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Regional Home Price Model Scenario Update – 2016 Q2

Mortgage Index Models

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1.0 Overview

After the close of business on Friday, January 13, 2017, we will update the standard set of HPA scenarios in the Home Price Appreciation Analyzer (keyword “hpa”) and agency MBS calculator (keyword “mtgcalc”) on Barclays Live. The updated scenarios will incorporate actual home price data through 2016 Q2.

Our updated base case regional home price scenarios incorporate actual regional home prices through 2016 Q2 and full year 2016 US home price appreciation forecasts of 6.0% for the CoreLogic US Aggregate Home Price Index and 5.5% for the CoreLogic US Distressed Excluded Home Price Index. For 2015, US home price appreciation was 5.6% for the aggregate index and 4.8% excluding distressed sales (Figure 1).

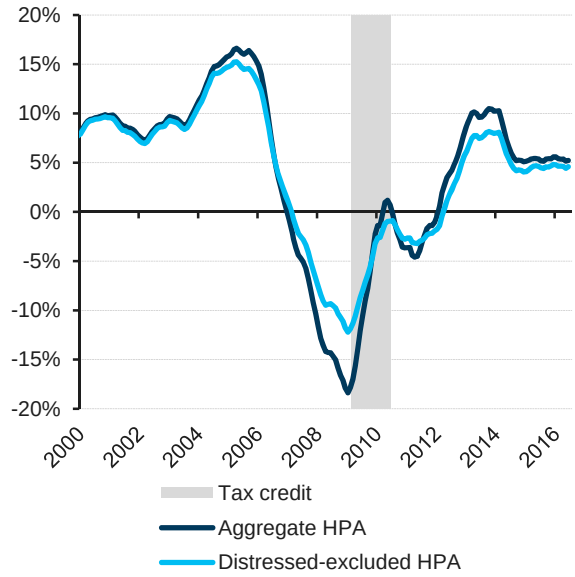
For the years 2017-2019, our base case assumptions for annual US home price appreciation are 5.4%, 4.5%, and 4.0% respectively for the CoreLogic US Aggregate Home Price Index and 4.9%, 4.4%, and 3.9% for the CoreLogic US Distressed Excluded Home Price Index.

Beyond 2019, base case annual US home price appreciation is assumed to stabilize around 3.5% for both the aggregate and distressed excluded indices. This convergence reflects the declining share of distressed transactions in overall home sales and resulting reduction in compositional differences between the aggregate and distressed excluded home price indices. Longer term, housing market fundamentals, such as income, become the most relevant determinants of home price growth for both indices.

The income measure used in Bloomberg’s regional home price model is per-capita disposable income. Figure 2 displays the ratios of the CoreLogic US Aggregate and Distressed Excluded Home Price Indices to per-capita disposable income. Both ratios have been normalized to equal 100 at their pre housing bubble long run average. Currently, both measures of the price-to-income ratio are close to their long run average, suggesting that home prices are consistent with borrowers’ ability to pay.[1] The updated base case scenario maintains this balance by assuming that home prices grow roughly in line with per capita disposable income beyond 2016.

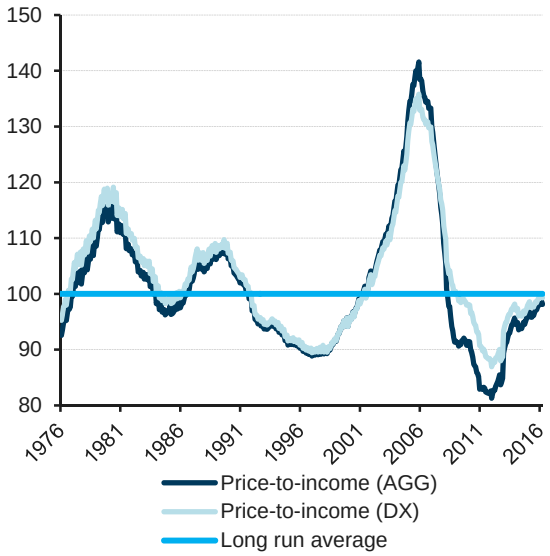
[1]An alternative measure of the price-to-income ratio, calculated using median home prices and median family income, suggests that home prices are somewhat elevated relative to borrower ability to pay, albeit well below the peak levels observed at the height of the home price bubble of the early 2000s.

FIGURE 1
Prices are up 5.2% y/y through Q2



Source: CoreLogic, Bloomberg L.P.

FIGURE 2
Price-to-income close to long-run average

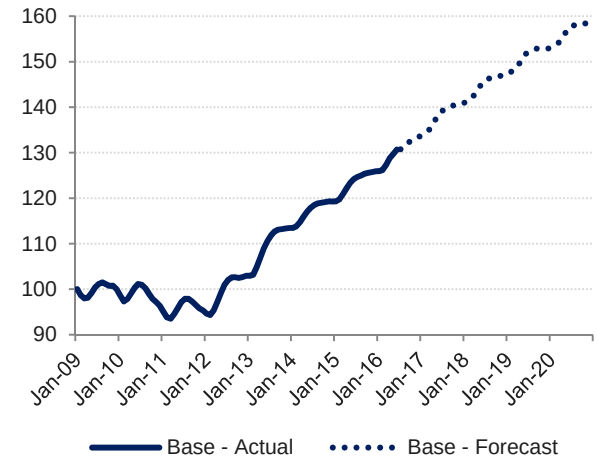


Note: Long-run average based on 1976-2000 levels
Source: CoreLogic, Moody's, Bloomberg L.P.

2.0 2016 Q2 Regional Housing Update

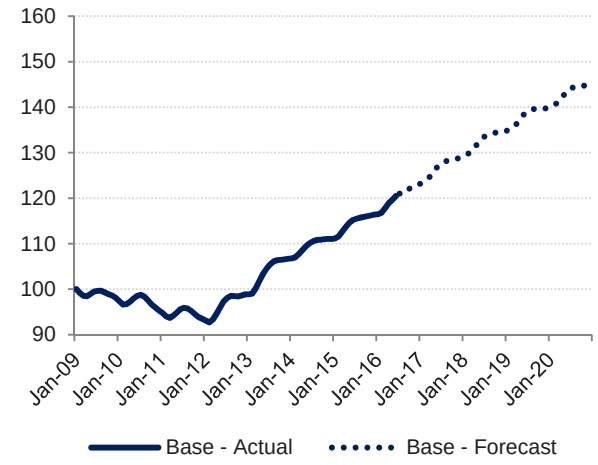
National forecast update

FIGURE 3
Base US aggregate HPI forecast



Source: CoreLogic, Bloomberg L.P.

FIGURE 4
Base US distressed-excluded HPI forecast



Source: CoreLogic, Bloomberg L.P.

Table 1 Aggregate national HPA scenarios, annualized HPA

Scenario	2016	2017	2018	2019	2020	2021-2025
Base + 20%	8.4	10.2	9.3	8.8	6.0	3.5
Base + 10%	7.7	8.7	7.8	5.6	3.6	3.5
Base Case	6.0	5.4	4.5	4.0	3.6	3.5
Base - 10%	4.2	1.8	0.9	2.2	3.6	3.5
Base - 20%	3.1	-0.2	-1.1	-1.6	0.8	3.5
Down 20%	-2.6	-7.5	-5.6	-0.9	3.6	3.5
Down 30%	-2.6	-12.6	-10.0	-3.8	-3.4	2.9

Source: Bloomberg L.P.

Table 2 Distressed-excluded national HPA scenarios, annualized HPA

Scenario	2016	2017	2018	2019	2020	2021-2025
Base + 20%	7.9	9.7	9.2	8.7	5.9	3.5
Base + 10%	7.2	8.2	7.7	5.5	3.5	3.5
Base Case	5.5	4.9	4.4	3.9	3.5	3.5
Base - 10%	3.7	1.3	0.8	2.1	3.5	3.5
Base - 20%	2.6	-0.7	-1.2	-1.7	0.7	3.5
Down 20%	-3.0	-7.9	-5.7	-1.0	3.5	3.5
Down 30%	-3.0	-13.0	-10.1	-3.9	-3.5	2.8

Source: Bloomberg L.P.

3.0 Model attribution tables

Table 3 Contribution to HPA forecast, base scenario, Jun 2016 – June 2017

State	Beta	Aggregate HPA forecast	Nondistressed HPA forecast	US excess appreciation	Income growth	Foreclosure externalities	Distressed sales	Other factors
AZ	1.24	5.8	5.9	3.2	3.1	0.0	-0.1	-0.5
CA	1.48	6.8	6.8	3.9	4.0	0.0	-0.1	-1.0
FL	1.28	7.6	6.8	3.3	3.4	0.8	0.8	-0.7
MI	0.36	7.9	4.7	0.9	4.3	0.4	3.2	-0.9
NV	1.14	6.3	5.8	3.0	2.7	0.3	0.5	-0.2
NY	0.90	5.7	5.0	2.4	3.4	0.6	0.7	-1.4
OH	0.34	7.1	5.2	0.9	3.5	0.1	1.9	0.7
TX	0.44	3.7	3.9	1.1	1.6	0.0	-0.2	1.2
US		6.1	5.6	2.6	2.2	0.3	0.5	0.4

Note: HPA and components reported in log percentage units
Source: Bloomberg L.P.

Table 4 Model attribution of HPA during the past 12 months, June 2015 – June 2016

State	Beta	Actual HPA	Model HPA	US excess appreciation	Income growth	Foreclosure externalities	Distressed sales	Other factors	Unexplained HPA
AZ	1.24	5.4	5.0	1.5	2.8	0.2	0.6	-0.1	0.4
CA	1.48	6.1	6.8	1.8	4.1	0.2	0.7	-0.1	-0.7
FL	1.28	6.8	8.0	1.6	3.1	2.0	1.8	-0.5	-1.2
MI	0.36	5.5	6.4	0.4	4.2	0.4	1.0	0.2	-0.9
NV	1.14	6.8	6.6	1.4	3.2	0.5	0.9	0.6	0.2
NY	0.90	2.5	4.7	1.1	3.5	0.6	-0.4	-0.1	-2.3
OH	0.34	3.8	4.5	0.4	3.3	0.6	0.5	-0.3	-0.7
TX	0.44	6.1	4.9	0.5	2.5	0.1	0.3	1.4	1.2
US		5.1		1.6	2.4	0.5	0.6	0.0	

Note: HPA and components reported in log percentage units
Source: Bloomberg L.P.

Table 5 Model attribution of HPA during housing boom, January 2000 – June 2006

State	Beta	Actual HPA	Model HPA	US excess appreciation	Income growth	Foreclosure externalities	Distressed sales	Other factors	Unexplained HPA
AZ	1.24	79.8	81.0	42.2	30.3	0.4	3.5	4.4	-1.1
CA	1.48	91.1	86.4	50.7	30.5	0.7	3.1	1.5	4.6
FL	1.28	91.9	86.3	43.6	30.7	0.9	5.2	5.9	5.6
MI	0.36	20.2	24.1	12.1	21.5	-2.0	-0.9	-6.6	-3.9
NV	1.14	82.4	79.9	39.1	29.6	0.8	0.8	9.5	2.5
NY	0.90	69.8	60.2	30.9	26.1	0.7	1.0	1.4	9.6
OH	0.34	19.3	27.2	11.7	23.2	-1.8	-0.3	-5.6	-7.9
TX	0.44	29.9	38.0	15.0	27.9	-0.4	2.3	-6.8	-8.1
US		66.0		33.0	29.3	0.3	3.4	0.0	

Note: HPA and components reported in log percentage units
Source: Bloomberg L.P.

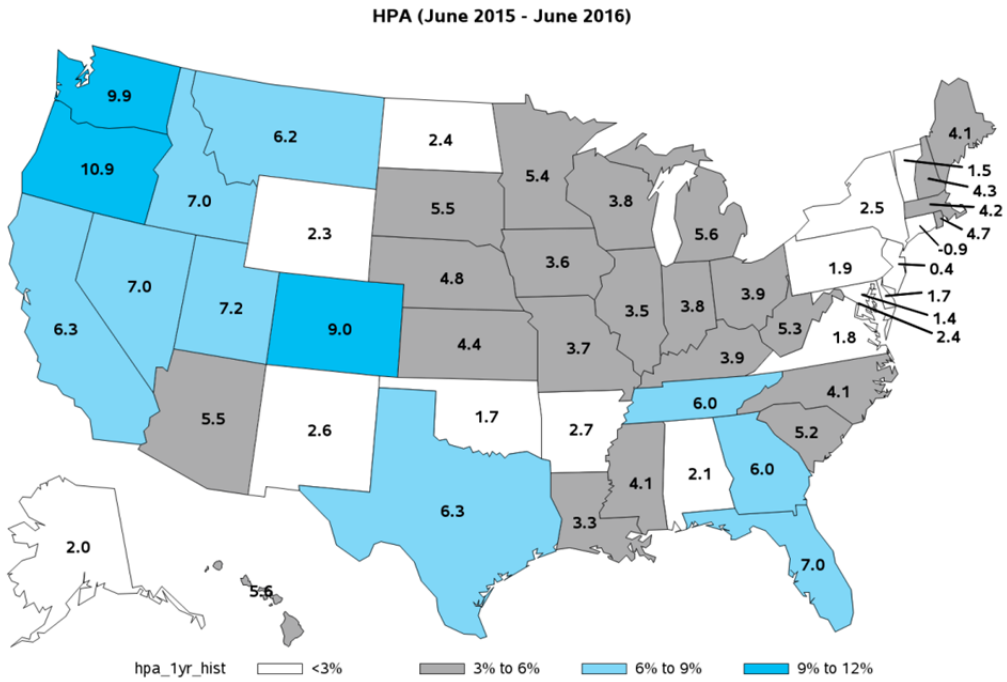
Table 6 Model attribution of HPA during housing bust, June 2006 – March 2009

State	Beta	Actual HPA	Model HPA	US excess appreciation	Income growth	Foreclosure externalities	Distressed sales	Other factors	Unexplained HPA
AZ	1.24	-56.4	-54.0	-38.7	9.8	-6.0	-18.1	-1.0	-2.4
CA	1.48	-52.4	-54.9	-46.4	8.5	-5.4	-11.6	0.1	2.4
FL	1.28	-54.4	-55.1	-40.0	8.7	-7.3	-16.0	-0.5	0.7
MI	0.36	-44.1	-36.5	-11.1	5.2	-6.6	-17.6	-6.4	-7.6
NV	1.14	-67.5	-59.7	-35.8	5.3	-8.3	-10.4	-10.4	-7.8
NY	0.90	-10.9	-12.8	-28.3	13.3	-1.4	-3.4	7.1	1.9
OH	0.34	-15.8	-13.4	-10.7	8.8	-1.5	-8.1	-1.9	-2.3
TX	0.44	-7.8	-5.4	-13.7	12.3	-0.5	-4.0	0.5	-2.4
US		-35.6		-31.1	11.8	-3.0	-13.2	0.0	

Note: HPA and components reported in log percentage units
Source: Bloomberg L.P.

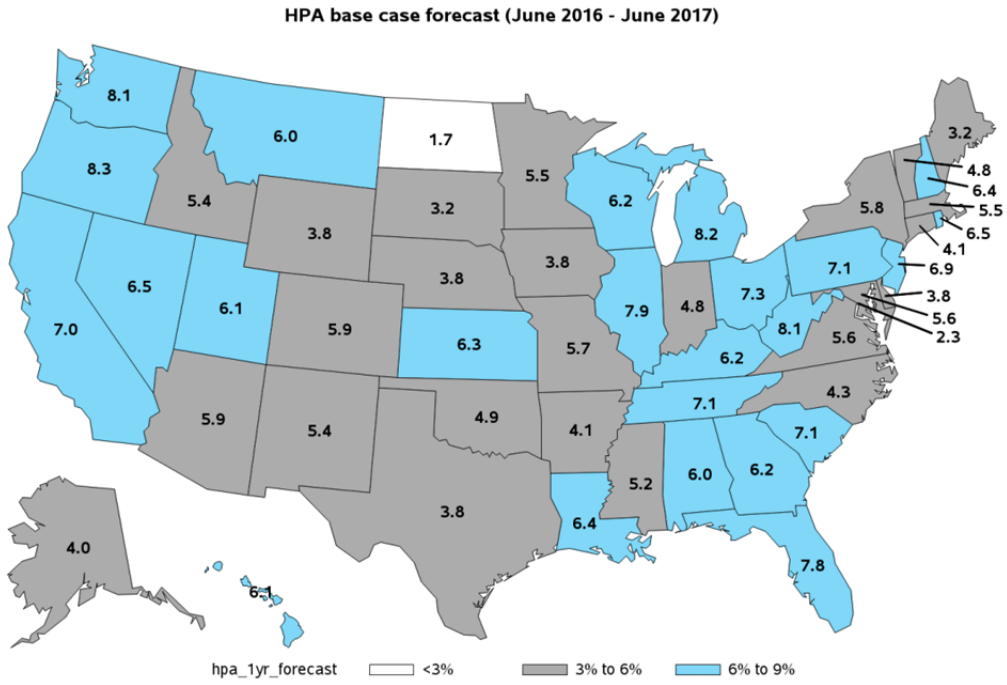
4.0 Regional HPA distribution

FIGURE 5
One-year aggregate HPA history



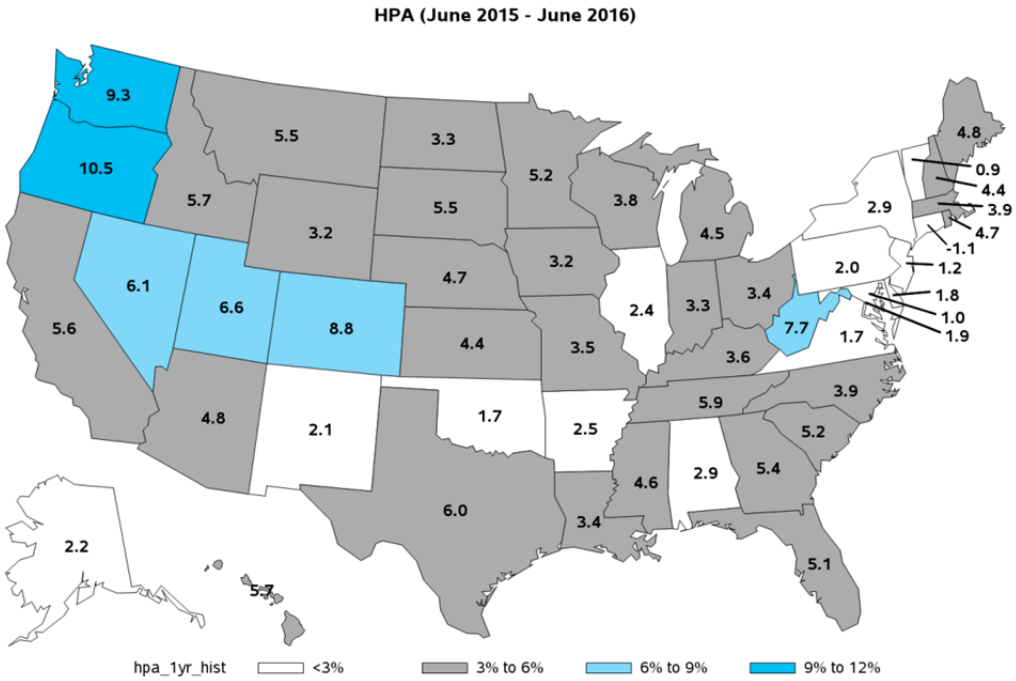
Source: CoreLogic

FIGURE 6
One-year aggregate HPA forecast



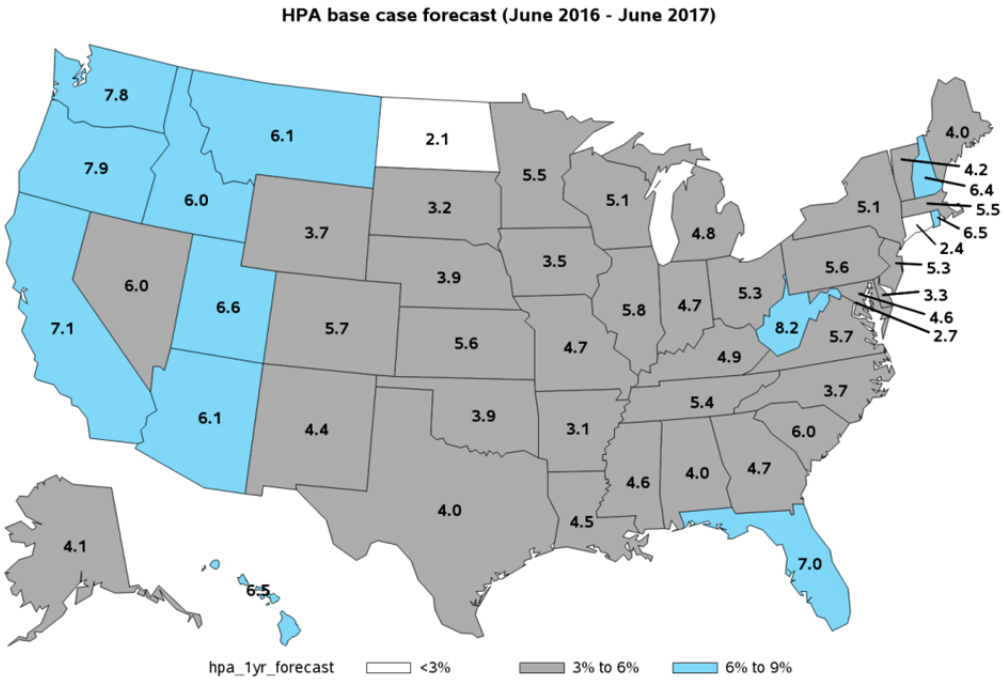
Source: CoreLogic, Bloomberg L.P.

FIGURE 7
One-year distressed-excluded HPA history



Source: CoreLogic

FIGURE 8
One-year distressed-excluded HPA forecast



Source: CoreLogic, Bloomberg L.P.

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5.0 State-level HPA forecasts

Table 7 Aggregate HPA forecasts, base (% annualized)							
State	2015	2016	2017	2018	2019	2020	2021-2025
US	5.6	6.0	5.4	4.5	4.0	3.6	3.5
AK	0.6	4.3	3.8	4.5	4.5	3.9	3.4
AL	3.3	4.5	5.4	3.6	3.9	3.9	3.4
AR	2.2	3.8	4.1	3.7	4.1	4.0	3.2
AZ	5.9	6.5	4.5	3.5	3.1	2.9	3.6
CA	7.8	6.6	5.1	3.9	3.0	2.7	3.7
CO	9.9	7.6	4.8	3.7	3.4	3.0	3.3
CT	0.5	1.4	4.8	6.0	5.7	5.2	3.7
DC	3.7	1.7	1.1	0.6	0.7	2.0	3.5
DE	3.4	1.9	3.9	4.2	4.3	4.1	3.6
FL	7.9	8.0	6.6	5.5	4.6	3.8	3.7
GA	6.4	6.0	5.1	3.3	3.3	3.4	3.4
HI	5.2	7.2	4.9	3.3	2.8	2.7	3.3
IA	4.2	4.0	4.1	5.0	4.8	4.1	3.2
ID	6.6	7.6	4.6	4.7	4.1	3.3	3.2
IL	2.6	6.5	7.8	5.9	5.3	4.4	3.5
IN	3.9	4.9	5.0	5.3	5.3	4.5	3.3
KS	2.5	6.6	6.2	5.4	4.6	3.8	3.3
KY	2.8	5.4	6.3	4.9	5.1	4.5	3.3
LA	3.0	5.4	5.8	4.5	4.2	3.9	3.4
MA	4.0	5.5	4.9	4.4	3.8	3.5	3.4
MD	0.6	4.4	5.1	4.1	4.0	3.9	3.6
ME	5.9	1.8	2.5	2.5	2.9	3.2	3.2
MI	6.3	6.3	7.4	4.9	5.0	4.6	3.6
MN	4.5	6.5	4.3	3.1	2.9	2.8	3.3
MO	3.8	4.9	5.7	5.4	5.1	4.3	3.4
MS	0.9	5.2	4.4	3.1	3.1	3.1	3.2
MT	4.3	7.2	5.7	4.7	4.1	3.3	3.2
NC	4.5	4.4	4.2	3.3	3.8	3.7	3.3
ND	2.2	4.4	1.3	2.5	3.2	2.8	3.1
NE	3.4	5.5	3.7	4.6	4.2	3.5	3.2
NH	5.0	5.8	6.0	5.5	4.9	4.2	3.4
NJ	2.1	3.3	6.7	6.0	5.3	4.6	3.7
NM	0.5	6.7	4.6	3.6	3.6	3.7	3.4
NV	6.7	8.0	4.5	2.2	2.1	2.6	3.7

Table 7 Aggregate HPA forecasts, base (% annualized)							
State	2015	2016	2017	2018	2019	2020	2021-2025
NY	3.1	4.9	5.1	4.9	4.1	3.8	3.7
OH	2.9	6.3	7.5	6.1	5.9	4.8	3.4
OK	2.0	3.4	5.0	5.2	5.1	4.3	3.3
OR	9.5	10.3	7.0	5.3	4.6	3.6	3.4
PA	1.3	5.3	7.1	6.6	5.8	4.7	3.5
RI	4.2	6.2	5.7	4.5	3.8	3.4	3.4
SC	5.0	7.2	6.8	5.0	4.4	3.7	3.4
SD	5.7	4.7	2.7	3.0	3.0	2.9	3.3
TN	5.8	7.1	6.6	4.5	4.3	3.8	3.3
TX	6.2	5.6	3.0	2.6	3.0	3.0	3.2
UT	6.8	7.4	5.4	4.3	3.8	3.1	3.3
VA	1.3	4.9	5.1	4.8	4.2	3.6	3.5
VT	-0.6	4.5	4.7	3.6	3.4	3.5	3.3
WA	8.9	10.1	6.7	5.6	4.2	3.2	3.4
WI	4.0	5.5	6.0	5.3	4.9	4.1	3.4
WV	4.8	6.3	6.4	5.2	4.5	3.2	3.2
WY	3.7	3.1	3.3	4.8	5.0	4.1	3.3

Source: Bloomberg L.P.

Table 8	Distressed-excluded HPA forecasts, base (% annualized)						
State	2015	2016	2017	2018	2019	2020	2021-2025
US	4.8	5.5	4.9	4.4	3.9	3.5	3.5
AK	0.4	4.1	3.8	4.6	4.5	4.0	3.4
AL	3.1	3.8	3.4	3.1	3.5	3.6	3.3
AR	1.8	3.5	3.3	3.5	4.0	3.9	3.2
AZ	5.0	6.3	4.6	3.6	3.1	2.9	3.6
CA	7.0	6.6	5.1	3.9	3.0	2.8	3.7
CO	9.2	7.6	4.7	3.7	3.4	3.0	3.3
CT	0.7	0.5	3.1	5.4	5.2	4.8	3.5
DC	3.7	1.9	1.5	0.9	0.9	2.2	3.6
DE	3.0	1.6	3.3	4.0	4.2	4.0	3.5
FL	6.1	6.8	5.9	5.4	4.5	3.7	3.7
GA	5.4	5.3	3.9	2.9	3.0	3.2	3.4
HI	4.8	7.5	5.3	3.6	3.0	2.9	3.4
IA	3.8	3.8	3.8	4.9	4.8	4.0	3.2
ID	5.5	7.1	5.2	5.1	4.5	3.6	3.4
IL	1.6	5.1	5.8	5.4	4.9	4.1	3.3
IN	3.5	4.5	4.9	5.3	5.3	4.5	3.3
KS	2.2	6.1	5.4	5.2	4.4	3.7	3.2
KY	2.6	4.7	5.0	4.5	4.8	4.3	3.2
LA	3.0	4.6	4.0	3.9	3.8	3.5	3.3
MA	3.7	5.6	4.9	4.4	3.8	3.6	3.4
MD	0.9	3.5	4.0	3.9	3.8	3.8	3.5
ME	6.4	2.4	3.3	3.1	3.4	3.6	3.5
MI	5.5	4.9	4.6	4.4	4.6	4.2	3.4
MN	4.1	6.3	4.3	3.1	2.9	2.8	3.3
MO	3.1	4.3	4.7	5.1	4.9	4.1	3.3
MS	1.4	5.6	4.0	2.9	3.0	3.0	3.1
MT	4.6	6.6	5.7	4.8	4.1	3.4	3.2
NC	4.1	4.0	3.6	3.1	3.6	3.6	3.3
ND	1.9	5.2	1.6	2.7	3.4	3.0	3.2
NE	3.5	5.1	3.8	4.7	4.3	3.6	3.2
NH	4.8	5.7	6.0	5.5	4.9	4.2	3.4
NJ	2.1	3.2	5.3	5.4	4.8	4.3	3.6
NM	0.5	5.8	3.6	3.3	3.4	3.6	3.3
NV	6.0	7.5	4.1	2.1	2.0	2.5	3.7

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Table 8	Distressed-excluded HPA forecasts, base (% annualized)						
State	2015	2016	2017	2018	2019	2020	2021-2025
NY	3.6	5.0	4.4	4.6	3.9	3.6	3.6
OH	3.0	5.1	5.5	5.6	5.5	4.5	3.3
OK	1.6	3.2	4.2	5.0	4.9	4.1	3.2
OR	8.8	10.1	6.8	5.3	4.5	3.6	3.4
PA	1.5	4.6	5.7	6.3	5.6	4.5	3.4
RI	4.4	5.1	5.4	4.5	3.8	3.4	3.4
SC	5.0	6.4	5.6	4.7	4.1	3.5	3.3
SD	5.7	4.8	2.7	3.0	3.0	2.9	3.3
TN	5.3	6.5	5.1	4.1	4.1	3.6	3.2
TX	5.5	5.8	3.2	2.8	3.1	3.1	3.3
UT	5.8	7.2	5.8	4.6	4.0	3.3	3.4
VA	1.1	4.6	5.1	4.9	4.2	3.7	3.5
VT	0.5	3.1	3.7	3.3	3.2	3.4	3.2
WA	8.2	9.6	6.4	5.5	4.2	3.2	3.4
WI	3.7	5.0	5.0	4.9	4.6	3.9	3.3
WV	6.9	8.0	6.5	5.3	4.5	3.2	3.3
WY	3.6	3.3	3.3	4.8	5.0	4.0	3.3

Source: Bloomberg L.P.

Appendix

Table A1 HPA Scenarios

Scenario Name	Description
Base + 20%	Up 20% relative to base over 4 years
Base + 10%	Up 10% relative to base over 3 years
Base Case	Base case
Base - 10%	Down 10% relative to base over 3 years
Base - 20%	Down 20% relative to base over 4 years
Down 20%	Down 20% over 3 years
Down 30%	Down 30% over 5 years, similar to US housing downturn from 2007 to 2011

Note: * All HPA scenarios accumulate from last actual HPI and percentage change is based on the respective distress excluded scenario.
Source: Bloomberg L.P.