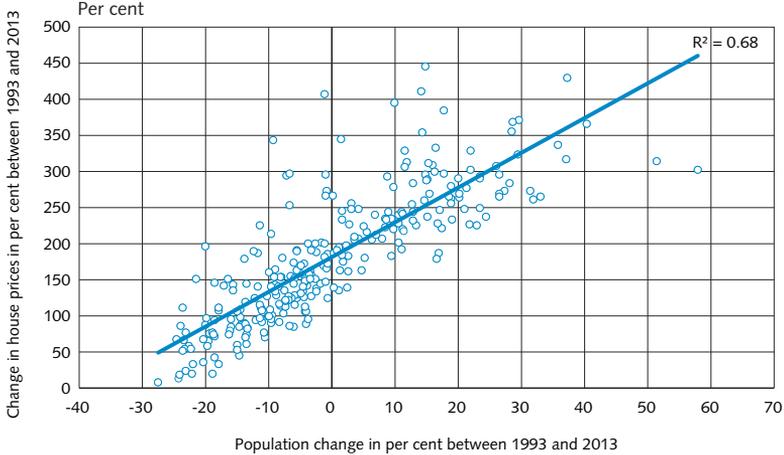
Sources: Statistics Sweden and the Riksbank

As different assumptions can be made with regard to the number of people in different sized homes, the results of this type of calculation should of course be interpreted with caution, and should perhaps be regarded as a theoretical measure of how large the supply would be if new builds will used in an optimal way.¹⁶ But on the whole, the calculations imply that the shortage of housing in nominal terms has not been as great in Sweden during most of the 1900s and 2000s. However, the large surplus of beds in the nation as a whole implies that a large share of the homes in Sweden is located in regions where demand is not as great as in metropolitan regions. This indicates that there is an imbalance between supply and demand in Sweden, rather than an absolute deficit of homes.

The calculations also show that the substantial urbanisation and population increase during the 1990s and onwards have meant that the earlier supply surplus in many metropolitan regions has rapidly disappeared. When few apartments were built there, at the same time as the population increased, there was greater competition for the existing homes, which could have pushed up housing prices in these regions. As shown in Chart 6, there is also a clear connection in Sweden's municipalities between how house prices have developed and how the population has increased or decreased within the municipality. The higher the population growth a municipality has experienced, the more housing prices in the municipality have risen.

¹⁶ Alternative calculations, using different starting years and other assumption on the number of people who live in the homes, gives roughly the same pattern as shown in Chart 5. On the other hand, the levels of the deficit and surplus differ.

Chart 6. Correlation between changes in house prices and population for Sweden's municipalities between 1993 and 2013



Note. Each point shows the percentage change in the price of nominal one- or two-dwelling buildings and in the number of inhabitants in Swedish municipalities between 1993 and 2013. The price of single-family houses is calculated at the average price in each municipality.

Sources: Statistics Sweden and the Riksbank

SEVERAL ANALYSTS BELIEVE THAT THERE ARE HOUSING SHORTAGES IN MANY PARTS OF THE COUNTRY

The low level of housing construction in recent decades in relation to the growth in the population has contributed to the apparent housing shortages in many parts of Sweden. Swedish National Board of Housing, Building and Planning (2012a) has estimated, for instance, that there was a shortage of between 90 000 and 160 000 homes in Sweden in 2012. The biggest shortage was in the Stockholm region, where the deficit was estimated at between 28 000 and 51 000 homes.^{17, 18} Stockholm Chamber of Commerce (2014) believes that the deficit in the Stockholm region is even larger, around 120 000 homes, given the increase in the population seen in the region in recent years.

The number of inhabitants per home has also risen in the Stockholm region, other metropolitan regions and several growth regions in recent years. According to Swedish National Board of Housing, Building and Planning (2013a), the differences between the different parts of the country are, however, considerable and in 12 of Sweden's 21 countries the number of inhabitants has actually declined over a long period of time. In the

17 The deficit in housing is defined by Swedish National Board of Housing, Building and Planning (2012a) as the difference between the current stock and what would be required to eliminate excessive housing prices. Excessive price refers to the price rise that exceeds the rise caused by the increase in population.

18 Later studies, such as Swedish National Board of Housing, Building and Planning (2014a), state that the deficit is slightly lower given the deviation from the average household size between 1990 and 2013.

country as a whole, the number of inhabitants per home has remained fairly constant in recent decades, after falling substantially from the 1960s to the beginning of the 2000s.¹⁹

However, it is difficult to try to measure the housing shortage quantitatively like this. The results are very dependent on how one chooses to define the housing shortage.²⁰ As mentioned earlier, estimates are sensitive to various assumptions regarding people's living forms, for instance. Another problem is that a large part of the demand surplus in many cases is not captured by the quantitative models. It is for example difficult to estimate how many households actually want to move to a certain town or region but don't because they can't find anywhere to live there. Furthermore, there can be a surplus of a certain type of home that is not suitable for the households, who then do not move for that reason. Swedish National Board of Housing, Building and Planning (2014d) states for example that the Swedish market for tenant-owned housing is accessible by large groups of people, but only in certain locations. The housing shortage is thus partly a shortage of housing in areas where people would prefer to live.²¹

There are however some qualitative indicators that constantly track the supply side of the housing market and that can supplement the quantitative studies. Such an indicator is the Swedish National Board of Housing, Building and Planning's annual housing market survey that poses questions to Sweden's 290 municipalities on how they perceive the housing situation in their area. The most recent housing market survey indicates that there is a housing shortage in several parts of the country and that the shortage has grown more acute in recent years. At the end of the 1990s, only 11 per cent of the municipalities said that there was a housing shortage (see Chart 7). The percentage has now increased to more than 40 per cent.²²

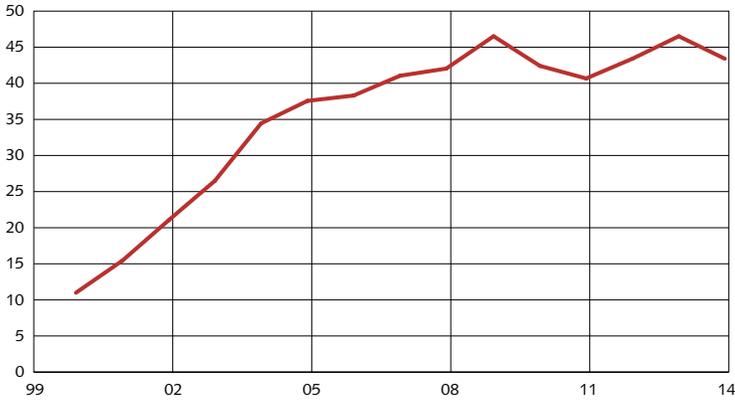
19 See Charts A.4 and A.5 in the Appendix.

20 See, for example, Bergendahl et al. (2015) for a detailed discussion of how the housing shortage can be defined.

21 Swedish National Board of Housing, Building and Planning (2014d) and Swedish National Board of Housing, Building and Planning (2015c) conclude that in locations where the supply of land is greatest, that is, outside city/town centres, people's willingness to pay falls rapidly to levels that make it difficult to build new tenant-owned housing at a profit. This is also true of peripheral areas that are considered to have good communications.

22 See also Swedish National Board of Housing, Building and Planning (2015c).

Chart 7. Percentage of municipalities reporting a housing shortage in Sweden
Per cent



Note. The fact that municipalities report a housing shortage does not necessarily mean there is a need to build new homes. One disadvantage with the Swedish National Board of Housing, Building and Planning's housing market survey is that the municipalities do not state how large the shortage is (for further information, see Swedish National Board of Housing, Building and Planning (2013b)).

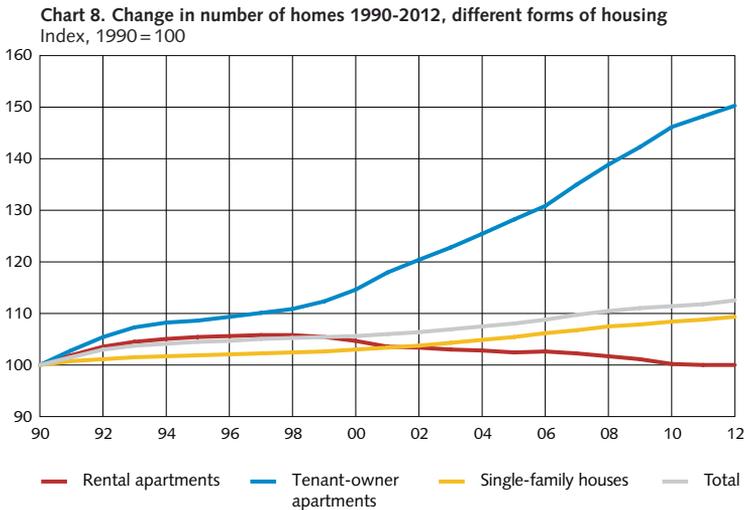
Source: Swedish National Board of Housing, Building and Planning

According to Sweden's municipalities, there is above all a shortage of housing for groups that cannot afford or do not have the possibility otherwise to buy their own home, such as pensioners, newly arrived migrants, students or single parents. An increasing number of municipalities have therefore said that there is a particular shortage of rented accommodation. In 2013, for example, 246 municipalities, or almost 85 per cent, stated that there was a lack of rented accommodation in their area. Even municipalities that said there is a balance, or even a surplus of homes, consider the supply of rented accommodation to be lower than the demand. A good 30 per cent of the municipalities consider there to be a shortage of tenant-owned housing in their area.

The perception that the shortage of tenant-owned housing is not just a problem for metropolitan regions is also indicated by the survey distributed by the Swedish Union of Tenants to 185 public housing companies in 2014. Their survey indicates that housing waiting-lists are getting longer and that it can take several years to find rented accommodation in many parts of the country. According to Swedish Housing Crisis Committee (2014), it is particularly difficult to obtain rented accommodation in Stockholm, where the waiting lists have almost doubled between 2009 and 2013, from 4 years to 8 years.

Many rented homes have been converted into tenant-owned housing

The shortage of rented accommodation in Sweden depends to a large extent on its very low net addition over the last decades (see Chart 8). According to Swedish National Board of Housing, Building and Planning (2012a), the number of rented properties has only increased marginally between 1990 and 2011, while the number of tenant-owned properties has increased by more than 300 000 during the same period. One reason for this development is that a large proportion of the country's rented homes have been converted into tenant-owned housing. Between 1991 and 2011, around 201 000 new rented homes were indeed built in Sweden but at the same time about 181 000 were converted to tenant-owned housing. The biggest share of conversions took place in the Stockholm region. For every rented home built in Stockholm between 1991 and 2010, three disappeared as a result of conversions.



Source: Statistics Sweden

The possibilities for conversion have contributed to more households owning their homes. At the end of 2014, 62 per cent of the housing stock was either a single-family dwelling or a tenant-owned apartment (see Table 1).²³ This is an increase of around 5 percentage points compared to 1992.

Table 1. Composition of the Swedish housing stock at the end of 2014

	NUMBER OF HOMES	SHARE OF TOTAL STOCK %
Privately owned homes	1 842 044	39
Tenant-owned homes	1 028 079	22
Rented homes	1 491 923	32
Special needs homes	226 731	5
Other units	77 855	2
Total	4 666 632	100

Note. Special needs homes are homes for older people, persons with disabilities and students. Other units are buildings that are not intended for housing purposes, e.g. buildings intended for business activities or with some kind of social function.

Source: Statistics Sweden, National Apartment Register

When housing prices rose, more housing was built, but not enough

On an efficiently-functioning market, supply is expected to increase when the price rises as a result of increased demand. The rising housing prices of recent decades should therefore, all else being equal, have led to increased housing construction as more new build projects are becoming profitable.

Profitability for new construction in the housing market can be related to the relationship between the market price of an existing home and the total construction cost of producing a new, similar home. This ratio is known as Tobin's Q and is based on the neoclassical investment model presented in Tobin (1969). The model was originally adapted to capital markets, but when applied to the housing market Tobin's Q can be expressed as:

$$(1) \quad \text{Tobin's } Q = \frac{\text{Market price of an existing home}}{\text{Total production cost of a new, similar home}}$$

Equation 1 shows that if Tobin's Q is above 1, this is a signal that it is profitable to build a new home, while a value below 1 indicates that investment would not be profitable.²⁴ If Tobin's Q is 1, this means that the cost of buying an existing house and building a new one is the same. In other words, one can say that the market is in balance if Tobin's Q is 1. On

²³ Tenant-owned housing is of course not personally owned property as the tenancy-owner only owns the right of disposal on the apartment. In a legal sense, tenant-owned housing is classed as personal property. The property is owned by the housing cooperative, of which the tenant is a member.

²⁴ The research is not unanimous as to how Tobin's Q should be defined, for instance, whether both land and building costs should be included in the production cost. Moreover, Englund (2011) argues that, considering the long lead times in the construction process, it is the expected housing price a couple of years ahead that is significant, rather than the prevailing market price that is significant for the propensity to invest. The construction companies' yield requirements may also mean that Tobin's Q often needs to be higher than one for a construction project to begin.

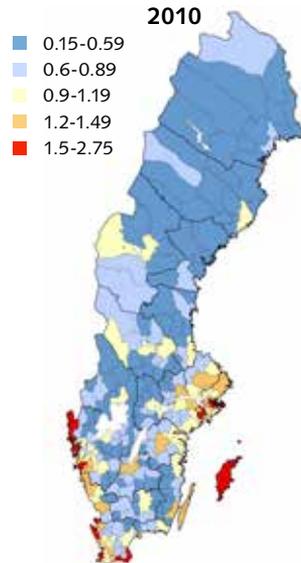
an efficient market, the participants who build homes will adapt their building to demand in this way and in the long run Tobin's Q is therefore expected to assume a value of 1.²⁵

The Institute for Housing and Urban Research (IBF) has calculated Tobin's Q in all municipalities in Sweden for the years 1981-2010, based on sale prices and production costs for single-family houses (see Table 2). Their calculations show that in 2010 it was profitable to build a new single-family house in 32 per cent of the country's municipalities. This was an increase on 2001, when 12 per cent of the country's municipalities showed a Tobin's Q above 1 and on 2006, when 30 per cent were above 1.

However, profitability has been different in different parts of the country. In most metropolitan regions, growth regions and attractive holiday spots, Tobin's Q was much higher than 1 in 2010, while it was much lower than 1 in the majority of Sweden's municipalities. The ratio for Sweden as a whole was 1.08 in 2010. Rapidly rising housing prices in recent years have contributed to Tobin's Q having increased further in several municipalities, such as the Stockholm region.²⁶

Table 2. Municipalities with highest Tobin's Q in Sweden, 2006 and 2010

MUNICIPALITY	TOBIN'S Q (2006)	MUNICIPALITY	TOBIN'S Q (2010)
Sundbyberg	2.79	Danderyd	2.75
Solna	2.74	Sotenäs	2.53
Danderyd	2.50	Lidingö	2.43
Lidingö	2.45	Solna	2.36
Sotenäs	2.21	Vaxholm	2.29
Stockholm	2.14	Båstad	2.27
Nacka	2.12	Nacka	2.21
Båstad	1.92	Tanum	2.10
Tanum	1.88	Sundbyberg	2.04
Vellinge	1.81	Stockholm	2.02
Öckerö	1.81	Höganäs	2.02
Malmö	1.80	Lysekil	1.90



Note. Tobin's Q states the ratio between the market value (the selling price) of a single-family dwelling and its production cost. See Swedish National Board of Housing, Building and Planning (2011a) for further information.

Sources: Institute for Housing and Urban Research (IBF) and Swedish National Board of Housing, Building and Planning

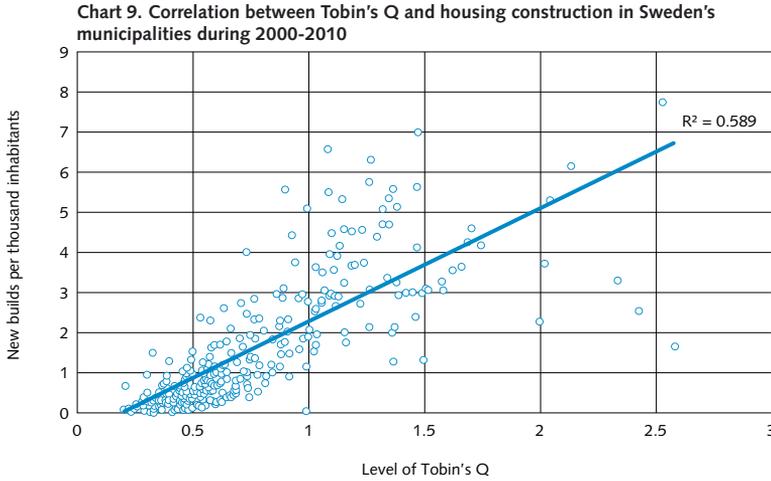
On the basis of these calculations, it would thus have been profitable to build a new single-family house in some regions during most of the 2000s and particularly in metropolitan areas. Consultant firm WSP also shows that there is a relatively high correlation between how many homes are built and how high Tobin's Q has been in a municipality.²⁷ According to their calculations, one can use the level of Tobin's Q to explain around 60 per cent of the variation in housing construction between Sweden's municipalities during the period

25 See also Topel and Rosen (1988) and Berg and Berger (2005).

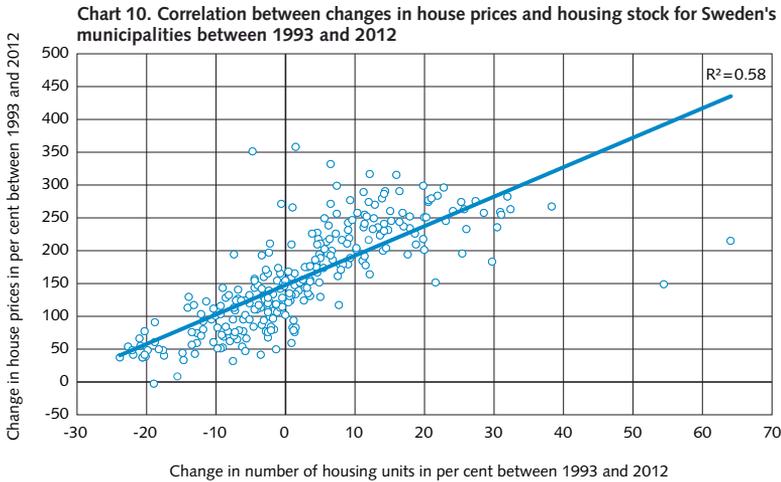
26 See Swedish National Board of Housing, Building and Planning (2015c).

27 Sørensen (2013) also claims, unlike for instance Englund (2011), that housing investment in Sweden has responded more to developments in housing prices than has been the case in many other comparable countries, even if the level of construction has still been low.

2000-2010 (see Chart 9). There is also a similar correlation for how prices of single-family dwellings have developed in relation to how many new homes have been built in the municipality during the period 1993-2012. As shown in Chart 10, the number of homes has increased most in municipalities that have also had the largest price rises.



Source: TMR (2014)



Note. Each point shows the percentage change in the price of nominal single-family houses and in the number of homes in Swedish municipalities between 1993 and 2012. The price of single-family houses is calculated at the average price in each municipality.

Sources: Statistics Sweden and the Riksbank

The rising housing prices have thus contributed to increased construction in many municipalities. But even if construction in these regions has been higher than in other parts of the country, it has still been very low in relation to how much has been built historically

and to the pace at which the population has grown. According to Swedish National Board of Housing, Building and Planning (2014b), total construction of single-family dwellings in the three metropolitan regions has been too small in relation to demand since the beginning of 1995. On the other hand, new housing production was far too high up to 1985 and in a balance between 1985 and 1995.

Lind (2003) and Englund (2011) say that even if the value of Tobin's Q affects the incentive for private and public housing companies to build a new house, there are other factors, of a more structural nature, which can also affect the house-builder's willingness to invest. If one studies how Tobin's Q has developed over time, it is also clear that construction in, for instance, the Stockholm region is held back by other factors, as the ratio has gradually increased since the beginning of the 1990s.²⁸ It is clear that it is not solely profitability that affects housing construction from the fact that the variation in construction increases the higher Tobin's Q a municipality shows (see Chart 9). In other words, the greater the profitability is, the more of the construction appears to be explained by other factors.

Why haven't more homes been built in Sweden?

Despite high Tobin's Q in many parts of the country and a high population growth, housing construction in many regions has not been sufficient. The debate on why more housing has not been built in Sweden has also intensified in recent years, with more inquiries and reports attempting to illustrate the problems on the supply side.²⁹ There is also relatively broad agreement that it is not one single factor that has meant more housing is not being built; it is rather the result of an interplay between several different factors.

IT MAY BE PROFITABLE FOR VARIOUS ACTORS NOT TO BUILD MORE

A game theory view as to why more housing is not being built is put forward by Lind (2013), who says that the municipalities and construction companies can regard it as rational not to build more housing than necessary. It is, for instance, far from obvious that it is in the interests of the individual municipality to build new housing, as this can be linked to negative external effects for the households already living in the municipality. A larger supply of housing can, for instance, lead to a fall in the prices of the housing already available in the municipality. Green areas may shrink and noise pollution may be increased, which can also push prices down.

In Sweden, the municipalities have a monopoly on planning, which means that it is the municipalities that determine how local land should be used and built on. Lind (2013) says that if a municipality owns a lot of land, it may be rational not to build on too much of the land at once, as this could lead to fall in the price of the land. A low, but even level

²⁸ See TMR (2014) and Chart A6 in the Appendix.

²⁹ See, for example, Bergendahl et al. (2015), New Construction Commission (2014), and Swedish Housing Crisis Committee (2014).

of construction may be in the best interests of the municipalities, as it can maximise their long-term incomes. If many other land-owners think in the same way, few will build and prices will continue to rise. Bergendahl et al. (2015) say that one of the most important reasons why more housing has not been built in Sweden is that the supply of land has not increased at the same pace as demand, which could be partly explained by the municipal monopoly on planning.

Despite high demand and high housing prices, it may also be rational for private market participants not to build more. One reason for this is that the construction industry in Sweden is characterised by a shortage of competition with major entry barriers and a small number of large participants, making it difficult for new companies to become established.³⁰ The large construction companies can thus make use of their oligopoly position and charge higher prices, which holds back construction.

Bergendahl et al. (2015) say, however, that it is difficult to find both theoretical and empirical evidence for the low level of housing construction being largely the result of a lack of competition in the construction industry. For instance, several foreign participants have become established on the Swedish construction market in recent years, which indicates that the market is nevertheless subject to competition if prices are rising and profits increasing.

LAND PRICES AND CONSTRUCTION COSTS HAVE RISEN

Another factor that is often highlighted as an explanation as to why more homes have not been built is that it is expensive to build new housing in Sweden, and much more expensive than in many other countries. This is based on arguments such as planning, construction and environmental legislation making substantial demands on new housing. For instance, there are noise pollution limits that must not be exceeded, there must be elevators installed and toilets must be adapted for the handicapped, and so on. Moreover, the cold climate in Sweden entails different structural requirements than in, for instance, southern Europe, which pushes up costs for those who build.

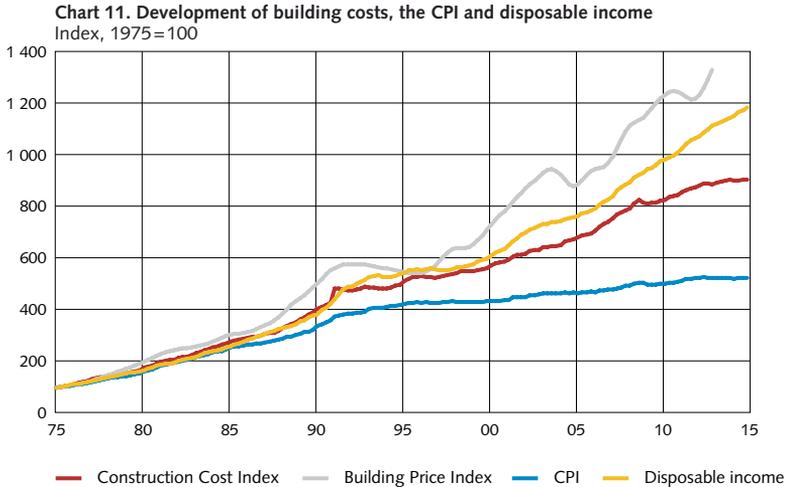
In recent decades, construction costs have increased by a relatively large amount in Sweden. Chart 11 shows how construction costs have developed in relation to the consumer price index (CPI) and disposable income for the household sector. The chart shows that construction costs (that is, production costs excluding land costs) have increased much faster than the CPI since the beginning of the 1990s, but somewhat more slowly than household incomes.³¹ The chart also shows Statistics Sweden's building price index, where the land cost is included (that is, what the building contractor pays). The building

³⁰ Swedish Competition Authority (2011) has illustrated the fact that the construction and civil engineering sector in Sweden is characterised by a lack of competition in various parts of the production and distribution chain.

However, there have long been competition problems in the construction industry and this has also been a constant theme of inquiries into the sector, at least from the 1960s and onwards.

³¹ Since part of the production costs is labour (which is expected to follow developments in income) and part is material costs (which are expected to follow the CPI), the total building costs should be lower than developments in income, but higher than the CPI.

price index has increased much faster than both household income and the CPI, which indicates that land prices have also risen substantially in recent decades.³²



Note. Building costs are the factor price index that measures production costs. The building price index measures price changes for residential buildings, adjusted for changes in quality and regional differences.

Source: Statistics Sweden

It thus appears as though construction costs have increased relatively substantially in Sweden in recent years. Sweden has also often had high construction costs in comparisons with other countries in Europe. According to Eurostat, construction costs in Sweden are a good 65 per cent higher than the average costs in EU15. But according to Swedish National Board of Housing, Building and Planning (2014c), the differences are exaggerated as they are not so large if one instead compares with countries that have conditions similar to those in Sweden, for instance, Norway, Denmark and the Netherlands.³³ In Norway, construction costs have also increased faster than in Sweden. Nevertheless, construction has been higher in Norway.³⁴

To summarise, construction costs have thus been rising for a long period of time. But this does not distinguish Sweden in comparisons with other comparable countries and therefore it does not explain why more housing has not been built in Sweden. Moreover, the results of the Tobin's Q analysis show that it would have been profitable to build more in many municipalities. This implies that it is not high construction costs that are the main reason for the low level of construction.

³² However, the building price index has been criticised for not taking into account the improvement in the quality of housing over time, which means that the measure to some extent overestimated building costs.

³³ However, Swedish National Board of Housing, Building and Planning (2014c) says that cost comparisons between countries are often misleading as housing is a heterogeneous product and there is a lack of comparable statistics.

³⁴ See Chart A1 in the Appendix.

STATE SUBSIDIES HAVE DECLINED

Parallel with the higher construction costs, state subsidies to construction companies have also declined in recent decades. According to Swedish Construction Federation (2004), housing subsidies declined from 3 per cent of GDP in 1991 to 0.7 per cent in 2003. Previously, the higher state subsidies meant that both private and municipal building contractors took a relatively small financial risk in building new housing. But as both the investment subsidies and interest rate guarantees have been phased out, the financial risk linked to new build projects has increased. This seems to have reduced the construction companies' willingness to invest in new builds and in particular in rental properties.³⁵

LAND AND PLANNING PROCESSES TAKE TOO LONG

A further obstacle that holds back housing construction is the long processes required for land acquisition and planning, which considerably prolong the building process as a whole. It also increases the financial risk linked to the building project. The economic situation can change during the time the home is being built, which can affect the companies' possibilities to fund construction and also households' demand for housing. Moreover, the construction work often has to be approved both in terms of the zoning plan and planning permission from the municipality. It is also possible to appeal against a municipal decision and in many cases both the zoning plans and building permission are subject to appeal. If the planning process is also protracted and uncertain and fewer companies are involved as developers, there may be relatively few land areas that can be built on at any given time. Once the land is ready for development, it has to be auctioned off and then the land prices may rise, which affects the profitability of the construction project.

The time required before building can start varies substantially from one building project to the next in Sweden. Although the average time before building can commence in Sweden does not differ from other countries, there is a greater risk that it may take considerably longer.³⁶ Lind (2003) says that these long lead times create uncertainty for the participants in the market and that this means that only a few financially strong companies have the resources to begin various new build projects.³⁷ This hampers competition in the market and can lead to less building.³⁸ International studies have also shown that stricter regulations are often followed by fewer homes being built and that prices become higher.³⁹

35 See Veidekke (2015) and Evidens (2015).

36 See Chart A7 in the Appendix.

37 Swedish National Board of Housing, Building and Planning (2011) says that the financing conditions for large construction companies have been good during the 2000s. However, the conditions for smaller companies have been poorer.

38 The importance of good knowledge of Swedish construction conditions makes it difficult for foreign companies to become established in the market, which can inhibit competition.

39 See, for instance, Luger and Temkin (2000) and Boulhouwer and deVries (2002).

RENT REGULATIONS CAN INCREASE THE RISKS AND REDUCE PROFITABILITY

One factor that hampers the construction of rental properties in Sweden is the regulations on the Swedish rental market. Eriksson and Lind (2005) say that today's rent regulations can in several different ways lead to fewer rented homes being built. For example, it becomes less profitable to build new rental properties when the rent has to be set lower than the price that would be set in the market. Moreover, poorly worded rent regulations can lead to major differences in the rents for new and existing rented accommodation. If demand then falls, it will mainly affect the new stock first, as they often have higher rents. This makes it more risky for construction companies to build new rented accommodation. The risk is particularly high in the parts of the country where housing waiting-lists are much shorter than they are in the cities.

But Eriksson and Lind (2005) nevertheless claim that these factors are not sufficient to explain why so few new rental properties are being built in Sweden. Instead, they draw the conclusion that the construction companies have chosen to build tenant-owned housing instead of rented accommodation as it has been more beneficial in tax terms and more people are willing to pay for tenant-owned housing.⁴⁰ They also say that the economic climate has made it more profitable to build tenant-owned housing, as investors have often got their money back quickly when housing prices and the stock market have risen. In other words, the profitability for construction companies has been greater if they have built tenant-owned properties and single-family dwellings instead of rental properties.

Attempts to increase housing construction

There are thus several explanations as to why more housing has not been built in Sweden since the early 1990s. It also means that probably more measures are required to resolve the problems with housing shortages. Over the past decade, the Riksdag (the Swedish parliament) and the government have also investigated which measures might promote housing construction. More than 60 different housing inquiries have been appointed in recent years, for instance, to examine how the processing of appeals can be made more efficient to speed up the building process.⁴¹ The inquiries also proposed that fewer detailed plans should be required, that the planning processes should be simplified, that higher demands should be made for the municipalities to revise guidelines for development agreements and land allocation, that the municipalities should not be allowed to make specific requirements regarding what housing is built, that the regulations regarding the protection of right to use beaches should be amended and that construction companies should not need to follow the same rules when building homes for students and young people. In recent years new guidelines regarding noise pollution have also been introduced, which should make it easier for the construction companies to build smaller apartments, in particular.

40 For example, Housing Taxation Committee (2014) says that the property charge in connection with company taxation means that the returns on investment in rental properties are subject to double taxation.

41 See the Ministry of Health and Social Affairs (2013).

However, politicians have tried earlier to make it easier to build new homes, particularly rented accommodation. In 2006, for instance, the utility value system was supplemented with presumptive rents for new-builds, in order to increase the incentive for building new rented accommodation.⁴² In practice, this has meant that a property owner has the possibility to charge market rents for newly-produced rental apartments during an exceptional period. This period was first set at 10 years, but was extended to 15 years in 2011. However, Lindbeck (2013) says that these amendments will not be sufficient to boost the construction of rental accommodation, as investors do not want to build new properties if they will face price controls that limit the return on them after a few years.

There have also been some tax changes that could affect housing construction. In 2008, for instance, the property tax was replaced by a property charge, which gave more households a lower cost of living. This could mean that more housing is built, as households' demand for housing will then increase. The cut in property tax was partly financed by raising the tax on capital gains to 22 per cent. On the other hand, the tax increase can have had a negative effect on mobility in the market and the utilisation of the existing housing stock, as the incentives to move may decline.⁴³

The trade organisation for builders of single-family dwellings, TMF, also says that fewer homes were built after Finansinspektionen (the Swedish Financial Supervisory Authority) introduced a loan-to-value limit in October 2010. They say that a loan-to-value limit makes it more difficult for first-time buyers, as it means they need to have a larger deposit to buy a home. This reduces the demand for newly-produced single-family dwellings. The association of estate agents Association of Estate Agents (2013) says that the requirements made by the loan-to-value limit have prevented many first-time buyers from entering the market.

Use of the existing housing stock can be improved

Although the measures proposed may have contributed to more housing being built, newly-built homes will nevertheless be a very small addition to the total stock of housing.⁴⁴ It is therefore also important to investigate how one can make better use of the existing housing stock to resolve the housing shortage in Sweden, particularly in the short term.⁴⁵ According to Swedish National Board of Housing, Building and Planning (2013c), 90 per cent of the welfare losses caused by the way current rental market regulations are designed could be avoided if existing housing was utilised more efficiently.

42 A presumptive rent is the rent for new-build homes agreed on by the landlord and the tenants' association.

43 Caldera et al. (2011) say that high transaction costs have a negative effect on the housing market and point out at the same time that less strictly regulated rents have a positive effect.

44 During 2014, around 30 000 new single-family dwellings and multi-family dwellings were completed, which corresponds to less than 1 per cent of the total stock of single-family dwellings and multi-family dwellings.

45 One sign that the housing stock is being used inefficiently is that the number of inhabitants per home is increasing in metropolitan regions, but falling in other regions, which implies that homes are not located in the parts of Sweden where demand is highest.

There are also many proposals regarding how the existing housing stock can be better utilised. Swedish National Board of Housing, Building and Planning (2014a) and Lindbeck (2013) highlight, for instance, the need to review the regulations on the rental market to reduce the long waiting lists for rented accommodation, particularly in the Stockholm region. Moreover, they argue that the tax on capital gains should be lowered to reduce the transaction costs and facilitate mobility in the market. New Construction Commission (2014) also argues in favour of a long-term reduction in this tax.

Some measures have been taken by politicians in recent years to try to ensure more efficient use of the existing stock of housing. In the middle of 2012, for instance, subletting of tenant-owner apartments was made easier by adapting the rents to market conditions.⁴⁶ This proposal meant that it is now possible to charge a higher rent for subletting than has previously been the case. The purpose of this measure was to try to increase mobility on the market and to manage the long waiting lists on the existing rental market.⁴⁷

Summary and concluding remarks

In recent decades, residential housing construction in Sweden has been low from an historical perspective, as well as in comparison with other countries and in relation to the needs arising from a rapidly-growing population and the process of urbanisation. The historically-low housing construction has also coincided with a period when households' demand for housing has increased substantially as a result of favourable economic conditions. Both quantitative and qualitative studies indicate that this has contributed to the housing shortages arising now in several parts of the country.

At the same time, it is difficult to define the concept of housing shortage. There are indications that there is sufficient housing in Sweden, but that much of this is in regions where demand is lower. From this perspective, there is an imbalance between supply and demand rather than an absolute deficit of housing. The housing shortage is thus perhaps mainly a shortage of housing in areas where people would prefer to live. Such an imbalance is difficult to resolve by building more, as access to land is often limited in such attractive areas. It is therefore important to remember that new builds are only a small part of a large existing housing stock. More efficient use of the existing stock thus has a decisive significance for how the housing shortage can be resolved, particularly in the near term.

But when the population is growing rapidly and urbanisation is increasing at the same time as the demand for housing is increasing, it is nevertheless necessary to build more homes. In particular, it is necessary to build housing in different forms that will suit different types of household. Although the higher housing prices have contributed to more being

46 Statistics from Blocket Bostad indicate that this amendment to the law has contributed to a sharp rise in rents for subletting. For instance, the rent for a studio apartment in the Stockholm region was around 30 per cent higher in 2014 than in 2012. Moreover, the amendment has contributed to more sublets coming out onto the market. During 2013, for instance, the supply of sublet apartments increased by a total of 33 per cent in Stockholm municipality, compared with the previous year.

47 Bergendahl et al. (2015) stress that the utility value system leads to an increase in transaction costs, mainly in the form of searching time.

built in many regions, particularly in recent years, if one studies developments over a longer time horizon, there have nevertheless been too few homes built in relation to demand. This applies in particular to rented accommodation. It is a problem as different types of housing are needed, for instance, to make it easier for people to move to areas where there are jobs and educational courses.

There are explanations for the low level of housing construction in Sweden. For instance, the Swedish housing policy was changed at the beginning of the 1990s, partly by reducing state subsidies for new builds, which affected the profitability of some times of construction project. New builds are also affected by poor incentives for both private and municipal actors, which may mean that they will not want to build more housing than they already are building. At the same time, there are laws and regulations that hamper competition on the market, which can lead to higher construction costs and fewer homes. These interacting factors hamper housing construction and thus contribute to the housing shortage prevailing in several parts of the country. The housing shortage leads to considerable social costs and other negative external effects for society.

References

- af Jochnick, Kerstin (2014), "Low inflation and high indebtedness – expansionary monetary policy makes demands of other policy areas," Speech at Swedish Society of Financial Analysts, Stockholm, 21 August. Sveriges Riksbank.
- Association of Estate Agents (Mäklarsamfundet) (2013), *Två år med bolånetaket* (Two years with the mortgage cap).
- Berg, Lennart and Tommy Berger (2006), "The Q theory and the Swedish housing market – an empirical test," *The Journal of Real Estate Finance and Economics*, 33(4), 329-344.
- Bergendahl, Per-Anders, Monika Hjeds Löfmark and Hans Lind (2015), "Bostadsmarknaden och den ekonomiska utvecklingen," (The housing market and economic development), Appendix 3 to *Långtidsutredningen* (Long-Term Survey of the Swedish Economy) 2015, SOU 2015:48.
- Boulhouwer, Peter J. and Paul de Vries (2002), "Housing production in the Netherlands: A growing misbalance between state and market," Working Paper, *OTB Research Institute Delft*.
- Caldera Sánchez, Aida and Dan Andrews (2011), "To Move or Not to Move: What Drives Residential Mobility in the OECD?" *OECD Economics Department Working Paper*, No. 846.
- Englund, Peter (2011), "Swedish house prices in an international perspective," *The Riksbank's inquiry into risks in the Swedish housing market*, Sveriges Riksbank.
- Eriksson, Kimmo and Hans Lind, (2005), "Vad vet vi om hyresregleringens effekter?" (What do we know about the effects of rent regulations), *Ekonomisk Debatt* 4/2005.
- European Commission (2015), "Country Report Sweden 2015. Including an In-Depth Review on the prevention and correction of macroeconomic imbalances" COM(2015) 85 final.
- Evidens (2015), *Utan fungerande finansiering stannar bostadsbyggandet – En djupanalys av bostadsbyggandets grundläggande villkor* (Without efficient funding – housing construction wanes – An in-depth analysis of the basic conditions for housing construction).
- Financial Supervisory Authority (Finansinspektionen), Swedish National Debt Office (Riksgälden) and Sveriges Riksbank (2015), "The driving forces behind household indebtedness", used as a basis for the Financial Stability Council meeting on 15 June.
- Flodén, Martin (2014), "Measures to mitigate the risks from high and increasing household debt," Speech at BNP Paribas, Stockholm, 20 November. Sveriges Riksbank.
- Housing Crisis Committee (Bokriskommittén) (2014), *En fungerande bostadsmarknad – en reformagenda* (An efficient housing market – an agenda for reform).
- International Monetary Fund (2014), "Macroeconomic imbalances Sweden," *Occasional papers* 186, March 2014.
- Jansson, Per (2013), "How do we stop the trend in household debt? Work on several fronts," speech at SvD Bank Summit, Stockholm, 3 December. Sveriges Riksbank.
- Lind, Hans (2003), "Ds 2003:6 Bostadsbyggandets hinderbana – en ESO-rapport om utvecklingen 1995-2001 (The housing construction obstacle course – a report on developments in 1995-2001 by the Expert Group on Public Finance).
- Lind, Hans (2013), *Vad händer på bostadsmarknaden?* (What's happening on the housing market?), SNS – Centre for Business and Policy Studies – Analysis No. 10, March 2013.
- Lindbeck, Assar (2013), "Hyreskontrollen måste bort för att få fart på byggandet," (Rent controls must be abolished to boost housing construction) article on DN debate page on 24 November 2013.
- Luger, Michael and Kenneth Temkin (2000), "Red tape and housing costs: How regulation affects new residential development," *Center for Urban Policy Research*, Rutgers University, New Jersey 2000.

Ministry of Health and Social Affairs (2013), *Propositioner, utredningsdirektiv och myndighetsuppdrag beslutade på bostadsområdet under innevarande mandatperiod* (Bills, inquiry instructions and authority assignments decided in the housing area during the current mandate period).

National Institute of Economic Research (2013), "Bostadspriser och bostadsbyggande – en internationell utblick," (Housing prices and housing construction – an international survey), an article in *Konjunkturläget 2013*, December 2013.

National Union of Tenants (Hyresgästföreningen) (2014), *Ett land fullt av bostadsköer – en rapport om kötider på den svenska bostadsmarknaden* (A land full of housing waiting lists – a report on waiting lists on the Swedish housing market).

New Construction Commission (Nybyggarkommissionen) (2014), *En bostadspolitisk agenda för Sverige – 63 förslag för ökat byggande* (A housing policy agenda for Sweden – 63 proposals for increased construction).

OECD (2013), "Robust Growth in Sweden," OECD Economics Department Working Papers, No. 1024. OECD.

Stockholm Chamber of Commerce (2014), *122 000 bostäder saknas i Stockholms län* (122 000 too few homes in Stockholm county).

Strömqvist, Ulf (2004), *Bostadsmarknaden i Stockholm-Mälarenregionen – framtida behov och förväntat byggande* (The housing market in Stockholm-the Mälaren region – future needs and expected construction). County Administrative Board in Västmanlands län, Report No. 3:2004.

Sveriges Riksbank (2015), *Financial Stability Report 2015.1*, Sveriges Riksbank.

Swedish Competition Authority (2011), "Konkurrens- och upphandlingsproblem i byggbranschen," (Competition and procurement problems in the construction industry) Speech by Dan Sjöblom, Director General of the Swedish Competition Authority at the conference Entreprenadrisker inom bygg och anläggning, Stockholm on 28 September 2011.

Swedish Construction Federation (Sveriges Byggindustrier) (2004), *Bostadsbyggande och bostadspolitik – En jämförelse mellan Sverige och Finland* (Housing construction and housing policy – A comparison between Sweden and Finland).

Swedish Construction Federation (Sveriges Byggindustrier) (2015), *Byggekongjunkturen no. 1* (Survey of economic activity in the construction industry), no. 1-2015.

Swedish National Board of Housing, Building and Planning (2011), *Analys av bostadsbyggandet i Norden – huvudrapport* (Analysis of housing construction in the Nordics – main report).

Swedish National Board of Housing, Building and Planning (2012c), *Bostadsmarknaderna i Norden och regionalt* (Housing markets in the Nordics and regionally).

Swedish National Board of Housing, Building and Planning (2012a), *Bostadsbrist ur ett marknadsperspektiv* (Housing shortage from a market perspective).

Swedish National Board of Housing, Building and Planning (2012b), *Bättre utnyttjande av bostadsbeståndet – Ett norskt exempel* (Better utilisation of the housing stock – A Nordic example).

Swedish National Board of Housing, Building and Planning (2012c), *Bostadsmarknaderna i Norden och regionalt* (Housing markets in the Nordics and regionally).

Swedish National Board of Housing, Building and Planning (2013a), *Drivs huspriserna av bostadsbrist?* (Are house prices driven by a shortage of housing?).

Swedish National Board of Housing, Building and Planning (2013b), *Bostadsmarknaden 2013–2014 – med slutsatser från bostadsmarknadsenkäten 2013* (Housing market 2013-2014 – with conclusions from the 2013 Housing Market Survey).

Swedish National Board of Housing, Building and Planning (2013c), *Bostadsbristen och hyressättningsystemet – ett kunskapsunderlag* (Housing shortage and the rent-setting system – an anthology).

Swedish National Board of Housing, Building and Planning (2014a), *Låst läge på bostadsmarknaden* (Deadlock on the housing market).

Swedish National Board of Housing, Building and Planning (2014b), *Förutsättningar för ökat småhusbyggande i storstadsregionerna – delrapport 1* (Conditions for building more one-family houses in Sweden's metropolitan regions – interim report 1).

Swedish National Board of Housing, Building and Planning (2015a), *Behov av bostadsbyggande – Teori och metod samt en analys av behovet av bostäder till 2025* (Need for housing construction – Theory and method and an analysis of the need for housing until 2025).

Swedish National Board of Housing, Building and Planning (2015b), *Boverket's indikatorer – maj 2015* (Boverket's indicators – May 2015).

Swedish National Board of Housing, Building and Planning (2015c), *Markpriser, markbrist och byggande* (Land prices, land shortage and construction).

Swedish National Board of Housing, Building and Planning (2015d), *Bostadsmarknadsenkäten 2015 i korthet* (2015 Housing Market Survey in brief), available on the Boverket website at www.boverket.se.

Sørensen, Peter Birch (2013), "The Swedish Housing Market: Trends and Risks," *Report to the Swedish Fiscal Policy Council*, 213/5.

TMR (2014), *Synergier mellan investeringar – För en tät och flerkärnig Stockholmsregion* (Investment synergies – for a populated and multicore Stockholm region). Stockholm County Council.

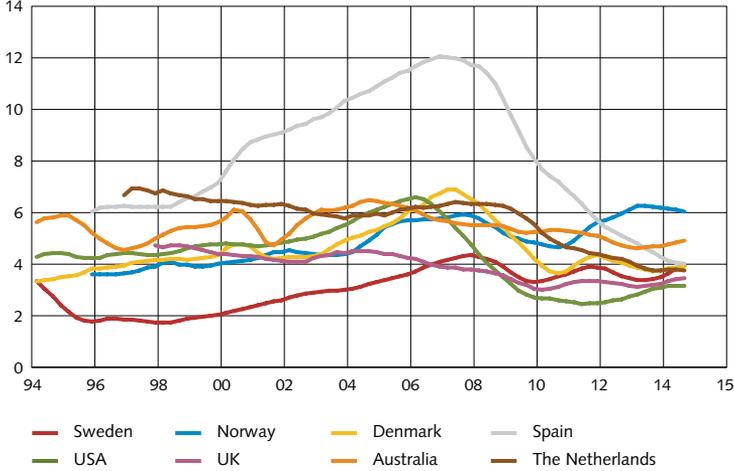
Tobin, James (1969), "A General Equilibrium Approach to Monetary Theory," *Journal of Money, Credit and Banking*, 29, 40-47.

Topel, Robert och Sherwin Rosen (1988), "Housing investment in the United States," *The Journal of Political Economy*, 718-740.

Veidekke (2015), *Från att hyra till att äga – riktlinjer för en ny bostadspolitik i en efterfrågestyrd marknad* (From renting to owning – guidelines for a new housing policy in a demand-driven market).

Appendix

Chart A1. Housing investment in different countries
Percentage of GDP, four quarter moving average



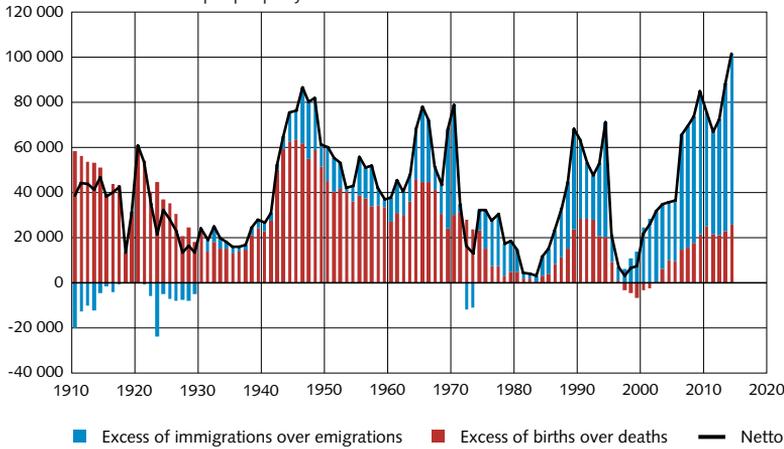
Sources: Reuters EcoWin and the Riksbank

Chart A2. Investment in the business sector in Sweden
Annual percentage change, standardised scale average value = 0 and standard deviation = 1



Sources: Statistics Sweden and the Riksbank

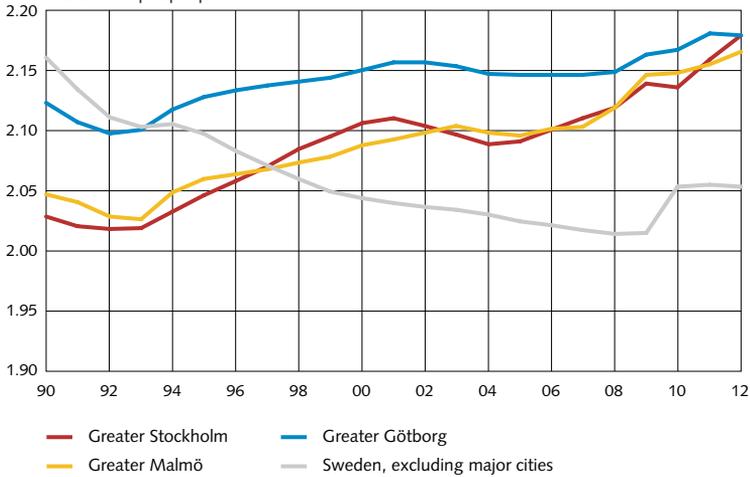
Chart A3. Population development in Sweden
Number of new people per year



Note. Birth surplus is defined as the difference between the number of people being born and the number of people dying. Immigration surplus is defined as the difference between the number of people immigrating and the number of people emigrating.

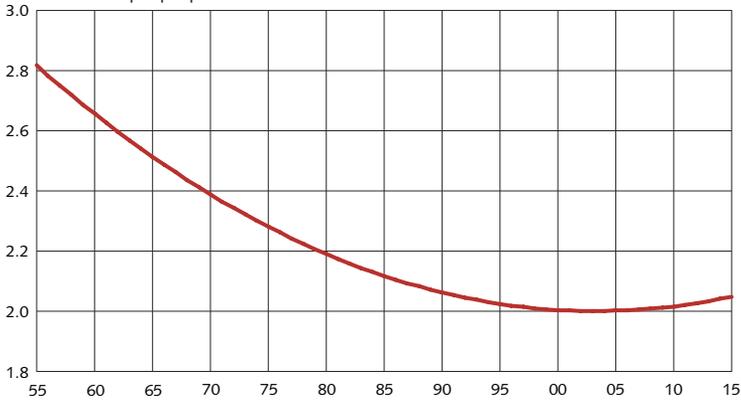
Source: Statistics Sweden

Chart A4. Population density for metropolitan regions and the rest of Sweden since 1990
Number of people per home



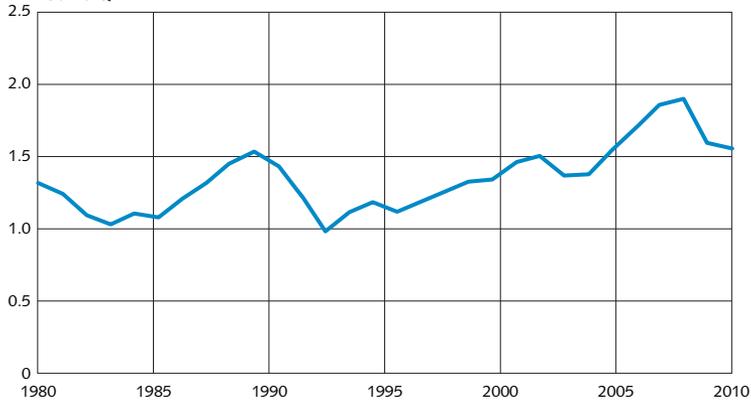
Sources: Statistics Sweden and the Riksbank

Chart A5. Population density in Sweden since 1960
Number of people per home



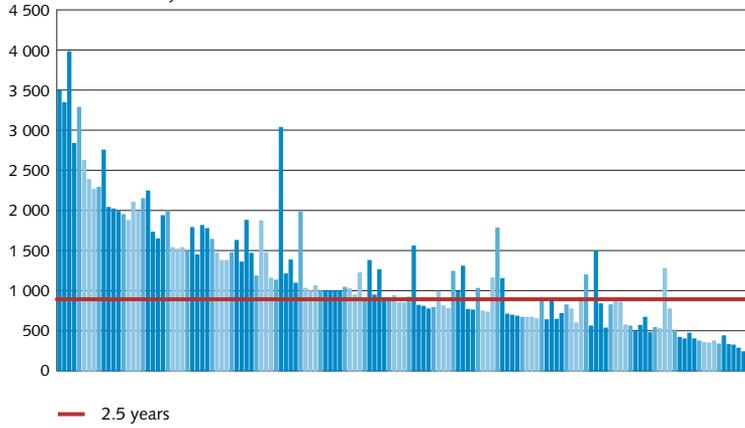
Source: Swedish National Board of Housing, Building and Planning

Chart A6. Average Tobin's Q for the municipalities in Stockholm county during the period 1981-2010
Tobin's Q



Source: WSP's working of data from Statistics Sweden and Institute for Housing Research (IBF) at Uppsala University

Chart A7. Time, including waiting time before active project start, to adoption and possible appeal of more than 150 detailed plans in Sweden
 Number of days



Source: Stadsbyggnadsbenchen (Benchmark cooperation between 9 municipalities in Stockholm)