6 Home-value insurance and idiosyncratic risks of residential property prices

Under review

Abstract

The recent Global Financial Crisis has reawakened home-owners to the need for protecting their home-equities from possible future house price decline. This paper re-examines the Shiller and Weiss (1999) home-value insurance scheme and proposes a modification that eliminates a large proportion of the idiosyncratic sale price risks of residential properties. Using data between 1995 and 2014 for Amsterdam, the proposed insurance policy shows a higher pay-out efficiency, a higher loss coverage and a greater pay-out probability than the original Shiller and Weiss (1999) scheme. The new home-value insurance policy thus provides better protection for the property sale price risks.

Keywords Home-ownership, Home-value insurance, Idiosyncratic risk, Sale price risk

§ 6.1 Introduction

Home-ownership has increasingly become the preferred housing tenure for most European households and in many other countries. In 2015, Eurostat estimated the European average home-ownership rate at about 70%, with the range between 51.8% in Germany and 96.5% in Romania. Research has revealed several benefits that motivate households into the home-ownership sector. Besides the esteemed social status, most household prefer home-ownership over renting because they believe it fosters family autonomy, provides environment for better child development, allows the flexibility to adapt the physical structure of the residential dwelling and has tax advantages (Andrews and Sánchez, 2011; Doling and Elsinga, 2006; Elsinga, 2003; Haurin et al., 2002). Households are also motivated by the welfare benefits of home-ownership, since it may serve as source of extra income and hedge against higher housing costs in old age (Toussaint and Elsinga, 2009; Haffner, 2008; Elsinga and Mandič, 2010).

Home-ownership, however, involves considerable risks. Primarily, households that acquire residential properties with mortgage loans will be faced with the risk of defaulting on the repayments, which may in turn lead to foreclosure. Furthermore, the high volatility of house prices exposes home-owners to negative equity and sale price risk. In negative equity, the value of the residential property is below the mortgage amount owed to the financial institutions and this to an extent constrains household mobility and consumption (Valletta, 2013; Dröes and Hassink, 2013; Chan, 2001). Sale price risk constitutes the possible loss from selling the property below the purchase price, which may be quite substantial. In the Netherlands, for instance, households that bought houses in the year 2007 and 2008, lost almost 21% on the value of their homes by the end of 2013 as a result of the large decrease in house prices caused by the Global Financial Crisis (GFC).

Home-value insurance is important for reducing the property sale price risk and to protect the accumulated home-equity which potentially yields the welfare benefits (see Doling and Ronald, 2010; Haffner, 2008). A section of the housing literature has proposed using housing futures and other forms of derivatives as possible home-value insurance schemes that may hedge the property sale price risk (Case Jr et al., 1993; Shiller, 2003; Shiller and Weiss, 1999). In their seminal paper, Case Jr et al. (1993) specifically suggested an insurance scheme that pays out benefit to home-owners according to the decline in a reference property price index. While the practical implementation of home-value insurance policies have been less successful, broadly owing to issues of illiquidity (see Swindler, 2012), the Case Jr et al. (1993) home-value protection scheme (Case-Shiller-Weiss or CSW hereafter) has intrinsic deficiencies that make it unattractive for the majority of home-owners (see Sommervoll and Wood, 2011).

Characteristically, the CWS policy pays home-owners who incurred losses only if the underlying index indicated a decline in house prices. Thus, the home-owners are not covered against the possible adverse idiosyncratic price changes. Strangely, however, this policy would pay benefit to an home-owner who incurred no loss on selling the residential property if the underlying index indicates a decline in house prices. Sommervoll and Wood (2011) and Sommervoll and de Haan (2014), in a more detailed empirical analyses conducted for the entire Netherlands and for the Australian metropolitan area of Melbourne, showed that the CSW policy actually has a very low loss coverage. This means that majority of the policy holding home-owners that sold properties at a loss would receive nothing or less than the actual loss. Their analyses further established that the CWS policy has low pay-out efficiency and target efficiency, which relate to the probability at which a policy holder incurring a loss would receive benefit from the scheme.

This paper proposes logical modifications to the CWS home-value protection scheme that limit the forgoing deficiencies. It suggests pay-out schemes that are based on aggregate measures of the underlying index and the more reasonable constriction that pay-out are made to only those actually incurring loss on the property sales. The proposed scheme is analysed and compared with the original CSW policy using detailed transaction data between 1995 and 2014 in Amsterdam. The results suggest that the modified scheme provides better cover for the sale price risk.

The rest of the paper is in sections. An overview of the related literature is presented in Section 6.2. Section 6.3 describes the modified CSW home-value protection scheme. Section 6.4 contains the descriptions of the data, while Section 6.5 discusses the empirical analyses for the whole Amsterdam and the results for the various property types that detail the differences between the idiosyncratic risks associated with these housing market segments. The paper is concluded in Section 6.6.

§ 6.2 Previous literature

This paper relates to the broader house price dynamics literature. The persistence of house prices and their characteristic high volatility in which the price path swings up and down to form a boom and burst cycle are well documented (see e.g. Agnello et al., 2015; Abraham and Hendershott, 1996; Muellbauer and Murphy, 1997; Droes et al., 2010). As one of the essential lessons from the GFC, this fluctuating nature of house prices may also present a source of risk for home-owners and for the stability of the larger economy (Agnello and Schuknecht, 2011; Aalbers, 2015; Case and Shiller, 2003; Baker, 2008; Stephens, 2006).

Several scholars have studied the fundamental factors which drive the developments of house prices (see, e.g. Abraham and Hendershott, 1996; Case and Shiller, 1988; Malpezzi, 1999; De Vries, 2010; DiPasquale, 1999; Himmelberg et al., 2005). Boelhouwer et al. (2004) classified these fundamentals into four groups, namely factors of economic development (e.g. income, interest rates), demographic factors (population growth, etc.), institutional policy (e.g. fiscal tax structure, land regulations) and speculative or psychological behaviour of home-buyers.

The psychological behaviour of home-owners relates to their expectations of future house prices, which tend to affect current property price developments (Case and Shiller, 2003; Flood and Hodrick, 1990). While house prices would maintain a stable long-run relationship with fundamentals, the speculative and psychological effect of household behaviours are noted for contributing to the short-term fluctuations (Case and Shiller, 1988; Flood and Hodrick, 1990; Case and Shiller, 2003; Shiller et al., 2014). A section of the literature, however identifies that these temporal house price fluctuations arising from certain regions may spread over their influence to an entire country, with a transitory or permanent effect. This market phenomenon is often referred to as the ripple or spillover effect (see Meen, 1999; Gong et al., 2016b; Teye and Ahelegbey, 2017).

Sinai and Souleles (2005) and Droes et al. (2010) argued that owning a home presently may serve as a hedge against uncertainties of house prices and higher rents in the future. This is because of the potential of accumulating substantial housing equity which may be used to purchase another home later during the course of life. Home-owners may also derive cash benefits from the future sale of their properties. However, the uncertainties with the future sale prices create the possibility that the home-owner may incur a loss on the investment capital.

Case Jr et al. (1993) proposed hedging against the future sale price in order to insure the home-owner against any future financial burden. To that effect, these authors also suggested index-based derivatives and other forms of housing insurance schemes (see also Shiller and Weiss, 1999; Shiller, 2003). Following Case Jr et al. (1993), some real estate researchers have studied in details the nature of risk associated with house prices, while others have investigated the pricing and applicability of the proposed derivatives (see Sommervoll and de Haan, 2014, for a historic discussion of home-value insurance policies). Iacoviello and Ortalo-Magne (2003), for example, investigated the hedging benefits of real estate properties in London, whereas Van Bragt et al. (2015) explored the risk-neutral valuation framework as pricing method for these insurance products.

In a more detailed analysis, Peng and Thibodeau (2013, 2017), studied the idiosyncratic risks of neighbourhood house prices. Adopting a cross-sectional regression analysis, these authors examined if the neighbourhood characteristics of residential properties may explain variations in the idiosyncratic risks. In their research, Peng and Thibodeau (2013, 2017) found that idiosyncratic house price risk increases proportionately with the neighbourhood median household income and house price volatility. Their results, however established that higher risk neighbourhoods are not necessarily rewarded with higher price appreciations.

Dröes and Hassink (2013), similarly conducted an empirical study by decomposing the total house price risk into an idiosyncratic and a market component. Their research, which is based on transaction data from the Netherlands concluded that the idiosyncratic risks of individual residential properties are large but tend to be averaged away using aggregated market indexes in measuring the property price risk. The finding of Dröes and Hassink (2013) thus suggests that an index-based home-value insurance cannot provide a complete cover for the sale price risk of residential properties.

In separate related studies, Sommervoll and Wood (2011) and Sommervoll and de Haan (2014) investigated the amount of risk that the index-based insurance scheme would cover practically. The authors estimated for the different application areas (Melbourne and Netherlands) that the home-value insurance scheme, based on an underlying property price index, would only cover up to 50% of the sale price risk, leaving a large part of the idiosyncratic risks uninsured. In the contribution of this paper, we suggest logical modification to the original Case Jr et al. (1993) index-based home-value insurance that provides a hedge potentially for a larger proportion of the sale price risk. The modification is based on aggregate statistics of the underlying index, which to our knowledge has not been analysed in the housing literature. Our analysis suggests that the modified scheme provides up to 70% loss coverage.

In general, however, there are problems that currently hamper the implementation of home-value insurance scheme. Such challenges include low trading volumes, issues with moral hazards and adverse selection problem as well as the appropriate pricing method of the scheme (see Case Jr et al., 1993). The low trading volume may result from less patronage from the home-owners, perhaps due to the little awareness and the general belief that house prices would continue to rise (Shiller et al., 2014). With the recent display of high volatility in house prices and following the GFC, home-owners are more likely to be aware of the house price risk and to seek protection against their home equities.

On the other hand, the assurance of receiving pay-outs from the insurance policy has intrinsic moral hazard. For instance, the home-owner may develop the attitude of abandoning important maintenance of the residential properties, knowing that any drop in the value of the property would be covered by the issuance policy. The adverse selection problem arises when home-owners purposefully choose deteriorating neighbourhoods, knowing that they would receive insurance pay-outs or when the underwriting insurance institutions subjectively pick which neighbourhood not to grant insurance. As Case Jr et al. (1993) argued, imposing deductibles and stricter government involvement may check the excesses with moral hazards and the adverse selection problem (see also, Shiller, 2003).

§ 6.3 The modified CSW insurance scheme

Shiller (2003) is of the firm opinion that households could reduce risk through an appropriate risk-sharing mechanism. The CSW is one of such schemes that enables home-owners to share their housing risks with more advanced portfolio managers. More specifically, the CSW insurance policy is an index-based home-value protection scheme that pays benefit to holders that is proportional to the decline captured by the reference residential property price index (RPPI).

For residential property j, in a designated housing market H, let the transaction prices at the times s and t, with $0 \leq s < t$, be $p^H_{j,s}$ and $p^H_{j,t}$ respectively. For the same market H, let I^H_s and I^H_t be the reference index numbers tracking the price levels in the periods s and t. The pay-out of the CSW scheme to the home-owner of the property j holding the policy is given as

$$\pi^H_{j,t-s} = \max\left[\left(I^H_s - I^H_t\right)p^H_{j,s}/I^H_s, 0\right] \qquad (6.1)$$

The expression (6.1) implies that the home-owner receives pay-out benefit if the RPPI for the housing market H indicates a decline, i.e, if $I^H_s > I^H_t$. However, if $I^H_s < I^H_t$, while $p^H_{j,s} > p^H_{j,t}$, the policy holder receives nothing. Following Sommervoll and de Haan (2014), consider an example where the initial price of the property, $p^H_{j,s}$ = €100,000 and the subsequent price, $p^H_{j,t}$ = €90,000. Assume furthermore that the RPPI indicates a market decline of properties by 5%. Then, the home-owner suffers a loss of €10,000 but will receive only €5,000 if (s)he holds a CSW policy. Again, assuming the RPPI instead indicates a price appreciation of 5%, the home-owner receives nothing at all although the property is sold at a loss of €10,000.

From the home-owner's perceptive, it makes more sense to receive the 5% market increase after selling at such loss. This paper proposes a modified home-value insurance policy that caters for such scenario, where pay-out is advanced to those suffering loss proportionally to the house price appreciations or depreciation. This modification could be realised using a pay-out scheme that is based on an aggregate measure of the reference RPPI to ensures that any accumulated home-equity over time does not completely erode away by a sudden drop in property prices. We define the pay-out for the modified CSW (MCSW, hereafter) insurance policy as

$$\pi^H_{j,t-s} = |\delta^H_{t-s}| p^H_{j,s} \mathbb{1}_{(p^H_{j,s} > p^H_{j,t})} \qquad (6.2)$$

where δ^H_{t-s} is some aggregate measure of the reference RPPI and $\mathbb{1}_{(.)}$ is the indicator function. Unlike the CSW scheme, the expression (6.2) means the holder of the MCSW policy receives pay-out only if the property is sold less the purchase price (i.e., if $p^H_{j,s} > p^H_{j,t}$).

The aggregate measure δ^H_{t-s} may take several forms. We analyse four of such measures in this paper, when

1. δ^H_{t-s} is the market house price change between the times s and t,
2. δ^H_{t-s} is the average market house price change between s and t,
3. δ^H_{t-s} is the average market house price change between the time t of the resale of the property and a year prior to the resale, and
4. δ^H_{t-s} is the market house price change between the time of resale t and a year prior to t.

The market price change is as measured by the reference RPPI. The averages for 2 & 3 are obtained over the period-to-period price changes within the indicated period. We label these MCSW schemes respectively as MCSW1, $\cdots$, MCSW4.

The MCSW1 scheme is a CSW policy that pays the holder incurring loss benefit that is equal to the market price appreciation or decline indicated by the HPPI. The pay-out for the MCSW2 policy is the absolute value of the (quarterly) average house price growth between the time of purchase and time of resale. The pay-outs for MCSW3 and MCSW4 are respectively the same as MCSW1 and MCSW2 but their aggregation reference period is between the time of resale (t) and a year prior to t (i.e $t - 4$).[1]

Sommervoll and Wood (2011) proposed three statistical measures (pay-out efficiency, loss coverage, target efficiency) for investigating the efficiency of any index-based home-value insurance policy. They defined the pay-out efficiency (PE) as the proportion of all pay-outs received by home-owner incurring a loss. The Loss coverage (LC), is the most important for the home-owners. It expresses the proportion of losses the insurance policy covers. The target efficiency (TE) indicates the probability that a policy holder will receive a pay-out. More specifically, the TE is the proportion of home-owners receiving pay-outs out of the entire policy holders incurring a loss (see also Sommervoll and de Haan, 2014).

In principle, the closer the values of these measures get to one, the better the policy from the perceptive of the home-owners. By construction, the PE for the MCSW scheme is one, since any home-owner suffering a loss will receive pay-out, unless, as it rarely happens, the reference index indicates no market appreciation nor decline. On the other hand, the PE for the CSW may be less than one. Furthermore, the TE for the MCSW is one by construction, while TE for the CSW may be less than one. The PE and TE thus shows that the MCSW is practically more efficient than CSW. However, the MCSW will equally not cover all the losses for the policy holder. Following Sommervoll and de Haan (2014), we call these residuals losses as idiosyncratic risks and we examine how they vary between the different property classes.

1 If the holding period is less than a year, $t - 4$ is simply replaced by s.

§ 6.4 Data description

The dataset for the analysis covers about 75% of all property transactions in Amsterdam between 1995 and 2014 obtained from the Dutch National Association of Property Brokers. Out of 150,000 raw data, we extracted 116,446 transaction sales following a thorough data clean-up procedure detailed by Teye et al. (2017). For the purposes of the current paper, we further extracted 22,393 repeated sale transactions consisting of 18,029 individual residential properties. The properties fall into one of the six categories indicated by the Dutch National Association of Property Brokers, including terraced houses, town houses, corner houses, semi-detached houses, detached houses and apartments.

The descriptive statistics for the repeated transactions are shown in Table 6.1. The table indicates that apartment blocks form the majority of housing stock in Amsterdam. Detached and terraced houses are also common, but town and semi-detached houses are less popular. The average price change (return) between first and second sale is about 36.90%. Detached and semi-detached houses appear to yield higher nominal returns than apartment blocks and terraced houses. The average holding period between two repeated sales runs up to 20.24 quarters. The data also reveals that about 17.86% of property transactions over the period 1995-2014 ended in losses. The losses appear to be linked with shorter holding periods, which is not surprising, because property prices typically appreciate above their initial levels over longer time period.

Figure 6.1 sheds light on the distribution of the house transactions over the holding period. It shows that a larger proportion of properties that resold within two quarters incur losses than gains. This may indicate an inherent higher probability of selling at loss within shorter holding periods as the proportion of losses declines sharply for longer holding periods. Interestingly, the proportion of transactions involved in a gain does not increase linearly with the holding period. From the figure, the percentage of resold properties with nominal gains could be seen to increase between the 8th and 26th quarters of holding and then declines for longer holding periods.

The location and individual characteristics of the property contribute to its selling price. In addition, the selling price would be largely determined by the economic and housing market conditions. Home-owners are more likely to profit from selling properties during market booms than in the downturns. Table 6.2 shows that the proportion of

TABLE 6.1 Summary statistics for repeated house transactions between 1995 and 2014

House type	Number of resales	Number of dwellings	Average % price change	Average holding period	% resales with loss	% resales with gain
All	22,393	18,029	36.90	20.24	17.86	79.44
Terraced house	1,928	1,638	42.07	21.11	16.44	80.08
Town house	30	26	26.51	18.70	13.33	73.33
Corner house	527	453	34.70	21.62	17.65	78.37
Semi-detached house	164	139	55.84	24.38	10.98	83.54
Detached house	1,181	156	74.38	21.78	14.92	81.22
Apartment	19,563	15,617	35.95	20.07	18.10	79.36

The price change is the difference between the first and second transaction prices. Holding period is the number of quarters between the repeated transactions.

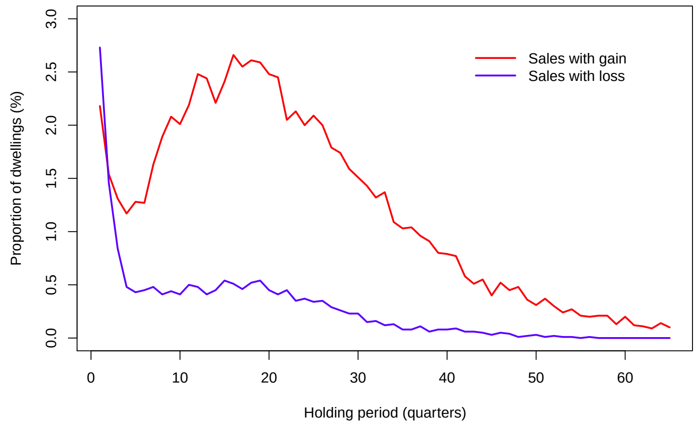

FIGURE 6.1 Distribution of sales over the holding periods

TABLE 6.2 Over time distribution of property transactions between 1995 and 2014

Year	Number of resales	Number of resales with loss	Average price (euros)	Average holding period	Average holding time if loss	% resales with loss	% resales with gain
1995	45	19	86,785	1.53	1.42	42.22	46.67
1996	116	19	111,925	3.23	2.26	16.38	80.17
1997	213	38	124,901	4.82	2.39	17.84	78.40
1998	313	41	154,136	6.92	2.46	13.10	81.79
1999	455	29	193,791	8.83	2.38	6.37	90.77
2000	610	63	217,538	9.78	1.73	10.33	86.39
2001	890	78	241,025	11.29	2.10	8.76	88.99
2002	1,046	163	227,565	13.18	3.94	15.58	81.84
2003	1,091	214	227,119	14.92	5.89	19.62	77.91
2004	1,094	160	233,414	17.01	9.36	14.63	82.18
2005	1,413	147	265,628	19.26	10.86	10.40	87.83
2006	1,615	129	258,092	19.91	8.76	7.99	89.47
2007	1,865	121	308,011	20.19	8.07	6.49	91.96
2008	1,903	145	306,762	21.37	8.78	7.62	91.01
2009	1,656	226	284,309	21.38	9.69	13.65	83.51
2010	1,641	323	293,130	23.19	11.20	19.68	77.27
2011	1,582	412	274,803	24.80	15.65	26.04	71.74
2012	1,593	609	263,713	25.22	18.62	38.23	57.19
2013	1,389	575	284,312	26.23	20.31	41.40	54.64
2014	1,863	488	293,925	28.97	23.10	26.19	71.18

The number of sales indicates total dwellings reselling in the reference year, which is a subject of sales in the same or in previous years. Average price is computed for all repeated transactions in the reference year. Holding period is in quarters.

properties sold at loss declined significantly during the housing boom between 2005 and 2008 in Amsterdam. On the other hand, in the course of the market downturn between 2002 and 2005, and following the GFC (2008-2013), the table indicates that the average transaction price fell, while the number of losses from the repeated property transactions grew comparatively higher within those periods. Particularly, we can find the proportion of properties that sold with nominal loss rising from 7.62% in 2008 to 41.40% by 2013 (Table 6.2). Over this same period, the nationwide house

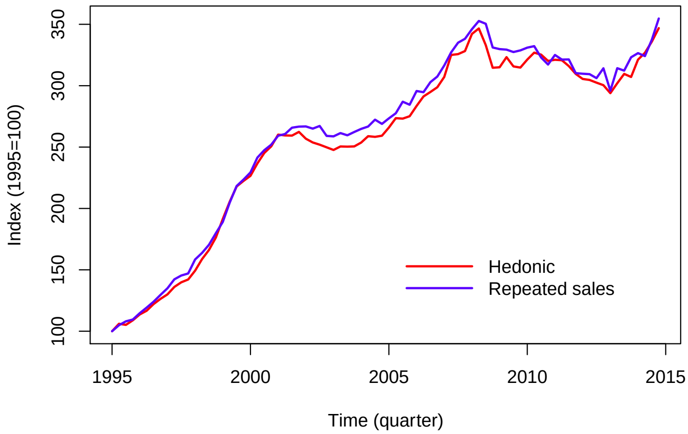

FIGURE 6.2 Amsterdam quarterly hedonic and repeated sales indexes.

price decline has been estimated at about 21%. A CSW or MCSW insurance scheme would cover part of these losses which we investigate in this paper.

§ 6.5 Empirical results

Since the CSW and MCSW are index-based schemes, the reference RPPI plays an important part in the analysis. This paper uses both the hedonic and the repeated sale indexes. The hedonic index method assumes that the transaction price is linked with the (shadow) prices of enjoying the locational features and individual characteristics of the residential property (see Hill, 2013; Rosen, 1974). By controlling for the period of transaction, the hedonic index is estimated using ordinary least squares (see de Haan and Diewert, 2013).

The repeated sales approach first proposed by Bailey et al. (1963), estimates the house index by considering properties that sold twice or more. This method involves regressing the consecutive price differences on the set of dummies that specifies the transaction periods. The two price index methods are widely used and one may be preferred over the other depending on the purpose and the availability of data (see de Haan and Diewert, 2013; Case and Shiller, 1987). The two methods are both adopted here however to cast light on the pay-out and efficiency of MCSW scheme.

Figure 6.2 shows the two indexes, which essentially capture an identical trend in the house price movements but vary on the price level at certain periods. The hedonic price index is lower mostly after the Amsterdam housing market downturn in 2002. In principle, the variations in the price levels depicted by the two indexes may similarly manifest in the corresponding pay-outs of the CSW or MCSW policy.

Table 6.3 displays the pay-out efficiency, target efficiency and the loss coverage for the CSW and MCSW schemes. The table shows, as already mentioned that the MCSW

TABLE 6.3 Pay-out efficiency, target efficiency and average loss coverage for CSW and MCSW schemes.

Policy	Pay-out efficiency		Target efficiency		Loss coverage	
	Hedonic index	Repeated sales index	Hedonic index	Repeated sales index	Hedonic index	Repeated sales index
CSW	0.53	0.55	0.45	0.44	0.13	0.15
MCSW1	1.00	1.00	1.00	1.00	0.51	0.51
MCSW2	1.00	1.00	1.00	1.00	0.06	0.06
MCSW3	1.00	1.00	1.00	1.00	0.09	0.08
MCSW4	1.00	1.00	1.00	1.00	0.27	0.25

Pay-out efficiency is the proportion of all pay-outs to home-owners inuring a loss. Target efficiency is the percentage of home-owners receiving pay-outs for a loss among all sales with losses. Loss coverage is the fraction of total losses covered by the combine pay-outs from the home-value insurance protection scheme. The reference indexes are computed for the entire Amsterdam.

schemes have optimal pay-out and target efficiencies both which are approximate to one. This is so because Figure 6.2 clearly shows that the price change between any two point in time is nonzero. The CSW policy, however has pay-out efficient ranging from 53% to 55%, and target efficiency of 44%-45%. By implication, there is almost 55% to 56% probability that a CSW policy holders incurring loss would receive no pay-outs.

On average, none of the home-value protection schemes provides a complete loss coverage. Table 6.3 indicates that the MCSW1 scheme has the highest loss coverage of about 51%. The MCSW1 scheme advances pay-outs to holders proportional to the decline or increase detected in the reference index between the time of purchase and resale. The MCSW2 and MCSW3 schemes give 6%-9% loss coverage, which is lower than the original CWS with a potential loss coverage between 13% to 15%. Interestingly, the MCSW4 which considers the growth rate only in the immediate past year yields a substantial loss coverage of 25% to 27%. Similar to the MCSW1 scheme, the MCSW4 policy holder has better protection than the home-owner with the CSW home-value product. The residual risk, however remains large with either the MCSW1 or MCSW4 scheme since the losses are not fully covered.

The residual risks may practically be considered as the idiosyncratic price risks not shared by the entire markets (see Sommervoll and Wood, 2011). To estimate these idiosyncratic risks more precisely, Sommervoll and de Haan (2014) suggested using customised indexes for smaller housing submarkets that share some common characteristics. Housing submarkets may reveal unique systematic features that are different from the larger city or nation-wide market. These submarkets could be spatial aggregations or other interesting forms of market segmentations.

In a related study, Teye et al. (2017) analysed the idiosyncratic risks for the spatially segmented Amsterdam housing submarkets. For this paper, we consider the segmentation of the Amsterdam residential housing market into the three property classes: small apartments (bedroom up to 3), large apartments (bed rooms more than 3) and houses. Houses, include terraced houses, town houses, corner houses, semi-detached houses and detached houses. The houses are combined into one submarket, partly because there are few resales to enable the construction of separate repeated sales indexes for each (see Section 6.4). The smaller and larger apartment markets may differ on their demand base. Smaller apartments may be patronised more by lower-income groups, smaller-sized families and first-time home-buyers.

TABLE 6.4 Loss coverage for CSW and MCSW schemes.

Policy	Small apartments		Large apartments		Houses	
	Hedonic index	Repeated sales index	Hedonic index	Repeated sales index	Hedonic index	Repeated sales index
CSW	0.15	0.18	0.17	0.19	0.15	0.14
MCSW1	0.67	0.66	0.70	0.68	0.53	0.55
MCSW2	0.07	0.07	0.10	0.10	0.07	0.07
MCSW3	0.10	0.10	0.13	0.12	0.10	0.10
MCSW4	0.33	0.30	0.37	0.34	0.28	0.30

Pay-out efficiency is the proportion of all pay-outs to home-owners inuring a loss. Target efficiency is the percentage of home-owners receiving pay-outs for a loss among all sales with losses. Loss coverage is the fraction of total losses covered by the combine pay-outs from the home-value insurance protection scheme. The reference indexes are computed separately for the indicated housing submarket.

Bigger-sized apartments, on the other hand, may greatly appeal to larger-sized families and middle-income earners.

Table 6.4 presents the loss coverage for the three submarkets. As expected, the loss coverage (and hence the idiosyncratic price risk) varies significantly for the housing submarkets. The CSW insurance policy, for example, estimates the loss coverage at 15%-18%, 17%-19% and 14%-15% for small apartments, large apartments and houses respectively. The table equally shows consistently that each of the insurance policies (CSW or MCSW) has enhance loss coverage for larger apartments than smaller apartments and houses. Interestingly, we can observe here again that the MCSW1 and MCSW4 policies have higher loss coverage than the CSW scheme. The MCSW1 scheme especially provides substantial loss coverage of up to 66%-67%, 68%-70% and 53%-55% for small apartments, large apartments and houses respectively.

By implication, the table shows that the idiosyncratic or residual risks will be larger for houses, followed by smaller apartments than larger apartments. Moreover, this residual risk depends on which home-value protection scheme is adopted. The results, however show that home-owners of any property type would be better protected against the idiosyncratic risks using the MCSW1 and MCSW4 scheme. It is also noteworthy that the loss coverage is slightly higher with the hedonic index than the repeated sale index. In most cases, the loss coverage from the hedonic index is up to 2% higher than repeated sale index as reference (see Table 6.3 & 6.4).

§ 6.6 Concluding remarks

The high volatility of residential property prices in recent times once again places an urgent need for home-owners to protect their home-value equities. This paper has re-examined the index-based home-value protection scheme to discover the amount of market risk that it potentially eliminates and the extent of idiosyncratic risks present for different categories of residential properties. The index-based home-value insurance policy (CSW) first proposed by Case Jr et al. (1993) advances pay-outs to its holders based on the market decline indicated by the reference index. The idiosyncratic risks constitute the individual property price decreases that are not caused by market forces and thus uncovered by the CSW scheme.

Using transaction data from Amsterdam spanning the period 1995 to 2014, the analysis confirms earlier results by Sommervoll and Wood (2011) and Sommervoll and de Haan (2014) that the CSW scheme is less efficient and has extremely low loss coverage. In particular, our results, based on the hedonic and repeated sales indexes, show that the CSW scheme has less than 45% target efficiency, which defines the probability that a home-owner selling a property at a loss will receive pay-outs. The average loss coverage is between 13% to 15%, which leaves a large proportion of idiosyncratic risks uncovered.

A logical modifications to the CSW scheme in this paper however shows that the efficiency and loss coverage could be enhanced significantly. By using a pay-out scheme that is based on aggregate measures of the index and restricting the pay-out to only properties which sold at loss, the modified version has approximately 100% target efficiency and the loss coverage may be enhanced up to 51% (see Table 6.3).

Our results further show that by segmenting the Amsterdam housing market into submarkets that share common characteristics, the loss coverage of the modified CSW scheme may be better improved. With the market segmented into three: small apartments, large apartments and houses, we observed that the modified CSW scheme achieves respective loss coverage equal to 66%-67%, 68%-70% and 53%-55%. The paper contains other modifications with equally higher loss coverages.

In summary, the lesson is that, segmenting the market into more homogeneous submarkets leads to better protection from the modified CSW scheme and a reduction in the residual risks, although the original scheme may perform poorly. The challenge however is that, segmenting the market into extremely finer/thinner submarkets immensely reduces the number of (repeated) transaction sales which poses problem for constructing a reliable index for such thin submarkets. Francke (2010), Francke and De Vos (2000) and Schwann (1998), for example, proposed methods for constructing house prices indexes in thin markets. In a future research, such methods could be applied in combinations with different markets segmentations to study the efficiency and loss coverage of the CSW scheme and its modified versions.

Our analysis does not include the pricing of the modified CSW home-value protection schemes and the additional financial burden to home-ownership. The pricing of these schemes may be one of the important issues to clarify in a future research for their practical implementations.

In a future research, it might also be insightful to consider the general behaviour of home-owners to housing equity insurance. While household decision about selling residential property may depend on several factors, the assurance of receiving insurance pay-outs might influence them to postpone the sales or opt for unreasonable prices. Such behaviour could negatively affect any housing equity insurance scheme and would be interesting to investigate further.

The above also relates to the issue of moral hazard or what is sometimes referred to as agency problem where home-owners neglect important maintenance in anticipation of receiving insurance pay-outs. As suggested by Case Jr et al. (1993), one of the possible ways to check this moral hazard is for the underwriting companies to impose some minimum maintenance requirement for obtaining pay-outs. This maintenance requirement can be practically implemented as a fix percentage deductible from the insurance pay-out.