

The Home Purchase Sentiment Index™

An Overview

September, 2015

1. Introduction

Fannie Mae launched the National Housing Survey (NHS) in 2010 to generate new information about consumer attitudes, intentions, and financial conditions that pertain to housing and mortgage markets.¹ The NHS is the only large, national, monthly survey of consumers focused primarily on housing. The responses of the nationally-representative sample of 1000 consumers each month to about 100 survey questions promptly provide information on a wide range of housing-related topics.

Timely detection of shifts in consumer outlooks is especially valuable for housing and mortgage markets, which are particularly oriented toward the future. Traditionally, economic data objectively and valuably measure what has happened in the past. Surveys, on the other hand, provide direct measures of consumers' evaluations of recent, of ongoing, and even of expected future developments to inform discussions and forecasts of consumer spending, business investment, labor costs, inflation, bond yields, and monetary policy. Thus, survey data often can better and sooner signal how consumers evaluate and will then react to recent news, shifts in prevailing economic relationships, and changes in their expectations about the future.

We extensively analyzed the NHS to develop a single indicator that would effectively and efficiently distill its information about consumers' home purchase sentiment: The Home Purchase Sentiment Index (HPSI). While similar in spirit to two venerable measures of general consumer sentiment, the University of Michigan Surveys of Consumers Index of Consumer Sentiment (ICS) and the Conference Board Consumer Confidence Index (CCI), the HPSI is specifically devoted to the housing market. Based on our analysis, we expect that the HPSI will reflect current and future housing market outcomes that are distinct from the indices of general consumer sentiment. Detailed analysis about the construction and performance of the HPSI can be found on the Fannie Mae website.²

The HPSI is constructed from consumers' answers to the six NHS questions shown in Table 1. The six questions solicit consumers' evaluations of housing market conditions and address topics that are related to their home purchase decisions. The questions ask consumers whether they

¹ More information on the National Housing Survey™ methodology and questionnaire can be found at <http://www.fanniemae.com/portal/research-and-analysis/housing-survey.html>

² Detailed analysis about the construction and performance of the HPSI can be found in *The Home-Purchase Sentiment Index: A New Housing Indicator* and even more detail can be found in an approximately 100 page white paper *Building a Home Purchase Sentiment Index*. See <http://www.fanniemae.com/resources/file/research/housingsurvey/pdf/hpsi-whitepaper.pdf>

think that it is a good or bad time to buy or to sell a house, what direction they expect home prices and mortgage interest rates to move, how concerned they are about losing their jobs, and whether their incomes are higher than they were a year earlier.

Table 1: The Six NHS Questions Used to Build the Home Purchase Sentiment Index

Survey Question	Question Posed to Consumers	Time Period
<i>Q12</i>	In general, do you think this is a very <u>good time to buy a house</u> , a somewhat good time, a somewhat bad time, or a very bad time to buy a house?	Now
<i>Q13</i>	In general, do you think this is a very <u>good time to sell a house</u> , a somewhat good time, a somewhat bad time, or a very bad time to sell a house?	Now
<i>Q15</i>	During the next 12 months, do you think <u>home prices</u> in general will go up, go down, or stay the same as where they are now?	Next 12 months
<i>Q20B</i>	During the next 12 months, do you think <u>home mortgage interest rates</u> will go up, go down, or stay the same as where they are now?	Next 12 months
<i>Q112B</i>	How concerned are you that you will <u>lose your job</u> in the next twelve months? Are you very concerned, somewhat concerned, not very concerned, or not at all concerned that you will lose your job in the next twelve months?	Next 12 months
<i>Q116</i>	How does your current monthly <u>household income</u> compare to what it was twelve months ago?	Past 12 months

We selected these six questions from the NHS based on our criteria that a selected question either logically pertained to perennial considerations of potential home buyers or demonstrated that it was correlated statistically with future housing outcomes, or both. As measures of housing markets in the future, we used national averages over upcoming 12-month intervals for four outcomes: house prices, home sales, housing starts, and mortgage origination volume.

Our analysis indicated that increases in the HPSI since 2011 have been quite reliably followed by stronger housing markets.³ Additional evidence bolstered our confidence in the reliability of the HPSI. We used questions from the University of Michigan Surveys of Consumers that were analogous to the HPSI questions to construct an index for a longer time period, 1992-2013. Like increases in the HPSI, increases in the analogous, Michigan-based index tended to lead stronger housing markets. In head-to-head competition, however, the HPSI was better than the analogous index, the ICS, and the CCI at forecasting the four future housing market outcomes.

³ The NHS was conducted each month starting in June 2010. The HPSI begins in March 2011, when the NHS first asked consumers about their job concerns (question *Q112B*).

2. Calculation of the Home Purchase Sentiment Index

How do we calculate the HPSI from the six questions?

Simply: Each month's HPSI is based on the average of the net percent positive responses to each of its six questions. To that average, we added 63.5 so that the initial value for the HPSI in March 2011 equaled 60, which was close to the values then for both the ICS and the CCI.

$$HPSI = \frac{Q12+Q13+Q15+Q20B+Q112B+Q116}{6} + 63.5$$

Q12: Good Time to Buy

(Very and Somewhat Good Time To Buy – Very and Somewhat Bad Time To Buy)

Q13: Good Time to Sell

(Very and Somewhat Good Time To Sell – Very and Somewhat Bad Time To Sell)

Q15: Home Prices Will Go Up (next 12 months)

(Home Prices Will Go Up – Home Prices Will Go Down)

Q20B: Mortgage Rates Will Go Down (next 12 months)

(Mortgage Rates Will Go Down – Mortgage Rates Will Go Up)

Q112B: Not Concerned about Losing Jobs (next 12 months)

(Not at All and Not Very Concerned about Losing Job – Very and Somewhat Concerned about Losing Job)

Q116: Household Income is Significantly Higher (past 12 months)

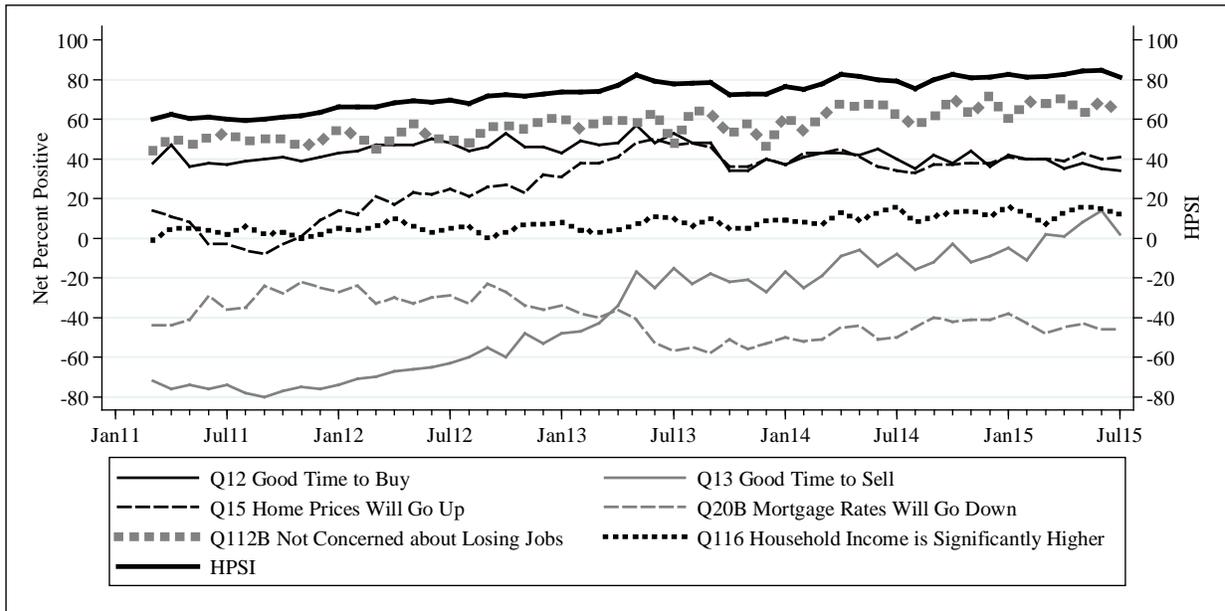
(Income is Significantly Higher – Income is Significantly Lower)

3. HPSI and Its Components, 2011 - 2015

Figure 1 shows that the HPSI initially fell, declining from March 2011 through the summer of 2011. From then until the middle of 2013, the HPSI rose quite steadily and substantially. Figure 1 also shows that responses to each of its six component questions contributed to that rise of the HPSI, except for the question about expected changes in mortgage interest rates. In the spring of 2013, the HPSI then spiked up, primarily due to the uptick in “good time to sell.”

The HPSI then declined considerably during the second half of 2013. During 2014, the HPSI went up, down, and back up, with a downtick in the fall of 2014. The HPSI edged upward during the first half of 2015, but then dropped back to its December 2014 level in July.

**Figure 1: The HPSI and Its Component Questions
(March 2011 – July 2015)**



4. HPSI Performance: Forecasting Housing Market Outcomes

The HPSI may prove valuable as a signal of future housing market outcomes either when used alone or when used to supplement other information, or both.

Table 2 below shows the relation of the HPSI for each month during 2011-2014 to 12-month-ahead house price growth, home sales, housing starts, and mortgage originations. The positive entries in row 1 indicate that higher values for the HPSI tended to be followed by higher values for each of the four housing market outcomes in the future.

Asterisks on the row 1 entries reflect confidence that the estimated positive relations were not due to chance. The asterisks show that, for sales, starts, and originations, the estimated positive relations were statistically significant at less than the 1 percent level, implying that we are more than 99 percent confident that the estimated positive relations were not due to chance. The results for house prices were not as significant, but the single asterisk still implies that the probability that we found a positive relation by chance was less than 10 percent.

The R-squared statistics at the bottom of Table 2 show that the HPSI accounted for more than 70 percent of the variation in future outcomes of these variables, except that the HPSI accounted for less than 8 percent of the variation in future house price growth. Assessment of the HPSI’s strong forecasting performance during this period should take into account, however, that we finalized the six component questions partly on the basis of their forecasting performances during this same period.

Table 2: Relations of 12-Month-Ahead Housing Market Outcomes to the HPSI
(Monthly, March 2011 – June 2014)

	Explanatory Variables	House Prices	Home Sales	Housing Starts	Originations
		(1)	(2)	(3)	(4)
1.	HPSI	0.0593*	0.0322***	0.0082***	9.274***
		(1.74)	(10.04)	(13.47)	(12.28)
2.	Constant	1.56	2.97***	0.0073	-10.36
		(0.65)	(13.05)	(0.17)	(-0.19)
	Observations	40	40	40	40
	R-squared (%)	7.4	72.6	82.7	79.9

Notes: t-statistics in parentheses. Asterisks denote statistical significance at the 10 (*), 5 (**), and 1 (***) percent levels.

5. Forecast Errors and Recent Changes in the HPSI

We analyzed whether the HPSI could have improved forecasts of housing markets during 2011 – 2015. To begin, we calculated the averages of housing market forecasts that were made in real time by a number of large organizations that had long focused on and forecasted housing markets. We then examined the deviations of actual, future from average forecasts made each month for housing market outcomes over the following four quarters. We analyzed whether recent changes in the HPSI would have provided reliable signals about housing beyond those in the forecasts.

To analyze whether signals from the HPSI could have improved forecasts, we regressed the forecast errors for each outcome on recent changes in the HPSI. Table 3 shows the results for each of the four housing market outcomes. Although they were not all statistically significant, the positive estimated coefficients in row 1 imply that actual, future outcomes were stronger than forecasted when the HPSI had risen over recent months. The results in columns 1 and 4, then, suggest that forecasts would have been more accurate during this period if they had been raised (lowered) by amounts equal to recent strengthening (weakening) of the HPSI multiplied by the estimated coefficients in row 1 of Table 3.

Table 3

Regressions of 12-Month-Ahead Forecast Errors on Recent Changes in the HPSI

(Errors=actual minus forecast averages, lagged three-month change in HPSI, monthly, July 2011 – June 2014)

	Explanatory Variable	House Price Growth	Home Sales	Housing Starts	Originations
		(1)	(2)	(3)	(4)
1.	HPSI (lag of three-month change)	0.12*	33.7**	1.89	8.4
		(1.89)	(2.51)	(0.44)	(1.46)
2.	Constant	1.65***	-198.6***	-45.4***	24.2
		(7.32)	(-4.02)	(-2.88)	(1.15)
Observations		36	36	36	36
R-squared (%)		10	16	1	6

Note: t-statistics in parentheses. Asterisks denote statistical significance at the 10 (*), 5 (**), and 1 (***) percent levels.

At least two caveats deserve mention. Until enough data accumulated to allow analysis and estimation of relations between forecast errors and the HPSI like those in Table 3, however, it would be difficult to calculate how much forecasts should be raised following increases in the HPSI. Prudence argues for care still when using these initial estimates because housing markets have been anything but typical in recent years. Second, because of “look-ahead bias,” the results here are biased in favor of finding that HPSI could have helped forecasts: We evaluated which variables to include in the HPSI by using the data for the entire 2011 – 2014 period, as well as to estimate the relation of forecast errors to recent changes in the HPSI. Of course, real-time forecasts did not have the information in future data.

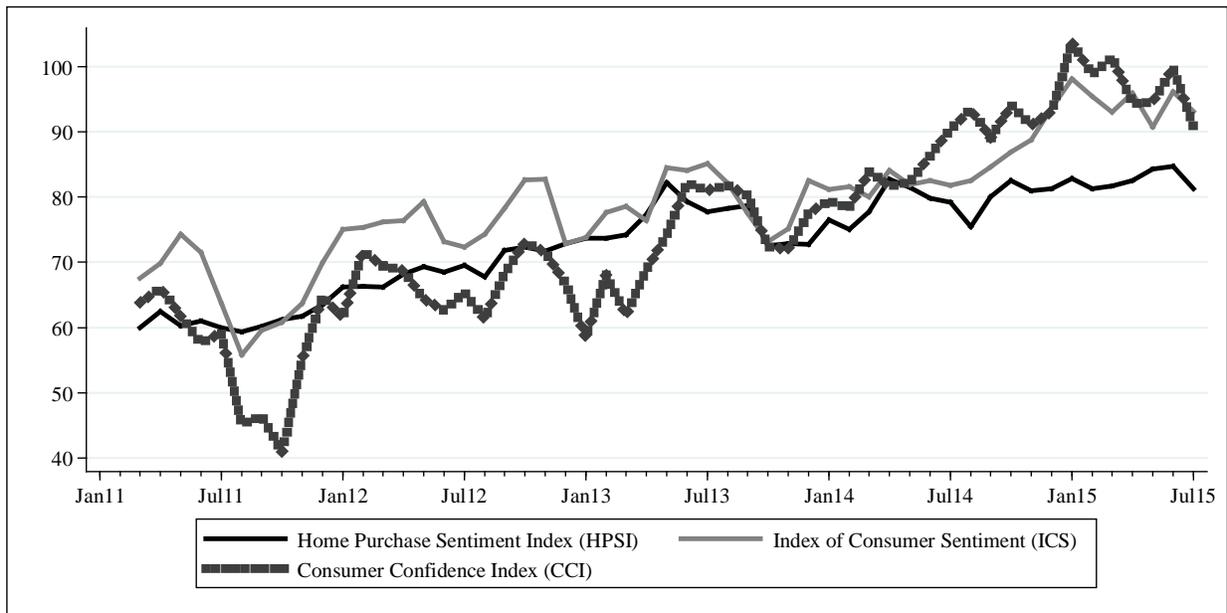
6. Comparing the HPSI with Indices of General Consumer Sentiment

Figure 2 shows the HPSI and two indices of general consumer sentiment, the ICS and the CCI, for March 2011 – July 2015. As housing market outcomes and the broader economy strengthened, over these four years, the indices each rose.

But, some differences are also noticeable. One difference was that the HPSI fluctuated much less than the ICS or the CCI fluctuated. During the middle half of 2011, as the federal debt ceiling crisis waxed and waned, all three indices declined and then recovered. But, during that episode and thereafter, the swings up and down in the ICS and the CCI were more pronounced than those

of the HPSI. Second, the HPSI declined more than the other indices when long-term interest rates rose. On the heels of the Spring 2013 “taper tantrum” that raised bond and mortgage rates, the HPSI quickly and clearly declined. In contrast, the general consumer sentiment indices only weakened months later. As the tantrum passed and rates fell back, the indices then resumed their climbs in late 2013. Figure 2 also shows that the HPSI diverged from the ICS and the CCI recently. While the ICS and the CCI both continued and perhaps accelerated their ascents through 2014, the HPSI rose only modestly over 2014. And, in the first half of 2015, while the more-general sentiment indices declined noticeably, the HPSI eked out only a small rise. Then, all three indices declined noticeably in July 2015. These episodes show that, despite its similarities to general consumer sentiment indices, the HPSI seems to provide distinct information about housing and mortgage markets.

Figure 2: Comparing Consumer Sentiment Indices: HPSI, ICS, and CCI
 (Monthly, March 2011 – July 2015)



7. Concluding Remarks

Its performance indicates that the HPSI provides useful and new information. Since the HPSI started in March 2011, increases in the HPSI have been quite reliably followed by stronger housing markets. That suggests that the HPSI may be useful as a stand-alone indicator for housing markets. In addition, we found that recent changes in the HPSI were correlated to varying degrees with forecast errors made on average by housing-forecast organizations. Those results suggest that forecasts for house prices particularly and for home sales and purchase-money-mortgage originations less consistently could have been more accurate during this period if they had been adjusted somewhat in the direction of recent changes in the HPSI. Confidence that the HPSI sends reliable signals about housing markets was bolstered by our finding, for the much-longer 1992 – 2013 period, that increases in an analogous index that we built from data from the University of Michigan Surveys of Consumers were also reliably followed by stronger housing markets.