

July 2009 – July 2010 Validation of property value estimates, using the new model



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Title **July 2009 – July 2010**
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Abstract

Eiendomsverdi is a company that estimates the value of properties in the Norwegian residential real estate market. This document is prepared by Norwegian Computing Center, as a third party, to document the quality of Eiendomsverdi's estimates.

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1 Introduction

Eiendomsverdi is a company that estimates the value of properties in the Norwegian residential real estate market. These automated value estimates are delivered to real estate agents and banks. Eiendomsverdi's model take into account several characteristics of the property in question, including the previous sales price, the size and type of the property and sales prices of surrounding properties.

Eiendomsverdi's original model estimates the market value by five methods. Then one estimate is chosen for each property according to a set of rules. To reduce the probability of overestimating individual properties, certain haircuts has been applied.

Norwegian Computing Center has been involved in order to improve Eiendomsverdi's model. In short, the five estimates of Eiendomsverdi are weighted together, and this estimate is again weighted together with the indexed previous sales price, depending on how long time it is since previous sale. A model of the uncertainty has also been developed. The purpose of this document is for us, as a third party, to document the quality of Eiendomsverdi's estimates using their improved model.

2 Data

We have used the new model of Eiendomsverdi to estimate sales prices on property sales in the period from July 6th 2009 to July 6th 2010.

The portfolio we have considered consists of 47 673 property sales, of which 19 316 are detached homes, 18 718 are flats, 4 016 are terraced homes and 5 623 are semi-detached homes. Throughout this document we combine semi-detached and terraced homes into one category semi/terraced, which consists of 9 639 homes.

Table 1 shows the percentages of the property types in each county. The rightmost column gives the number of property sales in each county in per cent of the total number of transactions. The bottom row shows the distribution of the different property types as a total over all counties.

County	Detached	Flat	Semi/terraced	Total
Oslo	7.5 %	82.8 %	9.6 %	17.9 %
Akershus	39.6 %	33.7 %	26.6 %	14.4 %
Rogaland	41.3 %	31.8 %	26.9 %	11.0 %
Hordaland	29.8 %	50.0 %	20.3 %	8.6 %
Sør-Trøndelag	32.5 %	46.1 %	21.4 %	6.2 %
Vestfold	60.2 %	19.4 %	20.4 %	5.7 %
Buskerud	52.1 %	27.8 %	20.0 %	5.6 %
Østfold	62.2 %	18.3 %	19.5 %	5.5 %
Vest-Agder	42.2 %	31.9 %	25.9 %	3.9 %
Møre og Romsdal	44.5 %	30.5 %	25.0 %	3.7 %
Hedmark	73.9 %	11.5 %	14.6 %	2.9 %
Telemark	74.8 %	11.3 %	13.9 %	2.6 %
Nordland	56.2 %	16.7 %	27.1 %	2.6 %
Oppland	68.1 %	15.2 %	16.7 %	2.4 %
Nord-Trøndelag	56.7 %	19.5 %	23.8 %	2.0 %
Aust-Agder	69.5 %	14.8 %	15.7 %	2.0 %
Troms	48.8 %	28.3 %	22.9 %	1.7 %
Finnmark	62.5 %	16.5 %	21.0 %	0.7 %
Sogn og fjordane	46.6 %	29.2 %	24.1 %	0.5 %
Total	40.5 %	39.3 %	20.2 %	100.0 %

Table 1. Distribution of property types in each county.

3 Estimation results

This section describes to which degree Eiendomsverdi's estimated market values fit the real sales price. The estimates are categorized according to the deviation in per cent from the real sales price. Seven categories are used, the first interval, "< -30 %", contains estimates which are underestimated and deviates more than 30 % from the sales price. That is, reducing the sales price by 30 %, the estimates in interval "< -30 %" are less than this value. The next interval contains all estimates less than the sales price which deviates 20-30 % from the sales price, and so on. The interval "-10, 10" contains all estimates which deviates less than 10 % from the sales price in both positive and negative direction. The header of table 2 shows all error intervals.

3.1 Summary tables

Table 2 shows the percentage of the estimates which fall into the seven different error intervals for different property types. To the right, the estimated value and sales price of the total portfolio (in MNOK) for each property type are shown. Table 8 in section 3.4 summarizes the same quantities for the haircut portfolio.

Table 3 – 5 show the distribution of estimates in different error intervals for properties differentiated by size, market value and county, respectively.

Property type	< -30 %	-30 % -20 %	-20 % -10 %	-10 % 10 %	10 % 20 %	20 % 30 %	>30 %	Total number	Total (%)	Est. value (MNOK)	Sales price (MNOK)	Dev. (%)
Detached	5 %	7 %	15 %	43 %	12 %	7 %	9 %	19 316	41 %	52 510	53 423	-2 %
Flat	2 %	5 %	15 %	60 %	11 %	4 %	3 %	18 718	39 %	42 451	43 538	-2 %
Semi/terraced	1 %	4 %	15 %	61 %	12 %	5 %	3 %	9 639	20 %	24 540	24 900	-1 %
Total	3 %	5 %	15 %	54 %	12 %	5 %	6 %	47 673	100 %	119 501	121 861	-2 %

Table 2. Deviation per property type: Percentages of estimates from different property types falling into the different error intervals.

Property type	BOA	< -30 %	-30 % -20 %	-20 % -10 %	-10 % 10 %	10 % 20 %	20 % 30 %	>30 %	Total	Est.value (MNOK)	Sales price (MNOK)	Dev. (%)
Detached	< 100 m ²	8 %	8 %	17 %	41 %	10 %	6 %	10 %	5 %	3 351	3 530	-5 %
	100-120 m ²	5 %	7 %	17 %	43 %	12 %	6 %	10 %	6 %	5 014	5 146	-3 %
	120-160 m ²	5 %	8 %	16 %	44 %	12 %	7 %	8 %	13 %	15 170	15 566	-3 %
	160-200 m ²	4 %	7 %	16 %	44 %	14 %	7 %	9 %	9 %	13 551	13 754	-1 %
	> 200 m ²	4 %	6 %	13 %	44 %	14 %	8 %	11 %	7 %	14 852	14 833	0 %
	Total	5 %	7 %	16 %	44 %	12 %	7 %	9 %	40 %	51 937	52 829	-2 %
Flat	< 50 m ²	1 %	3 %	14 %	66 %	10 %	3 %	3 %	8 %	5 949	6 012	-1 %
	50-70 m ²	1 %	4 %	15 %	63 %	11 %	3 %	3 %	13 %	12 171	12 418	-2 %
	70-90 m ²	2 %	5 %	15 %	60 %	11 %	4 %	2 %	10 %	11 184	11 511	-3 %
	90-120 m ²	3 %	6 %	16 %	54 %	12 %	5 %	4 %	5 %	7 865	8 095	-3 %
	> 120 m ²	5 %	8 %	16 %	44 %	12 %	6 %	9 %	2 %	4 751	4 895	-3 %
	Total	2 %	5 %	15 %	61 %	11 %	4 %	3 %	39 %	41 921	42 932	-2 %
Semi/terraced	< 70 m ²	1 %	6 %	15 %	64 %	10 %	3 %	2 %	2 %	1 132	1 156	-2 %
	70-90 m ²	1 %	3 %	14 %	63 %	11 %	5 %	3 %	3 %	2 645	2 674	-1 %
	90-120 m ²	1 %	3 %	15 %	64 %	11 %	4 %	2 %	7 %	8 001	8 159	-2 %
	120-140 m ²	1 %	4 %	13 %	61 %	13 %	5 %	3 %	4 %	4 747	4 804	-1 %
	> 140 m ²	2 %	5 %	16 %	54 %	12 %	7 %	5 %	4 %	7 746	7 832	-1 %
	Total	1 %	4 %	15 %	61 %	11 %	5 %	3 %	20 %	24 271	24 625	-1 %
Total		3 %	5 %	15 %	54 %	12 %	5 %	6 %	100 %	118 129	120 386	-2 %

Table 3. Deviation per property type and size.

Sales price	< -30 %	-30 % -20 %	-20 % -10 %	-10 % 10 %	10 % 20 %	20 % 30 %	>30 %	Total	Est.value (MNOK)	Sales price (MNOK)	Dev. (%)
< 1 MNOK	3 %	2 %	4 %	26 %	15 %	10 %	40 %	3 %	1 524	1 179	29 %
1-2 MNOK	2 %	3 %	10 %	56 %	14 %	7 %	8 %	38 %	30 081	28 899	4 %
2-3 MNOK	2 %	6 %	17 %	56 %	11 %	4 %	3 %	33 %	37 414	37 932	-1 %
3-4 MNOK	4 %	8 %	19 %	53 %	9 %	4 %	2 %	14 %	22 735	23 648	-4 %
4-5 MNOK	7 %	10 %	22 %	48 %	8 %	4 %	2 %	6 %	12 044	12 795	-6 %
> 5 MNOK	11 %	12 %	21 %	44 %	7 %	3 %	2 %	5 %	15 702	17 407	-10 %
Total	3 %	5 %	15 %	54 %	12 %	5 %	6 %	100 %	119 501	121 861	-2 %

Table 4. Deviation per market value bracket.

County	< -30 %	-30 % -20 %	-20 % -10 %	-10 % 10 %	10 % 20 %	20 % 30 %	>30 %	Total (%)	Est.value (MNOK)	Sales price (MNOK)	Dev. (%)
Oslo	2 %	5 %	15 %	60 %	11 %	4 %	3 %	18 %	26 977	27 558	-2 %
Akershus	2 %	4 %	15 %	59 %	12 %	4 %	4 %	14 %	20 693	21 058	-2 %
Rogaland	3 %	6 %	18 %	56 %	10 %	4 %	3 %	11 %	14 069	14 597	-4 %
Hordaland	3 %	5 %	15 %	56 %	12 %	5 %	5 %	9 %	10 073	10 188	-1 %
Sør-Trøndelag	3 %	5 %	15 %	58 %	11 %	5 %	4 %	6 %	6 942	7 107	-2 %
Vestfold	5 %	5 %	14 %	47 %	14 %	7 %	8 %	6 %	6 075	6 191	-2 %
Buskerud	4 %	6 %	16 %	49 %	11 %	6 %	7 %	6 %	5 543	5 672	-2 %
Østfold	3 %	6 %	12 %	49 %	13 %	7 %	10 %	6 %	5 298	5 303	0 %
Vest-Agder	5 %	6 %	16 %	53 %	12 %	5 %	4 %	4 %	4 250	4 424	-4 %
Møre og Romsdal	4 %	6 %	15 %	48 %	12 %	6 %	9 %	4 %	3 669	3 704	-1 %
Hedmark	3 %	8 %	15 %	46 %	11 %	6 %	11 %	3 %	2 418	2 437	-1 %
Telemark	7 %	9 %	17 %	37 %	12 %	8 %	10 %	3 %	2 258	2 350	-4 %
Nordland	4 %	6 %	14 %	50 %	11 %	8 %	8 %	3 %	2 424	2 418	0 %
Oppland	5 %	7 %	13 %	43 %	13 %	7 %	11 %	2 %	2 037	2 047	0 %
Nord-Trøndelag	5 %	6 %	11 %	41 %	16 %	7 %	14 %	2 %	1 624	1 574	3 %
Aust-Agder	6 %	6 %	14 %	43 %	13 %	8 %	10 %	2 %	1 931	1 982	-3 %
Troms	3 %	6 %	15 %	50 %	13 %	6 %	6 %	2 %	2 001	2 015	-1 %
Finnmark	5 %	4 %	20 %	44 %	11 %	6 %	10 %	1 %	715	718	0 %
Sogn og fjordane	9 %	8 %	14 %	43 %	12 %	5 %	9 %	1 %	503	520	-3 %
Total	3 %	5 %	15 %	54 %	12 %	5 %	6 %	100 %	119 501	121 861	-2 %

Table 5. Deviation per county.

3.2 Different valuation methods

Table 6 shows the error intervals depending on the transition weight and how many of Eiendomsverdi's five estimation methods that are included in the weighted estimate.

Property type	Transition weight	Methods used	Includes static IX	Deviation ranges							Total number	Total (%)	Est. value (MNOK)	Sales price (MNOK)	Dev. (%)
				< -30 %	-30 % -20 %	-20 % -10 %	-10 % 0 %	0 % 10 %	10 % 20 %	>30 %					
Detached	1	1	Yes	38 %	9 %	10 %	17 %	9 %	6 %	12 %	332	1 %	383	471	-19 %
	1	1	No	14 %	6 %	12 %	29 %	10 %	6 %	22 %	241	1 %	804	837	-4 %
	1	2-5	Yes	3 %	8 %	17 %	48 %	12 %	6 %	6 %	6 330	13 %	17 152	17 591	-2 %
	1	2-5	No	5 %	7 %	14 %	39 %	14 %	8 %	13 %	10 189	21 %	28 842	28 905	0 %
	0-1	1	-	22 %	12 %	14 %	35 %	12 %	2 %	2 %	125	0 %	159	185	-14 %
0-1	2-5	-	4 %	6 %	19 %	58 %	8 %	2 %	2 %	1 824	4 %	4 469	4 704	-5 %	
0	-	-	11 %	2 %	12 %	60 %	8 %	4 %	3 %	275	1 %	700	732	-4 %	
Flat	1	1	Yes	17 %	9 %	8 %	37 %	9 %	9 %	12 %	102	0 %	188	212	-11 %
	1	1	No	10 %	7 %	12 %	46 %	15 %	4 %	6 %	405	1 %	1 016	1 070	-5 %
	1	2-5	Yes	1 %	4 %	16 %	64 %	11 %	3 %	2 %	7 859	16 %	17 749	18 211	-3 %
	1	2-5	No	3 %	5 %	12 %	54 %	14 %	6 %	6 %	4 634	10 %	11 524	11 572	0 %
	0-1	1	-	0 %	4 %	11 %	61 %	19 %	4 %	2 %	84	0 %	141	137	3 %
0-1	2-5	-	2 %	4 %	17 %	68 %	7 %	1 %	1 %	3 932	8 %	8 340	8 722	-4 %	
0	-	-	7 %	8 %	15 %	48 %	12 %	5 %	6 %	1 702	4 %	3 493	3 615	-3 %	
Semi/terraced	1	1	Yes	7 %	5 %	14 %	41 %	12 %	7 %	13 %	151	0 %	238	237	0 %
	1	1	No	8 %	4 %	16 %	50 %	12 %	7 %	4 %	106	0 %	262	272	-4 %
	1	2-5	Yes	1 %	4 %	15 %	62 %	13 %	4 %	2 %	4 372	9 %	11 127	11 364	-2 %
	1	2-5	No	1 %	4 %	14 %	53 %	13 %	7 %	6 %	3 130	7 %	8 748	8 703	1 %
	0-1	1	-	1 %	6 %	15 %	61 %	12 %	4 %	1 %	82	0 %	128	131	-2 %
0-1	2-5	-	2 %	3 %	15 %	72 %	6 %	1 %	0 %	1 619	3 %	3 632	3 766	-4 %	
0	-	-	6 %	4 %	15 %	70 %	3 %	0 %	2 %	179	0 %	405	427	-5 %	

Table 6. Deviation per property type and estimation method.

3.3 Accuracy levels

The present method has seven accuracy levels in which the properties are divided into. Table 7 shows the deviation for each accuracy level and property type. Table 9 in section 3.4 summarizes the same quantities for the haircut portfolio.

Accuracy level	Property type	< -30 %	-30 % -20 %	-20 % -10 %	-10 % 10 %	10 % 20 %	20 % 30 %	>30 %	Total	Est.value (MNOK)	Sales price (MNOK)	Dev. (%)
1	Detached	0 %	0 %	10 %	69 %	17 %	2 %	2 %	0 %	134	132	1 %
	Flat	0 %	2 %	15 %	76 %	4 %	1 %	1 %	3 %	1 009	1 043	-3 %
	Semi/terraced	0 %	1 %	12 %	77 %	9 %	1 %	0 %	9 %	1 917	1 941	-1 %
2	Detached	1 %	4 %	13 %	63 %	14 %	4 %	2 %	6 %	3 590	3 601	0 %
	Flat	1 %	3 %	15 %	68 %	9 %	2 %	2 %	36 %	13 684	13 958	-2 %
	Semi/terraced	0 %	2 %	14 %	70 %	9 %	3 %	1 %	36 %	8 331	8 468	-2 %
3	Detached	2 %	6 %	17 %	52 %	13 %	6 %	4 %	30 %	16 946	17 189	-1 %
	Flat	1 %	4 %	16 %	62 %	11 %	3 %	2 %	35 %	14 539	14 977	-3 %
	Semi/terraced	1 %	5 %	16 %	57 %	12 %	6 %	3 %	35 %	8 665	8 816	-2 %
4	Detached	4 %	8 %	15 %	42 %	13 %	7 %	10 %	36 %	19 119	19 400	-1 %
	Flat	3 %	7 %	14 %	50 %	14 %	6 %	5 %	18 %	8 785	8 950	-2 %
	Semi/terraced	3 %	7 %	15 %	46 %	16 %	7 %	7 %	14 %	3 915	3 958	-1 %
5	Detached	7 %	9 %	15 %	35 %	12 %	8 %	15 %	21 %	10 167	10 347	-2 %
	Flat	8 %	8 %	15 %	36 %	13 %	8 %	11 %	6 %	3 396	3 515	-3 %
	Semi/terraced	4 %	5 %	14 %	41 %	14 %	10 %	12 %	5 %	1 416	1 406	1 %
6	Detached	16 %	9 %	13 %	25 %	8 %	7 %	22 %	6 %	2 381	2 500	-5 %
	Flat	19 %	5 %	12 %	31 %	9 %	8 %	16 %	1 %	1 019	1 072	-5 %
	Semi/terraced	14 %	7 %	11 %	36 %	15 %	9 %	8 %	1 %	282	295	-4 %
7	Detached	56 %	7 %	5 %	9 %	8 %	2 %	13 %	1 %	173	254	-32 %
	Flat	50 %	0 %	17 %	17 %	8 %	8 %	0 %	0 %	18	24	-24 %
	Semi/terraced	57 %	0 %	0 %	29 %	0 %	0 %	14 %	0 %	14	16	-10 %

Table 7. Deviation according to accuracy level and property type.

3.4 Haircut portfolio

In order to minimize the probability of overestimating individual properties, Eienomsverdi has applied haircuts according to specific rules. This results in a downgrading of some of the estimates. This section describes the deviation after applying these haircuts. Table 8 – 9 show deviations differentiated by property type and accuracy level, respectively.

Property type	-30 %	-20 %	-10 %	10 %	20 %			Total number	Total (%)	Est.value (MNOK)	Sales price (MNOK)	Dev. (%)
	< -30 %	-20 %	-10 %	10 %	20 %	30 %	>30 %					
Detached	7 %	9 %	17 %	43 %	11 %	6 %	8 %	19 316	41 %	51 138	53 423	-4 %
Flat	3 %	5 %	16 %	60 %	10 %	3 %	3 %	18 718	39 %	41 878	43 538	-4 %
Semi/terraced	2 %	4 %	16 %	61 %	11 %	4 %	3 %	9 639	20 %	24 323	24 900	-2 %
Total	4 %	6 %	16 %	53 %	11 %	5 %	5 %	47 673	100 %	117 339	121 861	-4 %

Table 8. Deviation per property type after haircuts: Percentages of estimates from different property types falling into the different error intervals in the haircut portfolio.

Accuracy level	Property type	-30 %	-20 %	-10 %	10 %	20 %			Total	Est.value (MNOK)	Sales price (MNOK)	Dev. (%)
		< -30 %	-20 %	-10 %	10 %	20 %	30 %	>30 %				
1	Detached	0 %	0 %	10 %	69 %	17 %	2 %	2 %	0 %	134	132	1 %
	Flat	0 %	2 %	15 %	76 %	4 %	1 %	1 %	3 %	1 009	1 043	-3 %
	Semi/terraced	0 %	1 %	12 %	77 %	9 %	1 %	0 %	9 %	1 917	1 941	-1 %
2	Detached	1 %	4 %	13 %	63 %	14 %	4 %	2 %	6 %	3 590	3 601	0 %
	Flat	1 %	3 %	15 %	68 %	9 %	2 %	2 %	36 %	13 684	13 958	-2 %
	Semi/terraced	0 %	2 %	14 %	70 %	9 %	3 %	1 %	36 %	8 331	8 468	-2 %
3	Detached	2 %	6 %	17 %	52 %	13 %	6 %	4 %	30 %	16 946	17 189	-1 %
	Flat	1 %	4 %	16 %	62 %	11 %	3 %	2 %	35 %	14 539	14 977	-3 %
	Semi/terraced	1 %	5 %	16 %	57 %	12 %	6 %	3 %	35 %	8 665	8 816	-2 %
4	Detached	6 %	10 %	18 %	42 %	11 %	5 %	8 %	36 %	18 442	19 400	-5 %
	Flat	4 %	8 %	19 %	50 %	11 %	5 %	3 %	18 %	8 464	8 950	-5 %
	Semi/terraced	3 %	8 %	20 %	46 %	12 %	6 %	5 %	14 %	3 784	3 958	-4 %
5	Detached	9 %	11 %	17 %	34 %	10 %	7 %	11 %	21 %	9 716	10 347	-6 %
	Flat	11 %	10 %	19 %	34 %	10 %	7 %	8 %	6 %	3 239	3 515	-8 %
	Semi/terraced	6 %	8 %	17 %	41 %	13 %	5 %	10 %	5 %	1 357	1 406	-3 %
6	Detached	23 %	13 %	13 %	23 %	8 %	5 %	16 %	6 %	2 169	2 500	-13 %
	Flat	23 %	8 %	20 %	26 %	8 %	6 %	9 %	1 %	929	1 072	-13 %
	Semi/terraced	19 %	8 %	20 %	36 %	9 %	6 %	3 %	1 %	258	295	-13 %
7	Detached	65 %	7 %	6 %	11 %	5 %	2 %	5 %	1 %	141	254	-45 %
	Flat	58 %	17 %	8 %	17 %	0 %	0 %	0 %	0 %	15	24	-39 %
	Semi/terraced	57 %	14 %	14 %	14 %	0 %	0 %	0 %	0 %	12	16	-27 %

Table 9. Deviation according to accuracy level and property type in the haircut portfolio.

3.5 Results – sample portfolio

This section gives the results when we weight the observations at hand to obtain a sample portfolio of properties. Table 10 shows the sample distribution of properties within the different accuracy levels and property types.

Accuracy level	1	2	3	4	5	6	7	Total
Detached homes	0%	2%	30%	30%	15%	20%	3%	60%
Flats	1.5%	47%	25%	15%	10%	1%	0.5%	20%
Terraced homes	5%	48%	23%	10%	10%	2%	2%	10%
Semi-detached homes	2%	22%	42%	15%	11%	7%	1%	10%
Total	1%	17.6%	29.5%	23.5%	13.1%	13.1%	2.2%	100%

Table 10. Sample portfolio of properties.

In order to account for the sample distributions for both accuracy levels and property types, we introduce a weight for each observation, ω ,

$$\omega = \omega_a \cdot \omega_p.$$

Here, the weight ω_a weights the observations according to the sample distribution of accuracy levels, whereas the weight ω_p weights the observations according to the sample distribution of property types. In this section we present some of the corresponding tables as in previous section, when the sample portfolio of properties is considered. Table 11 shows the percentages of the property types in each county. Table 12 shows the deviation per property type, Table 13 shows the deviation within different sales prices, and Table 14 shows the deviation for different living areas.

County	Detached	Flat	Semi/terraced	Total
Akershus	54.9 %	18.2 %	26.9 %	13.4 %
Oslo	16.4 %	67.0 %	16.6 %	11.2 %
Rogaland	57.8 %	17.3 %	24.9 %	10.5 %
Hordaland	47.9 %	29.3 %	22.9 %	7.5 %
Vestfold	74.0 %	9.1 %	17.0 %	6.6 %
Østfold	74.9 %	8.0 %	17.0 %	6.5 %
Buskerud	69.7 %	12.8 %	17.5 %	6.0 %
Sør-Trøndelag	51.5 %	25.0 %	23.5 %	5.9 %
Hedmark	87.8 %	3.7 %	8.6 %	4.6 %
Møre og Romsdal	64.4 %	13.5 %	22.1 %	4.1 %
Vest-Agder	59.2 %	16.0 %	24.9 %	4.1 %
Telemark	84.1 %	4.6 %	11.2 %	3.7 %
Nordland	72.8 %	6.3 %	20.9 %	3.3 %
Oppland	81.9 %	5.7 %	12.4 %	3.2 %
Nord-Trøndelag	74.2 %	7.2 %	18.6 %	3.1 %
Aust-Agder	82.2 %	5.7 %	12.1 %	2.9 %
Troms	65.6 %	13.5 %	20.9 %	1.8 %
Finnmark	73.3 %	6.6 %	20.1 %	0.9 %
Sogn og fjordane	56.2 %	10.8 %	33.0 %	0.8 %
Total	60.0 %	20.0 %	20.0 %	100.0 %

Table 11. Distribution of property types in each county, when considering the sample portfolio. Table 1 shows the corresponding distribution in the original data set.

Property type	-30 %	-20 %	-10 %	10 %	20 %			Total (%)
	< -30 %	-20 %	-10 %	10 %	20 %	30 %	>30 %	
Detached	8 %	7 %	15 %	40 %	12 %	7 %	11 %	60 %
Flat	2 %	5 %	15 %	60 %	11 %	4 %	4 %	20 %
Semi/terraced	3 %	4 %	14 %	58 %	12 %	5 %	4 %	20 %
Total	6 %	6 %	15 %	47 %	12 %	6 %	8 %	100 %

Table 12. Deviation per property type (when considering the sample portfolio): Percentages of estimates from different property types falling into the different error intervals. Table 2 shows the corresponding results obtained with the original data set.

Sales price		-30 %	-20 %	-10 %	10 %	20 %		Total
	< - 30 %	-20 %	-10 %	10 %	20 %	30 %	>30 %	
< 1 MNOK	6 %	3 %	6 %	23 %	13 %	9 %	40 %	6 %
1-2 MNOK	6 %	4 %	11 %	48 %	14 %	8 %	10 %	37 %
2-3 MNOK	4 %	6 %	17 %	53 %	11 %	5 %	4 %	30 %
3-4 MNOK	5 %	8 %	19 %	51 %	9 %	4 %	3 %	14 %
4-5 MNOK	8 %	9 %	22 %	45 %	8 %	5 %	3 %	6 %
> 5 MNOK	13 %	11 %	20 %	41 %	8 %	3 %	4 %	7 %
Total	6 %	6 %	15 %	47 %	12 %	6 %	8 %	100 %

Table 13. Deviation for properties with different sales prices (when considering the sample portfolio): Percentages of estimates falling into the different error intervals. Table 4 shows the corresponding results obtained with the original data set.

Property type	BOA		-30 %	-20 %	-10 %	10 %	20 %		Total
		< - 30 %	-20 %	-10 %	10 %	20 %	30 %	>30 %	
Detached	< 100 m ²	10 %	8 %	16 %	36 %	9 %	7 %	14 %	8 %
	100-120 m ²	8 %	7 %	16 %	39 %	11 %	6 %	12 %	8 %
	120-160 m ²	8 %	9 %	15 %	41 %	12 %	7 %	9 %	19 %
	160-200 m ²	6 %	7 %	16 %	43 %	13 %	6 %	9 %	13 %
	> 200 m ²	6 %	6 %	13 %	41 %	13 %	8 %	13 %	10 %
	Total	7 %	7 %	15 %	40 %	12 %	7 %	11 %	60 %
Flat	< 50 m ²	1 %	3 %	14 %	66 %	10 %	3 %	3 %	4 %
	50-70 m ²	1 %	4 %	15 %	63 %	11 %	3 %	3 %	7 %
	70-90 m ²	3 %	5 %	15 %	61 %	10 %	4 %	2 %	5 %
	90-120 m ²	4 %	6 %	16 %	53 %	11 %	5 %	5 %	3 %
	> 120 m ²	5 %	8 %	16 %	41 %	14 %	6 %	10 %	1 %
	Total	2 %	4 %	15 %	60 %	11 %	4 %	4 %	20 %
Semi/terraced	< 70 m ²	2 %	6 %	17 %	59 %	10 %	3 %	4 %	1 %
	70-90 m ²	2 %	4 %	14 %	59 %	11 %	6 %	4 %	3 %
	90-120 m ²	4 %	3 %	15 %	61 %	10 %	4 %	2 %	7 %
	120-140 m ²	2 %	4 %	12 %	62 %	13 %	5 %	3 %	3 %
	> 140 m ²	3 %	5 %	16 %	51 %	12 %	7 %	6 %	5 %
	Total	3 %	4 %	15 %	58 %	11 %	5 %	4 %	20 %
Total		6 %	6 %	15 %	47 %	12 %	6 %	8 %	100 %

Table 14. Deviation for properties with different living areas (when considering the sample portfolio): Percentages of estimates falling into the different error intervals. Table 3 shows the corresponding results obtained with the original data set.

3.6 Results – sample and haircut portfolio

The tables in this section show the results when we downgrade the estimates according to Eiendomsverdi's haircut strategy, and when we consider the sample portfolio in Table 10.

Property type	-30 %	-20 %	-10 %	10 %	20 %			Total (%)
	< -30 %	-20 %	-10 %	10 %	20 %	30 %	>30 %	
Detached	10 %	9 %	16 %	39 %	11 %	6 %	9 %	60 %
Flat	3 %	5 %	16 %	60 %	10 %	3 %	3 %	20 %
Semi/terraced	4 %	5 %	16 %	58 %	11 %	4 %	3 %	20 %
Total	7 %	7 %	16 %	47 %	11 %	5 %	6 %	100 %

Table 15. Deviation per property type (with downgraded estimates and when considering the sample portfolio): Percentages of estimates from different property types falling into the different error intervals. Table 8 shows the corresponding results obtained with the original data set.

A Appendix

We would like to check if the uncertainty distribution captures the observed uncertainty in different subsets of the data set. Tables A.1-A.4 show the percentage of observed sales prices that are below different quantiles in the estimated price distributions, for different subsets of the available detached homes, flats, terraced homes and semi-detached homes, respectively. Tables A.5-A.8 show the same applied to the sample portfolio.

In these tables, we consider different subsets of the data; those sales with previous sale less than a year ago, 1-2 years ago, 2-3 years ago, 1-3 years ago, and more than three years ago. Further, Eiendomsverdi classifies each sale with risk score "Red", "Yellow" or "Green", and each of these subsets are considered. Also, we focus on subsets with estimates which include at least method 1 of Eiendomsverdi, method 2 of Eiendomsverdi and so on, and then estimates which only include method 1 of Eiendomsverdi, method 2 of Eiendomsverdi and so on. Finally, each county in Norway is considered.

For each subset, we check if the percentage of the observed sales prices that are below the quantiles are close to (10%, 25%, 50%, 75%, 90%). The column Phat in each table shows the percentage of the observed sales prices that are below the point estimates. The column 80CI in each table shows the percentage of the observed sales prices that are within the 80% confidence interval. The rightmost column in each table shows the number of observations in each subset.

	10%	25%	50%	75%	90%	Phat	80CI	N
All	17.3%	30.2%	49.3%	69.6%	83.9%	49.1%	66.7%	19 316
<1 year since prev. sale	8.4%	16.4%	46.5%	75.3%	88.4%	41.1%	80.0%	275
1-2 years since prev. sale	4.7%	13.6%	38.0%	65.7%	85.6%	36.9%	80.9%	832
2-3 years since prev. sale	11.5%	22.3%	40.7%	62.8%	84.0%	39.3%	72.4%	1 117
1-3 years since prev. sale	8.6%	18.6%	39.6%	64.1%	84.7%	38.3%	76.0%	1 949
>3 years since prev. sale	18.4%	31.8%	50.5%	70.1%	83.8%	50.5%	65.4%	17 092
Risk score Red	14.6%	22.2%	37.8%	54.7%	71.7%	37.4%	57.2%	481
Risk score Yellow	17.4%	29.1%	44.8%	66.4%	81.7%	44.5%	64.4%	1 925
Risk score Green	17.3%	30.6%	50.2%	70.4%	84.5%	50.0%	67.2%	16 910
P_1	11.4%	23.7%	45.4%	67.9%	84.7%	45.1%	73.3%	4 505
P_2	12.6%	24.4%	44.4%	66.2%	82.7%	44.0%	70.1%	8 886
P_3	11.1%	23.5%	45.1%	67.3%	84.2%	44.7%	73.2%	4 509
P_4	17.5%	30.5%	49.7%	70.0%	84.3%	49.5%	66.8%	18 649
P_5	17.4%	30.5%	49.7%	70.0%	84.3%	49.5%	66.9%	18 652
Only P_1	–	–	–	–	–	–	–	–
Only P_2	8.4%	17.1%	33.6%	52.9%	70.4%	33.2%	62.1%	467
Only P_3	–	–	–	–	–	–	–	–
Only P_4	26.8%	38.1%	56.7%	72.2%	80.4%	56.7%	53.6%	97
Only P_5	20.8%	31.9%	51.4%	71.5%	84.7%	51.4%	63.9%	144
County 1	20.1%	33.2%	52.7%	73.0%	86.5%	52.3%	66.4%	1 639
County 2	17.1%	30.2%	50.6%	71.4%	86.1%	50.6%	69.0%	2 714
County 3	18.6%	34.5%	55.7%	75.9%	87.3%	55.9%	68.6%	644
County 4	17.4%	29.8%	50.3%	71.4%	85.4%	49.7%	68.1%	1 036
County 5	20.7%	32.5%	49.1%	68.4%	83.1%	48.8%	62.4%	782
County 6	16.8%	29.4%	46.9%	68.6%	83.5%	46.7%	66.7%	1 384
County 7	18.7%	33.6%	53.1%	71.0%	83.6%	52.8%	64.9%	1 630
County 8	16.2%	29.1%	45.7%	65.2%	80.4%	45.4%	64.2%	939
County 9	18.3%	33.5%	52.1%	70.5%	82.2%	52.1%	63.9%	662
County 10	14.0%	25.5%	46.7%	65.9%	79.6%	46.2%	65.6%	788
County 11	13.3%	25.1%	43.9%	65.3%	82.0%	43.8%	68.7%	2 163
County 12	18.9%	32.0%	53.1%	73.4%	86.5%	52.8%	67.5%	1 220
County 14	15.3%	29.7%	44.1%	60.2%	78.0%	44.1%	62.7%	118
County 15	18.7%	30.7%	48.1%	67.0%	81.3%	48.0%	62.6%	792
County 16	13.3%	26.8%	46.1%	67.9%	83.0%	46.0%	69.7%	960
County 17	20.1%	33.8%	55.5%	73.9%	87.5%	55.4%	67.3%	551
County 18	18.2%	30.3%	45.5%	68.5%	83.2%	45.4%	65.0%	692
County 19	17.8%	27.9%	44.9%	64.2%	83.0%	44.9%	65.2%	394
County 20	19.2%	31.7%	48.6%	68.8%	83.7%	48.6%	64.4%	208

Table A.1. Detached homes: For different subsets of the data, the percentage of observed sales prices that are below different quantiles in the estimated price distributions are shown.

	10%	25%	50%	75%	90%	Phat	80CI	N
All	11.6%	23.5%	45.2%	69.5%	84.6%	44.4%	72.9%	18 718
<1 year since prev. sale	20.0%	30.4%	49.1%	67.3%	81.3%	46.2%	61.3%	1 702
1-2 years since prev. sale	6.3%	15.4%	40.7%	70.6%	87.3%	35.8%	81.0%	1 793
2-3 years since prev. sale	6.7%	18.1%	38.9%	68.1%	86.5%	35.2%	79.9%	2 223
1-3 years since prev. sale	6.5%	16.9%	39.7%	69.2%	86.9%	35.5%	80.4%	4 016
>3 years since prev. sale	12.1%	24.6%	46.3%	69.9%	84.3%	46.9%	72.2%	13 000
Risk score Red	0.0%	10.7%	28.6%	46.4%	67.9%	25.0%	67.9%	28
Risk score Yellow	14.6%	29.5%	49.3%	69.9%	82.8%	47.7%	68.2%	302
Risk score Green	11.6%	23.4%	45.1%	69.6%	84.6%	44.4%	73.0%	18 388
P_1	7.4%	17.6%	39.4%	66.4%	83.6%	38.4%	76.2%	7 945
P_2	9.9%	20.9%	42.6%	68.1%	84.2%	41.3%	74.4%	13 679
P_3	7.9%	18.6%	41.5%	68.0%	84.4%	40.5%	76.5%	7 966
P_4	11.6%	23.5%	45.1%	69.6%	84.8%	44.4%	73.1%	18 340
P_5	11.4%	23.0%	44.6%	69.2%	84.3%	43.8%	73.0%	17 530
Only P_1	–	–	–	–	–	–	–	–
Only P_2	17.7%	32.7%	58.6%	75.0%	85.0%	55.9%	67.3%	220
Only P_3	–	–	–	–	–	–	–	–
Only P_4	18.4%	38.2%	58.8%	79.0%	91.2%	58.8%	72.8%	272
Only P_5	3.0%	7.5%	26.3%	45.1%	57.9%	27.1%	54.9%	133
County 1	15.5%	30.8%	55.1%	76.0%	89.9%	53.2%	74.3%	483
County 2	7.4%	18.5%	39.2%	67.3%	84.2%	38.6%	76.8%	2 309
County 3	11.0%	22.4%	44.4%	69.0%	83.6%	44.1%	72.7%	7 079
County 4	13.0%	27.3%	52.2%	77.0%	85.1%	51.6%	72.0%	161
County 5	14.4%	33.3%	59.2%	82.8%	91.4%	59.2%	77.0%	174
County 6	13.1%	22.7%	45.1%	68.6%	84.2%	43.7%	71.0%	739
County 7	16.0%	30.5%	52.3%	72.5%	87.4%	50.8%	71.4%	524
County 8	17.6%	29.6%	48.6%	67.6%	79.6%	48.6%	62.0%	142
County 9	19.1%	30.5%	53.2%	74.5%	87.9%	52.5%	68.8%	141
County 10	10.7%	22.0%	43.0%	67.6%	82.6%	41.9%	71.8%	596
County 11	8.5%	17.9%	38.1%	64.2%	81.3%	36.1%	72.7%	1 666
County 12	12.7%	25.4%	46.9%	70.1%	85.1%	46.1%	72.3%	2 048
County 14	8.1%	23.0%	39.2%	67.6%	82.4%	39.2%	74.3%	74
County 15	16.0%	29.8%	50.3%	72.6%	87.3%	49.7%	71.3%	543
County 16	11.6%	24.2%	46.7%	70.2%	86.8%	45.9%	75.2%	1 361
County 17	40.2%	52.9%	73.5%	86.2%	93.7%	72.5%	53.4%	189
County 18	16.5%	31.1%	54.4%	81.1%	92.2%	52.9%	75.7%	206
County 19	16.7%	31.6%	55.7%	78.5%	88.2%	55.7%	71.5%	228
County 20	20.0%	36.4%	54.5%	74.5%	89.1%	52.7%	69.1%	55

Table A.2. Flats: For different subsets of the data, the percentage of observed sales prices that are below different quantiles in the estimated price distributions are shown.

	10%	25%	50%	75%	90%	Phat	80CI	N
All	11.7%	24.3%	44.9%	68.5%	84.8%	43.7%	73.1%	4 016
<1 year since prev. sale	0.0%	7.7%	38.5%	70.8%	81.5%	29.2%	81.5%	65
1-2 years since prev. sale	4.4%	16.9%	45.0%	73.4%	89.3%	37.0%	84.9%	338
2-3 years since prev. sale	12.3%	24.4%	41.8%	65.9%	84.1%	37.4%	71.8%	390
1-3 years since prev. sale	8.7%	20.9%	43.3%	69.4%	86.5%	37.2%	77.9%	728
>3 years since prev. sale	12.6%	25.3%	45.4%	68.3%	84.4%	45.4%	71.9%	3 223
Risk score Red	0.0%	16.7%	16.7%	33.3%	33.3%	16.7%	33.3%	6
Risk score Yellow	15.0%	22.8%	42.5%	66.9%	82.7%	40.2%	67.7%	127
Risk score Green	11.6%	24.3%	45.0%	68.6%	84.9%	43.8%	73.3%	3 883
P_1	9.4%	21.3%	41.7%	65.5%	84.1%	39.7%	74.7%	1 697
P_2	10.8%	23.0%	44.2%	68.0%	84.8%	42.6%	74.0%	2 924
P_3	9.5%	21.8%	42.1%	66.0%	84.3%	40.3%	74.8%	1 740
P_4	11.6%	24.1%	44.5%	68.2%	84.5%	43.3%	72.9%	3 872
P_5	11.6%	24.0%	44.4%	68.0%	84.6%	43.3%	73.0%	3 852
Only P_1	–	–	–	–	–	–	–	–
Only P_2	20.3%	37.7%	53.6%	78.3%	88.4%	52.2%	68.1%	69
Only P_3	–	–	–	–	–	–	–	–
Only P_4	26.3%	36.8%	47.4%	73.7%	84.2%	47.4%	57.9%	19
Only P_5	0.0%	7.1%	35.7%	50.0%	85.7%	35.7%	85.7%	14
County 1	13.5%	33.3%	51.5%	76.0%	86.5%	49.7%	73.1%	171
County 2	11.7%	24.3%	46.1%	68.4%	84.8%	45.0%	73.1%	991
County 3	12.1%	26.1%	52.0%	77.6%	92.7%	50.9%	80.6%	371
County 4	17.6%	23.0%	47.3%	79.7%	85.1%	44.6%	67.6%	74
County 5	12.0%	30.0%	50.0%	76.0%	92.0%	48.0%	80.0%	50
County 6	8.8%	17.6%	41.2%	68.2%	82.9%	40.0%	74.1%	170
County 7	13.9%	24.9%	45.1%	68.8%	86.7%	44.5%	72.8%	173
County 8	27.1%	47.9%	56.2%	77.1%	85.4%	56.2%	58.3%	48
County 9	17.6%	33.8%	52.9%	73.5%	89.7%	52.9%	72.1%	68
County 10	10.9%	29.0%	45.2%	69.2%	88.7%	43.9%	77.8%	221
County 11	7.2%	17.9%	34.8%	57.1%	74.8%	33.9%	67.6%	543
County 12	11.7%	23.8%	44.4%	66.0%	83.0%	43.2%	71.4%	412
County 14	15.2%	21.2%	36.4%	63.6%	69.7%	36.4%	54.5%	33
County 15	10.4%	27.8%	45.8%	74.3%	90.3%	45.1%	79.9%	144
County 16	7.4%	14.0%	37.2%	62.4%	84.7%	35.1%	77.3%	242
County 17	22.8%	40.4%	64.9%	82.5%	94.7%	63.2%	71.9%	114
County 18	15.0%	24.8%	45.1%	70.8%	83.2%	45.1%	68.1%	113
County 19	9.4%	13.2%	32.1%	58.5%	83.0%	28.3%	73.6%	53
County 20	16.0%	28.0%	44.0%	72.0%	88.0%	40.0%	72.0%	25

Table A.3. Terraced homes: For different subsets of the data, the percentage of observed sales prices that are below different quantiles in the estimated price distributions are shown.

	10%	25%	50%	75%	90%	Phat	80CI	N
All	14.9%	28.7%	51.1%	71.6%	86.3%	49.0%	71.4%	5 623
<1 year since prev. sale	5.3%	13.2%	48.2%	74.6%	88.6%	35.1%	83.3%	114
1-2 years since prev. sale	5.4%	14.4%	43.3%	74.7%	92.0%	36.4%	86.5%	423
2-3 years since prev. sale	8.9%	23.1%	45.3%	69.5%	89.3%	40.5%	80.4%	550
1-3 years since prev. sale	7.4%	19.3%	44.4%	71.7%	90.4%	38.7%	83.0%	973
>3 years since prev. sale	16.8%	31.1%	52.6%	71.5%	85.4%	51.5%	68.6%	4 536
Risk score Red	8.7%	21.7%	52.2%	73.9%	95.7%	43.5%	87.0%	23
Risk score Yellow	12.2%	26.9%	46.6%	75.6%	87.4%	44.5%	75.2%	238
Risk score Green	15.1%	28.8%	51.3%	71.4%	86.2%	49.2%	71.1%	5 362
P_1	9.8%	23.2%	46.8%	69.6%	86.3%	44.1%	76.5%	1 993
P_2	11.3%	24.7%	48.2%	70.0%	86.1%	45.5%	74.8%	3 479
P_3	9.4%	22.6%	46.8%	70.2%	86.5%	44.0%	77.1%	2 036
P_4	15.2%	28.9%	50.9%	71.4%	86.1%	48.7%	70.8%	5 391
P_5	15.2%	28.9%	51.0%	71.6%	86.1%	48.9%	70.9%	5 312
Only P_1	–	–	–	–	–	–	–	–
Only P_2	8.1%	24.9%	52.6%	74.6%	92.5%	50.3%	84.4%	173
Only P_3	–	–	–	–	–	–	–	–
Only P_4	14.9%	31.9%	51.1%	70.2%	85.1%	46.8%	70.2%	47
Only P_5	11.5%	26.9%	65.4%	73.1%	84.6%	61.5%	73.1%	26
County 1	19.3%	31.9%	57.3%	77.2%	90.1%	54.4%	70.8%	342
County 2	14.9%	29.9%	52.5%	71.9%	86.9%	51.0%	72.0%	832
County 3	12.8%	27.8%	51.2%	70.2%	88.7%	49.7%	75.9%	453
County 4	12.2%	31.3%	52.7%	67.9%	89.3%	48.1%	77.1%	131
County 5	22.5%	41.5%	71.8%	84.5%	91.5%	67.6%	69.0%	142
County 6	14.4%	24.9%	49.9%	70.9%	85.3%	47.9%	70.9%	361
County 7	15.8%	33.0%	58.8%	81.8%	90.8%	56.7%	74.9%	379
County 8	17.5%	32.5%	46.8%	68.3%	87.3%	45.2%	69.8%	126
County 9	18.3%	31.7%	56.1%	72.0%	84.1%	52.4%	65.9%	82
County 10	11.1%	25.6%	51.9%	67.2%	83.2%	48.9%	72.1%	262
County 11	9.5%	22.8%	43.6%	64.9%	81.8%	41.0%	72.3%	863
County 12	15.0%	28.4%	47.7%	69.2%	85.4%	46.1%	70.4%	419
County 14	25.0%	35.7%	50.0%	78.6%	85.7%	50.0%	60.7%	28
County 15	17.0%	31.7%	57.0%	79.7%	89.0%	55.0%	72.0%	300
County 16	13.1%	22.9%	40.6%	64.8%	80.7%	38.8%	67.6%	389
County 17	23.9%	35.0%	50.4%	75.2%	88.0%	48.7%	64.1%	117
County 18	24.1%	36.8%	58.2%	77.7%	92.3%	56.8%	68.2%	220
County 19	19.7%	31.8%	56.8%	78.0%	88.6%	54.5%	68.9%	132
County 20	11.1%	15.6%	28.9%	53.3%	73.3%	26.7%	62.2%	45

Table A.4. Semi-detached homes: For different subsets of the data, the percentage of observed sales prices that are below different quantiles in the estimated price distributions are shown.

	10%	25%	50%	75%	90%	Phat	80CI	N
All	16.9%	29.8%	48.7%	68.6%	83.1%	48.5%	66.1%	100.0%
<1 year since prev. sale	7.2%	13.9%	42.9%	70.4%	84.1%	36.6%	76.8%	1.5%
1-2 years since prev. sale	4.1%	12.1%	35.5%	63.1%	83.0%	34.5%	78.9%	4.6%
2-3 years since prev. sale	10.2%	20.5%	38.7%	61.8%	83.7%	37.6%	73.5%	4.7%
1-3 years since prev. sale	7.2%	16.3%	37.1%	62.4%	83.4%	36.1%	76.2%	9.3%
>3 years since prev. sale	18.1%	31.5%	50.0%	69.2%	83.0%	50.1%	64.9%	89.2%
Risk score Red	11.6%	18.0%	34.3%	49.9%	66.2%	34.1%	54.7%	5.1%
Risk score Yellow	16.6%	28.7%	44.7%	65.7%	81.1%	44.4%	64.5%	13.1%
Risk score Green	17.3%	30.8%	50.3%	70.2%	84.4%	50.1%	67.1%	81.8%
P_1	11.1%	23.6%	45.1%	67.7%	84.5%	44.8%	73.5%	20.4%
P_2	11.8%	23.3%	42.8%	64.3%	80.9%	42.4%	69.2%	45.6%
P_3	10.9%	23.8%	45.3%	67.6%	84.2%	44.9%	73.3%	20.9%
P_4	17.5%	30.8%	49.9%	69.9%	84.1%	49.7%	66.6%	91.3%
P_5	17.6%	30.8%	49.9%	70.0%	84.3%	49.8%	66.7%	92.5%
Only P_1	–	–	–	–	–	–	–	–
Only P_2	6.4%	14.1%	29.6%	47.0%	65.5%	29.4%	59.1%	6.1%
Only P_3	–	–	–	–	–	–	–	–
Only P_4	22.8%	33.5%	49.1%	65.3%	73.9%	49.1%	51.1%	0.7%
Only P_5	22.1%	32.6%	50.0%	69.9%	84.6%	50.0%	62.6%	1.8%
County 1	19.2%	32.6%	51.3%	71.2%	84.7%	51.0%	65.5%	8.1%
County 2	16.7%	29.9%	50.3%	71.1%	86.5%	50.4%	69.8%	12.3%
County 3	19.3%	33.9%	54.4%	76.1%	86.7%	54.6%	67.3%	3.0%
County 4	17.7%	30.3%	51.5%	72.8%	86.8%	50.8%	69.0%	6.7%
County 5	19.3%	31.7%	46.9%	66.5%	81.5%	46.6%	62.2%	4.4%
County 6	16.8%	30.4%	47.2%	68.8%	83.0%	47.1%	66.2%	7.0%
County 7	18.9%	33.6%	53.1%	71.7%	83.9%	52.9%	65.1%	8.2%
County 8	15.3%	28.1%	45.3%	64.7%	78.6%	45.0%	63.3%	5.2%
County 9	17.7%	33.8%	51.1%	69.6%	80.5%	51.1%	62.8%	4.0%
County 10	14.2%	26.9%	47.2%	64.1%	77.3%	46.7%	63.1%	4.0%
County 11	13.8%	25.4%	44.2%	64.9%	81.4%	44.1%	67.6%	10.1%
County 12	18.8%	31.7%	52.6%	71.6%	85.1%	52.3%	66.3%	5.9%
County 14	11.8%	24.1%	37.9%	52.3%	70.0%	37.9%	58.2%	0.7%
County 15	19.3%	31.6%	48.5%	65.4%	79.7%	48.4%	60.3%	4.4%
County 16	13.2%	25.6%	45.5%	67.6%	83.2%	45.1%	70.0%	5.1%
County 17	17.8%	30.1%	54.2%	73.0%	87.7%	54.1%	69.9%	3.8%
County 18	16.0%	26.9%	42.3%	62.9%	79.5%	42.1%	63.5%	4.1%
County 19	15.2%	23.8%	39.4%	59.0%	80.1%	39.4%	64.9%	2.0%
County 20	16.7%	28.4%	42.4%	59.4%	78.7%	42.4%	62.1%	1.1%

Table A.5. Detached homes: For different subsets of the data, the portion of observed sales prices that are below different quantiles in the estimates price distributions are shown (when considering the sample portfolio). Table A.1 shows the corresponding results obtained with the original data set.

	10%	25%	50%	75%	90%	Phat	80CI	N
All	11.9%	23.7%	45.2%	69.4%	84.6%	44.3%	72.6%	100.0%
<1 year since prev. sale	20.8%	31.3%	51.0%	68.3%	82.7%	48.0%	61.8%	11.1%
1-2 years since prev. sale	6.5%	15.7%	40.8%	70.7%	87.4%	36.0%	80.9%	11.1%
2-3 years since prev. sale	6.6%	18.1%	38.9%	68.1%	87.2%	35.3%	80.6%	12.9%
1-3 years since prev. sale	6.5%	17.0%	39.8%	69.3%	87.3%	35.7%	80.7%	24.0%
>3 years since prev. sale	12.4%	24.8%	46.2%	69.6%	83.9%	46.8%	71.5%	64.9%
Risk score Red	0.0%	10.6%	33.0%	46.0%	61.3%	27.3%	61.3%	0.2%
Risk score Yellow	15.0%	28.6%	49.9%	69.2%	84.0%	46.0%	69.0%	1.7%
Risk score Green	11.9%	23.6%	45.2%	69.4%	84.6%	44.3%	72.7%	98.2%
P_1	7.5%	17.8%	39.4%	66.3%	83.7%	38.2%	76.2%	42.3%
P_2	10.3%	21.2%	42.9%	68.0%	84.3%	41.4%	74.1%	73.8%
P_3	8.0%	18.8%	41.7%	67.9%	84.5%	40.6%	76.5%	42.5%
P_4	12.0%	23.7%	45.2%	69.5%	84.8%	44.3%	72.9%	97.7%
P_5	11.7%	23.3%	44.6%	69.1%	84.3%	43.7%	72.7%	93.5%
Only P_1	–	–	–	–	–	–	–	–
Only P_2	16.0%	28.9%	57.9%	71.9%	82.9%	52.5%	66.9%	1.3%
Only P_3	–	–	–	–	–	–	–	–
Only P_4	18.9%	38.2%	57.5%	77.8%	91.9%	57.5%	73.1%	1.4%
Only P_5	2.6%	7.6%	26.4%	43.9%	54.5%	27.4%	51.9%	0.8%
County 1	15.2%	30.6%	52.8%	74.5%	88.5%	51.1%	73.2%	2.6%
County 2	7.2%	18.2%	38.8%	67.5%	84.4%	37.9%	77.2%	12.3%
County 3	11.6%	22.9%	44.7%	69.0%	83.6%	44.2%	72.1%	37.3%
County 4	11.7%	25.5%	54.2%	76.9%	85.6%	53.7%	73.9%	0.8%
County 5	14.7%	34.8%	61.7%	83.3%	90.9%	61.9%	76.2%	0.9%
County 6	12.6%	21.8%	44.6%	66.4%	82.7%	43.3%	70.2%	3.8%
County 7	16.7%	30.6%	50.4%	68.4%	86.5%	48.9%	69.8%	3.0%
County 8	17.5%	28.0%	44.8%	62.8%	77.8%	44.8%	60.4%	0.9%
County 9	16.9%	26.9%	53.1%	74.7%	88.8%	52.2%	72.0%	0.8%
County 10	10.5%	22.2%	42.9%	67.7%	83.1%	42.0%	72.6%	3.2%
County 11	8.4%	17.4%	37.0%	63.8%	81.2%	35.0%	72.8%	9.1%
County 12	13.4%	26.2%	47.6%	70.6%	85.6%	46.5%	72.2%	10.9%
County 14	7.7%	23.1%	37.7%	65.2%	80.9%	37.7%	73.1%	0.4%
County 15	16.2%	30.2%	51.7%	73.5%	87.6%	51.0%	71.4%	2.8%
County 16	12.1%	24.7%	47.4%	70.1%	86.6%	46.5%	74.4%	7.4%
County 17	39.1%	50.9%	74.4%	87.4%	94.5%	70.0%	55.4%	1.1%
County 18	16.8%	32.3%	55.1%	81.2%	92.7%	53.2%	75.9%	1.1%
County 19	17.9%	31.9%	56.9%	79.9%	88.5%	57.0%	70.6%	1.2%
County 20	23.1%	40.2%	55.7%	74.3%	89.3%	54.4%	66.2%	0.3%

Table A.6. Flats: For different subsets of the data, the percentage of observed sales prices that are below different quantiles in the estimates price distributions are shown (when considering the sample portfolio). Table A.2 shows the corresponding results obtained with the original data set.

	10%	25%	50%	75%	90%	Phat	80CI	N
All	10.9%	23.7%	44.9%	68.3%	84.1%	43.7%	73.2%	100.0%
<1 year since prev. sale	0.0%	8.1%	37.8%	70.2%	80.9%	28.8%	80.9%	1.7%
1-2 years since prev. sale	4.3%	15.6%	42.3%	72.5%	89.1%	33.3%	84.8%	8.4%
2-3 years since prev. sale	10.8%	23.2%	42.1%	68.6%	85.4%	38.2%	74.6%	6.7%
1-3 years since prev. sale	7.2%	18.9%	42.2%	70.8%	87.5%	35.5%	80.3%	15.1%
>3 years since prev. sale	11.8%	24.9%	45.5%	67.8%	83.6%	45.5%	71.8%	83.3%
Risk score Red	0.0%	2.4%	2.4%	3.5%	3.5%	2.4%	3.5%	2.2%
Risk score Yellow	16.0%	24.8%	44.7%	69.9%	85.2%	43.4%	69.2%	4.1%
Risk score Green	11.0%	24.1%	45.9%	69.7%	86.0%	44.7%	75.0%	93.8%
P_1	8.2%	20.0%	41.0%	65.4%	84.3%	39.0%	76.2%	38.2%
P_2	9.8%	21.7%	42.9%	66.8%	83.1%	41.4%	73.2%	71.7%
P_3	8.2%	20.2%	41.8%	66.1%	84.8%	39.8%	76.7%	40.1%
P_4	11.0%	24.0%	45.2%	69.1%	85.3%	44.0%	74.3%	91.9%
P_5	11.0%	24.1%	45.3%	69.0%	85.5%	44.2%	74.6%	92.3%
Only P_1	–	–	–	–	–	–	–	–
Only P_2	13.9%	20.7%	30.9%	47.3%	53.8%	30.3%	40.0%	4.8%
Only P_3	–	–	–	–	–	–	–	–
Only P_4	14.0%	20.5%	37.4%	71.5%	78.1%	37.4%	64.1%	0.6%
Only P_5	0.0%	11.0%	40.1%	50.0%	90.1%	40.1%	90.1%	0.7%
County 1	15.4%	33.1%	52.2%	77.8%	87.1%	50.4%	71.6%	4.4%
County 2	10.3%	22.5%	46.0%	68.6%	85.0%	45.1%	74.8%	22.9%
County 3	11.4%	25.6%	52.3%	78.3%	92.9%	51.4%	81.5%	9.3%
County 4	13.0%	17.5%	43.8%	81.7%	87.3%	41.3%	74.4%	1.9%
County 5	12.7%	28.6%	53.1%	74.7%	92.5%	47.6%	79.8%	1.4%
County 6	8.1%	18.2%	40.6%	71.4%	84.7%	39.7%	76.6%	4.3%
County 7	12.4%	24.5%	46.1%	69.8%	87.7%	45.6%	75.2%	4.5%
County 8	26.3%	52.1%	62.6%	82.9%	89.4%	62.6%	63.1%	1.4%
County 9	20.1%	39.2%	52.5%	79.6%	92.2%	52.5%	72.1%	2.1%
County 10	10.0%	28.6%	46.4%	68.9%	89.1%	45.2%	79.2%	5.5%
County 11	7.3%	18.1%	34.5%	56.6%	75.2%	33.6%	67.9%	11.8%
County 12	11.5%	23.9%	45.8%	66.6%	84.6%	44.8%	73.2%	10.0%
County 14	7.2%	9.3%	16.3%	28.1%	30.6%	16.3%	23.5%	1.7%
County 15	12.3%	32.1%	46.9%	76.6%	90.7%	46.1%	78.4%	3.9%
County 16	5.5%	11.5%	35.5%	57.1%	73.5%	33.9%	68.0%	7.1%
County 17	19.7%	40.8%	64.9%	80.4%	96.4%	62.2%	76.7%	3.1%
County 18	12.8%	22.3%	47.2%	71.5%	83.9%	47.2%	71.1%	2.9%
County 19	6.9%	10.0%	27.9%	51.9%	84.7%	23.4%	77.8%	1.2%
County 20	16.3%	28.8%	41.6%	73.7%	90.0%	40.3%	73.7%	0.7%

Table A.7. Terraced homes: For different subsets of the data, the percentage of observed sales prices that are below different quantiles in the estimates price distributions are shown (when considering the sample portfolio). Table A.3 shows the corresponding results obtained with the original data set.

	10%	25%	50%	75%	90%	Phat	80CI	N
All	14.7%	28.7%	51.4%	72.0%	86.5%	49.5%	71.8%	100.0%
<1 year since prev. sale	4.1%	10.2%	41.4%	65.7%	84.7%	29.3%	80.6%	1.9%
1-2 years since prev. sale	4.8%	13.3%	41.0%	72.3%	91.8%	34.6%	87.0%	6.0%
2-3 years since prev. sale	8.6%	23.0%	45.3%	69.5%	89.2%	40.3%	80.6%	6.7%
1-3 years since prev. sale	6.8%	18.4%	43.2%	70.8%	90.4%	37.6%	83.6%	12.7%
>3 years since prev. sale	16.1%	30.7%	52.9%	72.3%	86.0%	51.7%	69.8%	85.4%
Risk score Red	3.6%	7.9%	40.9%	66.0%	98.2%	37.9%	94.6%	1.7%
Risk score Yellow	14.4%	28.1%	47.0%	76.5%	88.1%	45.5%	73.7%	5.4%
Risk score Green	14.9%	29.2%	51.9%	71.8%	86.2%	50.0%	71.3%	92.9%
P_1	9.7%	23.3%	46.7%	69.5%	86.1%	44.2%	76.3%	30.5%
P_2	10.8%	24.2%	48.5%	70.0%	86.1%	46.1%	75.4%	59.3%
P_3	9.2%	22.5%	48.2%	71.0%	86.6%	45.7%	77.4%	32.6%
P_4	15.6%	29.4%	51.1%	71.4%	86.0%	49.1%	70.4%	90.6%
P_5	15.3%	29.4%	51.2%	71.8%	86.0%	49.3%	70.7%	90.7%
Only P_1	–	–	–	–	–	–	–	–
Only P_2	8.4%	21.6%	46.7%	71.0%	92.1%	43.9%	83.7%	5.5%
Only P_3	–	–	–	–	–	–	–	–
Only P_4	15.0%	31.0%	51.2%	67.4%	88.5%	47.5%	73.4%	1.0%
Only P_5	5.0%	28.8%	51.8%	72.4%	82.6%	50.8%	77.5%	1.5%
County 1	18.5%	31.6%	57.4%	77.1%	89.2%	55.0%	70.7%	6.7%
County 2	14.4%	29.3%	52.3%	72.1%	86.9%	51.0%	72.5%	13.2%
County 3	11.4%	26.9%	51.1%	70.7%	87.2%	49.5%	75.8%	9.2%
County 4	13.7%	34.1%	54.3%	68.7%	89.8%	50.4%	76.1%	2.0%
County 5	20.9%	38.4%	67.8%	78.7%	92.2%	64.8%	71.3%	2.6%
County 6	15.1%	24.9%	49.7%	70.5%	85.5%	47.8%	70.4%	6.2%
County 7	15.2%	34.5%	59.5%	80.7%	88.9%	57.9%	73.7%	6.8%
County 8	18.7%	38.0%	49.0%	67.6%	85.8%	47.6%	67.2%	2.7%
County 9	17.6%	30.1%	55.0%	70.6%	83.4%	52.2%	65.7%	1.4%
County 10	10.4%	24.8%	54.9%	68.1%	84.1%	52.3%	73.7%	4.6%
County 11	10.0%	23.3%	44.5%	66.4%	82.7%	42.3%	72.7%	14.2%
County 12	13.6%	30.0%	51.3%	71.5%	86.3%	48.4%	72.7%	7.0%
County 14	18.1%	26.1%	36.7%	73.8%	78.7%	36.7%	60.7%	0.8%
County 15	18.1%	31.6%	56.5%	80.8%	89.0%	55.1%	70.9%	5.3%
County 16	12.5%	22.1%	40.5%	64.9%	82.1%	38.9%	69.6%	6.8%
County 17	21.2%	32.9%	44.9%	75.5%	88.9%	43.6%	67.7%	2.6%
County 18	22.7%	35.8%	56.1%	76.2%	92.4%	55.1%	69.7%	4.1%
County 19	19.7%	29.6%	59.7%	81.7%	89.6%	57.2%	69.9%	2.5%
County 20	15.6%	18.4%	34.5%	51.1%	82.5%	32.7%	66.9%	1.1%

Table A.8. Semi-detached homes: For different subsets of the data, the percentage of observed sales prices that are below different quantiles in the estimates price distributions are shown (when considering the sample portfolio). Table A.4 shows the corresponding results obtained with the original data set.