



# Asymmetric information and list-price reductions in the housing market<sup>☆</sup>

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## ABSTRACT

In housing markets with asymmetric information list prices may signal unobserved properties of the house or the seller. Asymmetric information is the starting point for many models for the housing market. In this paper, we estimate the causal effect of list-price reductions on the time houses remain for sale on the market to test for the presence of asymmetric information. We use very rich and extensive administrative data from the Netherlands. Our empirical results show that list-price reductions significantly increase the selling rate of a house, but also the rate of withdrawal from the market increases.

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## 1. Introduction

Heterogeneity in the housing market is often considered to be quite substantial. Houses, for example, differ in size, location and quality. Many of such house characteristics are revealed to potential buyers when a house is put up for sale on the market. In fact, real-estate brokers often add an extensive list of house characteristics including pictures to their advertisements of houses for sale. However, there may remain characteristics, which are known to the seller, but unobserved by potential buyers. These may not only be characteristics of the house, but may also relate to the seller. Sellers can, for example, differ in risk preference, financial constraints and patience. In theoretical models for the housing market such asymmetric information is often ignored. Some exceptions are Albrecht et al. (2012) and Taylor (1999). An important question is to which extent information asymmetries are important in the housing market.

In this paper, we focus on how changes in the list price affect the time a house remains on the market. List prices are not binding in the Dutch housing market. They have no formal role, and by law sellers have to provide all relevant information about the house. The lack of any legal commitment implies that if the market is characterized by symmetric information between buyers and sellers, the list price does not have any effect on outcomes. However, in case of asymmetric information, the list price can signal some unobserved properties of the house or the seller (e.g. Albrecht et al., 2012). More patient sellers may, for example, set a higher list price than desperate sellers. Indeed, Genesove and Mayer (1997) show that sellers with a higher loan-to-value set a higher list price and experience a longer time to sale. Genesove and Mayer (2001) attribute this to loss aversion of sellers. Based on this finding, they conclude that the real-estate market is not a perfect asset market. We sketch the setup of a theoretical housing model with asymmetric information. This model guides interpretation for our empirical analysis.

Estimating the causal effect of the list price on outcomes in the housing market is complicated. There may be characteristics which are observed by both buyers and sellers, but which are unobserved by the econometrician. For example, the thinness of the market for a particular house affects both the list price and the probability of selling the house (e.g. Lazear, 1986). Therefore, we focus on the effects of changes in list prices while a house is on the market, rather than the initial level of the list price. However, Lazear (1986) shows that also changes in the

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list price are not exogenous; market thinness may affect list-price changes. This is confirmed by [Sass \(1988\)](#), who shows that the size of the pool of potential buyers is important. [Deng et al. \(2009\)](#) show that less-informed sellers set a higher list price, are more likely to reduce the list price and sell at a lower price.

We use a timing-of-events duration model to estimate the causal effect of a list-price change on the time a house is on the market. The empirical model extends the competing risks model used by, for example, [Deng et al. \(2000, 2005\)](#). [Abbring and Van den Berg \(2003a\)](#) show that identification of the causal effect of a list-price change depends upon buyers not anticipating the exact moment at which the list price is reduced. No anticipation only implies that buyers do not know the exact moment at which the list price is lowered, i.e. the actual list-price reduction causes a shock. Buyers may, however, know that certain houses are at risk of lowering the list price or that list prices are likely to be lowered in certain time periods. No anticipation thus does not imply that list-price reductions are exogenous, or that the rate at which list prices are reduced is the same over time. Houses may have different rates at which list prices are reduced, and it may be that during particular periods a list-price reduction is more likely than in other periods. Therefore, we explicitly allow for selection on unobservables. Also if some houses never lower the list price (i.e., the duration distribution until lowering the list price is defective), the model is still identified. We not only focus on the time until selling the house, but also allow for the option to withdraw a house from the market. Withdrawing a house from the market is not exogenous (e.g. [Taylor, 1999](#)). We explicitly incorporate this in our model by having competing risks.

We use a unique administrative data set provided by the Dutch NVM (Association of Real Estate Brokers and Real Estate Experts) on houses put for sale on the Dutch housing market during the period 2005–2007. The data contain daily information on the time the house was on the market. Also the reason for leaving the market is recorded, so we also observe houses withdrawn from the market by the seller. Such information is not trivial. [Caplin and Leahy \(1996\)](#) discuss the consequences of self selection in markets with frictions such as real-estate markets, when only sales are observed. Withdrawal data contain important information about the selling process (e.g. [Taylor, 1999](#)). Our data contain not only the initial list price, but are also informative on the dates and magnitudes of all list-price changes. Furthermore, we observe a very extensive set of characteristics of each house.

Our paper contributes to two earlier studies considering list-price changes. Both [Knight \(2002\)](#) and [Merlo and Ortalo-Magné \(2004\)](#) provide descriptive evidence on list-price reductions. [Knight \(2002\)](#) suggests that high initial list prices are costly to the seller. Those houses with large reductions in initial list prices take longer to sell and ultimately sell at lower prices. [Merlo and Ortalo-Magné \(2004\)](#) establish a number of stylized facts of bidding behavior and list-price changes.

The remainder of the paper is organized as follows. [Section 2](#) describes the institutional setting of the Dutch market for owner-occupied houses. [Section 3](#) describes our empirical model that is inspired by some theoretical literature. [Section 4](#) describes the unique administrative data set. [Section 5](#) presents the estimation results and some sensitivity analyses. [Section 6](#) concludes.

## 2. Owner occupied housing market in the Netherlands

In this section, we describe some institutions of the Dutch housing market. We focus on the owner-occupied sector, and highlight aspects relevant for our purposes. According to Statistics Netherlands in 2006, 56% of the seven million households in the Netherlands were living in an owner-occupied house. The average price of owner-occupied houses was €235,842, which is 4.57 times the average household income.

During the 1990s the Dutch housing market experienced a large real-price increase. Apart from a growth in real income, this price

increase is often explained from population growth, stringent spatial-planning policies reducing the construction of new houses, reduced interest rates on mortgages, and changes in the Dutch mortgage-finance market.<sup>1</sup> Usually banks restrict mortgages to 4.5 times the household income, but in exceptional cases they give higher mortgages. There is no restriction on the loan-to-value ratio. [Ball \(2009\)](#) indicates that in 2007 the loan-to-value ratio of first-time buyers was 114%.

There are substantial transaction costs associated with purchasing a house. For existing houses there is a transaction tax of 6%, which is absent for new houses. Broker costs are between 1% and 3% of the selling price, and mortgages often have a 1% to 1.5% initiation fee. Furthermore, there are notary fees and possible intermediary fees. Total transaction costs are approximately 10% of the selling price, and are often financed by including them in the mortgage principle.

Usually when selling a house, the seller approaches a real-estate broker. Most real-estate brokers are connected to the NVM. Actually, about 70% of all houses offered for sale are offered through a member of the NVM. The broker advises the seller on an appropriate list price, but the seller determines the list price. The real-estate broker adds the house to a publicly available website with a list price, a detailed description on the characteristics and some pictures. This website also contains information about socioeconomic characteristics of the neighborhood. The seller can choose to advertise in media such as local newspapers. An interested potential buyer contacts the broker for information on the house or to visit the house. A visit to the house is usually hosted by the broker, and the seller will not be present.

In the Netherlands, list prices do not have a formal role as they are not binding. So even if a buyer is willing to pay the list price, a seller can refuse or try to negotiate a higher price. There are rules for negotiating with potential buyers. Potential buyers communicate their bids to the broker. The broker will then contact the seller and this starts the negotiation process. Sellers are not allowed to negotiate with multiple buyers at the same time or to reveal bids to other buyers. Furthermore, the seller must negotiate with potential buyers in the order in which they made their first bid. Finally, if after selling the house it turns out that there are defects to the house, the buyer can hold the seller liable for the costs of repairing (even in case the buyer inspected the house during the sale). The seller thus has by law the obligation to reveal all information about the house.

## 3. The model

### 3.1. Theoretical framework

An early model for the housing market was developed by [Olsen \(1969\)](#). Because it is a model of perfect competition and symmetric information, list prices play no role. [Genesove and Mayer \(2001\)](#) conclude from the result that transaction prices depend also on seller's characteristics, that real-estate markets differ from perfect asset markets. Below we sketch a theoretical framework in which sellers use list prices to signal private information to buyers. So, the discussion allows for the possibility of asymmetric information.<sup>2</sup> We do not show formal proofs, but indicate at which stage list prices may be important.

<sup>1</sup> Since 1990 mortgages can be based on total household income rather than the income of the highest earner. Furthermore, during the 1990s new mortgage products were introduced which exploited more the existing tax benefits. Interest payments on mortgages are for 30 years 100% deductible.

<sup>2</sup> When considering asymmetric information we implicitly assume that the seller has more information, which may either relate to the seller's type (e.g. patience) or the quality of the house. However, it may also imply that the seller has some private belief about the local housing market. [Deng et al. \(2009\)](#) show that the strategy of sellers depends on how well informed they are.

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