Housing Market Risks

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Without being actually aware of this, millions of people are exposed to serious investment risk, simply by owning a house. Just like stocks or bonds, a purchased house has to be sold once, for a price depending on uncontrollable market forces. However, for many housing markets, the most recent years do not give any cause to think in terms of risk. In the Netherlands, for example, the prosperous nineties pulled the wool over nation’s eye; house prices kept on rising, even in real terms, and doubled in 8 years time. Over the year 2001, UK and US house prices increased sharply as well. A less myopic view, however, would provide a different perception. Price developments have not always been this favorable. For the countries mentioned before, appreciation rates for the most recent years are about double the annual averages since 1980. Figure 1.1 provides an impression of the house price developments for these countries.

Figure 1.1: How far should we look back?
Nominal house prices and changes, 1976-2001, United Kingdom, United States, and the Netherlands

*Based on data of respectively Nationwide Building Society (UK), OFHEO House Price Index (US), and Ministry of Housing, Spatial Planning and the Environment, VROM (NL)*
In the Netherlands, households that bought their house at the top of the housing market at the end of the 1970’s, had to wait for 14 years until prices reached the original level. If these prices are corrected for inflation, this period was 20 years. Over the last 25 years, the standard deviation of annual house price changes is about half the standard deviation of stock values. Currently, house price growth is slowing down; some models even predict structural price decreases for the Dutch near future, like Boelhouwer (2001).

Not the actual house price changes, but the variability of house price changes is the source of risk. House prices move very gradually compared to stock or bond prices, but could still show very unstable appreciation rates for horizons longer than a few years. Housing market booms and busts could drive up standard deviations to a large extent. On average, Dutch house prices rose at the same pace as US prices over the period 1975-2000, but the standard deviation of Dutch price changes is 3 times as high. In contrast with the United Kingdom or the Netherlands, no housing market boom or collapse occurred in the United States during these years. Besides due to several booms and a bust, the large standard deviation of UK house price changes is due as well to the relatively large appreciation rates during ‘regular’ years. The figures from Table 1.1 show that owning a house could mean a considerable risk, but that the risk perception depends heavily on the studied time horizon.

Table 1.1: How risky is a home?
Averages and standard deviations of annual house price changes for the Netherlands, the UK and the US.

<table>
<thead>
<tr>
<th>Period</th>
<th>Return (average annual return)</th>
<th>Risk (standard deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NL</td>
<td>UK</td>
</tr>
<tr>
<td>1976-1980</td>
<td>10.6%</td>
<td>16.5%</td>
</tr>
<tr>
<td>1981-1985</td>
<td>-3.9%</td>
<td>8.1%</td>
</tr>
<tr>
<td>1986-1990</td>
<td>4.7%</td>
<td>10.9%</td>
</tr>
<tr>
<td>1991-1995</td>
<td>6.7%</td>
<td>-2.3%</td>
</tr>
<tr>
<td>1996-2000</td>
<td>11.2%</td>
<td>9.4%</td>
</tr>
<tr>
<td>2001</td>
<td>7.4%</td>
<td>12.5%</td>
</tr>
<tr>
<td>1976-2000</td>
<td>5.7%</td>
<td>8.3%</td>
</tr>
<tr>
<td>1981-2000</td>
<td>4.5%</td>
<td>6.4%</td>
</tr>
<tr>
<td>1986-2000</td>
<td>7.5%</td>
<td>5.8%</td>
</tr>
<tr>
<td>1991-2000</td>
<td>8.9%</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

The change over 2001 concerns the annualized difference in price indices for the third quarters of 2000 and 2001. The annual figures are based on Ministry of Housing, Spatial Planning and the Environment, VROM (NL), Nationwide Building Society (UK), and OFHEO House Price Index (US).

These figures only reflect changes in national averages, caused by factors that influence the housing market as a whole, like interest rates or policy changes. However, these changes only concern one aspect of the total risk. Besides these macro-level influences, uncontrollable micro-level factors could cause price changes as well. A specific neighborhood might gain or loose popularity in a relatively short time period, certain
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property characteristics might become less desirable, and a specific property might be ignored completely by potential buyers. Consider, for example, what would happen to house prices if the local government would announce the construction of a nuclear power plant. And would property values be the same before and after the explosion of a fireworks factory?

1.1 Why housing market risk cannot be ignored

For many households, the house is the biggest asset in the private investment portfolio. However, investment return might not be the dominant investment motivation for many residents. Since a home provides accommodation in the first place, decisions to buy a house instead of renting it might be based on other motivations, like lower costs in the long run, or realization of dwelling preferences. Price risk might be assumed away with arguments like the absence of the explicit need to sell the property, or the likewise fallen price of a subsequently owned property if the housing market would collapse.

![Figure 1.2: Huge price differences within a small county.](image)

For 1'8 of the 80 NVM-regions, the number of transacted detached properties is insufficiently large to calculate reliable statistics.

However, this is head-in-the-sand thinking, since ultimately every property will be sold. As far as the collective-collapse argument concerns, it is unlikely that all property prices show exactly the same changes at the same moment. For example, Dutch detached single-family properties currently rise much faster in price than any other residential property type, but even for this type of houses, large differences exist within the country.
Figure 1.2 shows how large these differences could be. Prices of detached houses in The Hague and Rotterdam rose over 50 percent over during the year 2000, while properties in the regions Groningen and Bunnik/Zeist did not rise at all. Since housing demand and supply are local factors, 'the' Dutch housing market does not really exist. In case of overbuilding or rising mortgage interest rates, not all property values would fall; prices of less popular areas or property types are likely to be affected before other areas or property types.

Another argument not to ignore housing market risk relates to the impact of the housing market on general wealth. High property values induce higher consumer spending; people may feel richer, or are actually richer by cashing their home's equity. So, fluctuations in the housing market cause fluctuations in the general economy. Case, Quigley and Shiller (2001) proved that housing markets of developed countries appear to be more important than the stock market in influencing consumption.

This thesis studies macro-level and micro-level aspects of housing market risk. Many studies have analyzed macro-level factors driving house prices, like changes in GDP or policy changes. On the other hand, many other studies have focused on micro-level factors, by studying the price impact of amenities and externalities like highways or waste sites. So, if this area is so widely studied, why do we add another 178 pages to the literature?

1.2 Outline of the dissertation

Looking back 25 years in history yields a different view on housing risk than studying only 15 years. However, even these 25 years may not be sufficient. The great majority of real estate research concerns data periods of a few decades at most; longer periods are frequently not available. Nevertheless, data periods of a few centuries instead of a few decades could add a lot of additional research material, which might lead to different perceptions. Therefore, we will study housing market risk at a macro-level for very long time periods in the first part of this thesis. The second part focuses on housing market externality analysis at a micro-level. Both parts start with a 'toolkit'-chapter, in which the methodologies being applied in the five empirical chapters are explained in more detail. Although all empirical studies concern Dutch housing market data, the conclusions of most chapters are likely to be general.

Macro-level risk

To analyze house prices, an index is needed. For real estate, this is not as straightforward as for the stock or bond market. Stocks are traded at a high frequency, and the stock universe is relatively homogenous. Real estate, however, is usually sold after a number of years, and there are thousands or millions of different properties within a housing market region. Moreover, property values can change considerably in between two transaction
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moments. Due to the low transaction frequency, a real estate index based on transaction prices must assume that all transacted properties within a specific time interval are representative to the entire market. Due to the wide heterogeneity of the housing stock, this will seldom be the case. As a result, all kinds of measurement problems might arise, which need to be dealt with. Since housing market indices play an important role throughout this thesis, a brief overview of the applied index construction methods is given in Chapter 2.

In Chapter 3, one of the index construction techniques developed to measure house price changes is used to construct an index for the rental housing market. We compare the resulting rent index with other rent indices that are constructed with methodologies widely used in practice, but which do not reflect true market value, and do not control for the heterogeneity problem. The data set we use for this is quite unique; it entails rents on a cross section of residential properties in Amsterdam and covers the period between 1550 and 1850. This index does not suffer from the major pitfalls of the specific index method.

This constructed rent index is used in Chapter 4 to study the behavior of the Amsterdam housing market in the long run. In this chapter, a property price index is used as well, which is based on the Amsterdam property price index of Eichholtz (1997), starting in 1649 and extended to 1998. With other variables, a time span of 450 years of Amsterdam economic history is covered. Our market analysis shows that rents and prices change very similarly, and track business cycles closely in the long run. Event studies indicate that the housing market could react very fast to major socio-economic events, like the eruption of wars and other disasters. Property sales prices react directly to such large shocks with significant declines, and rents react with some delay. The long-run view indicates that housing investment is exposed to the entire economy, but more severely than the stable recent years would suggest.

Another source of macro-level house price market risk is the possibility that property prices do not keep track with inflation. In that case, the owner suffers a loss in real terms. This potential threat is studied in Chapter 5. Using the index for Amsterdam house prices for the period 1649-1998, this chapter shows that the link between house price changes and inflation depends on the time horizon, and the longer the investment horizon, the higher the inflation hedge ratio of house price changes. This chapter also shows that when inflation is persistent, home ownership provides some protection against inflation risk. Again, with a short-term data set these conclusions could not have been derived.

Micro-level risk

So far, this study has considered housing market risk at a macro-level. The second part of this thesis analyzes how externalities impact house prices at a micro-level. Due to new methodologies, algorithms and increasing computer power, analysis of this impact on a
property-by-property base gains efficiency and reliability. By applying recently developed insights into real estate micro market analysis, spatial autocorrelation techniques, to a rich data set, we are able to address two topics that gain the most Dutch public attention with respect to house prices. However, we first explain in Chapter 6 how housing market externalities are studied in the literature, provide a brief review of this literature, and show why and how using spatial autocorrelation could improve this type of analysis.

An externality that is frequently referred to in the media, but politically very delicate, is the presence of a center for accommodation of asylum seekers. One argument frequently used by opponents of new accommodation centers concerns the value of surrounding properties. Chapter 7 analyzes whether this argument is actually true. For this, we use 113,574 housing transactions occurring in the western part of the Netherlands during the years 1997 through 1999, and study all 55 accommodation centers that were in operation during this period. Our results suggest that in the majority of cases, the nearby presence of a center neither influences property prices, the time required to sell the house, nor the sellers’ price concession. Despite all public prejudices, asylum seekers centers can therefore not be seen as negative housing market externalities.

Because of large planned infrastructural projects like expansion of the main airport and construction of high-speed railways, noise nuisance and its impact on house prices has become another national social topic in the Netherlands. Moreover, according to EU-guidelines, determination and enforcement of differentiated noise limits will be delegated from national to local governments in the near future. The value of noise has never been this important. In Chapter 8, we use the same property information as in Chapter 7, and relate the properties to a grid specifying the traffic noise for small 100-by-100 meter areas. We estimate that traffic noise will impact property prices if it exceeds a sound level of 65 decibels. The maximum impact will be a 3 to 10 percent value reduction, depending on the studied sub-market. The reduction appears to be a nonlinear function of the noise level; reducing noise from a very loud to a loud level is less beneficial than reducing it from loud to moderately loud.

Finally, Chapter 9 summarizes the thesis and provides conclusions.