

The Virginia Tech – U.S. Forest Service

September 2017

Housing Commentary: Section I



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<http://woodproducts.sbio.vt.edu/housing-report>. To request the report, please email: buehlmann@gmail.com

Opening Remarks

Hurricane effects are attributed by many analysts as the cause for September's tepid housing data. Yet, starts in the Northeast and Midwest also decreased. Housing starts and new single-family starts appear to have stalled on a monthly and year-to-year basis. The bright point in September was new single-family sales. Regionally, data were mixed across all sectors. New construction spending's contribution to United States gross domestic product decreased on a quarterly basis. Occupied housing continued to improve; yet the percentage of owner- and renter occupied houses remain tightly bound. The November 15th Atlanta Fed GDPNow™ model projects aggregate residential investment spending increasing 4.1% in Quarter Four 2017. New private construction expenditures are projected to increase 1.2% and the improvement spending forecast is a 2.6% increase (all: seasonally adjusted annual rate).¹

“Income is not keeping up with rising home prices and the gap is growing. The industry needs desperately income growth. We've gone as far as we can go on artificially low interest rates. Income growth is so important to so many parts of the economy.”² – Mohamed El-Erian, Chief Economic Advisor, Allianz

This month's commentary also contains a 2018 forecast, applicable housing data; new single-family and multifamily analysis; construction firms, housing occupancy and vacancy; remodeling projections; and economic and demographic information. Section I contains data and commentary and Section II includes Federal Reserve analysis, private indicators, and demographic commentary.

Sources: ¹ <https://www.frbatlanta.org/-/media/Documents/cqer/researchcq/gdpnow/GDPTrackingModelDataAndForecasts.xlsx>; 11/14/17;

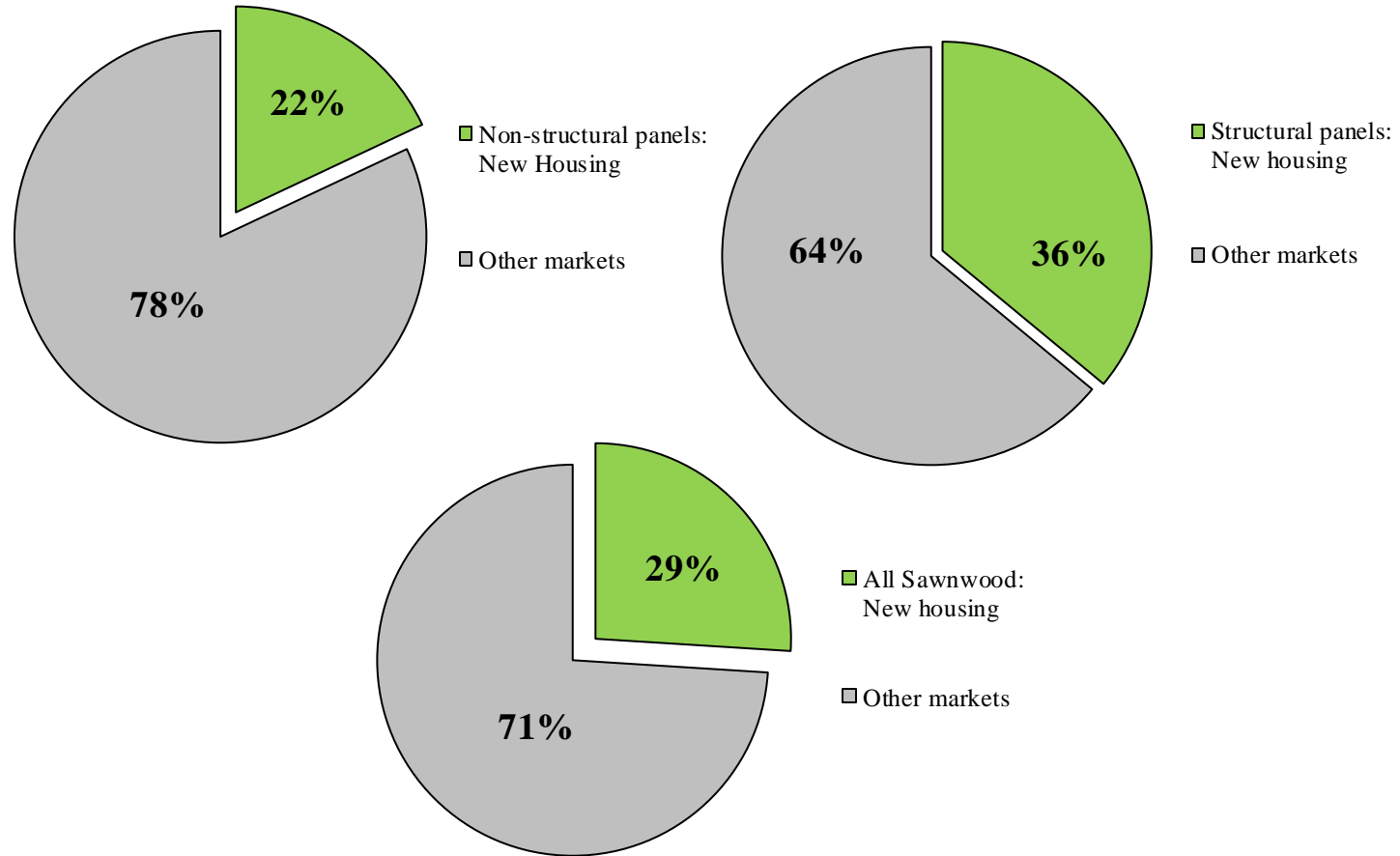
² <https://www.housingwire.com/articles/41646-mohamed-el-erian-talks-rate-hikes-future-of-the-fed-state-of-housing?eid=311702681&bid=1905668;10/24/17>

September 2017 Housing Scorecard

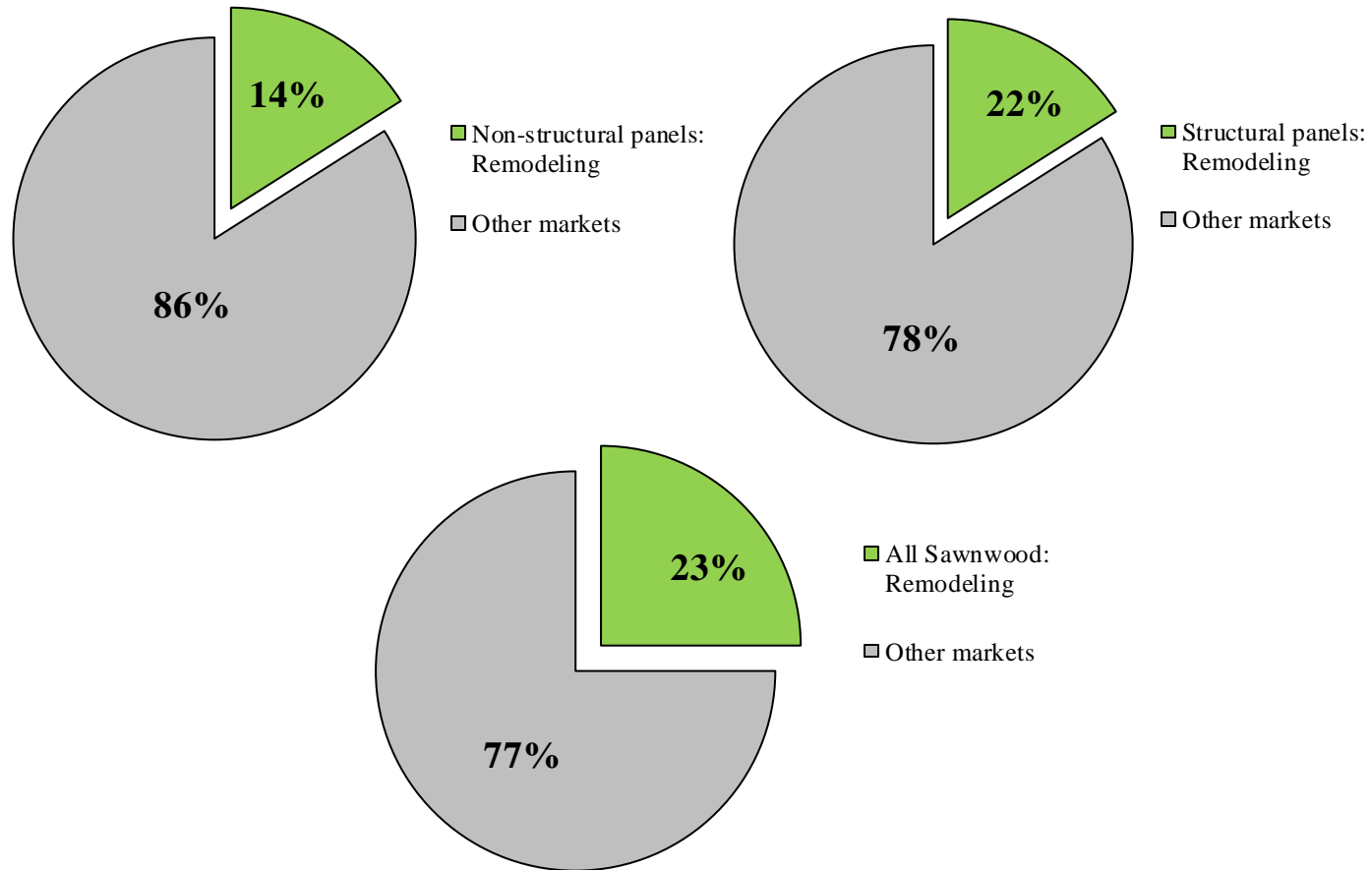
	M/M	Y/Y
Housing Starts	▽ 4.7%	△ 6.1%
Single-Family Starts	▽ 4.6%	△ 5.9%
Housing Permits	▽ 4.5%	▽ 4.3%
Single-Family Permits	△ 2.4%	△ 9.3%
Housing Completions	△ 1.1%	△ 10.3%
Single-Family Completions	△ 4.6%	△ 8.8%
New Single-Family House Sales	△ 18.9%	△ 17.0%
Private Residential Construction Spending	NC	△ 9.6%
Single-Family Construction Spending	△ 0.2%	△ 11.9%
Existing House Sales ¹	△ 0.7%	▽ 1.5%

M/M = month-over-month; Y/Y = year-over-year; NC = no change

New Construction's Percentage of Wood Products Consumption



Repair and Remodeling's Percentage of Wood Products Consumption



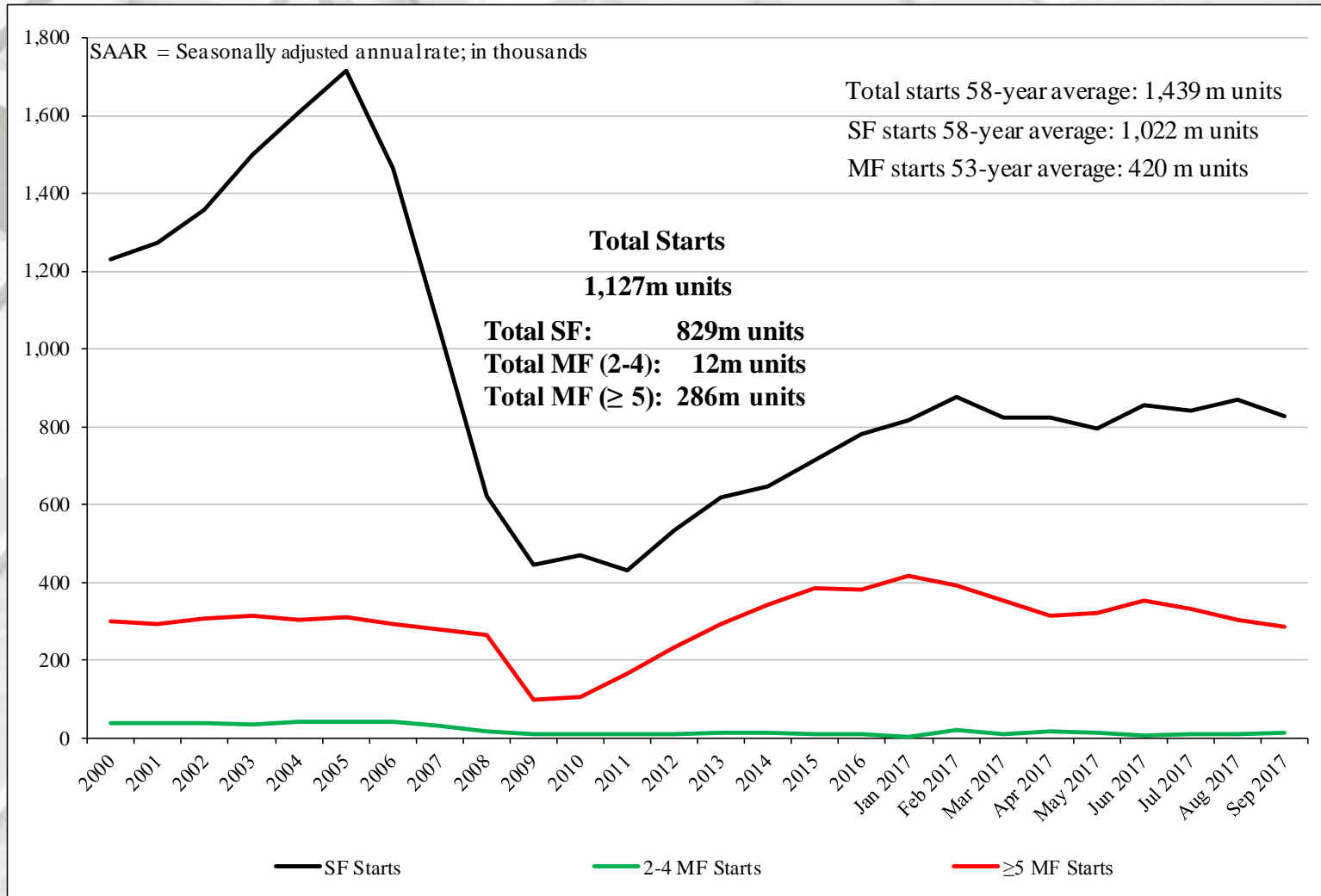
New Housing Starts

	Total Starts*	SF Starts	MF 2-4 Starts**	MF ≥5 Starts
September	1,127,000	829,000	12,000	286,000
August	1,183,000	869,000	9,000	305,000
2016	1,062,000	783,000	14,000	265,000
M/M change	-4.7%	-4.6%	33.3%	-6.2%
Y/Y change	6.1%	5.9%	-14.3%	7.9%

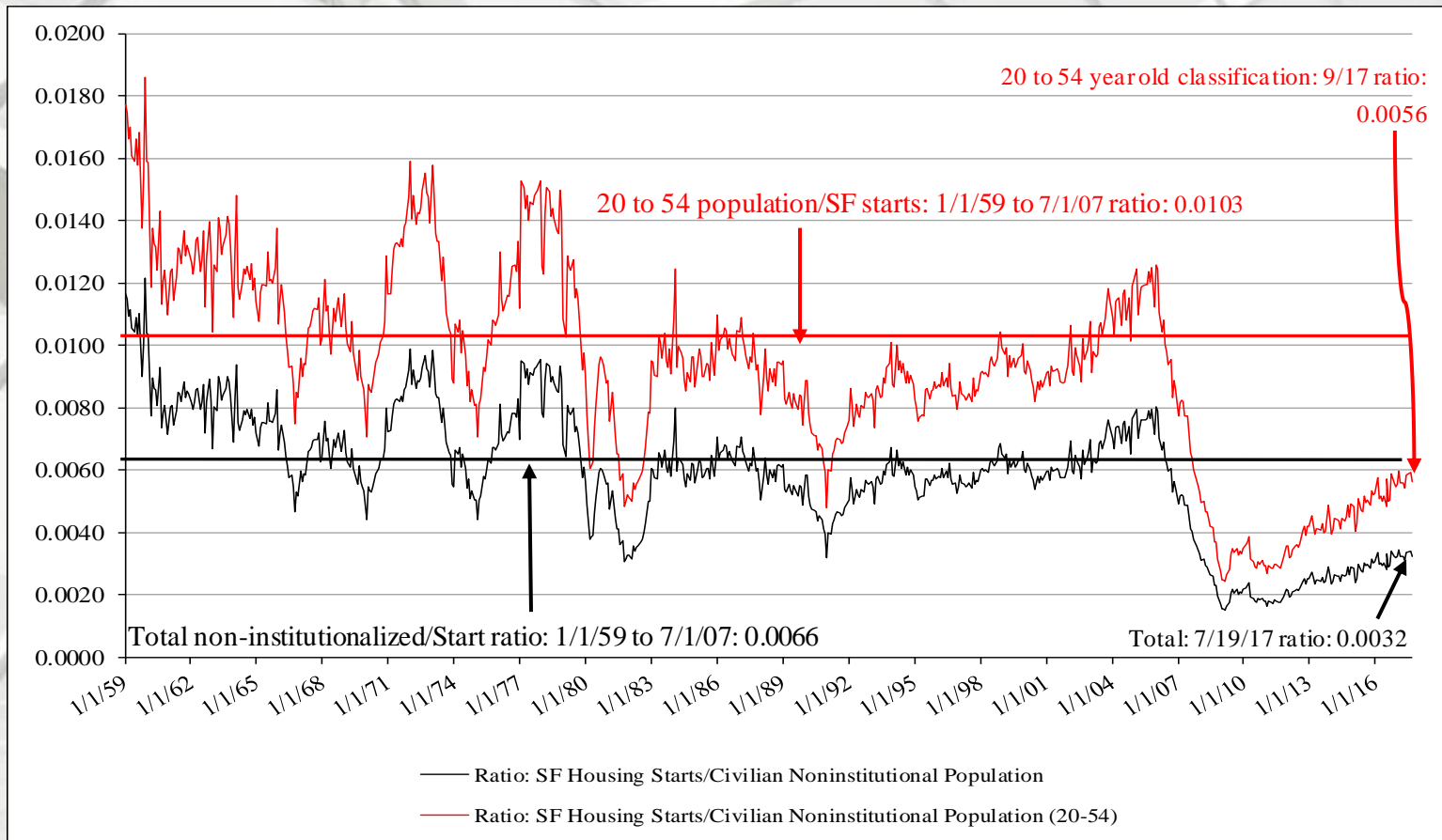
* All start data are presented at a seasonally adjusted annual rate (SAAR).

** US DOC does not report 2 to 4 multifamily starts directly, this is an estimation ((Total starts – (SF + 5 unit MF)).

Total Housing Starts



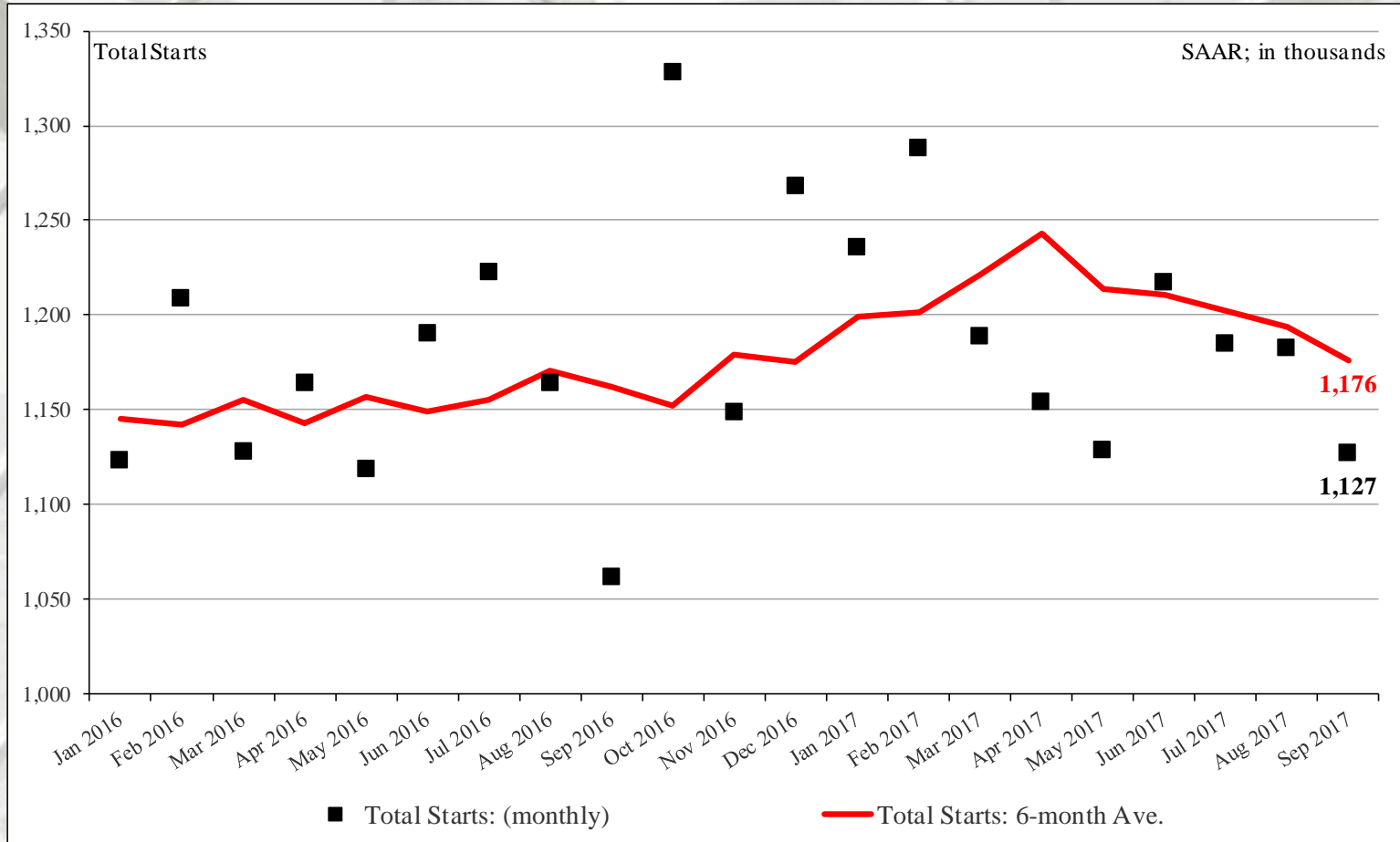
New SF Starts



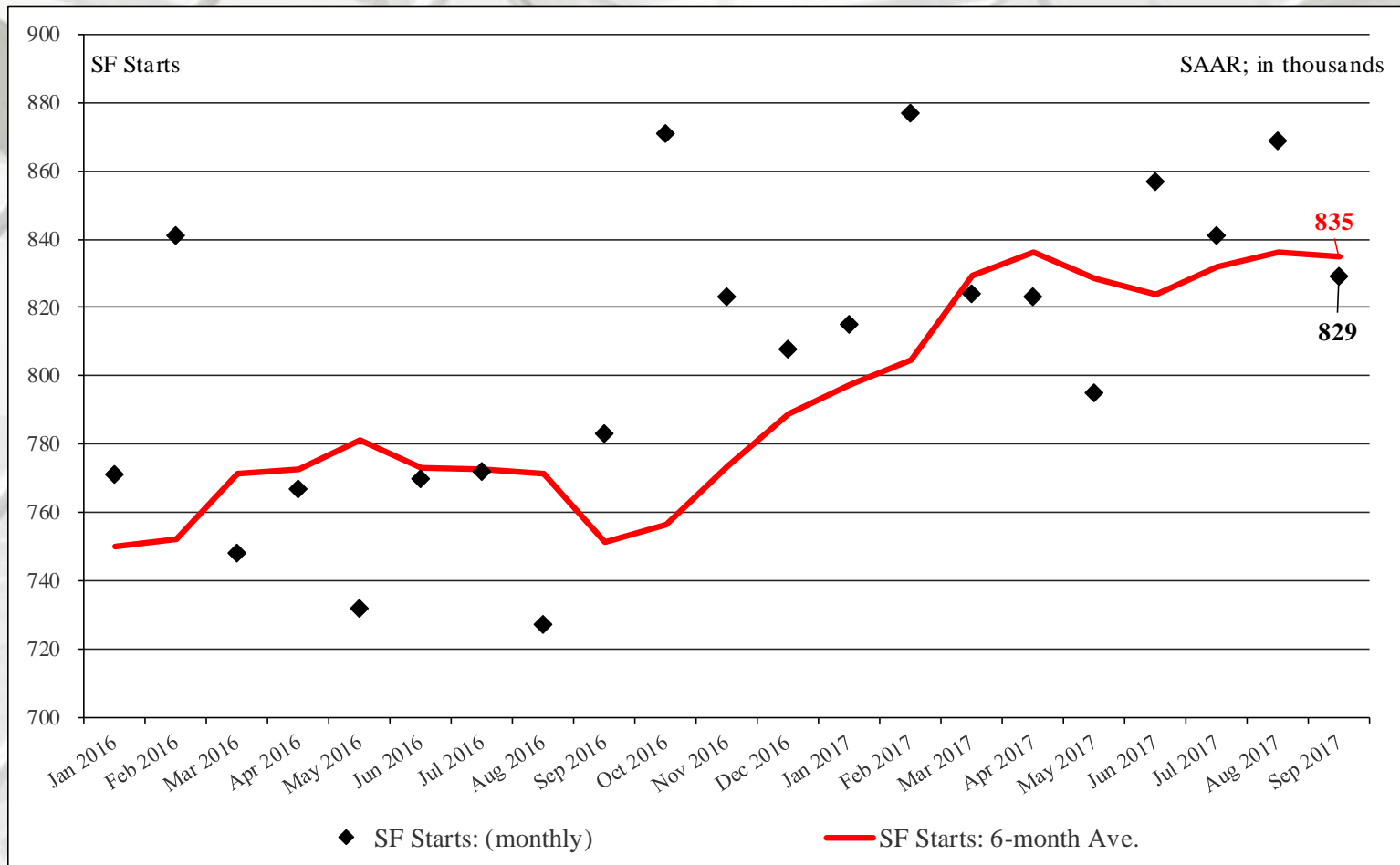
New SF starts adjusted for the US population

From January 1959 to September 2007, the long-term ratio of new SF starts to the total US non-institutionalized population was 0.0066; in September 2017 it was 0.0032 – a decrease from August. The long-term ratio of non-institutionalized population, aged 20 to 54 is 0.0103; in September 2017 it was 0.0056 – a decline from August. From a population worldview, construction is less than what is necessary for changes in population (i.e., under-building).

Total Housing Starts: Six-Month Average



SF Housing Starts: Six-Month Average



New Housing Starts by Region

	NE Total	NE SF	NE MF**
September	99,000	73,000	26,000
August	109,000	69,000	40,000
2016	95,000	62,000	33,000
M/M change	-9.2%	5.8%	-35.0%
Y/Y change	4.2%	17.7%	-21.2%

	MW Total	MW SF	MW MF
September	154,000	126,000	28,000
August	193,000	114,000	79,000
2016	150,000	114,000	36,000
M/M change	-20.2%	10.5%	-64.6%
Y/Y change	2.7%	10.5%	-22.2%

All data are SAAR; NE = Northeast and MW = Midwest.

** US DOC does not report multifamily starts directly, this is an estimation (Total starts – SF starts).

New Housing Starts by Region

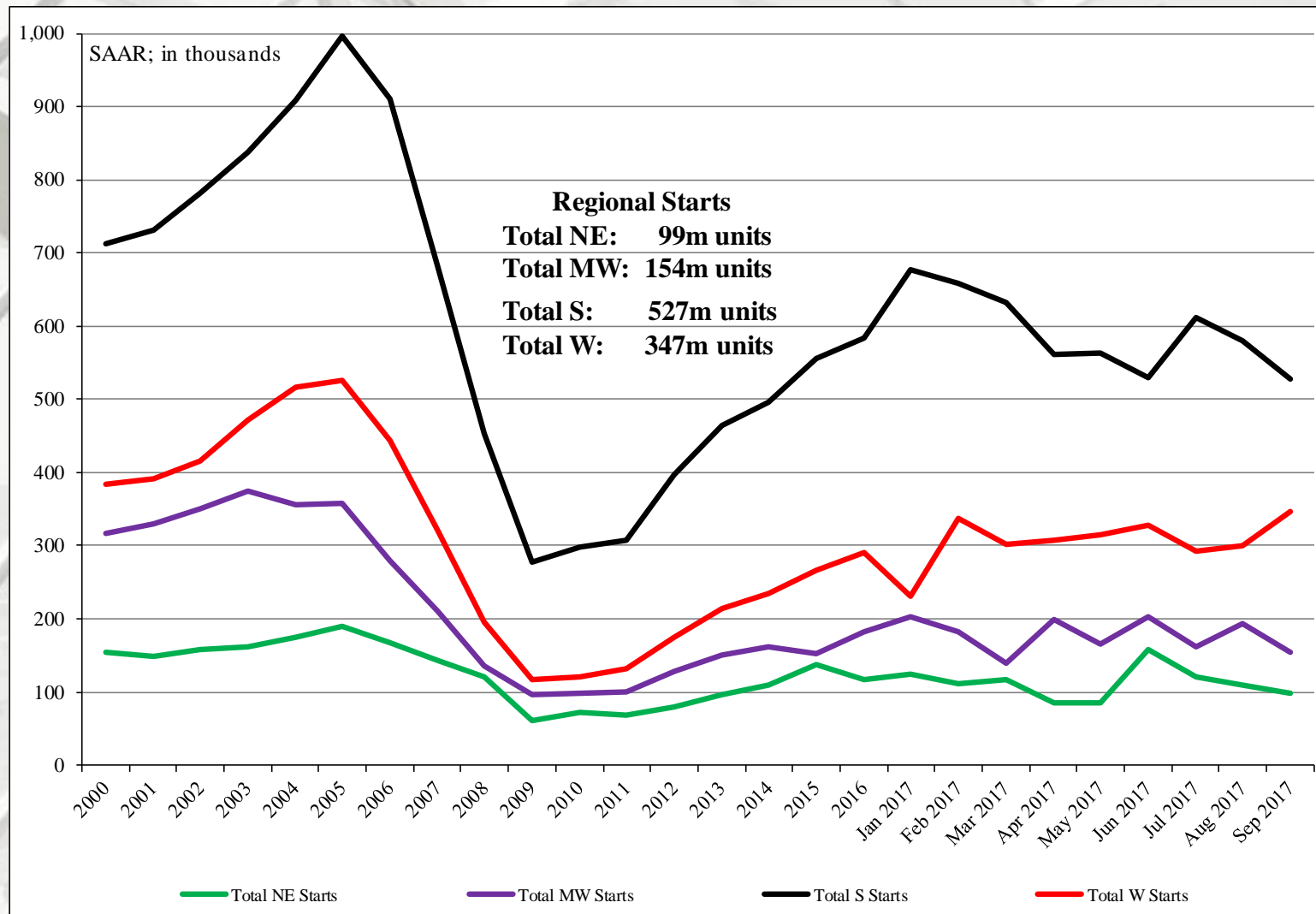
	S Total	S SF	S MF**
September	527,000	403,000	124,000
August	581,000	476,000	105,000
2016	539,000	427,000	112,000
M/M change	-9.3%	-15.3%	18.1%
Y/Y change	-2.2%	-5.6%	10.7%

	W Total	W SF	W MF
September	347,000	227,000	120,000
August	300,000	210,000	90,000
2016	278,000	180,000	98,000
M/M change	15.7%	8.1%	33.3%
Y/Y change	24.8%	26.1%	22.4%

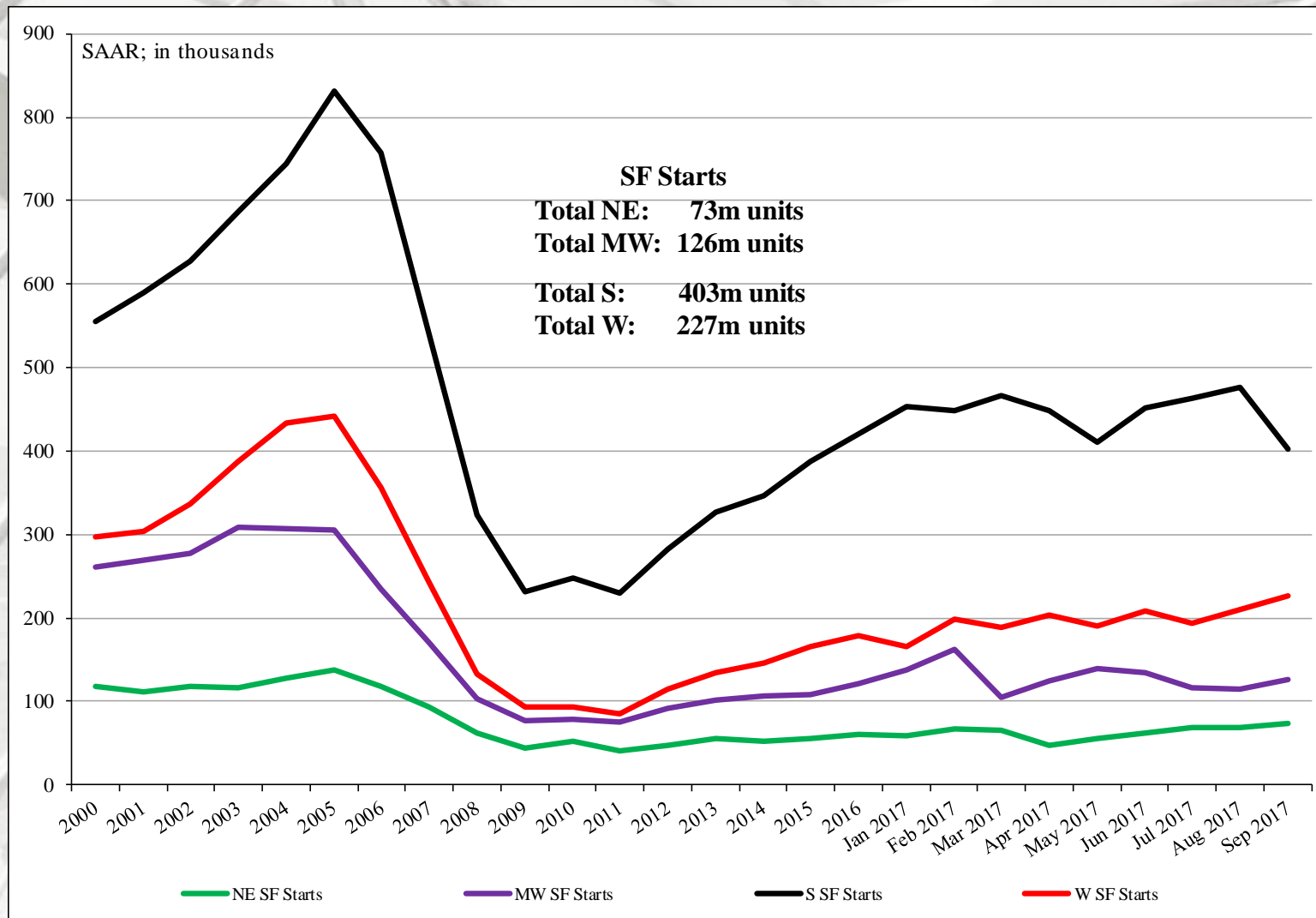
All data are SAAR; S = South and W = West.

** US DOC does not report multifamily starts directly, this is an estimation (Total starts – SF starts).

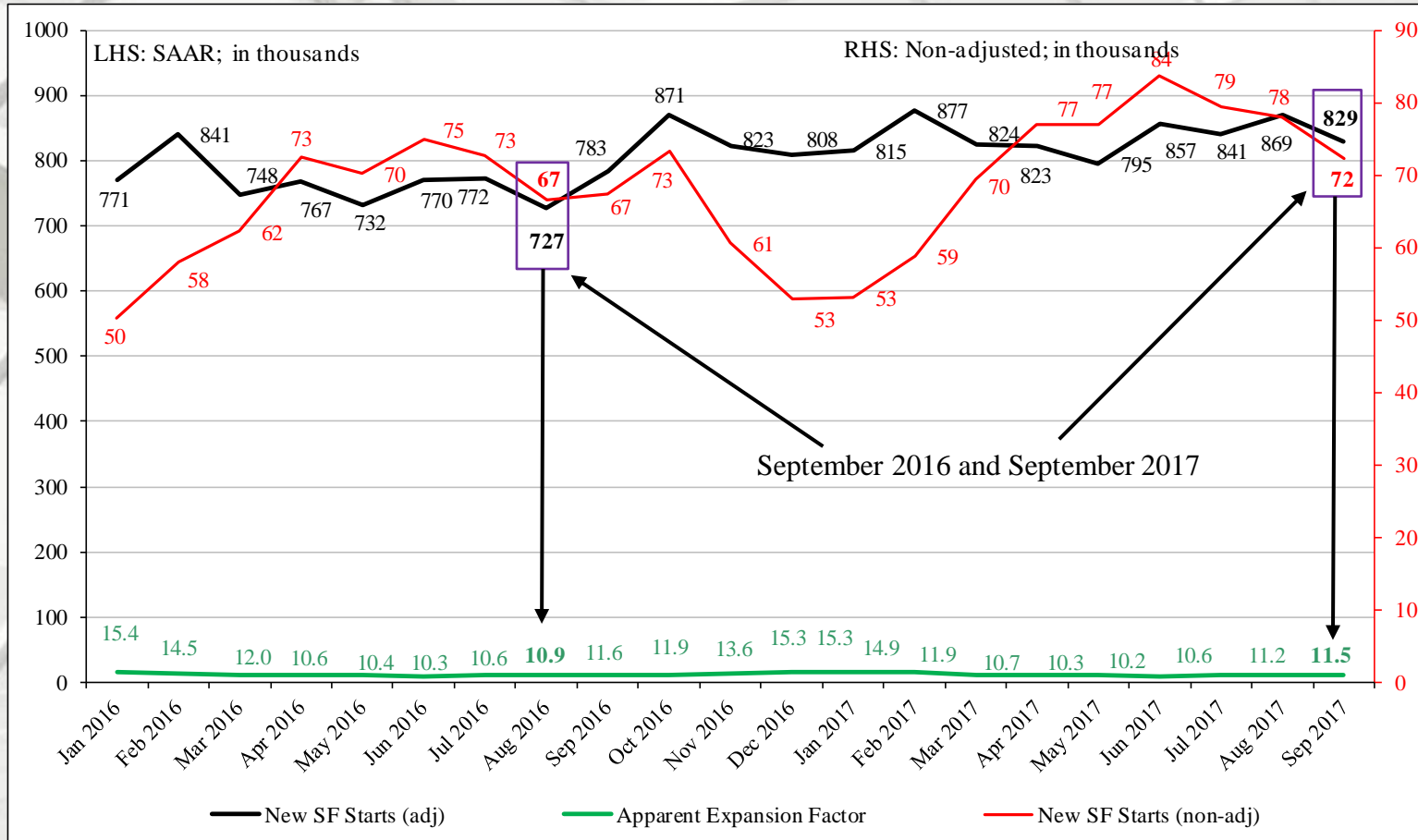
Total Housing Starts by Region



SF Housing Starts by Region



Nominal & SAAR SF Starts

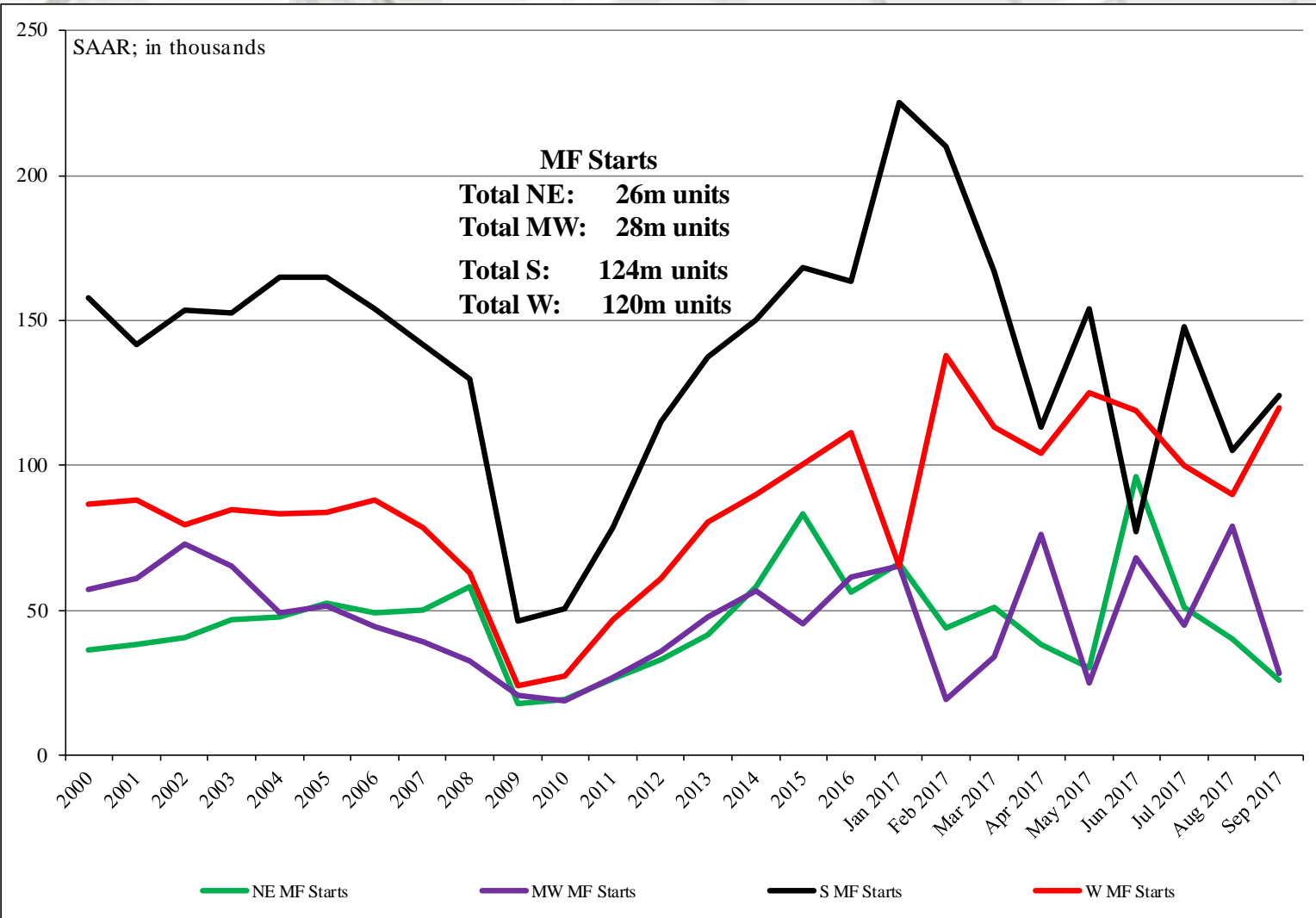


Nominal and Adjusted New SF Monthly Starts

Presented above is nominal (non-adjusted) new SF start data contrasted against SAAR data.

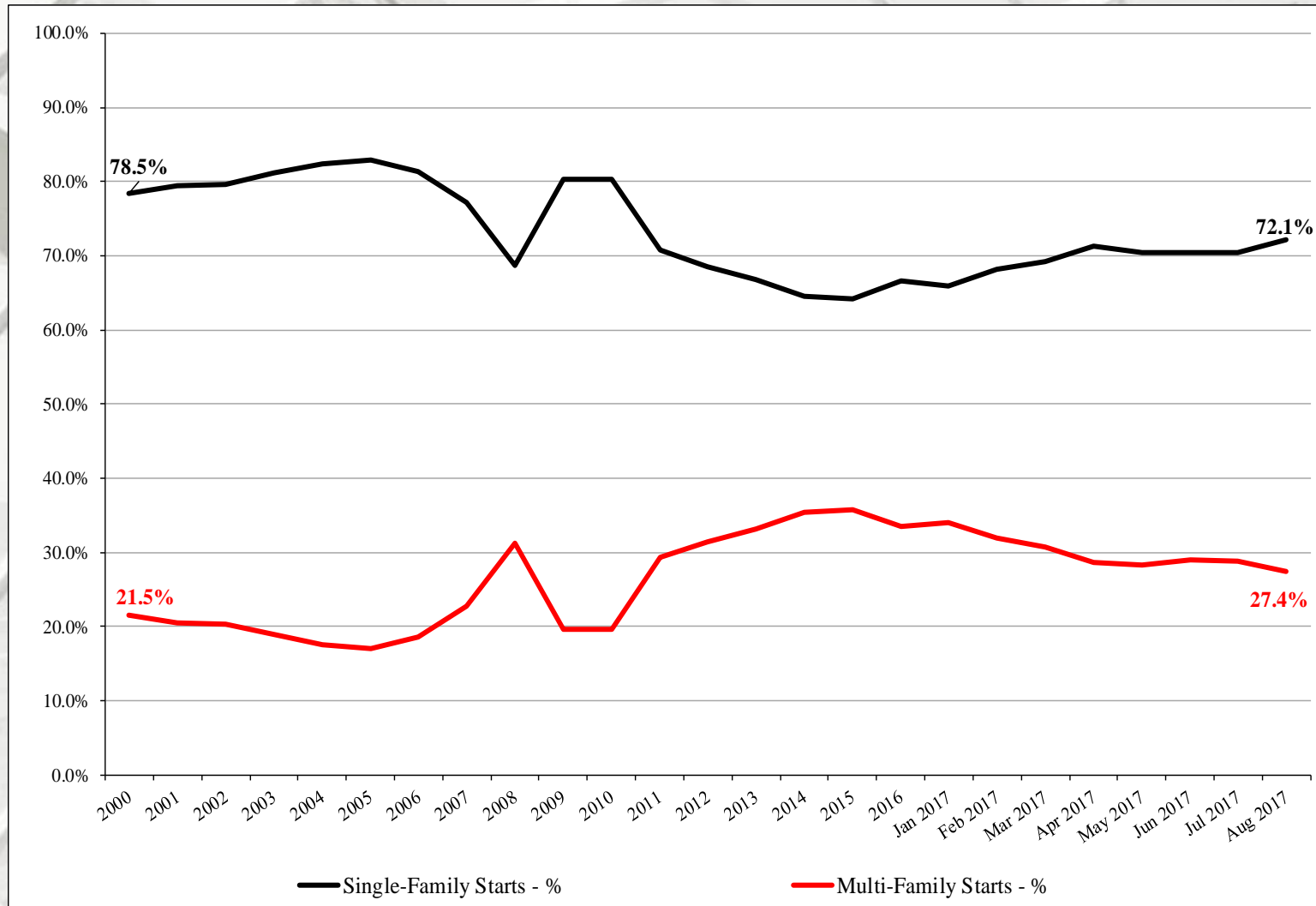
The apparent expansion factor "... is the ratio of the unadjusted number of houses started in the US to the seasonally adjusted number of houses started in the US (i.e., to the sum of the seasonally adjusted values for the four regions)." – U.S. DOC-Construction

MF Housing Starts by Region

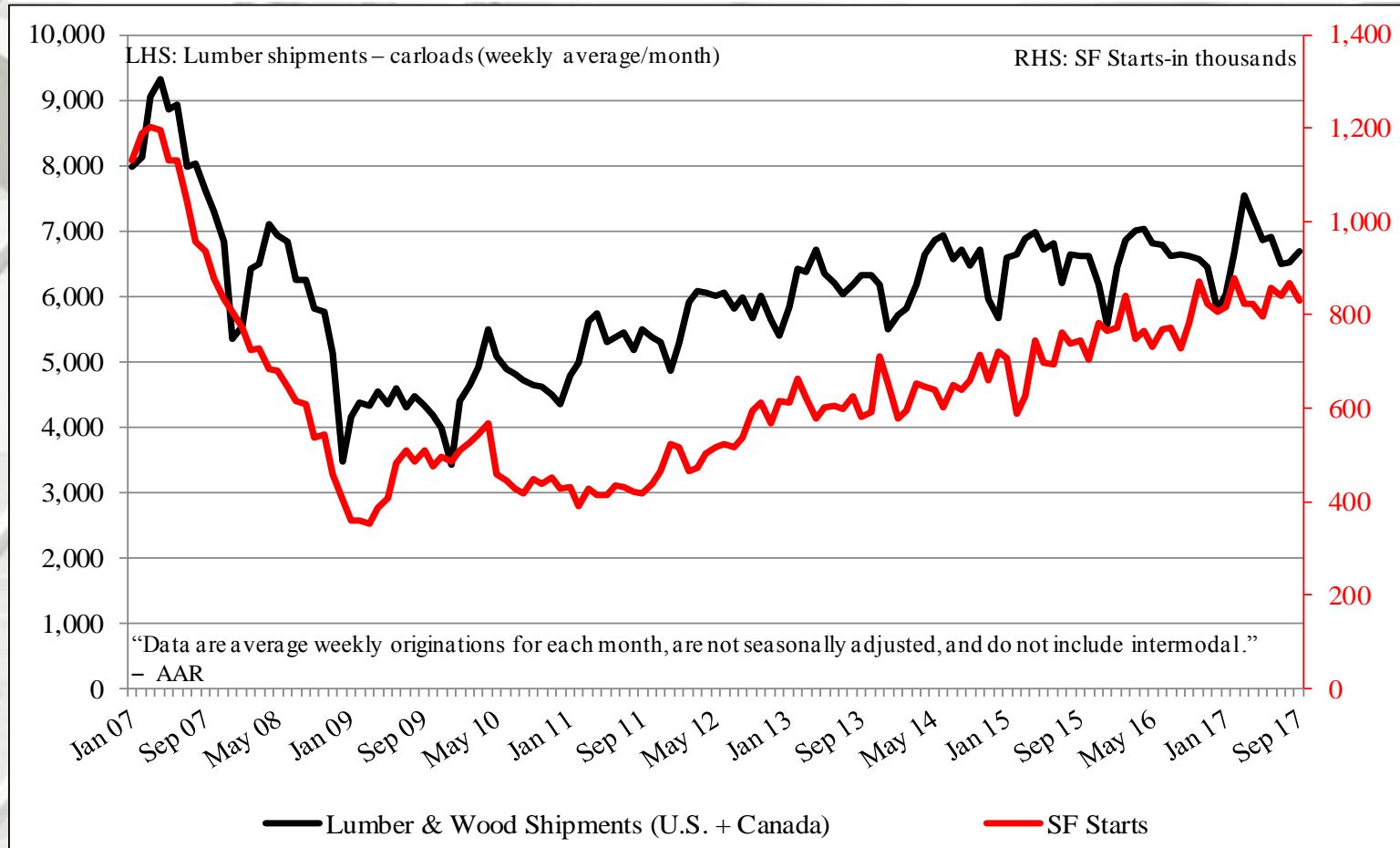


Source: <http://www.census.gov/construction/nrc/pdf/newresconst.pdf>; 10/18/17

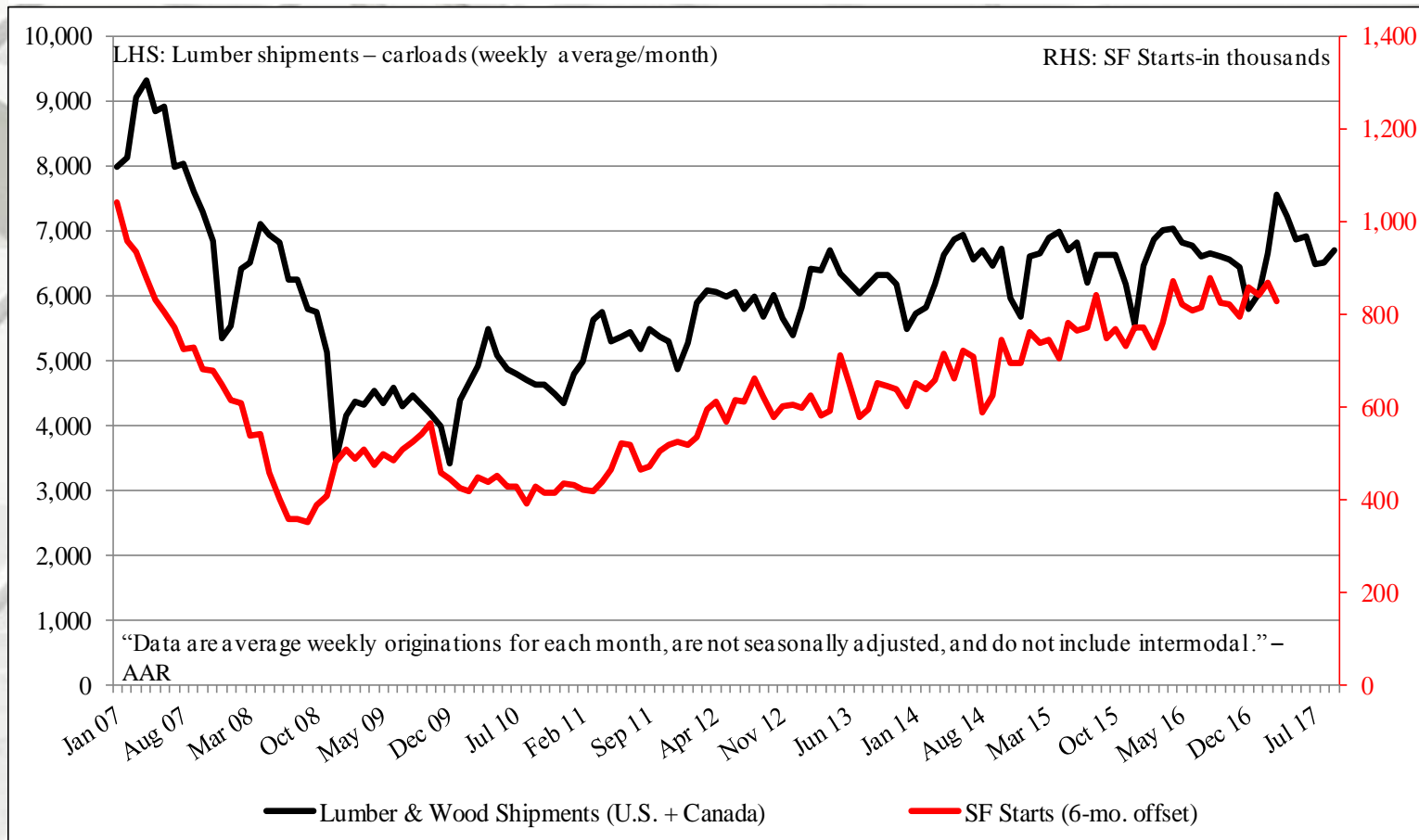
SF & MF Housing Starts (%)



Railroad Lumber & Wood Shipments vs. U.S. SF Housing Starts



Railroad Lumber & Wood Shipments vs. U.S. SF Housing Starts: 6-month Offset



In this graph, January 2007 lumber shipments are contrasted with September 2007 SF starts, and continuing through September 2017 SF starts. The purpose is to discover if lumber shipments relate to future single-family starts. Also, it is realized that lumber and wood products are trucked; however, to our knowledge comprehensive trucking data is not available.

New Construction Starts in 2018 to Increase 3% to \$765 Billion

“The U.S. construction industry has moved into a mature stage of expansion. After rising 11% to 13% per year from 2012 through 2015, total construction starts advanced a more subdued 5% in 2016. An important question entering 2017 was whether the construction industry had the potential for further expansion. Several project types, including multifamily housing and hotels, have pulled back from their 2016 levels, but the current year has seen continued growth by single family housing, office buildings, and warehouses. In addition, the institutional segment of nonresidential building has been quite strong, led especially by transportation terminal projects in combination with gains for schools and healthcare facilities. As for public works, the specifics of a \$1 trillion infrastructure program by the Trump Administration have yet to materialize, so activity continues to hover around basically the plateau for construction starts reached a couple of years ago. Total construction starts in 2017 are estimated to climb 4% to \$746 billion.

For 2018, there are several positive factors which suggest that the construction expansion has further room to proceed. The U.S. economy next year is anticipated to see moderate job growth. Long term interest rates may see some upward movement but not substantially. While market fundamentals for commercial real estate won't be quite as strong as this year, funding support for construction will continue to come from state and local bond measures. Two areas of uncertainty relate to whether tax reform and a federal infrastructure program get passed, with their potential to lift investment. Overall, the year 2018 is likely to show some construction project types register gains while other project types settle back, with the end result being a 3% increase for total construction starts. By major sector, gains are predicted for residential building, up 4%; and nonresidential building, up 2%; while nonbuilding construction stabilizes after two years of decline.” – Robert Murray, Chief Economist, Dodge Data & Analytics

New Construction Starts in 2018 to Increase 3% to \$765 Billion

“The pattern of construction starts by more specific segments is the following:

- **Single family housing** will rise 9% in dollars, corresponding to a 7% increase in units to 850,000 (Dodge basis). Continued employment growth has eased some of the caution shown by potential homebuyers, while older Millennials in their 30s are helping to lift demand for single family housing. A modest boost will also come from rebuilding efforts in Texas and Florida after Hurricanes Harvey and Irma.
- **Multifamily housing** will retreat 8% in dollars and 11% in units to 425,000 (Dodge basis). This project type appears to have peaked in 2016, helped by widespread growth across major metropolitan markets. That strength has begun to wane in 2017, given slight deterioration in market fundamentals (rent growth, occupancies) and a more cautious bank lending stance.
- **Commercial building** will increase 2%, following a 3% gain in 2017, and continuing to decelerate after the sharp 21% hike back in 2016. Office construction should see further growth in 2018, helped by broad development efforts in downtown markets, and warehouse construction is supported by greater demand arising from e-commerce. However, store construction will remain weak, and hotel construction will continue to pull back from its 2016 peak.” – Robert Murray, Chief Economist, Dodge Data & Analytics

New Construction Starts in 2018 to Increase 3% to \$765 Billion

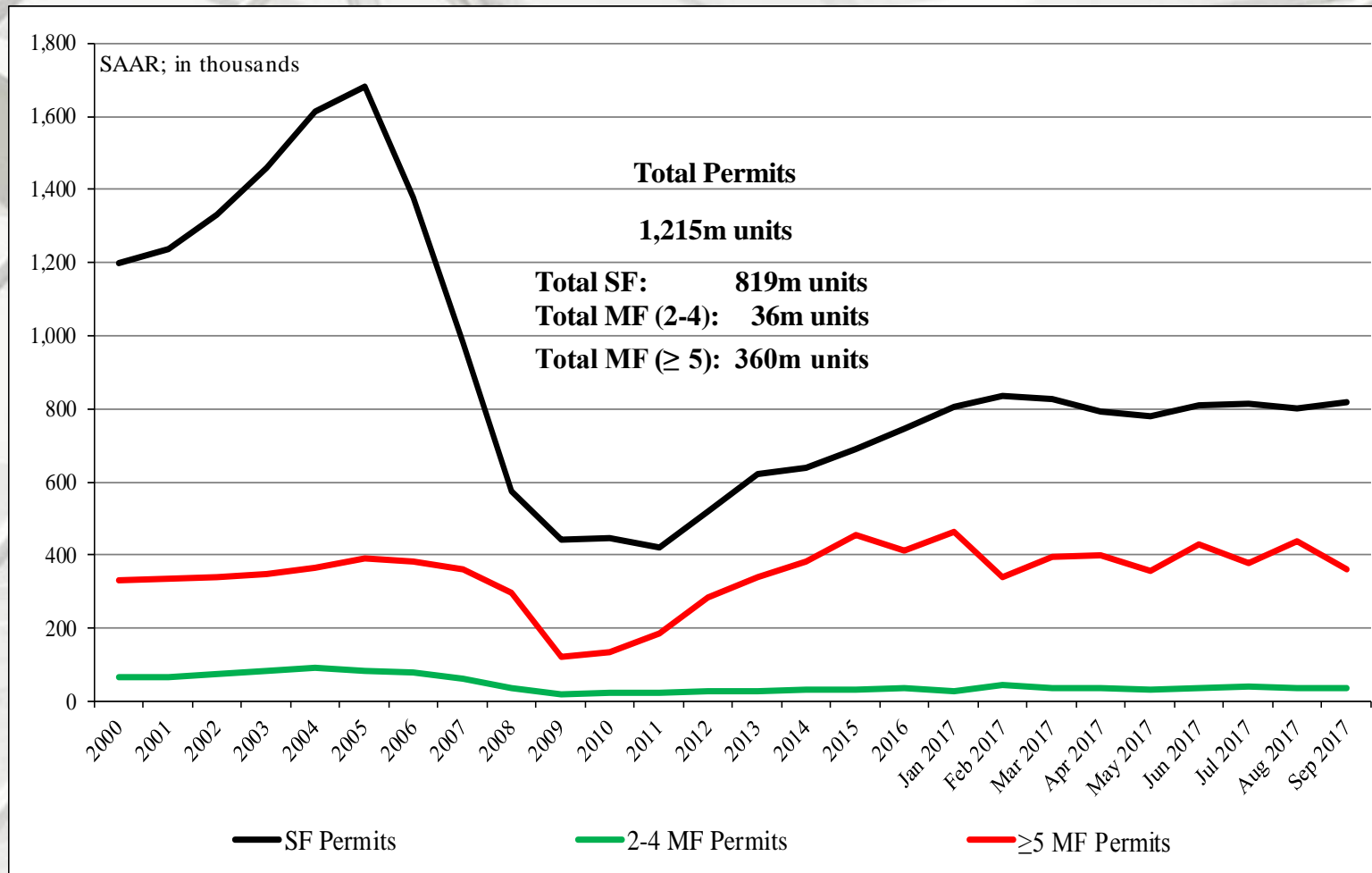
- “**Institutional building** will advance 3%, maintaining its upward track after this year’s 14% jump. Educational facilities should see more substantial growth next year, lifted by the passage of recent school construction bond measures. The robust volume of transportation terminal projects in 2017 may not be repeated in 2018, but activity should stay at a high level.
- **Manufacturing plant** construction will recede 1% in dollar terms, after surging 27% this year due to the start of several massive petrochemical projects. Next year should still see moderate growth for manufacturing plants in square footage terms.
- **Public works** construction will improve 3%, slightly more than the 1% growth in 2017. Highways and bridges should be helped as federal funding rises to the levels called for by the FAST Act, while the environmental categories will partly reflect reconstruction efforts related to Hurricanes Harvey and Irma. Additional benefit may come from the infrastructure program proposed by the Trump Administration, should it achieve passage in some form.
- **Electric utilities and gas plants** will drop 13%, falling for the third year in a row after the exceptional amount reported in 2015. Power plant construction starts will ease back as new generating capacity comes on line.” – Robert Murray, Chief Economist, Dodge Data & Analytics

New Housing Permits

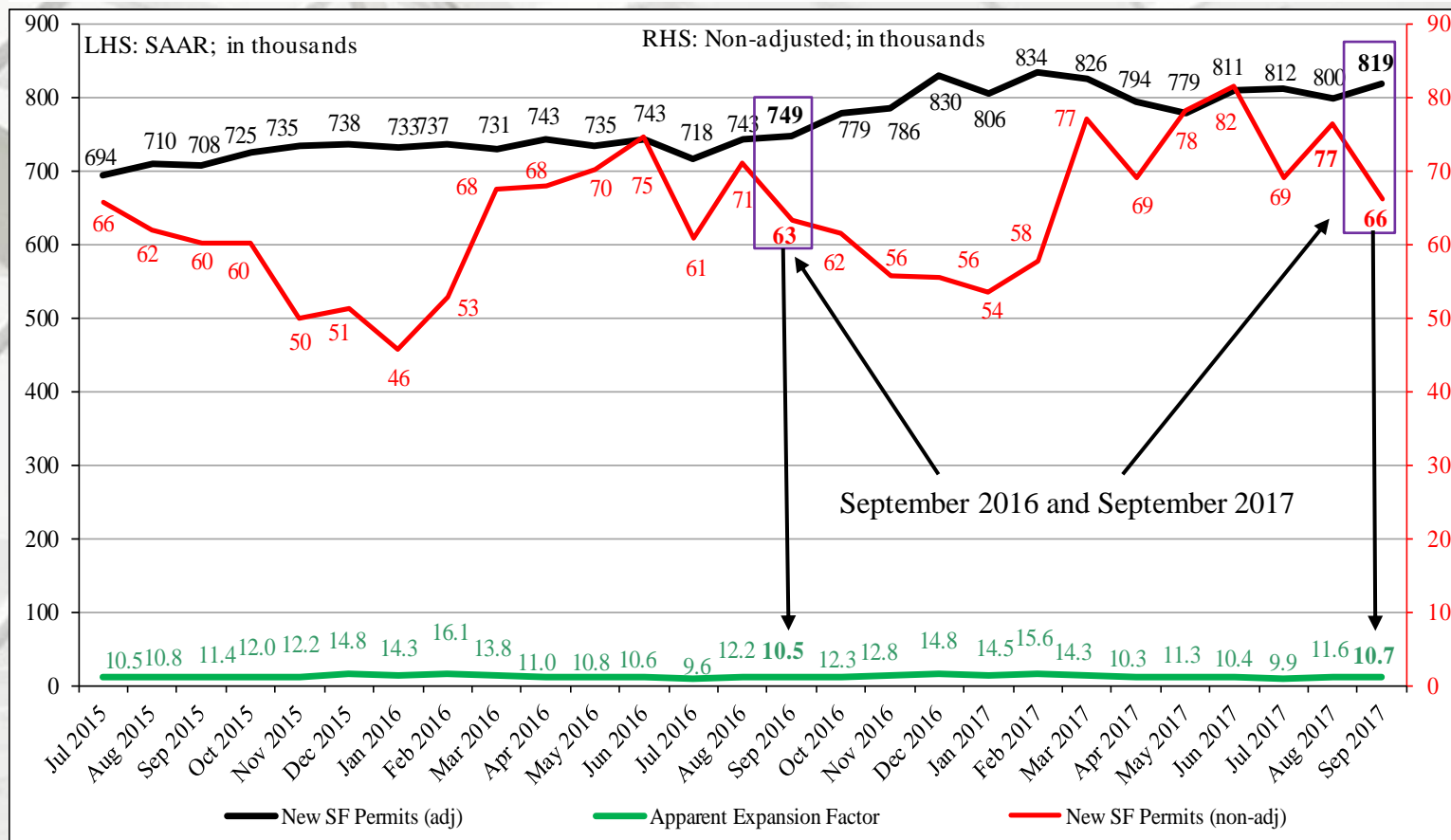
	Total Permits*	SF Permits	MF 2-4 unit Permits	MF ≥ 5 unit Permits
September	1,215,000	819,000	36,000	360,000
August	1,272,000	800,000	36,000	436,000
2016	1,270,000	749,000	39,000	482,000
M/M change	-4.5%	2.4%	0.0%	-17.4%
Y/Y change	-4.3%	9.3%	-7.7%	-25.3%

* All permit data are presented at a seasonally adjusted annual rate (SAAR).

Total New Housing Permits



Nominal & SAAR SF Permits



Nominal and Adjusted New SF Monthly Permits

Presented above is nominal (non-adjusted) new SF start data contrasted against SAAR data.

The apparent expansion factor “...is the ratio of the unadjusted number of houses started in the US to the seasonally adjusted number of houses started in the US (i.e., to the sum of the seasonally adjusted values for the four regions).” – U.S. DOC-Construction

New Housing Permits by Region

	NE Total*	NE SF	NE MF**
September	119,000	70,000	49,000
August	109,000	58,000	51,000
2016	142,000	53,000	89,000
M/M change	9.2%	20.7%	-3.9%
Y/Y change	-16.2%	32.1%	-44.9%

	MW Total*	MW SF	MW MF**
September	185,000	123,000	62,000
August	184,000	114,000	70,000
2016	181,000	113,000	68,000
M/M change	0.5%	7.9%	-11.4%
Y/Y change	2.2%	8.8%	-8.8%

- All data are SAAR
- ** US DOC does not report multifamily starts directly, this is an estimation (Total starts – SF starts).

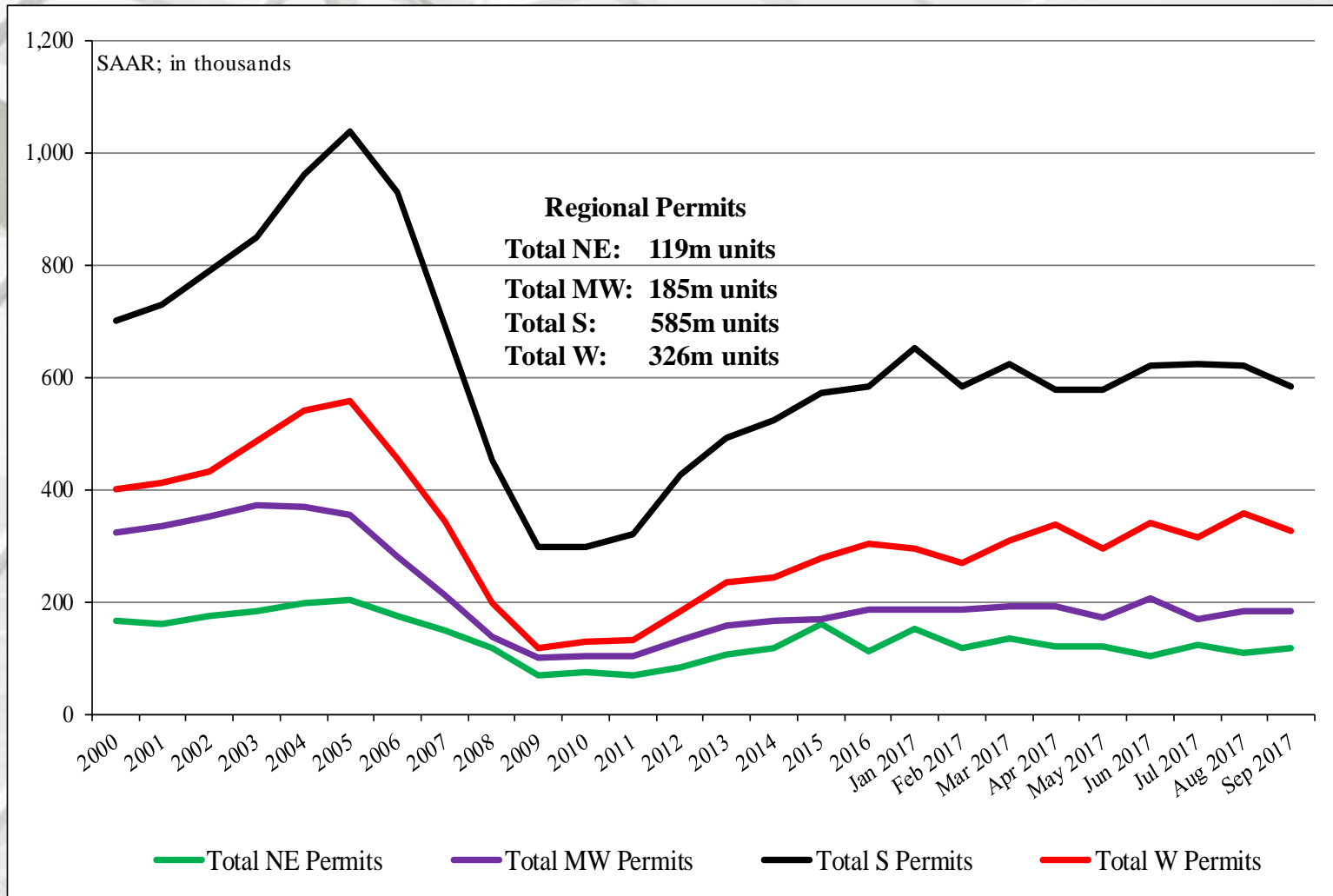
New Housing Permits by Region

	S Total*	S SF	S MF**
September	585,000	425,000	160,000
August	620,000	429,000	191,000
2016	618,000	408,000	210,000
M/M change	-5.6%	-0.9%	-16.2%
Y/Y change	-5.3%	4.2%	-23.8%

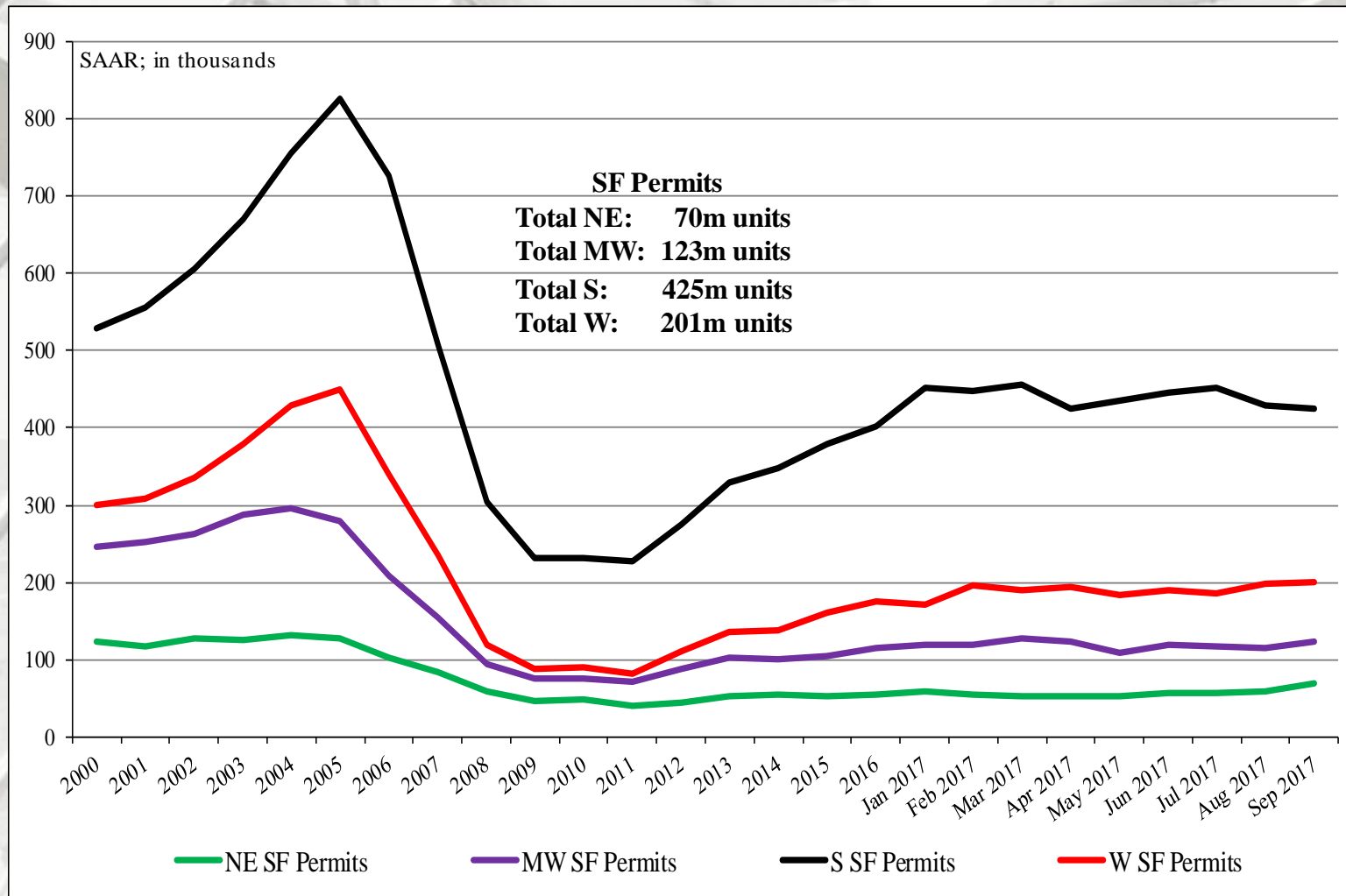
	W Total*	W SF	W MF**
September	326,000	201,000	125,000
August	359,000	199,000	160,000
2016	329,000	175,000	154,000
M/M change	-9.2%	1.0%	-21.9%
Y/Y change	-0.9%	14.9%	-18.8%

- All data are SAAR
- ** US DOC does not report multifamily starts directly, this is an estimation (Total starts – SF starts).

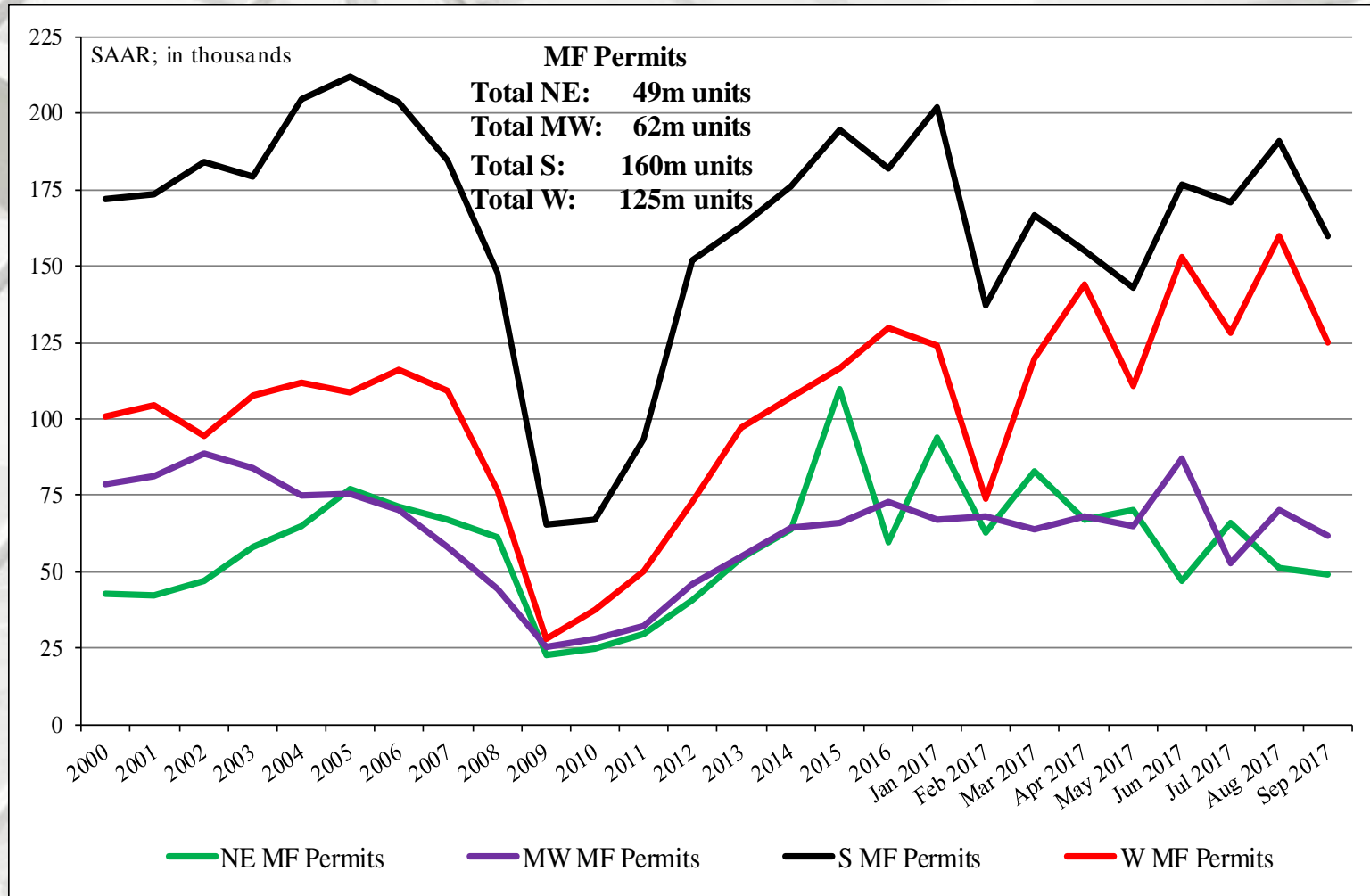
Total Housing Permits by Region



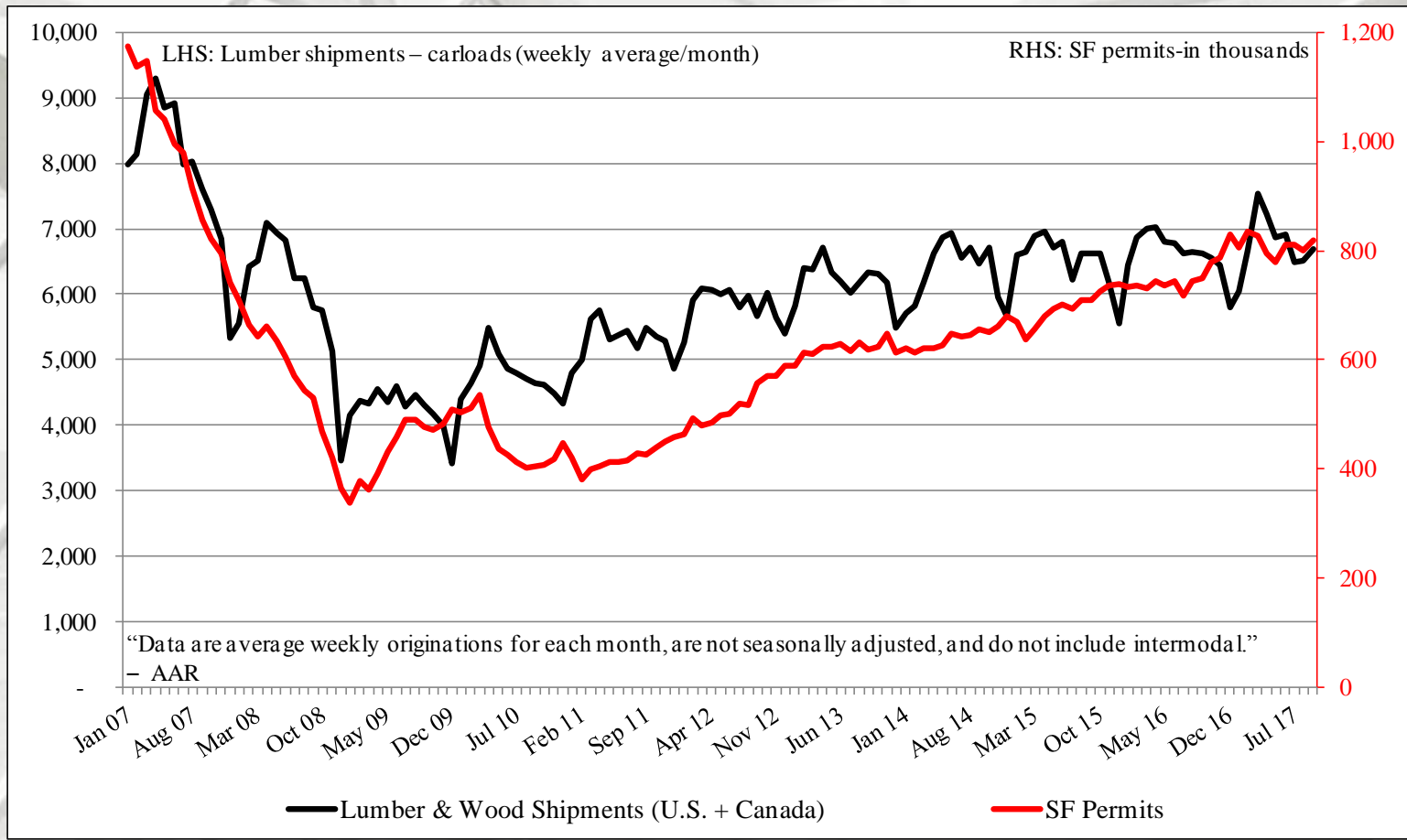
SF Housing Permits by Region



MF Housing Permits by Region

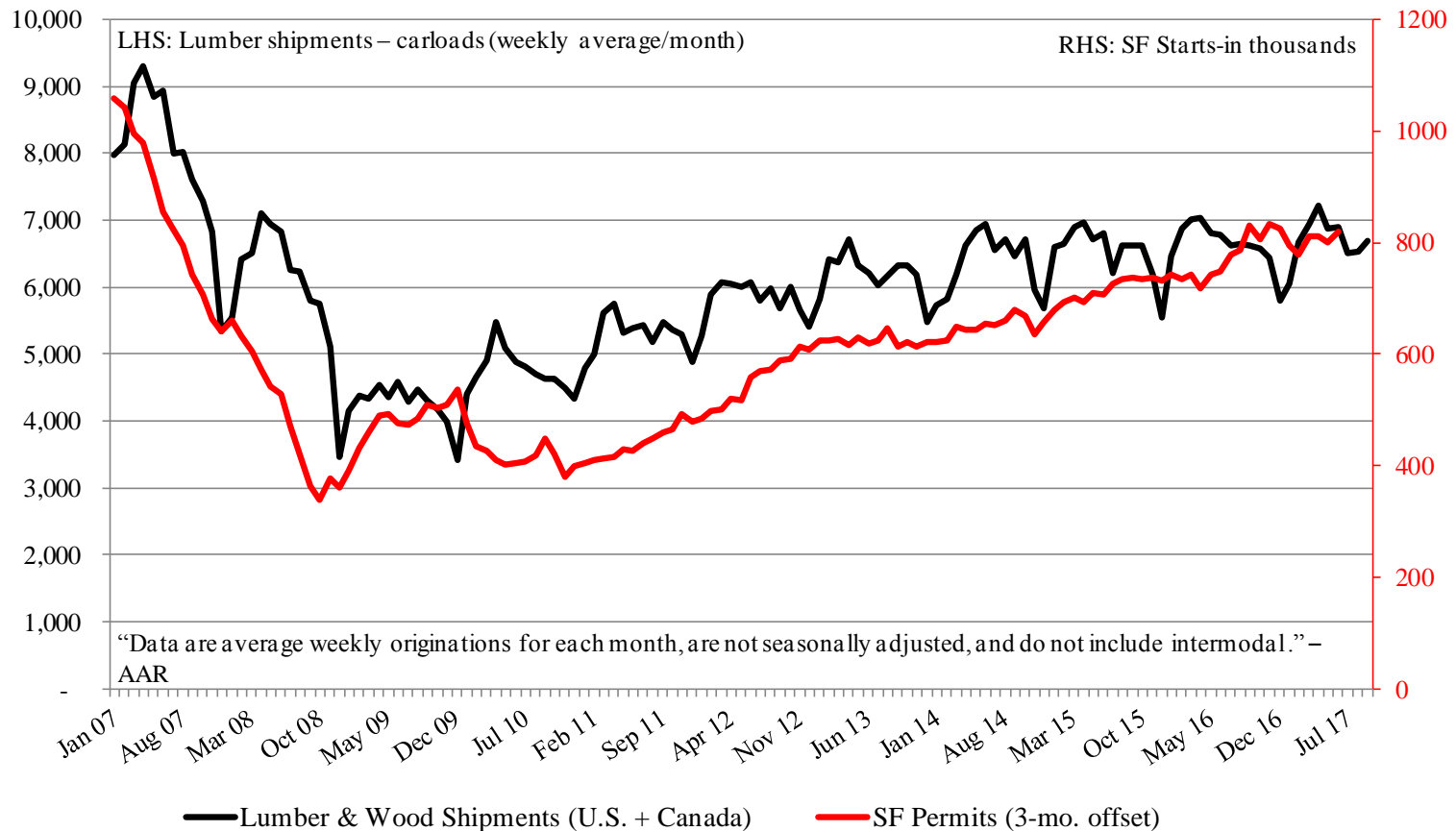


Railroad Lumber & Wood Shipments vs. U.S. SF Housing Permits



Sources: Association of American Railroads (AAR), *Rail Time Indicators* report 10/6/17; U.S. DOC-Construction; 10/18/17

Railroad Lumber & Wood Shipments vs. U.S. SF Housing Permits: 3-month Offset



In this graph, January 2007 lumber shipments are contrasted with April 2007 SF permits, continuing through September 2017. The purpose is to discover if lumber shipments relate to future single-family permits. Also, it is realized that lumber and wood products are trucked; however, to our knowledge comprehensive trucking data is not available.

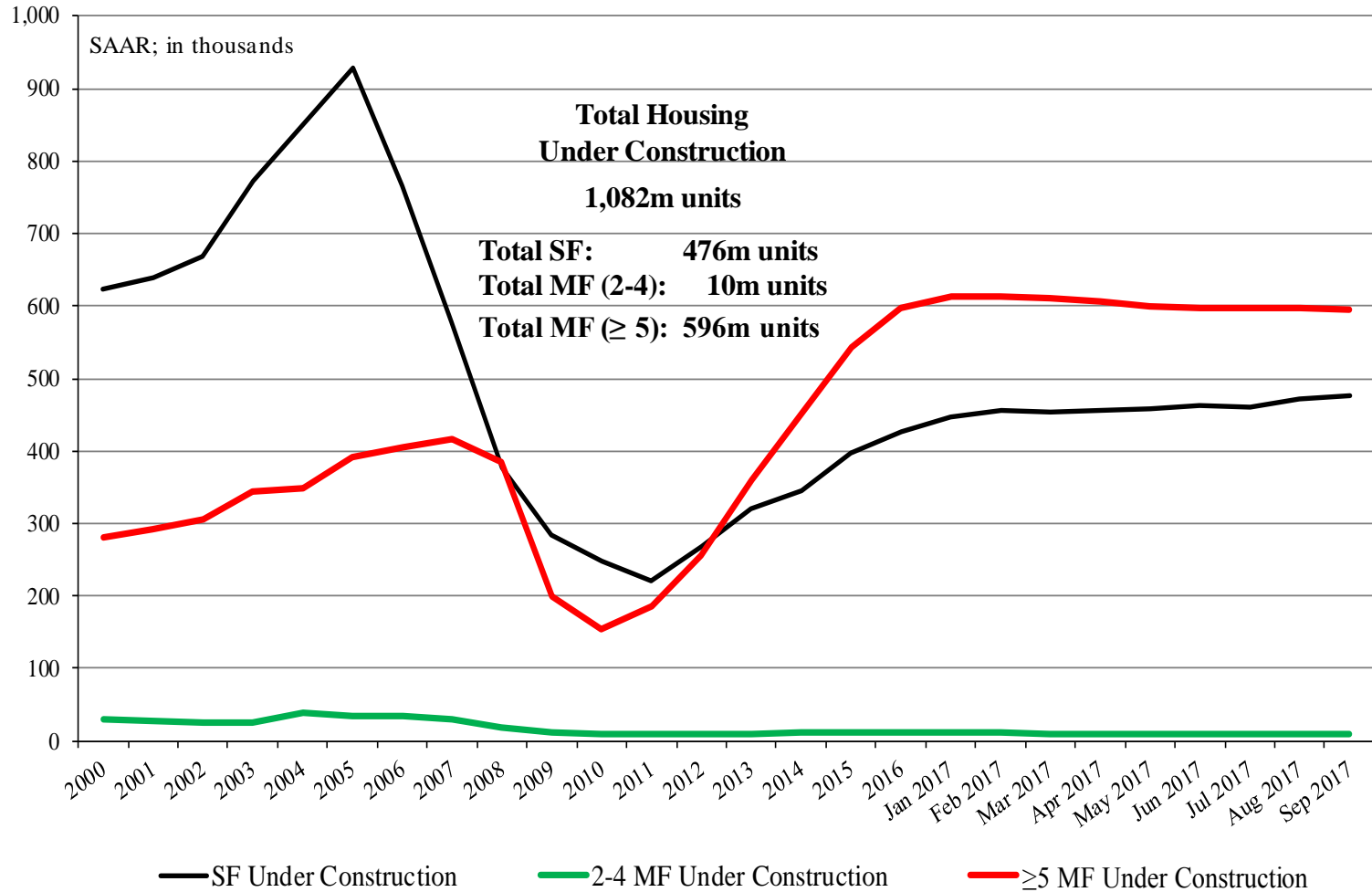
New Housing Under Construction

	Total Under Construction*	SF Under Construction	MF 2-4 unit** Under Construction	MF ≥ 5 unit Under Construction
September	1,082,000	476,000	10,000	596,000
August	1,079,000	472,000	10,000	597,000
2016	1,033,000	432,000	11,000	590,000
M/M change	0.3%	0.8%	0.0%	-0.2%
Y/Y change	4.7%	10.2%	-9.1%	1.0%

All housing under construction data are presented at a seasonally adjusted annual rate (SAAR).

** US DOC does not report 2-4 multifamily units under construction directly, this is an estimation ((Total under construction – (SF + 5 unit MF)).

Total Housing Under Construction



New Housing Under Construction by Region

	NE Total	NE SF	NE MF**
September	188,000	53,000	135,000
August	187,000	52,000	135,000
2016	190,000	49,000	141,000
M/M change	0.5%	1.9%	0.0%
Y/Y change	-1.1%	8.2%	-4.3%
	MW Total	MW SF	MW MF
September	151,000	77,000	74,000
August	152,000	76,000	76,000
2016	139,000	72,000	67,000
M/M change	-0.7%	1.3%	-2.6%
Y/Y change	8.6%	6.9%	10.4%

All data are SAAR; NE = Northeast and MW = Midwest.

** US DOC does not report multifamily units under construction directly, this is an estimation
(Total under construction – SF under construction).

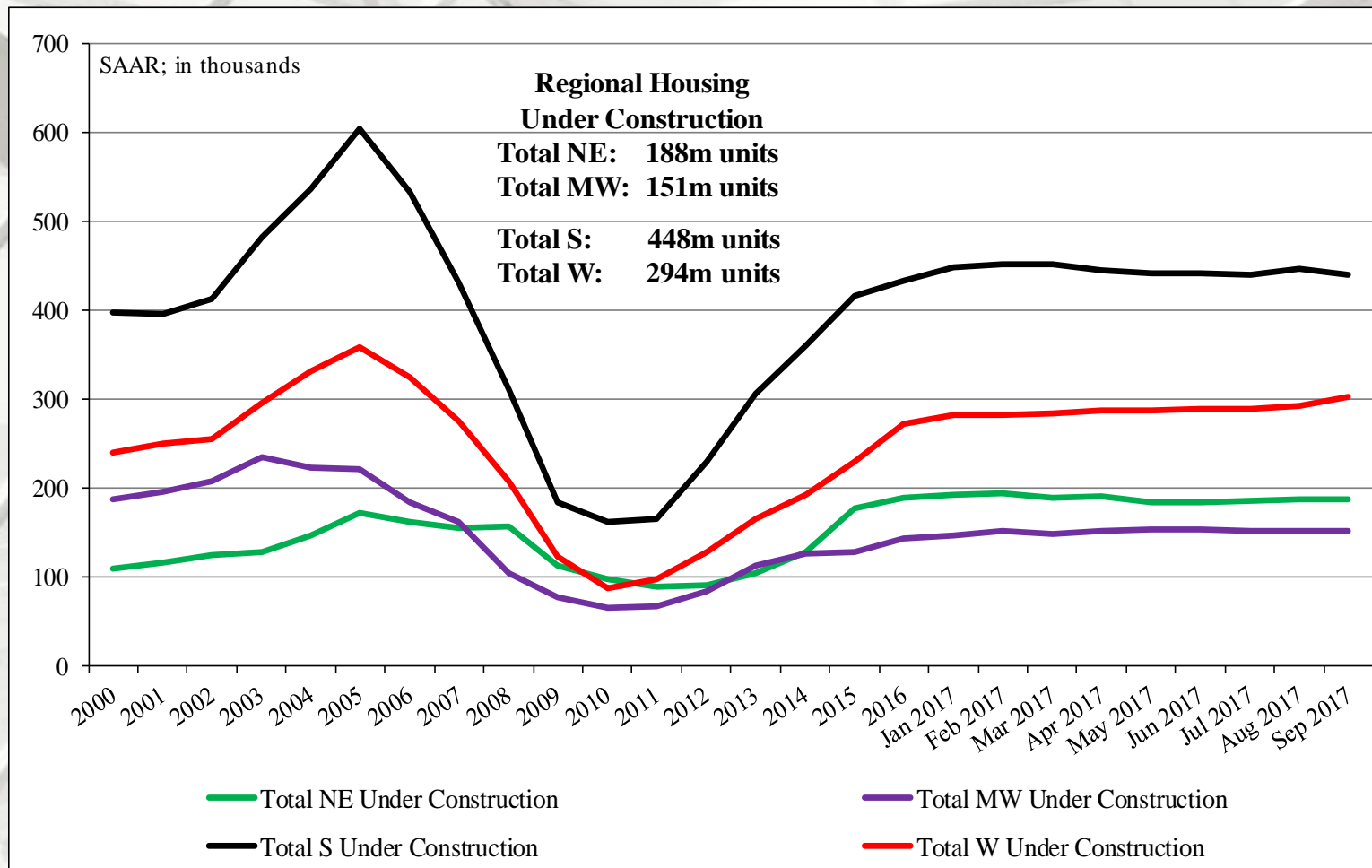
New Housing Under Construction by Region

	S Total	S SF	S MF**
August	448,000	228,000	220,000
July	441,000	221,000	220,000
2016	446,000	208,000	238,000
M/M change	1.6%	3.2%	0.0%
Y/Y change	0.4%	9.6%	-7.6%
	W Total	W SF	W MF
August	294,000	117,000	177,000
July	291,000	114,000	177,000
2016	260,000	100,000	160,000
M/M change	1.0%	2.6%	0.0%
Y/Y change	13.1%	17.0%	10.6%

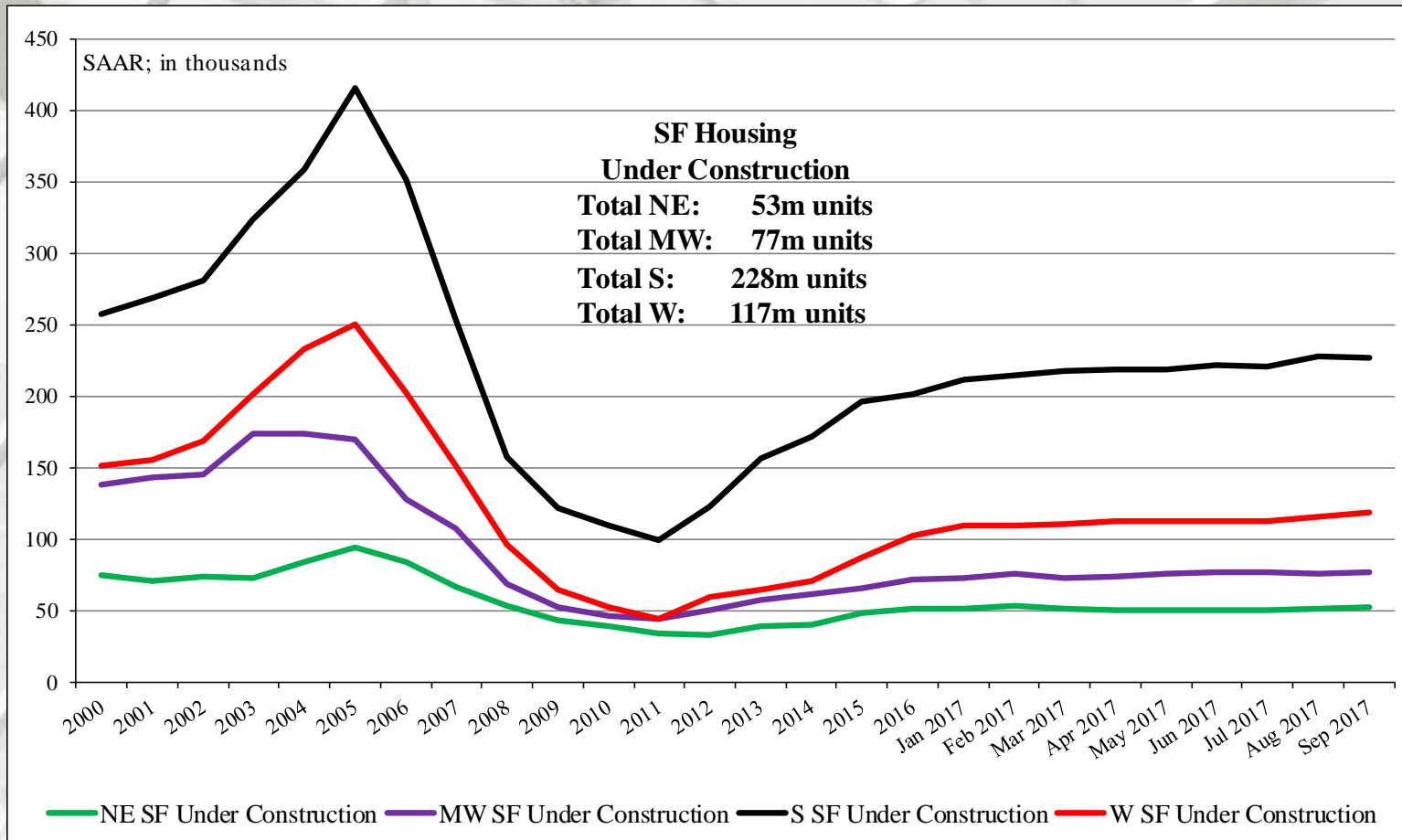
All data are SAAR; S = South and W = West.

** US DOC does not report multifamily units under construction directly, this is an estimation
(Total under construction – SF under construction).

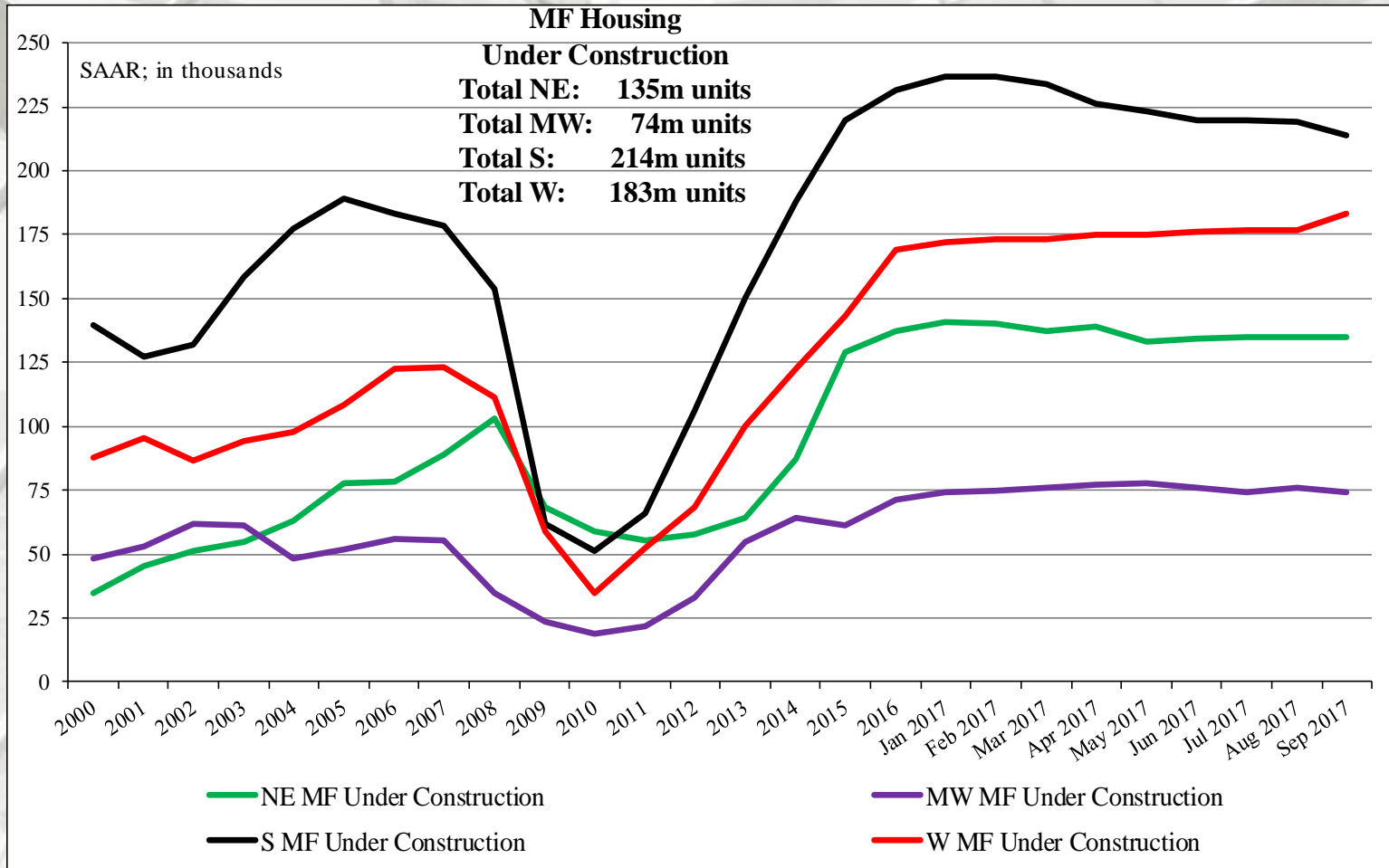
Total Housing Under Construction by Region



SF Housing Under Construction by Region



MF Housing Under Construction by Region



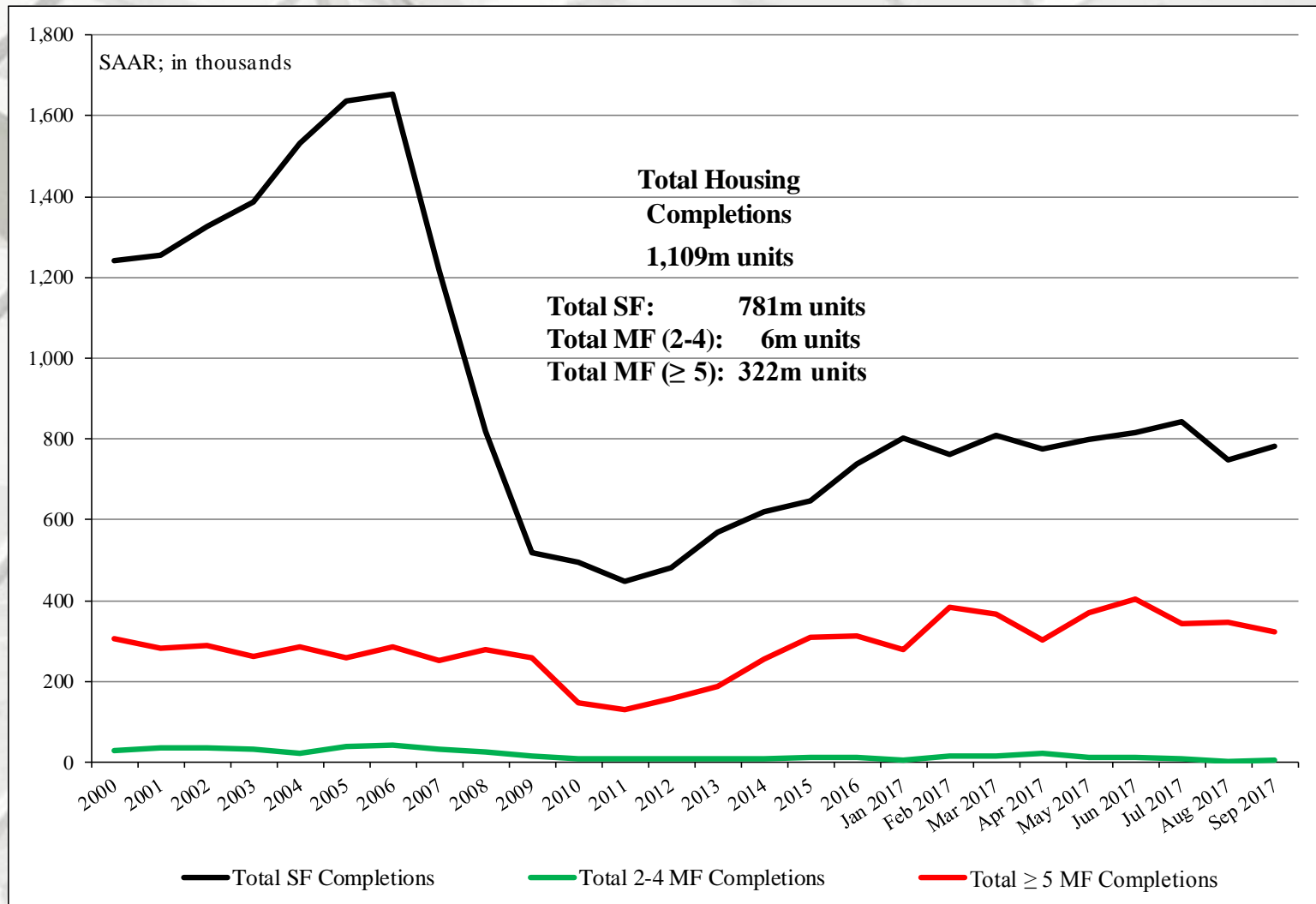
New Housing Completions

	Total Completions*	SF Completions	MF 2-4 unit**	MF ≥ 5 unit Completions
September	1,109,000	781,000	6,000	322,000
August	1,097,000	747,000	3,000	347,000
2016	1,005,000	718,000	14,000	273,000
M/M change	1.1%	4.6%	100.0%	-7.2%
Y/Y change	10.3%	8.8%	-57.1%	17.9%

* All completion data are presented at a seasonally adjusted annual rate (SAAR).

** US DOC does not report multifamily completions directly, this is an estimation ((Total completions – (SF + 5 unit MF)).

Total Housing Completions



Total Housing Completions by Region

	NE Total	NE SF	NE MF**
September	83,000	55,000	28,000
August	141,000	56,000	85,000
2016	97,000	56,000	41,000
M/M change	-41.1%	-1.8%	-67.1%
Y/Y change	-14.4%	-1.8%	-31.7%
	MW Total	MW SF	MW MF
September	182,000	110,000	72,000
August	176,000	126,000	50,000
2016	118,000	103,000	15,000
M/M change	3.4%	-12.7%	44.0%
Y/Y change	54.2%	6.8%	380.0%

All data are SAAR; NE = Northeast and MW = West.

** US DOC does not report multi-family completions directly, this is an estimation (Total completions – SF completions).

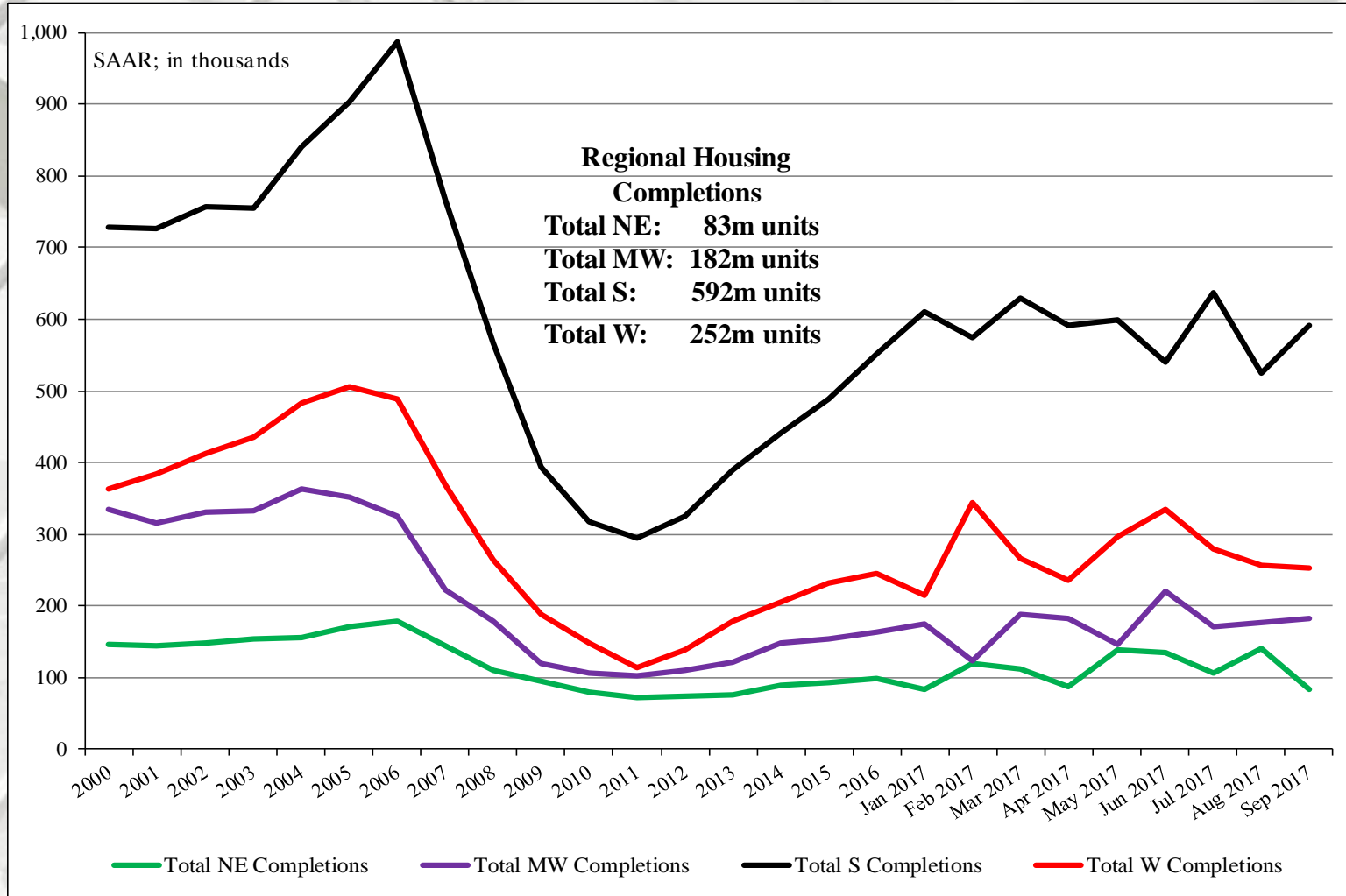
Total Housing Completions by Region

	S Total	S SF	S MF**
September	592,000	419,000	173,000
August	524,000	390,000	134,000
2016	537,000	384,000	153,000
M/M change	13.0%	7.4%	29.1%
Y/Y change	10.2%	9.1%	13.1%
	W Total	W SF	W MF
September	252,000	197,000	55,000
August	256,000	175,000	81,000
2016	253,000	175,000	78,000
M/M change	-1.6%	12.6%	-32.1%
Y/Y change	-0.4%	12.6%	-29.5%

All data are SAAR; S = South and W = West.

** US DOC does not report multi-family completions directly, this is an estimation (Total completions – SF completions).

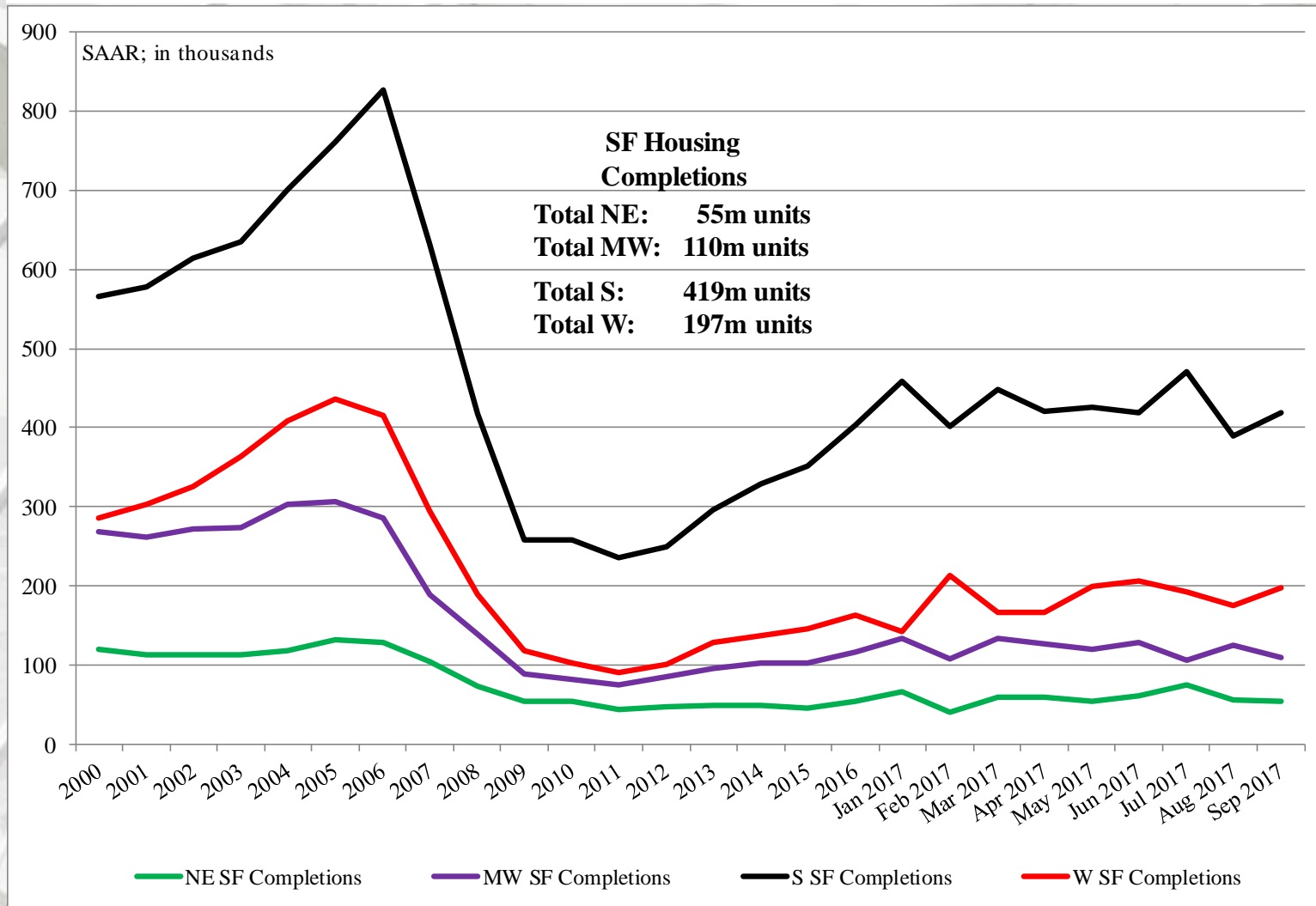
New Housing Completions by Region



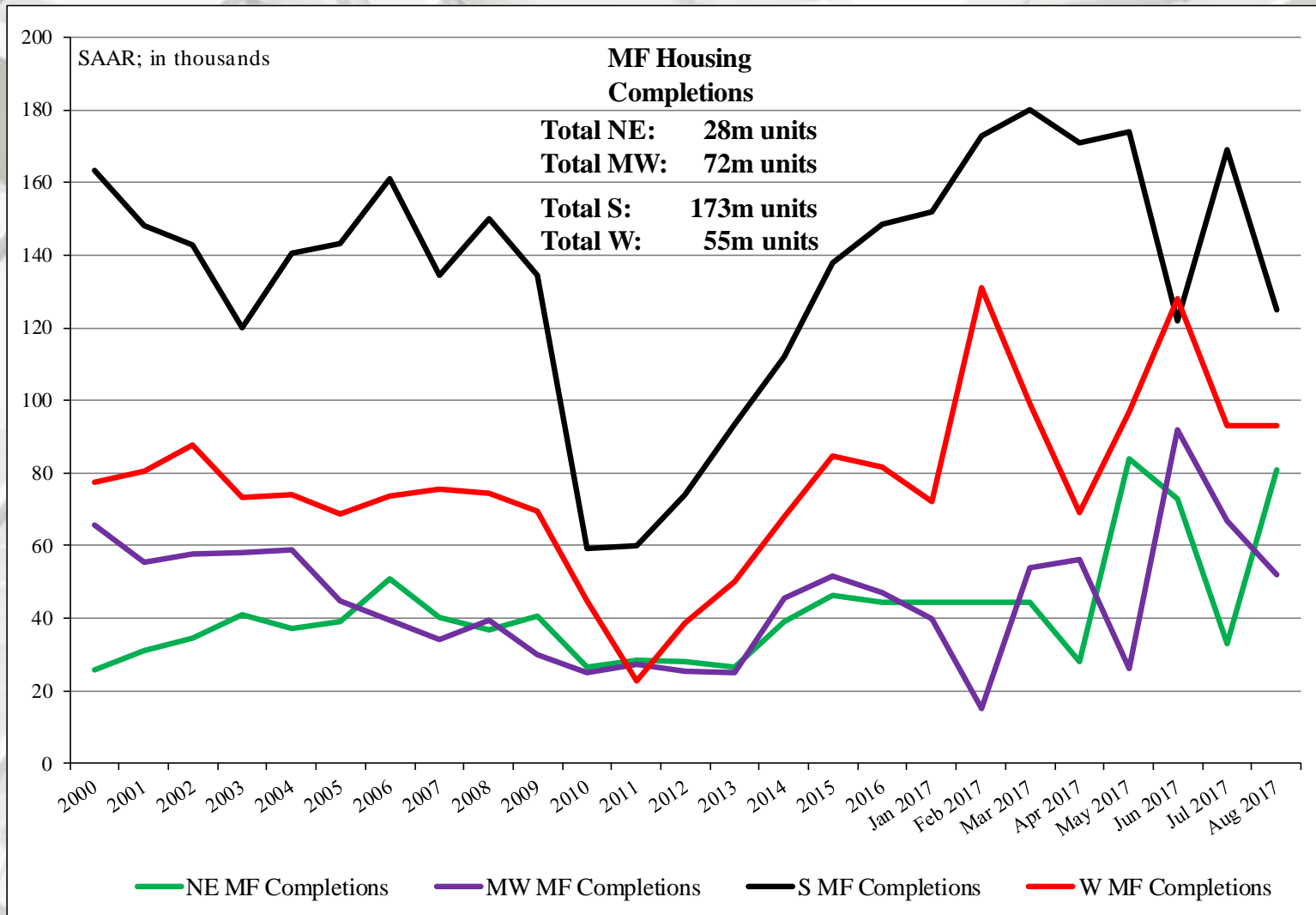
All data are SAAR; NE = Northeast and MW = Midwest.

** US DOC does not report multifamily completions directly, this is an estimation (Total completions – SF completions).

SF Housing Completions by Region



MF Housing Completions by Region



New Single-Family House Sales

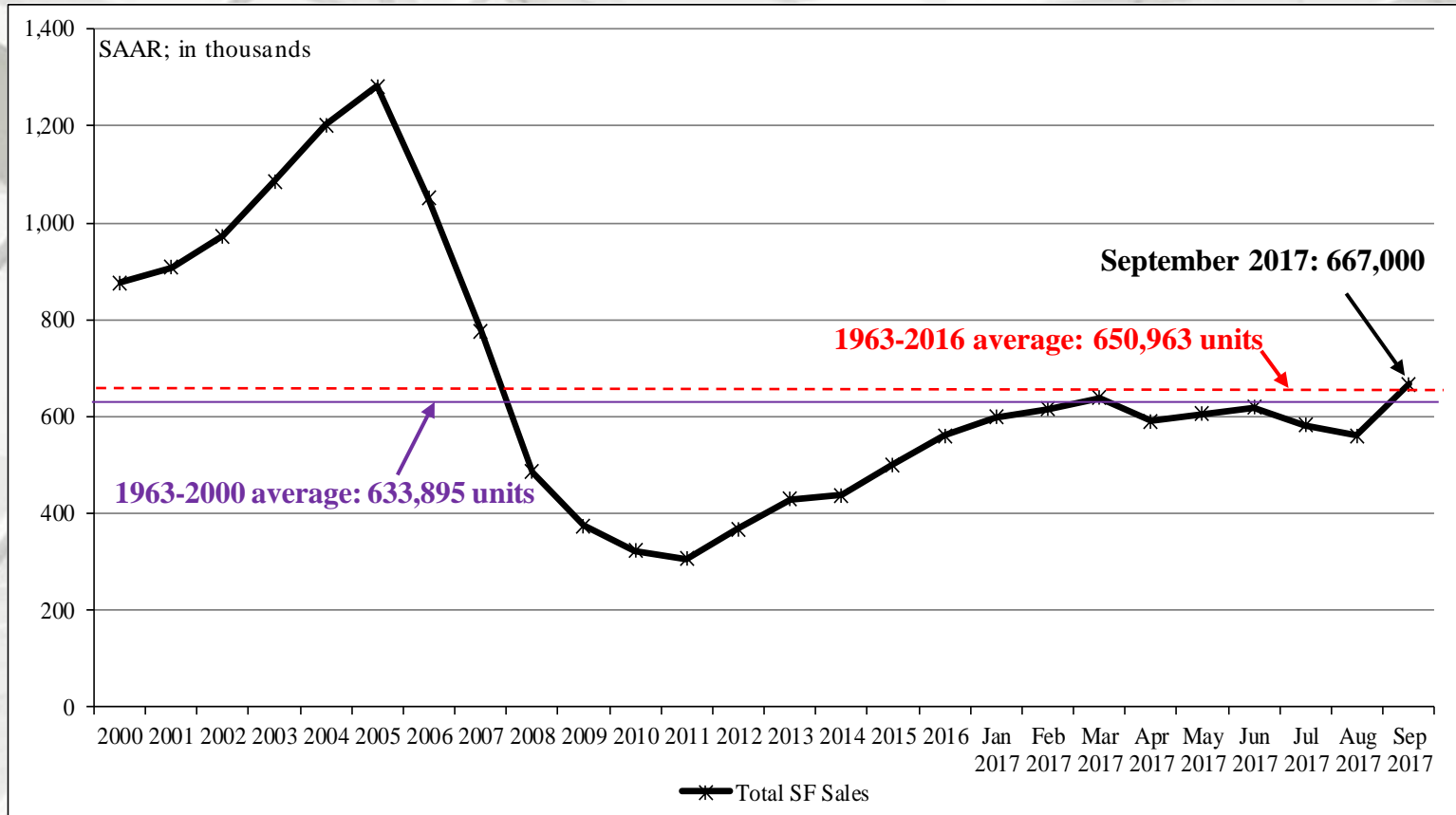
	New SF Sales*	Median Price	Mean Price	Month's Supply
September	667,000	\$319,700	\$385,200	5.0
August	561,000	\$303,800	\$364,300	6.0
2016	570,000	\$314,800	\$366,100	5.1
M/M change	18.9%	5.2%	5.7%	-16.7%
Y/Y change	17.0%	1.6%	5.2%	-2.0%

* All new sales data are presented at a seasonally adjusted annual rate (SAAR)¹ and housing prices are adjusted at irregular intervals².

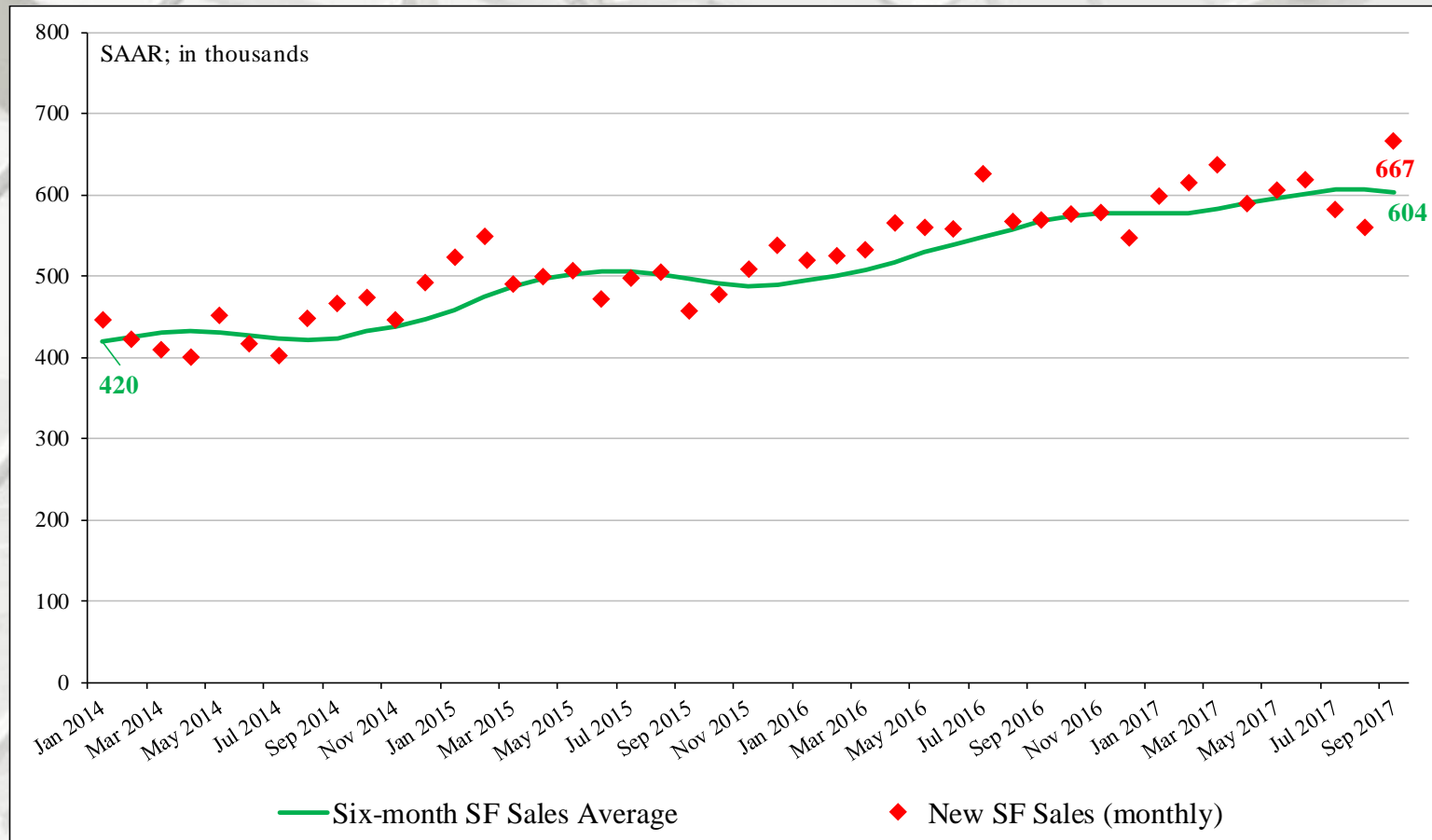
New SF sales were much greater than the consensus forecast (555 m)³, primarily due to extraordinary sales in the South. The past three month's new SF sales data also were revised:

June initial: 614 m revised to 619 m;
 July initial: 580 m revised to 582 m;
 August initial: 560 m revised to 561 m.

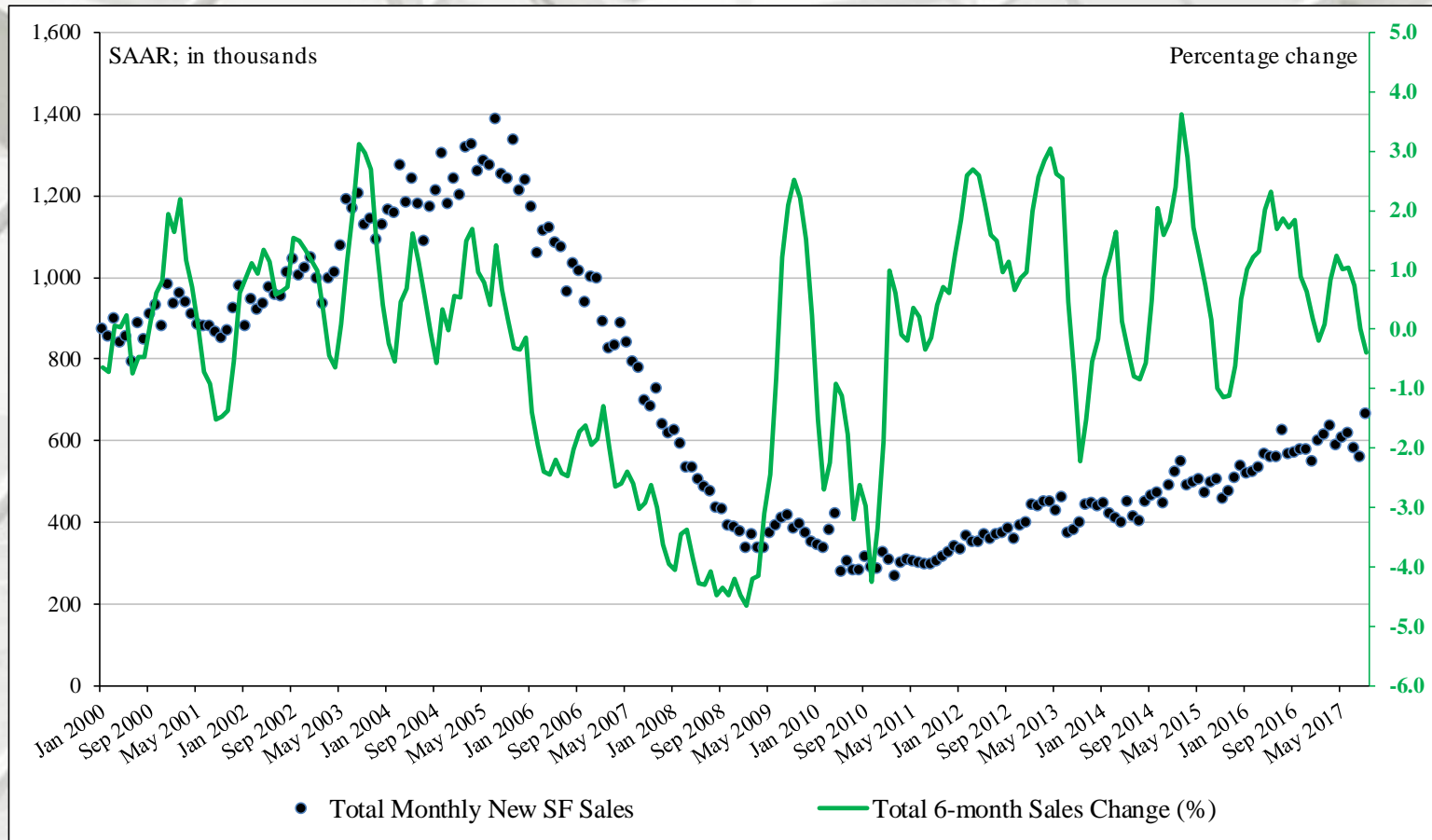
New SF House Sales



New SF Housing Sales: Six-month average & monthly

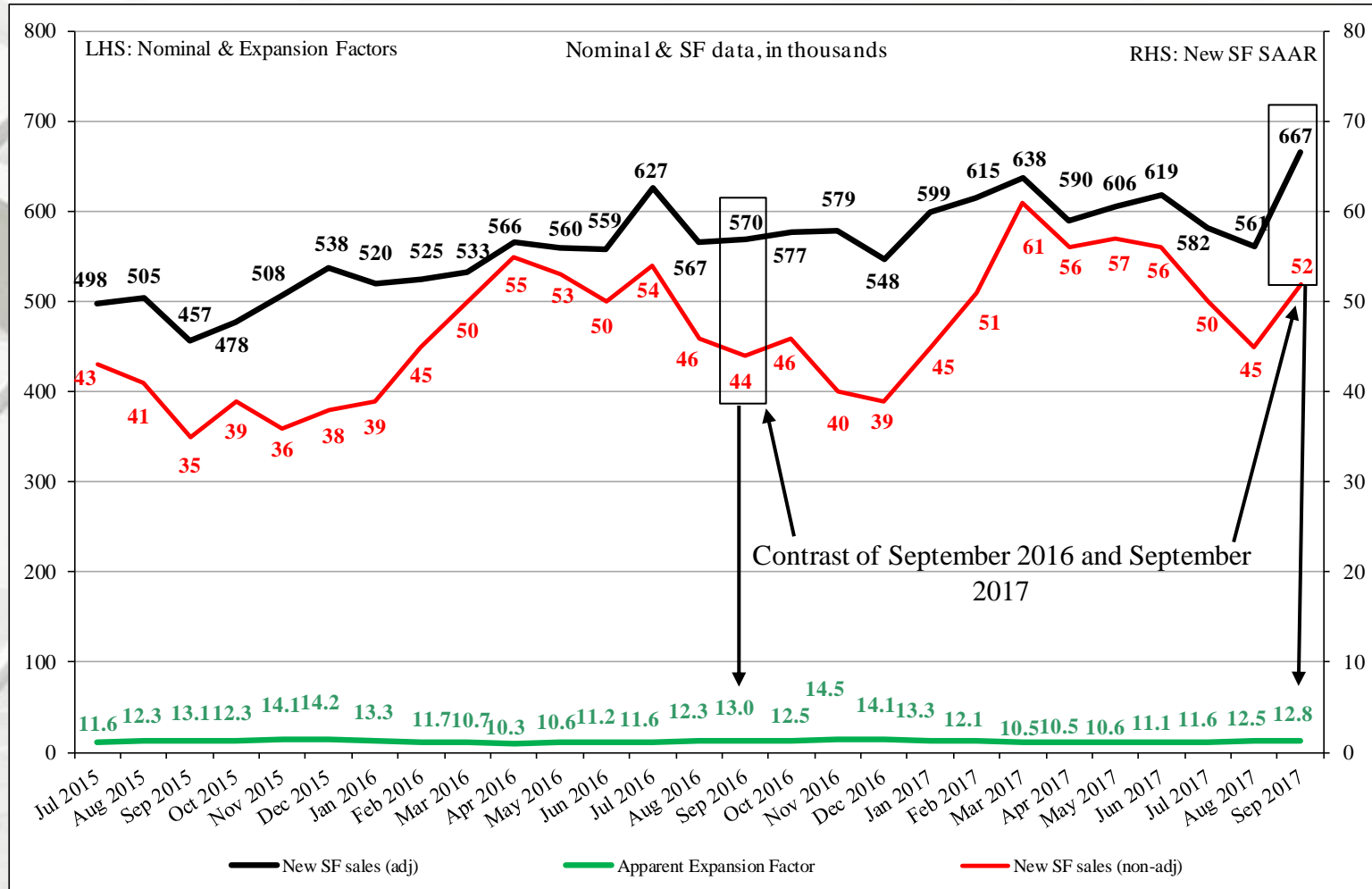


New SF Housing Sales: Monthly Sales & Change



This slide demonstrates the volatility in new SF sales data. Some analysts attribute this to what they regard as a small sample size.

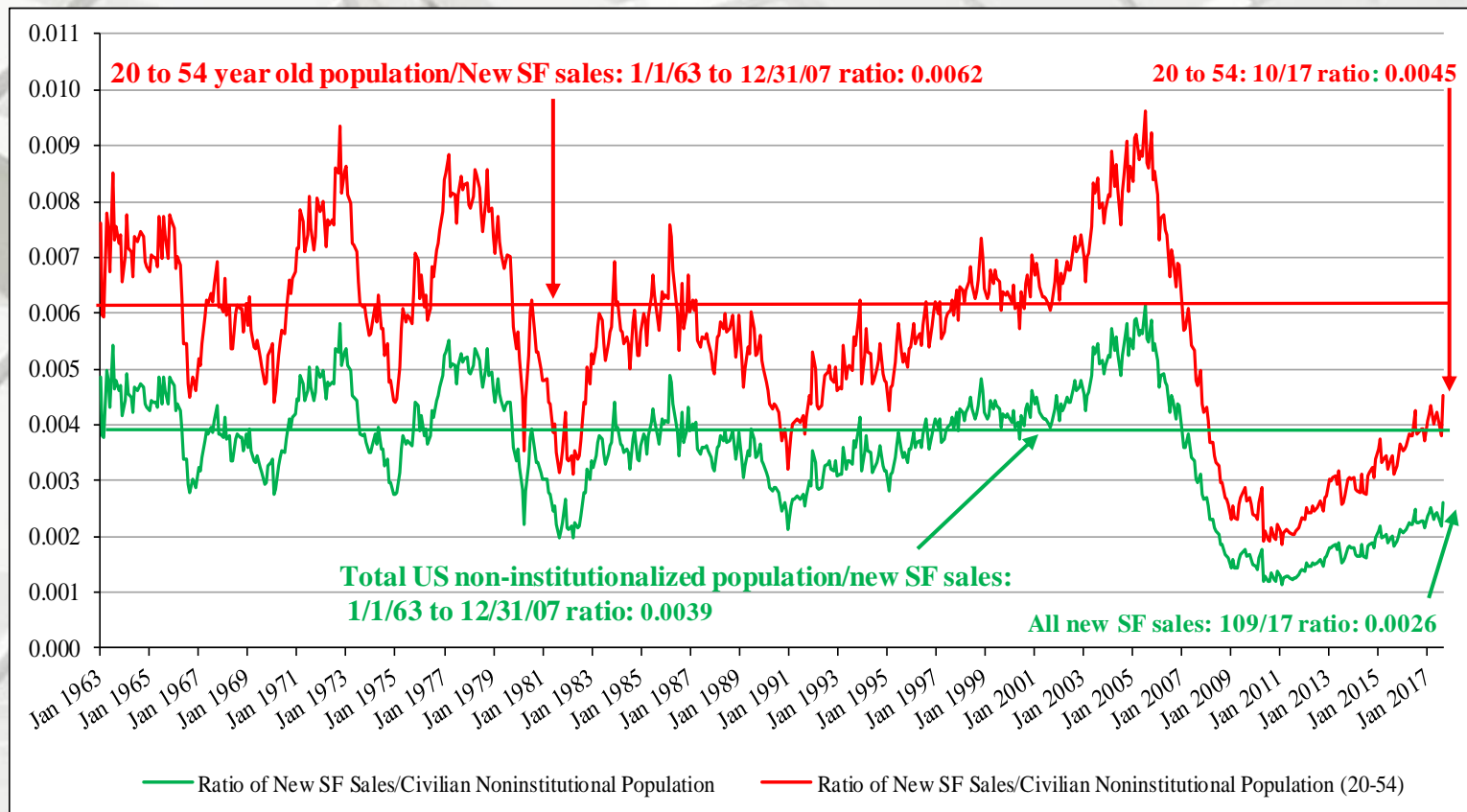
Nominal vs. SAAR New SF House Sales



Nominal and Adjusted New SF Monthly Sales

Presented above is nominal (non-adjusted) new SF sales data contrasted against SAAR data. The apparent expansion factor "... is the ratio of the unadjusted number of houses sold in the US to the seasonally adjusted number of houses sold in the US (i.e., to the sum of the seasonally adjusted values for the four regions)." – U.S. DOC-Construction

New SF House Sales



New SF sales adjusted for the US population

From January 1963 to September 2007, the long-term ratio of new house sales to the total US non-institutionalized population was 0.0039; in September 2017 it was 0.0026 – an increase from August (0.0022). The non-institutionalized population, aged 20 to 54 long-term ratio is 0.0062; in September 2017 it was 0.0045 – also an increase from August (0.0045). All are non-adjusted data. From a population viewpoint, construction is less than what is necessary for changes in population (i.e., under-building).

New SF House Sales by Region and Price Category

	NE SF Sales	MW SF Sales	S SF Sales	W SF Sales
September	48,000	73,000	405,000	141,000
August	36,000	66,000	322,000	137,000
2016	31,000	75,000	329,000	135,000
M/M change	33.3%	10.6%	25.8%	2.9%
Y/Y change	54.8%	-2.7%	23.1%	4.4%

	\$150 - ≤ \$150m	\$200 - \$199.9m 299.9m	\$300 - \$399.9m	\$400 - \$499.9m	\$500 - \$749.9m	≥ \$750m	
September ^{1,2,3,4}	1,000	5,000	16,000	13,000	6,000	7,000	3,000
August	2,000	5,000	14,000	10,000	6,000	5,000	3,000
2016	1,000	6,000	13,000	12,000	6,000	5,000	2,000
M/M change	-50.0%	0.0%	14.3%	30.0%	0.0%	40.0%	0.0%
Y/Y change	0.0%	-16.7%	23.1%	8.3%	0.0%	40.0%	50.0%

¹ All data are SAAR

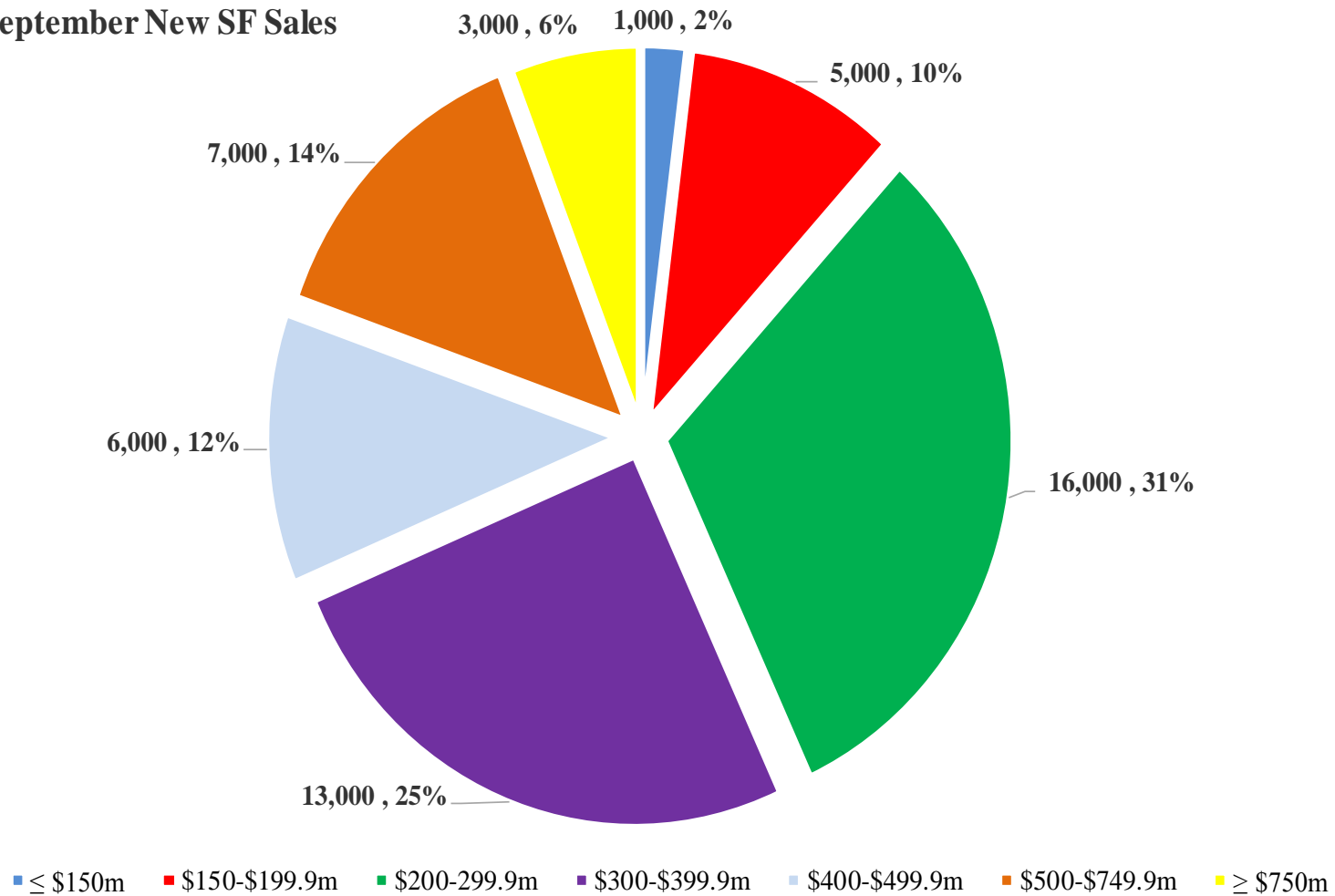
² Houses for which sales price were not reported have been distributed proportionally to those for which sales price was reported;

³ Detail may not add to total because of rounding.

⁴ Housing prices are adjusted at irregular intervals.

New SF House Sales

September New SF Sales



New SF House Sales

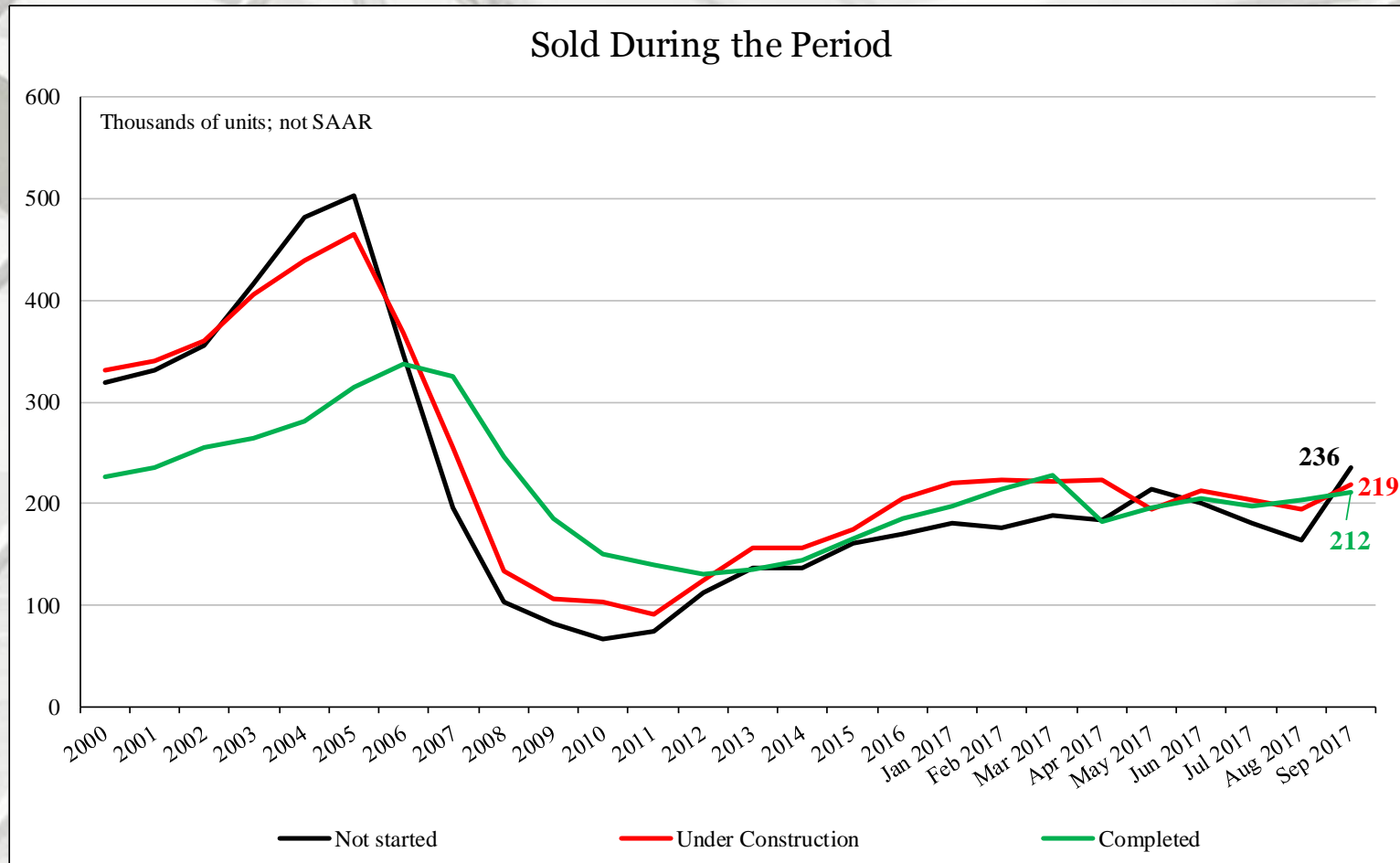
New SF Houses Sold During Period

	Total	Not started	Under Construction	Completed
September	667,000	236,000	219,000	212,000
August	561,000	164,000	194,000	203,000
2016	570,000	180,000	203,000	187,000
M/M change	18.9%	43.9%	12.9%	4.4%
Y/Y change	17.0%	31.1%	7.9%	13.4%
Total percentage		35.4%	32.8%	31.8%

New SF Houses Sold During Period

In September 2017, a substantial portion of new sales – 35.4% – had not been started. Viewing the graph on the following slide, one can see that September new SF sales appears to be an anomaly.

New SF House Sales

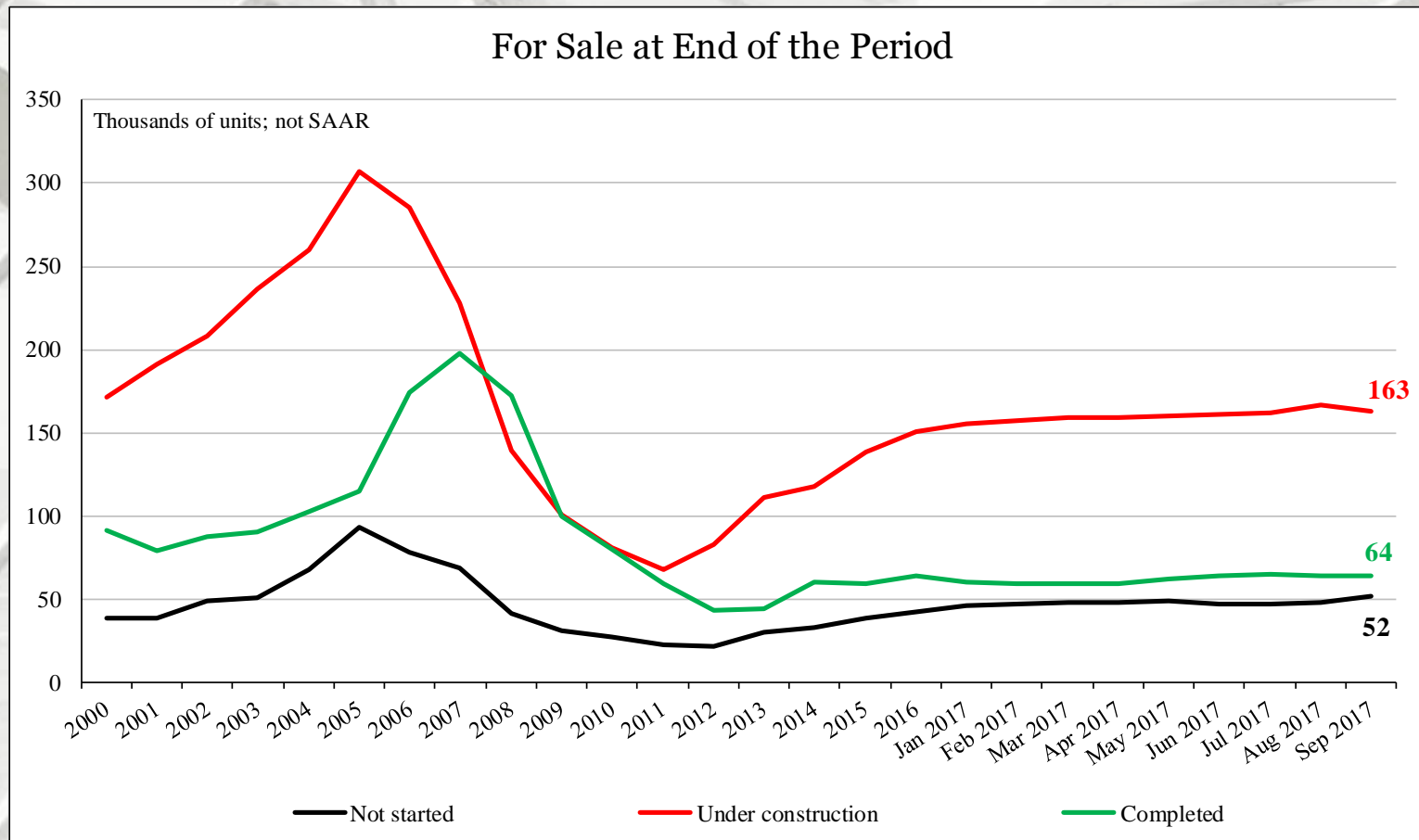


New SF House Sales

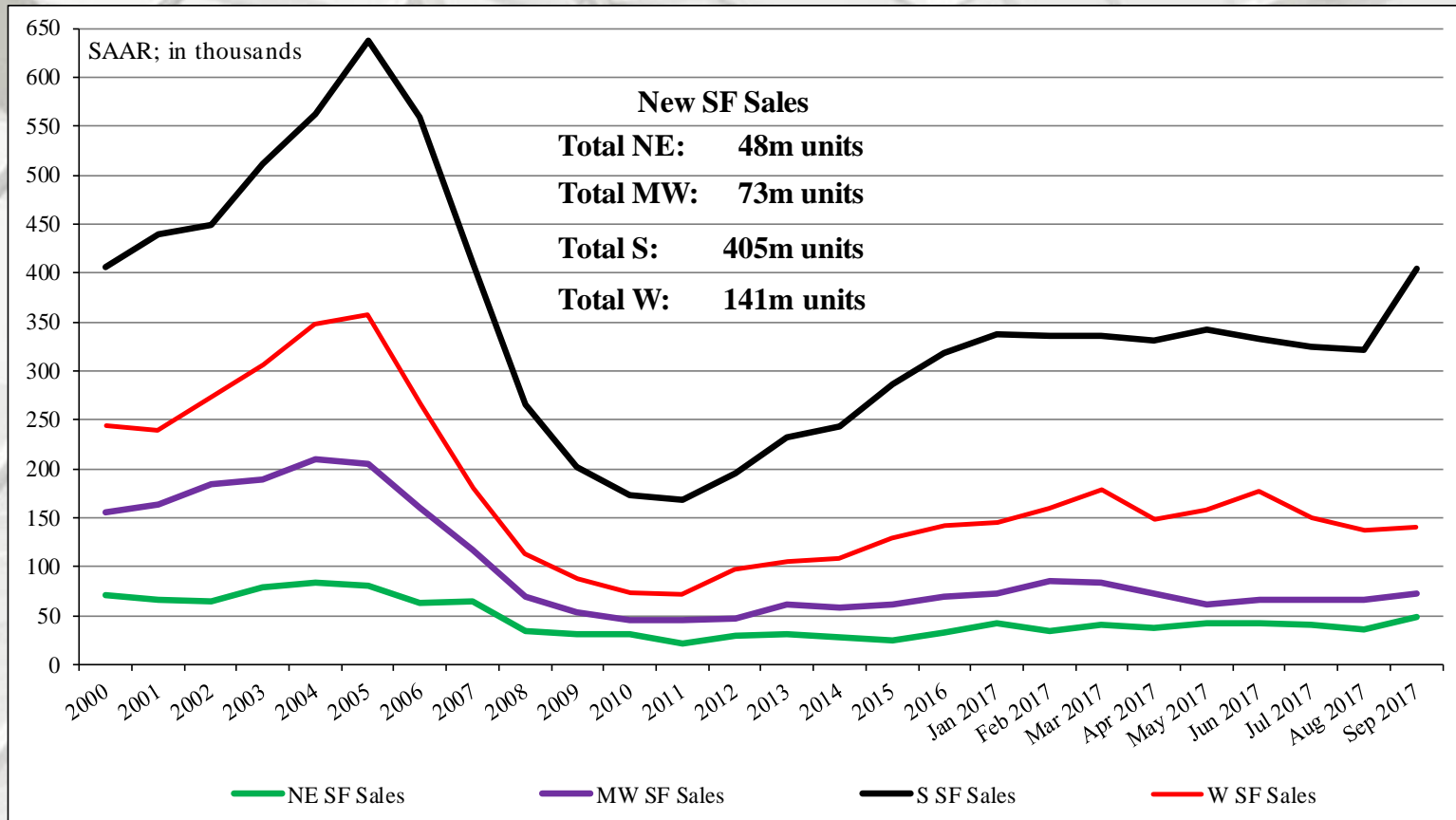
New SF Houses For Sale At The End Of The Period

	Total	Not started	Under Construction	Completed
September	279,000	52,000	163,000	64,000
August	279,000	48,000	167,000	64,000
2016	242,000	40,000	142,000	60,000
M/M change	0.0%	8.3%	-2.4%	0.0%
Y/Y change	15.3%	30.0%	14.8%	6.7%
Total percentage		18.6%	58.4%	22.9%

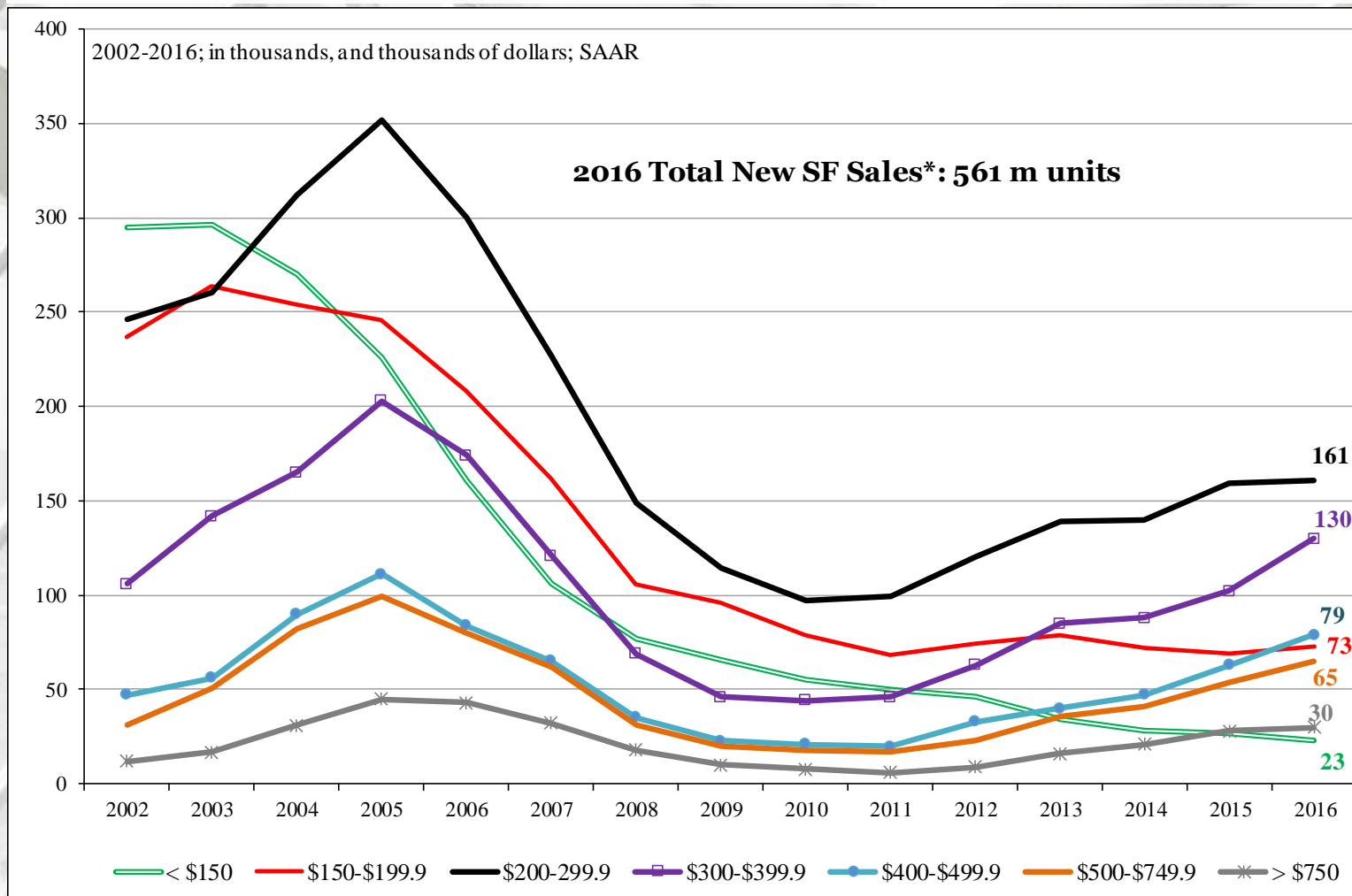
New SF House Sales



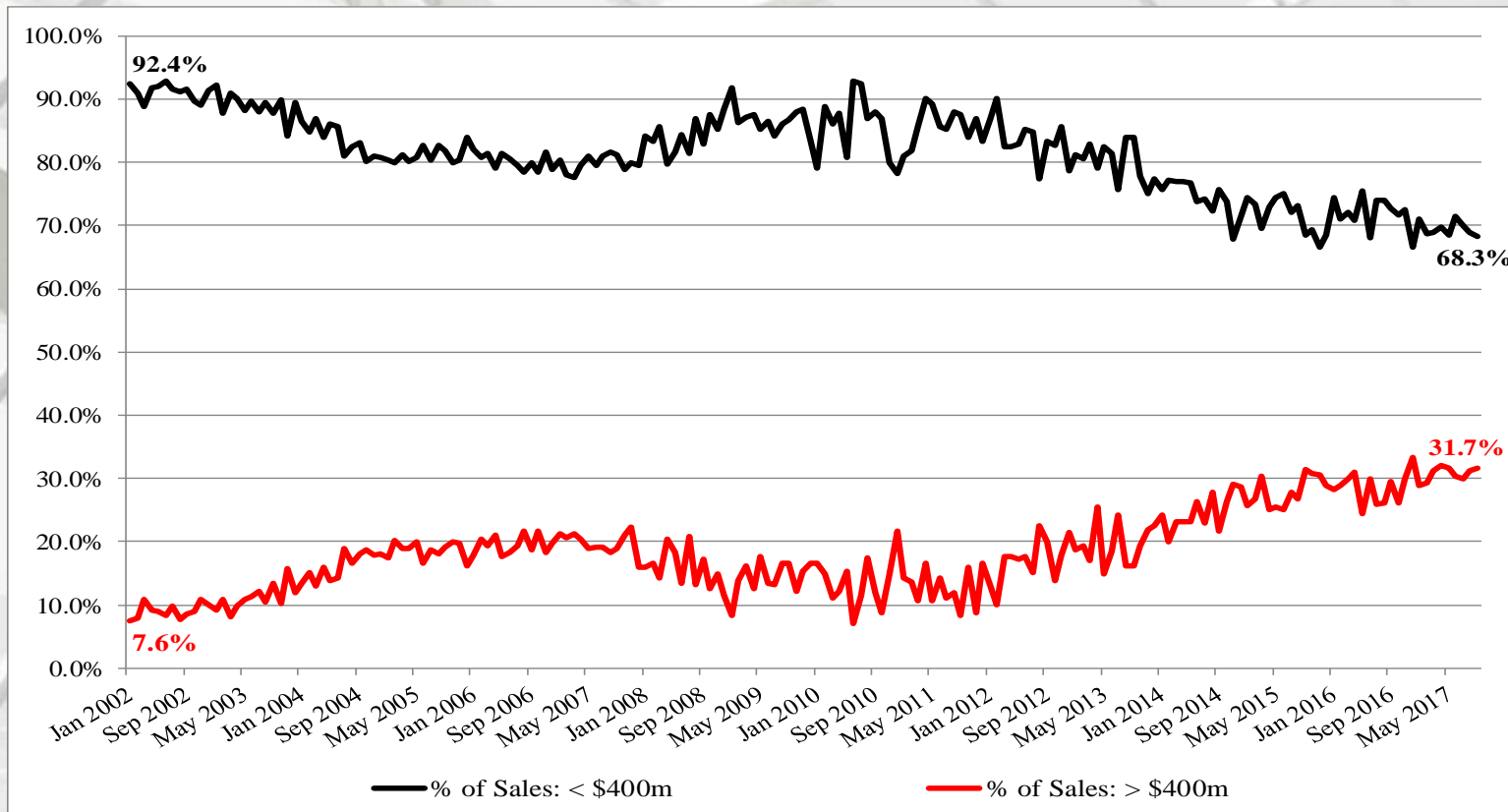
New SF House Sales by Region



New SF House Sales by Price Category



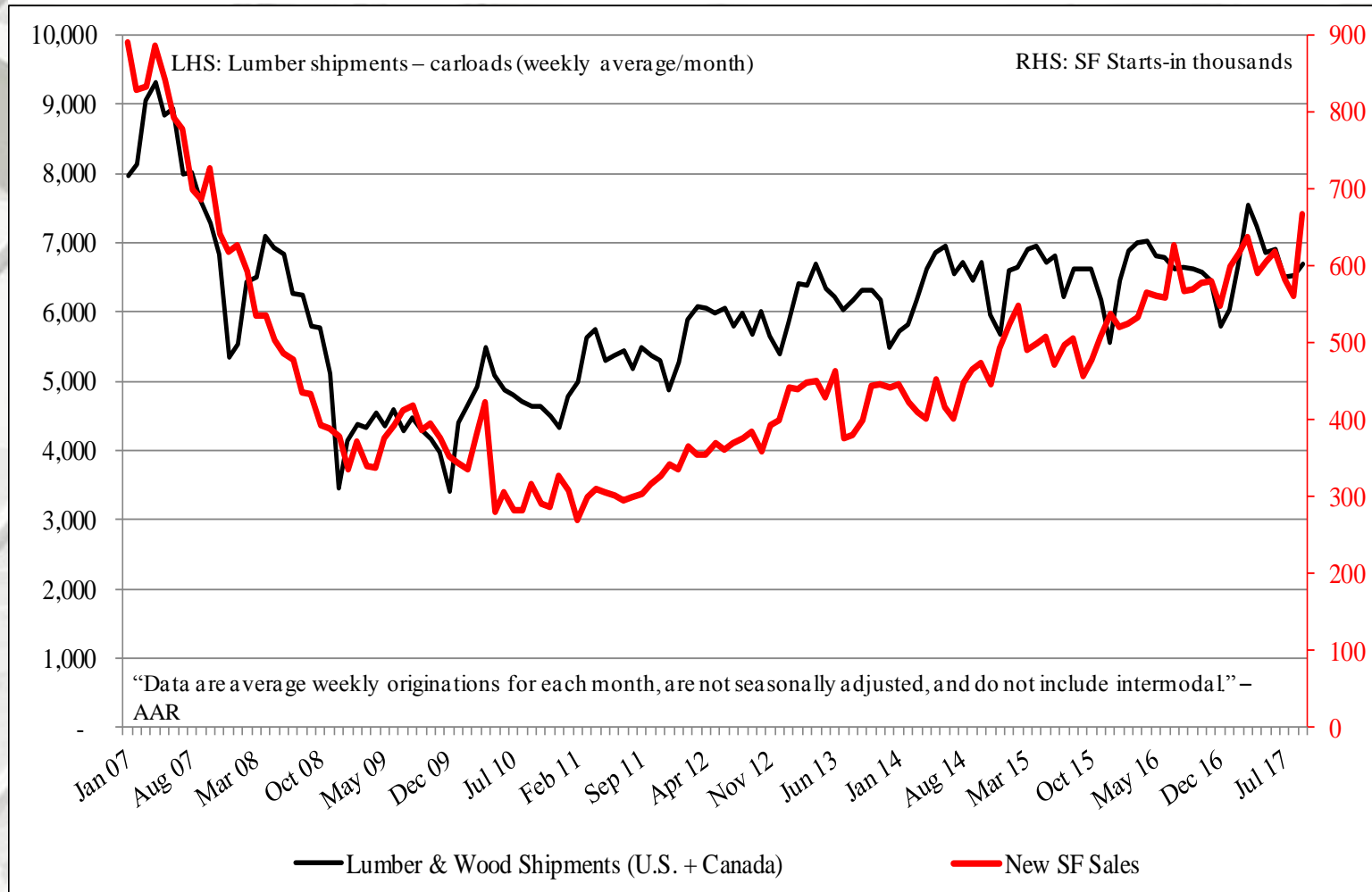
New SF House Sales



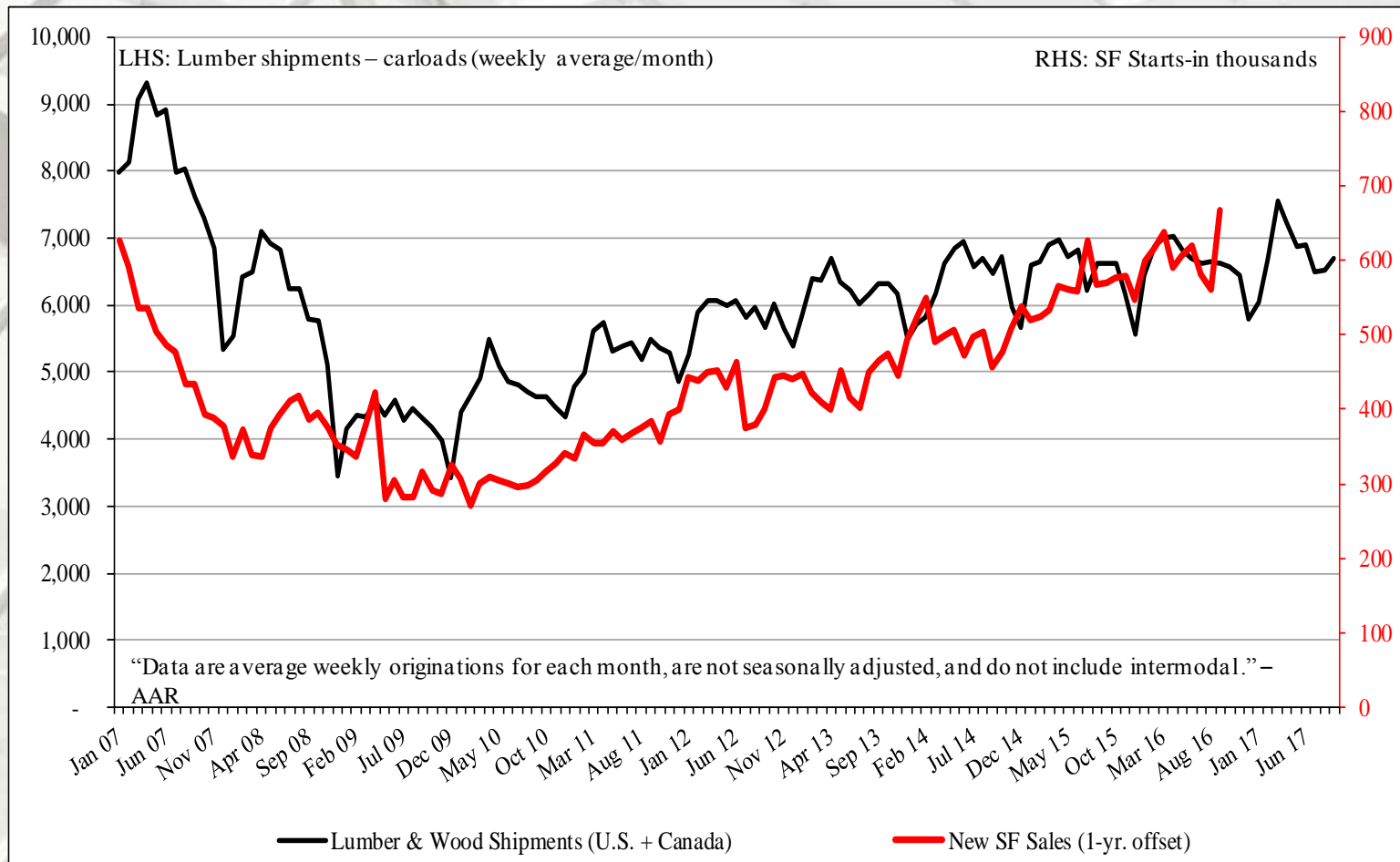
New SF Sales: 2002 – September 2017

The sales share of \$400 thousand plus SF houses is presented above^{1,2}. Since the beginning of 2012, the upper priced houses have and are garnering a greater percentage of sales. The wider the spread, the more high-end luxury homes were sold. Several reasons are offered by industry analysts; 1) builders can realize a profit on higher priced houses; 2) historically low interest rates have indirectly resulted in increasing house prices; and 3) purchasers of upper end houses fared better financially coming out of the Great Recession.

Railroad Lumber & Wood Shipments vs. U.S. New SF House Sales



Railroad Lumber & Wood Shipments vs. U.S. New SF House Sales: 1-year offset



In this graph, initially January 2007 lumber shipments are contrasted with January 2008 new SF sales through September 2017 new SF sales. The purpose is to discover if lumber shipments relate to future new SF house sales. Also, it is realized that lumber and wood products are trucked; however, to our knowledge comprehensive trucking data is not available.

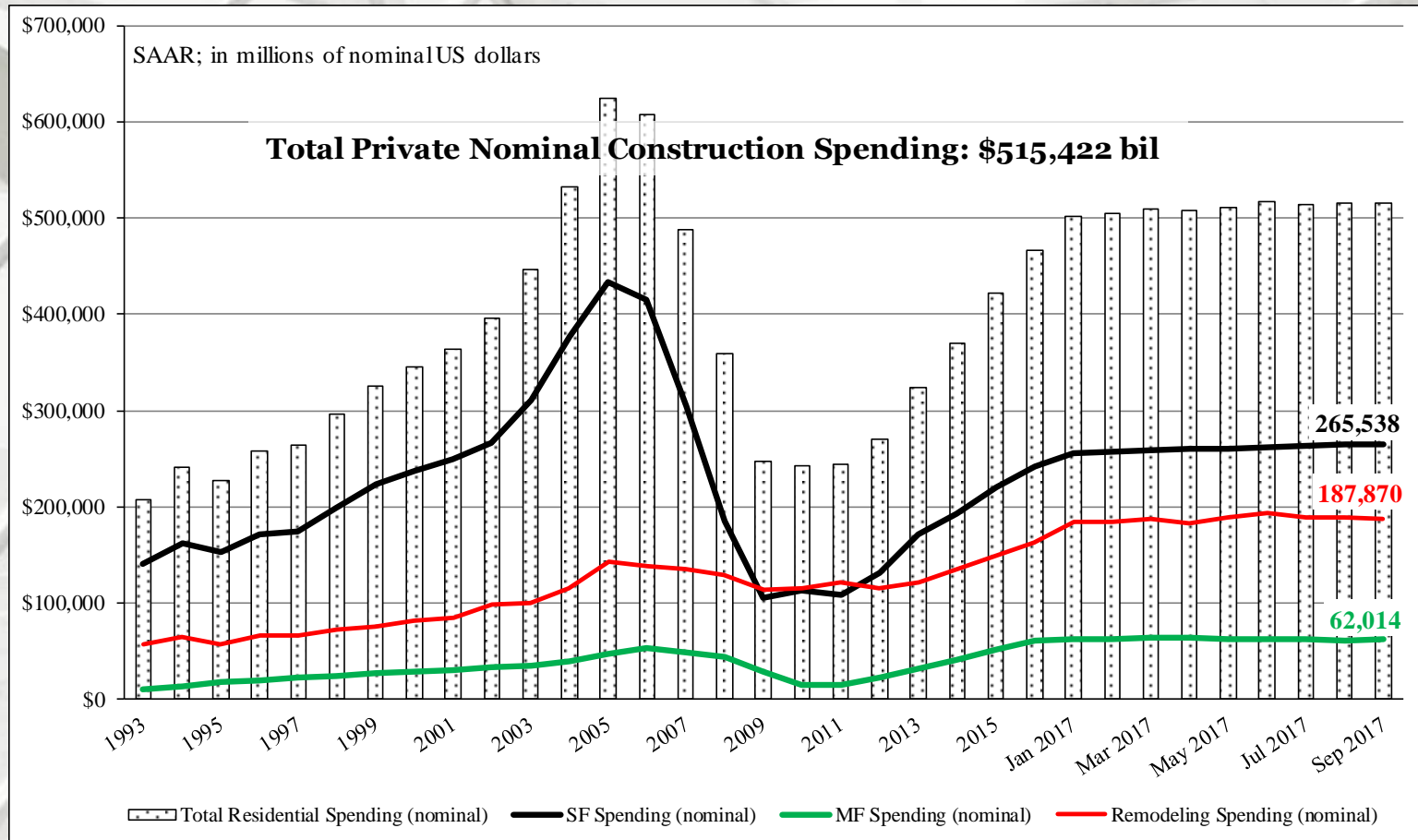
September 2017 Construction Spending

	Total Private Residential*	SF	MF	Improvement**
September	\$515,422	\$265,538	\$62,014	\$187,870
August	\$515,612	\$265,030	\$61,637	\$188,945
2016	\$470,108	\$237,207	\$61,488	\$171,413
M/M change	0.0%	0.2%	0.6%	-0.6%
Y/Y change	9.6%	11.9%	0.9%	9.6%

* Millions

** The US DOC does not report improvement spending directly, this is a monthly estimation for 2017:
((Total Private Spending – (SF spending + MF spending)).
All data are SAARs and reported in nominal US\$.

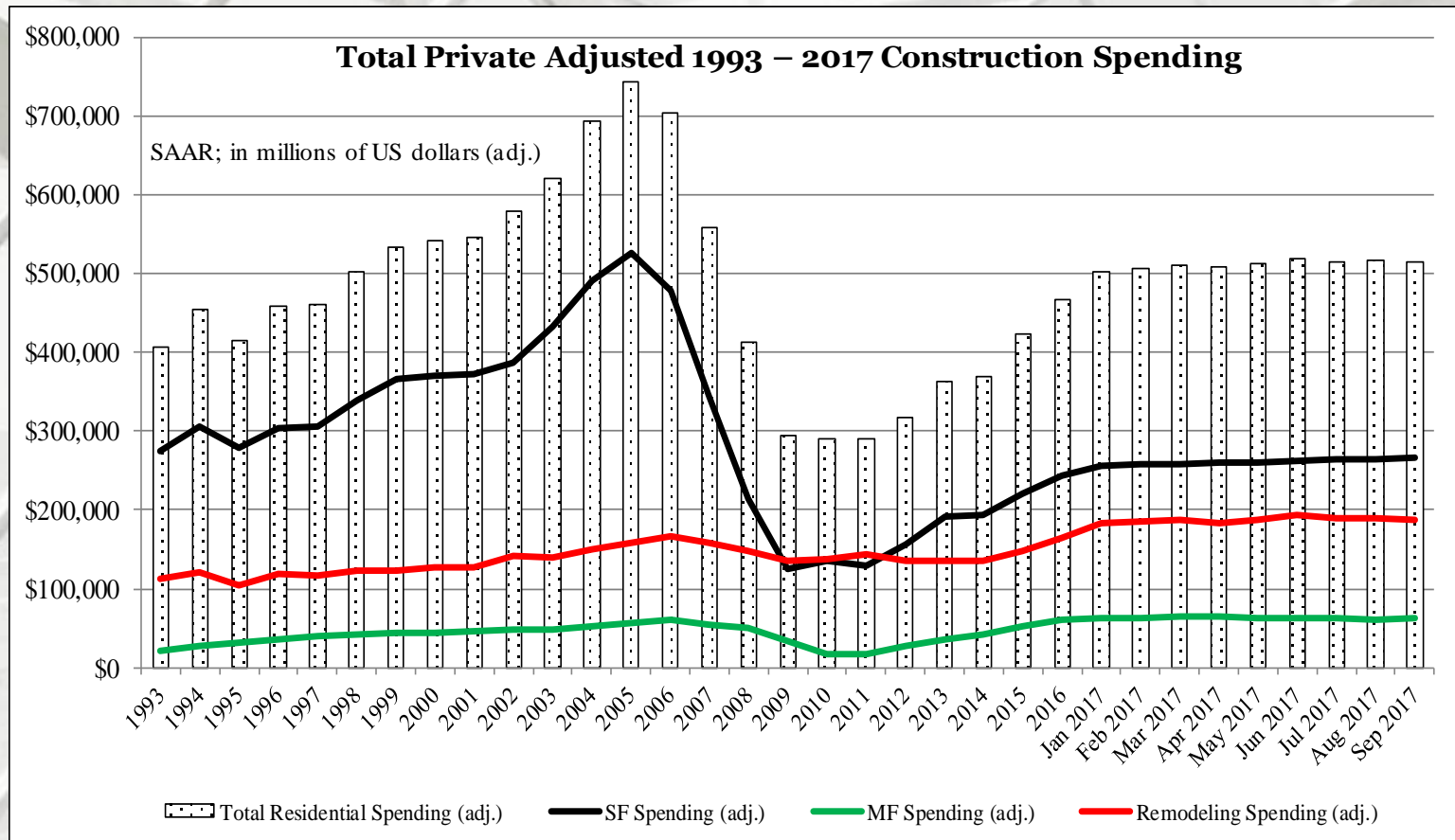
Total Construction Spending (nominal): 1993 – September 2017



Reported in nominal US\$.

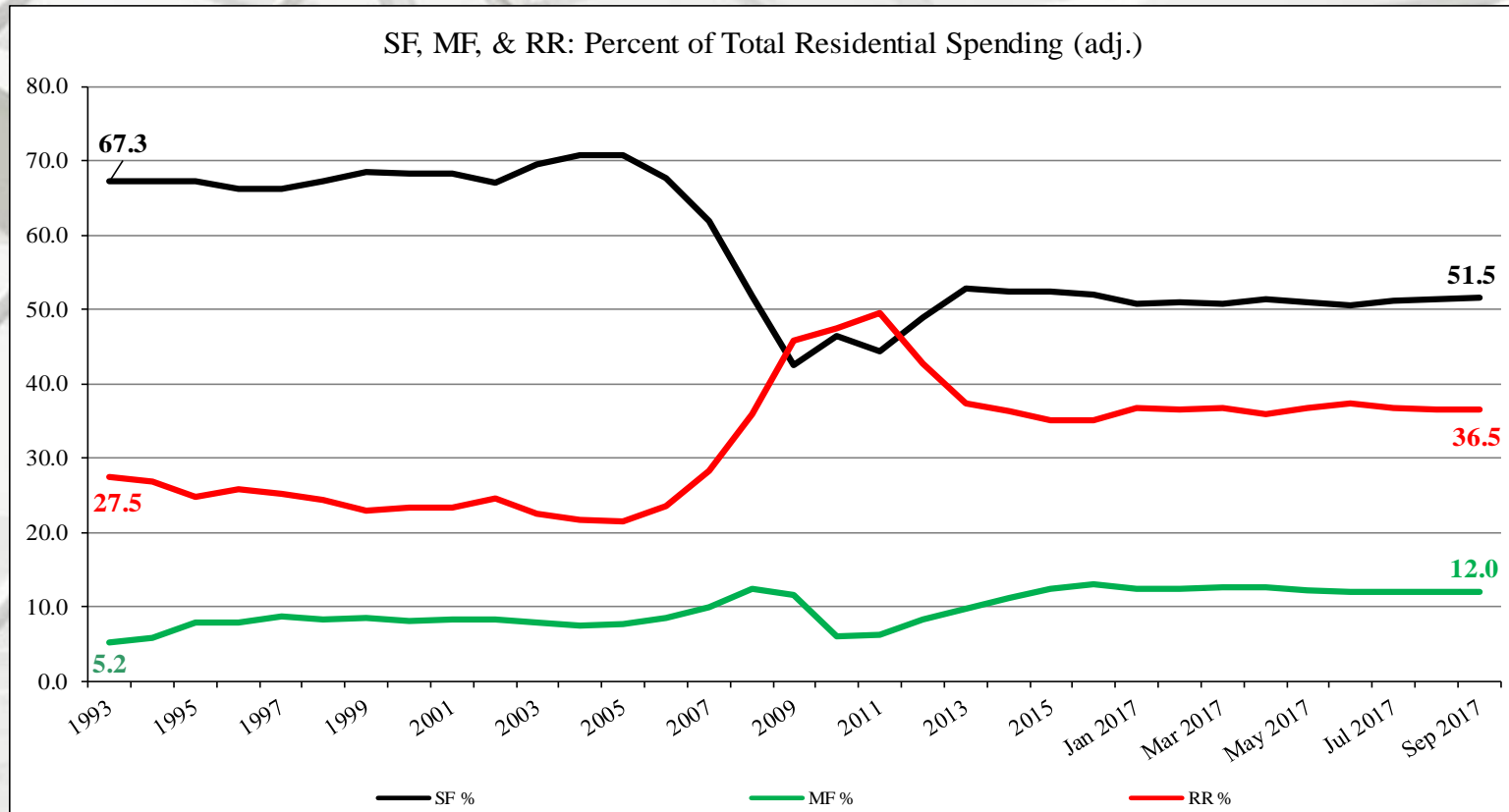
The US DOC does not report improvement spending directly, this is a monthly estimation for 2017.

Total Construction Spending (adjusted): 1993-2017*



Reported in adjusted US\$: 1993 – 2016 (adjusted for inflation, BEA Table 1.1.9); *January-September 2017 reported in nominal US\$.

Construction Spending Shares: 1993 to September 2017



Total Residential Spending: 1993 through 2006

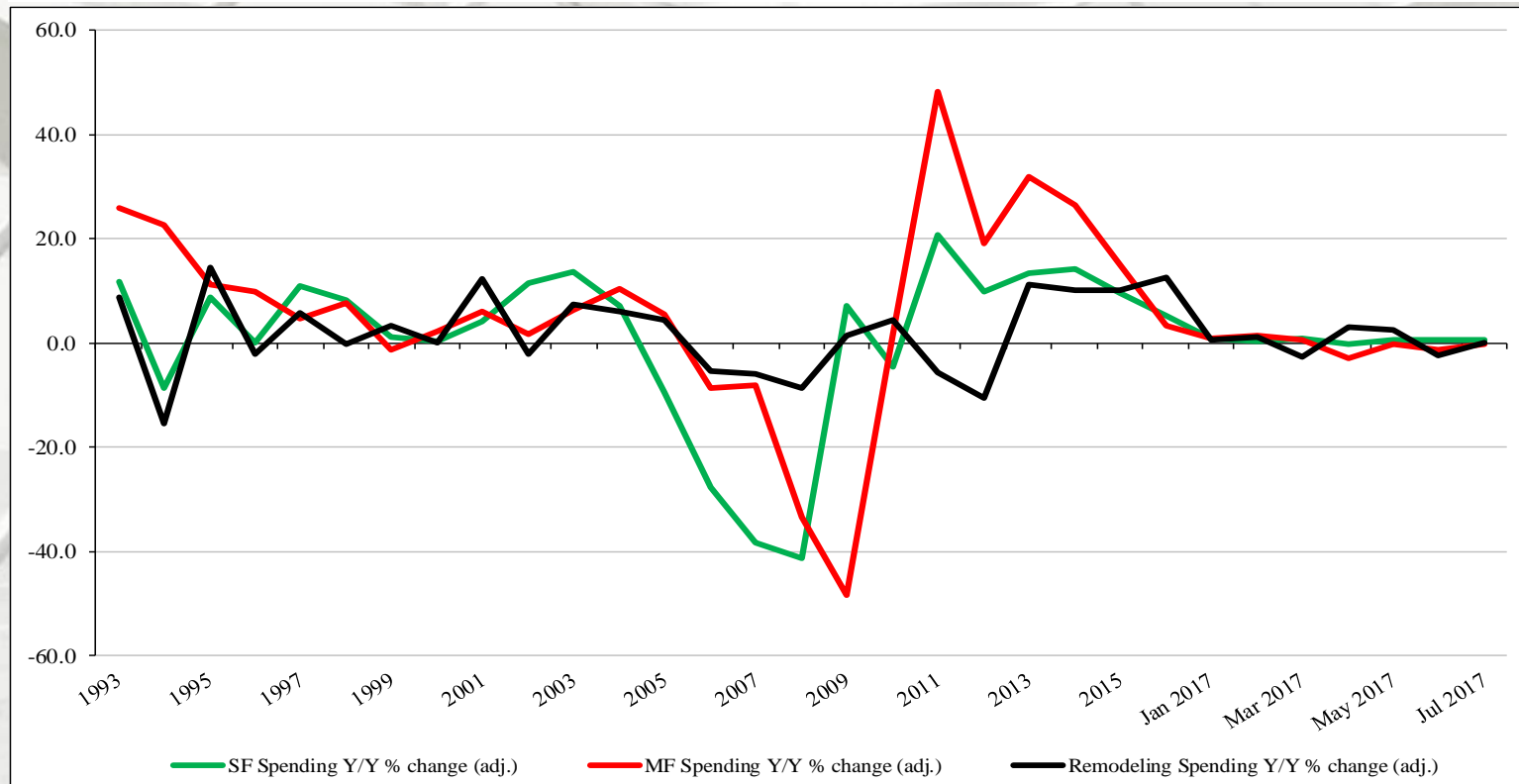
SF spending average: 69.2%

MF spending average: 7.5 %

Residential remodeling (RR) spending average: 23.3 % (SAAR).

Note: 1993 to 2016 (adjusted for inflation, BEA Table 1.1.9); January-September 2017 reported in nominal US\$.

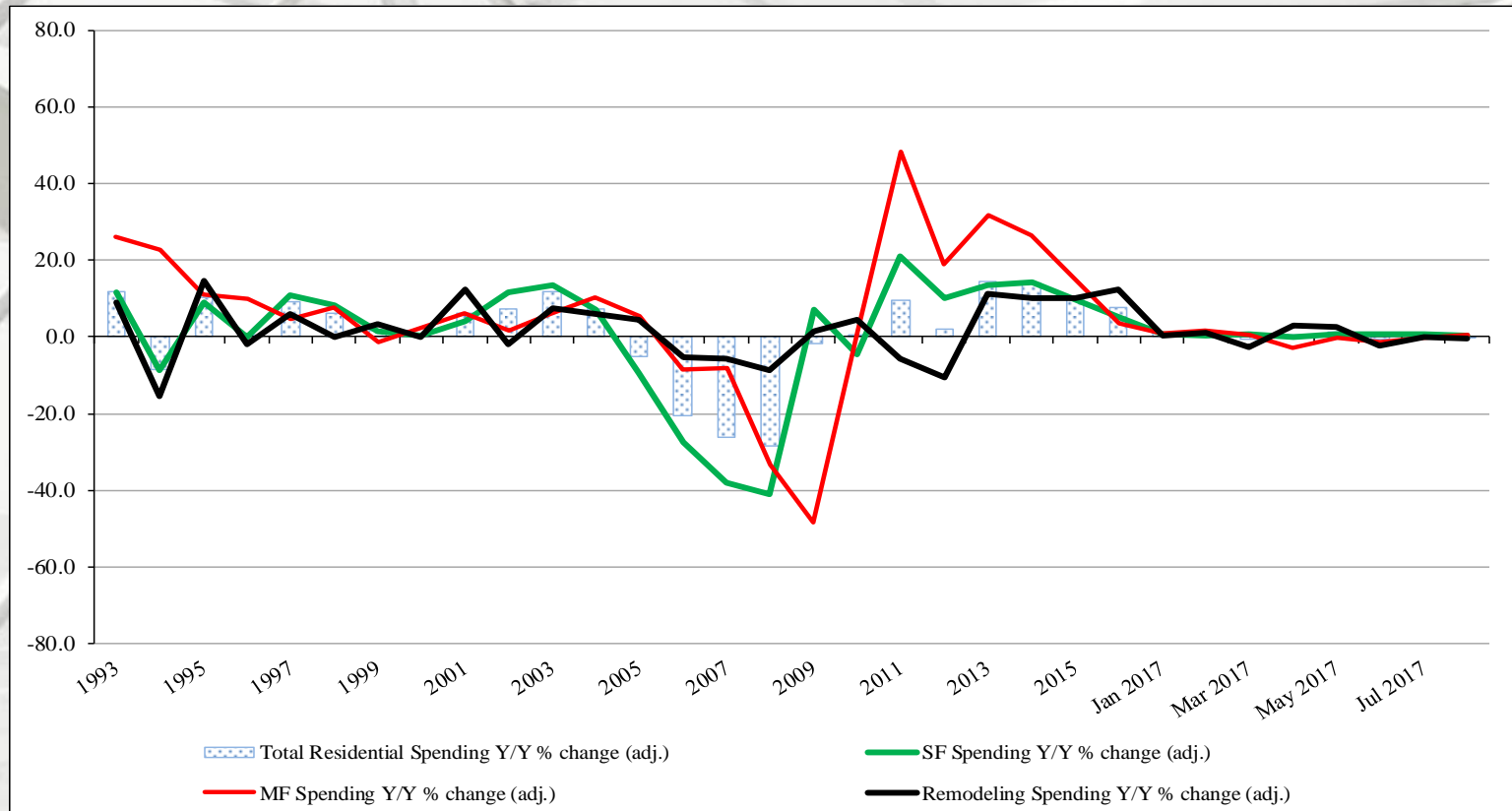
Adjusted Construction Spending: Y/Y Percentage Change, 1993 to September 2017



Residential Construction Spending: Percentage Change, 1993 to September 2017

Presented above is the percentage change of inflation adjusted Y/Y construction spending (1993-2016). Since mid-2015 – MF and RR spending are in an apparent flat-line trend.

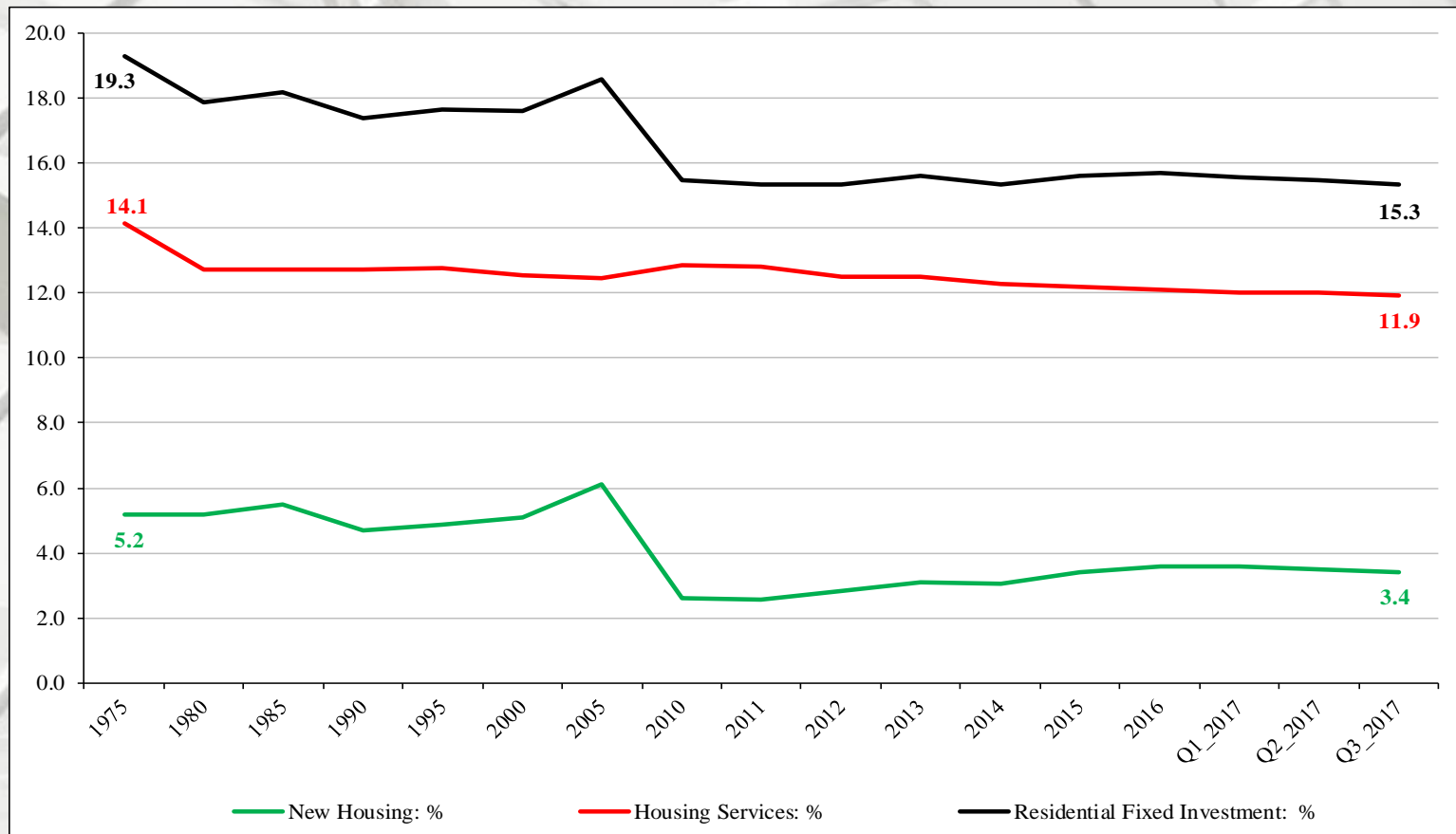
Total Adjusted Construction Spending: Y/Y Percentage Change, 1993 to September 2017



Residential Construction Spending: Percentage Change, 1993 to September 2017

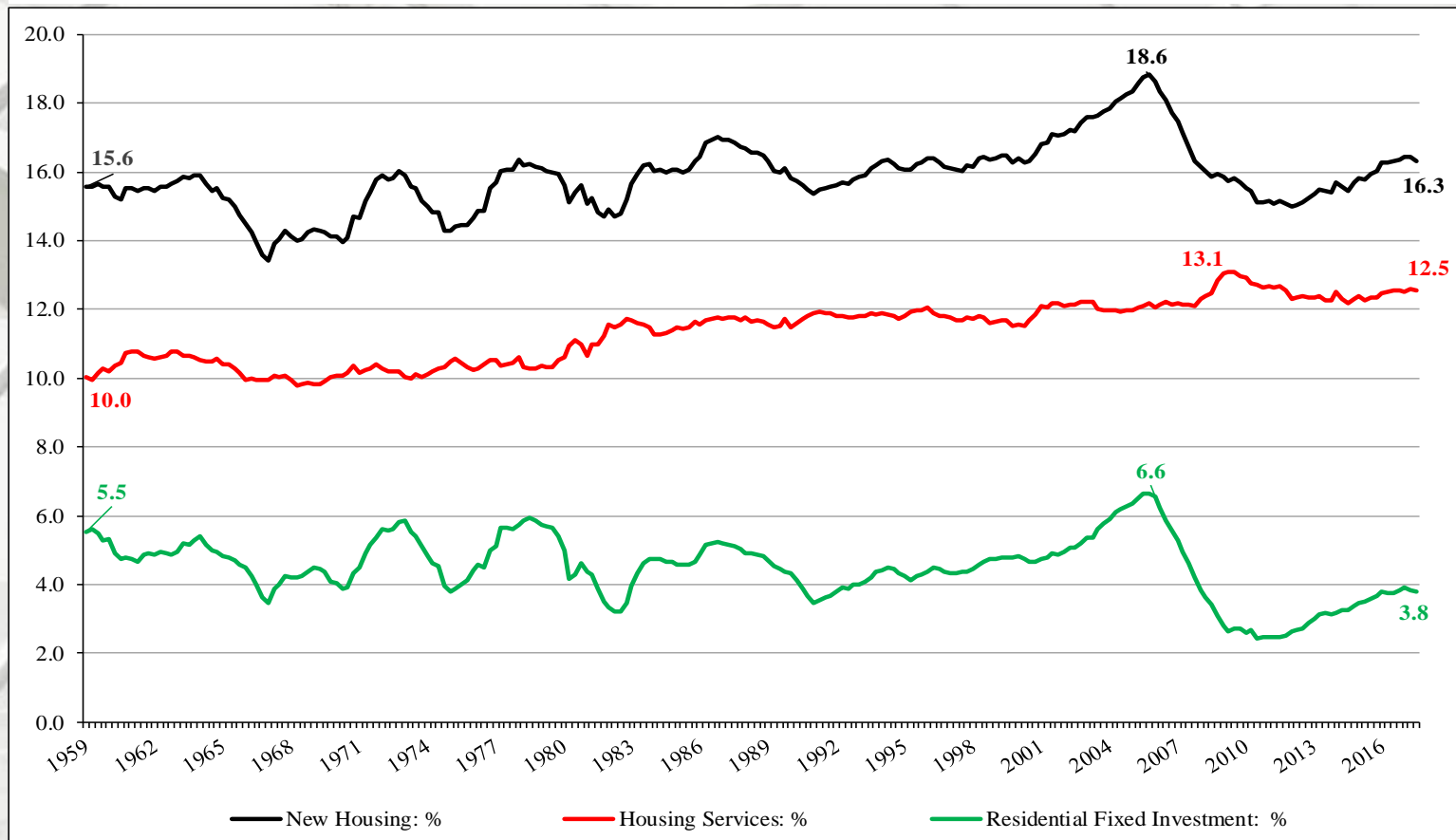
The questions remain: Is construction spending normalizing? Has housing stalled? Or, are there alternative explanations? The percentage change in construction spending has been flat and/or declining since the beginning of 2017.

Housing's Contribution to GDP



Housing services (HS) and residential fixed investment (RFI) both declined by 0.1 percent from Q2 to Q3; thus the overall contribution to GDP decreased by 0.2 percent (chained dollars). “HS: Market-oriented household activities, such as sole proprietorships and rental of tenant-occupied housing and RFI: Component of gross private fixed investment that covers all private residential structures and residential equipment. Chained (2009) dollar series are calculated as the product of the chain-type quantity index and the 2009 current-dollar value of the corresponding series, divided by 100.” – U.S. Bureau of Economic Analysis. New housing percentage = HS + RFI.

Housing's Contribution to GDP



HS and RFI both declined by 0.1 percent from Q2 to Q3; thus the overall contribution decreased by 0.2 percent in SAAR dollars. “SAAR: Statistical adjustment of a time series that removes the average effect of variations that normally occur at about the same time and in about the same magnitude each year – for example, the effects of weather or of holidays. After seasonal adjustment, trends, business cycles, and other movements in the time series stand out more clearly.” – U.S. Bureau of Economic Analysis

Remodeling

Business Confidence High and Q4 Expectations Strong for Home Renovation Professionals, Houzz Study Finds

Labor shortages driving cost increases and project delays for homeowners; Study also surfaces impact of Hurricanes Harvey and Irma on local renovators

“[Houzz Inc.](#), the leading platform for home remodeling and design, today released the Q3 2017 Houzz Renovation Barometer, which tracks confidence in the home renovation market among industry professionals. The Q3 2017 Barometer reflected high quarter-over-quarter confidence for all industry sectors including architects, designers, general contractors (GCs)/remodelers, design-build, specialty building/renovation and specialty landscape/outdoor, with readings of 62* or higher. Expectations for Q4 are strong across all sectors.

Coupled with this positive business outlook are persistent labor shortages, as reported by 78 percent of GCs, remodelers and design-build firms. For homeowners, this translates to higher costs and longer project timelines. Fifty-six percent of renovation firms report increasing costs of subcontractors in Q3 2017 (versus 53 percent in Q3 2016) and 54 percent report increasing project lengths (versus 50 percent in Q3 2016) due to labor shortages.

The Houzz Renovation Barometer Backlog Index increased slightly from Q2 2017 to Q3 2017, with project backlogs of five to eight weeks on average across sectors, reflecting significant wait times before companies can take on new projects. General contractors (GCs), remodelers and design-build companies have the longest average backlogs (7.1 and 7.7 weeks, respectively).” – Houzz

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“

Hurricane Impact

Given the recent severe impact of hurricanes Harvey and Irma in the Houston metropolitan area and Southwestern Florida, Houzz took a deeper look at conditions among renovation professionals in these areas.

Within the first two weeks of landfall, the hurricanes caused 28 percent of renovation-related businesses in the Houston metropolitan area and 41 percent in Southwestern Florida to suspend business operations in these areas. Among companies that suspended operations, 91 percent of those impacted by Hurricane Harvey kept their doors closed for a week or longer, and 65 percent of those affected by Hurricane Irma.

The hurricanes also exacerbated labor shortages across the region and increased project backlogs by nearly two weeks, on average. Top business challenges exacerbated by the hurricane disruptions are the shortage of subcontractors (38 percent for both Irma and Harvey-stricken areas), managing cost-concerned consumers (23 and 46 percent, respectively), and managing consumer expectations (23 and 31 percent, respectively). A shortage of products and/or materials is also a top challenge for many (23 and 15 percent, respectively).

Renovation-related companies estimate the average total cost of repairs and renovations to homeowners to be \$13K for the hardest Irma-stricken areas, and a staggering \$111K for the hardest Harvey-stricken areas.” – Houzz

Remodeling

Business Confidence High and Q4 Expectations Strong for Home Renovation Professionals, Houzz Study Finds

Labor shortages driving cost increases and project delays for homeowners; Study also surfaces impact of Hurricanes Harvey and Irma on local renovators

“The Barometer posted year-over-year readings of 67 to 75 in the third quarter of 2017, indicating high optimism in continued year-over-year gains in the home renovation market. These scores are in line with Q2 2017 scores (65 to 78). The year-over-year scores for architects increased from 65 in Q2 to 67 in Q3 and are now at the highest level since Q2 2016.” – Houzz

“Residential renovation and design professionals report another strong quarter of new business activity and a very positive outlook in the near term. That said, widespread skilled labor shortages leave little wiggle room for businesses to absorb sudden demand pressures such as recent hurricanes in the South or more localized damage from wildfires in the West, driving up wait times.” – Nino Sitchinava, Principal Economist, Houzz

Remodeling

Initial Two-Week Hurricane Impact on Business Operations



Remodeling

Growing Momentum Expected for Remodeling Spending

“Accelerating growth in residential improvement and repair expenditures is anticipated through the third quarter of 2018, according to our latest [Leading Indicator of Remodeling Activity \(LIRA\)](#). The LIRA projects that annual gains in home renovation and repair spending will increase from 6.3 percent in the fourth quarter of 2017 to 7.7 percent by the third quarter of next year.

Recent strengthening of the US economy, tight for-sale housing inventories, and healthy home equity gains are all working to boost home improvement activity. Over the coming year, owners are projected to spend in excess of \$330 billion on home upgrades and replacements, as well as routine maintenance.

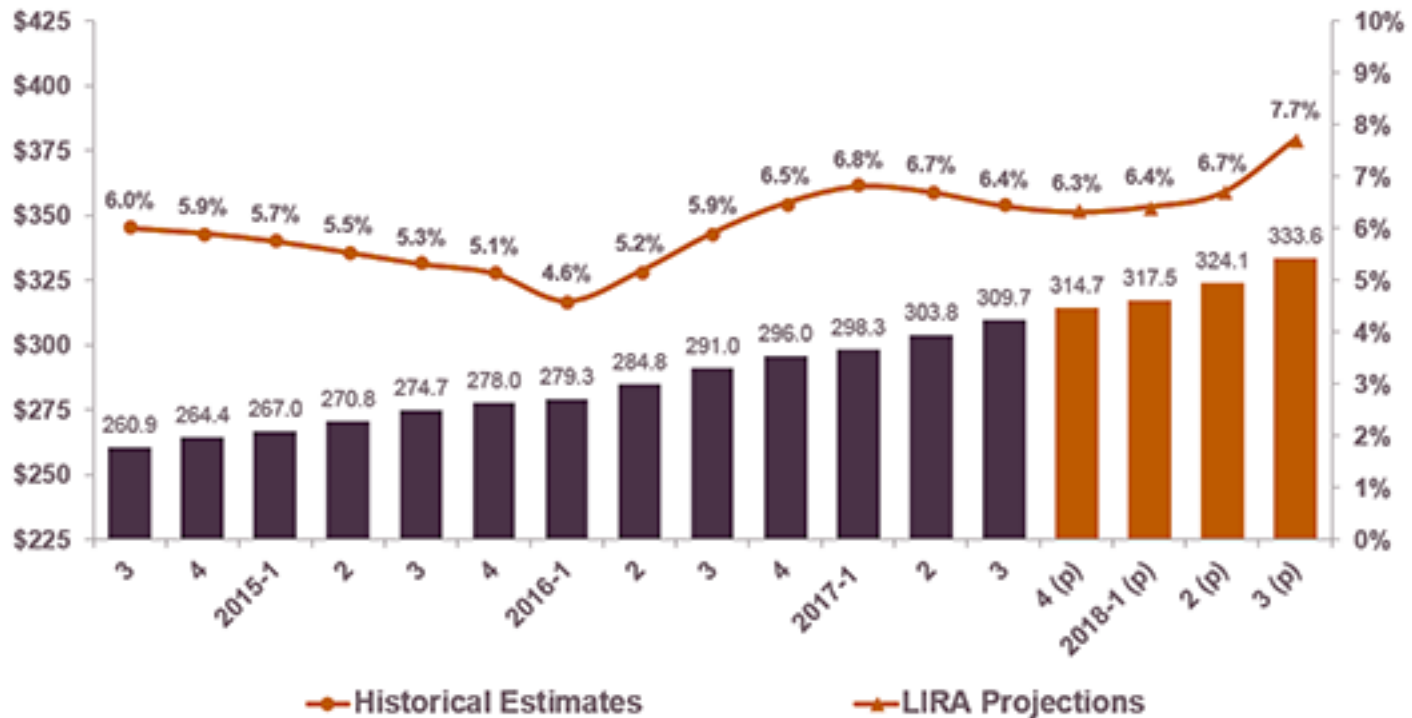
And while it’s too early for our LIRA model to capture the effects of recent hurricanes and other natural disasters experienced around the country, there is certainly potential for even stronger growth in remodeling next year as major reconstruction and repairs get underway in affected regions.” – Abbe Will, Research Associate, Harvard Joint Center for Housing Studies

Remodeling

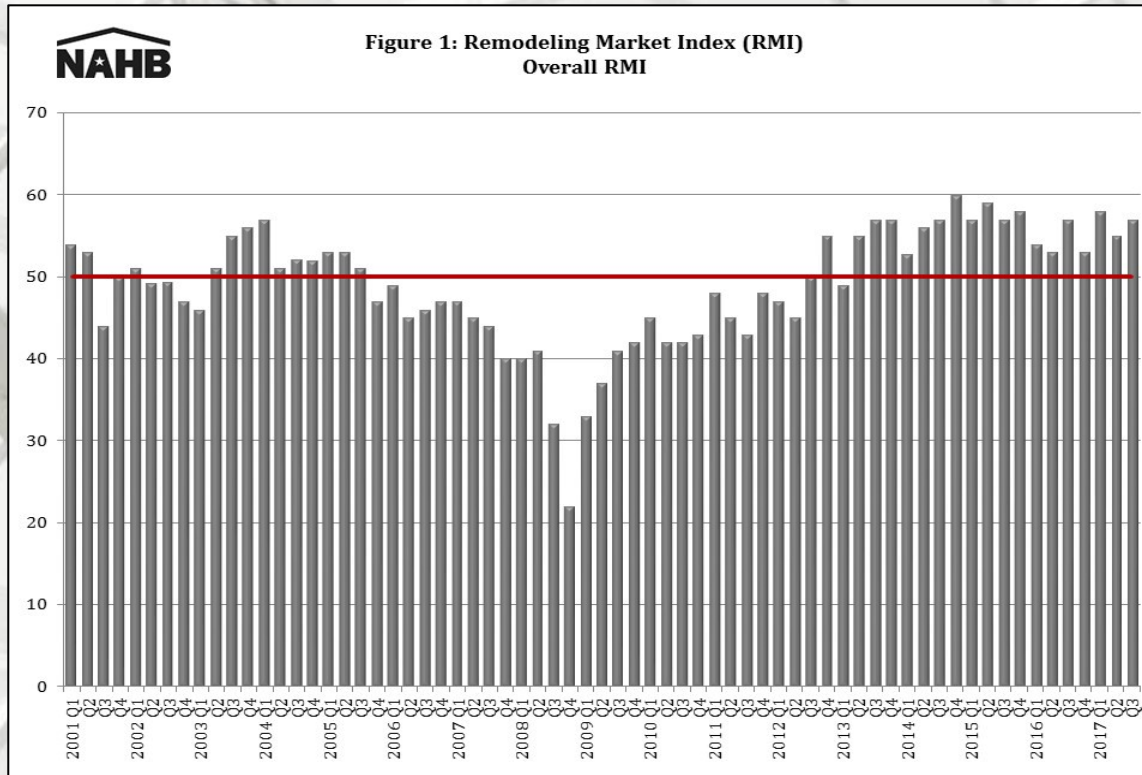
Leading Indicator of Remodeling Activity – Third Quarter 2017

Homeowner Improvements & Repairs
Four-Quarter Moving Totals
Billions

Four-Quarter Moving
Rate of Change



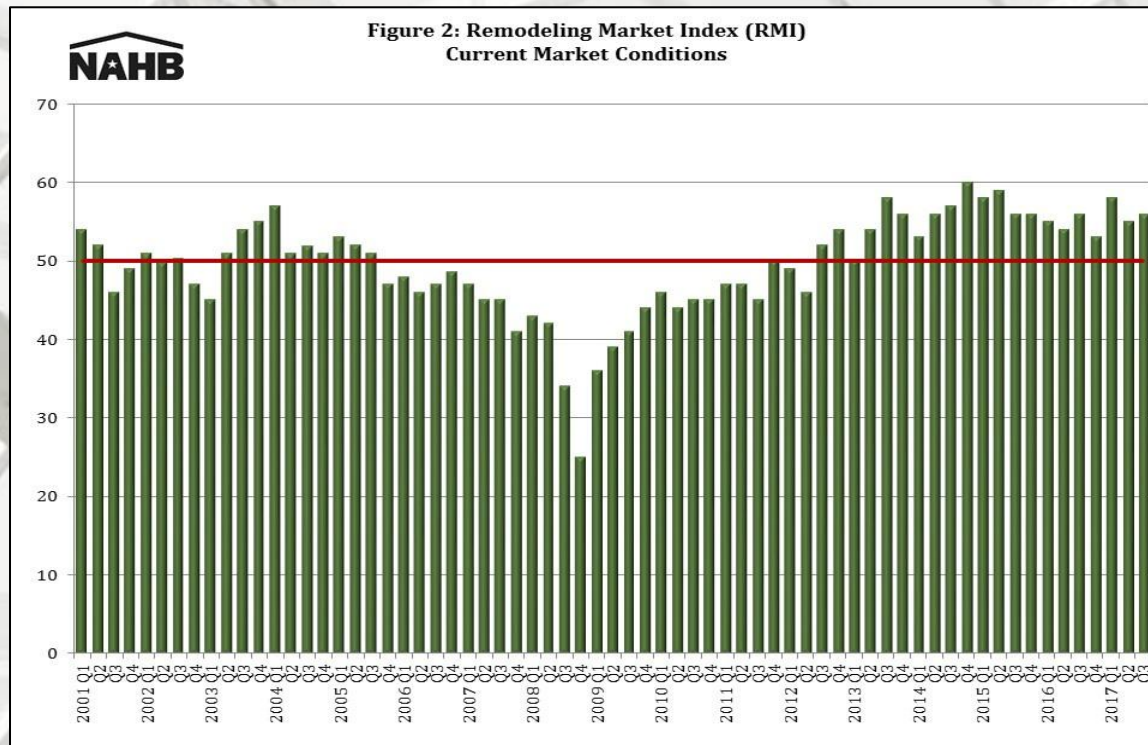
Remodeling



Remodeling Market Index Maintains Strength in Third Quarter

“The Remodeling Market Index (RMI) posted a reading of 57 in the third quarter of 2017, up two points from the previous quarter, according to the National Association of Home Builders (Figure 1). For 18 consecutive quarters, the RMI has been at or above 50, which indicates that more remodelers report market activity is higher than report it is lower (compared to the previous quarter).” – Carmel Ford, Research Associate, NAHB

Remodeling



Remodeling Market Index Maintains Strength in Third Quarter

“The RMI is an average of two sub-indices, one that measures current market conditions and another that measures future remodeling activity. The current market conditions index increased one point to 56 in the third quarter of 2017 (Figure 2). Among its three components, major additions and alterations waned one point to 53, minor additions and alterations increased three points to 56, and the home maintenance and repair component rose one point to 58.” – Carmel Ford, Research Associate, NAHB

Remodeling

Remodeling Market Index Maintains Strength in Third Quarter

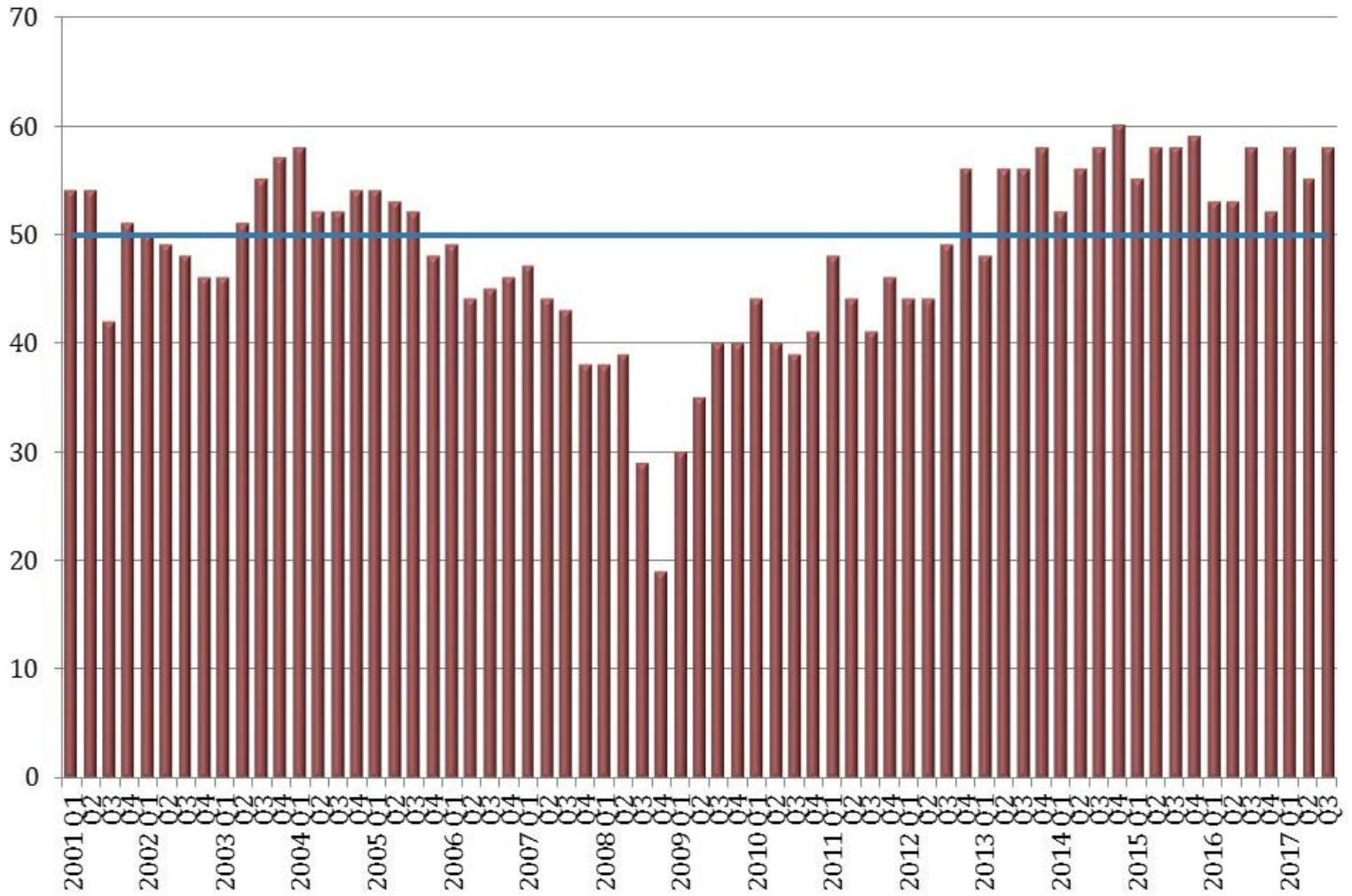
“The future market indicators index rose three points to 58 in the third quarter (Figure 3). Calls for bids increased two points to 58, amount of work rose three points to 56, the backlog of remodeling jobs gained two points to 60 and appointments for proposals hiked four points to 59.

Although the RMI indicates a healthy remodeling market, remodelers face ongoing challenges. The third quarter survey included a set of special questions asking remodelers about the labor supply in 15 different trades, such as carpenters, framing crews, and electricians. Of the trades that have data history (12 trades), 66 percent of remodelers reported labor shortages in the third quarter of 2017, compared to 52 percent in the third quarter of 2016. The elevated cost of materials is also a challenge for remodelers going forward. Both of these issues are constraining remodelers’ ability to complete projects in a timely, cost-effective manner.” – Carmel Ford, Research Associate, NAHB

Remodeling



Figure 3: Remodeling Market Index (RMI)
Future Market Indicators



Existing House Sales

National Association of Realtors (NAR®)

September 2017 sales: 5.390 million (SAAR)

	Existing Sales*	Median Price	Mean Price	Month's Supply
September	5,390,000	\$245,100	\$286,700	4.2
August	5,350,000	\$253,100	\$294,400	4.2
2016	5,470,000	\$235,200	\$277,000	4.5
M/M change	0.7%	-3.2%	-2.6%	0.0%
Y/Y change	-1.5%	4.2%	3.5%	-6.7%

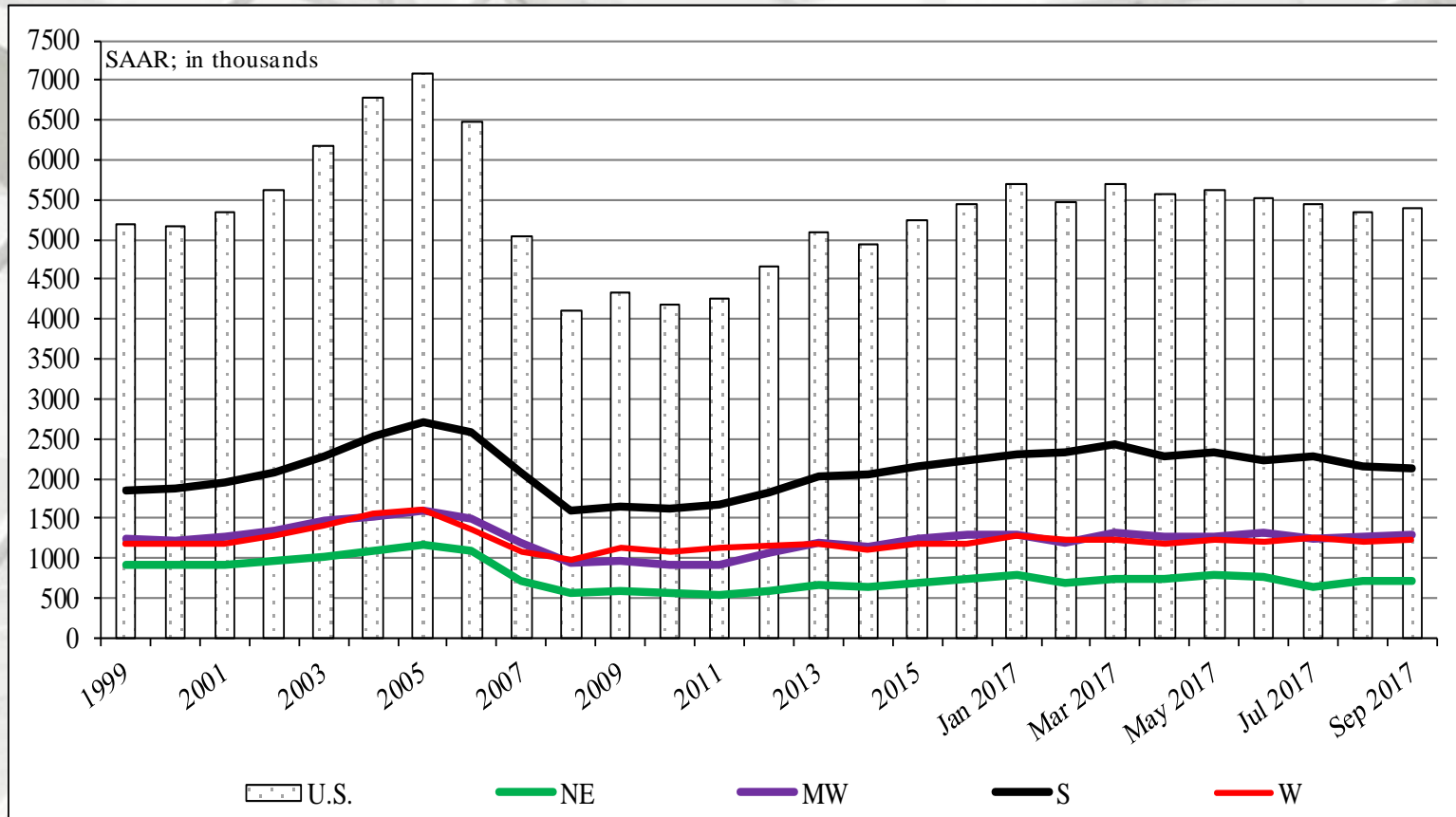
* All sales data: SAAR

Existing House Sales

	NE Sales	MW Sales	S Sales	W Sales
September	720,000	1,300,000	2,130,000	1,240,000
August	720,000	1,280,000	2,150,000	1,200,000
2016	730,000	1,320,000	2,180,000	1,240,000
M/M change	0.0%	1.6%	-0.9%	3.3%
Y/Y change	-1.4%	-1.5%	-2.3%	0.0%

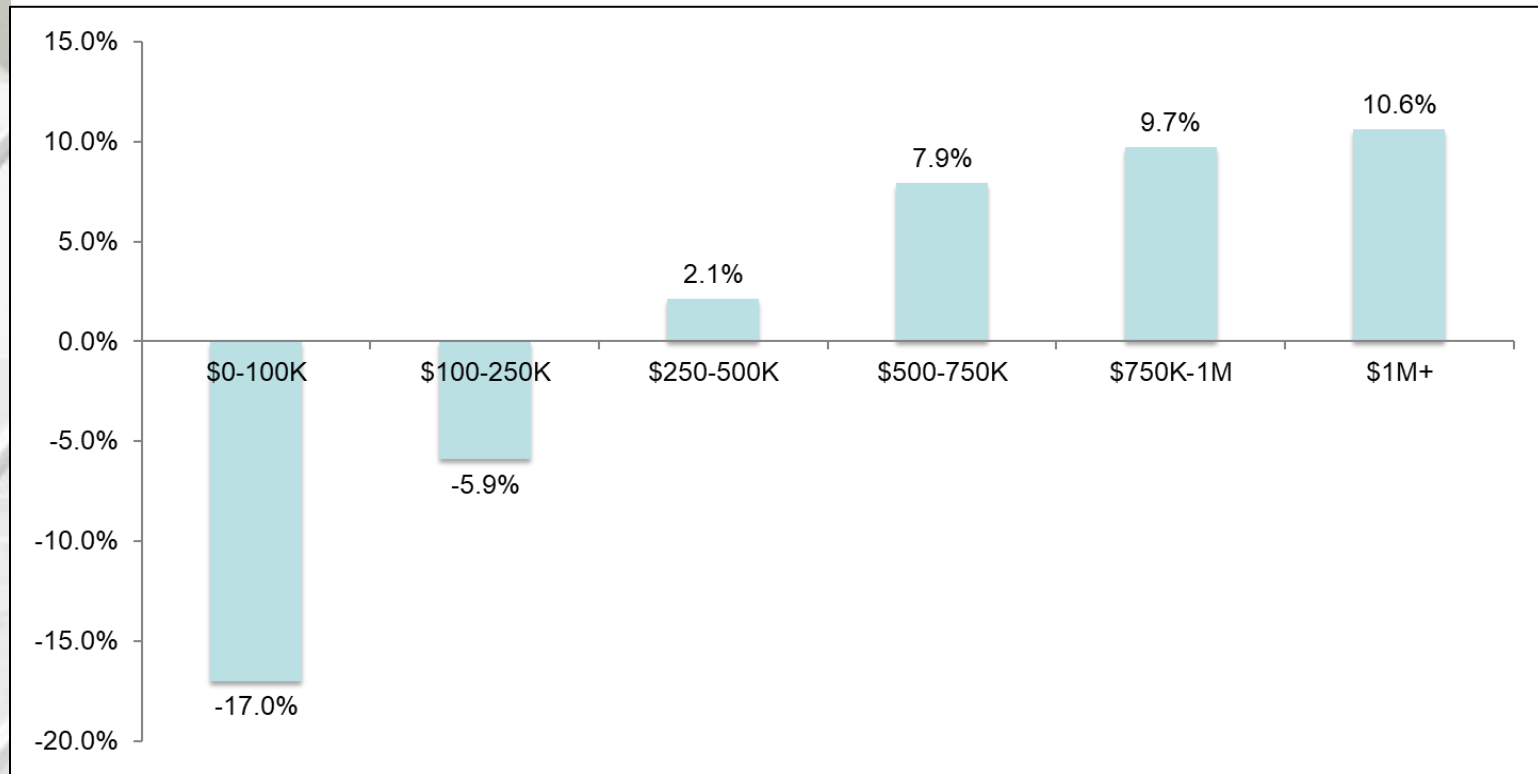
	Distressed House Sales	Foreclosures	Short-Sales	All-Cash Sales	Individual Investor Purchases
September	4%	3%	1%	20%	15%
August	4%	3%	1%	20%	15%
2016	4%	3%	1%	21%	15%

Total Existing House Sales



Changes in Existing House Sales

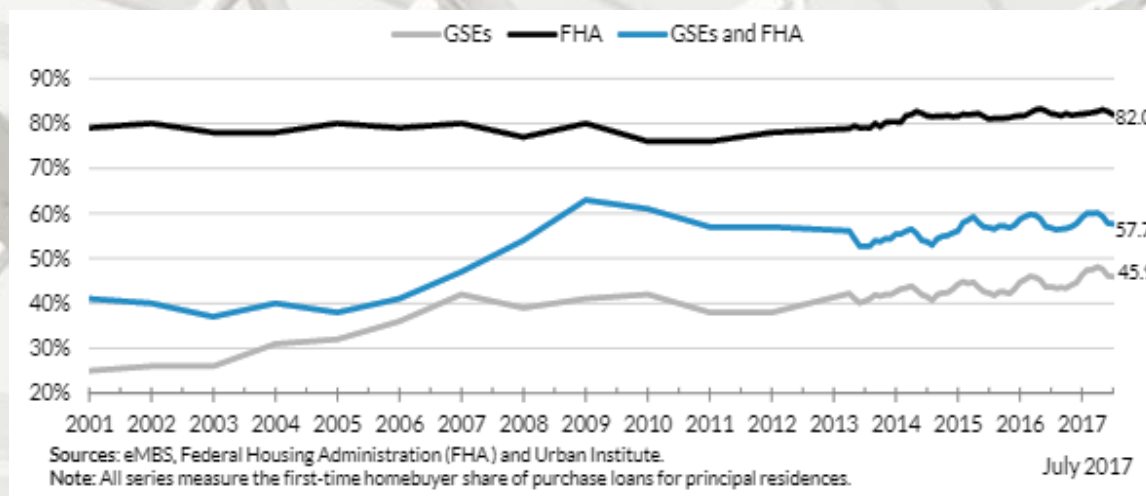
Percent Change in Sales From a Year Ago by Price Range



First-Time Purchasers

National Association of Realtors (NAR®)

29% of sales in September 2017 – 31% in August 2017, and 34% in September 2016¹



Urban Institute

“In July 2017, the first-time homebuyer share of GSE purchase loans fell for the third consecutive month to 45.9 percent, after hitting the highest level in recent history in April (48.1 percent). The FHA has always been more focused on first-time homebuyers, with its first-time homebuyer share hovering around 80 percent; it stood at 82.0 percent in July 2017. The bottom table shows that based on mortgages originated in July 2017, the average first-time homebuyer was more likely than an average repeat buyer to take out a smaller loan and have a lower credit score and higher LTV and DTI, thus requiring a higher interest rate.”² – Laurie Goodman, et al., Co-director, Housing Finance Policy Center

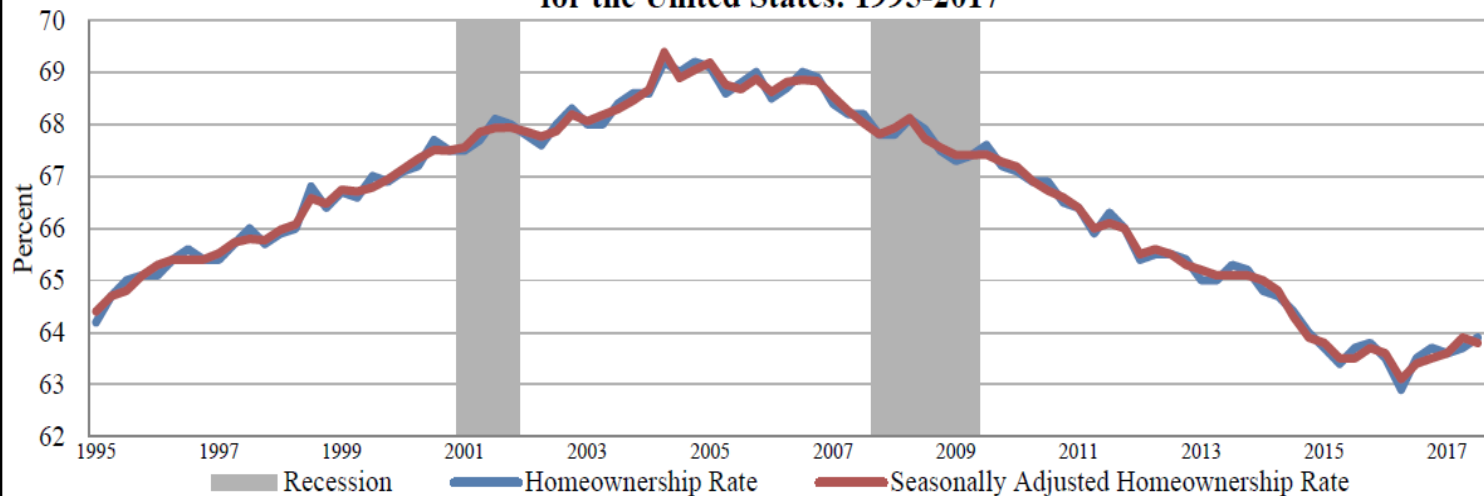
Sources: ¹ <https://www.nar.realtor/newsroom/existing-home-sales-inch-07-percent-higher-in-september>, 10/20/17;

² https://www.urban.org/research/publication/housing-finance-glance-monthly-chartbook-october-2017/view/full_report; 10/24/17

Housing Vacancies and Home Ownership

Figure 4

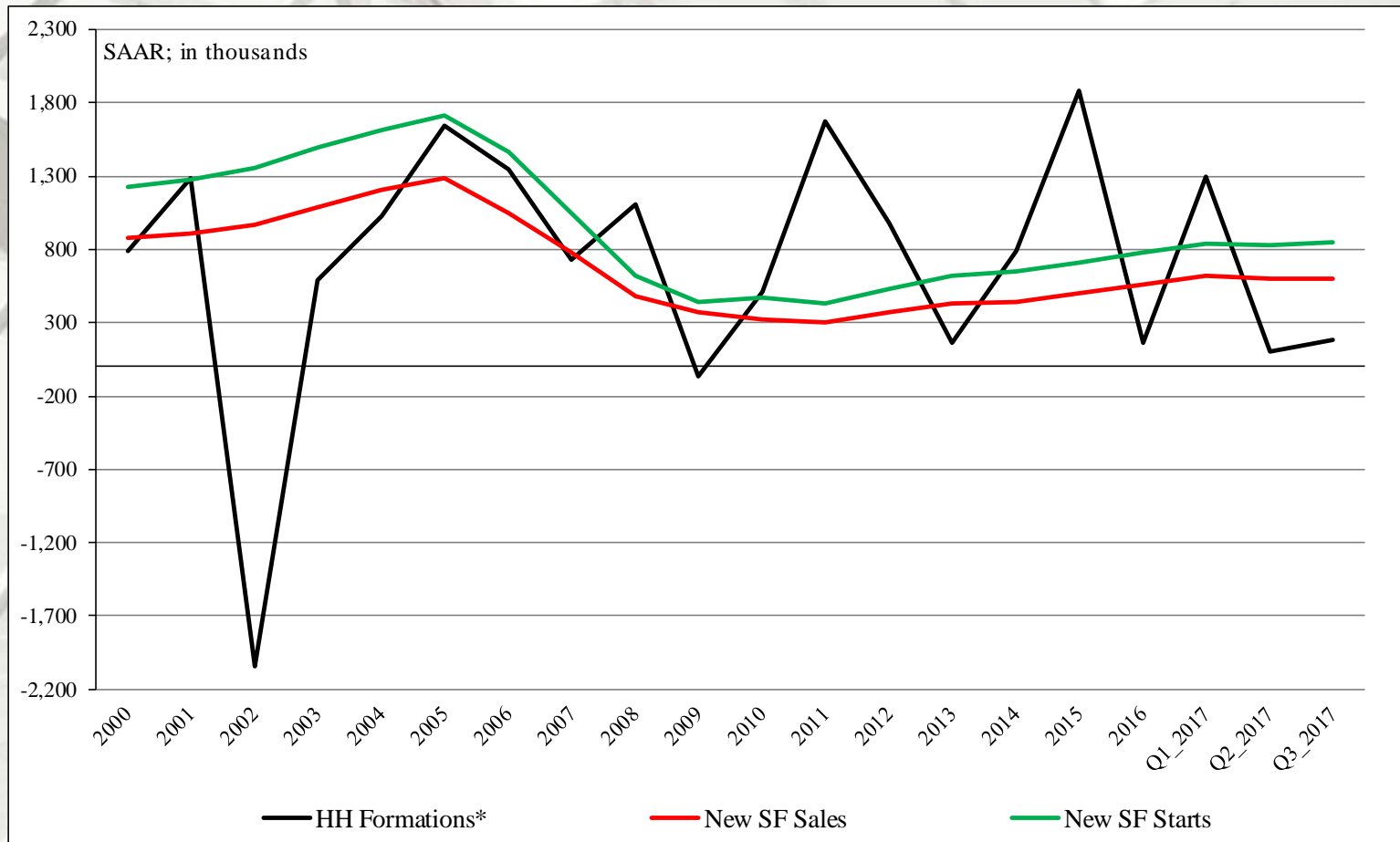
Quarterly Homeownership Rates and Seasonally Adjusted Homeownership Rates for the United States: 1995-2017



Source: U.S. Census Bureau, Current Population Survey/Housing Vacancy Survey, Oct 31, 2017, Recession data: National Bureau of Economic Research, <www.nber.org>

“The homeownership rate of 63.9 percent was not statistically different from the rates in the third quarter 2016 (63.5 percent) or the second quarter 2017 (63.7 percent).” – Robert Callis and Melissa Kresin, Social, Economic & Housing Statistics Division, Financial & Market Characteristics Branch; U.S. Department of Commerce; U.S. Census Bureau

Household Formations*: New Sales & SF Starts



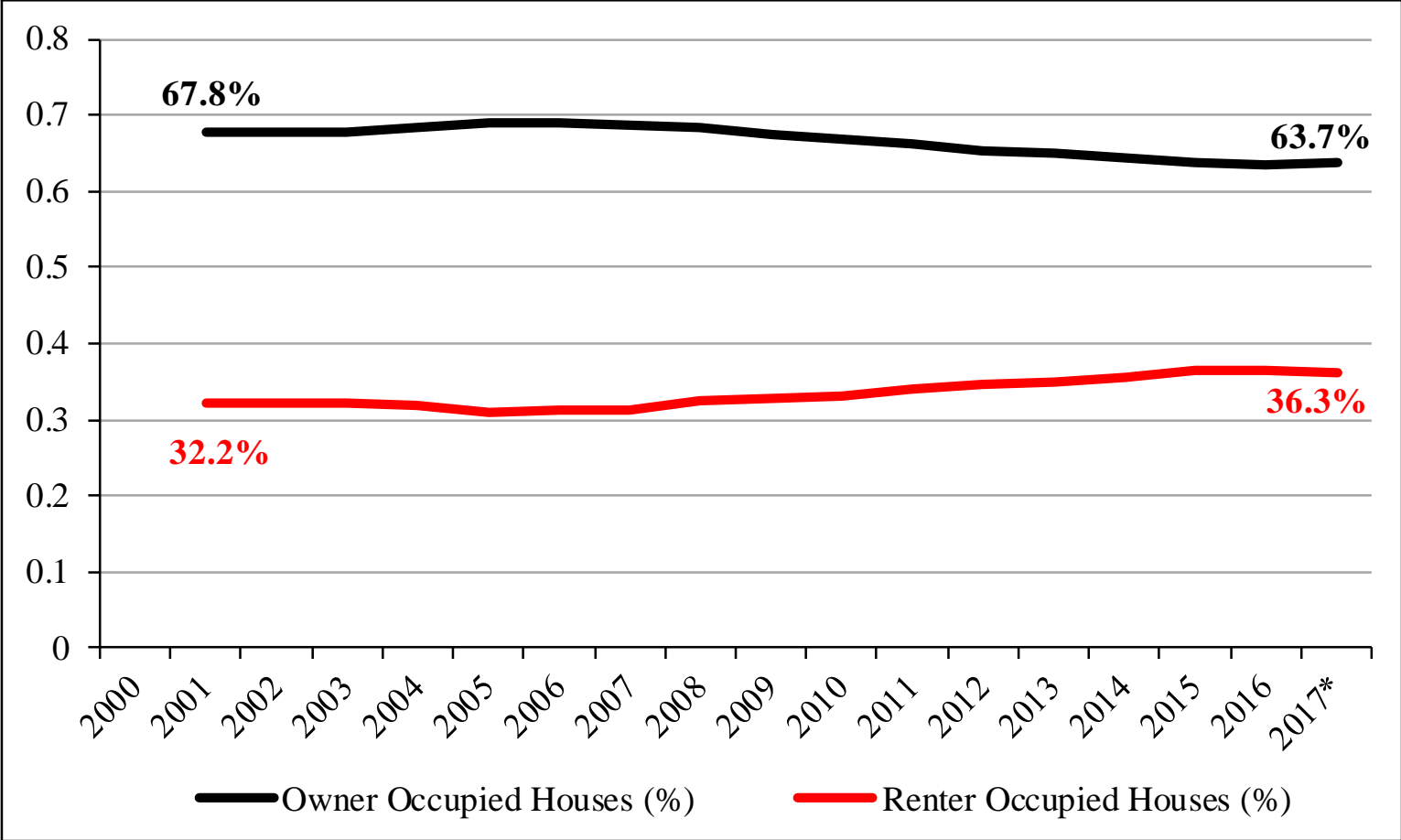
* The U.S. Department of Commerce-Census measures occupied houses and not household formations. In this graph, household formation estimates are derived from the housing inventory assessment.

Housing Vacancies and Home Ownership



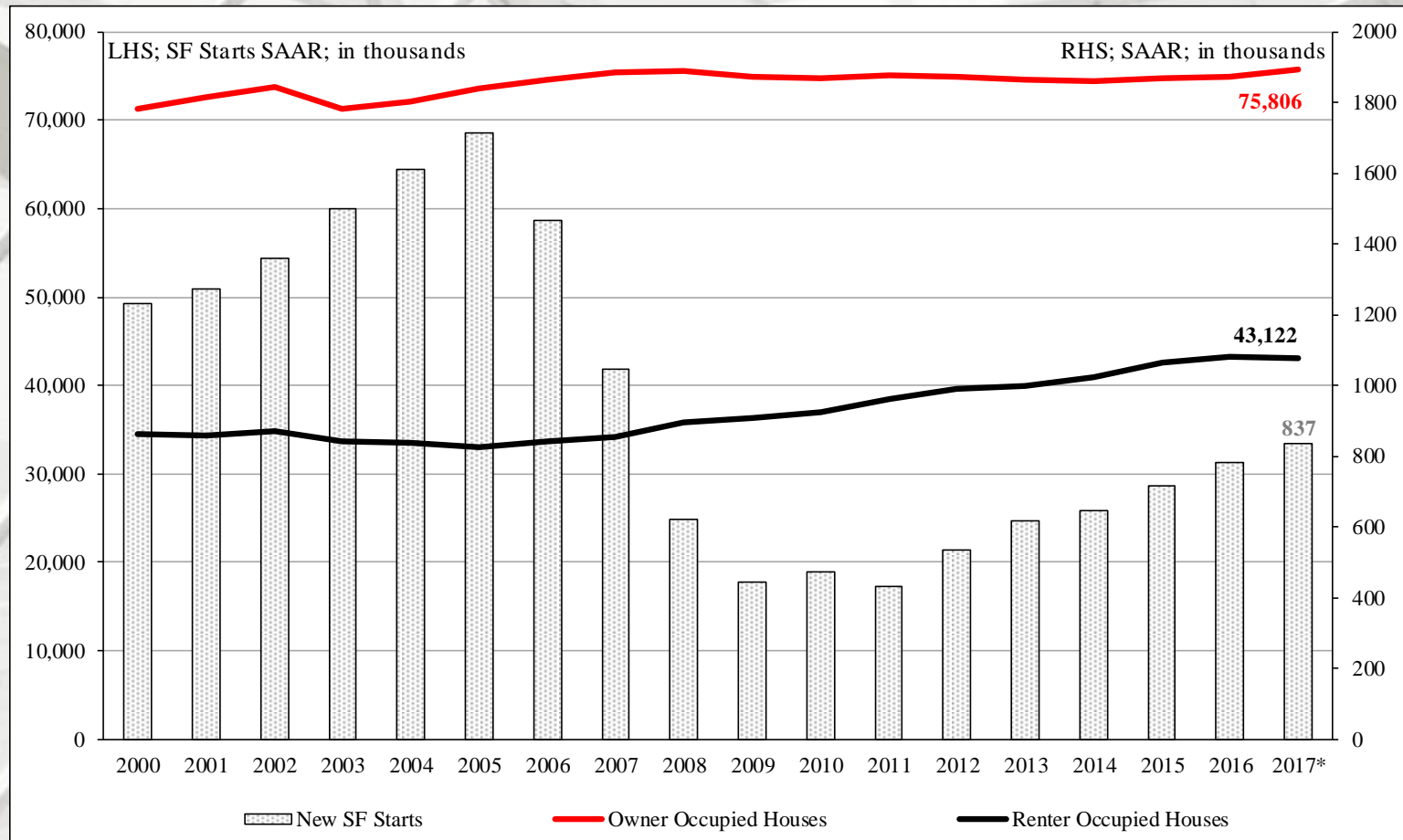
Total occupied housing units increased by 407,000 units between the third quarter of 2016 and 2017. Owner occupied units increased by 755,000 and renter occupied units decreased by 348,000 units in the same period.

Occupied Housing: Segment & Percent



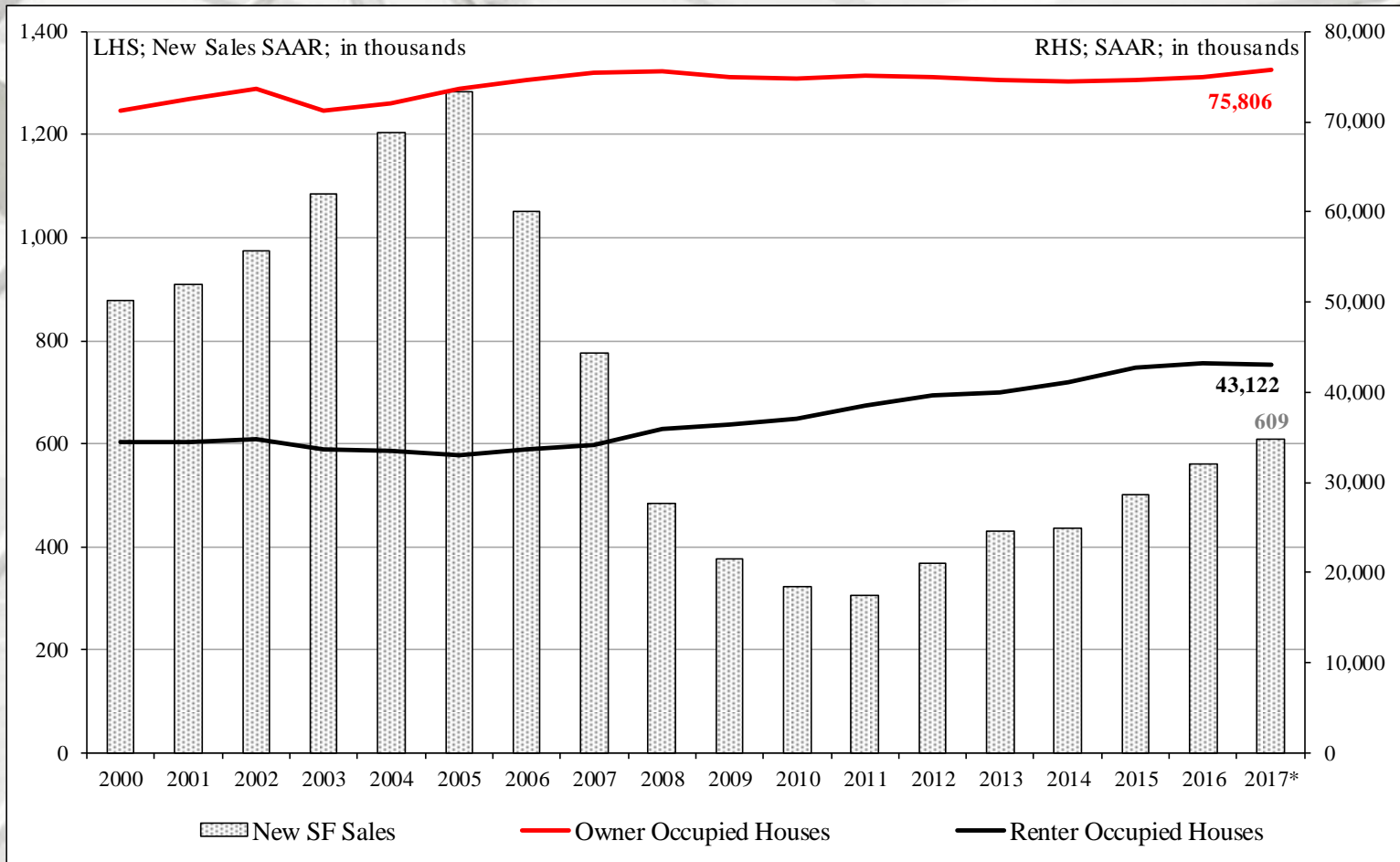
* 2017: SAAR

Housing Vacancies and Home Ownership



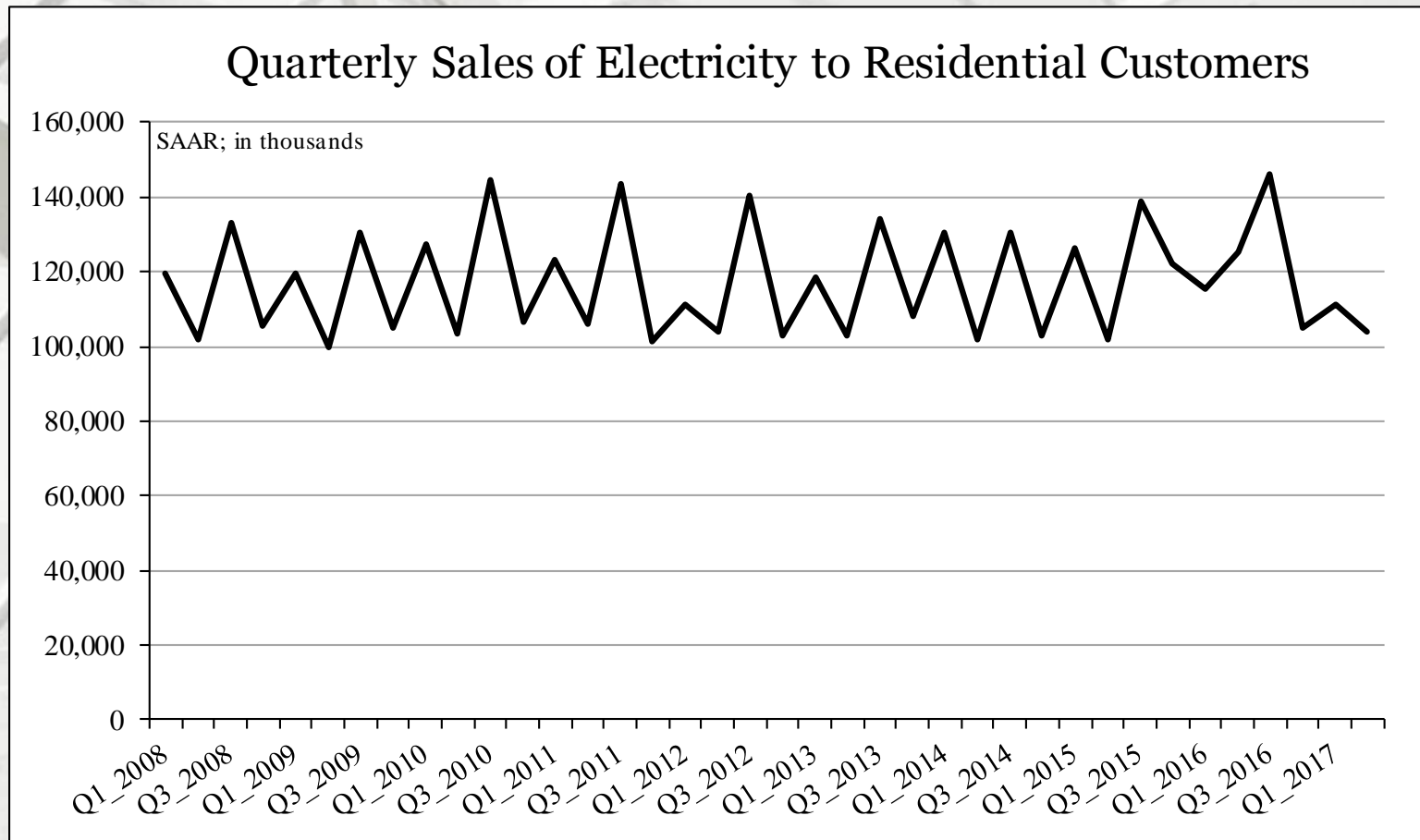
* 2017: SAAR

Housing Vacancies and Home Ownership



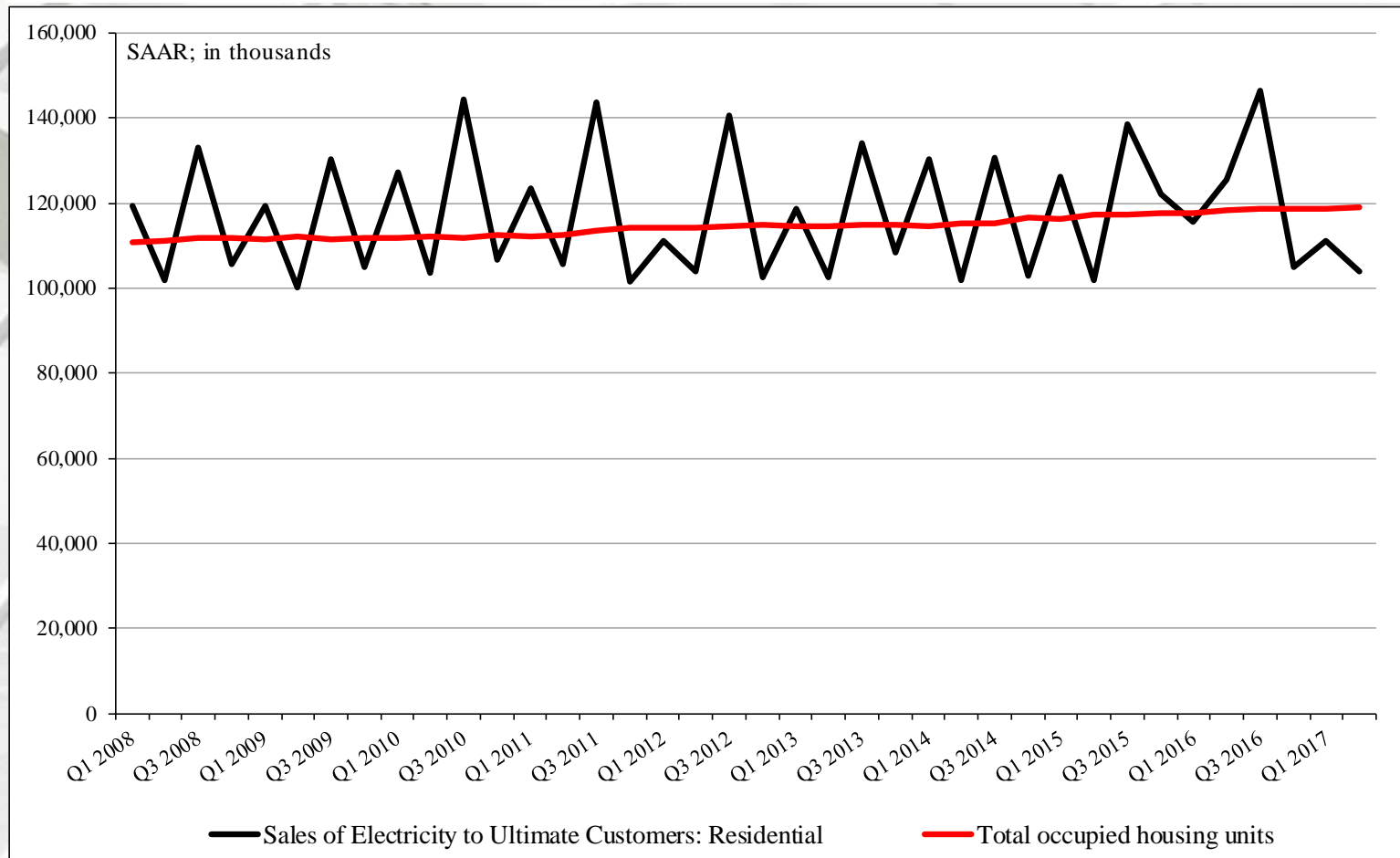
* 2017: SAAR

Household Estimates by Electricity Sales



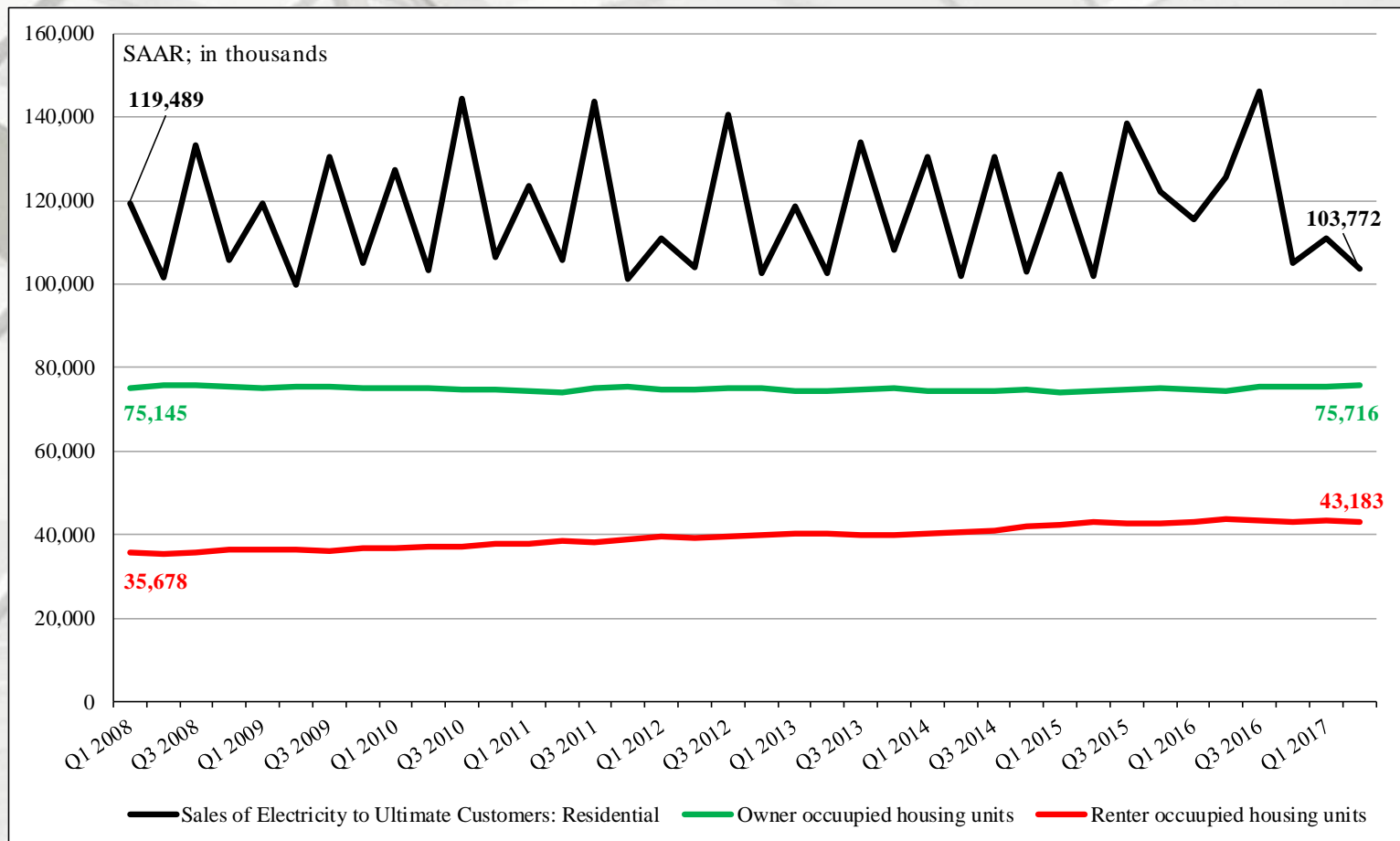
Total quarterly sales to residential customers increased by 4,335,262 between the first quarter (Q) of 2008 and Q2 2017. The Housing Vacancy survey resulted an increase of 4,240,516 occupied units in the same time period.

Household Estimates by Electricity Sales



Total occupied housing units increased by 4,240,514 units and sales of electricity to residential customers increased by 4,335,262 (between Q1 2008 and Q2 2017) – a difference of 94,746.

Household Estimates by Electricity Sales

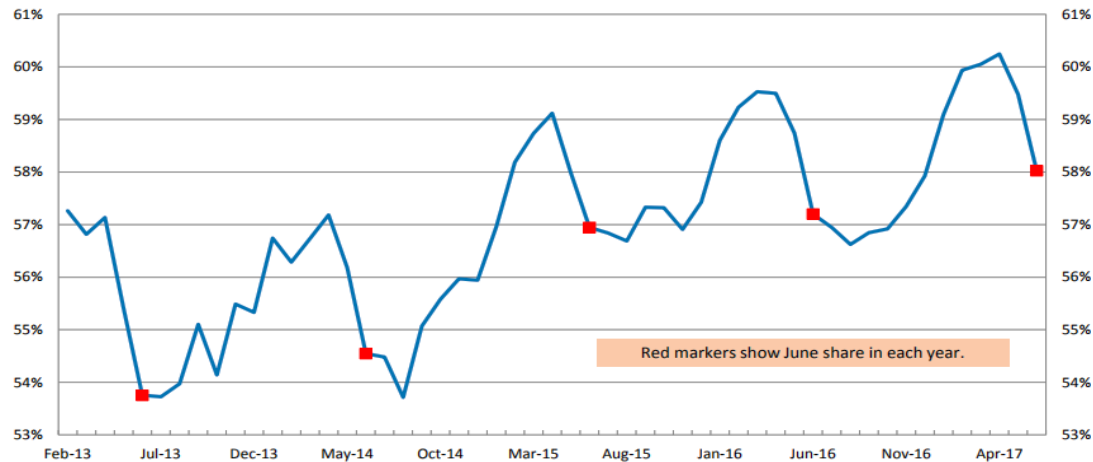


Assuming 67% of residential electricity sales were to owner-occupants, this yields about 62,000 owner-occupied units and 32,750 renter-occupied units – greater than the Housing Vacancy survey estimates (between Q1 2008 and Q2 2017).

First-Time Purchasers

Update: Agency First-Time Buyer Mortgage Share

The Agency First-Time Buyer Mortgage Share Index continued to climb in June as first-time buyer volume (by count) increased 4 percent. The index stood at 58.0% in June, up from 57.2% a year ago and from 53.8% four years ago.



Source: AEI International Center on Housing Risk, www.HousingRisk.org. RHS is Rural Housing Service.

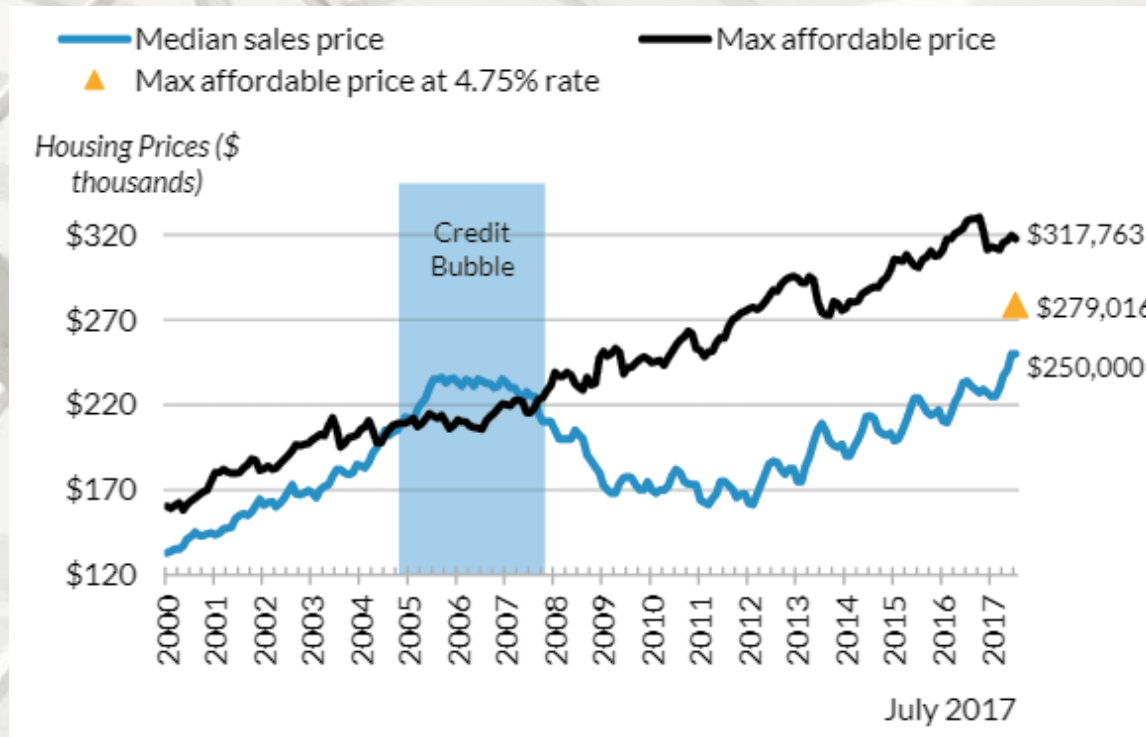
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AEI International Center on Housing Risk Housing Market Index Release for Second Quarter 2017

“Composite NMRI for purchase increased from already elevated levels a year ago. Index higher for first-time buyers and FHA and lower for repeat buyers. First-time buyers are alive but highly-leveraged.

The Agency First-Time Buyer Mortgage Share Index continued to climb in June as first-time buyer volume (by count) increased 4 percent. The index stood at 58.0% in June, up from 57.2% a year ago and from 53.8% four years ago.” – Edward Pinto, AEI International Center on Housing Risk

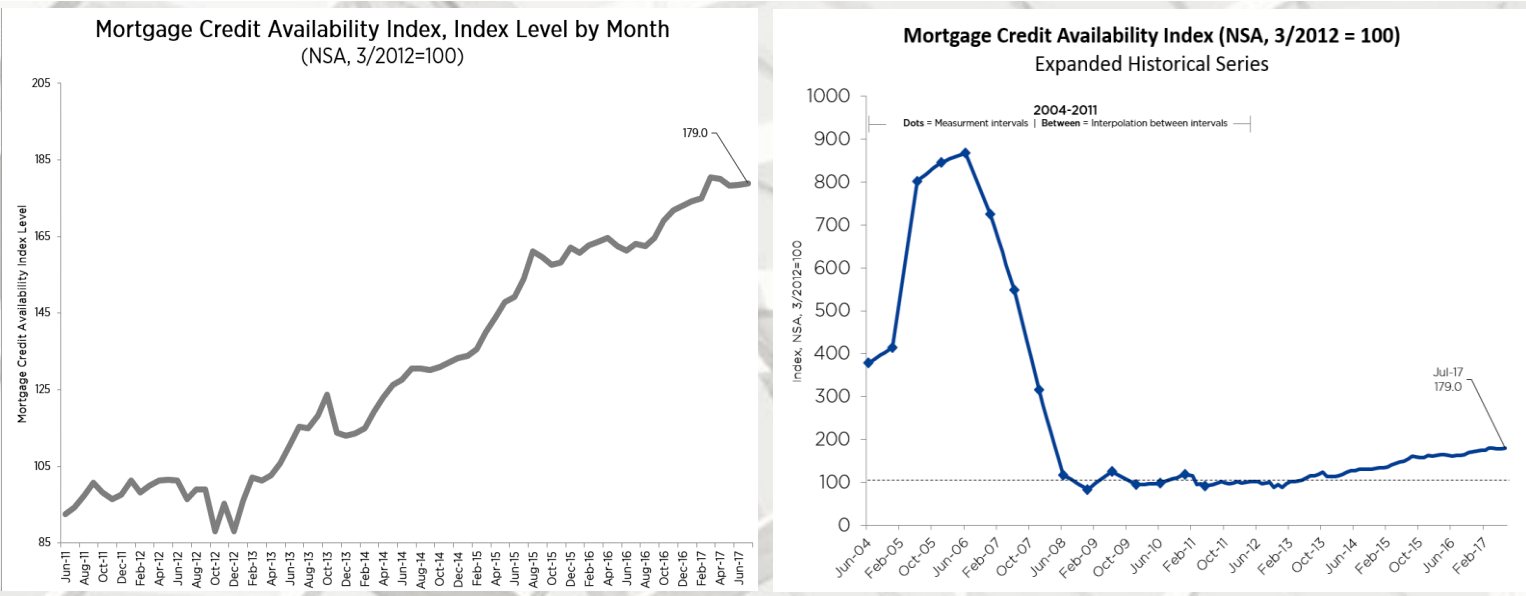
Housing Affordability



Urban Institute

“Home prices are still very affordable by historic standards, despite increases over the last four years and the recent interest rate hike. Even if interest rates rise to 4.75 percent, affordability would still be at the long term historical average.” – Bing Lai, Research Associate, Housing Finance Policy Center

Mortgage Credit Availability



Mortgage Credit Availability Increases in September

“Mortgage credit availability increased slightly in September according to the Mortgage Credit Availability Index (MCAI) . . . Mortgage credit availability increased in September due to continuing updates to conforming loan programs as well as agency jumbo programs that have been phased in over the last few months. For the year to date, the supply of credit has increased only modestly in the non-jumbo space while it has expanded significantly among jumbo programs.”

The MCAI increased 0.7 percent to 181.4 in September. A decline in the MCAI indicates that lending standards are tightening, while increases in the index are indicative of loosening credit. The index was benchmarked to 100 in March 2012. Of the four component indices, the Conforming MCAI and the Conventional MCAI saw the greatest increase in availability over the month (both up 1.5 percent), followed by the Jumbo MCAI (up 1.4 percent) and then the Government MCAI (up 0.2 percent).” – Lynn Fisher, Vice President of Research and Economics, MBA

Future Housing?



Group of Russian Machining and 3D Printing Companies Constructs 3D Printed Residential House

“Using 3D printing technology in the construction sector has led to [bridges](#), an [office building](#) and a [laboratory](#) in Dubai, a [hotel](#) and [tiny houses](#), and even [full-size homes](#) and [villages](#). In February, a group of European construction experts met in [Copenhagen to discuss how 3D printing is changing construction](#), and came to the conclusion that [Europe would become the leader in 3D printing construction](#) over the next three to five years. Russia has also been in the 3D printing construction headlines for a [house printed in just 24 hours](#), and a group of machining and 3D printing companies, called AMT-SPECAVIA, recently used a 3D printer to construct a residential house in Yaroslavl.” – Sarah Saunders, 3D Print.com

Future Housing?

Group of Russian Machining and 3D Printing Companies Constructs 3D Printed Residential House

“The 3D printed house was presented this week, and will soon be the permanent home of a Russian family. Specialists with AMT-SPECAVIA, which includes Skolkovo LLC near Moscow, have been printing parts of the house over the last two years, and recently put them all together to build the 298.5 square-meter building, known as the Yaroslavl AMT project.

“It was important for us to create a precedent, to show in practice that 3D construction technology is working. At that time, printing houses – it was something from the realm of fantasy. We set the task to make it real. Printing was done in the shop on the smallest printer. Printed the building in parts (the walls of the house, decorative elements, the tower), were taken to the construction site and assembled on site as a designer. Since then, of course, the equipment has been improved: the speed of printing has increased, the quality has improved. But even our first model proved to be a reliable and efficient equipment. The status of the Skolkovo participant allows us to accelerate development and access to foreign markets. ([translated quote](#)).” – Alexander Maslov, general director, AMT-SPECAVIA

Maxim Avdeev, the Deputy Governor of the Yaroslavl Region, attended the presentation of the 3D printed house.

The AMT-SPECAVIA companies first created a 3D model of the house on the computer, before dividing the model by cross sections in layers. Not only did the collaborative group of companies 3D print the house, partner [SPECAVIA](#) also created the 3D printing [equipment](#) that handled the job. A 3D portal printer, with a build volume of 3.5 x 3.6 x 1 meters, was used to build the residential building, using standard M-300 concrete sand.” – Sarah Saunders, 3D Print.com

Future Housing?



Group of Russian Machining and 3D Printing Companies Constructs 3D Printed Residential House

“The layers of the house were printed at 10 mm high and 30 to 50 mm wide, and the walls were printed at up to 15 square meters an hour. One of the great benefits of 3D printed houses is the ability to use complex geometry to create features like arches and cylindrical structures. In addition, the time from design to production is reduced up to 8-12 times; obviously, the high rate of speed at which the house was built is also a plus.

“Oleg Pertsovsky, the director of operations for the [Skolkovo Energy Efficient Technologies cluster](#), said in a translated quote, “Today, Russian developers are among the world leaders in 3D printing. In the Fund, AMT LLC is developing and commercializing a line of portal building printers: from small format (for printing small architectural forms) to large (capable of printing houses up to 3 floors high). Today “AMT” presented an impressive result of its innovative activity – a full-length residential building built for permanent residence. “Skolkovo” purposefully involves projects on construction 3D-printing. Support from Skolkovo will allow companies to get an additional impetus to development not only on the Russian market, but also on the world market.””
– Sarah Saunders, 3D Print.com

Future Housing?



Group of Russian Machining and 3D Printing Companies Constructs 3D Printed Residential House

“The 3D printed Yaroslavl house is consistent with all of the rules and regulations of individual housing construction in Russia, including getting a building permit and a technical passport from the Bureau of Technical Inventory (BTI), which is necessary when it comes to performing registration actions. Soon, the 3D printed residential home will also be placed on the cadastral survey, a comprehensive register of a specific country’s real estate.

Not that long ago, the idea that we might all one day live in 3D printed homes probably seemed like a joke, or something out of a cheesy sci-fi movie. But as we see more and more 3D printing innovations come out of the construction field, it doesn’t seem quite so funny anymore. What’s more, as is the case with the Yaroslavl house, these buildings aren’t gimmicks or ad campaigns, but real homes where people will actually live. So it seems like we may need to get used to the idea that 3D printed homes are here to stay.” – Sarah Saunders, 3D Print.com

Summary

In summary:

In September, the U.S. housing market remained in the doldrums, as many monthly indicators were negative and/or indicating minimal increases on a month-over-month basis. New SF sales exploded on a month-over-month basis; hopefully the SAAR new SF sales continue. Monthly construction spending is anemic, as SF and improvement expenditures were barely positive on a month-over-month basis. Once more, new SF lower-priced tier house sales were well less than historical averages. It warrants repeating, the market needs consistent improvement in this category to influence the housing construction market upward.

Housing, in the majority of categories, continues to be substantially less than their historical averages. The new SF housing construction sector is where the majority of value-added forest products are utilized and this housing sector has room for improvement.

Pros:

- 1) Historically low interest rates are still in effect, though in aggregate rates are incrementally rising (future Fed actions may indirectly cause *i*-rates to rise);
- 2) As a result, housing affordability is good for many in the U.S. – but not all of the U.S.;
- 3) Select builders are beginning to focus on entry-level houses.

Cons:

- 1) Lot availability and building regulations (according to several sources);
- 2) Household formations are still lagging historical averages;
- 3) Changing attitudes towards SF ownership;
- 4) Gentrification;
- 5) Job creation is improving and consistent but some economists question the quantity and types of jobs being created;
- 6) Debt: Corporate, personal, government – United States and globally;
- 7) Other global uncertainties.

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