AALBORG UNIVERSITY

DENMARK

Tobin's q for Danish single-family houses

Haagerup, Christian Deichmann

[Link to publication from Aalborg University](#)

Christian Deichmann Haagerup, Danish Building Research Institute, University of Aalborg
ISA International Housing Conference, Glasgow 2009

Tobin's q for Danish single-family houses

The rising price of single-family houses in Denmark and it's relation to the activity in the construction sector has given renewed interest in the theory of Tobin's q. Prices for single-family houses in Denmark have risen by 153 percent from 1993 to 2007 in real terms, with a particular steep rise from 2003 to 2006. The activity in the construction sector has been increasing too, but with some time lag caused by what seems to be an inelastic supply. In the long run, house prices will be determined by the replacement cost of houses, e.g. the cost of constructing a similar house including the cost of land. This can be used as a guide as to how much prices are to fall, in order to bring them back to the fundamental value. It can also be seen as a warning or indication of a price bubble. This paper presents a calculation of the value of Tobin's q for single-family houses in Denmark from 1968 to 2008. It shows that the value of Tobin's q has risen by around 40 percent from 2003 to 2006, caused by increasing house prices. This was not a sustainable development, and prices and the value of Tobin's q are now falling. In order for the value of Tobin's q to reach its fundamental value of 1, prices have to fall by around 25 percent from the current level, depending on how fast the downwards adjustment occurs. But an undershooting of the fundamental level is also possible, leading to even larger drops in house prices.

Keywords: Tobin's q, Single-family houses, Price, Construction

Contact information:

Author:
Christian Deichmann Haagerup, MSc (Econ), Research Assistant
Danish Building Research Institute, Aalborg University
Department of Town, Housing and Property
Dr. Neergaards Vej 15
2970 Hørsholm
Denmark

Telephone: +45 9940 2249 / +45 2360 5567
Email: cdh@sbi.dk

Introduction

The focus of this article is the price development of Danish single-family houses. Single-family houses constitute a large part of the Danish housing mass, as of 2008 there were 1,076,634 single-family houses, 96 percent of these were owner occupied according to Statistics Denmark (Statistics Denmark, www.statistikbanken.dk, table BOL33). The total Danish housing stock was 2,710,297 dwellings in 2008, so the single-family house accounts for 40 percent of all housing in Denmark. The Danish single-family house is also chosen as a case because statistics for price and construction are available for a long time span. This allows analysis of both price booms and price busts, which is especially relevant in the current economic situation.

Theory

In an economy with access to vacant land, house prices must converge towards their replacement cost in the long run (Albrecht & Deichmann Haagerup, 2008, p. 120). In other words, if it is possible to build new houses, prices of old houses should not be able to overshoot the cost of constructing a new house including the cost of land in the long run. This formulation borrows on a formulation used in DiPasquale & Wheaton's book from 1996 (DiPasquale & Wheaton, 1996, p. 6), and is in essence a formulation of the value of Tobin's q in relation to housing.

Tobin's q for housing can be written as follows:

$$\text{Tobin's q} = \frac{\text{Market price of existing housing}}{\text{Construction cost plus land cost for new housing}}$$

This relationship is also an expression of the profit for a developer. If the market price of an existing house for example is 3 million DKK, but a similar house with a similar location only costs 2 million DKK to build (including the cost of land) the developer makes a profit of 1 million DKK on that specific building project.

Every building project has its own unique Tobin's q, but because it takes time from the decision to build is made until the house is ready for sale, there is a time lag. Therefore Tobin's q should be taken as an expression for the expected profit of the building project. A guess would be that it takes around one year to build a single-family house. Therefore the supply-elasticity is never the same in the short run at in the long run. But even in the short run there can be differences in how responsive developers are to price changes.

The difference between an elastic market and an inelastic market can be shown by a two diagram model used by Malpezzi & Wachter (2005) and found in Appendix 1. Because of the increased volatility in house prices from an inelastic supply, an elastic supply of new houses is desirable. An elastic supply of new houses insures that an increased demand of new houses can be met without the appearance of a large house price bubble.
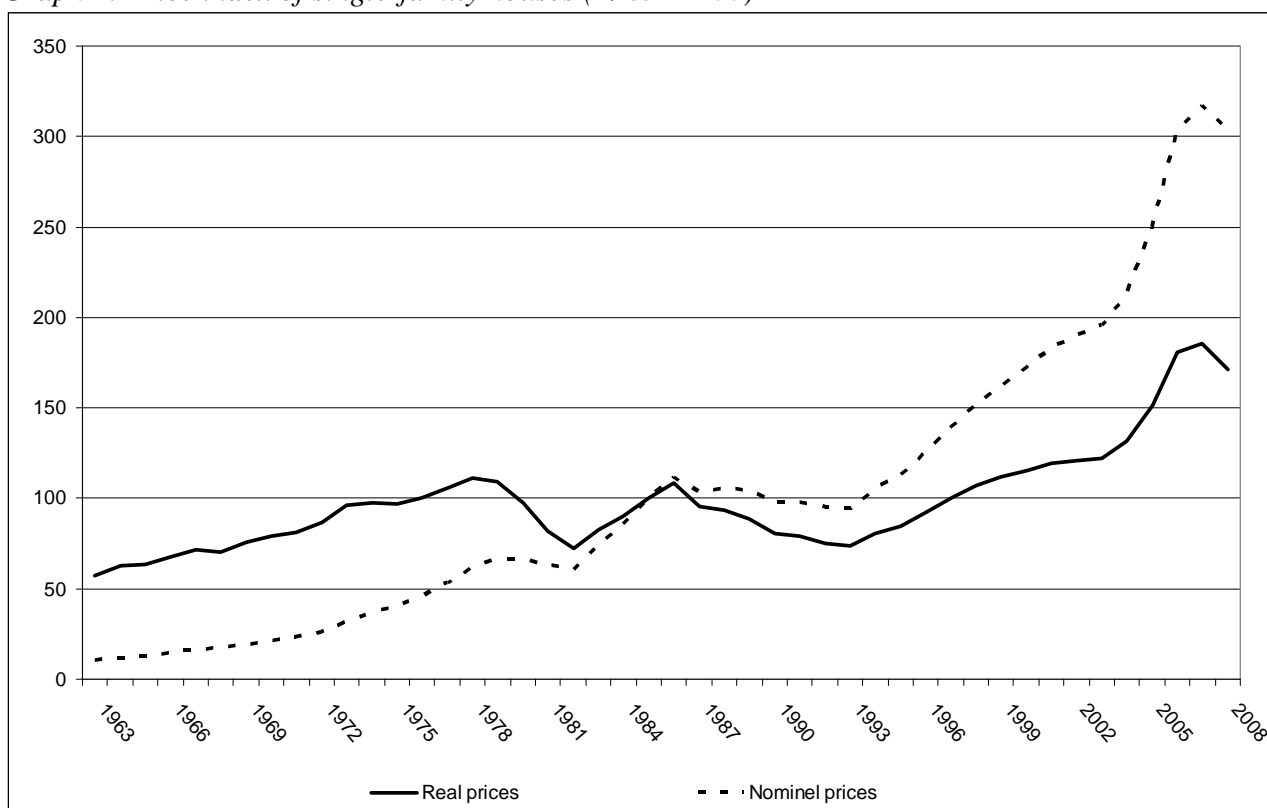
Statistics

As all building projects have their own unique value for Tobin's q, the ideal way to estimate a index for Tobin's q would be to aggregate all the values for Tobin's q for all the building projects during a year. However, such data is not available. Instead a time series for Tobin's q can be constructed

using the price index of Danish single-family houses as nominator, and an index of the cost in the construction sector as denominator.

The price index of Danish single-family houses can be seen below in both real and nominal prices. The real prices are obtained by deflating with the consumer price index (CPI) and both data series are obtained from Statistics Denmark. The price index of single-family houses is made up by all traded houses that year. The price of each house is weighed by the house's specific tax valuation (Statistics Denmark, Label: Price index for traded houses), to take differences in the quality of the trades houses into account.

Graph 1. Price index of single-family houses (1985 = 100)

Source: Statistics Denmark and own calculations (www.statistikbanken.dk, table EJEN5 & PRIS6)

When looking at the developments in real prices from 1963 there are three noticeable peaks, the first in 1978, the second in 1986 and the third in 2007. Another way to analyse the prices is to look at year to year changes in real prices, shown in the graph below.

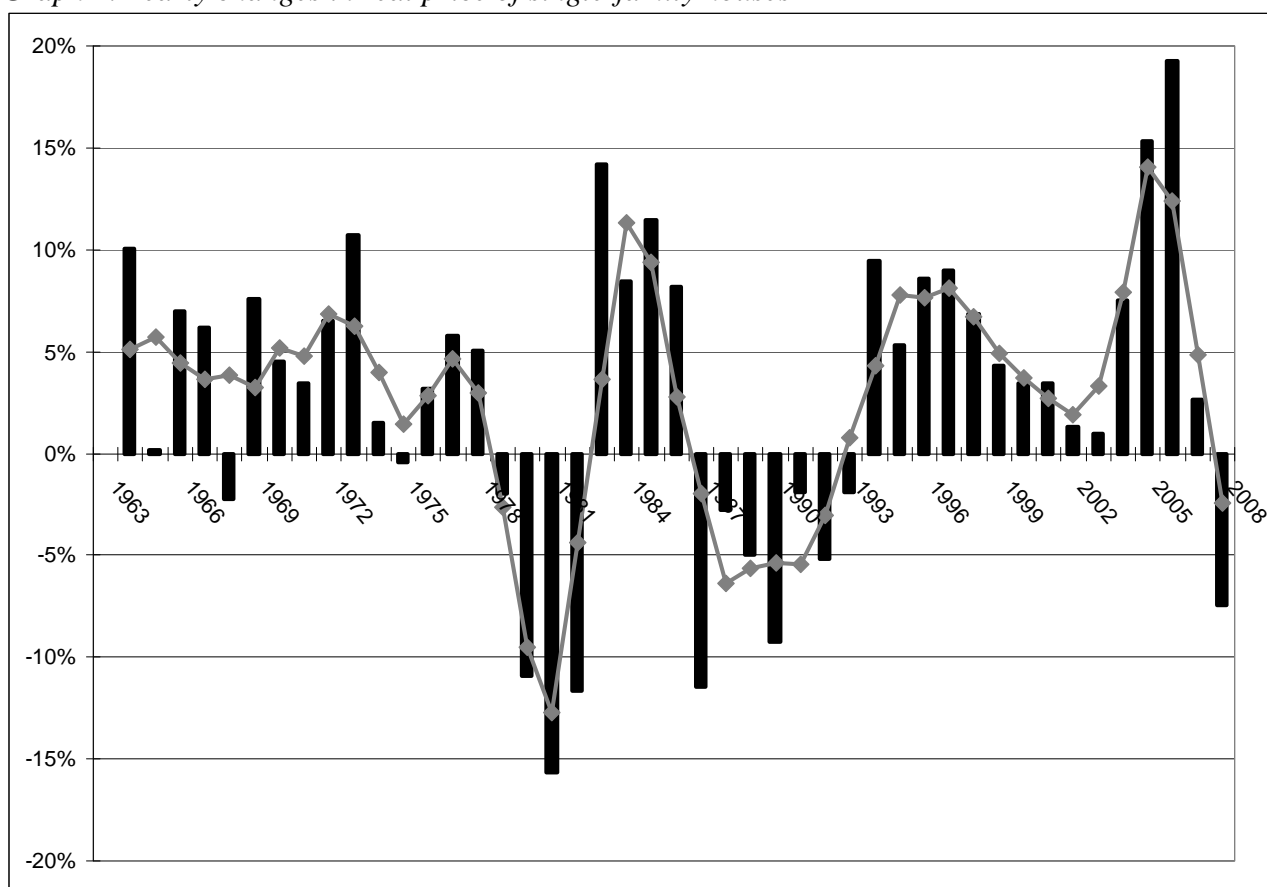*Graph 2. Yearly changes in real price of single-family houses*

Source: Statistics Denmark and own calculations (www.statistikbanken.dk, table EJEN5 & PRIS6)

This graph shows the yearly real change in house prices (column) and a 3-year mowing average of the yearly real change in house prices (gray line). It also unveils six different periods, all shown in table 1.

Table 1. Price booms and price busts for Danish single-family houses (real prices)

Period	Years	Total increase	Average yearly increase
I	1963-1978	94%	4.5%
II	1978-1982	-35%	-10.2%
III	1982-1986	49%	10.5%
IV	1986-1993	-32%	-5.4%
V	1993-2007	153%	6.8%
VI	2008-	-7.5%	-7.5%
	1963-2007	223%	2.7%
	1963-2008	199%	2.5%

Source: Statistics Denmark (www.statistikbanken.dk, table EJEN5 & PRIS6) and own calculations

In the first period from 1963 to 1978 the prices has generally been rising, even though the first oil price chock dampened the increase and gave a small negative development in 1975.

The second oil price chock marks the beginning of period 2 from 1978 to 1982 with an average yearly decrease in real house prices of 10.2 percent, partly brought about by a yearly inflation of 10 to 12 percent. But even nominal prices for single-family houses were falling from 1980 to 1982.

A shift from a floating to a fixed exchange rate of the Danish Krone towards the Deutsche Mark stopped the rising inflation and brought down real interest rates in 1982 and the following years. This decrease in interest rate brought down the monthly repayments on the mortgage on an owner occupied house, and resulted in rising prices in the years 1982-1986 (period III).

A lower tax relief on interest payments in 1987 meant a higher user cost of owner occupied houses and the number of foreclosures doubled from 1986 to 1988 (Albrecht & Deichmann Haagerup, 2008, p. 34). Real prices fell yearly by 5.4 percent in period IV from 1986 to 1993.

A fiscal expansion in 1993 and a generally lower price of credit (Hansen et al. (2003) p. 66) started the rise in house prices in period V. During the years from 1995 to 1999 the interest rate fell and among other things gave rise to increase in the price of single family houses. A fiscal contraction and a lower tax relief on interest payments in 1998 dampened the price increases, but among other things introduction of flexible interest mortgages in 2001 and interest only mortgages in 2003 fuelled large increases in real prices during the years 2003-2006. In 2007 house prices peaked and the price increase lost momentum. In 2008 prices for single-family houses have fallen by 7.5 percent.

Regarding the future development of prices for single-family houses in Denmark several factors point to a negative future development. Anecdotal evidence points to a shift in the lending policy among mortgage lenders. Instead of valuing brick and mortar they now to a higher degree look at the yearly income of the potential buyers when deciding whether to give a loan or not. This seems sensible in a time of falling house prices, but may also limit households' access to loans compared with the period of rising house prices. The Danish government has presented a bank bailout package to counter this and strengthen liquidity among Danish banks in general. Meanwhile unemployment has risen from 1.7 percent of the Danish workforce in September 2008 to 3.8 percent of the workforce in June 2009 (Statistics Denmark, www.statistikbanken.dk, table AUS02) and is projected to rise even further. This increased insecurity about future job options may also deter households from buying owner occupied dwellings and instead search for a dwelling to let This increases demand for rental apartments including social housing and decreasing demand and thereby price for owner occupied dwellings, including single-family houses.

*Graph 3. Cost index and consumer price index (1985 = 100)*
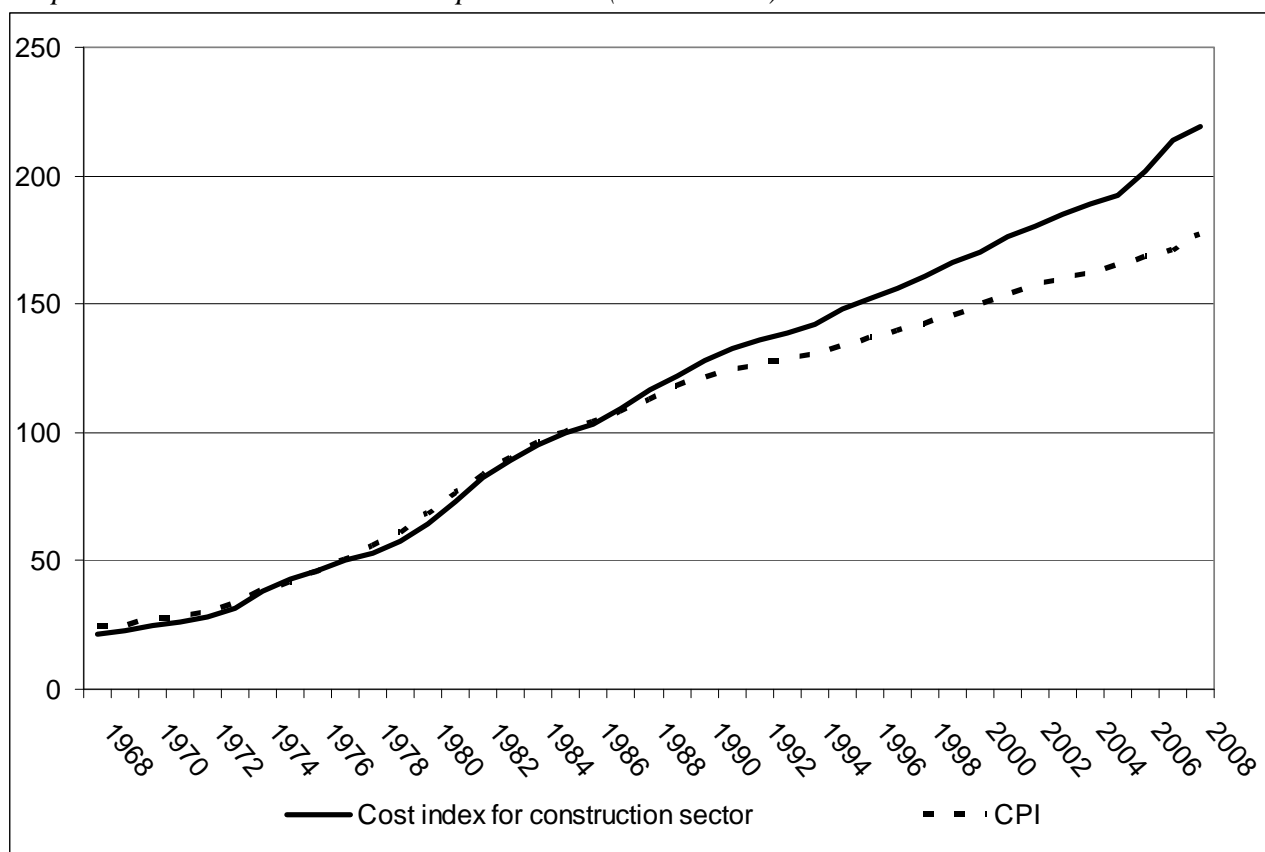
Source: Statistics Denmark and own calculations (www.statistikbanken.dk, table BYG5 & PRIS6)

The Danish cost index for construction sector, single-family houses (Reguleringsindeks for boligbyggeri, enfamiliehuse) is made by Statistics Denmark and is available back to the year 1968. It is made up by an index for labour such as carpentry and masonry and an index for materials such as foundation, shell and windows (Statistics Denmark, Label: Cost index for construction sector). These two indexes are weighed to represent an average house.

From 1968 to about 1980 the cost index for the construction sector followed the consumer price index, but from 1980 and onwards the cost index for the construction sector have risen faster than the consumer price index, with an yearly increase about 5 percent in 2006 and 2007. This reveals the fact that the market for both labour and materials was very tight in those two years.

As mentioned above, the calculation of Tobin's q should include the cost of land in the denominator. However, there are several complications the first being the poor quality of the price index for building lots. This price index only covers actually traded lots, and this is a problem as new lots, which are mostly located in the outskirts of a city, has a lower value than lots with houses in the city centre. But as these lots with houses are not traded as lots, there is a negative bias in the price index (Skat: http://www.skat.dk/SKAT.aspx?oId=400338&vId=0&i=2#i400338).

Graph 4. Price index of lots below 2,000 square meters (1985 = 100)
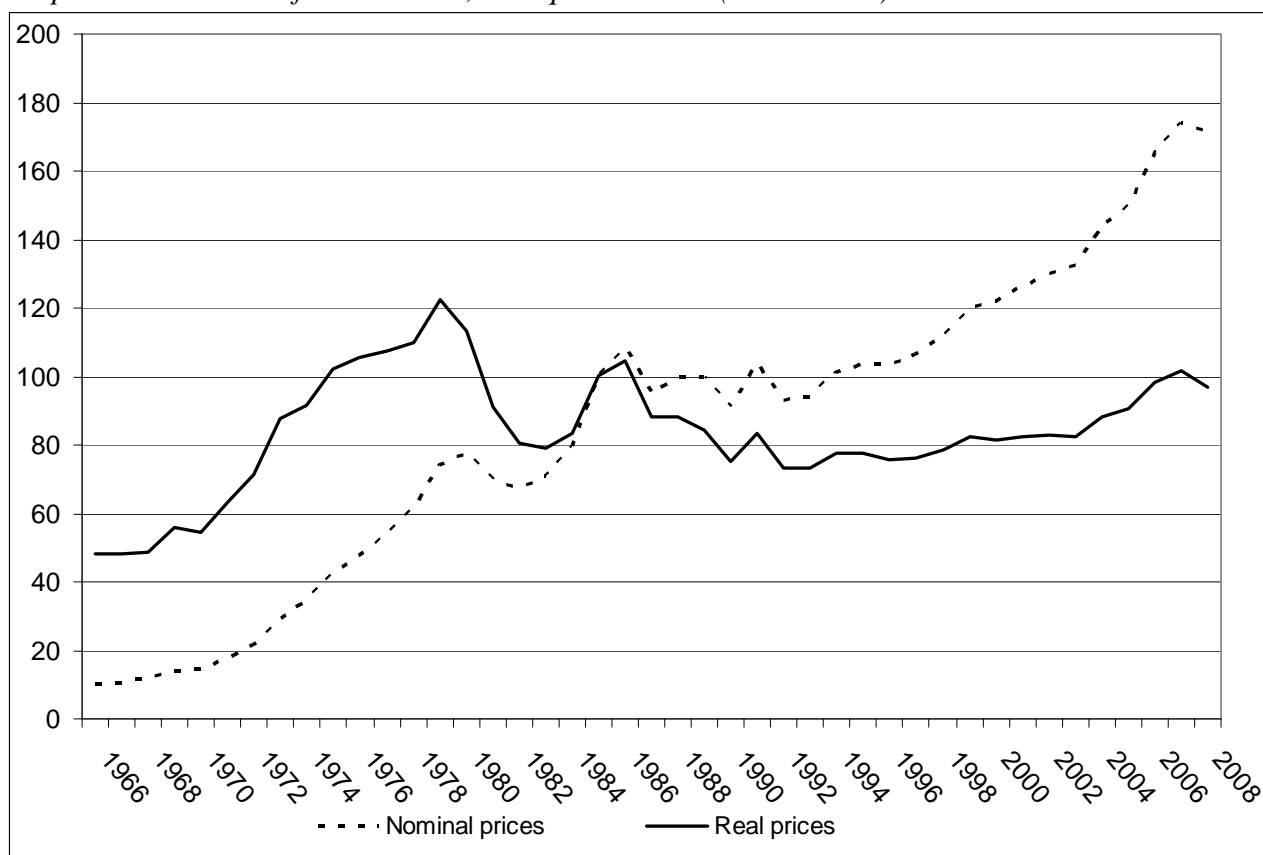
Source: Statistics Denmark and own calculations (www.statistikbanken.dk, table EJEN5 & PRIS6)

A second problem is the weight the cost of the lot should have in the denominator of Tobin's q, meaning the share of the total construction cost that goes to the purchase of the building lot. A guess would be 25 percent, but this would wary according to geographical location due to differences in land prices and would probably also wary over time. According to Skat (The Danish Ministry of Taxation, http://www.skat.dk/SKAT.aspx?oId=400337&vId=0&i=1&action=open#i400337), the average price of a single-family house during the years from 2001 to 2008 has been 1,478,002 DKK, while an empty building lot below 2,000 square meters has had an average price of 460,705 DKK. This indicate that the cost of land make up 31 percent of the cost of a single-family house on average. This can now be used to make a new index of the cost of construction including the cost of land seen in Graph 5. Because of the difficulties with including the cost of land, two time series for Tobin's q is presented, one including the cost of land in the denominator and one excluding the cost in the denominator of Tobin's q.

Graph 5. Cost index including cost of land and consumer price index (1985 = 100)
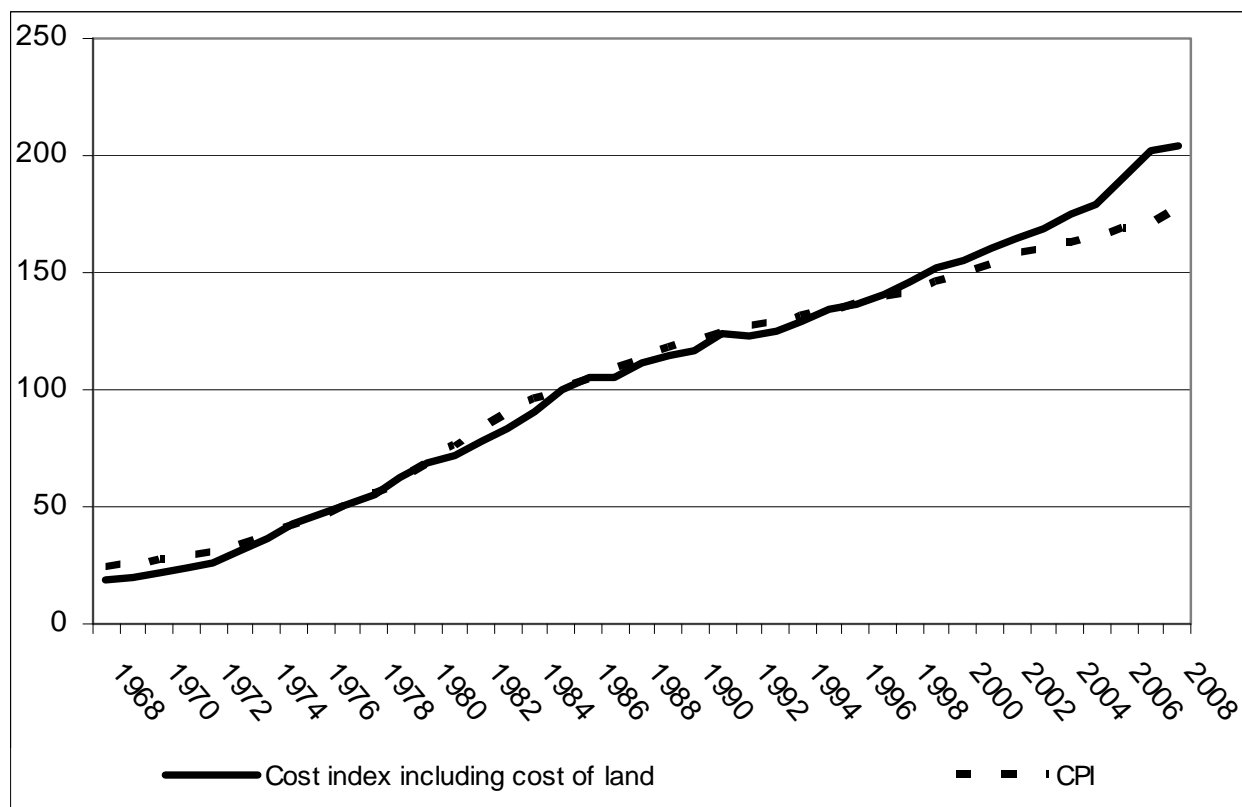
Source: Statistics Denmark and own calculations (www.statistikbanken.dk, table BYG5 & PRIS6)

With both the price index of single-family houses and the appropriate construction cost index it is possible to construct a time series for Tobin's Q. Of course, when dividing two indexes with each other, the scale of the new index becomes arbitrary. As both the index for house prices and construction cost are equal to 100 in the year 1985, the new index is also equal to one in this year. Another possibility is to adjust the data with the same factor so that it on average (Brøchner Madsen, 2008, p. 374) is equal to 1, which should be its long term value. The data for Tobin's q from 1968-2008 in this paper is equal to 0.97 for the index without land cost and equal to 1.03 for the index with land cost on average, so the adjustment is almost unnecessary and hence not done.

*Graph 6. Tobin's q for Danish single-family houses*
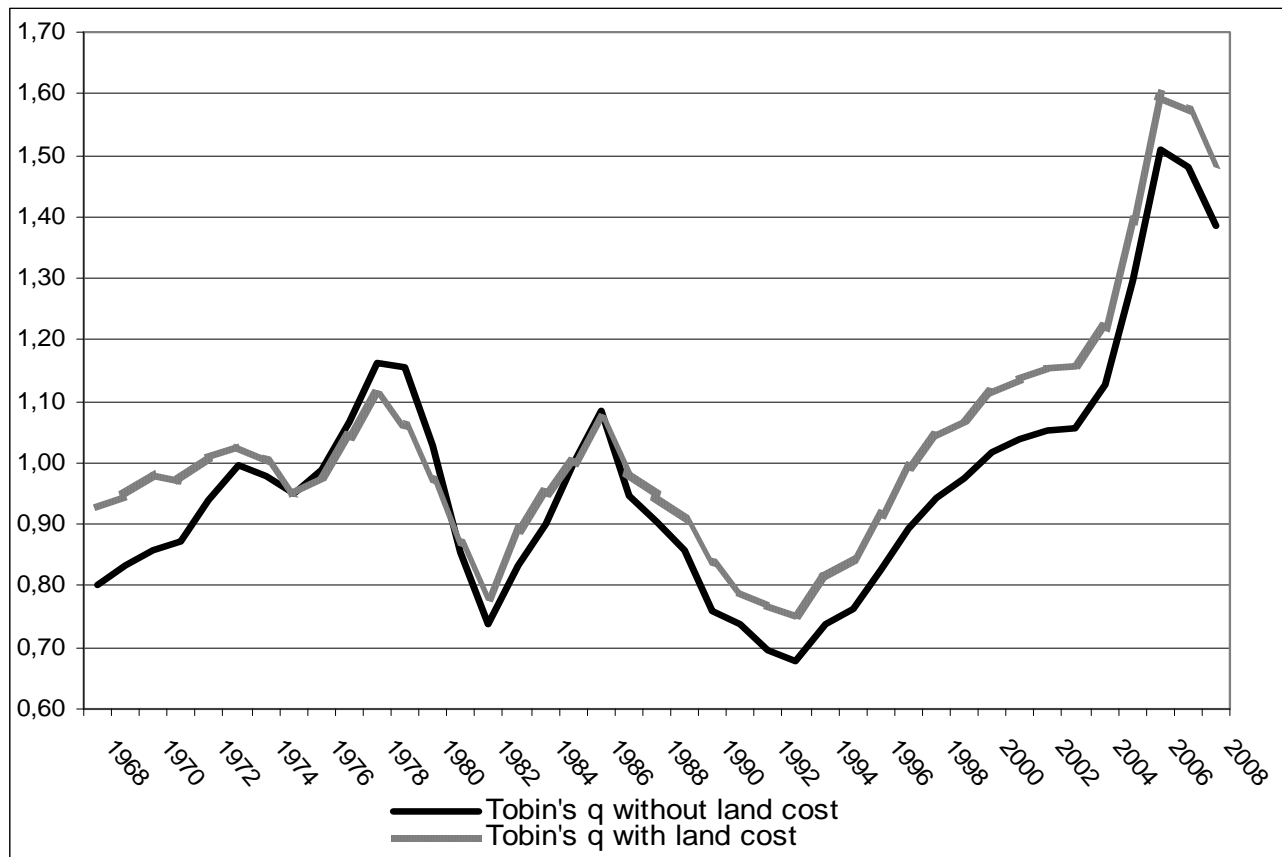
Source: Albrecht & Deichmann Haagerup (2008) and own calculations

The same three peaks as in graph 1 spring into mind when looking at the above graph for Tobin's q. The most interesting development however is the uninterrupted increase from 1993 to 2006, where the value of Tobin's q without land cost rose from 0.68 to 1.51. In 2007 Tobin's q fell to a value of 1.48, and continued to fall in 2008 to a value of 1.39. Tobin's q with land cost has a slightly different path than Tobin's q without land cost.

As the value of Tobin's q is a proxy of how profitable it is for developers to construct and sell new houses, there should be a relationship between the level or trend of Tobin's q and the activity in the construction sector, provided that municipalities and other landowners subdivide and sell new building lots for development.

Graph 7. Number of starts, construction of single-family houses, private developers
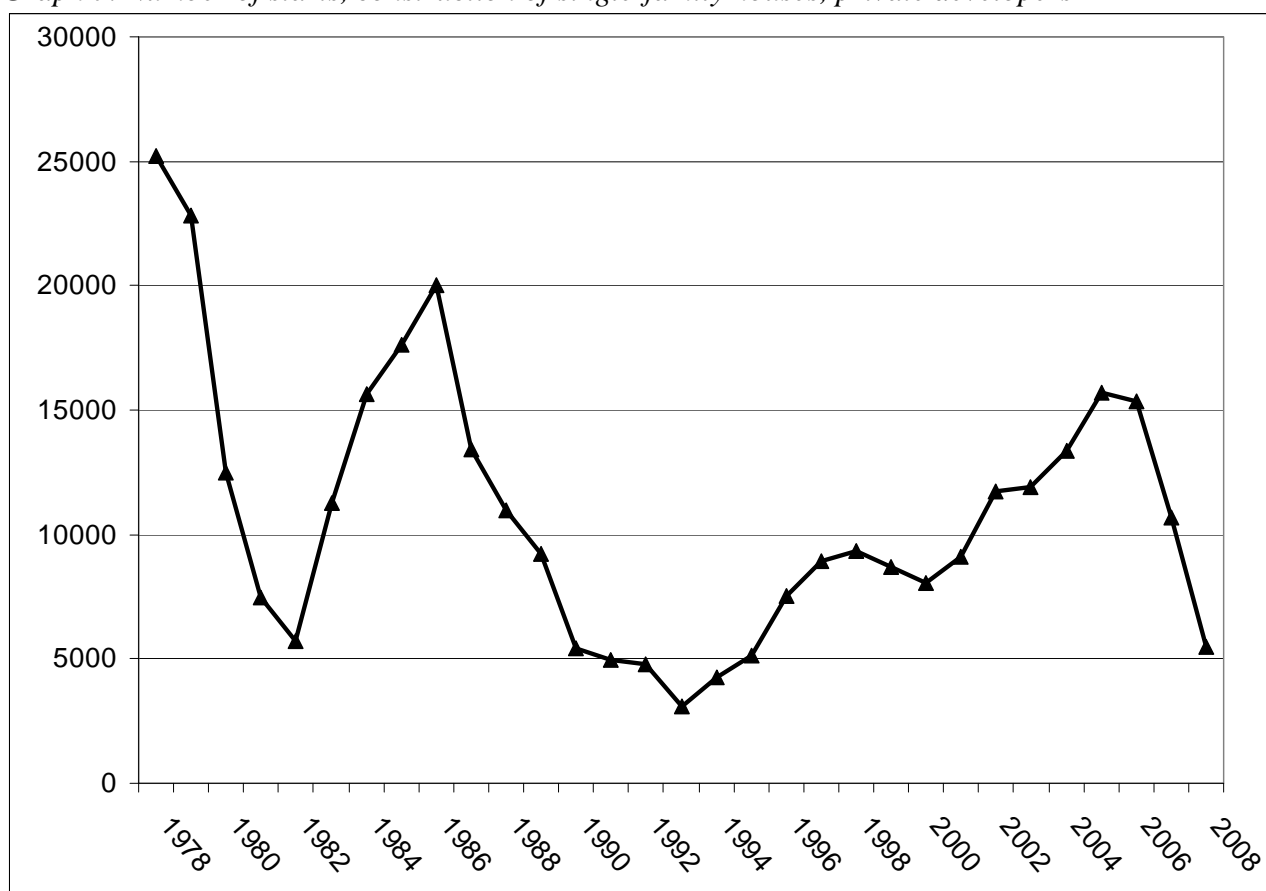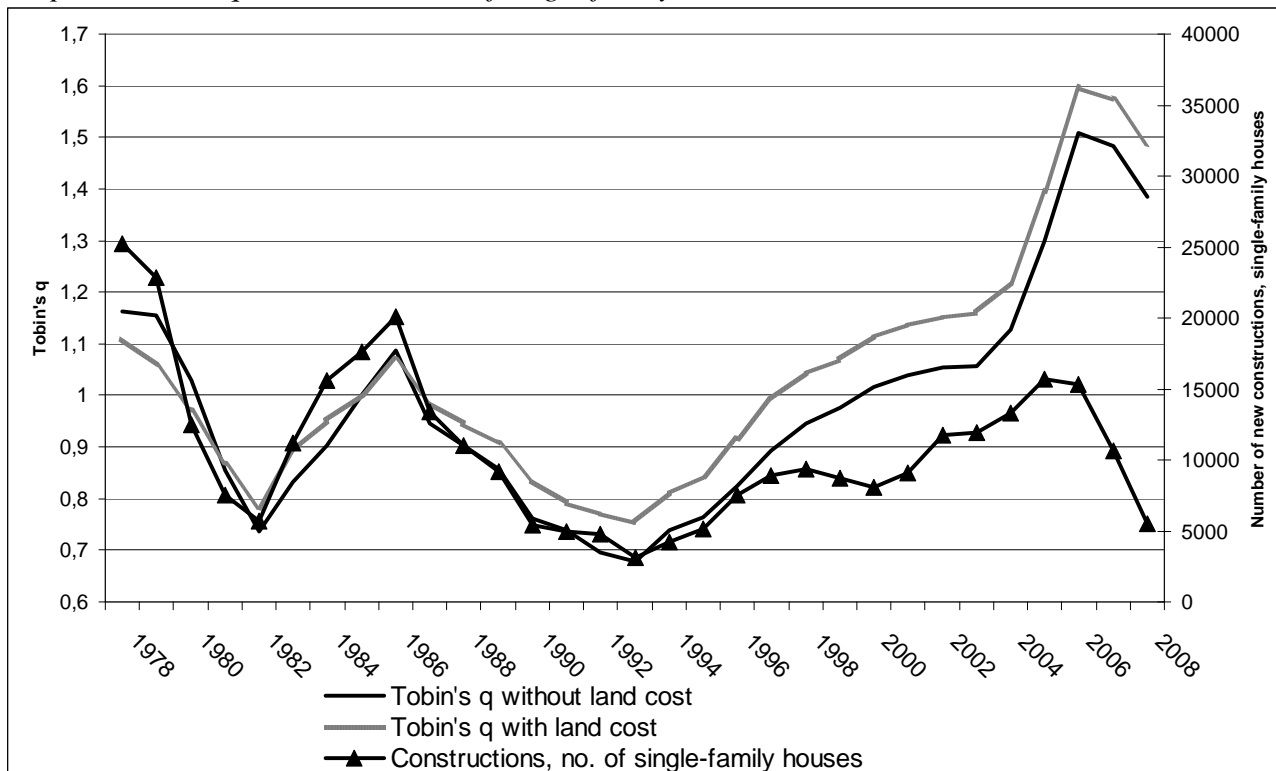

Source: Statistics Denmark, Statistical News, Construction and Housing, various volumes

To avoid interference from government construction, only the number of houses build by private developers is used. It is assumed that private developers respond the strongest to changes in profitability and therefore changes in Tobin's q, while government construction or construction aided by government grants is unaffected by changes in Tobin's q. Unfortunately Statistics Denmark only has this time series from 1978 and onwards. It shows a large variation in the activity in the construction sector, some years less than 5,000 starts of construction was recorded, but in 1978 25,000 starts of construction was recorded, and in both the years 2005 and 2006 the construction start of more than 15,000 houses were recorded each year. The number for 2008 is 5,506 houses. The number of starts of construction is chosen because it is the leading indicator for the activity in the construction sector.

The relationship between Tobin's q and construction is clear if the two time series are presented in the same graph.

Graph 8. Tobin's q and construction of single-family houses

Source: Albrecht & Deichmann Haagerup (2008) and own calculations and Statistics Denmark, Statistical News, Construction and Housing, various volumes

Both the trend and the value of the two measures of Tobin's q and construction activity coincide from 1978 to 1998, but already in 1997 the growth in the activity in the construction sector slowed down indicating an inelastic supply. In 1998 a fiscal contraction lowers the activity in the construction sector the following years, even though the value of Tobin's q was still rising. This lasts until 2001, where the number of new houses rises again. The next turn is in 2007 where the number of new houses decreases from around 15,000 in both 2005 and 2006, to 10,670 in 2007 and 5,506 houses in 2008. This happens at the same time as a decrease in the value of Tobin's q from 1.51 in 2006 to 1.48 in 2007 and lastly 1.39 in 2008.

One way to understand this reluctance to build among developers from 1998 to 2001 is to employ option theory. Uncertainty about the future plays a big role when deciding whether to invest in a building project. If the developer is a land owner and holds plots for development at some point in the future, the decision whether to build or not does not only depend on the net present value of the investment project. As such an investment is irreversible the net present value is not the correct way to evaluate the investment (Holland et. al. 2000).

Instead option theory can tell us about the incentives of the developer. The value of Tobin's q not only has to be above one, it also has to be above a trigger value that is larger than one if the market for development and construction is not perfectly competitive. The Danish market for construction is probably not perfectly competitive but has several large actors with some market power (Danish Competition Authority (2005)). If there were more competition on the market for development the developers would to a higher degree compete to be the first to build, this corresponds to classical Bertrand competition known from microeconomics (Albrecht & Deichmann Haagerup (2008) p.

106). If there is a monopoly a wait and see attitude is even more likely. Therefore a low level of competition the trigger value for construction is higher and therefore prices has to increase further before construction starts and the option to build is executed.

Uncertainty about the future of prices and demand for housing also affects the trigger value. If there is much uncertainty about future price development, the trigger value increase and therefore it may be optimal for developers to wait and see what the future may bring.

Together, high uncertainty about the future and a low degree of competition on the Danish market for new single-family houses brought down the amount of construction during the years from 1998 to 2001, as the fiscal contraction in 1998 and stagnating house prices together increased uncertainty about the future (Albrecht & Deichmann Haagerup (2008) p. 106). Therefore, construction of new single-family houses was delayed until the years after 2001 and this may have further pushed up the price of existing houses.

Implications

How low should the value of Tobin's q go before the trend of decreasing real house prices will stop?

Answering this question is not without complications, and there are many different approaches. The approach in this paper is to relate the real house prices to the fundamental value of houses. In the long run, the price of houses will always converge towards its fundamental value, given by the replacement cost of houses, and indeed, looking at graph 6, the is a tendency of Tobin's q to fluctuate around a long run level of 1.

This advocates that the level of Tobin's q should converge towards a value of 1, and looking at the experience from former house price downturns, perhaps to a value lower than 1, meaning a undershooting of the fundamental value in the short run.

This decrease in the value of Tobin's q can only be brought about by falling nominal prices of Danish single-family houses or rising construction cost or both. Looking at graph 1 and 3 it is clear that nominal prices of Danish single-family houses has been decreasing and the construction cost index is still increasing.

From the third quarter of 2007 to the third quarter of 2008, the nominal price of single-family houses in Denmark has fallen by 5 percent. If a yearly price fall of 5 percent is used for building a scenario of the future, and the construction cost index continues to rise by 2 percent pro anno, Tobin's q will reach a value of around 1 by 2013. This implies a nominal price fall for single-family houses of 23 percent before Tobin's q reaches a value of 1.

From the fourth quarter of 2007 to the fourth quarter of 2008, nominal prices have fallen by around 10 percent. If this yearly nominal price fall of 10 percent continues to be the case in future years, Tobin's q will reach a value of 1 already in 2011. This implies a nominal price fall of 28 percent before Tobin's q reaches a value of 1.

Using the measure for Tobin's q with the cost of land for this analysis complicates matters because it is necessary to extrapolate the development of future land prices. This is all complicated by the fact that official statistics are lagging behind, and that the quality of more up-to-date unofficial

statistics, for instance from real estate brokers and mortgage credit institutions, are often of a lower quality.

Graph 9. Possible scenarios for Tobin's q without land cost depending on future house price falls
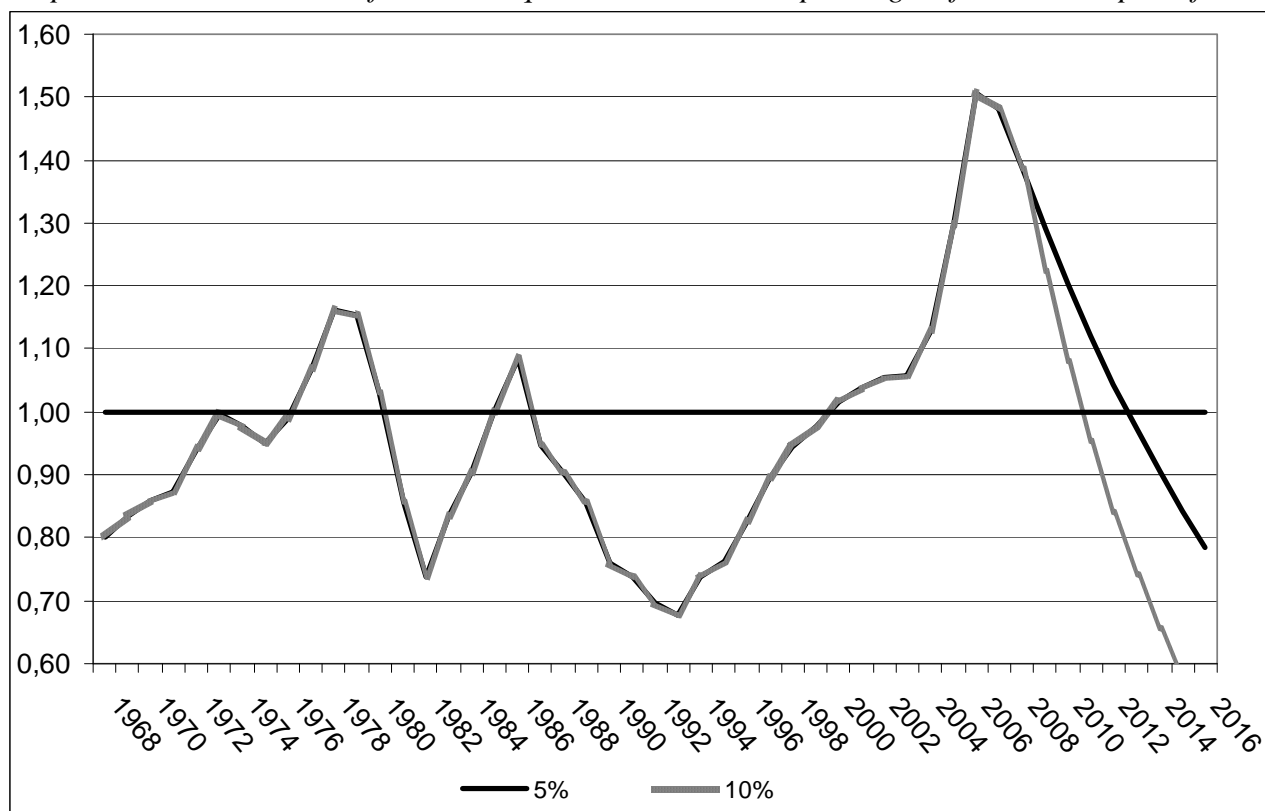

Source: Albrecht & Deichmann Haagerup (2008) and own calculations

What will the consequences of this downward adjustment be for the Danish housing market in general and for Danish households in particular? As mentioned the rising overall unemployment and tighter access to credit also indicate falling prices in future years. This will leave many households technically insolvent and the number of foreclosures is in fact already rising, as can be seen from Graph 10. The increased use of flexible interest mortgages (Danmarks Nationalbank http://nationalbanken.dk/DNDK/statistik.nsf/side/POB20090224Nyt!OpenDocument) may also contribute to an increase in foreclosures if short term interest rates rise in future years.

The number of sales of single-family houses has also decreased since year the 4th quarter of 2007 according to Statistics Denmark (see table A1 in appendix 2) and is now as low as 7,563 houses traded in the 4th quarter of 2008. This indicates a frozen housing market where the consumption of housing is not adjusted to match changes in needs and preferences. As mentioned earlier, this also increases demand for rented dwellings.

Whereas the years 2006 and 2007 saw very high employment in the part of the construction sector dealing with new construction, the employment in this sector is now decreasing (see graph A2 in appendix 2). There are no signs that the activity in the construction sector will increase significantly in the short run as long as prices and Tobin's q is falling and as long as the overall unemployment is rising.

Graph 10. Number of foreclosures for single-family houses
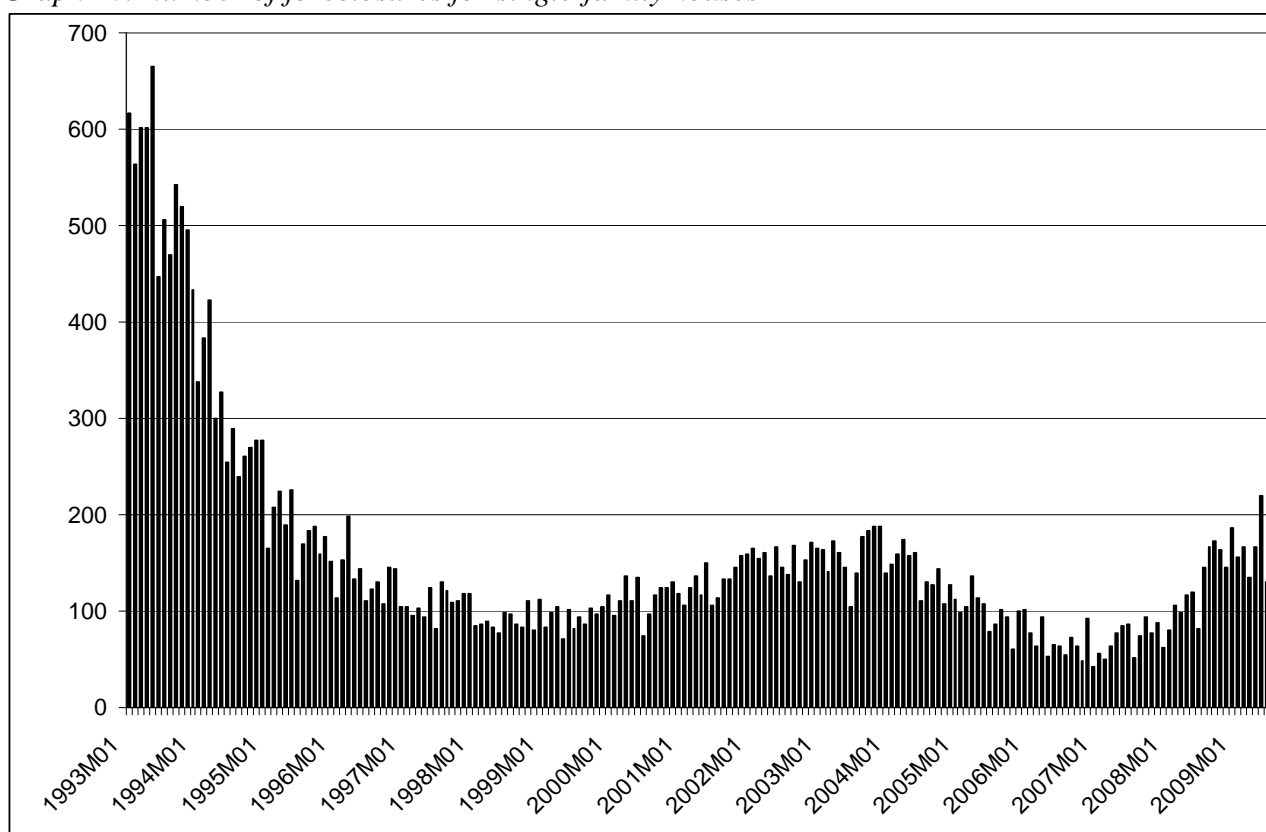
Source: Statistics Denmark (www.statistikbanken.dk, table TVANG1)

Conclusion

In the long run the price of houses should be given by the replacement cost of houses. In a competitive market with access to land, any deviation would result in either construction or no construction (resulting in depreciation of the existing housing stock). How responsive developers are to changes in prices depends on their short-run supply elasticity.

Tobin's q is the ratio of exiting house prices relative to construction cost. Tobin's q largely explains the activity in the construction sector in the period analysed in this paper, except in the years from 1998 to 2001. Here developers were uncertain about the future and had a wait and see attitude leading to less construction than the value of Tobin's q would have predicted.

During the period from 1968 to 2008 real prices of Danish single-family houses have risen by 2.5 percent on a yearly basis, but during the years 1993-2007 the average yearly increase was 6.8 percent and in 2006 prices rose by 19.3 percent, pushing the value of Tobin's q to an all time high of 1.51. This was not a sustainable development and prices fell by 7.5 percent in 2008.

Bringing the value of Tobin's q back to its fundamental value of 1 involve a nominal price fall of 23 to 28 percent from the current level, depending on how fast the downward adjustment occurs. Whether the recent years overshooting of the fundamental level of Tobin's q will imply undershooting in the coming years still needs to be seen. But an adjustment down to the fundamental level of 1 seems inevitable.

This adjustment process may be very unpleasant with a housing market with a very low mobility and few transactions, a rising unemployment and an increase in the number of foreclosures. The construction of new single-family houses will also be very low, and may decrease to an all time low in 2009 and 2010 if the current situation continues.

Further research

Extending this analysis to other countries would be of great interest even though the necessary data on prices and construction cost is not always available.

It would increase the validity of the index if it was build bottom-up instead for top-down. As all building projects have their own unique value for Tobin's q, the correct way to estimate a index for Tobin's q would be to aggregate all the values for Tobin's q for all the building projects for that specific year. This would give a far more robust and correct data series for Tobin's q and hence profitability in the construction sector.

Estimate supply elasticity for single-family houses in Denmark and investigate the market power of developers on the Danish market. This would also involve interviews with developers to investigate their strategies.

References

Albrecht, K. H. & Deichmann Haagerup, C. (2008). Konjunkturcykler i boligbyggeriet (Cycles in housing construction), Masters Dissertation, University of Copenhagen, Department of economics 2008.

Brøchner Madsen, J. (2009). *Taxes and the fundamental value of houses*. Regional Science and Urban Economics 39 2009 365-376.

Bulan, L. et. al. (2006): *Irreversible Investment, Real Options and Competition: Evidence from Real Estate Development*, NBER Working paper: http://nber.org/papers/w12486 august 2006

Danmarks Nationalbank (2009): *More interest only mortgages with flexible interest rate*, http://nationalbanken.dk/DNDK/statistik.nsf/side/POB20090224Nyt!OpenDocument

DiPasquale, D. & Wheaton, W.C. (1996): Urban Economics and Real Estate Markets, Prentience-Hall Incorporated, New Jersey.

Hansen, N. L. & Pedersen, E. Haller. (2003): Årsager til opsvinget i 1993-94, hvor afgørende var finanspolitikken (Causes for the up-turn in 1993-1994, how decisive was the fiscal policy?), Nationalbanken, Kvartalsoversigt 3. kvartal 2003, p. 63-73.
Danmarks Nationalbank, Quarterly overview, 3rd Quarter 2003, p. 63-73, 2003
http://www.nationalbanken.dk/C1256BE2005737D3/side/Kvartalsoversigt_2003_3_kvartal!opendocument

Holland, A. S., Ott, S. H. & Riddiough, T. J. (2000): *The Role of Uncertainty in Investment: An Examination of Competing Models using Commercial Real Estate Data*, Real Estate Economics 28: 33-64.

Konkurrencestyrelsen (2005).: Konkurrenceredegørelse 2005:
http://www.ks.dk/index.php?id=17992 (Danish Competition Authority (2005))

Malpezzi, S. and Watcher, S. M. (2005): *The Role of Speculation in Real Estate Cycles*, Journal of Real Estate Literature, Volume 13 Number 2, p. 143-164

Statistics Denmark, Label: Price index for traded houses.
Danmarks Statistik, Varedeklaration: Prisindeks for ejendomssalg – online 2007.
http://www.dst.dk/Vejviser/dokumentation/Varedeklarationer/emnegruppe/emne.aspx?sysrid=000906

Statistics Denmark, Label: Cost index for construction sector
Danmarks Statistik, Varedeklaration: Reguleringsindeks for boligbyggeri – online 2007.
http://www.dst.dk/Vejviser/dokumentation/Varedeklarationer/emnegruppe/emne.aspx?sysrid=095119

Statistics Denmark, Statistical News, Construction and Housing, various volumes
Danmarks Statistik, Statistiske Efterretninger, Byggeri og boligforhold, Byggevirksomheden, diverse årgange. http://www.dst.dk/TilSalg/abonnementer/StE/Emneopdelt.aspx?msi=10

Skat (The Danish Ministry of Taxation), Ejendomssalg, various years.
http://www.skat.dk/getFile.aspx?Id=54653

Bogason, P. et al (2008).: En forhandlet løsning - En casebaseret analyse af byggegrunde, byudvikling og prisdannelse i Danmark (A negotiated outcome - A case based analysis of building lots, development and price formation in Denmark), Center for Bolig of Velfærd, Copenhagen. (ISBN 978-87-7296-266-5) http://bovel.dk/node/112

Appendix 1

An elastic supply of new houses ensures that the short-run supply curve and the long-run supply curve are not very different.

Diagram A1. Demand chock with elastic supply

Price

New construction
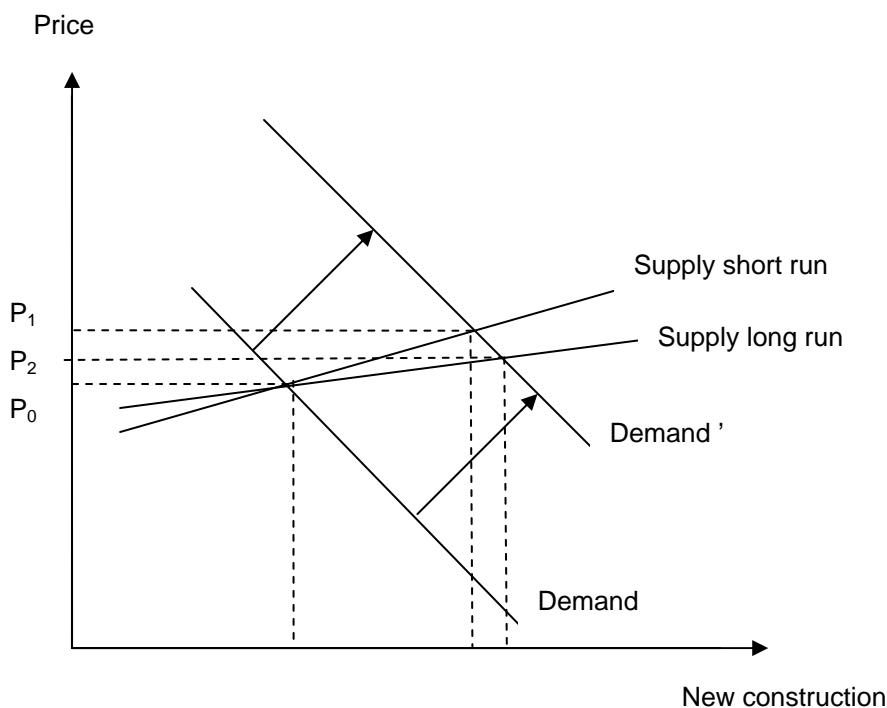
Source: Malpezzi & Wachter (2005) p. 153

Increased demand for housing shifts the demand curve from Demand to Demand '. This leads to an initial price jump from P_0 to P_1 where prices in the short run overshoots it long run future level, but only by very little. In the next period prices fall to its new long run level and the adjustment is complete. The important thing to note is that from period 0 to period 1 the number of new constructions increases almost to its new long run level for period 2, and only a small part of the adjustment from period 0 to period 1 is done via prices. If the supply of new housing was inelastic the adjustment would look a lot different, as shown in the next diagram.

Diagram A2. Demand chock with inelastic supply

Price

Supply short
run

Supply long
run

P_1

P_2

P_0

Demand '

Demand
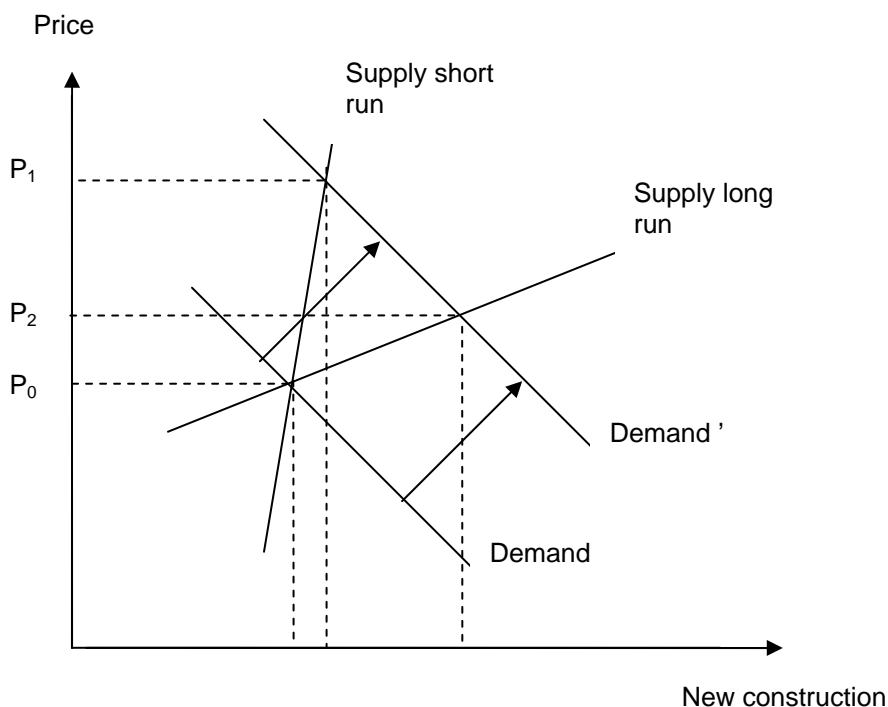
New construction

Source: Malpezzi & Wachter (2005) p. 153

An inelastic supply in the short run gives a large difference between the short run supply curve and
the long run supply curve. Increased demand is to a large extend not met by increased new
construction, and this leads to prices that overshoot their new long run level to a large extend. Not
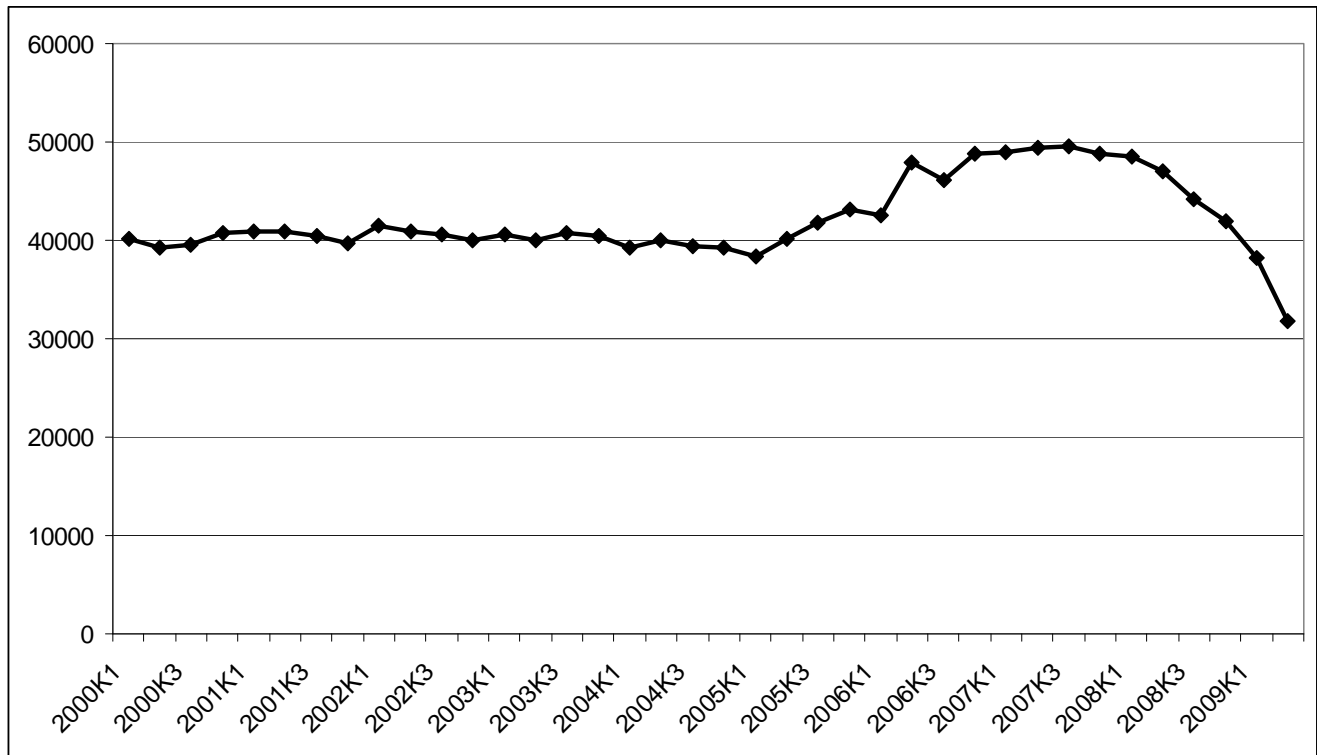until period 2 is the supply of new housing able to increase significantly.

Appendix 2

Graph A1. Number of traded single-family houses from 2000Q1 to 2008Q4, seasonally adjusted
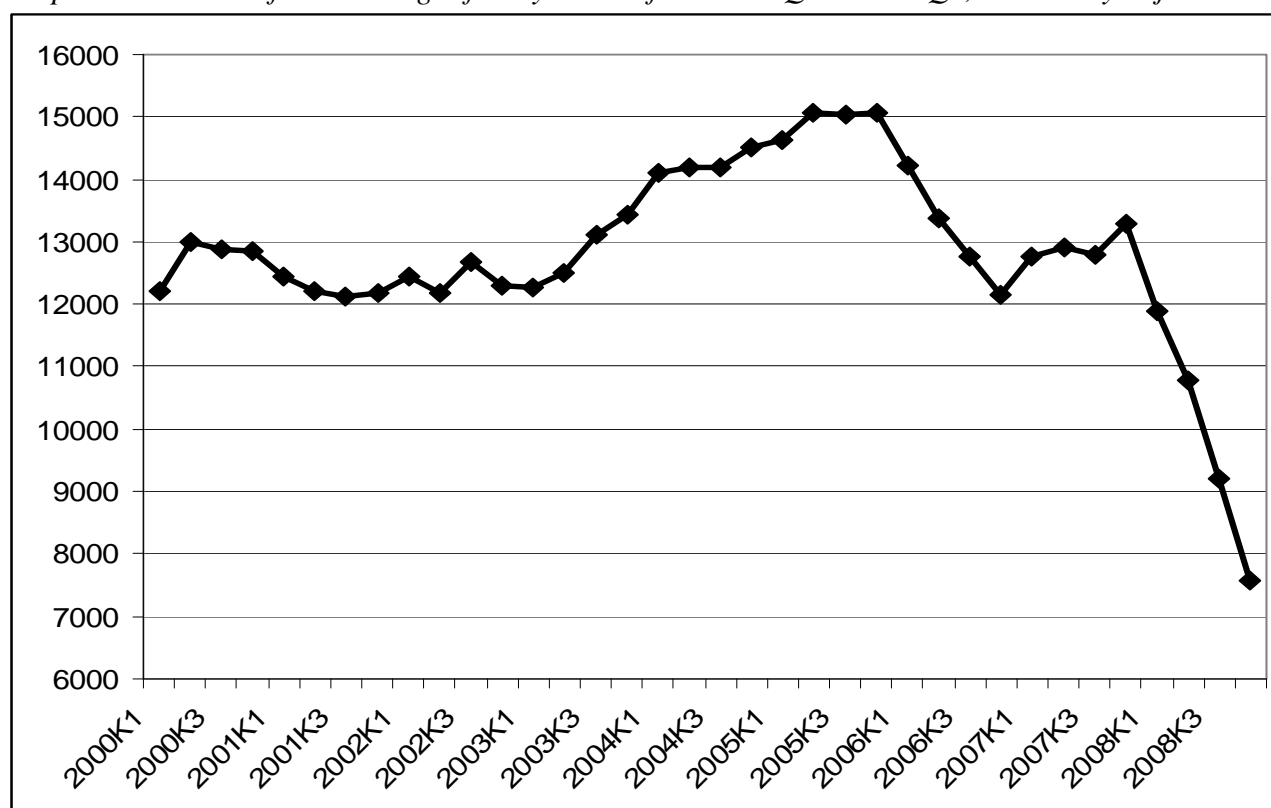
Source: Statistics Denmark (www.statistikbanken.dk, table EJEN12)

Graph A2. Number of people employed with new construction and extensions (seasonally adjusted)

Source: Statistics Denmark (www.statistikbanken.dk, table DB07)