Powered by UBS Evidence Lab

Machinery, Engineering & Construction

Non-Res Construction: 2017 outlook Q1 update – is this the peak?

Equities

Americas

Heavy Machinery

Steven Fisher, CFA
Analyst
steven.fisher@ubs.com
+1-212-713 8634

Cleve Rueckert
Analyst
cleve.rueckert@ubs.com
+1-212-713 4913

Ajit Agrawal, PhD
Strategist
ajit.agrawal@ubs.com
+1-212-713 2053

Shannon O'Callaghan
Analyst
shannon.ocallaghan@ubs.com
+1-212-713 2716

Erika Jackson
Associate Analyst
erika.jackson@ubs.com
+1-212-713 1426

Our 2017 forecasts remain unchanged, despite big moves in Q1

We are updating our initial non-residential construction outlook, first published in February (Getting more positive on 2017 as private sector signals are supportive). The overall market grew 2.5% in Q1 (vs. UBS 2017E of 2%), led by continued strong growth of 8.2% in the private market. Public spending growth weakened to -6.9% in Q1, from -1.2% in 2016. While we see indications that private market growth will continue to slow throughout the year, we think there is potential for improvement in public sector spending later this year.

Private better than expected; Public weaker

In the first quarter, private non-res construction ran ahead of our expectations, led by double digit growth in Office, Lodging and Commercial construction, while public sector construction was below our expectations. Water, Sewage & Waste, Transportation and Highway & Street declined 20%, 9%, and 5% respectively. UBS Evidence Lab Macro Analysis indicates that the private sector could weaken later this year, while stabilizing public spending and easier comps could flatten public sector declines. Putting it all together, we still forecast 2% growth in 2017 and 1.5% growth in 2018.

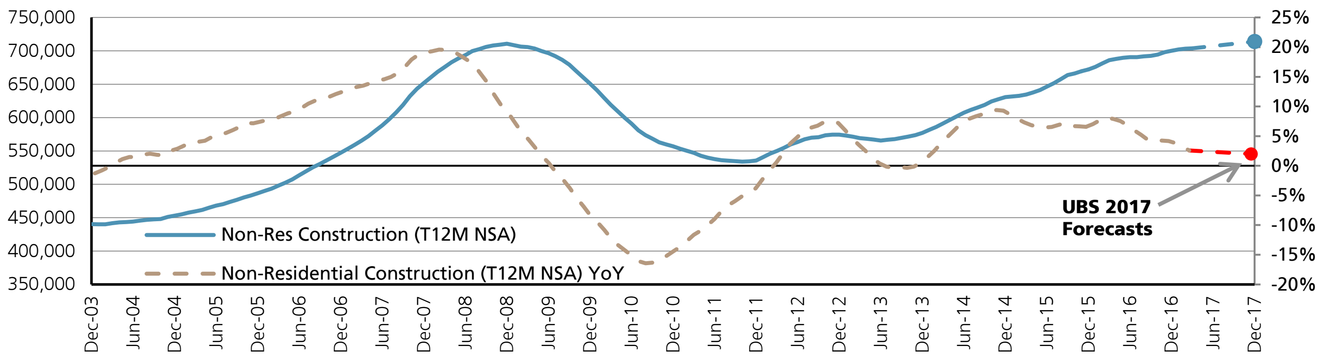
UBS Evidence Lab Macro: Forecasting a private activity peak; possible declines

UBS Evidence Lab Macro data tends to lead monthly private non-residential construction spending (ex-Power) by 6-9 months. Our data indicate a continued flattening of the growth rate over the coming year with possible YoY declines in Q4. The analysis suggests the YoY growth of non-res spending ex-Power will slow from 8.2% in 2016 to ~3% monthly declines towards the end of the year.

The US non-residential market's breadth includes a variety of stocks

Industrial stocks with exposure to US non-res construction include: Machinery (HEES, URI, TEX, CAT, MTW, ITW, KMT, DE, CMI), E&C (TPC, PWR, BW, CBI, JEC, ACM, FLS, KBR, FLR), Other Industrial (LII, NCS, IR, ETN, JCI, ADSW), and Steel (RS, NUE, STLD).

Figure 1: US Non-Residential Construction – Trailing 12 Months (Not Seasonally Adjusted)



Source: US Census, UBS estimates

Contents

Steven Fisher, CFA
Analyst
steven.fisher@ubs.com
+1-212-713 8634

Cleve Rueckert
Analyst
cleve.rueckert@ubs.com
+1-212-713 4913

Ajit Agrawal, PhD
Strategist
ajit.agrawal@ubs.com
+1-212-713 2053

Shannon O'Callaghan
Analyst
shannon.ocallaghan@ubs.com
+1-212-713 2716

Erika Jackson
Associate Analyst
erika.jackson@ubs.com
+1-212-713 1426

US Non-Residential Construction

UBS Research THESIS MAP | MOST FAVORED | LEAST FAVORED

	MOST FAVORED	LEAST FAVORED
UBS Research THESIS MAP	**AECOM (ACM)**	**Kennametal (KMT)**

PIVOTAL QUESTIONS

Q: Has Non-Residential construction peaked?

We expect continued growth in private non-residential construction, but at slower levels. Public non-residential construction is in the earlier stages of an improving cycle, but growth is slowing. We assume overall spending in 2017 could be up 2.0%.

Q: How much will public infrastructure projects impact overall spending?

Growth in Transportation and Highway & Street was disappointing in 2016, following a strong start to the year. Highway and Street finished 2016 up 1.3% and Transportation finished down 6.5%. We think the FAST Act passed in December 2015 could have sparked a wave of project planning, and combined with the election may have slowed down spending. We expect some recovery in 2017.

Q: To what extent will energy projects be a drag going forward?

We expect Manufacturing to be the biggest drag on 2017 Private spending, as we think new project starts are unlikely to replace LNG and chemical projects nearing peak levels on the Gulf Coast. The Power category might have neutralized, and we expect growth to come from the pipeline category. Lower gas prices were expected to result in more miles travelled and increased gas tax receipts, but this has not translated into lasting growth in spending.

WHAT'S PRICED IN?

We think many investors had been assuming that private non-residential construction is at its peak; however, recent stock moves suggest that some think the cycle may continue. While it differs by company, earnings multiples have expanded in a broad post-election rally. Leaders are HEES, TEX, FLS, and TPC; laggards are KBR, BW, CBI, and DE.

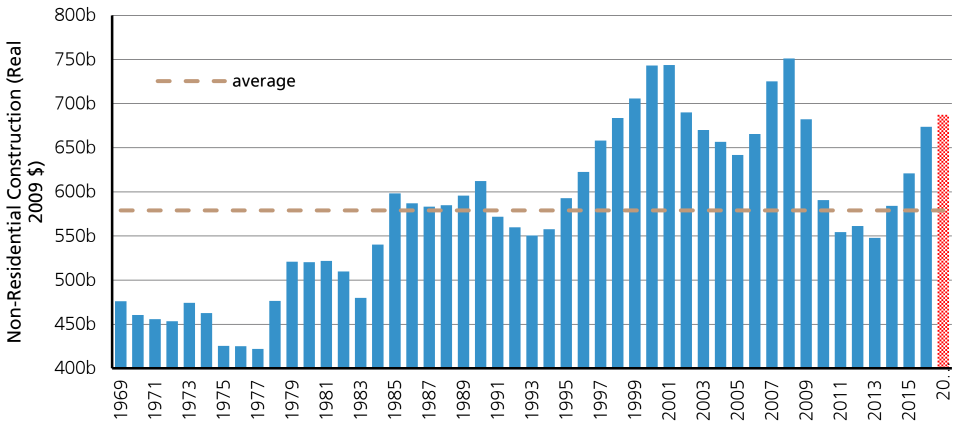
UBS VIEW

We think private construction growth will slow in 2017. Public construction has disappointed, but we continue to see the potential for improvement. Public spending is just beginning a growth cycle, and broad congressional and state level support for infrastructure projects could provide a multi-year tailwind. We expect private non-res spending to grow 2-3% in 2017 and public spending to grow 1-2%.

EVIDENCE

Assuming growth in 2017, our analysis indicates that private construction will have grown for six years, consistent with the length of historical up cycles. Public construction has not grown significantly over the last six years, but has support from ongoing job growth, passage from the highway bill, and increasing miles traveled. UBS Evidence Lab Macro forecasts a slowdown.

Real Non-Residential Construction spending is still 10% below the 2008 peak



Source: BEA, UBS Estimates

2017 Forecast Summary

Non-residential construction is a key indicator of demand for engineering and construction services and heavy machinery. After a quarter of reported construction spending data, our 2017 outlook remains intact.

We expect modest growth in 2017 and 2018, with 2017 driven by a continuation of Private spending growth, albeit at lower levels.

(1) We expect a modest 2% growth rate in 2017 as ongoing growth in Office construction offsets a further decline in Manufacturing.

(2) We think the public infrastructure categories, including Highway and Street, Transportation, and Water, Sewage & Waste could grow slightly in 2017 and then accelerate somewhat in 2018. That said, after a weak start, activity needs to improve to hit our forecast. Also, 2018 remains uncertain and dependent on government (Federal/State/Local) actions this year.

(3) Timing of public funding and federal spending and a potential rollover in Office construction are the main source of uncertainty in our forecast assumptions.

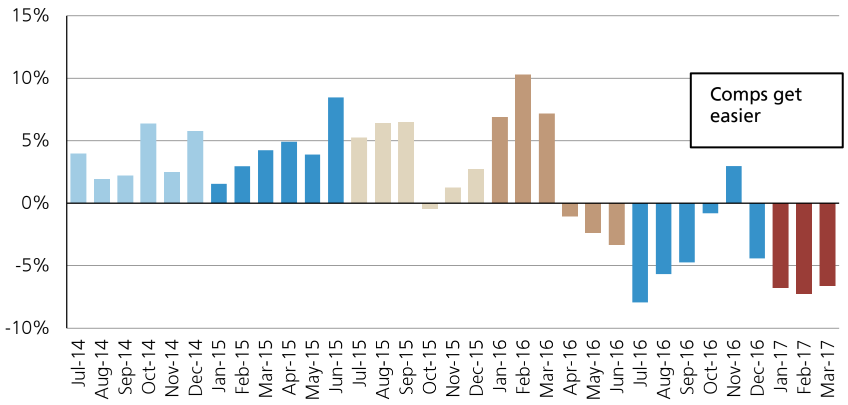
Forecasting 2017 Non-Residential Construction +2.0%

The non-residential construction market grew 4.2% in 2016, with strong growth in Office spending (+25.1%) more than offsetting weakness in Manufacturing and Transportation (-3.9% and -6.4% respectively).

- **Expecting continued Private growth in 2017.** Office construction had the largest impact of any category on 2016 growth. We expect the growth rate to slow, but continue to expect the Office market to advance in 2017 based on already scheduled project completions. We expect Manufacturing to be the biggest drag on 2017 Private spending, as we think new project starts are unlikely to replace LNG and chemical projects nearing peak levels on the Gulf Coast.

- **Expecting modest Public spending growth in 2017.** Our initial forecast had contemplated ~6.5% growth in public spending, driven by Highway & Street and Transportation growth of 10% in each category. Public spending declined slightly in 2016, with Highway and Street up 1.1% and Transportation down 6.4%. We think the FAST Act passed in December 2015 could have sparked a wave of project planning, and combined with the election may have slowed down spending. We expect some recovery in 2017, driven by state initiatives and FAST Act spending.

Figure 2: Public Non-Res Spending (YoY)



Source: US Census Bureau, UBS estimates

Figure 3: UBS 2017 Non-Residential Construction Forecasts

	Dec 2016 T12M	Pct of Total	YoY Growth 2016	YoY Growth 2017 YTD	UBSe 2017	UBSe 2018
Office	69,042	10%	25.1%	20.9%	10.0%	-5.0%
Transportation	42,632	6%	-6.4%	-9.3%	2.0%	6.0%
Education	88,672	13%	6.2%	4.8%	2.0%	1.0%
Health Care	41,361	6%	1.5%	1.2%	2.0%	1.0%
Commercial	74,550	11%	11.4%	13.7%	2.0%	-1.0%
Highway and Street	90,755	13%	1.1%	-5.3%	2.0%	6.0%
Power	95,785	14%	3.6%	4.8%	2.0%	5.0%
Water, Sewage & Waste	34,040	5%	-9.0%	-19.5%	1.0%	5.0%
Manufacturing	75,091	11%	-3.9%	-9.9%	-5.0%	-5.0%
Other	88,224	13%	6.9%	7.4%	2.0%	3.0%
Total	**700,152**	**100%**	**4.2%**	**2.5%**	**2.0%**	**1.5%**

Source: US Census, UBS estimates

What drives our forecast?

We use variety of inputs to analyze the non-residential construction market and generate our forecasts by category for the coming year. These include, but are not limited to:

(1) **UBS Evidence Lab Macro:** The UBS Evidence Lab Macro team uses a quantitative model based on a sampling of local building permits from around the country. The forecast, discussed and presented in further detail later, has been an accurate indicator of growth in private non-residential construction spending, excluding the Power category, with a lead time of six to nine months.

(2) **Industry expert discussions:** We have an ongoing dialogue with industry experts throughout the year to update our view on both construction categories and regional markets. Recently we have spoken with experts in the energy market (link to LNG report), office market (link to office report), and infrastructure market (link to infrastructure report). We also hosted meetings with a construction economist (link to AGCA report), with legislative staff and associations (link to Washington DC report), and with experts who specialize in Public Private Partnerships (link to private investment report) to understand the dynamics of potential public spending.

(3) **Data point digging:** We analyze news articles from around the country in an effort to track corporate development plans, upcoming capital expenditures, and government policy focus. We augment this work with periodic deep dives into specific end markets, such as our December report: Q-Series: How could a new wave of infrastructure spending impact the construction sector?

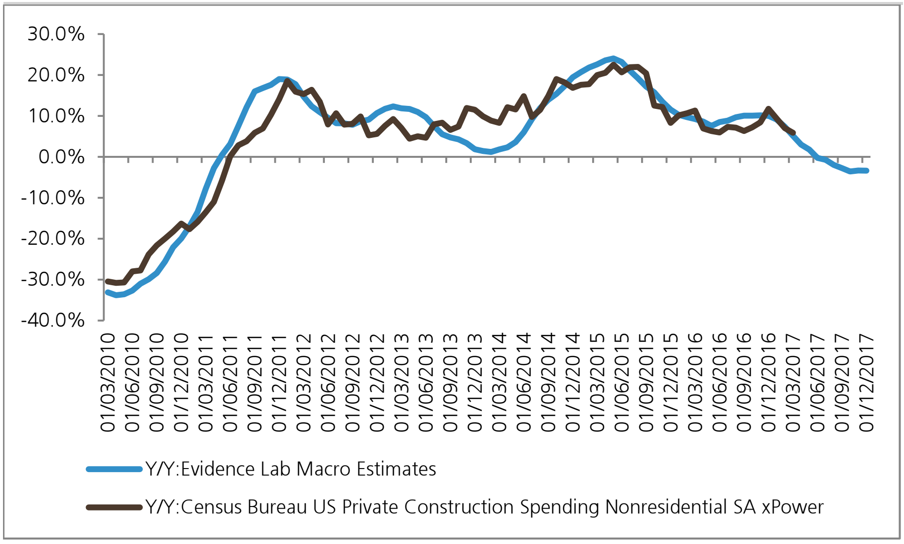
(4) **Trend analysis:** We have assembled our US Non-Residential Construction Dashboard (page 53) of roughly 30 data series we track and believe have relevance to the construction market. Additionally we follow the subcategories within the construction market (page 70 and page 74) to try and understand the trends driving growth or contraction and whether these are likely to persist.

UBS Evidence Lab Macro

UBS Evidence Lab has developed a meaningful leading indicator of Private Non-Res Construction, excluding Power (Launching Big-Data Driven Early Read on US Economy, Nov 11 2015). The typical lead time is 6-9 months. The UBS Evidence Lab analysis is pointing towards a meaningful slowdown in spending as 2017 progresses. While the forecasts do at times show some divergence from the actual reported data in late 2013 and early 2014, we note that the UBS Evidence Lab Macro model accurately predicted the 2015 slowdown in spending growth, followed by a slight uptick in 2H16 before slowing down again in early 2017.

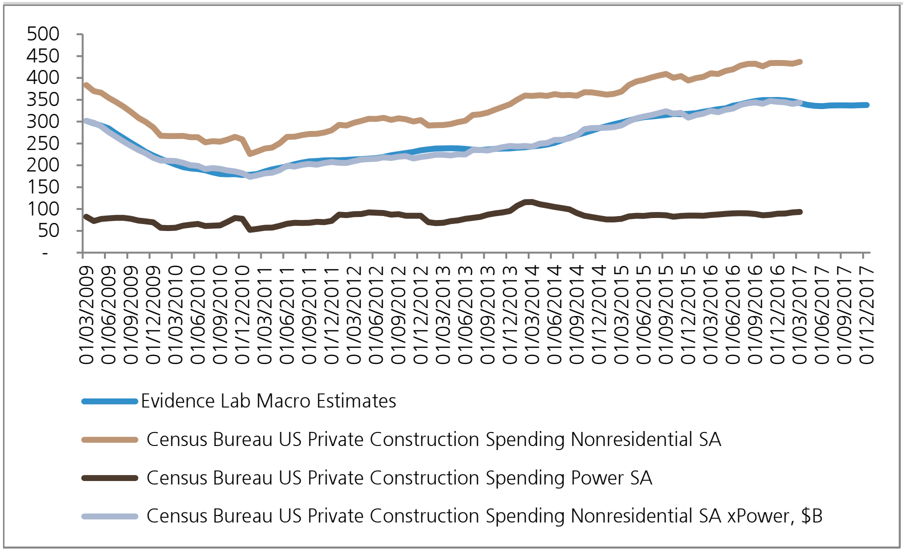
Note that the UBS Evidence Lab Macro analysis excludes the Power category and Public spending.

Figure 4: UBS Evidence Lab Macro analysis is calling for a 2017 slowdown in private non-residential construction (excluding power)



Source: UBS Evidence Lab Macro

Figure 5: UBS Evidence Lab Macro forecasts a roughly flat level of private non-residential spending in 2017 (excluding power)

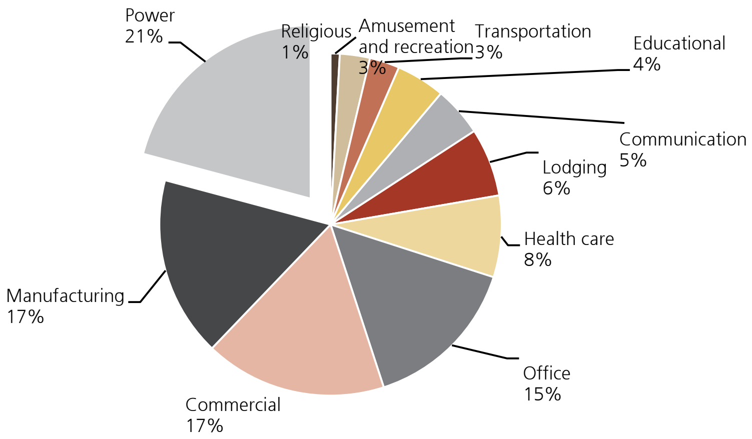


Source: UBS Evidence Lab Macro

What does the Evidence Lab Macro analysis mean for the categories?

While the Power category makes up over 20% of the private side of non-residential spending, Manufacturing, Commercial and Office are also significant. The Evidence Lab Macro analysis is relevant to all of the private market outside of Power, but we think, given the skew in weight towards some of the larger categories, the analysis is more relevant to the three or four largest. Figure 7 shows the last 12 months of growth for the private market. With Office and Construction driving the majority of the recent growth, we think the Evidence Lab analysis could be pointing towards a slowdown in one of these areas, or perhaps a faster decline in the Manufacturing category.

Figure 6: Manufacturing, Commercial and Office make up 62% of the Private non-residential construction market excluding Power



Source: US Census Bureau, UBS

Figure 7: Private non-residential construction detail (excluding Power)

	T12M ($,b)	YoY Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
Private Non-Res	**428.71**	**12.2%**	**6.8%**	**6.7%**	**5.8%**	**6.4%**	**8.3%**	**5.9%**	**6.0%**	**7.8%**	**9.3%**	**10.3%**	**8.4%**	**5.9%**
Private Non-Res Ex-Power	**339.55**	**12.2%**	**6.8%**	**6.7%**	**5.8%**	**6.6%**	**9.0%**	**6.6%**	**6.9%**	**9.0%**	**10.5%**	**11.1%**	**7.8%**	**5.3%**
Manufacturing	**72.71**	**2.2%**	**-4.9%**	**-3.9%**	**-8.0%**	**-2.4%**	**0.7%**	**-7.2%**	**-9.8%**	**-7.1%**	**-8.6%**	**-7.8%**	**-10.6%**	**-11.0%**
Chemical	35.96	6.4%	-2.4%	-8.7%	-2.4%	0.2%	5.7%	-7.2%	-11.3%	-6.2%	-12.2%	0.7%	2.9%	2.3%
Transportation Equipment	10.81	19.2%	5.1%	22.4%	-5.0%	1.6%	-9.6%	-8.8%	-8.0%	-10.3%	-14.9%	-16.1%	-24.4%	-29.1%
Other	25.94	-8.2%	-11.6%	-7.1%	-15.9%	-7.3%	-1.4%	-6.7%	-8.6%	-6.8%	-0.3%	-14.6%	-20.5%	-19.3%
Commercial	**73.60**	**10.8%**	**5.4%**	**4.9%**	**8.3%**	**9.9%**	**11.5%**	**9.8%**	**10.5%**	**18.1%**	**18.5%**	**16.5%**	**16.5%**	**12.6%**
Automotive	6.59	22.0%	-1.0%	-10.5%	3.7%	15.7%	31.0%	25.5%	22.3%	27.9%	31.7%	22.2%	30.9%	12.4%
Food/beverage	7.71	-3.5%	-0.7%	-6.6%	-15.7%	2.7%	18.9%	23.8%	16.0%	21.9%	24.0%	6.3%	1.5%	12.9%
Multi-retail	21.13	1.5%	-3.5%	-5.0%	4.5%	3.6%	5.8%	3.0%	10.4%	19.9%	17.0%	12.7%	10.2%	5.9%
Warehouse	21.24	23.7%	19.2%	32.8%	30.7%	24.5%	16.5%	13.3%	15.7%	27.5%	28.0%	37.0%	39.9%	37.8%
Other	16.93	13.1%	9.2%	4.5%	5.5%	5.0%	3.8%	3.5%	-0.8%	1.9%	3.5%	2.0%	0.1%	-6.9%
Office	**64.15**	**29.2%**	**26.5%**	**22.0%**	**28.9%**	**28.2%**	**31.3%**	**34.3%**	**35.7%**	**29.1%**	**35.0%**	**32.4%**	**23.8%**	**16.3%**
General	61.73	29.0%	27.1%	21.5%	28.3%	28.7%	30.8%	35.4%	35.8%	28.9%	34.4%	31.0%	23.7%	15.9%
Financial	1.94	13.3%	-1.5%	8.1%	3.0%	-5.5%	2.8%	-8.5%	15.0%	24.5%	43.6%	82.7%	28.1%	32.4%
Other	0.48	nmf												
Health care	**32.91**	**9.5%**	**3.0%**	**8.7%**	**0.0%**	**-5.2%**	**-0.4%**	**-2.7%**	**3.5%**	**-3.5%**	**6.2%**	**7.3%**	**-0.5%**	**-1.1%**
Hospital	21.27	13.8%	3.5%	10.4%	6.0%	6.3%	10.4%	8.8%	-0.8%	-3.3%	4.9%	5.4%	-2.6%	2.9%
Medical building	7.77	13.4%	11.1%	14.4%	-10.1%	-28.8%	-21.5%	-27.7%	12.3%	-4.7%	14.7%	11.6%	5.0%	-8.3%
Special care	3.88	-13.4%	-12.0%	-9.1%	-6.9%	0.3%	0.6%	4.8%	11.0%	-2.1%	-1.5%	8.9%	0.3%	-7.9%
Lodging	**27.63**	**37.8%**	**31.0%**	**31.3%**	**22.0%**	**25.2%**	**22.7%**	**25.9%**	**21.6%**	**28.7%**	**23.7%**	**20.0%**	**12.7%**	**8.2%**
Communication	**20.05**	**2.8%**	**-8.9%**	**-8.2%**	**-6.4%**	**-13.4%**	**-7.1%**	**-12.9%**	**-10.4%**	**-1.8%**	**1.3%**	**6.9%**	**7.2%**	**19.0%**
Educational	**19.70**	**12.9%**	**8.6%**	**6.8%**	**4.0%**	**7.1%**	**10.0%**	**17.9%**	**15.2%**	**22.4%**	**18.3%**	**21.4%**	**20.7%**	**14.5%**
Primary/Secondary	3.61	1.2%	-2.8%	-3.6%	-16.9%	-10.9%	-7.2%	6.1%	16.5%	34.2%	20.4%	24.1%	29.1%	22.1%
Higher Education	13.17	12.5%	8.7%	4.8%	4.8%	9.4%	15.5%	21.8%	11.7%	18.3%	11.2%	19.8%	15.8%	10.4%
Other	2.93	34.2%	28.0%	37.6%	42.4%	28.6%	13.5%	16.0%	32.0%	28.3%	50.0%	24.8%	33.0%	25.0%
Transportation	**12.09**	**-10.1%**	**-2.8%**	**-3.9%**	**-2.7%**	**-4.0%**	**-15.9%**	**-15.2%**	**-8.3%**	**-16.6%**	**-14.2%**	**-5.5%**	**-3.3%**	**-7.8%**
Land	10.60	-12.2%	-3.2%	-5.8%	-5.2%	-6.9%	-19.0%	-17.7%	-10.5%	-18.9%	-18.3%	-15.2%	-15.4%	-16.8%
Other	1.48	6.8%	1.0%	18.5%	31.3%	32.6%	24.7%	15.6%	18.8%	10.9%	36.5%	81.2%	83.3%	51.8%
Amusement and recreation	**12.15**	**34.6%**	**21.6%**	**21.0%**	**17.4%**	**17.2%**	**23.9%**	**19.7%**	**15.8%**	**23.2%**	**24.7%**	**16.7%**	**13.3%**	**12.2%**
Sports	4.62	50.2%	27.1%	27.0%	28.8%	6.1%	5.4%	2.0%	-8.6%	15.5%	25.2%	19.6%	30.8%	33.4%
Other	7.52	26.7%	18.5%	17.7%	11.3%	24.7%	36.8%	31.1%	33.0%	28.3%	24.3%	14.8%	2.3%	-0.5%
Religious	**3.70**	**17.7%**	**19.6%**	**6.0%**	**3.8%**	**-4.8%**	**4.0%**	**-9.4%**	**-13.5%**	**0.3%**	**1.4%**	**-6.5%**	**-3.8%**	**-8.7%**
House of Worship	3.20	22.2%	25.2%	1.9%	3.3%	-1.3%	4.0%	-6.9%	-7.1%	7.1%	6.3%	-3.7%	-4.4%	-10.8%
Other Religious	0.51	-4.8%	-6.4%	31.7%	6.5%	-24.5%	6.8%	-22.6%	-45.0%	-28.6%	-22.4%	-18.4%	0.0%	5.0%
Power	**89.15**	**12.3%**	**6.7%**	**6.8%**	**6.0%**	**5.5%**	**5.7%**	**3.3%**	**2.8%**	**3.6%**	**5.3%**	**7.6%**	**10.5%**	**8.2%**
Electric	68.59	16.5%	12.3%	14.1%	13.6%	13.1%	14.3%	11.0%	11.8%	12.7%	14.9%	17.3%	19.9%	14.8%

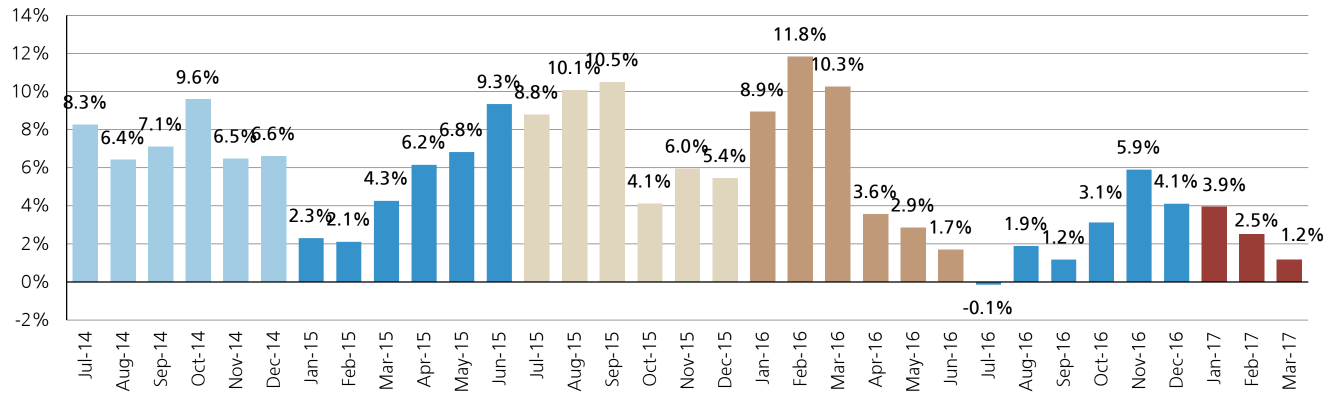
Source: US Census Bureau

How did Q1 2017 play out?

Private: Strong but slowing / Public: Stabilizing but still weak

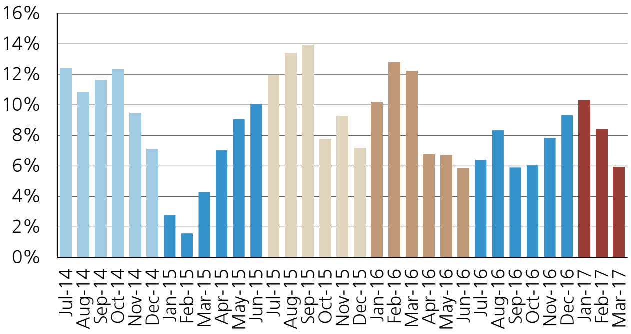
Overall non-residential spending grew 2.5% in Q1, with private markets up 8.2% and public markets down 6.9%. The pace of spending in slowed, and the market was up 2.6% a T12M basis as of March 31st. Private spending growth continued, however the pace slowed throughout Q1, and public spending continued to decline. The public decline accelerated in Q1, but was relatively stable for the three months (the March data point is still preliminary). 2017 is paying out roughly as we expected from an overall market perspective. Private spending growth is slowing, but the public side has been weaker than we thought. As the year progresses we expect public spending will begin to accelerate, or at least neutralize on easier comps, and think private spending will continue to slow.

Figure 8: Total Non-Residential Construction Spending (YoY)



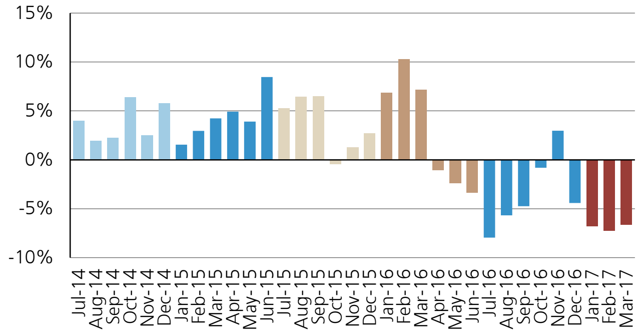
Source: US Census Bureau, UBS estimates

Figure 9: Private Non-Res Spending (YoY)



Source: US Census Bureau, UBS estimates

Figure 10: Public Non-Res Spending (YoY)



Source: US Census Bureau, UBS estimates

Figure 11: US non-residential construction growth rate by month (not seasonally adjusted)

	% of	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	T12M
Total Non-Residential	Total	**3.6%**	**2.9%**	**1.7%**	**-0.1%**	**1.9%**	**1.2%**	**3.1%**	**5.9%**	**4.1%**	**3.9%**	**2.5%**	**1.2%**	**2.6%**
Public	39%	-1.1%	-2.4%	-3.4%	-7.9%	-5.7%	-4.7%	-0.8%	3.0%	-4.4%	-6.8%	-7.3%	-6.6%	-4.0%
Private	61%	6.8%	6.7%	5.8%	6.4%	8.3%	5.9%	6.0%	7.8%	9.3%	10.3%	8.4%	5.9%	7.3%
Lodging	4%	30.1%	30.5%	20.4%	23.1%	20.8%	22.1%	20.1%	27.8%	22.5%	19.4%	11.6%	7.9%	21.1%
Office	10%	20.9%	16.5%	24.0%	23.3%	27.8%	29.9%	30.5%	26.7%	31.0%	28.6%	20.5%	14.5%	24.6%
Commercial	11%	7.2%	6.1%	8.3%	8.8%	11.1%	9.8%	10.5%	18.0%	17.8%	15.3%	15.2%	10.7%	11.5%
Health Care	6%	2.6%	5.2%	-1.2%	-4.7%	2.1%	-0.7%	2.9%	-2.5%	5.5%	5.9%	-0.1%	-1.5%	1.0%
Educational	13%	6.8%	1.1%	2.9%	-0.9%	3.4%	5.2%	9.2%	10.2%	4.9%	8.9%	5.0%	1.1%	4.5%
Religious	1%	19.6%	5.7%	3.4%	-4.8%	3.7%	-9.6%	-13.8%	0.3%	1.4%	-6.5%	-3.8%	-8.7%	-1.4%
Public Safety	1%	-6.9%	-3.6%	-7.8%	-10.0%	-11.9%	-11.4%	-10.8%	-1.9%	3.7%	-10.1%	-4.2%	2.6%	-6.3%
Amusement and recreation	3%	11.5%	9.7%	3.8%	3.7%	7.2%	4.0%	8.2%	14.1%	10.9%	11.8%	9.7%	9.1%	8.4%
Transportation	6%	-7.2%	-3.7%	-4.3%	-5.1%	-13.1%	-14.4%	-9.3%	-9.4%	-7.3%	-8.6%	-6.8%	-12.2%	-8.6%
Communication	3%	-8.9%	-8.0%	-6.5%	-13.6%	-7.1%	-13.3%	-10.7%	-2.0%	1.2%	6.5%	6.8%	18.4%	-3.7%
Power	14%	4.1%	5.9%	6.4%	0.8%	-1.6%	-1.8%	0.8%	0.7%	2.8%	4.1%	5.3%	5.0%	2.6%
Highway & Street	13%	-1.9%	-1.2%	-3.3%	-6.1%	-3.7%	-0.2%	3.2%	10.8%	-8.4%	-9.8%	-4.8%	-1.8%	-1.9%
Sewage and Waste Disposal	3%	-0.9%	-9.7%	-16.3%	-16.8%	-10.0%	-15.4%	-12.6%	-9.8%	-19.4%	-25.9%	-23.8%	-21.4%	-14.9%
Water Supply	2%	-8.0%	-9.4%	-16.0%	-17.9%	-14.3%	-12.7%	-9.8%	-6.0%	5.3%	-6.9%	-13.1%	-12.9%	-10.6%
Conservation & Development	1%	-6.6%	1.9%	2.5%	-18.2%	-16.3%	-8.2%	-8.5%	-1.8%	8.8%	-4.3%	-12.9%	-3.0%	-6.0%
Manufacturing	10%	-4.7%	-3.9%	-8.0%	-2.7%	0.9%	-7.2%	-10.1%	-7.1%	-8.6%	-7.8%	-10.8%	-10.9%	-6.7%

Source: US Census Bureau, UBS Estimates

Private spending: Growing but slowing

Private spending growth, at +8.2%, remained elevated during Q1, but did slow moderately to 5.9% growth in March as the quarter progressed (from 9.3% growth exiting 2016). Three of the eleven categories we track posted growth, with all of the larger categories up except for Manufacturing. The top four categories, Commercial, Manufacturing, Office and Power, represent 70% of total private spending.

Figure 12: Private spending heat map – Office and Lodging remain key drivers

	% of	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	T12M
Private	Total	10.2%	12.8%	12.2%	6.8%	6.7%	5.8%	6.4%	8.3%	5.9%	6.0%	7.8%	9.3%	10.3%	8.4%	5.9%	7.3%
Amusement and recreation	3%	27.1%	27.9%	34.6%	21.6%	21.0%	17.4%	17.2%	23.9%	19.7%	15.8%	23.2%	24.7%	16.7%	13.3%	12.2%	**18.8%**
Commercial	17%	9.4%	14.7%	10.8%	5.4%	4.9%	8.3%	9.9%	11.5%	9.8%	10.5%	18.1%	18.5%	16.5%	16.5%	12.6%	11.8%
Communication	5%	19.5%	12.9%	2.8%	-8.9%	-8.2%	-6.4%	-13.4%	-7.1%	-12.9%	-10.4%	-1.8%	1.3%	6.9%	7.2%	19.0%	-3.5%
Educational	4%	9.4%	15.8%	12.9%	8.6%	6.8%	4.0%	7.1%	10.0%	17.9%	15.2%	22.4%	18.3%	21.4%	20.7%	14.5%	13.5%
Health Care	8%	-0.9%	6.4%	9.5%	3.0%	8.7%	0.0%	-5.2%	-0.4%	-2.7%	3.5%	-3.5%	6.2%	7.3%	-0.5%	-1.1%	1.0%
Lodging	6%	25.5%	31.2%	37.8%	31.0%	31.3%	22.0%	25.2%	22.7%	25.9%	21.6%	28.7%	23.7%	20.0%	12.7%	8.2%	22.5%
Manufacturing	18%	2.6%	1.8%	2.2%	-4.9%	-3.9%	-8.0%	-2.4%	0.7%	-7.2%	-9.8%	-7.1%	-8.6%	-7.8%	-10.6%	-11.0%	-6.7%
Office	14%	22.9%	30.1%	29.2%	26.5%	22.0%	28.9%	28.2%	31.3%	34.3%	35.7%	29.1%	35.0%	32.4%	23.8%	16.3%	28.7%
Power	21%	12.1%	12.7%	12.3%	6.7%	6.8%	6.0%	5.5%	5.7%	3.3%	2.8%	3.6%	5.3%	7.6%	10.5%	8.2%	5.9%
Religious	1%	9.6%	9.5%	17.7%	19.6%	6.0%	3.8%	-4.8%	4.0%	-9.4%	-13.5%	0.3%	1.4%	-6.5%	-3.8%	-8.7%	-1.3%
Transportation	3%	-8.6%	-12.1%	-10.1%	-2.8%	-3.9%	-2.7%	-4.0%	-15.9%	-15.2%	-8.3%	-16.6%	-14.2%	-5.5%	-3.3%	-7.8%	-8.8%

Source: US Census Bureau, UBS estimates

- **Manufacturing** spending was weak. Down 9.8% in Q1, it was the weakest performing category within private spending. We expect the weakness to continue, as fewer petrochemical and LNG export plants started construction in 1Q17. There are several new chemical and LNG projects that we are tracking: CB&I was recently awarded a $1.3b EPC contract for the Total Ethane Cracker in Port Arthur, TX; Exxon and SABIC are moving forward in the design phase of a significant chemical complex in San Patricio County, TX; Fluor is expecting to book a methanol project in the near-term; KBR is optimistic that the Magnolia

LNG project will move forward; and we think there is an ongoing opportunity in chemical derivative plants. However, we think it will be challenging to replace the significant amount of work that was started in the last several years, particularly given the slow ramp up time for large projects, and we expect ongoing declines in Manufacturing spending.

- **Power** spending grew 8.8% in Q1, and was up YoY each month in 2016, following declines resulting from the 2014-2015 oil price sell-off. We think there could be some pent up strength in Power if pipeline projects move forward, but regulatory issues remain a concern.

- **Office** spending was particularly robust, and grew 24% in Q1, though February and March spending did slow significantly from the 35% YoY growth rate highs in 2H16. The monthly YoY growth rate in Office spending has exceeded 10% since October 2013 in what has been the most protracted advance in spending of the current construction cycle.

- **Commercial** spending remained strong but did slow slightly to 17% growth in Q1, from ~18% exiting 2016. There were some interesting puts and takes in the quarter. We note some of the details later in the report, but warehouse spending remained robust, and, surprisingly, shopping mall construction strengthened.

Public spending: Have declines stabilized?

Public spending remained weak in Q1, declines accelerated in January, but the rate of decline did remain range bound around ~7% thereafter. Nine of the twelve major categories declined. The top three categories, Highway and Street, Educational, and Transportation, make up 68% of public spending.

Figure 13: Public spending heat map

Public	% of Total	Jan-16 6.9%	Feb-16 10.3%	Mar-16 7.2%	Apr-16 -1.1%	May-16 -2.4%	Jun-16 -3.4%	Jul-16 -7.9%	Aug-16 -5.7%	Sep-16 -4.7%	Oct-16 -0.8%	Nov-16 3.0%	Dec-16 -4.4%	Jan-17 -6.8%	Feb-17 -7.3%	Mar-17 -6.6%	T12M -4.0%
Amusement and recreation	4%	2.8%	2.4%	-0.5%	2.2%	0.0%	-8.1%	-8.9%	-7.6%	-10.5%	0.6%	4.6%	-3.5%	5.9%	5.0%	5.3%	-1.9%
Commercial	1%	76.1%	75.2%	76.2%	66.7%	37.9%	8.2%	-17.3%	3.0%	11.5%	9.6%	15.2%	3.3%	-8.9%	-9.6%	-23.3%	5.3%
Conservation & Development	3%	1.0%	0.8%	2.8%	-6.0%	2.7%	2.0%	-18.5%	-16.7%	-7.8%	-7.0%	-1.0%	9.2%	-4.0%	-12.1%	-2.4%	-5.6%
Educational	25%	10.5%	15.7%	14.2%	6.3%	-0.5%	2.6%	-2.7%	1.9%	2.2%	7.7%	7.1%	1.3%	5.4%	0.5%	-2.6%	2.2%
Health Care	3%	-5.1%	-0.6%	3.9%	1.1%	-7.3%	-5.8%	-2.8%	12.8%	7.7%	0.6%	1.6%	2.9%	0.8%	1.5%	-3.1%	0.8%
Highway & Street	32%	15.8%	15.7%	16.0%	-1.9%	-1.1%	-3.3%	-5.9%	-3.6%	0.1%	3.5%	10.9%	-8.2%	-9.9%	-5.0%	-1.8%	-1.7%
Office	3%	-8.0%	0.9%	-3.7%	-9.3%	-12.4%	-4.4%	-6.3%	5.4%	3.2%	-3.0%	10.4%	4.7%	3.0%	-2.7%	1.0%	-1.1%
Power	3%	-3.0%	-6.5%	-25.6%	-14.2%	-1.5%	9.1%	-32.7%	-45.5%	-38.8%	-17.8%	-27.7%	-22.9%	-30.5%	-41.1%	-31.7%	-24.7%
Public Safety	3%	-0.6%	-0.3%	-7.5%	-4.0%	-1.2%	-6.4%	-9.5%	-11.6%	-11.4%	-10.6%	-2.4%	4.4%	-10.4%	-4.8%	3.1%	-5.7%
Sewage and Waste Disposal	8%	6.4%	6.5%	-1.2%	-1.6%	-10.2%	-17.0%	-17.7%	-10.8%	-15.5%	-12.5%	-9.5%	-19.5%	-25.5%	-23.2%	-21.2%	-15.1%
Transportation	11%	3.3%	8.5%	5.2%	-9.0%	-3.6%	-4.9%	-5.5%	-11.9%	-14.1%	-9.7%	-5.9%	-4.1%	-9.9%	-8.0%	-13.6%	-8.4%
Water Supply	4%	-10.1%	7.9%	-0.1%	-5.2%	-6.6%	-13.8%	-15.3%	-10.6%	-9.6%	-7.3%	-3.0%	4.8%	-9.3%	-13.4%	-13.6%	-8.8%

Source: US Census Bureau, UBS estimates

- **Highway and Street** spending declined 5% in Q1, weakening after what was a choppy 2016 marked by periods of 15%+ growth and 5-8% declines. The rate of decline moderated after a particularly weak December and January. We think there could be some pent up Federal funding from recently allocated FAST Act funds, and states continue to enact independent highway construction policy.

- **Transportation** spending remained weak, declining 11% in Q1. We think some of the same dynamics are impacting Transportation and Highway and Street. While we are optimistic, we remain somewhat more cautious as state

policy appears more aimed towards road and bridge construction, and we think Federal funding could still take more time to deploy as Transportation projects likely take more time to plan.

- **Educational** spending grew slightly in Q1, up 1%, but the growth rate slowed throughout the quarter. March posted the first YoY decline since July 2016. Year over year comparisons do ease somewhat later in the year, but we are not expecting growth to pick up significantly from current levels.

Figure 14: Annual construction spending and YoY growth

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	T12M Mar-17
Total Construction	1,147,953	1,077,351	906,544	809,254	788,331	850,456	906,351	1,005,629	1,112,433	1,164,472	1,176,485
Residential	496,068	366,661	255,543	252,330	252,646	276,057	329,218	374,859	440,255	464,337	472,635
Non-Residential	651,884	710,690	651,003	556,930	535,688	574,401	577,135	630,768	672,177	700,134	703,851
YoY	*19.1%*	*9.0%*	*-8.4%*	*-14.5%*	*-3.8%*	*7.2%*	*0.5%*	*9.3%*	*6.6%*	*4.2%*	*2.6%*
Total Public	281,852	301,250	306,881	293,674	277,885	273,038	264,847	271,062	282,329	279,021	275,143
Total Private	370,033	409,439	344,122	263,258	257,805	301,362	312,288	359,707	389,850	421,111	428,706
Manufacturing	40,633	54,105	57,898	41,179	40,560	47,741	50,547	58,648	78,179	75,091	73,345
Lodging	28,708	35,806	25,498	11,635	9,130	10,836	13,486	16,737	21,728	27,227	27,973
Amusement and recreation	21,214	21,829	19,406	16,943	15,995	15,482	15,206	16,776	19,878	21,758	22,229
Office	65,262	68,565	51,909	37,849	36,010	37,800	37,979	46,584	55,189	69,042	71,996
Communication	27,581	26,490	19,755	17,730	17,687	16,166	17,783	17,298	20,506	19,699	20,166
Conservation & Development	5,263	5,232	5,752	7,172	7,540	6,229	5,968	7,310	7,988	7,641	7,516
Commercial	89,684	86,213	54,736	40,102	42,816	47,335	53,160	62,843	66,926	74,550	76,750
Sewage and Waste Disposal	24,872	25,697	24,831	25,991	22,710	22,263	22,427	23,172	24,284	22,137	20,863
Transportation	31,879	35,472	36,700	38,341	34,738	37,862	39,460	42,044	45,566	42,632	41,759
Highway & Street	76,682	81,362	82,166	82,529	79,324	80,546	81,364	84,743	89,751	90,755	90,001
Educational	96,758	104,891	103,203	88,405	84,986	84,673	79,059	79,681	83,518	88,672	89,565
Religious	7,539	7,225	6,193	5,289	4,241	3,848	3,590	3,388	3,667	3,756	3,703
Health Care	43,767	46,902	44,846	39,344	40,203	42,545	40,689	38,647	40,735	41,361	41,479
Water Supply	15,799	16,753	15,470	15,323	14,164	13,219	13,597	13,380	13,106	11,903	11,608
Public Safety	10,203	13,085	13,789	11,154	10,409	10,432	9,507	9,438	8,728	8,143	8,069
Power	66,056	81,075	88,862	77,946	75,186	97,436	93,319	110,089	92,436	95,785	96,845
Total Construction	-1.1%	-6.2%	-15.9%	-10.7%	-2.6%	7.9%	6.6%	11.0%	10.6%	4.7%	3.4%
Residential	-19.2%	-26.1%	-30.3%	-1.3%	0.1%	9.3%	19.3%	13.9%	17.4%	5.5%	4.7%
Non-Residential	19.1%	9.0%	-8.4%	-14.5%	-3.8%	7.2%	0.5%	9.3%	6.6%	4.2%	2.6%
Total Public	13.1%	6.9%	1.9%	-4.3%	-5.4%	-1.7%	-3.0%	2.3%	4.2%	-1.2%	-4.0%
Total Private	24.1%	10.6%	-16.0%	-23.5%	-2.1%	16.9%	3.6%	15.2%	8.4%	8.0%	7.3%
Manufacturing	24.4%	33.2%	7.0%	-28.9%	-1.5%	17.7%	5.9%	16.0%	33.3%	-3.9%	-6.7%
Lodging	58.3%	24.7%	-28.8%	-54.4%	-21.5%	18.7%	24.5%	24.1%	29.8%	25.3%	21.1%
Amusement and recreation	11.5%	2.9%	-11.1%	-12.7%	-5.6%	-3.2%	-1.8%	10.3%	18.5%	9.5%	8.4%
Office	20.4%	5.1%	-24.3%	-27.1%	-4.9%	5.0%	0.5%	22.7%	18.5%	25.1%	24.6%
Communication	24.1%	-4.0%	-25.4%	-10.3%	-0.2%	-8.6%	10.0%	-2.7%	18.5%	-3.9%	-3.7%
Conservation & Development	2.6%	-0.6%	9.9%	24.7%	5.1%	-17.4%	-4.2%	22.5%	9.3%	-4.3%	-6.0%
Commercial	16.9%	-3.9%	-36.5%	-26.7%	6.8%	10.6%	12.3%	18.2%	6.5%	11.4%	11.5%
Sewage and Waste Disposal	7.3%	3.3%	-3.4%	4.7%	-12.6%	-2.0%	0.7%	3.3%	4.8%	-8.8%	-14.9%
Transportation	14.0%	11.3%	3.5%	4.5%	-9.4%	9.0%	4.2%	6.5%	8.4%	-6.4%	-8.6%
Highway & Street	6.4%	6.1%	1.0%	0.4%	-3.9%	1.5%	1.0%	4.2%	5.9%	1.1%	-1.9%
Educational	13.9%	8.4%	-1.6%	-14.3%	-3.9%	-0.4%	-6.6%	0.8%	4.8%	6.2%	4.5%
Religious	-2.7%	-4.2%	-14.3%	-14.6%	-19.8%	-9.3%	-6.7%	-5.6%	8.2%	2.4%	-1.4%
Health Care	13.8%	7.2%	-4.4%	-12.3%	2.2%	5.8%	-4.4%	-5.0%	5.4%	1.5%	1.0%
Water Supply	5.6%	6.0%	-7.7%	-1.0%	-7.6%	-6.7%	2.9%	-1.6%	-2.0%	-9.2%	-10.6%
Public Safety	31.3%	28.2%	5.4%	-19.1%	-6.7%	0.2%	-8.9%	-0.7%	-7.5%	-6.7%	-6.3%
Power	56.4%	22.7%	9.6%	-12.3%	-3.5%	29.6%	-4.2%	18.0%	-16.0%	3.6%	2.6%

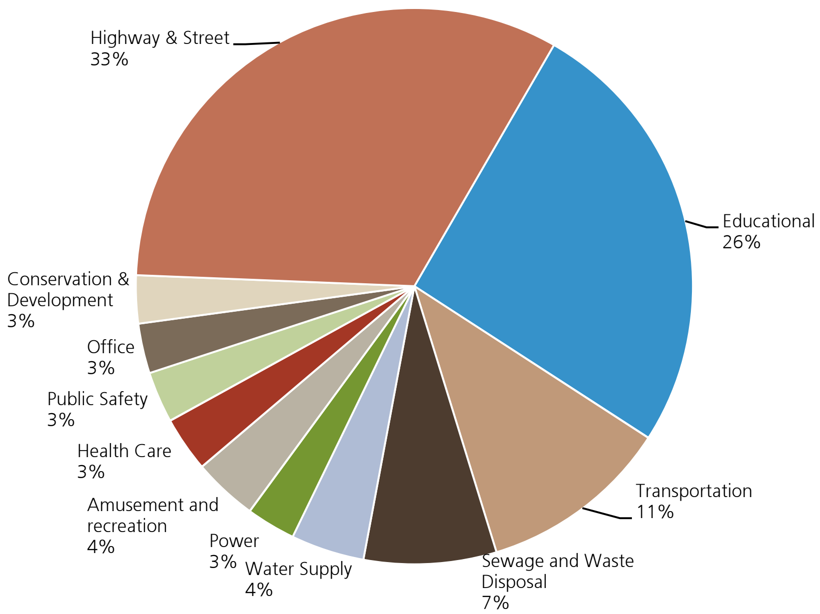
Source: US Census Bureau

Public Spending Update: States taking the lead

Declines in public spending accelerated in Q1 to -6.9%, from a 1.2% rate of decline in 2016. Our forecast is for 1-2% growth in Public construction in 2017, followed by acceleration to +5-6% in 2018. At both the Federal and State levels there are several initiatives and dynamics that could impact non-residential construction which we believe are supportive of our growth forecasts.

On a T12M basis through March, the majority of public spending (~70%) was directed at the Highway & Street, Educational, and Transportation categories.

Figure 15: Public non-res construction spending by category



Source: US Census Bureau, UBS

The Federal Dimension: Helpful but how impactful?

Infrastructure has been a widely discussed topic over the last six months, as President Trump has proposed a $1t infrastructure plan and infrastructure has bipartisan support (though differences exist over how an infrastructure plan should be funded). That said, infrastructure investment is just one objective in Congress's policy agenda, which also includes replacing the Affordable Care Act, immigration reform, and corporate tax reform.

What is the company impact? Test various assumptions with our Infrastructure Interactive Model.

We recently held meetings with various experts, legislative staff, and associations in Washington, DC (link) to discuss the potential for an infrastructure program. We think additional Federal infrastructure spending is unlikely before 2018.

We also held meetings with NY based advisory / infrastructure firms that specialize in Public Private Partnerships (P3) to discuss the likelihood of private investment in public infrastructure (link). The contacts noted that complex new construction is ideal for private investment, and that airports and roads/bridges could be a focus, with water projects likely picking up once the P3 market is more established. We

think there are potential opportunities for private investment in projects, but the market will likely develop in a slow and selective manner. We do think it is notable that Saudi Arabia's sovereign wealth fund reportedly committed $20b to a new infrastructure investment fund with Blackstone.

While it is encouraging that the administration continues to include infrastructure in its agenda, even if a bill were to be passed in late 2017, we think project planning and appropriations could push the impact to 2019. Please read our January report: Expert panel weighs in on infrastructure spending, for further details.

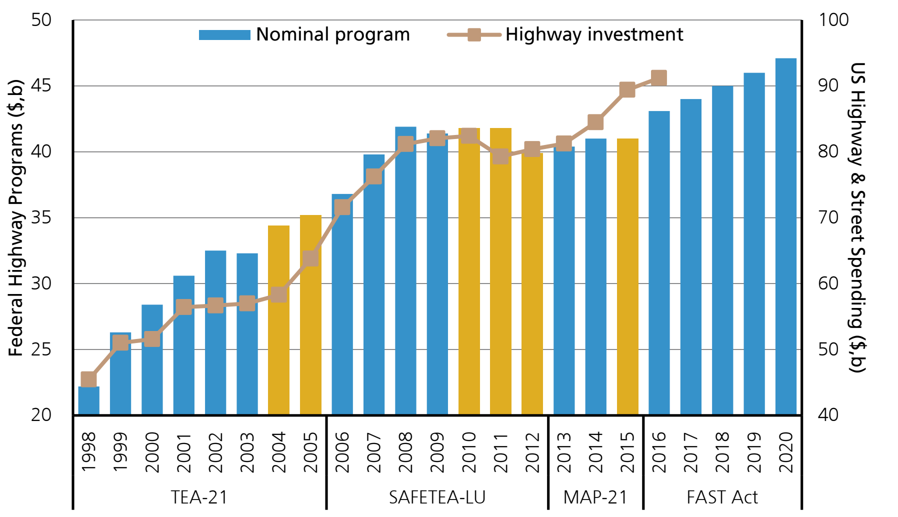
On May 23, President Trump released his 2018 budget proposal, which included a 6 page policy paper on infrastructure. As expected, the paper targeted $1 trillion of spending, by leveraging $200 billion in direct federal investment. We did not find the major points of the policy paper to be surprising. Given the heavy reliance on private investment, we still remain skeptical on the ability to quickly and easily match available private funds with $800 billion of project opportunities. Some of the programs discussed in the paper, such as TIFIA have already been in place, and underutilized, for several years.

The FAST Act update

The FAST Act was passed in December 2015 and is the first multi-year highway program enacted at the Federal level since 2009. Federal highway spending levels were flat from 2008 through 2015, and Highway & Street spending languished as a result. States began to find alternative sources of funding, such as raising gas taxes or offering infrastructure bonds, but 2016 was the first year of meaningful increase in Federal funding.

We think 2016 was likely a year of project planning, and it is possible that a more active slate of project starts will flow throughout 2017, leading to higher growth in Highway & Street spending. Further, recent meetings have pointed to $900m in additional funding included in the FY17 federal budget that passed in early May. The Federal government had been operating under a continuing resolution since October that had kept spending levels flat with the prior year. The additional funding could provide some support; however, relative to the market seize, the incremental increase is small.

Figure 16: Historic Federal highway spending programs



Source: ARTBA, US Census Bureau, Note: Reauthorizations are highlighted in gold

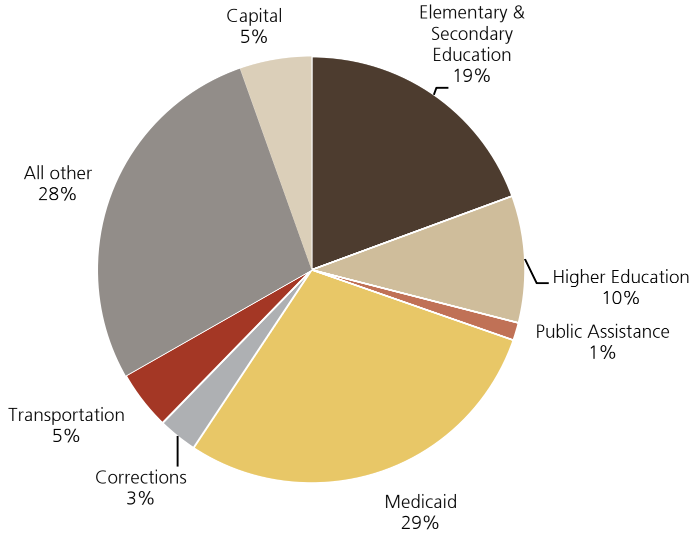
The State Dimension: Taking charge

While the Federal dimension is important, as states receive reimbursement and aid from the Federal government, ~92% of all public spending in 2016 was ultimately directed at the state level. The governors of each state recently released their proposed FY 2018 budgets (majority of state fiscal years begin on July 1). Several state budgets continue to be burdened with uncertainties ranging from lower oil prices to declining sales and income tax receipts; however, many states have proposed infrastructure plans.

Budget details

Though the composition of each state's budget is different, capital expenditures are largely made for new construction, infrastructure, major repairs and improvements, land purchases, and the acquisition of major equipment and existing structures, while minor repairs and routine maintenance are considered operating expenses. Thus, when considering any potential infrastructure bills we think it is important to determine whether funding will be used for capex or opex, as opex would typically not be considered construction. In FY 2016, the National Association of State Budget Officers (NASBO) estimates that ~5% of total state spending was considered capital spending.

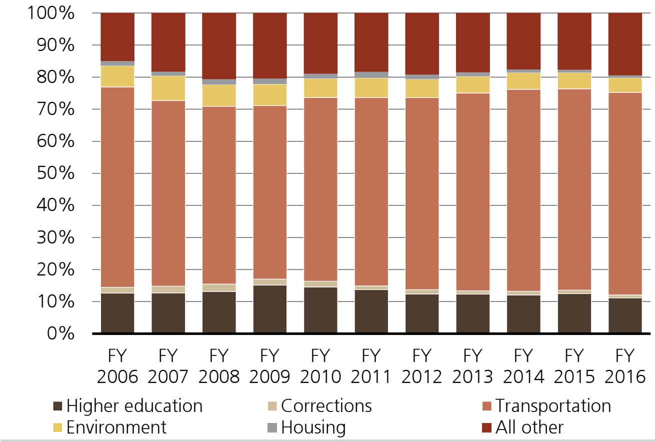
Figure 17: Total state spending by expenditure type (FY 2016E)



Source: National Association of State Budget Officers, UBS

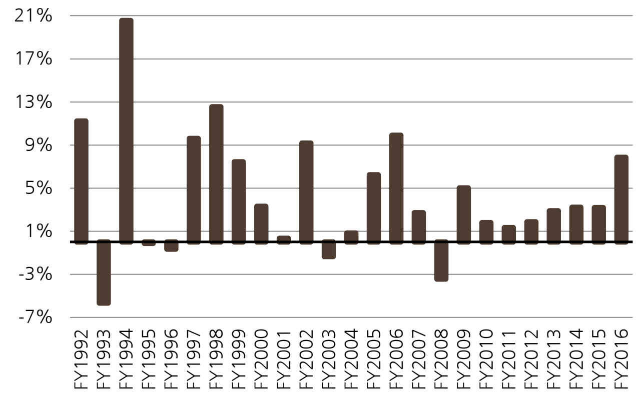
Digging into just the capital expenditure portion of state spending, we note that transportation is by far the largest category of state capital spending. In FY 2016, NASBO estimates ~63% of total capital expenditures were spent on transportation projects. On a YoY basis, total capital spending grew at a ~3% rate from FY 2013-2015, but accelerated to +6% in FY 2016.

Figure 18: Total state capital expenditures by program area



Source: National Association of State Budget Officers

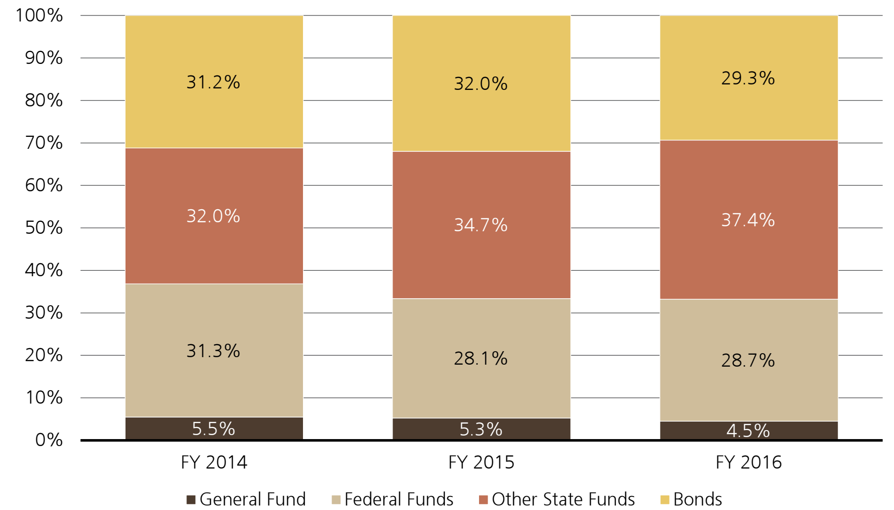
Figure 19: Total capital expenditures YoY



Source: National Association of State Budget Officers

As shown in Figure 20, state funding for capital spending comes from a variety of fund sources (primarily non-General Fund sources), with "Other state funds" (includes dedicated fees and fund surpluses) and Bonds accounting for roughly two thirds of total state capital spending.

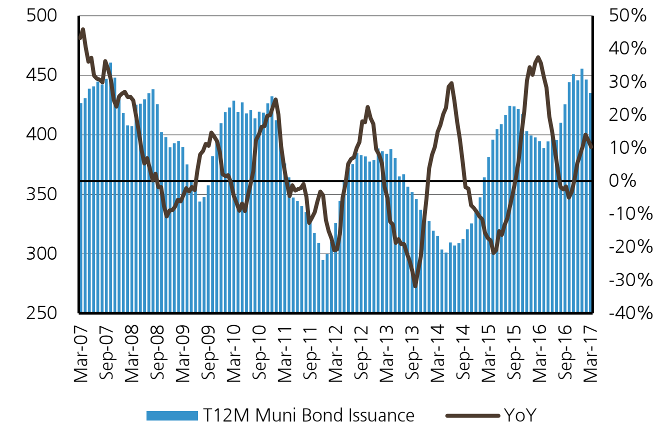
Figure 20: Total state capital expenditures by funding source



Source: National Association of State Budget Officers

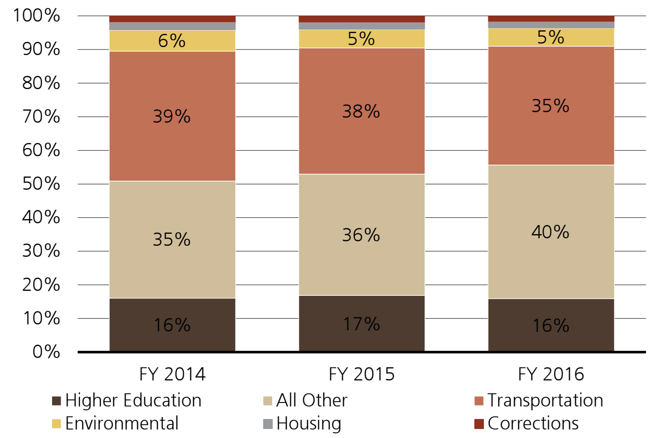
Municipal bond issuance has been rising since a trough in early 2014. Capital spending from bonds proceeds has historically been mostly spent on Transportation and "All Other" projects. We think at least some of the funds from the bond issuances are being put towards various construction projects in the Highway & Street and Transportation non-res construction categories.

Figure 21: Municipal bond issuance



Source: SIFMA

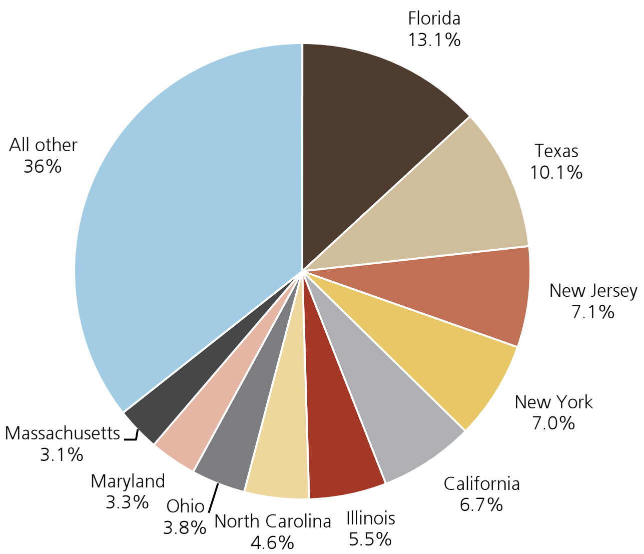
Figure 22: Bond fund capital spending by program area



Source: NASBO, UBS

At the individual state level, ten states were responsible for ~66% of the total transportation capital expenditures in fiscal years 2014 – 2016.

Figure 23: 20% of states accounted for ~66% of FY14-16 transportation capital spending



Source: NASBO, UBS

Notably, among these ten states, several have proposed or enacted a multi-year capital project plan for Transportation capital spending over the next 5-10 years. Many others have included meaningful transportation capital spending in their FY 2018 budgets. For example:

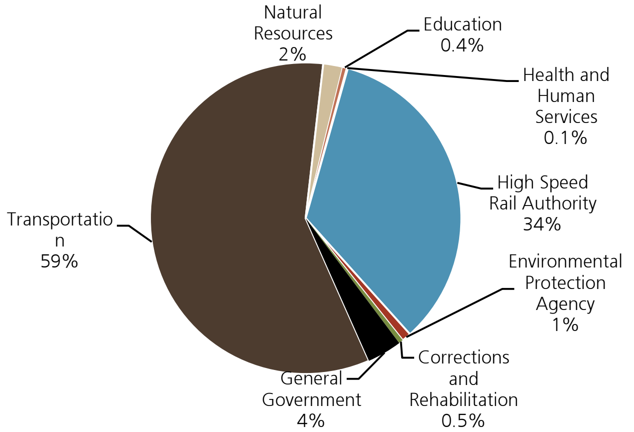
- The Texas governor's proposed budget fully funds $5b in additional road construction.
- The governor of Illinois proposes ~$2b in spending to improve aviation, bridge, highway, and rail infrastructure.
- The proposed Ohio budget recommends a 60.8% YoY increase in transportation capital project spending in FY2018 to $552m (primarily due to inclusion of one project in particular – the I-480 Valley View Bridge project).

Several states have enacted longer-term plans

California

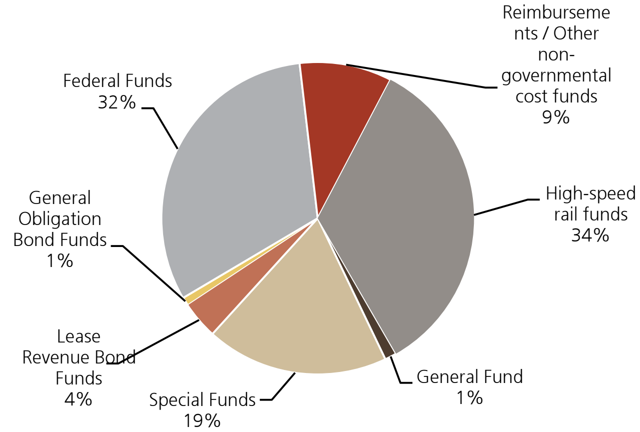
The CA governor submitted a 2017 Five-Year Infrastructure Plan which proposes investing $43b in state infrastructure over the next five years, with 92% of funding dedicated to the state's transportation system, including building a high-speed rail system. The plan proposes a greater reliance on debt financing than in the past, due to budget challenges. CA has $38.6b of general obligation and lease revenue bonds that are authorized but not yet issued, though the plan only proposes ~$2b of bond funding.

Figure 24: Five-Year Infrastructure Plan proposed spending by agency



Source: State of California report

Figure 25: Five-Year Infrastructure Plan proposed funding by source



Source: State of California report

In addition, CA recently passed a highway bill (SB-1) that will provide $52b over the next ten years, funded partly through a $0.12 increase to the state gas tax and various other user fees, to improve the maintenance of highways and roads, expand public transit, and support trade corridors. However, we note this bill mostly funds roadway maintenance rather than roadway expansion or new construction (i.e. not capital spending), but is still positive for highway construction. As the Tutor Perini CEO said, "…only a fraction that will be applicable to what we like. If I had to hazard a guess, maybe 10% to 20%.The rest of it will be repaving, road repair, bridge repair. It's the kinds of things we won't pursue. But it's business into the industry and it all absorbs capacity. And there will always be a few major projects involved in it. But we think it's good for the industry…"

That said, there have been local measures passed or proposed that do contemplate significant capital spending. These include:

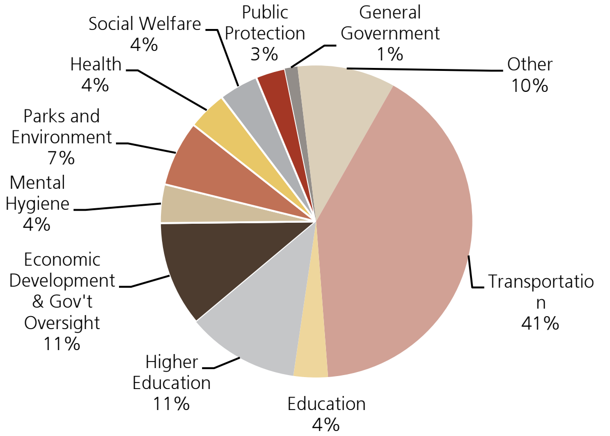
- Measure M in Los Angeles County: Voters approved a permanent sales tax increase (½ cent for every dollar spent on taxable items) to fund a 40-year transportation plan ($860m/year would be raised). Planned projects include expanding the light rail, adding bus routes, widening freeways, investing in rail lines and subway projects, building freeway transitions, street improvements, and building a streetcar project.

- Measure B in Santa Clara County: Voters approved a ½ percent sales tax that will raise $6.3b for transportation over 30 years. ~$1.5b of funds raised will go toward the BART expansion project.
- Proposition J in San Francisco: Voters approved the creation of a Transportation Improvement Fund which will allocate $101.6m per year for 24 years to improve the city's transportation network (no new taxes). However, part of the funding will be used for maintenance, safety education, and improving transit affordability for select demographics.

New York

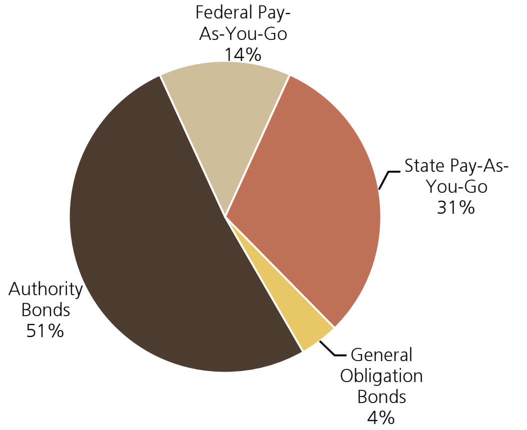
New York's FY 2017 enacted budget includes a Five-Year Capital Plan (FY 2017 – FY 2021) for $63.5b of total capital spending, the majority of which will be spent on transportation projects. The plan is financed by state-supported bonds, PAYGO resources (which are supported by dedicated taxes, fees, and settlement funds provided through the Special Infrastructure Account), and Federal Aid.

Figure 26: Five-Year Capital Plan total spending by function



Source: State of New York report

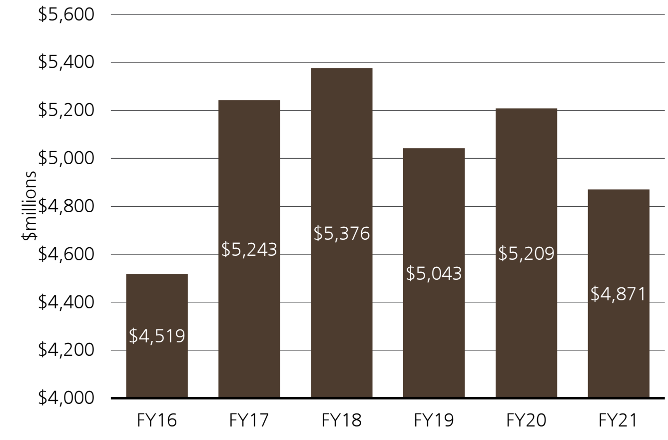
Figure 27: Five-Year Capital Plan total spending by financing source



Source: State of New York report

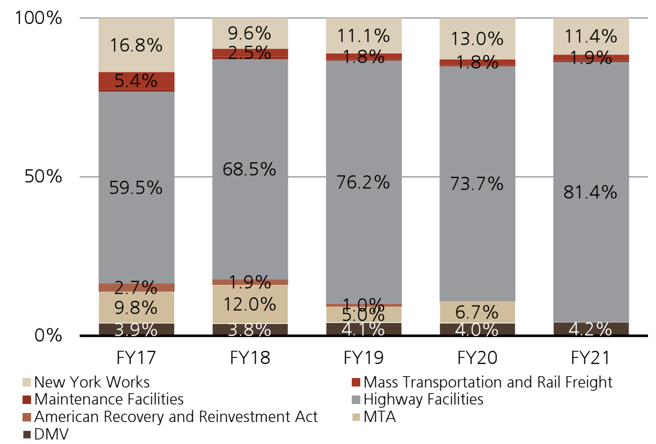
The enacted budget commits to $25.7b in Transportation capital spending, which will be directed to improving roads, bridges, airports, rail facilities, ports and transit systems. As shown in Figure 29, the majority of spending is designated for highway facilities. The American Recovery and Reinvestment Act program was primarily designated for high speed rail spending and the New York Works program is mostly a combination of highway, rail, aviation, and bridge spending.

Figure 28: Transportation Capital Spending by year



Source: State of New York report

Figure 29: Transportation Capital Spending by program

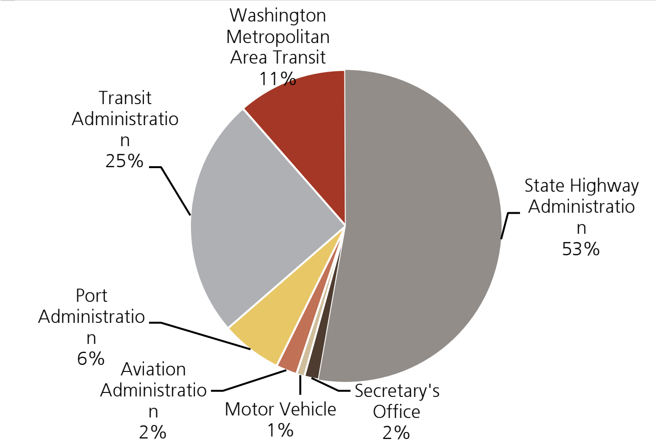


Source: State of New York report
Note: Aviation and Transportation Bondable programs not pictured (~1% combined)

Maryland

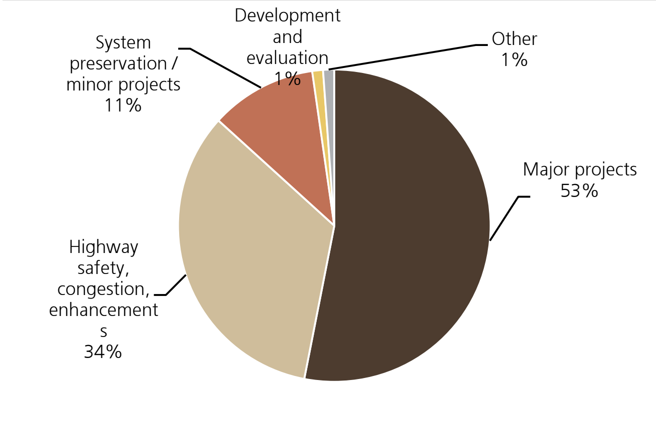
The Department of Transportation represents the largest component of Maryland's proposed FY 2018 five-year Capital Improvement Program (FY 2018 – FY 2022) at proposed spending of ~$12b. Maryland is expected to receive ~$620m in highway funding and ~$175m in transit funding from the FAST Act. The State Highway Administration, which is responsible for planning, designing, constructing, and maintaining all state highway facilities, is the largest beneficiary of the proposed transportation program spending.

Figure 30: Transportation Capital Program spending by administration



Source: State of Maryland report

Figure 31: Use of Transportation Capital Program Funds

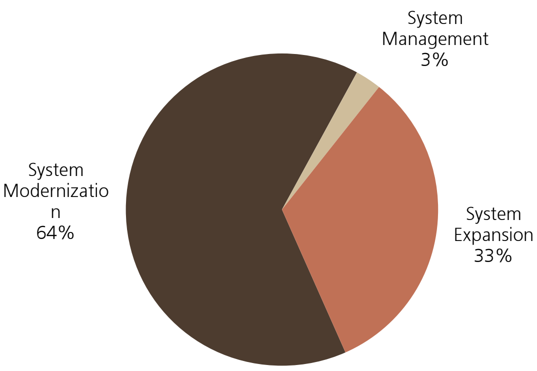


Source: State of Maryland report

Georgia

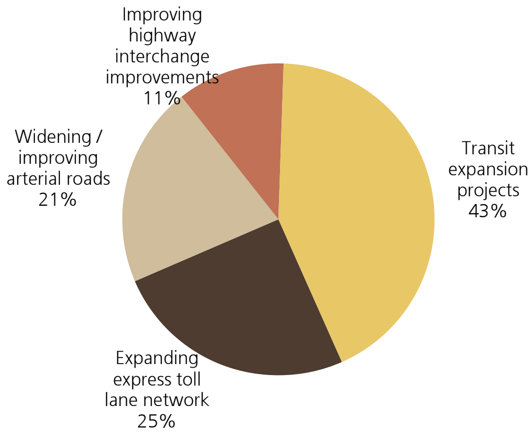
Atlanta Region's Transportation Improvement Program: $85.1b over 25 years in new investment in the region's transportation system. ~2/3 will be used to maintain existing infrastructure but ~$28b will be used to expand the region's transportation network, including expanding the express toll lane network on area highways ($7b), widening and improving major arterial roads ($5.8b), highway interchange improvements ($3.1b), and potential transit expansion projects ($11.9b).

Figure 32: Breakdown of total program



Source: State of Georgia reports

Figure 33: Breakdown of System Expansion spending



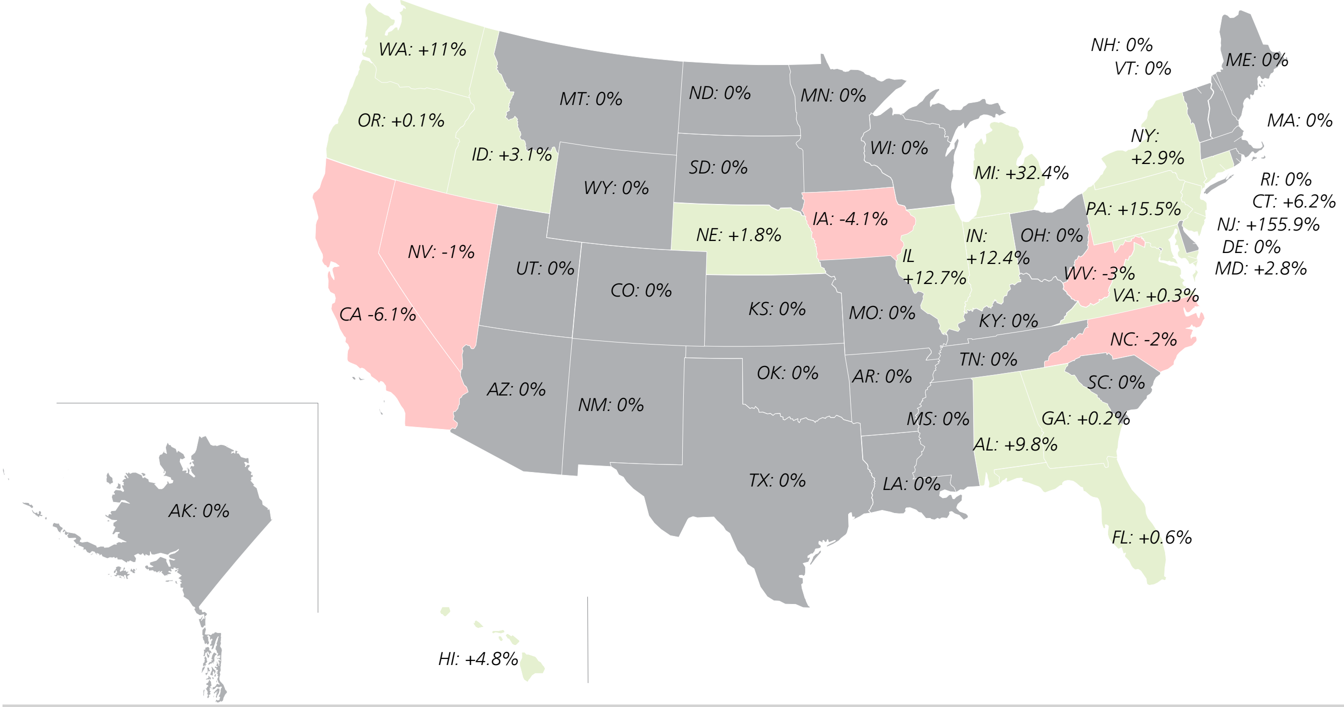
Source: State of Georgia reports

Fuel tax revisions

At both the Federal and State level, taxes on gasoline sales are a key source of funding for highway and street spending. The Federal fuel tax has been 18.4 cents per gallon of gasoline and 24.4 cents per gallon of diesel since 1993. As cars have become more efficient, and as costs have inflated, the Federal fuel tax revenue is insufficient to replenish annual spending out of the Highway Trust Fund. Congress has been reluctant to raise the fuel tax, but several states have successfully pursued fuel tax increases to help boost their own budgets.

In FY 2014 (the last year the data is available), the Tax Foundation found that gas taxes and motor vehicles license fees paid for 41.7% of state and local road spending, which was down from 50.4% in FY 2011, as most state gas rates do not keep up with inflation. However, in recent months many states have raised or are considered raising the state gas tax. As shown in Figure 34, as of 1/1/17, 17 states have raised their gas taxes compared to 1/1/16 (5 states decreased the tax rate due to automatic adjustments). Other states, including California, Tennessee, and Indiana have since approved a raise and others including Alaska, South Carolina, Louisiana, Oklahoma and Alabama, have proposed raises.

Figure 34: Gas tax rate increases (Jan 2016 vs. Jan 2017)

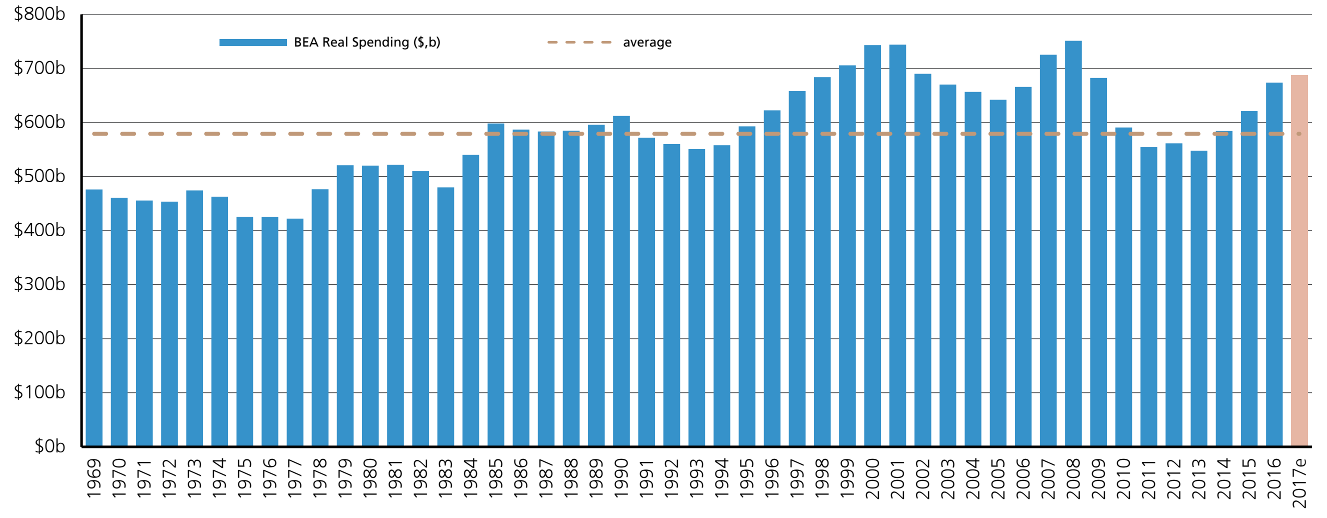


Source: Tax Foundation, American Petroleum Institute, UBS
Note: Rates include excise taxes, environmental fees, storage tank taxes, other fees or taxes, and general sales tax, in states where gasoline is either partially or fully subject to the general sales tax (which includes: CA, CT, GA, IL, IN, MI, NY).

The Big Picture: Where are we in the Cycle?

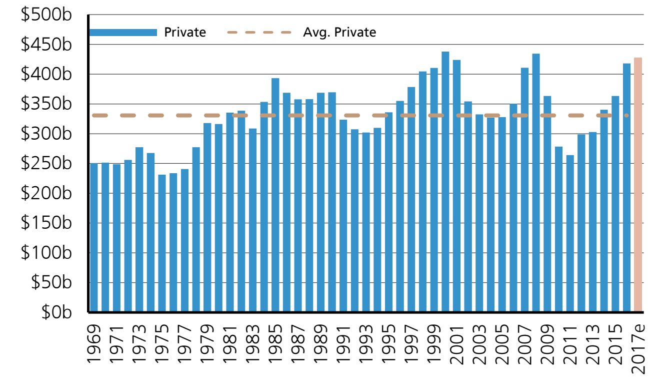
On a real basis, we think private spending has peaked, and we think the non-residential construction market could be roughly flat in 2017. In Q1, real private spending averaged 7.9% growth, versus public spending averaging a 9.7% decline. Real private spending is now up 77% from the 2011 trough, the strongest run of private growth since the decade from 1975 to 1985. Public spending disappointed in 2016, and despite showing some signs of stabilization in Q1, it still remains only slightly above trough levels. We expect another year of modest growth in 2017 and see less downside risk to public spending.

Figure 35: Non-residential spending (real 2009 $)



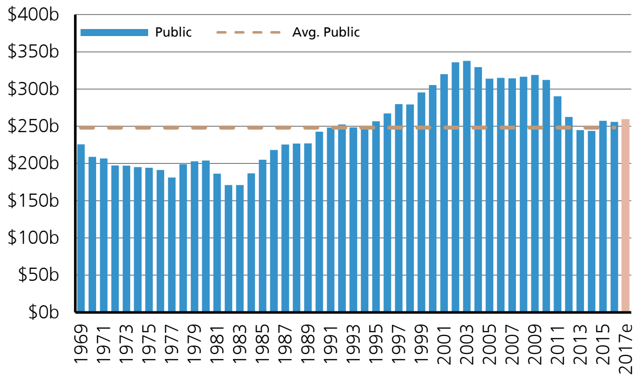
Source: BEA

Figure 36: Private non-residential spending (real 2009 $)



Source: BEA

Figure 37: Public non-residential spending (real 2009 $)



Source: BEA

We think it is informative to examine non-residential construction cycles in terms of real spending; however, real spending data on the individual categories within non-residential construction are less available on historical basis. In Figure 38 we

look at the nine key categories considered in our forecasts, and the market as a whole on a nominal basis.

Several trends stand out:

- The nominal market is within 5% of its prior peak.
- Two categories are within 5% of the prior peak (Highway and Street and Office). Manufacturing has peaked and is declining.
- Every category is showing slowing growth rates or accelerating declines on a T12M basis (most significantly Water and Manufacturing).
- Trailing 12 month year-over-year growth in the office category was significantly stronger than any other category in the most recent month and surpassed its prior peak.

Figure 38: Current non-residential construction cycles (T12M basis)

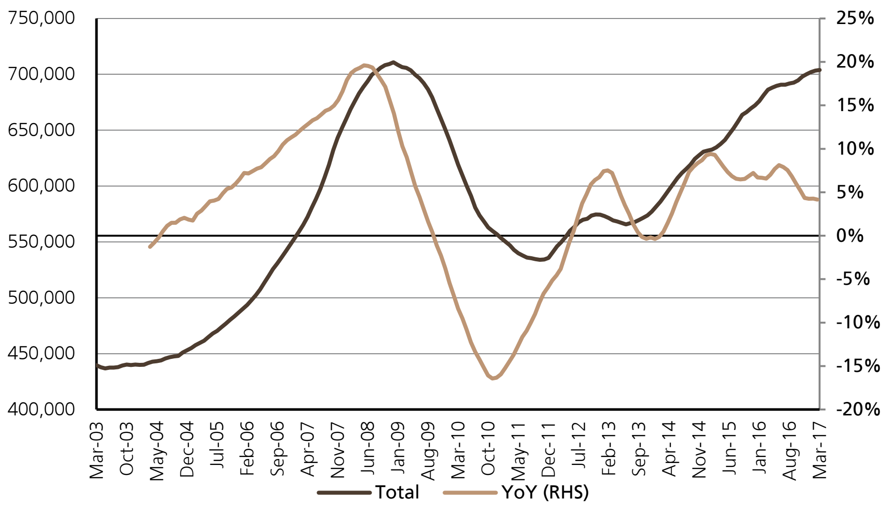
	Current Level	Current Trend	Growth Trajectory	Peak / Trough	Peak Level	Peak Date	Trough Level	Trough Date
Commercial	76,750	11.5%	-0.2%	71%	92,141	4/1/08	39,218	3/1/11
Education	89,565	4.5%	-0.9%	47%	107,474	7/1/09	73,848	5/1/04
Health care	41,479	1.0%	-0.8%	71%	47,369	4/1/09	27,139	12/1/02
Highway and street	90,001	-1.9%	-0.9%	95%	91,698	3/1/16	56,840	2/1/04
Manufacturing	73,345	-6.7%	-1.0%	91%	78,600	3/1/16	20,927	7/1/03
Office	71,996	24.6%	-0.9%	100%	71,996	3/1/17	35,505	10/1/11
Power	96,845	2.6%	-0.2%	79%	113,230	9/1/14	35,256	1/1/05
Transportation	41,759	-8.6%	-0.9%	81%	45,665	3/1/16	24,579	6/1/04
Water, Sewage & Waste	32,471	-13.4%	-1.3%	27%	42,577	1/1/09	28,664	5/1/03
Other	89,656	5.6%	-0.3%	58%	110,102	9/1/08	61,557	1/1/04
Total	703,851	2.6%	-0.6%	98%	710,690	12/1/08	436,852	5/1/03

Source: US Census, UBS

Figure 38 data explanation:

- **Current Level**: shows the trailing 12 month level of spending in millions of dollars.
- **Current Trend**: shows the YoY change in the trailing 12 month level of spending.
- **Growth Trajectory:** depicts the change in growth rate from the current month versus the prior month. This data point is meant to show whether the rate of change is accelerating or decelerating. In the current table, growth is slowing and declines are accelerating for each of the ten main categories we track.
- **Peak / Trough:** shows the "current level" relative to the overall range since 2002, and is intended to show where the current level of spending is relative to previous cycles. Categories at or above prior peaks will show as 100%, such as the Office category. Conversely, categories closer to prior troughs will be closer to 0%, such as Water, Sewage & Waste. The levels and dates of the peaks and troughs being considered are also shown to the right.

Figure 39: Non-residential construction spending (T12M)



Source: US Census

We think the non-residential construction market could be at somewhat of a crossroads. On a trailing twelve month basis, growth in spending slowed during Q1. The most important question is whether growth can reaccelerate in 2H 2017, possibly driven by Highway and Street spending and easier public sector comparisons in the summer, or whether growth will continue to weaken if Office spending slows and the Manufacturing category continues to decline.

Below we look more closely at the longer-term trends of the key categories.

Slowing Growth Trajectory (T12M basis)

We observe six non-residential construction categories that are exhibiting a slowing growth trajectory. We define slowing growth as a sequential decline in the positive growth rate. A category shifting to +4% from +5% would qualify as showing slowing growth.

- **Health Care** spending has been choppy over the last three to five years, and we think is continuing a secular decline that started in late 2008. After a year and a half of growth, the rate of increase began to slow in mid-2016 and continued to weaken through Q1.

- **Power** growth has been improving from sharp YoY declines that troughed at nearly -20% in late 2015. Power spending slowed significantly as oil prices declined, but have since stabilized at a trailing twelve month dollar value averaging ~$95b/year. We think there are some uncertainties around energy related spending in private markets, as oil prices could continue to be volatile in 2017 and lack of a FERC leadership quorum could limit approvals for major planned pipeline projects. The rate of growth slowed moderately during Q1, indicating there is some risk that Power could roll over, but our base case is for modest growth in 2017.

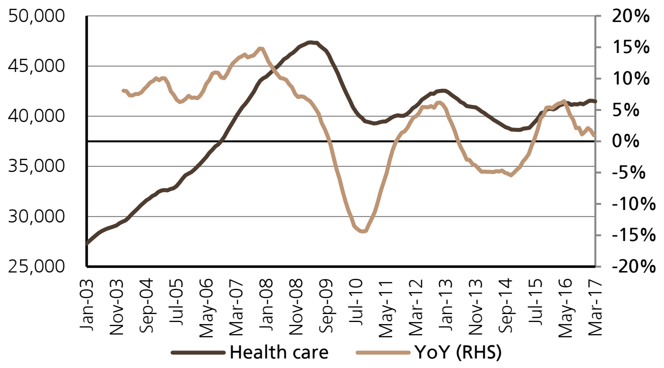
- **Education** growth had been steady at ~6% from mid-2016 through January, but the growth rate started to slow in February and March. The growth rate is down to 4.5% in March. However, given the low base and relative trajectory of the prior cycle, we think the Education category could continue showing modest growth for several more years.

- **Office** growth continues to impress us. The growth rate slowed from the low 20%s in late 2014 to the high teens in 2015 and early 2016, but then began to accelerate in early 2016, and continued to do so in November and December. Growth remained relatively steady in Q1 at ~25%, which we think could indicate the beginning of slowdown in office construction.

- **Commercial** growth slowed from nearly 20% YoY in late 2014 to roughly 6% in the middle of 2016. Growth accelerated during 2H16, but has since been relatively stable. The commercial construction cycle seems to be intact for the time being, but there is some risk that it could roll over.

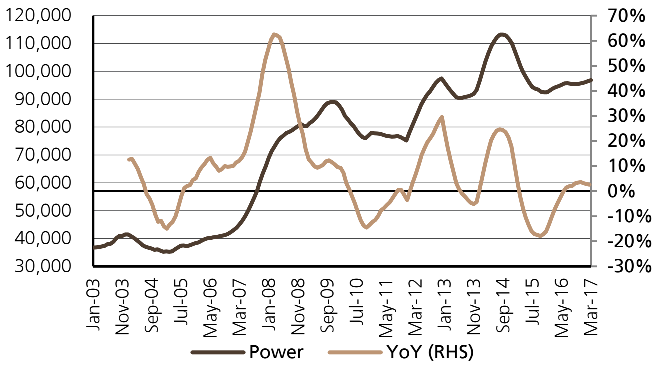
- **Other** includes Lodging, Religious, Public Safety, Amusement and Recreation, Communication and Conservation and Development. The growth rate in the Other category has been slowing since mid-2016 (partially due to toughening comps).

Figure 40: Health care spending growth is slowing, but construction in the category has remained stable



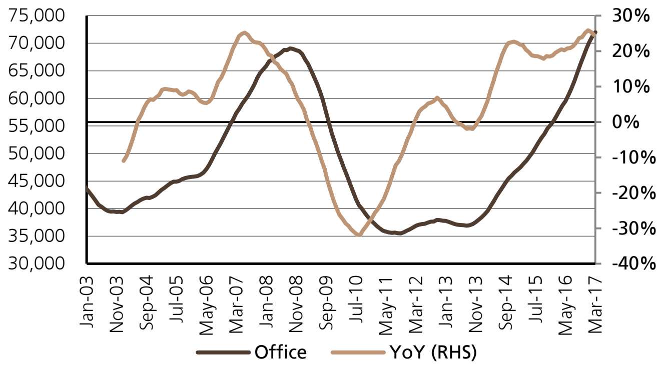
Source: US Census Bureau

Figure 41: Power spending growth had been accelerating but the trend could be rolling over



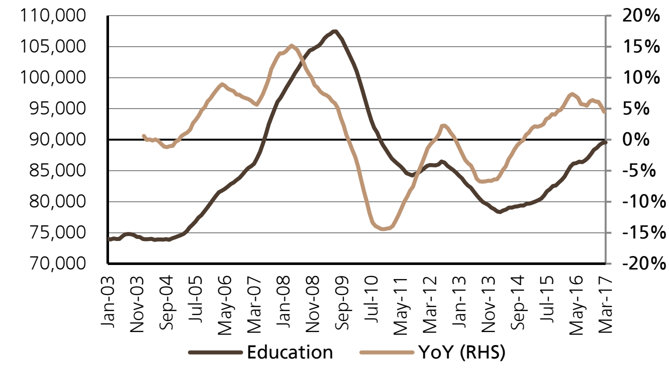
Source: US Census Bureau

Figure 42: Office construction growth may have peaked



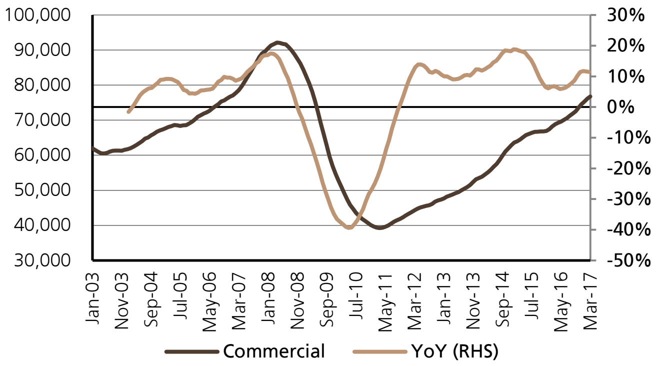
Source: US Census Bureau

Figure 43: Education spending growth has been relatively stable



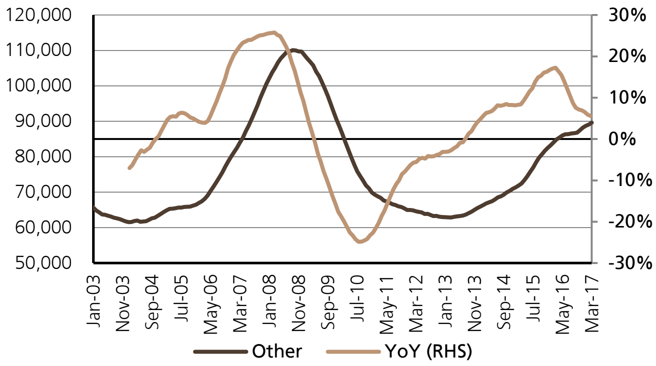
Source: US Census Bureau

Figure 44: Commercial spending growth had been accelerating but the trend could be rolling over



Source: US Census Bureau

Figure 45: Growth in the "other" category continues slow, but construction in the category has remained stable



Source: US Census Bureau

Accelerating Decline Trajectory (T12M basis)

We observe four non-residential construction categories that are exhibiting an accelerating decline trajectory. We define accelerating decline as the sequential decline in the in the negative growth rate. A category shifting to -5% from -4% would qualify as an accelerating decline.

- **Manufacturing** spending continued to weaken sharply in Q1. The large LNG and petrochemical projects being constructed on the Gulf Coast are classified in Manufacturing, and we think a lack of new project FIDs over the last twelve months will result in a longer-term slowdown in spending. Year over year comparisons start to ease in the second half of 2017, but we see spending coming down off a high level with relatively few new projects ready to replace the ones that are nearing completion.

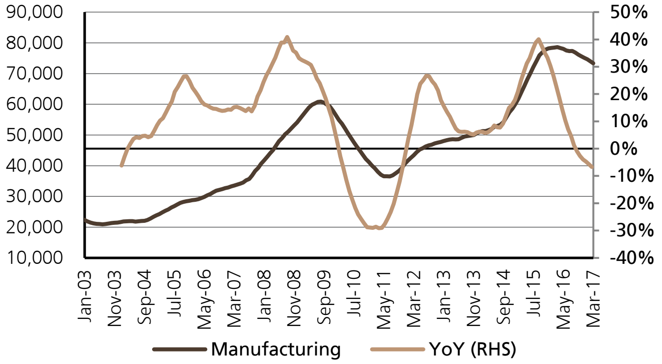
- **Transportation** spending growth is also weakening sharply, and is now declining 8.5% YoY (on a T12M basis); down from -6.4% YoY in December. The category includes facilities such as airports, railroad tracks and bridges, and ports. We think spending could have slowed partially as a result of a slowdown in crude-by-rail investment, and it is not immediately clear how much LNG port construction is classified in the category. There are several airport projects that are just starting, and we think rail investment could be a part of a broader infrastructure plan, so we would not assume that the category is necessarily headed towards prior trough levels.

- **Highway and Street** growth was a major disappointment in 2016, as we had expected the 2015 passage of the FAST Act to help civil infrastructure investment. 1Q16 comps were tough as, T12M growth slowed from 8.1% in March 2016 to -1.9% in March 2017. However, monthly YoY growth improved to -1.8% in March from -9.8% in December. We think there could be some pent up investment, resulting from delayed spending due to project planning in 2016, and budget funds that were only recently allocated, which could reaccelerate growth as 2017 progresses.

- **Water, Sewage & Waste** was the weakest growing category in 2016 posting a ~9% decline and remained the weakest category in Q1 (-13.4%). While spending is still declining (both YoY and on a sequential basis), we think many

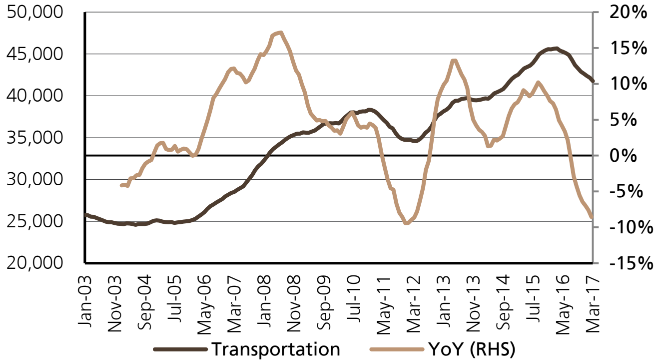
of the assets considered in the category fall into the infrastructure bucket, and therefore could benefit if a new infrastructure spending bill is passed at the Federal level.

Figure 46: Manufacturing is weakening the fastest of all the categories we follow



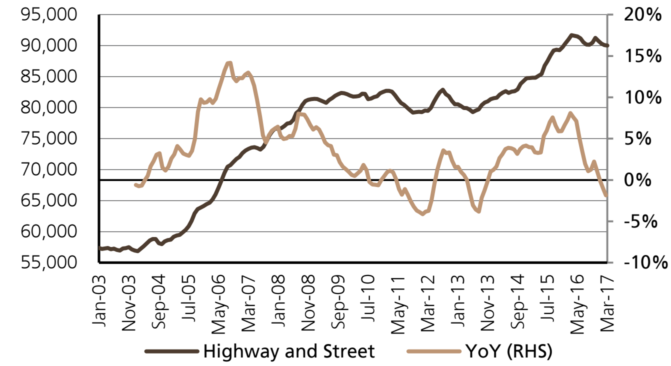
Source: US Census Bureau

Figure 47: Transportation spending growth continued to decline, but spending levels remain above trough levels



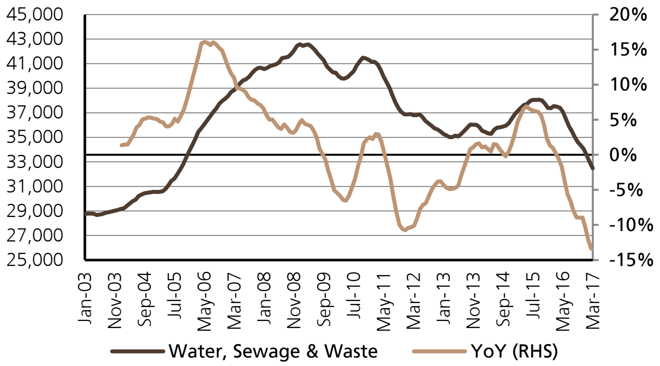
Source: US Census Bureau

Figure 48: Highway and Street growth could re-accelerate in the summer



Source: US Census Bureau

Figure 49: Growth in Water, Sewage & Waste has been negative since April 2016



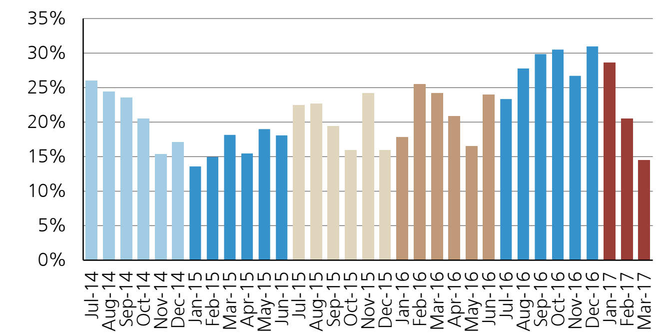
Source: US Census Bureau

2017 Outlook: Key categories to watch

Office

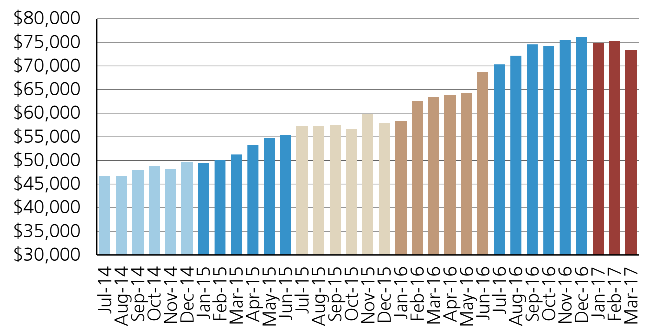
Growth in the Office category has been impressive over the last four years, and we expect growth to continue in 2017, leading to ongoing strength in the Private sector, driven by the technology and financial sectors. That said, we think growth will slow significantly as the year progresses. Overall, we think the Office category will grow 10% in 2017 and decline 5% in 2018. On a T12M basis through March, Office spending has already started to slow, posting 24.6% growth (vs. +25.1% exiting 2016).

Figure 50: Office (YoY)



Source: US Census Bureau, UBS

Figure 51: Office (SAAR)



Source: US Census Bureau, UBS

The Office category makes up ~10% of total non-res construction spending, with the bulk of that spending coming from the Private sector. On a T12M basis, General office spending has been the strongest sub-category; however, the pace of growth has been slowing down. General office buildings include administration buildings, computer centers, office buildings, and professional buildings.

On the other hand, Financial Office spending growth has been accelerating in recent months. Financial office buildings include banks, financial institutions, building & loans, saving & loans, and credit unions. That said, as a percentage of total non-res spending, Financial office is not as meaningful as the General office category, so we think the slowdown in General office spending will drive an overall slowdown in Office spending growth.

Figure 52: Office Spending Heatmap

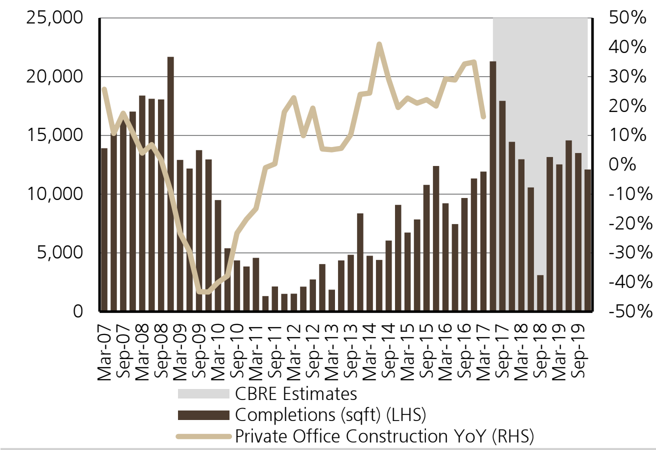
	% of Total	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	T12M
Total Office	**10.2%**	**24.3%**	**20.9%**	**16.5%**	**24.0%**	**23.3%**	**27.8%**	**29.9%**	**30.5%**	**26.7%**	**31.0%**	**28.6%**	**20.5%**	**14.5%**	**24.6%**
Public	1.1%	-3.7%	-9.3%	-12.4%	-4.4%	-6.3%	5.4%	3.2%	-3.0%	10.4%	4.7%	3.0%	-2.7%	1.0%	-1.1%
Private	9.1%	29.2%	26.5%	22.0%	28.9%	28.2%	31.3%	34.3%	35.7%	29.1%	35.0%	32.4%	23.8%	16.3%	28.7%
General	8.8%	29.0%	27.1%	21.5%	28.3%	28.7%	30.8%	35.4%	35.8%	28.9%	34.4%	31.0%	23.7%	15.9%	28.5%
Financial	0.3%	13.3%	-1.5%	8.1%	3.0%	-5.5%	2.8%	-8.5%	15.0%	24.5%	43.6%	82.7%	28.1%	32.4%	17.0%
State	0.8%	-2.7%	-11.9%	-13.4%	-6.7%	-9.8%	-2.5%	-4.5%	-8.7%	8.6%	5.0%	-1.5%	-0.3%	-6.3%	-4.7%
Federal	0.3%	-6.1%	-1.2%	-9.7%	2.3%	4.4%	29.8%	20.1%	17.7%	16.0%	4.0%	14.1%	-7.7%	20.2%	8.7%

Source: US Census Bureau, UBS

We think trends are in place for growth to continue in 2017. On a basic level, for now, rents are good, jobs are being created, and interest rates are low. CBRE expects nearly 75% YoY growth in 2017 completions. The comparisons do not

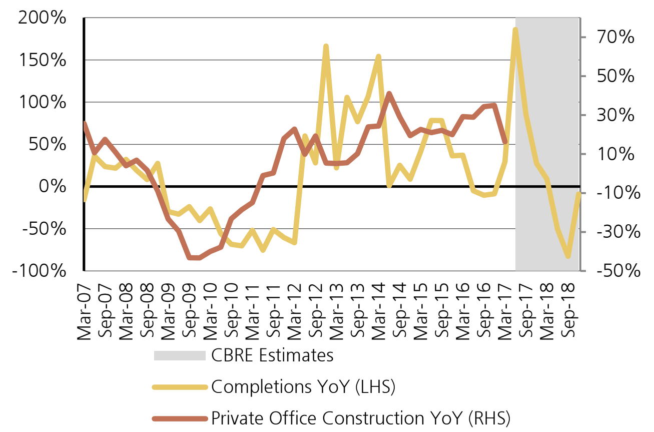
start getting tougher until the second half of the year, so we think momentum could continue in the Office market, but we also think that 2017 may mark the peak, as increasing supply will likely lead to a higher vacancy rate, lower rental rates, and fewer ground breakings.

Figure 53: Office completions are positively correlated to office construction growth…



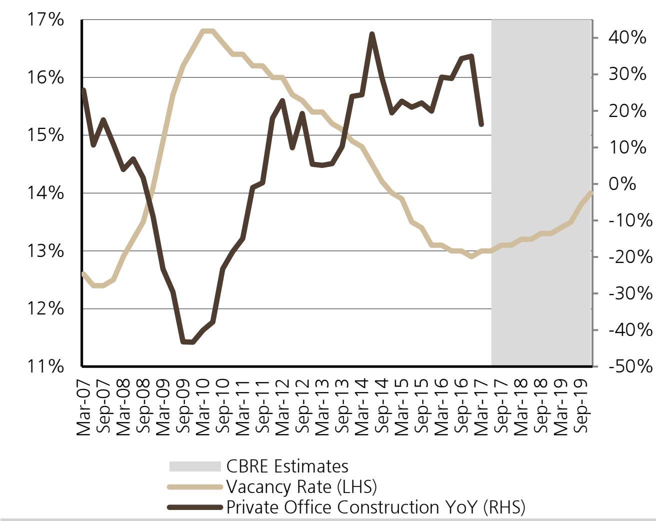
Source: CBRE, US Census Bureau, UBS

Figure 54: …and completions are excepted to be strong in in 2017, before declining in 2018



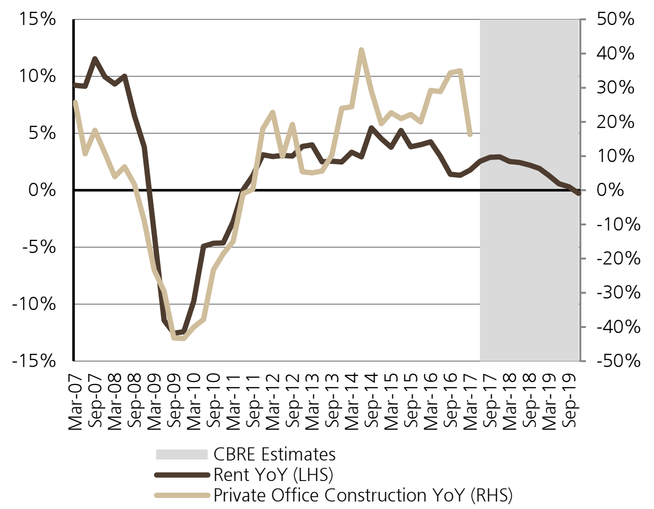
Source: CBRE, US Census Bureau, UBS

Figure 55: Office vacancy rates are expected to rise in 2018 and are inversely correlated to Office construction



Source: CBRE, US Census Bureau, UBS

Figure 56: Office rental rate growth is correlated to office construction and is expected to peak in 2017



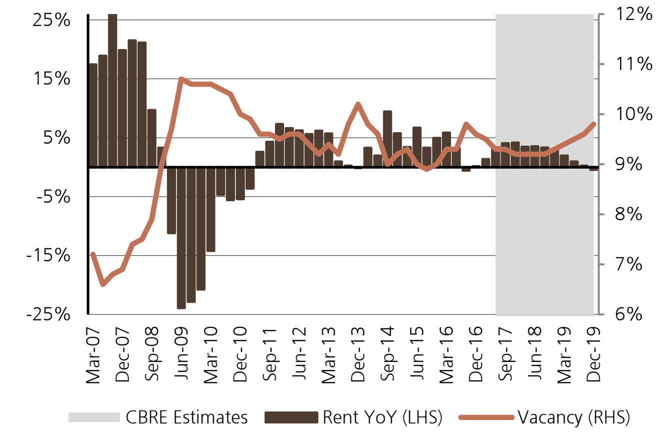
Source: CBRE, US Census Bureau, UBS

At a local market level, JLL notes that growth in previously leading metro areas (e.g. San Francisco, Atlanta, Chicago) has slowed down, and that secondary and tertiary metro areas (e.g. Phoenix, Austin, Charlotte) have been driving recent strength.

To that end, we note that the New York, Houston, and San Francisco office construction markets are softening. CBRE thinks New York office vacancy will bottom in 2017 and that rental rate growth will be minimal over the next four years, which we think could limit investors' willingness to pursue office

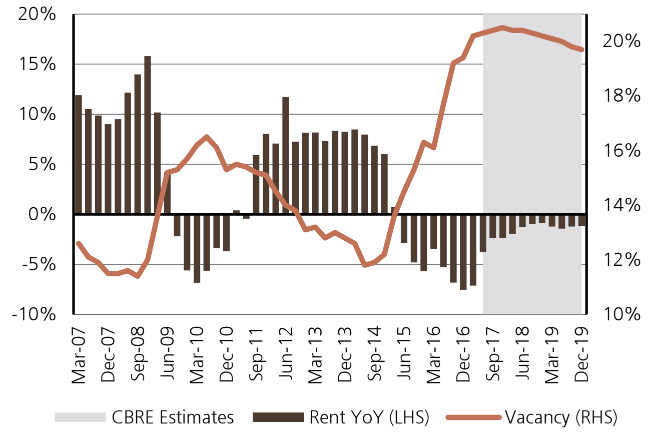
construction projects in New York. Similarly, CBRE projects continued weakness in Houston rental rates through 2019 with an increasing vacancy rate through 2017, which will likewise limit new office construction in Houston, in our view.

Figure 57: CBRE expects that New York's office vacancy rate will bottom in 2017 of 2018



Source: CBRE, UBS

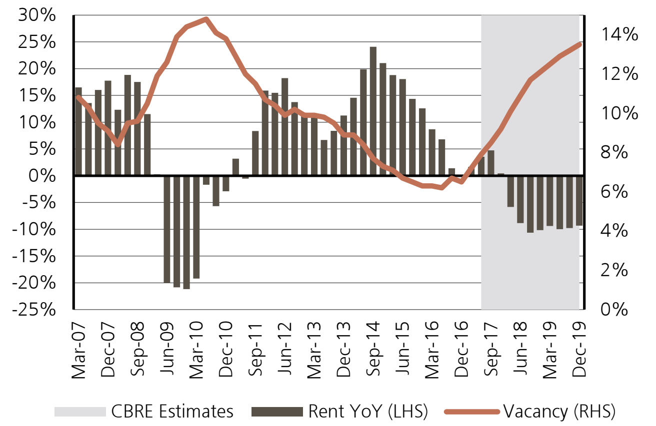
Figure 58: CBRE expects Houston rental rates to decline though 2019



Source: CBRE, UBS

CBRE thinks San Francisco vacancy bottomed in 2016. While rates are expected to continue growing in 2017, CBRE forecasts increasing vacancy through 2019 with rental rates beginning to decline in 2018.

Figure 59: CBRE expects San Francisco rental rates to decline in 2018



Source: CBRE, UBS

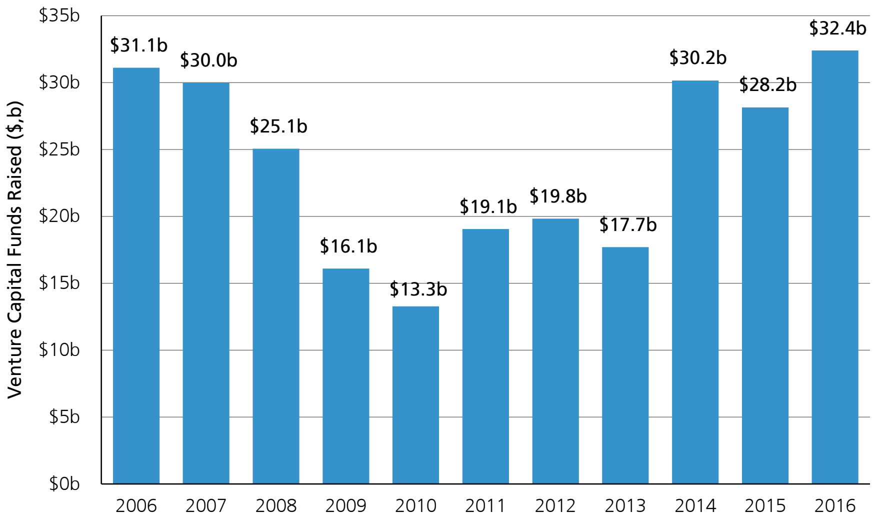
At the individual sector level, according to JLL, the Technology sector is driving tenant demand. During Q1 the tech sector represented 24.2% of total leasing activity, followed by the finance and insurance sector at 14.2%. We think current market dynamics will sustain these trends which could help Office construction.

Specifically, 2017 may see an acceleration in tech IPOs and M&A activity, which could drive office demand. According to PwC and Thomson Reuters, there were 486 US tech deals announced in Q1, up 28% from Q1 2016 and Q2 has remained active. There have also been various other news reports suggesting continued tech growth momentum:

- "Bankers Expect a Trump Bump for IPO Market" – *WSJ* (1/10/17)
- "A Wary Tech Sector is Booming in the Land of Trump" – *WSJ* (4/25/17)
- "As IPOs Pick Up, Big Startups Hold Out" – *WSJ* (5/7/17)
- "Tech IPOs Making Comeback" – *MediaPost* (5/10/17)
- "Will the tech acquisition spree continue?" – *TechCrunch* (5/7/17)
- "The Window for Tech IPOs is Wide Open – and is Likely to Stay Open" – *Forbes* (3/31/17)
- "These tech startups are IPO candidates to watch in 2017" – *Business Insider* (1/3/17)

Venture capitalists raised $7.9b across 58 funds in 1Q17, down ~24% YoY. The National Venture Capital Association attributes the decline primarily to the absence of mega-funds raised, as most of the vehicles raised during 1Q17 were sub-$250m. That said, the Association notes that $7.9b of funds raised absent mega-funds, "bodes well for VC fundraising for the rest of 2017."

Figure 60: Venture capital funding fell sharply in 2H15 but rose in 2016

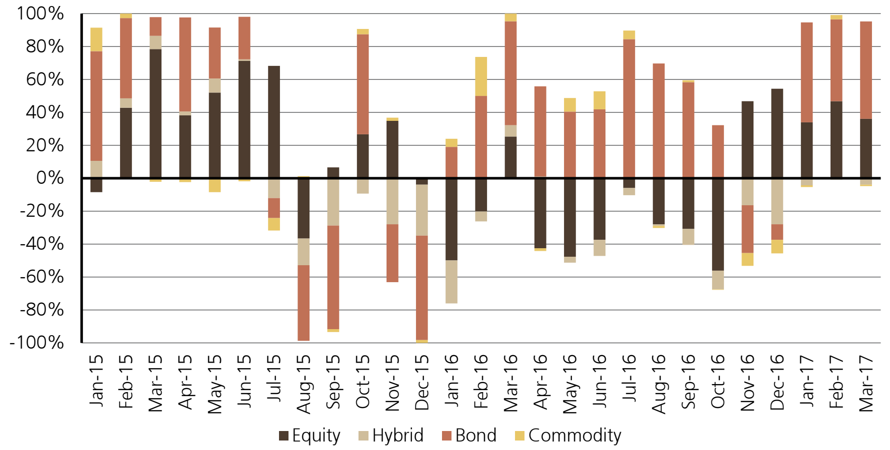


Source: Thomson Reuters and National Venture Capital Association, UBS Estimates

There have also been numerous media reports suggesting an imminent shift back to active investing. UBS quantitative analysts believe that over the next eight years, passive investments are unlikely to meet return requirements due to expected low market growth and that investors are moving away from funds that provide 'total market exposure.' We think active investing requires more office space than passive investing, and thus this shift could drive some growth in the Financial Office category.

Through most of 2016, monthly flow data shows that investors were largely removing money from equity mutual funds; however, starting in November the trend seemed to reverse and flows into equity mutual funds have been positive in Q1. Further, according to Barclyhedge, hedge fund performance during Q1 was the highest since 2015.

Figure 61: Long-term Mutual fund and ETF flows across asset class



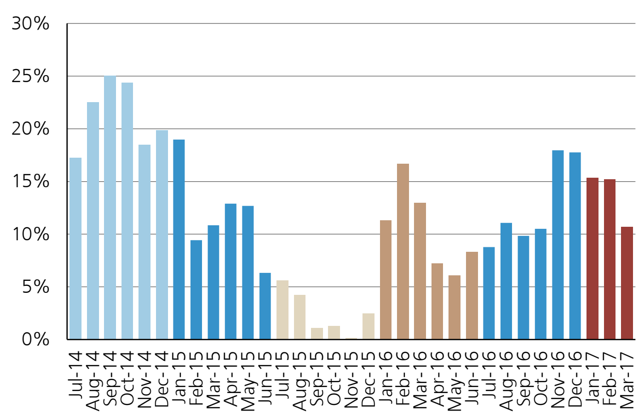
Source: Investment Company Institute

As for 2018, if economic growth accelerates, job growth remains robust, and capital market conditions remain favorable, we think there could be some pockets of upside in the Office market. Additionally, Federal policy changes such as corporate tax reform and boarder adjustment taxes could prolong the Office construction wave (GE has not yet begun construction of its new Boston location), but these developments will play out over time, and we think on a SAAR basis that the market may have already peaked.

Commercial

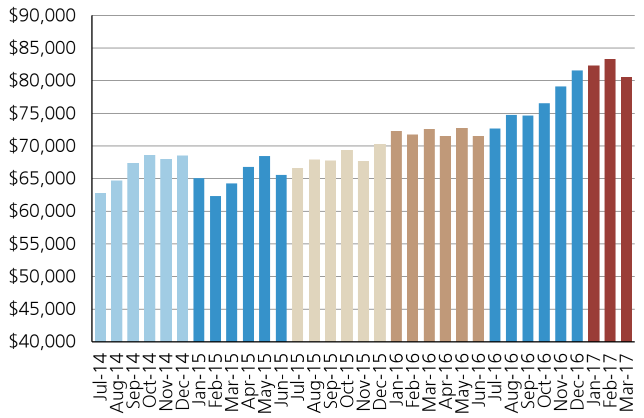
Commercial construction is holding up better than expected, as warehouse, automotive, and multi-retail (general merchandise, shopping center, and shopping malls) growth have held up. That said, growth trends in automotive and multi-retail appear to be slowing. We think consumers remain relatively confident, and warehouse construction combined with some retail investment could offset closures and lead to Commercial growth. Overall, we think the Commercial category will grow 2% in 2017 and decline 1% in 2018, as we think slowing multi-retail and automotive construction will outpace Warehouse strength. On a T12M basis through March, Commercial spending has remained relatively stable, posting 11.5% growth (vs. +11.4% exiting 2016).

Figure 62: Commercial (YoY)



Source: US Census Bureau, UBS

Figure 63: Commercial (SAAR)



Source: US Census Bureau, UBS

The Commercial category makes up ~10.9% of total non-res construction spending, with the bulk of that spending coming from the Private sector. On a T12M basis, Warehouse commercial spending has been the strongest sub-category. Warehouse buildings include general commercial warehouses (commercial warehouses, storage warehouses, distribution buildings, grain elevators, and greenhouses) and mini-storage centers and self-storage centers.

On a T12M basis, the Building supply store sub-category has been the weakest. Other stores include clothing stores, jewelry stores, non-auto salesrooms, furniture stores, office supply stores, storerooms, and electronics stores. Other notable trends include the slowdown in Shopping Center spending (includes shopping centers, shopping plazas, and town centers) and the relatively stable Automotive spending (includes auto/motorcycle/truck dealerships, auto showrooms, auto service/parts/repair centers, tire service centers, car washes, car rental centers, gas stations, emissions testing centers, and commercial parking lots/garages).

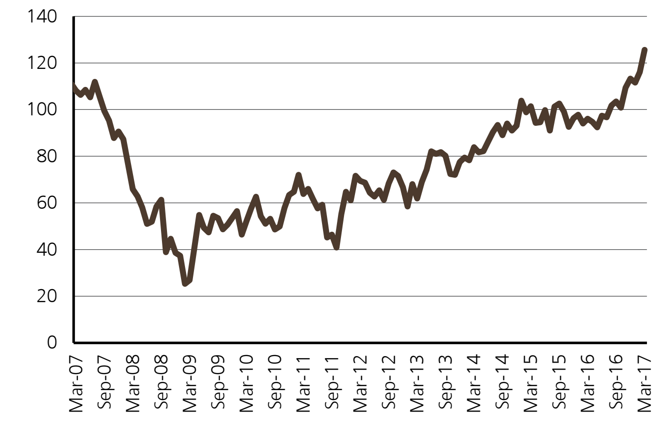
Figure 64: Commercial Spending Heatmap

	% of Total	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	T12M
Total Commercial	**10.9%**	**13.0%**	**7.2%**	**6.1%**	**8.3%**	**8.8%**	**11.1%**	**9.8%**	**10.5%**	**18.0%**	**17.8%**	**15.3%**	**15.2%**	**10.7%**	**11.5%**
Public	0.4%	76.2%	66.7%	37.9%	8.2%	-17.3%	3.0%	11.5%	9.6%	15.2%	3.3%	-8.9%	-9.6%	-23.3%	5.3%
Private	10.5%	10.8%	5.4%	4.9%	8.3%	9.9%	11.5%	9.8%	10.5%	18.1%	18.5%	16.5%	16.5%	12.6%	11.8%
Automotive (Private)	0.9%	22.0%	-1.0%	-10.5%	3.7%	15.7%	31.0%	25.5%	22.3%	27.9%	31.7%	22.2%	30.9%	12.4%	16.6%
Food	0.5%	-7.6%	-3.0%	-9.1%	-10.2%	-12.9%	-0.7%	34.2%	45.8%	60.4%	54.3%	22.0%	19.9%	2.8%	13.9%
Dining/drinking	0.4%	-13.8%	-10.0%	0.0%	-1.5%	42.9%	37.9%	3.3%	-0.4%	14.5%	18.7%	0.0%	-4.2%	34.0%	10.1%
General merchandise	0.4%	-16.2%	-13.0%	-0.9%	17.8%	37.0%	44.3%	8.8%	-1.8%	-11.5%	2.2%	15.6%	23.8%	15.0%	11.4%
Shopping center	2.0%	5.6%	7.4%	4.7%	11.0%	-1.4%	2.5%	3.5%	11.8%	18.4%	8.6%	3.3%	2.1%	0.6%	5.9%
Shopping mall	0.5%	1.3%	-35.5%	-39.7%	-18.9%	0.7%	7.3%	17.1%	39.8%	80.0%	87.0%	89.2%	57.4%	41.5%	16.9%
Drug Store	0.1%	9.4%	-14.6%	-11.9%	21.6%	20.0%	-13.0%	-18.2%	-14.9%	37.8%	-2.6%	0.0%	0.0%	-42.9%	-3.5%
Building supply store	0.1%	22.6%	-20.8%	-5.5%	15.8%	20.4%	14.6%	-36.2%	-37.0%	-22.7%	-14.3%	-28.2%	-19.0%	-21.1%	-12.4%
Other stores	0.6%	55.3%	53.2%	32.6%	34.5%	43.7%	34.6%	28.4%	11.8%	15.9%	28.0%	15.5%	6.9%	-9.5%	22.6%
Warehouse	3.0%	23.7%	19.2%	32.8%	30.7%	24.5%	16.5%	13.3%	15.7%	27.5%	28.0%	37.0%	39.9%	37.8%	26.5%
State	0.2%	98.7%	69.7%	36.1%	-11.9%	-29.0%	-22.8%	-0.7%	-15.5%	-12.7%	-22.9%	-19.1%	-18.8%	-32.9%	-10.7%
Federal	0.2%	56.7%	63.2%	39.6%	31.4%	-0.9%	36.6%	23.3%	50.5%	62.0%	31.9%	5.0%	1.6%	-12.8%	25.0%

Source: US Census Bureau, UBS

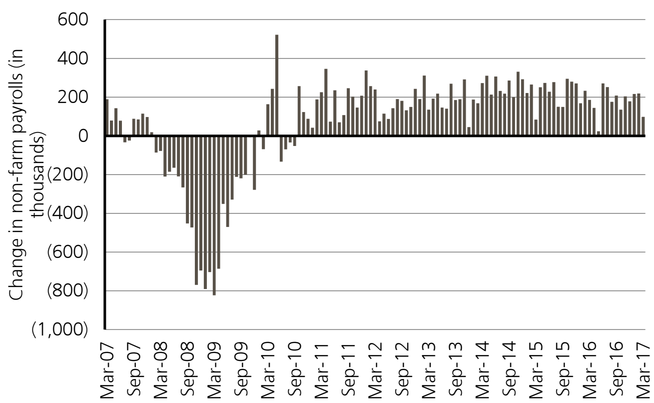
We think macro trends are in place for strength to continue in 2017. On a basic level, consumer confidence is high, jobs are being created, and interest rates are low. The comparisons ease in the coming months, and get progressively weaker later in the year, so we think momentum could continue in the Commercial market, but we also think that 2017 may mark the peak.

Figure 65: Consumer confidence is near a 10-year high



Source: Conference Board

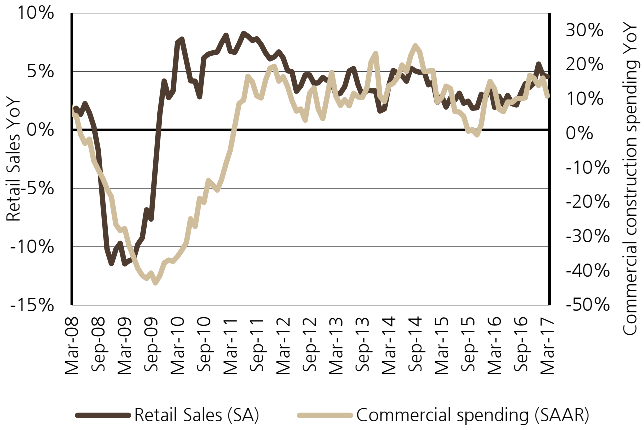
Figure 66: Jobs are being created



Source: BLS

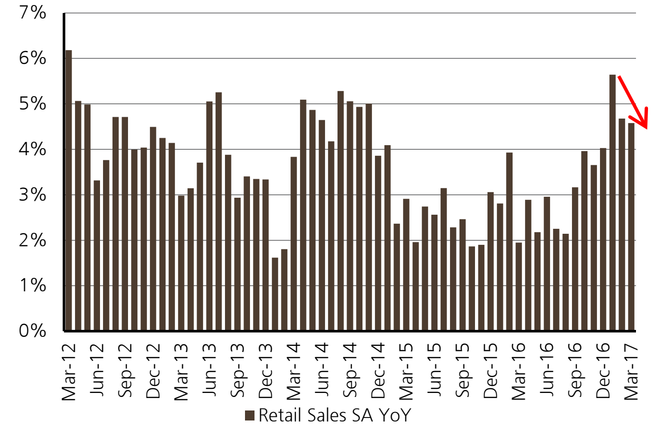
On a YoY basis, retail sales growth tends to lead commercial construction spending growth. Despite strong optimism and steady job creation, US retail sales fell sequentially for the second straight month in March. Sales declined 0.2% sequentially in March, following February's decline of 0.3%. On a YoY basis, while still positive, the rate of retail sales growth slowed in February and March. That said, UBS US economists believe Q1 appeared weak for temporary reasons and think 2017 will be another strong year for retail spending. We think sustained retail sales strength will continue to support Commercial construction.

Figure 67: Retail sales vs. Commercial construction (YoY)



Source: US Census Bureau

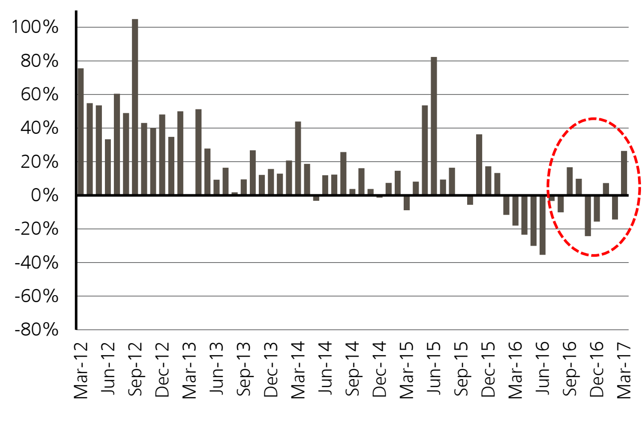
Figure 68: Retail sales have been slowing



Source: US Census Bureau

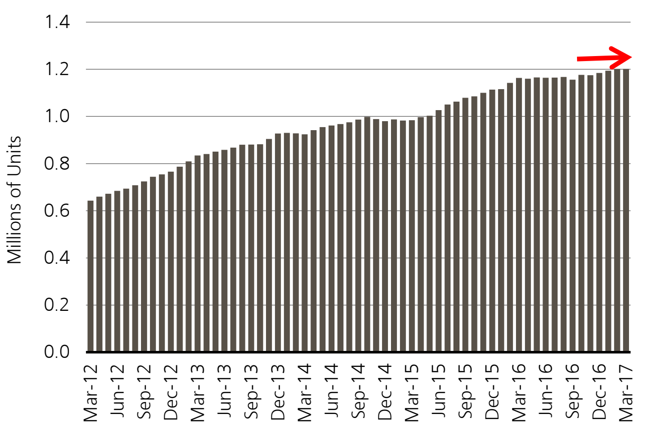
However, residential construction growth may be slowing, which we think could be a leading indicator of a coming slowdown in Commercial construction growth. New building permits (for residential buildings with 5 units or more) have mostly been declining since 2H16 and new housing starts on a T12M basis have been relatively flat since 2H16, which could indicate they have peaked. Permits did grow YoY in March, which we think may have been driven by the Affordable New York initiative, which offers tax incentives to developers who build projects of 300 units or more in certain areas of NYC, and is the successor to the 421-a program, which expired in January 2016 (credited with driving the year-end permitting surge in 2015). The New York Building Congress reported that the number of permitted residential units in NYC in 1Q17 were triple that of 1Q16.

Figure 69: Residential 5+ Unit Building Permits (YoY)



Source: US Census Bureau

Figure 70: New Housing Starts (R12M)



Source: FactSet

At the individual sub-category level we note that of the three largest (as a percentage of total non-res construction) commercial categories, growth in warehouse remains the strongest (T12M +26.5% vs. 2016 +22.2%), followed by Automotive (T12M +16.6% vs. 2016 +14.9%). Shopping center spending remain strong; however the rate of growth appears to be slowing (T12M +5.9% vs. 2016 +8.0%).

We think both the strength in Warehouse and the slowdown in Shopping Center can be attributed partly to the expansion of eCommerce. In a recent Q-Series report, UBS found that penetration of eCommerce in the US continues to rise, with internet retail expected to make up ~16% of total retail spend by 2019 (vs. 12% today). In 2015, eCommerce (ex. Amazon) grew at 5.5% (Amazon grew >35%), while total retail sales grew only 1.9%.

According to Reis, a real estate research firm, vacancy rates in shopping centers increased in 28 of 77 US metro areas in 1Q17 vs. 1Q16, which was relatively flat with 4Q16 (vacancy rates increased in 30 out of 77 US metro areas vs. 4Q15). We think more vacant retail space could lead to lower levels of construction, as indicated by the slowing growth rate in Shopping Centers. Various articles have continued to highlight weakness in the big box retail market:

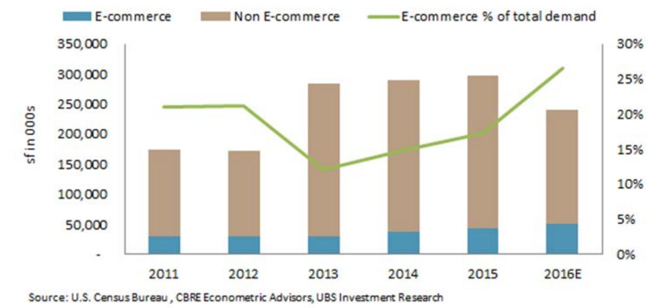
- "Sears is quietly closing more stores than it said it would - here's the list" – *Business Insider* (5/15/17)
- "All Marsh grocery stores in jeopardy of closing" – *Indianapolis Business Journal* (5/10/17)
- "Store Closing Data looks Foreboding for Malls" – *National Real Estate Investor* (5/11/17)
- "Jacksonville-based Winn-Dixie quietly closing stores" – *The Florida Times-Union* (5/11/17)
- "Gymboree to close stores as part of upcoming bankruptcy filing" – *Denver Post* (5/5/17)
- "Stores are closing at an epic pace" – *CNN Money* (4/22/17)
- "Brick-and-Mortar Stores are Shuttering at a Record Pace" – *WSJ* (4/21/17)
- "Retailer Bebe Plans to Close its Stores" – *WSJ* (4/21/17)
- "The New Shopping Hubs for Cities: Warehouse Distribution Centers" – *WSJ* (4/16/17)
- "GameStop Closing at Least 150 Stores amid Sales Decline" – *WSJ* (3/23/17)
- "Signet Plans to Close Stores, Invest in Digital amid Soft Sales" – *WSJ* (3/9/17)
- "Hhgregg to Cut about 1,500 jobs, Close 40% of its Stores" – *WSJ* (3/2/17)
- "Crocs to Close Stores, names new CEO amid Sales Rout" – *WSJ* (3/1/17)
- "J.C. Penney is Latest Retailer Forced to Downsize" – *WSJ* (2/27/17)

On the positive side, there have been some articles suggesting that international retailers are using these store closings as an opportunity to expand into the US retail market. European retailers including H&M, Zara, Sports Direct International, Primark, Scotch & Soda, and Reiss have all opened new stores in the US.

Further, online sales require 3x as much warehouse space as a similar level of brick and mortar sales. eCommerce represents ~20% of new leasing assuming 1 sq foot of warehouse space for every $1,000 of new eCommerce sales and industrial

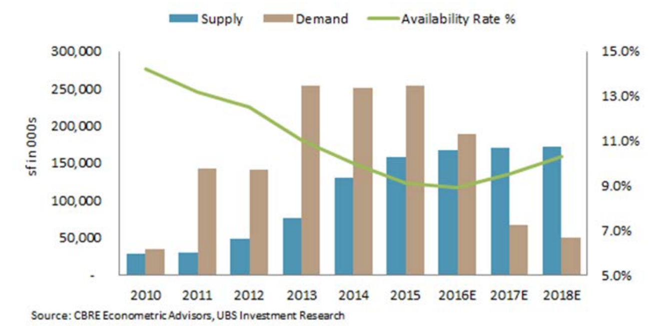
vacancy rates fell to record-low levels in 2016, partially due to growing eCommerce demand. We think this is driving the strength in Warehouse construction as well. However, as new supply begins to outpace demand in 2017 and 2018, we think the construction growth will slow down.

Figure 71: E-commerce as a % of total industrial real estate demand is increasing



Source: US Census Bureau, CBRE, UBS

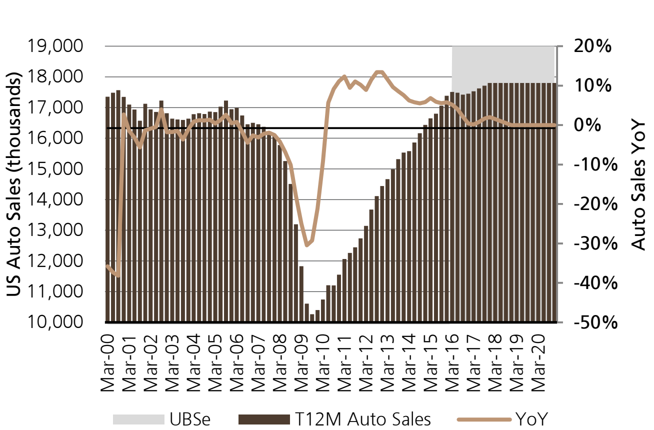
Figure 72: Industrial real estate vacancy rates are expected to increase in 2017 and 2018



Source: US Census Bureau, CBRE, UBS

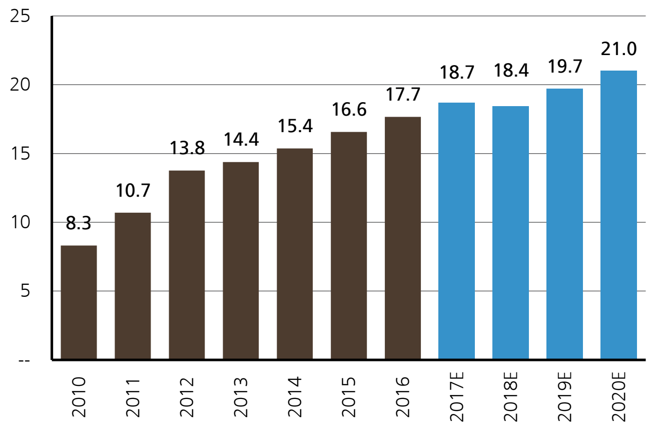
Auto sales have been declining in recent months, with April's SAAR of 16.8m down ~3% YoY. However, UBS forecasts relatively flat YoY growth in auto sales, with slight increases in 2H17-1H18 and Ford believes positive macroeconomic factors are supportive of mid-17m SAAR (in-line with GM's FY estimate of 17.2m). Automakers have also shown more discipline over incentives recently and inventories are expected to moderate as 2017 progresses. UBS also expects capex to be at a near-term peak in 2017 (+5.7% YoY) and then decline slightly in 2018 (-1.2% YoY). We think the growth in auto sales and capex in 2017 will sustain Automotive construction spending growth in 2017; however, we think the flattening forecast in 2018 is indicative of a slowdown in construction spending.

Figure 73: UBS forecasts flat US auto sales growth with slight increase in 2H17, from lows



Source: UBS estimates

Figure 74: UBS forecasts a near-term peak in US auto company capex

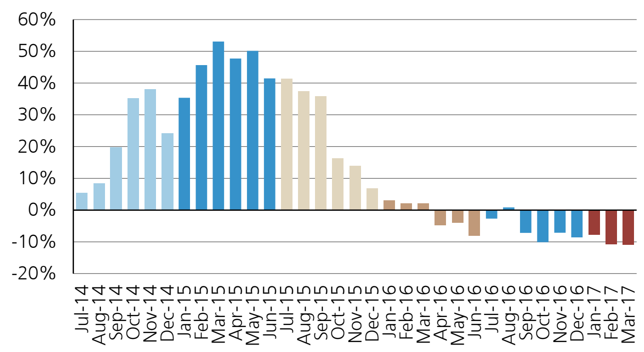


Source: UBS estimates

Manufacturing

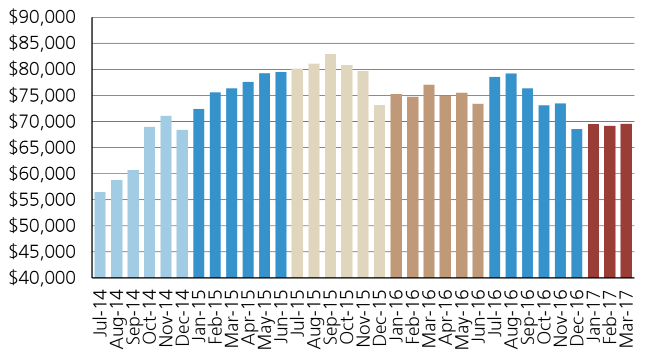
We expect a continued ramp down in Manufacturing in 2017. We note that Manufacturing has clearly peaked on a SAAR basis, and we do not think recent new project starts are sufficient to offset what will likely be a gradual decline in spending as project activity peaks. Despite easing comps as 2017 progresses, we expect manufacturing to ramp down as construction slows. Overall, we think the Manufacturing category will decline 5% in 2017 and in 2018, as we continue to expect weakness on the Gulf Coast from a slowdown in downstream energy and LNG investments. On a T12M basis through March, Manufacturing spending declined 6.7% (vs. -3.9% exiting 2016).

Figure 75: Manufacturing (YoY)



Source: US Census Bureau

Figure 76: Manufacturing (SAAR)



Source: US Census Bureau

The Manufacturing category makes up ~10.4% of total non-res construction spending, with all of the spending coming from the Private sector. Notable trends among the larger sub-categories include the moderation in declines of Chemical construction spending (industries that transform organic and inorganic raw materials by a chemical process and form products) and acceleration of declines in Transportation equipment spending (industries that produce equipment for transporting people and goods). We also note that the Manufacturing category includes LNG export terminals.

On a T12M basis, Fabricated Metal has been the strongest sub-category. Fabricated metal industries transform metal into intermediate or end products, other than machinery, computers and electronics, and metal furniture or treating metals and metal formed products fabricated elsewhere. On a T12M basis, Computer/electronic/electrical has been the weakest sub-category, which includes industries that manufacture computers, computer peripherals, and communications equipment, and industries that manufacture products that generate, distribute, and use electrical power (including manufacturers of lighting equipment and household appliances).

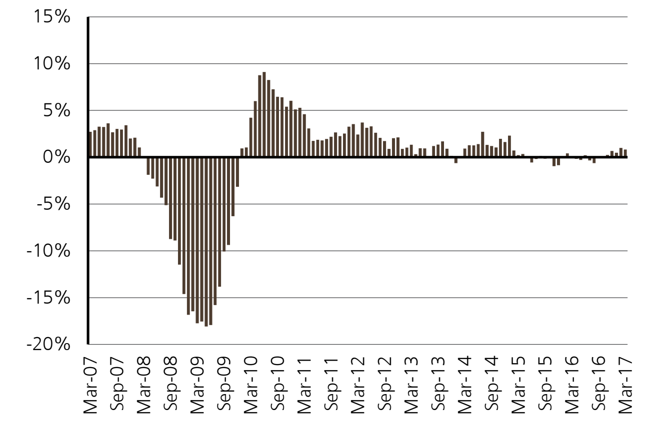
Figure 77: Manufacturing Spending Heatmap

	% of Total	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	T12M
Total Manufacturing	**10.4%**	**2.2%**	**-4.7%**	**-3.9%**	**-8.0%**	**-2.7%**	**0.9%**	**-7.2%**	**-10.1%**	**-7.1%**	**-8.6%**	**-7.8%**	**-10.8%**	**-10.9%**	**-6.7%**
Public	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Private	10.3%	2.2%	-4.9%	-3.9%	-8.0%	-2.4%	0.7%	-7.2%	-9.8%	-7.1%	-8.6%	-7.8%	-10.6%	-11.0%	-6.7%
Food/beverage/tobacco	0.9%	-4.9%	-15.2%	-5.3%	-13.3%	-6.0%	4.9%	-3.0%	4.5%	18.0%	20.5%	11.8%	6.1%	-8.0%	0.6%
Chemical	5.1%	6.4%	-2.4%	-8.7%	-2.4%	0.2%	5.7%	-7.2%	-11.3%	-6.2%	-12.2%	0.7%	2.9%	2.3%	-3.5%
Plastic/rubber	0.4%	2.3%	30.0%	20.3%	15.8%	5.6%	37.4%	24.1%	21.3%	-9.0%	-9.0%	-46.0%	-60.2%	-51.5%	-1.3%
Nonmetallic mineral	0.2%	5.7%	-24.2%	-37.4%	-33.9%	-5.9%	-36.3%	-22.3%	2.8%	0.0%	-25.2%	52.9%	21.1%	13.0%	-10.7%
Fabricated metal	0.3%	138.7%	275.6%	311.5%	253.7%	271.0%	156.8%	91.0%	76.9%	61.0%	65.3%	36.2%	24.8%	-21.6%	98.7%
Computer/electronic/electrical	0.2%	-30.3%	-41.0%	-41.4%	-16.3%	-51.4%	-43.0%	-31.2%	-51.6%	-52.1%	-50.9%	-43.0%	-46.4%	-41.2%	-43.3%
Transportation equipment	1.5%	19.2%	5.1%	22.4%	-5.0%	1.6%	-9.6%	-8.8%	-8.0%	-10.3%	-14.9%	-16.1%	-24.4%	-29.1%	-8.7%
Other	1.7%	-15.6%	-21.6%	-16.7%	-31.8%	-16.1%	-11.4%	-16.1%	-20.4%	-12.4%	3.2%	-23.4%	-26.2%	-15.4%	-17.7%

Source: US Census Bureau

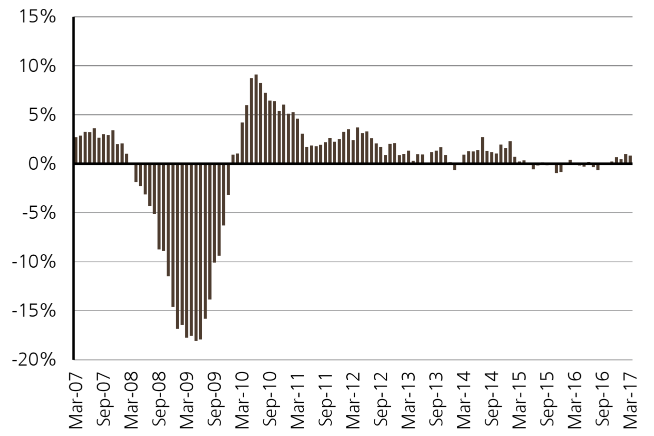
We think the current Industrial Production trends suggest weakness will continue in 2017. Though Manufacturing Industrial Production and Capacity Utilization have recently turned positive on a YoY basis, the rate of growth remains slow (under 1%).

Figure 78: Manufacturing IP (YoY)



Source: Federal Reserve, UBS

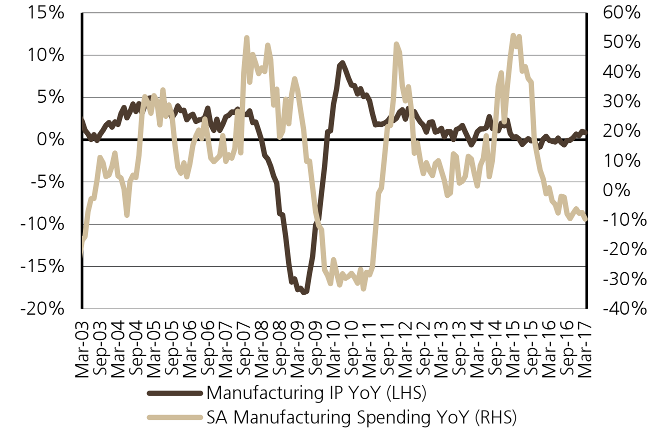
Figure 79: Manufacturing Capacity Utilization (YoY)



Source: Federal Reserve, UBS

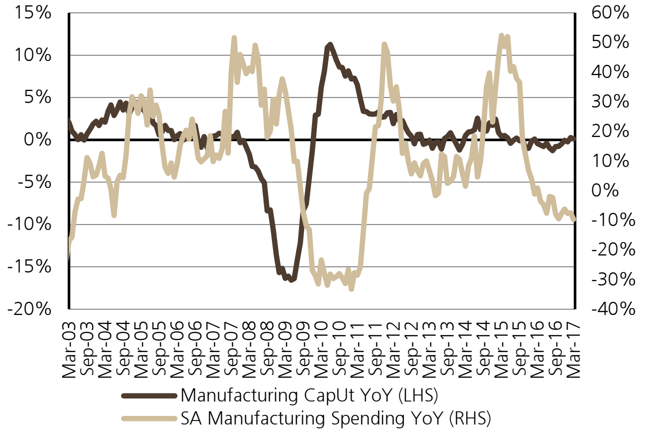
We note that Manufacturing IP and Capacity Utilization lead Manufacturing construction spending, and both have varied between -1% and 1% growth since early 2015. Thus, we think Manufacturing IP and Capacity Utilization growth will have to accelerate more meaningfully before we see growth in Manufacturing construction. UBS economists forecast total US IP growth of 1.2% in 2017 and 2.0% in 2018.

Figure 80: Manufacturing IP vs. Manufacturing construction



Source: Federal Reserve, US Census Bureau

Figure 81: Manufacturing Capacity Utilization vs. Manufacturing construction

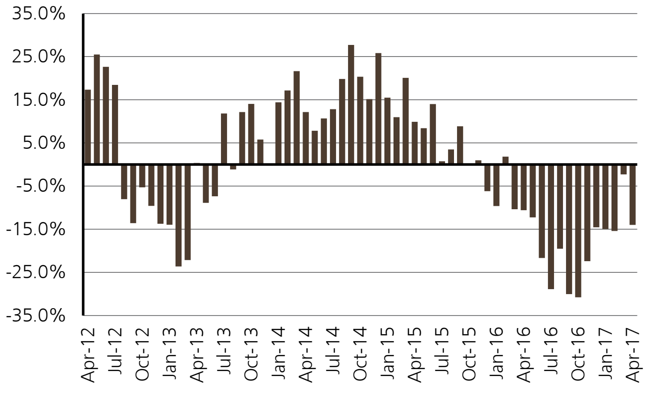


Source: Federal Reserve, US Census Bureau

At the individual sub-category level we note that the two largest Manufacturing sub-categories (as a percentage of total non-res construction) are Chemical (5.1% of total) and Transportation equipment (1.5% of total). While declines in Chemical appear to be moderating (T12M -3.5% vs. -10.4% exiting 2016), declines in Transportation Equipment appear to be accelerating (T12M -8.7% vs. -6.6% exiting 2016).

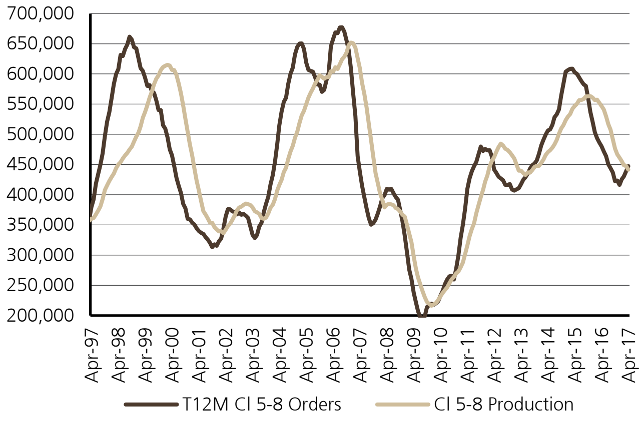
Class 5-8 truck production has been declining YoY since early 2016. That said, North American truck orders have rebounded from a trough and been strong YTD (Class 5-8 orders +20% YoY). Historically, order volumes have been strongly correlated to truck production. Figure 83 shows orders leading production since 1997, and also shows the late 2016 trough in orders. If truck production increases there could be upside to Transportation Equipment construction in 2018.

Figure 82: Class 8 production YoY



Source: ACT Research, UBS

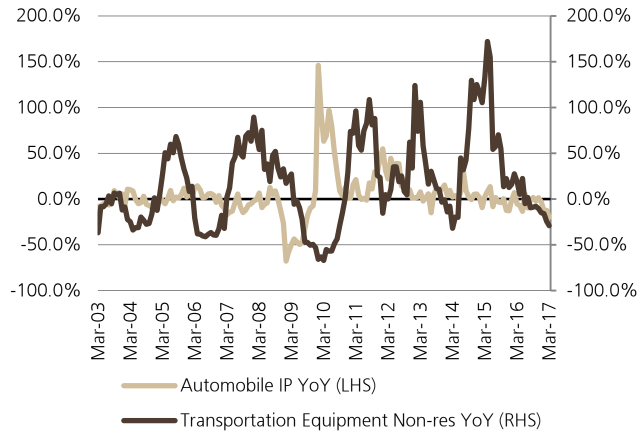
Figure 83: Class 5-8 T12M orders vs. production



Source: ACT Research, UBS

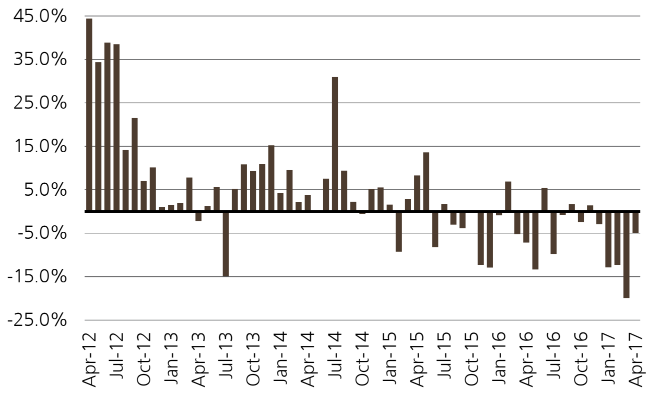
We found that Automobile industrial production has typically led Transportation Equipment construction spending. Automobile industrial production has been choppy, but mostly down since mid-2015.

Figure 84: Auto IP vs. Transportation Equipment non-res



Source: Federal Reserve, US Census Bureau

Figure 85: Automobile IP YoY

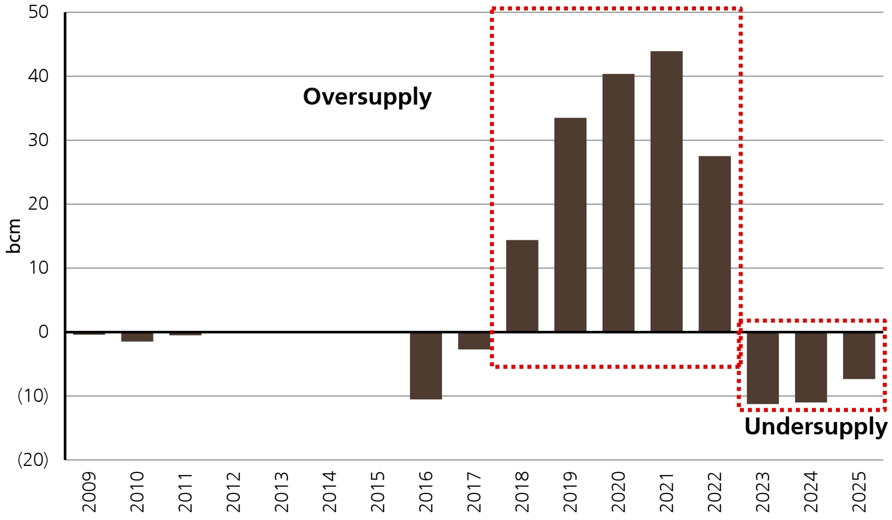


Source: Federal Reserve

Inventories remain elevated at GM and Ford. In April, Ford's inventory days supply of 83 was 12 days above its ten-year April average and GM's inventory of 100 days was 22 days above it ten-year average. However, GM expects inventory to moderate and end 2017 at similar inventory levels as 2016, due to lower production and new launches, which we think could keep Auto IP muted in the near-term. That said, Ford announced in January that it would cancel its plans for a $1.6b Mexico plant and launch a $700m Michigan expansion instead, which is in addition to investing $850m in Michigan Assembly Plant upgrades, $200m for an advanced data center in Michigan, and $150m to expand capacity for engine components for several vehicles at Romeo Engine Plan in Michigan.

We also note that the Manufacturing category includes construction of LNG export terminals (unclear in which sub-category it falls). As we discussed in our LNG capex and project tracker report, we expect a limited number of final investment decisions over the next few years, while the last round of projects wind down. The UBS oil & gas team's supply/demand model shows the LNG market loosening through 2020/2021 followed by a quick tightening (note), supporting our view of limited FIDs in the near-term. We expect to see a more active level of approvals followed by an upturn in construction activity around 2020-2025.

Figure 86: Global LNG supply/demand forecasts

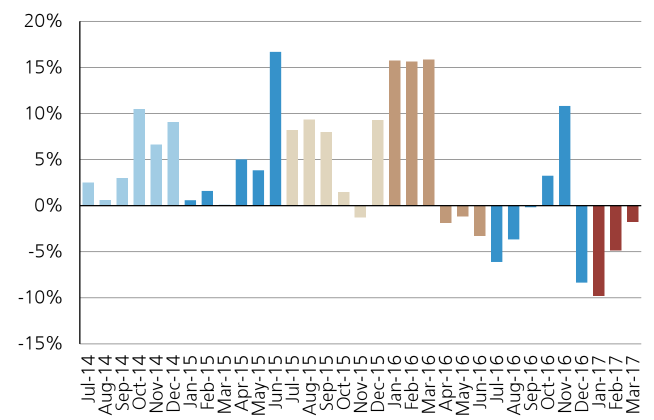


Source: UBS Oil and Gas team, BP Statistical Review of World Energy

Highway & Street

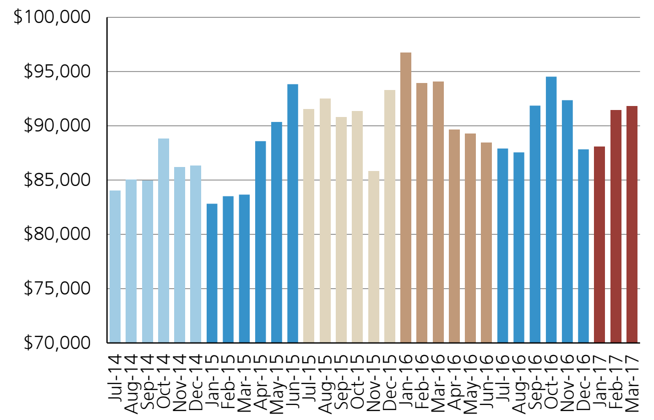
Without a doubt, spending in the Highway & Street category was the biggest disappointment in 2016, after the passage of the FAST Act in early December 2015. We think the Highway & Street category is well positioned for growth in 2017 as we think the longer-term visibility of funding provided by the FAST Act resulted in planning for higher cost replacement projects in 2016. Further, the FY17 budget passed by congress in early May (fiscal year began in October 2016) unlocked some of the spending growth contemplated in the FAST Act. That said, we think spending could remain choppy. On a SAAR basis, spending has stepped up and we think the combination of recent project starts and easier comparisons during the summer construction season could result in stronger growth towards the middle of 2017. Overall, we think the Highway & Street category will grow 2% in 2017 and 6% in 2018. On a T12M basis through March, Highway and Street spending has been weak, declining 1.9% YoY (vs. +1.1% exiting 2016), but we do not expect to see growth until mid-2017.

Figure 87: Highway & Street (YoY)



Source: US Census Bureau

Figure 88: Highway & Street (SAAR)



Source: US Census Bureau

The Highway and Street category makes up ~12.8% of total non-res construction spending, with all of the spending coming from the Public sector. On a T12M basis, Lighting has been the strongest sub-category, which includes traffic lights, signals, and highway lighting systems. On a T12M basis, Bridge has been the weakest sub-category, which includes bridges and overhead crossings (vehicular or pedestrian).

Figure 89: Highway and Street Spending Heatmap

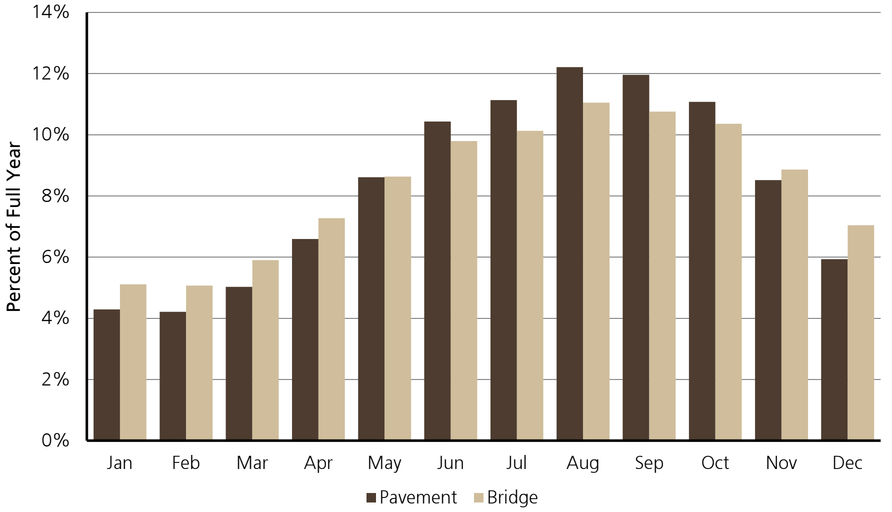
	% of Total	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	T12M
Total Highway and Street	**12.8%**	**15.8%**	**-1.9%**	**-1.2%**	**-3.3%**	**-6.1%**	**-3.7%**	**-0.2%**	**3.2%**	**10.8%**	**-8.4%**	**-9.8%**	**-4.8%**	**-1.8%**	**-1.9%**
Public	12.8%	16.0%	-1.9%	-1.1%	-3.3%	-5.9%	-3.6%	0.1%	3.5%	10.9%	-8.2%	-9.9%	-5.0%	-1.8%	-1.7%
Private	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pavement	7.5%	25.2%	-0.8%	0.8%	-7.4%	-10.5%	0.1%	0.3%	2.7%	7.9%	-7.5%	-6.9%	-1.4%	1.2%	-1.8%
Lighting	0.3%	-43.0%	-56.6%	-40.0%	4.6%	20.1%	41.6%	77.7%	94.4%	56.0%	66.0%	63.3%	173.8%	172.6%	43.9%
Bridge	4.3%	2.5%	-5.4%	-4.8%	3.5%	4.7%	-10.0%	-3.9%	-0.2%	8.8%	-16.9%	-23.6%	-14.4%	-9.6%	-4.8%
Rest Facility	0.1%	57.8%	73.7%	20.3%	23.1%	2.8%	4.9%	3.7%	-17.4%	-15.0%	12.0%	-41.2%	-54.4%	-45.1%	-3.2%
Federal	0.1%	237.5%	60.0%	48.6%	-8.9%	-25.6%	15.8%	77.9%	46.2%	67.4%	91.7%	129.4%	31.3%	70.4%	43.4%

Source: US Census Bureau, UBS

At the individual sub-category level we note the two largest components of Highway & Street spending, Pavement (includes highways, roads, streets, culverts, gutters, and sidewalks) and Bridges, are both highly seasonal, supporting our view

that we may begin to see growth in the Highway & Street category in mid-2017 as the construction season begins to pick up against easier comparisons.

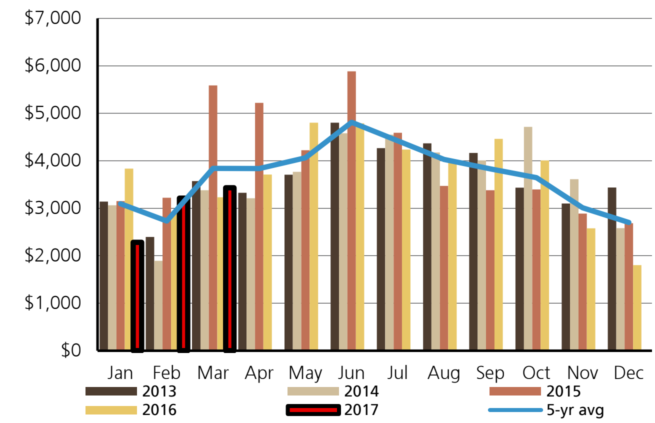
Figure 90: Seasonality of pavement and bridge spending (1993-2016) – makes up >90% of highway & street spending



Source: US Census

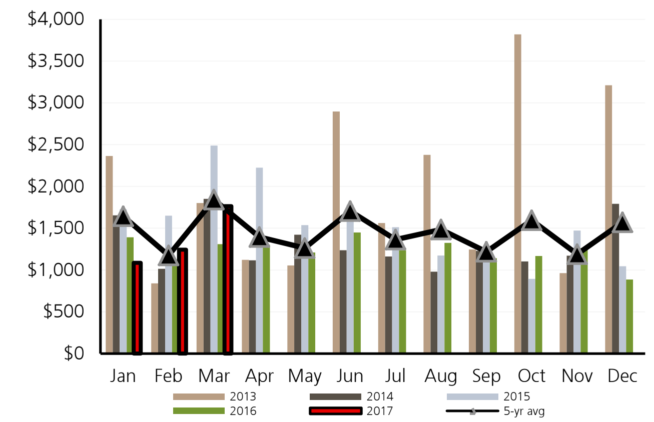
We see the same seasonality in terms of timing of highway and bridge awards as well. With the exception of February, Q1 highway and bridge awards have been below the 5-year averages; however, awards in February and March increased YoY in the both categories.

Figure 91: ARTBA Highway Awards



Source: ARTBA

Figure 92: ARTBA Bridge Awards



Source: ARTBA

As discussed previously, we think public spending growth will be supported by state initiatives in 2017 and 2018. Highway and Street is the largest public spending non-res category (accounting for ~32% of total public spending), with much of the spending ultimately coming at the state level. We partnered with UBS Evidence Lab to conduct a geospatial analysis on bridges and highways (and airports – see p. 46) and current state of repair to see where there is a need for highway and bridge infrastructure spending in the US.

UBS Evidence Lab examined data on 723,302 bridges in the US. Within that group, 75,474 have been determined by engineers to be functionally obsolete. The key findings were:

- The oldest bridges are in the central parts of the country.
- There are 133k functionally obsolete and structurally deficient bridges in the US that could cost $162b to repair.
- Texas and Florida (two states with relatively higher highway budgets), have younger infrastructure.
- Traffic volumes, as expected, are focused around urban areas. Weighting functionally obsolete bridges by traffic volumes highlights a bigger opportunity near the coasts.

For additional detail, please see our report: [Q-Series: How could a new wave of infrastructure spending impact the construction sector?]

Figure 93: UBS Evidence Lab estimates it would cost $162b to repair all Functionally Obsolete & Structurally Deficient Bridges in the US

Market Quality: United States Infrastructure

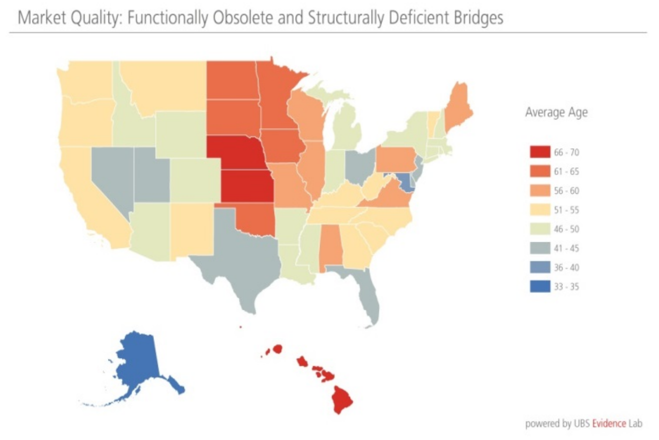
	Total Bridges*	Structurally Deficient Bridges	Functionally Obsolete Bridges	Functionally Obsolete & Structurally Deficient Bridges
Average Age	39	60	47	53
Number of Infrastructure Structures	723,302	57,913	75,474	133,387
Project Repair Cost ($000)	$372,813,013	$55,675,023	$106,298,019	$161,973,042

**Not all bridges record data have an associated project cost, thus priiject cost figures only reflect those bridges where data was available.*

powered by Evidence Lab

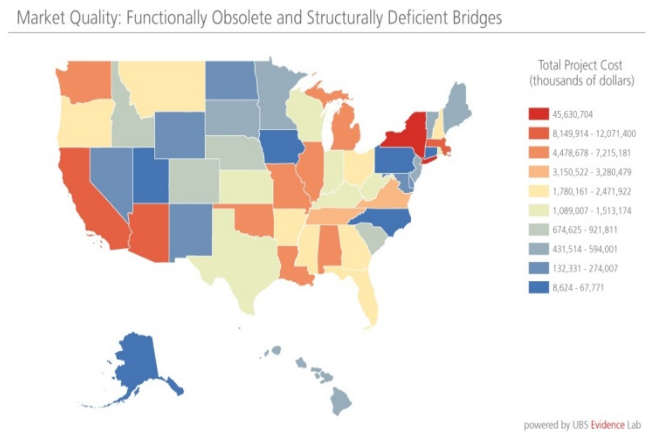
Source: UBS Evidence Lab, Department of Transportation; Note: Structurally Deficient and Functionally Obsolete are classifications established and defined by the US Federal Highway Administration.

Figure 94: The oldest bridges are in middle America



Source: UBS Evidence Lab

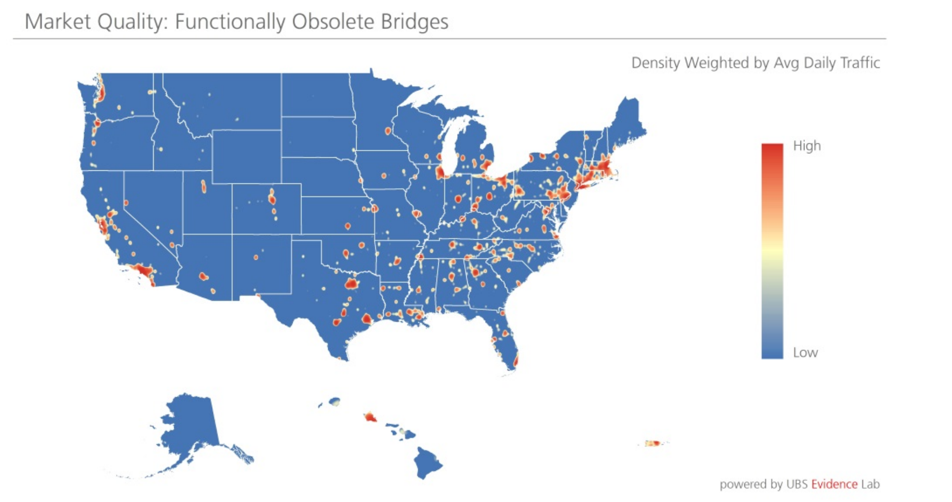
Figure 95: New York State would require the most investment (likely skewed by New York City)



Source: UBS Evidence Lab

Interestingly we note there are more potential projects on the coasts when we weight functionally obsolete bridges on traffic volume, despite the fact that the oldest bridges are in middle America. We also note that many coastal states, including California and New York have passed initiatives to fund highway infrastructure spending as discussed above.

Figure 96: Weighting functionally obsolete bridges on traffic highlights more potential projects on the coasts

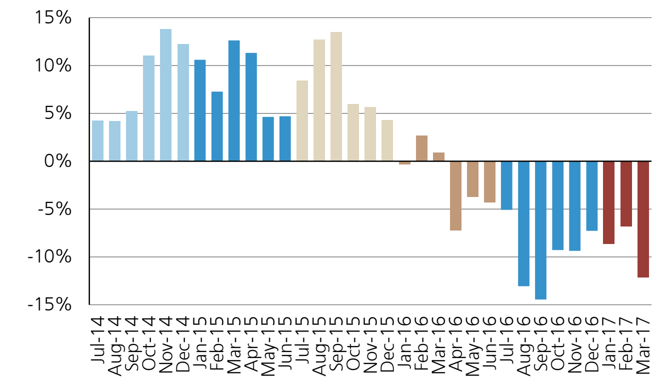


Source: UBS Evidence Lab

Transportation

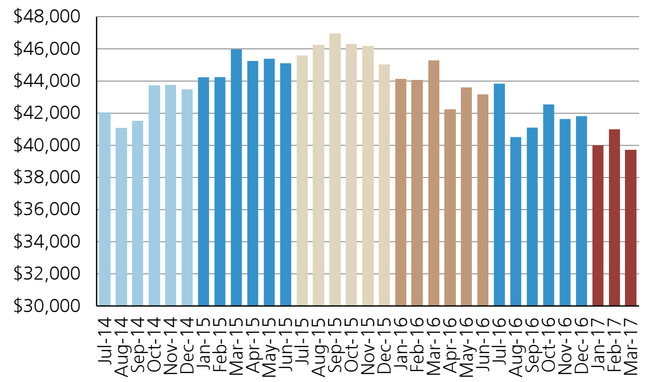
Though Transportation is a separate category, we think the dynamics of Transportation construction spending will be very similar to that of Highway & Street in the next few years. Like Highway and Street, we think the Transportation category is well positioned for growth in 2017, driven by the FAST Act and state initiatives on the public side. Overall, we think the Transportation category will grow 2% in 2017 and 6% in 2018. On a T12M basis through March, Transportation spending has been weak, declining 8.6% YoY (vs. -6.4% exiting 2016), but we think the combination of recent project starts and easier comparisons during the summer construction season could result in stronger growth towards the middle of 2017, bet we do note from a SAAR perspective that the category has seen multiple years of declines after peaking in September 2015.

Figure 97: Transportation (YoY)



Source: US Census Bureau

Figure 98: Transportation (SAAR)



Source: US Census Bureau

The Transportation category makes up ~5.9% of total non-res construction spending, with the majority of the spending coming from the Public sector. On a T12M basis, Air has been the strongest sub-category, which includes air passenger terminals, airport runway pavement and lighting, hangars, air freight terminals, space facilities, air traffic towers, and aircraft storage and maintenance buildings. On a T12M basis, Land has been the weakest sub-category, which includes bus and railroad passenger terminals, light rail/monorail/streetcar/subway facilities, railroad track and bridges, maintenance facilities, and bus/railroad/truck freight terminals.

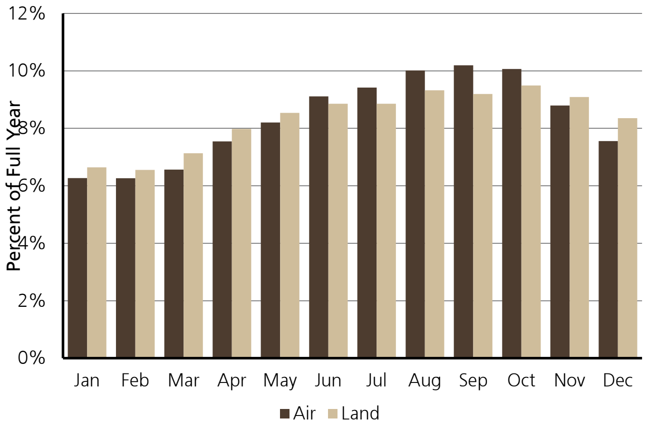
Figure 99: Transportation Spending Heatmap

	% of Total	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	T12M
Total Transportation	**5.9%**	**0.9%**	**-7.2%**	**-3.7%**	**-4.3%**	**-5.1%**	**-13.1%**	**-14.4%**	**-9.3%**	**-9.4%**	**-7.3%**	**-8.6%**	**-6.8%**	**-12.2%**	**-8.6%**
Public	4.2%	5.2%	-9.0%	-3.6%	-4.9%	-5.5%	-11.9%	-14.1%	-9.7%	-5.9%	-4.1%	-9.9%	-8.0%	-13.6%	-8.4%
Private	1.7%	-10.1%	-2.8%	-3.9%	-2.7%	-4.0%	-15.9%	-15.2%	-8.3%	-16.6%	-14.2%	-5.5%	-3.3%	-7.8%	-8.8%
Air - Private	0.2%	36.6%	30.1%	46.3%	54.0%	54.9%	43.8%	41.9%	45.9%	26.3%	52.2%	100.0%	105.3%	61.9%	55.4%
Land - Private	1.5%	-12.2%	-3.2%	-5.8%	-5.2%	-6.9%	-19.0%	-17.7%	-10.5%	-18.9%	-18.3%	-15.2%	-15.4%	-16.8%	-12.7%
Air - State	1.5%	-16.1%	-8.4%	-7.0%	2.6%	5.9%	-23.3%	-13.7%	-9.8%	8.1%	28.6%	12.3%	5.9%	2.3%	-1.8%
Land - State	2.2%	14.8%	-12.6%	-2.9%	-12.2%	-13.3%	-9.2%	-14.3%	-11.5%	-15.5%	-19.3%	-16.9%	-10.7%	-18.0%	-13.0%
Dock/marina (state)	0.2%	30.4%	-16.2%	-24.1%	-1.1%	0.0%	10.4%	-20.2%	-5.7%	-4.2%	8.0%	-11.3%	-3.3%	-24.2%	-8.9%
Federal	0.3%	11.4%	30.1%	20.7%	20.8%	0.0%	12.2%	-19.9%	-6.0%	-6.1%	-16.0%	-25.6%	-31.4%	-16.3%	-4.6%

Source: US Census Bureau, UBS

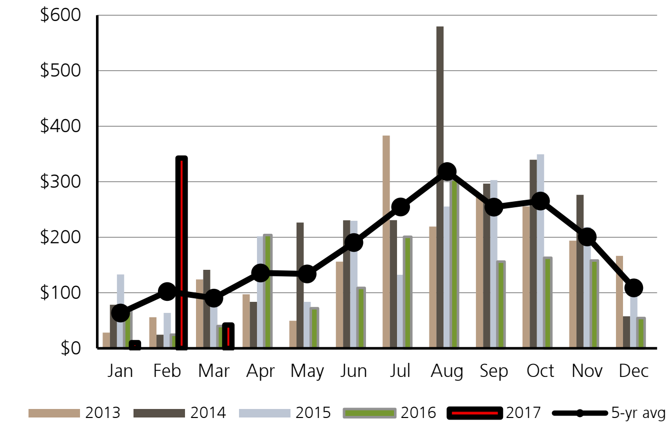
At the individual sub-category level we note the two largest components of Transportation spending, Land and Air (private and state spending combined), are both highly seasonal, supporting our view that we may begin to see growth in the Transportation category in mid-2017 as construction begins to pick up. We see the same seasonality in terms of timing of airport awards as well. With the exception of February, Q1 airport awards have been below the 5-year averages; however, awards in February and March increased YoY.

Figure 100: Seasonality of Land and Air spending (1993-2016) – makes up >90% of Transportation spending



Source: US Census

Figure 101: ARTBA Airport Awards

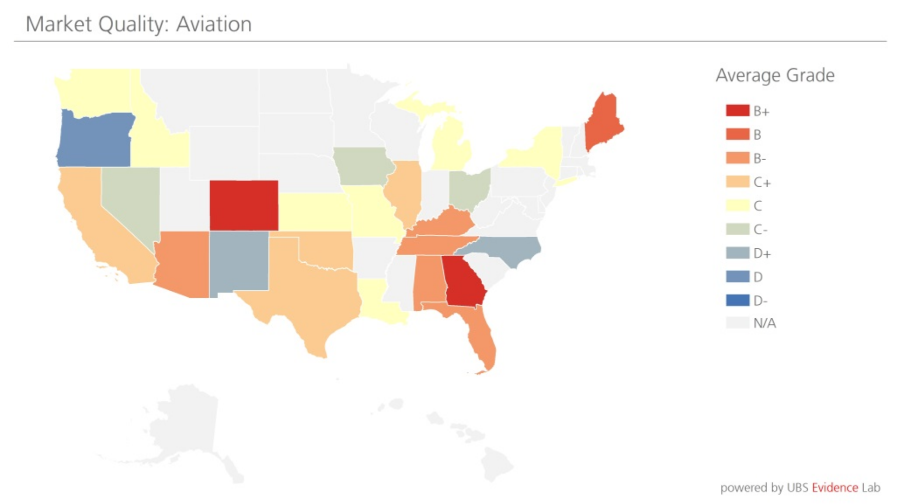


Source: ARTBA

As discussed above, we think public spending growth will be supported by state initiatives in 2017 and 2018. Transportation is the third largest non-res category for public spending (accounting for ~11% of total public spending), and thus stands to benefit significantly from the state initiatives, in our view. We partnered with UBS Evidence Lab to conduct a geospatial analysis on airports (and bridges and highways – see p. 44) and current state of repair to see where there is a need for airport infrastructure spending in the US.

The American Society of Civil Engineers grades various types of infrastructure, from airports and rail yards to bridges and dams. At the state-level, UBS Evidence Lab found that aviation infrastructure in Oregon, North Carolina, and New Mexico have the lowest grades.

Figure 102: Aviation infrastructure quality grades by state



Source: UBS Evidence Lab, American Society of Civil Engineers

Notably, all three of these states have spending and construction plans in place to upgrade select airports over the coming years. These include:

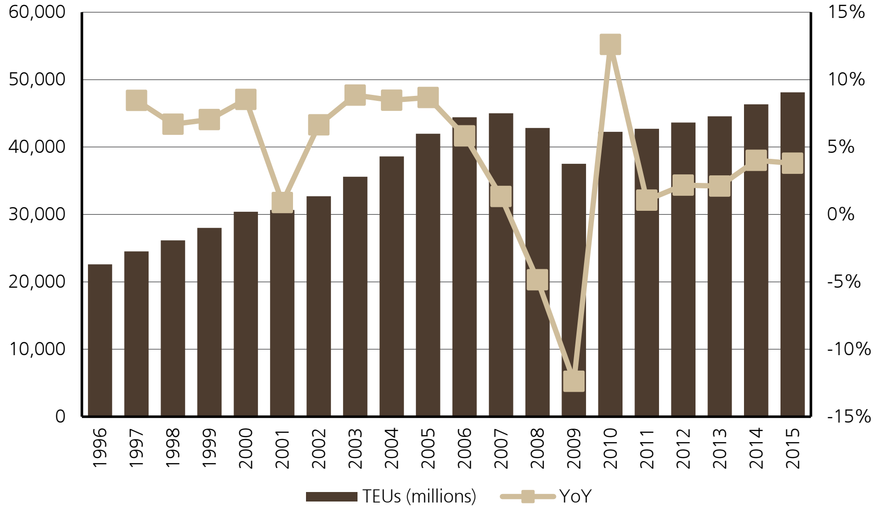
- Destination CLT (NC): $2.5b 10-year expansion plan for the Charlotte Douglas International airport into the 2020s. Projects include adding more gates to open in 2018 ($200m project), widening roads to open in 2018 ($50m project), an expanded lobby to begin construction in 2018 ($247m), and building a new runway to begin construction in 2020 ($422m).

- PDXNext (OR): $248m public investment in the Portland International Airport from 2015-2020 (with additional spending by private airlines). Projects include shop and restaurant infrastructure improvements ($19.8m), security access control expansion ($57m) and adding gates ($215m).

- Various upgrades (NM): The Federal Aviation Administration awarded $6.5m to New Mexico for maintenance and construction projects at 17 New Mexico airports, including runway rehabilitations, fencing construction, and other safety improvements. The city of Albuquerque also began a $30m upgrade project at the Albuquerque International airport paid through the airport capital program (construction began in February and is expected to take 15 months).

Though less material in terms of total non-res construction spending, we note that the dock/marina sub-category was particularly weak in Q1. That said, we think port infrastructure spending could be a source of upside. Container traffic has been growing modestly since 2010 (+3.8% in 2015), and the American Association of Port Authorities expects the amount of freight in the US to grow by 45% by 2045. The Association notes that seaports are critical to the US economy and estimates that failure to invest in US infrastructure could result in the loss of $4t of GDP by 2025.

Figure 103: United States Container Traffic



Source: American Association of Port Authorities

To that end, in December 2016 Congress passed the Water Resources Development Act (WRDA), which among other things, "authorizes investment in ports, channels, locks, dams, and other infrastructure that supports the maritime and waterways transportation system and provides flood protection for communities." Further, the Harbor Maintenance Tax (HMT), which funds navigation channel maintenance, raises over $1.7b per year, but historical underspending has resulted in a surplus of over $9b in the HMT Trust Fund. The WRDA of 2016 affirmed the targets laid out in the WRDA of 2014 to fully fund HMT revenue by 2025.

Figure 104: HMT Spending Targets

Year	Spending Target (% of previous FY revenue)
FY 2015	67%
FY 2016	69%
FY 2017	71%
FY 2018	74%
FY 2019	77%
FY 2020	80%
FY 2021	83%
FY 2022	87%
FY 2023	91%
FY 2024	95%
FY 2025+	100%

Source: American Association of Port Authorities

The Transportation and Infrastructure Committee notes that the expanded Panama Canal opened in June 2016 and now has the capacity accommodate larger vessels (can carry 3x as many shipping containers); however, fewer than 10 of America's ports are currently capable of handling these fully loaded larger container ships. According to Great Lakes Dredge and Dock (the largest provider of dredging),

there are 7 US ports with plans for expansion to accommodate these larger ships (Boston, Delaware, Port Everglades, Mobile, New Orleans, Houston, and San Diego). There are also 4 ports (New York, Charleston, Savannah, and Jacksonville) whose deepening projects were expedited by the Obama Administration, with Savannah's project already under construction.

We have also heard from private industry contacts that water infrastructure projects will likely lag in terms of private investment at first; however, it was suggested that once the P3 market is more established, water infrastructure will be a beneficiary of private spending.

Evidence

Non-Residential Construction Dashboard

Figure 105: UBS Construction Indicator and Outlook Dashboard (construction figures are seasonally adjusted annual rate)

Indicator	Current	Previous	Trend		Trend Period	Indication	Forecast	Direction
General	708,642	716,999	Mar 17	1.7%	last 6mo / prev 6mo		**2.0%**	▲
Architectural Billings	54.3	50.7	Mar 17	2.3%	last 6mo / prev 6mo	▲		
Architectural Inquiries	59.8	61.5	Mar 17	0.6%	last 6mo / prev 6mo	►		
UBS Rental Survey: Business Conditions	6.94	5.17	Mar 17	0.8%	last 6mo / prev 6mo	►		
UBS Rental Survey: Rental Rates	5.00	4.48	Mar 17	-7.3%	last 6mo / prev 6mo	▼		
UBS E&C Coverage Total Backlog	128,709	136,493	Mar 17	-5.3%	last 2Q / prev 2Q	▼		
Non-Residential Construction Starts (T12M)	432,950	405,808	Mar 17	12.6%	last 6mo / prev 6mo	▲		
Construction Employment	6,877	6,872	Apr 17	1.8%	last 6mo / prev 6mo	▲		
Office / Commercial	153,853	158,554	Mar 17	9.5%	last 6mo / prev 6mo		**5.8%**	▼
Office	73,342	75,222	Mar 17	8.5%	last 6mo / prev 6mo		**10.0%**	▼
Commercial	80,511	83,332	Mar 17	10.4%	last 6mo / prev 6mo		**2.0%**	▼
Federal Reserve Lending Standards Survey	2.8	-1.5	Mar 17	-4.7%	2Q Avg	▼		
Federal Reserve Loan Demand Survey	-6.9	-5.9	Mar 17	-4.3%	2Q Avg	▼		
Office Vacancy Rate	13	13	Mar 17	0.0%	last 2Q / prev 2Q	►		
Educational / Highway & Trans / Water	252,103	256,653	Mar 17	0.9%	last 6mo / prev 6mo		**1.9%**	▲
State Tax Receipts (T12M)	0.0	934.6	Mar 17	0.5%	last 2Q / prev 2Q	►		
Education	90,801	93,960	Mar 17	4.4%	last 6mo / prev 6mo		**2.0%**	▲
Municipal Bond Issuances (T12M)	435.3	446.5	Mar 17	10.8%	last 6mo / prev 6mo	▲		
Endowment Returns (FY16)	-1.9%	2.4%	Dec 16	-1.9%	FY 2015 return	▼		
College Enrollments	21,946	21,586	Dec 17E	1.4%	2016-2020E avg	►		
Transportation, Highway & Street	131,516	132,409	Mar 17	0.6%	last 6mo / prev 6mo		**2.0%**	►
Federal Highway Awards (T12M)	43,284	43,082	Mar 17	-4.1%	T12M YoY	▼		
Federal Airport Awards (T12M)	1,816	1,814	Mar 17	-8.8%	T12M YoY	▼		
Federal Bridge & Tunnel Awards (T12M)	15,075	14,620	Mar 17	-8.8%	T12M YoY	▼		
FAST Act Spending	44.0	43.1	Dec 17E	2.1%	FY 2017 / FY 2016	▲		
Water, Sewage & Waste	29,786	30,284	Mar 17	-7.9%	last 6mo / prev 6mo		**1.0%**	▲
Manufacturing	69,587	69,151	Mar 17	-7.6%	last 6mo / prev 6mo		**-5.0%**	▼
Institute for Supply Management PMI	54.8	57.2	Apr 17	7.6%	last 6mo / prev 6mo	▲		
ISM Manufacturing New Orders	57.5	64.5	Apr 17	10.7%	last 6mo / prev 6mo	▲		
Industrial Production	104.1	103.5	Mar 17	-0.2%	last 6mo / prev 6mo	►		
Capacity Utilization	76.1	75.7	Mar 17	0.2%	last 6mo / prev 6mo	►		
Power	99,290	99,939	Mar 17	-1.3%	last 6mo / prev 6mo		**2.0%**	▲
Utility Company Capex	74.93	83.70	Dec 17E	-10.5%	2017E YoY	▼		
Electric Generation	11.0	11.2	Dec 17E	-1.3%	2017E YoY	►		
Transmission Spending	22,500	21,500	Dec 17E	4.7%	2017E YoY	▲		
Pipeline Company Capex	30,329	34,117	Dec 17E	-11.1%	2017E YoY	▼		
Residential	509,643	503,736	Mar 17	7.0%	last 6mo / prev 6mo			
5+ Unit Building Permits (6 mo avg)	401.7	409.2	Mar 17	6.6%	last 6mo / prev 6mo	▲		
5+ Unit Building Starts (6 mo avg)	406.0	384.7	Mar 17	3.3%	last 6mo / prev 6mo	▲		

Source: AIA, Federal Reserve, US Census, US Department of Labor, ISM, SIFMA, ARTBA, McGraw-Hill, SHEEO, NACUBO, UBS

Figure 106: UBS Non-Res Construction Outlook

	Dec 2016 T12M	Pct of Total	2016 Growth	UBSe 2017	UBSe 2018
Office	69,042	10%	25.1%	10.0%	-5.0%
Transportation	42,632	6%	-6.4%	2.0%	6.0%
Education	88,672	13%	6.2%	2.0%	1.0%
Health Care	41,361	6%	1.5%	2.0%	1.0%
Commercial	74,550	11%	11.4%	2.0%	-1.0%
Highway and Street	90,755	13%	1.1%	2.0%	6.0%
Power	95,785	14%	3.6%	2.0%	5.0%
Water, Sewage & Waste	34,040	5%	-9.0%	1.0%	5.0%
Manufacturing	75,091	11%	-3.9%	-5.0%	-5.0%
Other	88,224	13%	6.9%	2.0%	3.0%
Total	**700,152**	**100%**	**4.2%**	**2.0%**	**1.5%**

Source: US Census, UBS estimates

Figure 107: Company Exposure to US Non-Res

Steel	
Nucor	65%
Steel Dynamics	34%
Reliance Steel	30%

Machinery	
H&E Equipment	80%
United Rentals	45%
Manitowoc	26%
Deere	16%
Caterpillar	14%
Terex	13%
Trinity	12%
Kennametal	10%
ITW	7%
Cummins	2%

E&C	
Tutor Perini	92%
Quanta Services	77%
AECOM	51%
Babcock & Wilcox	50%
Jacobs	46%
CB&I	36%
Flowserve	34%
KBR	26%
Fluor	17%

Industrial / Distributors	
NCI Building Systems	93%
Acuity Brands	90%
WESCO	40%
Ingersoll-Rand	29%
HD Supply	26%
Fastenal	25%
Lennox	17%
Stanley Black & Decker	9%

Source: UBS estimates, Company reports

The Next 10 Data Points on Non-res Construction

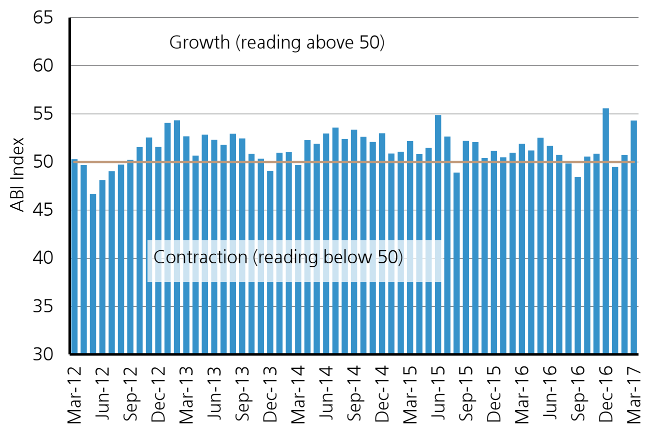
In 2016 we presented twenty data points that we thought sent negative signals about the non-residential construction market. In the following pages, we present ten new data points (in addition to the deep dives presented in the previous pages) that we think suggest non-res construction growth can be sustained, but at a slower level. Our bottom up and top down data points have become of mix of positives and negatives.

The next 10 data points on Non-Res construction	
(1) ABI ended Q1 strong.	(6) The number of hotels in the planning phase is growing
(2) Monthly sequential rental rates are turning positive.	(7) E&C backlogs have peaked.
(3) Oil prices have recovered and stabilized.	(8) UBS Evidence Lab Macro is showing a peak.
(4) Construction jobs are being added, but growth is slowing.	(9) Warehouse construction continues to grow.
(5) CMBS spreads have narrowed versus Treasuries.	(10) Easier comps are coming for the public sector.

(1) ABI ended Q1 strong

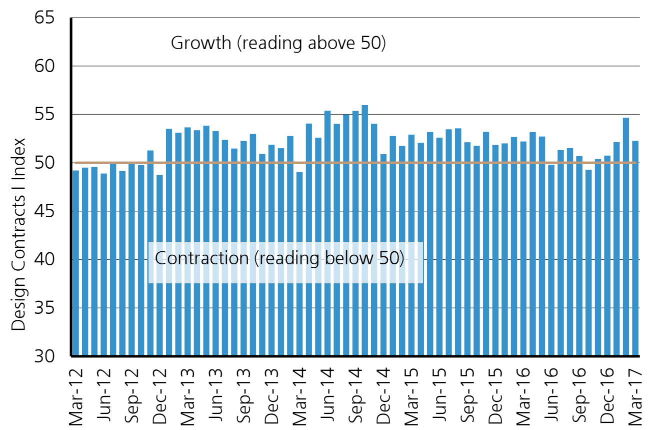
We believe ABI generally leads construction spending by 9-12 months. After contracting in January (score below 50) for the first time since September 2016, the index grew in both February and March, with March's reading of 54.3 the third highest score since 2008. The design and inquiries indices also posted strong readings during Q1 (neither has contracted since October 2016). Within the sector mix, Commercial/Industrial remained strong in January and February but contracted for the first time since 2015 in March (49.8). Institutional has remained relatively flat at ~53 since December 2016.

Figure 108: Monthly National Architectural Billings Index



Source: American Institute of Architects

Figure 109: Monthly National Design Contracts Index



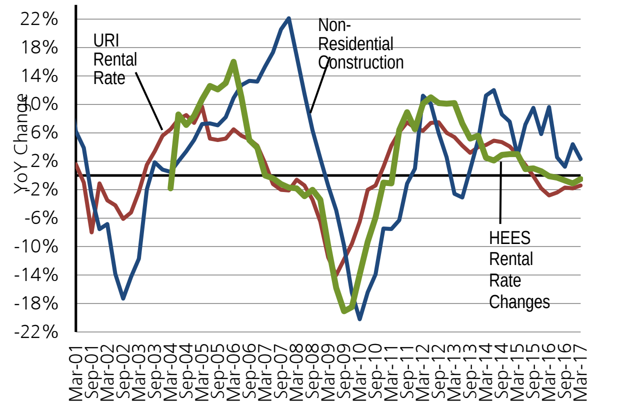
Source: American Institute of Architects

(2) Rental rates are expected to turn positive in 2017

Given the end markets served by rental companies (primarily non-residential construction), we found a loose correlation between the year-over-year change in domestic non-residential construction activity and the rental rate changes reported by United Rentals and H&E Equipment (Figure 110). Intuitively, rental companies are able to raise rental rates in periods of strong demand for equipment, primarily resulting from higher construction spending as projects are underway…and conversely, rental rates tend to be pressured as demand deteriorates, and/or overcapacity exists.

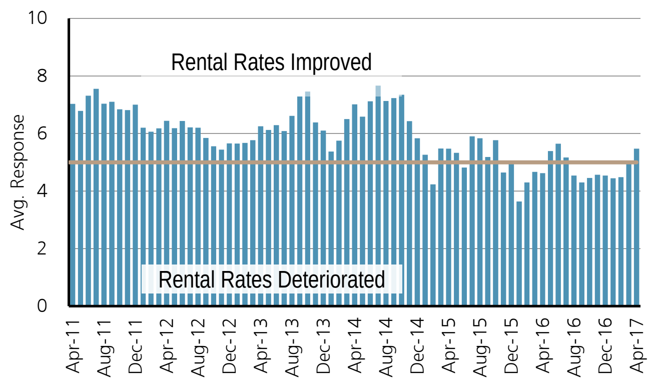
URI and HEES have reported monthly rental rate deterioration since early 2016; however, both have indicated they expect rental rates to turn positive during 2017. We also found a loose correlation between the year-over-year change in domestic non-residential construction activity and the business condition changes reported by rental equipment branch managers in our monthly rental survey (Figure 111). Reported changes in business conditions have historically been a leading indicator for changes in non-residential construction, with the correlation strongest when lagging non-res 12 months. In recent months, branch managers have been indicating that business conditions are improving on a YoY basis.

Figure 110: URI/HEES rental rate changes vs. YoY change in Non-res construction



Source: US Census, Company reports

Figure 111: UBS Rental Survey Rental rates are starting to improve sequentially

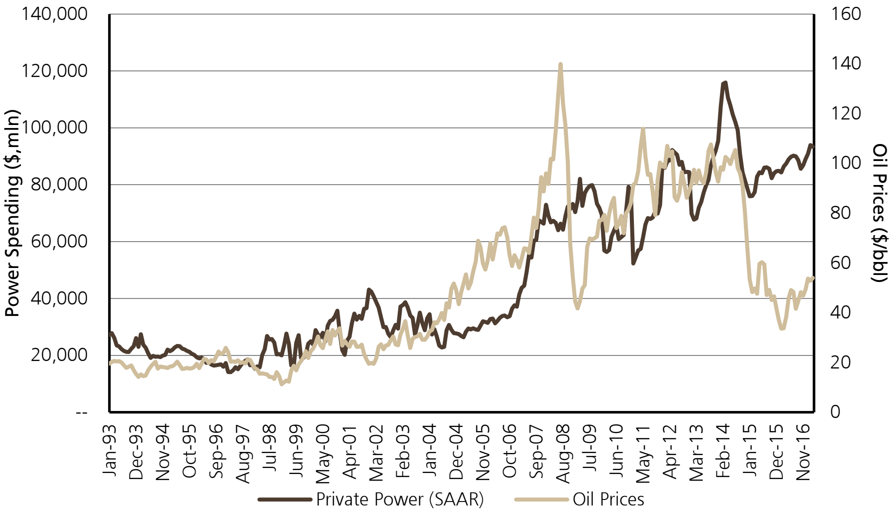


Source: UBS Rental Equipment Branch Manager Surveys, U.S. Census Bureau

(3) Oil prices have recovered and stabilized.

Oil prices were widely viewed as a driver of the slowdown in Power spending. Interestingly, on a SAAR basis Power spending both peaked and troughed before oil prices in 2015. The Power category has seemingly resumed a growth trajectory, and oil price stability could help pipeline construction.

Figure 112: Oil prices versus Power construction

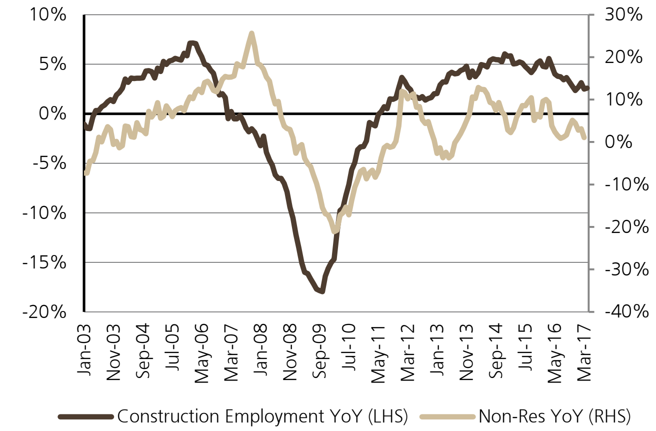


Source: US Census, FactSet

(4) Construction jobs are being added, but growth is slowing

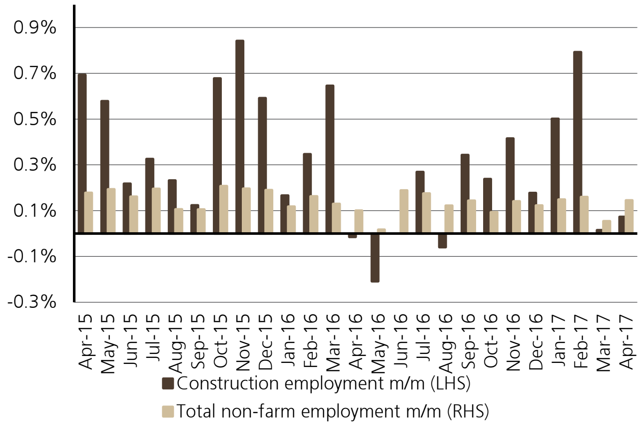
We found a loose correlation between the year-over-year change in domestic non-residential construction activity and the year-over-year growth in total construction employment. Construction employment growth has historically been a leading indicator for changes in non-residential construction. From September-February construction employment growth outpaced total non-farm employment growth. Jobs continued to be added in construction in March and April, but at a slightly slower rate than total non-farm employment. Despite accounting for only ~4.7% of total non-farm employment, construction has added ~12.7% of the total new nonfarm jobs in 2017 YTD.

Figure 113: Construction employment vs. non-res spending (SA, YoY)



Source: BLS, US Census, UBS

Figure 114: Construction employment vs. total non-farm employment (SA)

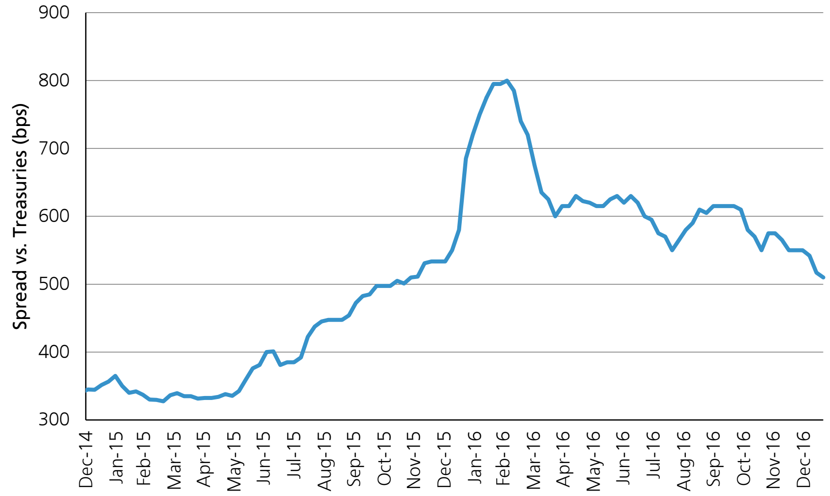


Source: BLS, UBS

(5) CMBS spreads have narrowed versus Treasuries

The CMBS market is a benchmark of borrowing costs for some real estate developers. Widening spreads indicate increased costs for borrowing and could lead to less investment in new construction. In early 2016 spreads were widening, but since then spreads have narrowed.

Figure 115: BBB- CMBS Spreads vs. Treasuries

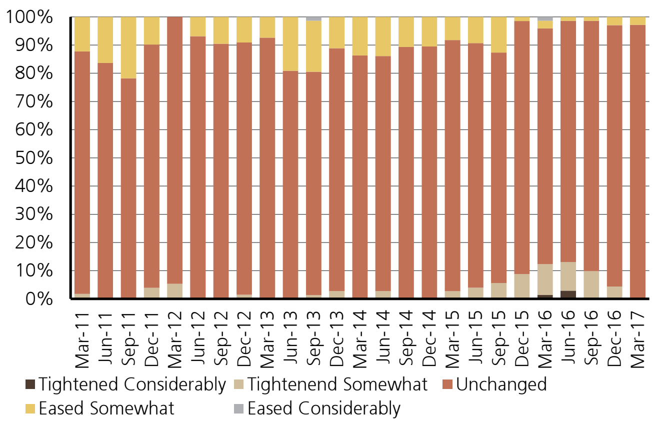


Source: Bloomberg, UBS Estimates

Lending demand is still weakening, but standards are unchanged

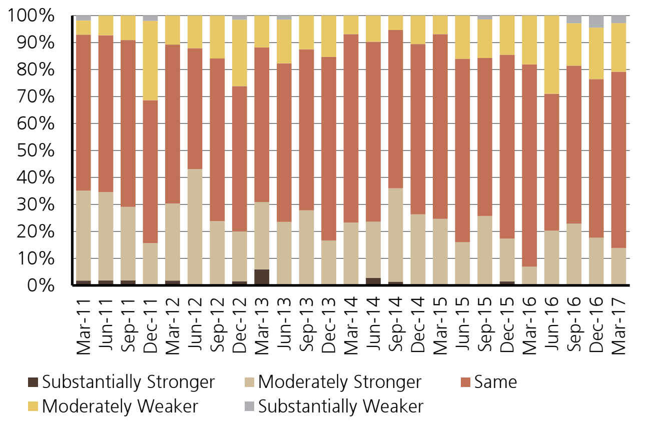
Tighter lending standards and weakening demand could also be indicative of borrowing and construction from real-estate developers. Standards were tightening in mid-2016, but lending standards appear to have stabilized in more recent results. That said, loan demand is weaker than it was in 2014 and 2015, but may have stabilized in 2016. We think the loan demand and standards surveys could be moderately supportive, but mostly point towards a continuation of the status quo.

Figure 116: Lending Standards



Source: Federal Reserve, UBS Estimates

Figure 117: Loan Demand



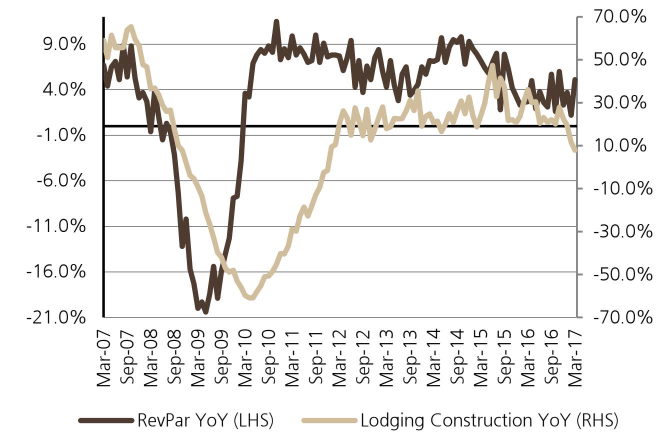
Source: Federal Reserve, UBS Estimates

(6) The number of hotels in the planning phase is growing.

We found a loose correlation between the year-over-year change Lodging non-residential construction activity and the year-over-year growth in US Hotel RevPAR (revenue per available room). RevPar growth has historically been a leading indicator for changes in Lodging non-residential construction. While RevPar growth has been choppy in recent months, it has remained below 2014 peak levels. On a T12M basis through March, Lodging construction spending has remained strong but is showing signs of a slowdown, posting 21.1% growth (vs. +25.3% exiting 2016). We think slower RevPAR growth could lead to slower growth in hotel construction; however, if recent RevPAR strength can be sustained there could be upside to Lodging construction.

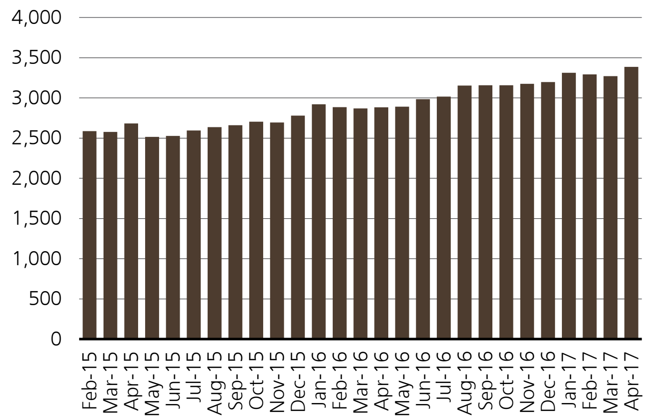
That said, according to Smith Travel Resource, as of April 30, there were 1,820 hotels in the "final planning" phase and another 1,567 in the "planning" phase. Combined, this is the highest number of hotels being planned in the past 2 years.

Figure 118: US hotel revenues per available room (RevPAR) vs. Lodging spending (NSA)



Source: US Census, Smith Travel Resource, Bloomberg

Figure 119: Number of hotels in the planning phase

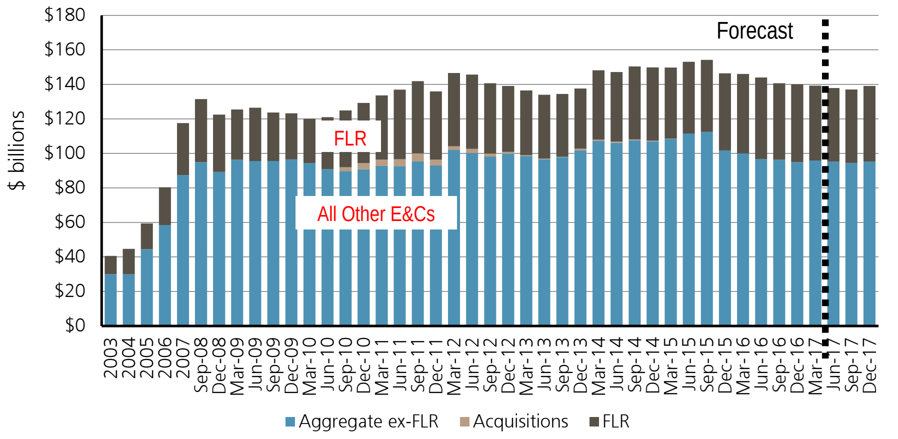


Source: Smith Travel Resource, Bloomberg

(7) E&C backlog growth could reaccelerate later in 2017.

E&C aggregate backlogs peaked in 2015, as lower oil prices delayed capital projects. The backlog work-down is partly informs our expectation that Manufacturing spending will continue to decline, as E&C companies work through ongoing petrochemical projects. That said, we think there is potential for backlogs to grow sequentially later in 2017, possibly setting up for a better 2018.

Figure 120: Aggregated E&C backlogs

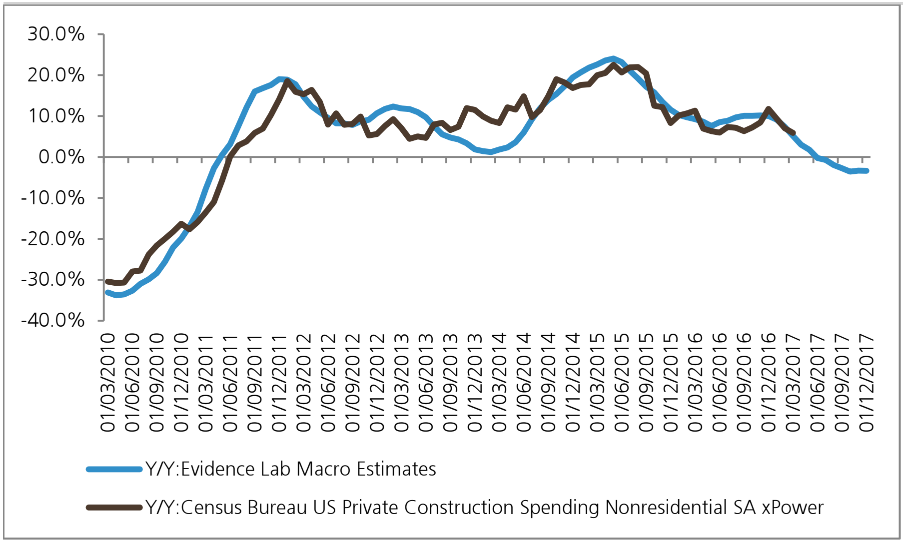


Source: Company Filings

(8) UBS Evidence Lab Macro is showing a peak

UBS Evidence Lab Macro analysts use a quantitative approach to forecasting construction spending growth, based on big data. Their forecasts are only for the private construction market, and exclude the Power category, but the model has been accurate in the past and is showing a rollover in the market later this year. We think the data could reflect a slowdown in Office spending and a further decline in Manufacturing.

Figure 121: UBS Evidence Lab macro data is now calling for a peak



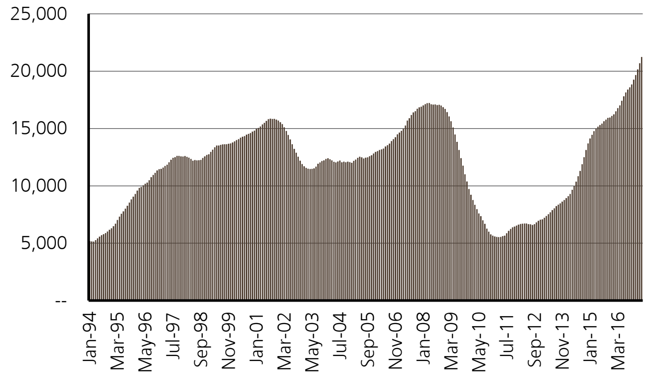
Source: UBS Evidence Lab Macro

(9) Warehouse construction continues to grow

Despite growing ~25% beyond prior peak levels (on a trailing 12 month basis), warehouse spending growth on a monthly basis continues to accelerate. The

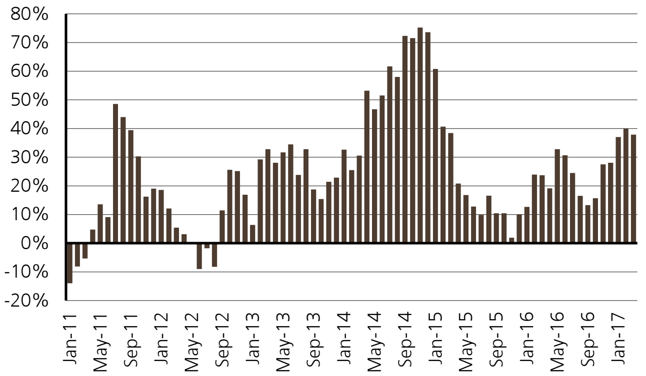
strong build out has been widely attributed to the rise in e-Commerce and online shopping. The warehouse subcategory falls within Commercial construction, and has helped offset recent declines in construction spending at shopping centers and other brick and mortar retailers.

Figure 122: Warehouse spending (T12M)



Source: US Census Bureau

Figure 123: Warehouse spending (monthly YoY)

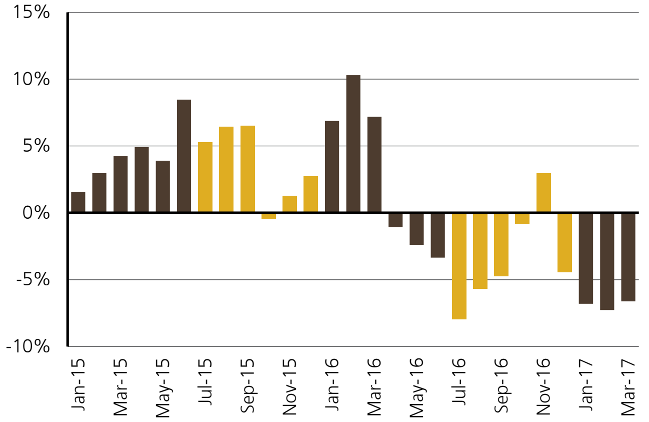


Source: US Census Bureau

(10) Easier comps are coming for the public sector

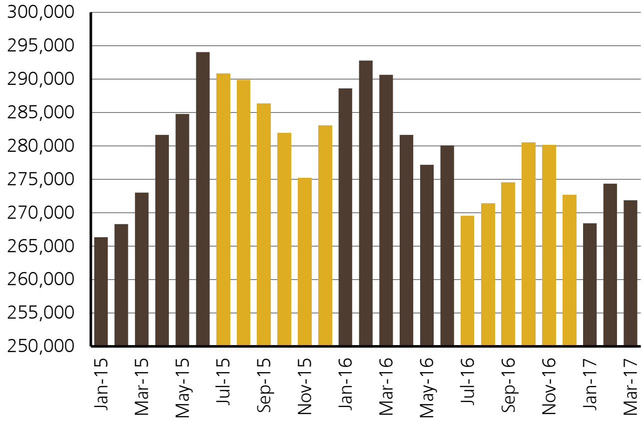
Public sector spending declined 6.9% in Q1, but we would note that the declines occurred against the toughest YoY comparisons of 2016. Comps begin to ease substantially in April, and continue to be relatively soft throughout the remainder of the year. On a SAAR basis, dollar spending troughed in January 2017, and appears relatively more stable. Based on the current level of spending, we expect declines to moderate and begin to trend towards growth in the middle of the year.

Figure 124: Public spending (monthly YoY)



Source: US Census Bureau

Figure 125: Public spending (monthly SAAR)



Source: US Census Bureau

What is Consensus saying?

Consensus expectations are pointing towards 5.6% non-residential construction growth in 2017, followed by 4.9% growth in 2018. 2017 forecasts are driven by robust growth in the office, Commercial and Educational categories. We think the 10.6% expected growth in Office construction in 2017 is noteworthy. We also note that it is not clear how comparable the forecasts in Figure 126 and Figure 127 are to our forecasts or the US Census non-residential construction data that we track. Specifically, we think the AIA consensus forecasts focus primarily on building construction, and do not include many of the chemical and LNG projects classified in the Manufacturing category or the public projects classified in the Highway & Street category.

Figure 126: Non-Residential Construction – 2017 consensus forecasts

	Consensus	Dodge Data & Analytics	IHS	Moody's	FMI	Construct Connect	Associated Builders & Contractors
Non-residential Total	5.6%	8.2%	4.2%	5.7%	4.4%	5.6%	5.3%
Commercial Total	8.3%	11.9%	4.6%	9.8%	4.7%	10.8%	5.8%
Office	10.6%	14.4%	8.9%	8.7%	4.9%	12.9%	6.5%
Retail & Other Commercial	6.8%	10.9%	2.9%	11.1%	4.5%	8.3%	5.6%
Hotel	7.2%	8.6%	-1.4%	9.5%	5.5%	12.4%	4.5%
Industrial Total	4.0%	2.5%	-3.7%	1.6%	3.0%	-7.2%	6.6%
Institutional Total	5.7%	7.0%	7.2%	6.6%	4.7%	6.9%	4.3%
Health	4.9%	2.1%	12.2%	2.5%	5.1%	12.6%	2.8%
Education	6.3%	8.9%	9.6%	4.5%	4.7%	5.2%	5.2%
Religious	-1.9%	2.3%	-16.2%	0.5%	0.0%	3.1%	1.8%
Public Safety	-7.0%	2.0%	N/A	2.8%	1.2%	2.9%	-3.0%
Amusement & Recreation	7.7%	11.2%	-6.8%	24.4%	5.6%	5.5%	6.7%

Source: AIA

Figure 127: Non-Residential Construction – 2018 consensus forecasts

	Consensus	Dodge Data & Analytics	IHS	Moody's	FMI	Construct Connect	Associated Builders & Contractors
Non-residential Total	4.9%	7.3%	2.4%	6.4%	4.1%	6.3%	4.1%
Commercial Total	4.4%	5.8%	-1.2%	8.5%	2.5%	5.4%	3.4%
Office	4.6%	9.0%	-2.9%	3.5%	3.7%	4.7%	4.3%
Retail & Other Commercial	5.3%	5.8%	2.2%	14.2%	2.1%	6.6%	3.1%
Hotel	1.8%	-2.6%	-5.1%	6.7%	1.5%	4.3%	2.2%
Industrial Total	3.3%	6.7%	-3.8%	3.2%	5.2%	7.6%	3.4%
Institutional Total	5.8%	9.3%	7.7%	5.1%	5.8%	6.6%	5.0%
Health	4.9%	4.4%	11.2%	3.0%	6.7%	10.9%	3.3%
Education	6.7%	12.3%	8.9%	5.3%	6.4%	5.0%	5.5%
Religious	0.6%	3.7%	-12.8%	11.5%	2.6%	4.6%	2.5%
Public Safety	4.0%	6.7%	N/A	5.9%	4.8%	5.7%	4.0%
Amusement & Recreation	4.3%	7.4%	-3.5%	6.5%	2.2%	5.4%	6.9%

Source: AIA

Recent Company Commentary

AECOM Q2 2017 Earnings Conference Call – May 9, 2017

- "First, last week's federal budget agreement removes uncertainty around FAST Act funding, which is now fully funded for this year and should become more significant contributor to our markets. Second, both the President and Congress remain supportive of a $1 trillion federal infrastructure bill. Comments from the administration and Congress are encouraging and significant funding mechanisms remain on the table, such as enabling greater private investment in infrastructure assets. Third, the California market, which is one of our largest, is set to benefit from the $52 billion Road Repair and Accountability Act that was passed on April 6. This bill will increase transportation spending in California by 75% over the next decade and is in addition to the over $120 billion of voter ballot measures that passed the state last November."

Vulcan Materials Q1 2017 Earnings Conference Call – May 10, 2017

- "Market conditions continue to improve in very important fundamental ways. At a macro level, as the Dodge data clearly shows, the pre-construction project pipeline keeps getting bigger and bigger. Construction starts also have continued to recover from last year's weaknesses. Generally speaking, we're continuing to see solid recovery in private construction activity across many markets."

- "On the public construction side, we are getting ready for multiple years of increasing demand in our key states. While the federal highway bill, the FAST Act brought stability, visibility and increased funds for the nation's highway systems, many of our key states and cities have stepped up to address their own needs. For example, last month, California and Tennessee passed major transportation funding legislation and South Carolina is on the brink of passing a new highway bill."

- "Our customers are getting ready for the next wave of large public transportation projects slated to start later this year…Projects like the 202 Loop around Phoenix, Highway 281 expansion in San Antonio, the I-285/400 interchange in Atlanta, and the widening of I-20 in Atlanta and I-85 in North Carolina just to name a few. We will see significantly increasing public infrastructure demand in the coming years. The trend is clear and the laws are written."

- "Private demand in California continues to strengthen, driven by both housing and non-residential construction. And, of course, the outlook for public construction in California improved substantially with the passage of SB 1. Near term, this legislation removes recent uncertainty about public road funding and allows Caltrans to move ahead with planned work this year. In the intermediate and longer term, we should benefit from a much higher level of public construction activity."

- "Virginia, those dollars that they passed a few ago were kicking in. We've got big widenings up on I-95. The Southeast is really humming right now. We see the private construction work continue to gain momentum, particularly in the Carolinas and Georgia border, and Tennessee. And now, we're seeing the big highway work kick in. We talked a lot about the Georgia work, the Carolinas.

We see big work and again, this is the FAST Act coming through and this is the states increases and funding start to flow in the shipments of stones."

Jacobs Engineering Group Q2 2017 Earnings Conference Call – May 9, 2017

- "Meanwhile, U.S. rig counts continue to rise and increase in production particularly in Texas and North Dakota, is outgrowing current pipeline capacity and storage. We therefore expect to see development opportunities in U.S. pipeline and midstream infrastructure like our recent greenfield gas processing plant win in the second quarter."
- "If you just start with roads and highways, aging infrastructure, new governments in place almost in all of our major markets. All are coming together to address the pent up demand to accelerate the improvements upgrades on roads and highways and we're seeing more funding certainty. And so, we're very bullish as we look to the next several quarters and into 2018 on that segment."
- "Even funding opportunities and things like our K-12, the education sector where it's a big part of our core market, a lot of bond issues, they're creating funding. Aviation, we've mentioned several times we're in the midst right now of some very important prospects that we believe we're going to be successful on that are going to continue this significant momentum on what we call our winning streak in aviation that is ahead of us."
- "Even things like U.S. courthouses, which many years ago was a big part of our business and there was a lot of activity, we're seeing a resurgence of opportunities in U.S. courthouses."

Tutor Perini Corp. Q1 2017 Earnings Conference Call – May 3, 2017

- " In early April, the California Legislature passed SB-1 or the Road Repair and Accountability Act of 2017… we expect it will result in a number of new Civil opportunities beginning in 2018 over the next decade."
- "The widespread interest in transportation revenue at the state levels through fuel tax and vehicle fee increases signals rather than waiting for the federal government to act, they are moving on their own to begin to rebuild the states' roads."
- "The actual fact is America is inundated with infrastructure bidding right now as we speak before any of the new administration's work even hit us."
- "Well, so you understand that Prop M of $120 billion tied to the increase of sales tax here. Same thing, it's on transit in Seattle. That only happened fourth quarter of 2016. None of that work has hit the market. None of it will and probably until the fourth quarter this year or first quarter next year."

United Rentals Q1 2017 Earnings Conference Call (April 20, 2017) & Investor Conference (May 10, 2017)

- "Demand is trending up in our core construction and industrial sectors. Commercial construction remained strong."
- "As far as infrastructure, the infrastructure is being talked on the political front. We've always said that would be accretive. We're not baking that into our number, that would be added on to as we go forward. But I would tell you

that the employment numbers, the consumer index, trucking improvements that we're seeing, the tonnage weight, all points to the economy doing fairly well."

- "There's certain facilities or certain infrastructures that require maintenance and require updating. And there's – obviously the civil engineering has gone through **and evaluated bridges and roads and actually rated them based on safety. So those have to be taken care first."**

Fluor Corp. Q1 2017 Earnings Conference Call – May 4, 2017

- "As I've said in the past, I believe, at least in the United States, a lot of the projects in infrastructure that are going to go forward are going to be in the $200 million to $300 million to $500 million kind of range."

Deere & Co. Q2 2017 Earnings Conference Call – May 19, 2017

- "The economic fundamentals affecting the construction and forestry industries in North America are cause for optimism. GDP growth is positive, job growth continues, Construction spending is up from 2016 levels and housing starts are expected to exceed 1.25 million units this year. Construction investment was up in the first quarter of 2017 by almost 10% led by rebounding oil and gas and residential activity. Commercial and institutional construction activity continued to increase moderately. Machinery rental utilization rates have improved after two years of deterioration and used inventory has come down in the past quarter."

Caterpillar Inc. Q1 2017 Earnings Conference Call – April 25, 2017

- "There are also positive indicators for North America construction demand. Many states have passed infrastructure bills. Pipeline projects that were previously stuck in permitting are now moving ahead and residential and nonresidential demand in certain parts of the U.S. remains robust."

- "We believe business optimism, which may be contributing to elevated quoting and ordering activity in North America, is partially a reflection of the benefits of pro-business policy in regards to infrastructure and tax reform. However, we don't expect to see any meaningful impact from these changes until 2018."

Granite Construction, Inc. Q1 2017 Earnings Conference Call – May 2, 2017

- "Public transportation and infrastructure spending overall remained steady and stable, and it is poised to increase. Private non-residential demand, the fuel of our growth the past few years, remained solid across geographies and end markets. This segment is primed for an exceptional year in 2017, and visibility for 2018 and beyond is promising for continued improvement."

- "Today, private market demand finally is being joined state-by-state and region-by-region by significant commitments to increase public investment. These commitments are tied to an ever-deepening pool of backlog for infrastructure investment created by decades of under-investment. We expect increased public demand to provide long-sought balance to the ever-competitive local construction markets we serve."

- "At the federal level, while Trump administration infrastructure discussions remain constructive, it is unrealistic to estimate timing, magnitude or the potential impact of still undefined incremental investment. We remain

cautiously aware of how slowly Congress acts in spite of a perpetually growing list of overdue projects to rebuild American infrastructure."

- "I think, California will struggle a little bit for labor, but I think what's going to happen is you're going to see a shift where people are going to migrate back into the construction industry now. The wage rates for the work that's going to be done in California are high, prevailing wage rates, and it's much higher paying jobs than other jobs that are available in the market today. And I think that what happened, obviously, was during the downturn people flat just got out of construction industry because there was no work."

Martin Marietta Materials Q1 2017 Earnings Conference Call – May 2, 2017

- "Job growth is also important because it serves as a stimulant for construction activity for all end users: residential, nonresidential and infrastructure."
- "The residential marketplace…is benefiting from continued economic recovery, particularly in Colorado, Georgia, North Carolina, Texas and Florida. We see no evidence of these positive trends reversing and consequently, it's our belief that we will witness steady, multi-year residential demand growth."
- "We also see broad positive trends in non-residential growth. North Carolina, Georgia and Texas, continue to benefit from improving economies, consistent job gains and large corporate relocations, all of which fuel construction activity. Consistent with this data, as of March 2017, the Dodge Momentum Index was at an eight-year high, signaling continued non-residential growth."
- "Turning to infrastructure, we remain confident that the benefits of federal, state and local funding increases, including those in the $305 billion Fixing America's Surface Transportation Act, or FAST Act, will have positive impacts on infrastructure construction activity in 2017 and beyond."
- "I do believe there's more broad consensus around the need for investment in infrastructure across the aisle than we've seen in healthcare and in some respects, in tax reform as well.
- "I think it [P3s] plays out just fine in large metropolitan areas. And I think it plays out not as well in the flyover states. And here's what I would say on that. Can you build more toll roads in Florida? Yeah. Can you do it in Georgia? Yeah. Can you do it in parts of North Carolina or New York or Chicago or other big cities? I think when you're looking at P3 in those places where you have to get some degree of return back, and it's typically driven by tolls, I think it works remarkably well. I think if you're looking at Des Moines and Omaha and parts of Middle-America, I think it gets considerably trickier."

H&E Equipment Q1 2017 Earnings Conference Call – April 27, 2017

- "Texas, our largest market, continues to experience a very healthy economy that is driving an array of nonresidential projects."
- "The key take away from this slide is the outlook for the nonresidential construction market in general is positive for 2017 and beyond. Major market indicators including the Dodge Momentum Index and the ABI forecast continued growth. Construction employment reaching an eight year high in March. And then, there is the infrastructure spending wildcard proposed by the new administration, in addition to significant other potential pro-business initiatives which could help extend the cycle for years to come."

Reliance Steel & Aluminum Q1 2017 Earnings Conference Call – April 27, 2017

- "Both pricing and demand levels remain better than they were a year ago, and we are optimistic with regard to increased infrastructure and equipment spending on the horizon."
- "Demand in non-residential construction market continues to experience steady upward growth, though volume is still far below peak levels."
- "We remain cautiously optimistic that domestic infrastructure spending will improve."

Nucor Corp Q1 2017 Earnings Conference Call – April 20, 2017

- "Our fabricated construction products order books indicate that the non-residential construction markets have regained momentum in 2017."
- "We've seen the construction industry slowly improving. We think this year, we'll see an improvement in construction somewhere in the neighborhood of 5% to 6%. And frankly that's the Dodge report number and it is also supported by the backlogs that we see in our downstream businesses, which are for us frankly a better leading indicated than the Dodge numbers."
- "Certainly, President Trump has talked about infrastructure and certainly, we support that. The infrastructure in this country is crumbling. It's an embarrassment."

Steel Dynamics Q1 2017 Earnings Conference Call – April 20, 2017

- "In what is typically a seasonally lower period, non-residential construction demand continues to be steady throughout much of the United States and we continue to see strong quote and order entry activity."
- "The ongoing strength of this business [fabrication] and continued customer optimism also provides positive insights into the continued strength of the non-residential construction activity."
- "We believe there will be additional growth in the construction sector, especially for larger public sector infrastructure projects."
- "Non-residential construction is continuing to grow."
- "I just might add to that that we are seeing movement at the state level that really has come prior to any federal infrastructure program."

Hubbell Q1 2017 Earnings Conference Call – April 25, 2017

- "On non-res, our outlook stays at 2% to 4%. We're seeing private outgrowing public, which has been the case for a while, but we continue to see supportive Dodge starts and AIA data as well as our order patterns in discussion with customers that lead us to feel like that 2% to 4% is appropriate for the rest of 2017."

Commercial Metals Q2 2017 Earnings Conference Call – March 23, 2017

- "The most direct indicator is robust volume of bidding we are seeing in our U.S. Fabrication businesses, which is driven by the strength of the construction market."
- "In the U.S. non-residential construction, our primary end-use market has grown 8% year-over-year. Additionally, the Architecture Billings Index for the Southern U.S…has remained strong for the last several quarters."

WESCO International Q1 2017 Earnings Conference Call – April 27, 2017

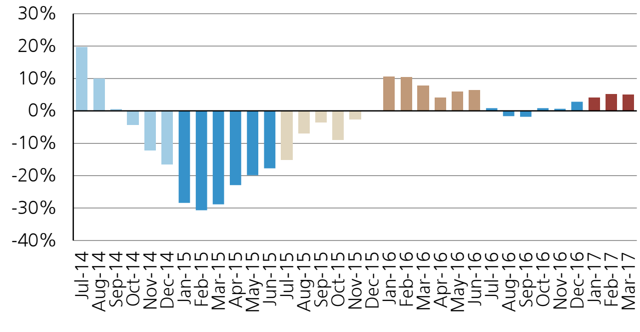
- "Our outlook for non-residential construction sales remains modestly positive for 2017 with supportive forward-looking indicators and an overall market that is still below its prior peak."
- "The non-resi market still, there's some areas where it's still challenged."

Acuity Brands Q2 2017 Earnings Conference Call – April 4, 2017

- "Additionally, we continue to hear from customers that labor shortages in certain markets continue to cause delays in larger projects."
- "Leading indicators for the North American market, such as Architecture Billing Index, vacancy rates, office absorption, lending availability and favorable employment trends continue to improve at varying paces."

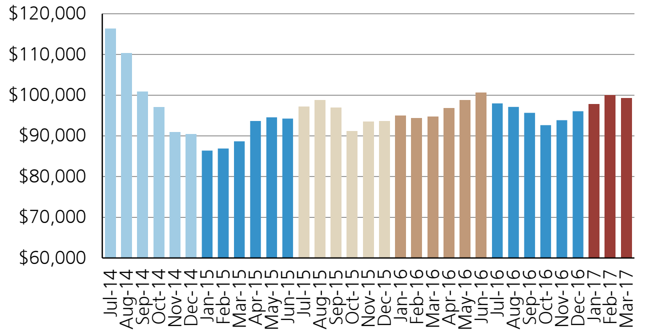
Appendix: 2016/1Q17 in charts and the setup into 2H17

Figure 128: Power (YoY)



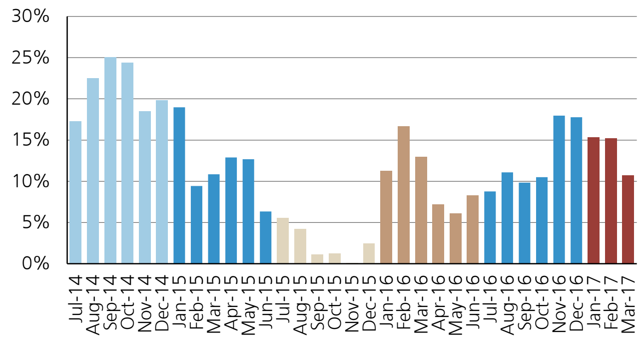
Source: US Census Bureau

Figure 129: Power (SAAR)



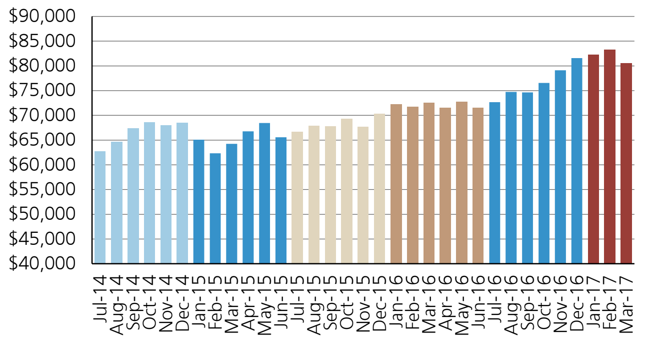
Source: US Census Bureau

Figure 130: Commercial (YoY)



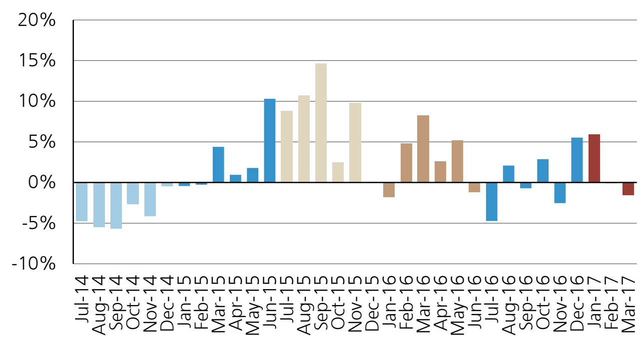
Source: US Census Bureau

Figure 131: Commercial (SAAR)



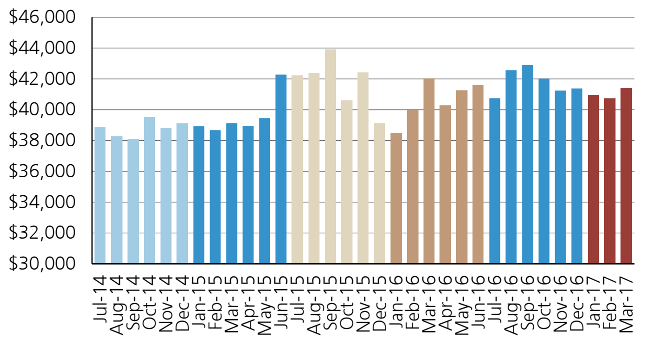
Source: US Census Bureau

Figure 132: Healthcare (YoY)



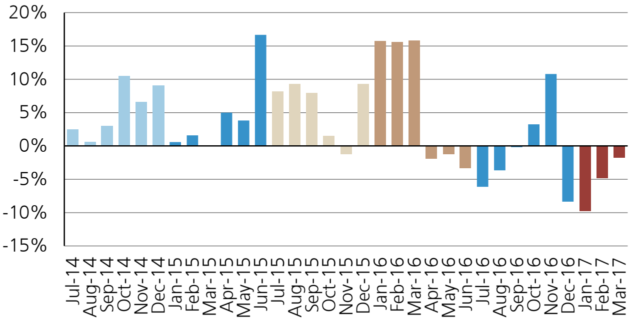
Source: US Census Bureau

Figure 133: Healthcare (SAAR)



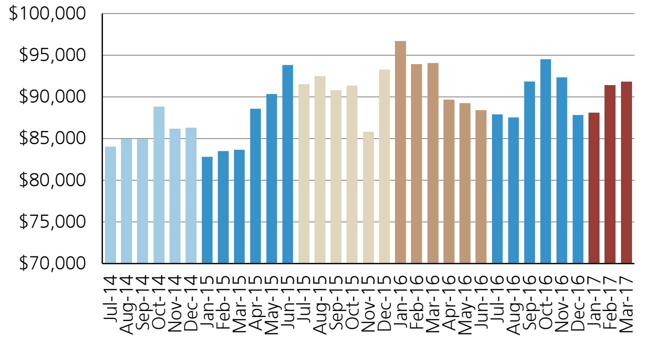
Source: US Census Bureau

Figure 134: Highway & Street (YoY)



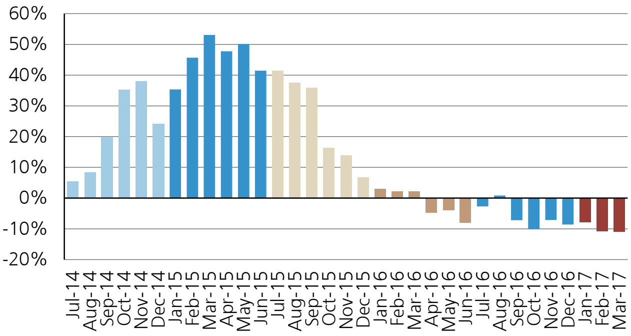
Source: US Census Bureau

Figure 135: Highway & Street (SAAR)



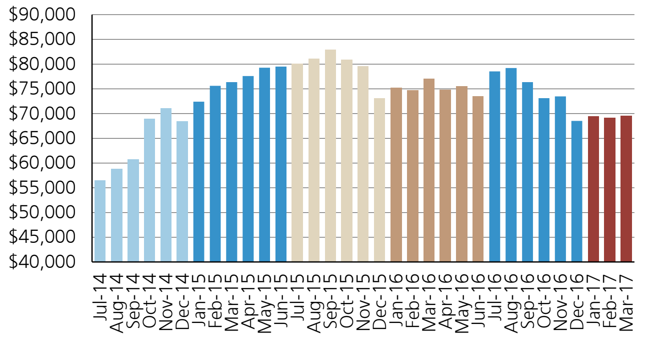
Source: US Census Bureau

Figure 136: Manufacturing (YoY)



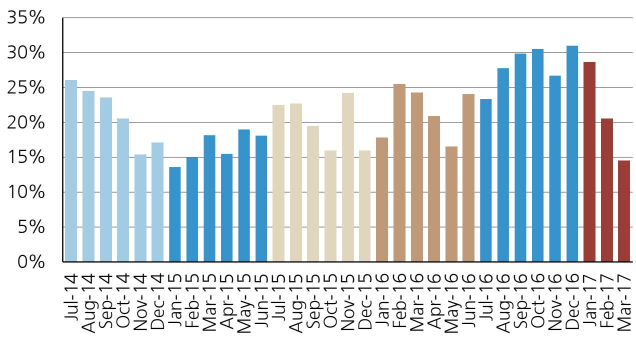
Source: US Census Bureau

Figure 137: Manufacturing (SAAR)



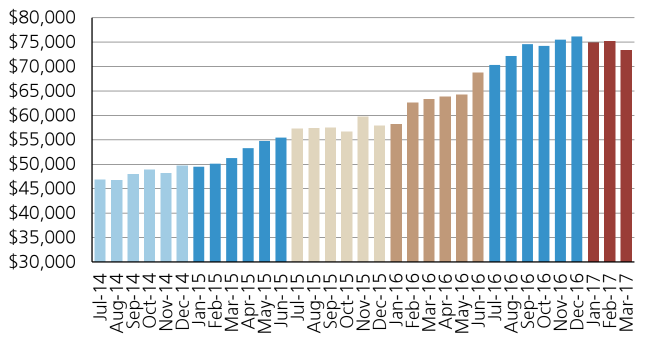
Source: US Census Bureau

Figure 138: Office (YoY)



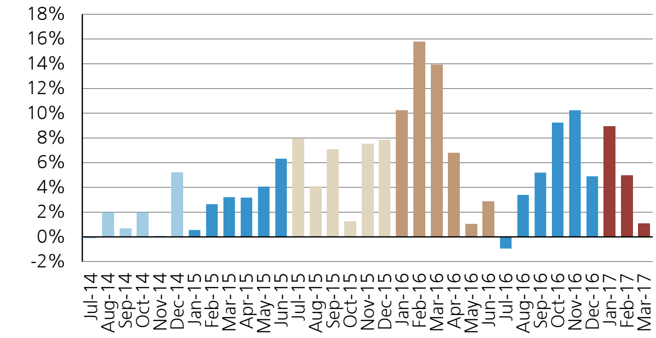
Source: US Census Bureau

Figure 139: Office (SAAR)



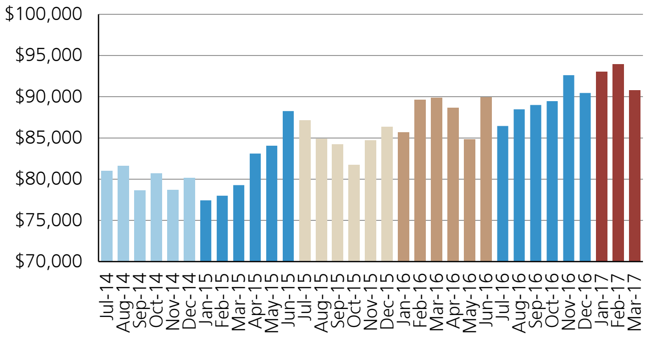
Source: US Census Bureau

Figure 140: Education (YoY)



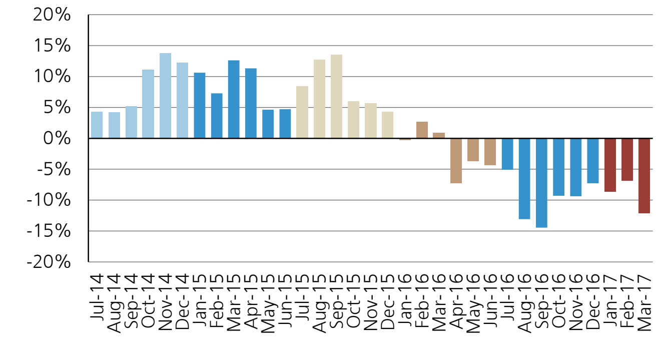
Source: US Census Bureau

Figure 141: Education (SAAR)



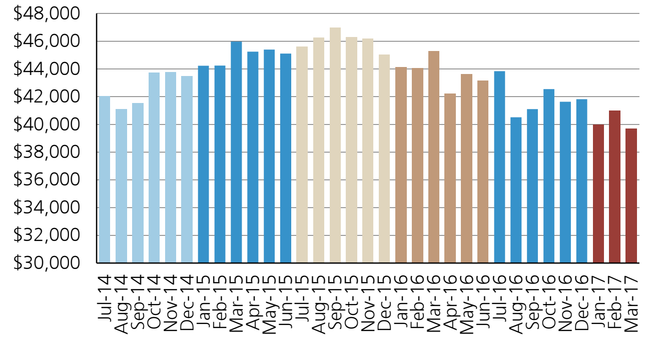
Source: US Census Bureau

Figure 142: Transportation (YoY)



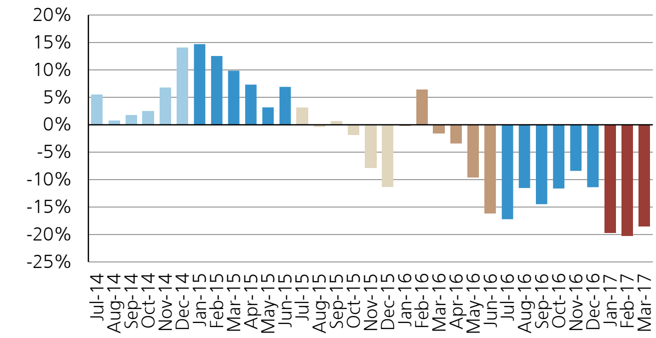
Source: US Census Bureau

Figure 143: Transportation (SAAR)



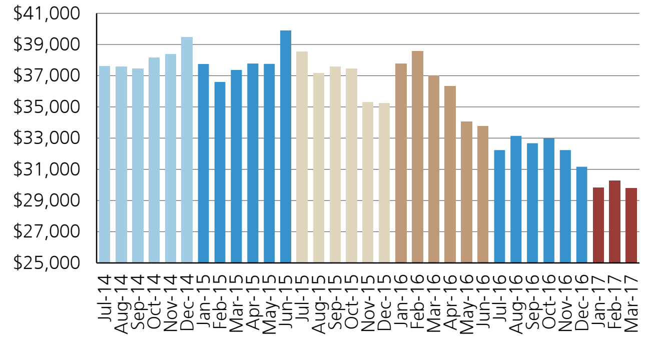
Source: US Census Bureau

Figure 144: Water, Sewage & Waste (YoY)



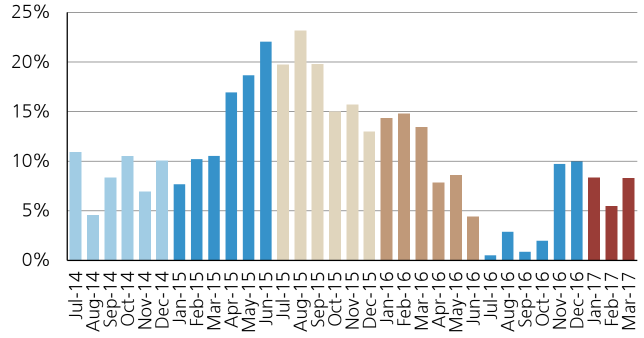
Source: US Census Bureau

Figure 145: Water, Sewage & Waste (SAAR)



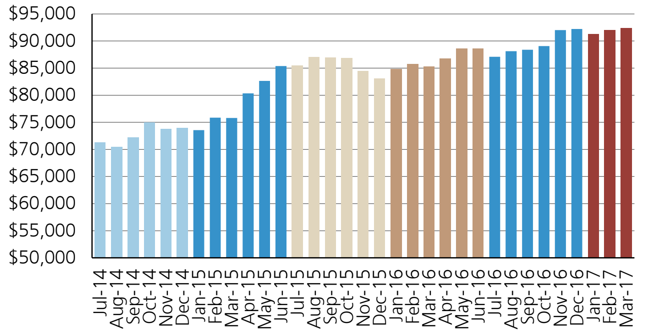
Source: US Census Bureau

Figure 146: Other (YoY)



Source: US Census Bureau

Figure 147: Other (SAAR)



Source: US Census Bureau

Appendix: Detailed construction spending dashboard

Figure 148: Detailed US Construction Dashboard (section 1 of 3)

	% of Total	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
Total Construction	**100%**	**11.6%**	**4.4%**	**3.0%**	**2.4%**	**1.6%**	**2.1%**	**0.4%**	**2.8%**	**6.0%**	**5.5%**	**5.0%**	**5.1%**	**4.5%**
Private	76.1%	13.0%	6.3%	4.9%	4.6%	5.4%	5.2%	2.4%	4.1%	7.0%	8.5%	8.6%	9.0%	7.8%
Public	23.9%	7.1%	-1.2%	-2.4%	-3.4%	-8.0%	-5.6%	-4.8%	-0.7%	2.9%	-4.3%	-6.8%	-7.3%	-6.6%
State and Local	22.0%	7.9%	-1.1%	-2.8%	-3.7%	-8.0%	-6.0%	-5.1%	0.0%	3.3%	-5.4%	-7.2%	-7.0%	-7.4%
Federal	1.9%	0.3%	-3.2%	2.3%	0.6%	-9.1%	0.4%	-1.7%	-9.2%	-0.9%	7.5%	-2.7%	-9.8%	1.2%
Residential	**40.2%**	**13.5%**	**5.7%**	**3.3%**	**3.3%**	**4.2%**	**2.4%**	**-0.8%**	**2.4%**	**6.1%**	**7.6%**	**6.7%**	**9.4%**	**9.2%**
Private	98.7%	13.6%	5.9%	3.4%	3.5%	4.5%	2.5%	-0.7%	2.4%	6.2%	7.8%	6.9%	9.6%	9.4%
New single family	51.9%	15.7%	9.8%	6.6%	4.2%	1.8%	-1.5%	-3.2%	-1.4%	-0.1%	1.0%	2.8%	3.8%	5.0%
New multi-family	13.0%	28.1%	18.1%	23.2%	17.6%	15.9%	13.4%	8.5%	9.2%	9.6%	5.0%	8.2%	7.8%	7.7%
Public	1.3%	5.2%	-7.9%	-3.9%	-7.0%	-12.2%	-2.2%	-8.4%	6.0%	0.9%	1.0%	-8.3%	-7.8%	-7.8%
State	1.2%	6.4%	-6.8%	-1.7%	-5.1%	-7.9%	3.5%	-4.3%	10.2%	7.5%	2.2%	-2.0%	-2.6%	-2.8%
Multi-family	1.1%	12.0%	-11.3%	-0.5%	-2.5%	-6.2%	8.2%	-0.7%	21.2%	23.8%	11.8%	8.2%	11.1%	12.4%
Federal	0.1%	-2.7%	-15.1%	-15.9%	-19.0%	-37.8%	-34.8%	-31.6%	-22.7%	-36.5%	-7.4%	-48.4%	-38.6%	-36.6%
Non- Residential	**59.8%**	**10.3%**	**3.6%**	**2.9%**	**1.7%**	**-0.1%**	**1.9%**	**1.2%**	**3.1%**	**5.9%**	**4.1%**	**3.9%**	**2.5%**	**1.2%**
Private	60.9%	12.2%	6.8%	6.7%	5.8%	6.4%	8.3%	5.9%	6.0%	7.8%	9.3%	10.3%	8.4%	5.9%
Public	39.1%	7.2%	-1.1%	-2.4%	-3.4%	-7.9%	-5.7%	-4.7%	-0.8%	3.0%	-4.4%	-6.8%	-7.3%	-6.6%
State	36.0%	7.9%	-0.9%	-2.8%	-3.7%	-8.0%	-6.2%	-5.1%	-0.2%	3.2%	-5.6%	-7.4%	-7.1%	-7.5%
Federal	3.1%	0.4%	-2.7%	3.2%	1.5%	-7.8%	2.1%	-0.5%	-8.7%	0.8%	8.0%	-0.8%	-8.7%	2.8%
Lodging	**4.0%**	**36.1%**	**30.1%**	**30.5%**	**20.4%**	**23.1%**	**20.8%**	**22.1%**	**20.1%**	**27.8%**	**22.5%**	**19.4%**	**11.6%**	**7.9%**
Private	3.9%	37.8%	31.0%	31.3%	22.0%	25.2%	22.7%	25.9%	21.6%	28.7%	23.7%	20.0%	12.7%	8.2%
Public	0.0%													
Office	**10.2%**	**24.3%**	**20.9%**	**16.5%**	**24.0%**	**23.3%**	**27.8%**	**29.9%**	**30.5%**	**26.7%**	**31.0%**	**28.6%**	**20.5%**	**14.5%**
Private	9.1%	29.2%	26.5%	22.0%	28.9%	28.2%	31.3%	34.3%	35.7%	29.1%	35.0%	32.4%	23.8%	16.3%
General	8.8%	29.0%	27.1%	21.5%	28.3%	28.7%	30.8%	35.4%	35.8%	28.9%	34.4%	31.0%	23.7%	15.9%
Financial	0.3%	13.3%	-1.5%	8.1%	3.0%	-5.5%	2.8%	-8.5%	15.0%	24.5%	43.6%	82.7%	28.1%	32.4%
Public	1.1%	-3.7%	-9.3%	-12.4%	-4.4%	-6.3%	5.4%	3.2%	-3.0%	10.4%	4.7%	3.0%	-2.7%	1.0%
State	0.8%	-2.7%	-11.9%	-13.4%	-6.7%	-9.8%	-2.5%	-4.5%	-8.7%	8.6%	5.0%	-1.5%	-0.3%	-6.3%
Federal	0.3%	-6.1%	-1.2%	-9.7%	2.3%	4.4%	29.8%	20.1%	17.7%	16.0%	4.0%	14.1%	-7.7%	20.2%
Commercial	**10.9%**	**13.0%**	**7.2%**	**6.1%**	**8.3%**	**8.8%**	**11.1%**	**9.8%**	**10.5%**	**18.0%**	**17.8%**	**15.3%**	**15.2%**	**10.7%**
Private (inc. Farm)	10.5%	10.8%	5.4%	4.9%	8.3%	9.9%	11.5%	9.8%	10.5%	18.1%	18.5%	16.5%	16.5%	12.6%
Automotive	0.9%	22.0%	-1.0%	-10.5%	3.7%	15.7%	31.0%	25.5%	22.3%	27.9%	31.7%	22.2%	30.9%	12.4%
Sales	0.4%	42.0%	6.9%	19.2%	24.6%	37.0%	32.4%	21.4%	16.9%	4.6%	12.5%	25.3%	45.1%	19.2%
Service/parts	0.4%	0.6%	-16.2%	-32.8%	-5.9%	1.2%	39.0%	29.1%	20.2%	38.1%	31.1%	9.9%	14.3%	2.3%
Parking	0.1%	38.3%	35.5%	13.6%	-7.8%	10.8%	8.0%	24.6%	50.8%	80.4%	104.2%	50.9%	34.2%	16.9%
Food/beverage	1.1%	-3.5%	-0.7%	-6.6%	-15.7%	2.7%	18.9%	23.8%	16.0%	21.9%	24.0%	6.3%	1.5%	12.9%
Food	0.5%	-7.6%	-3.0%	-9.1%	-10.2%	-12.9%	-0.7%	34.2%	45.8%	60.4%	54.3%	22.0%	19.9%	2.8%
Dining/drinking	0.4%	-13.8%	-10.0%	0.0%	-1.5%	42.9%	37.9%	3.3%	-0.4%	14.5%	18.7%	0.0%	-4.2%	34.0%
Multi-retail	3.0%	1.5%	-3.5%	-5.0%	4.5%	3.6%	5.8%	3.0%	10.4%	19.9%	17.0%	12.7%	10.2%	5.9%
General merchandise	0.4%	-16.2%	-13.0%	-0.9%	17.8%	37.0%	44.3%	8.8%	-1.8%	-11.5%	2.2%	15.6%	23.8%	15.0%
Shopping center	2.0%	5.6%	7.4%	4.7%	11.0%	-1.4%	2.5%	3.5%	11.8%	18.4%	8.6%	3.3%	2.1%	0.6%
Shopping mall	0.5%	1.3%	-35.5%	-39.7%	-18.9%	0.7%	7.3%	17.1%	39.8%	80.0%	87.0%	89.2%	57.4%	41.5%
Other commercial	0.9%	48.6%	29.0%	14.9%	28.0%	27.5%	16.9%	5.4%	-7.7%	4.9%	9.6%	4.9%	-0.2%	-18.0%
Drug store	0.1%	9.4%	-14.6%	-11.9%	21.6%	20.0%	-13.0%	-18.2%	-14.9%	37.8%	-2.6%	0.0%	0.0%	-42.9%
Building supply store	0.1%	22.6%	-20.8%	-5.5%	15.8%	20.4%	14.6%	-36.2%	-37.0%	-22.7%	-14.3%	-28.2%	-19.0%	-21.1%
Other stores	0.6%	55.3%	53.2%	32.6%	34.5%	43.7%	34.6%	28.4%	11.8%	15.9%	28.0%	15.5%	6.9%	-9.5%
Warehouse	3.0%	23.7%	19.2%	32.8%	30.7%	24.5%	16.5%	13.3%	15.7%	27.5%	28.0%	37.0%	39.9%	37.8%
General commercial	2.7%	19.3%	11.7%	28.7%	26.1%	19.6%	12.5%	9.4%	11.9%	25.4%	26.1%	34.1%	34.3%	32.8%
Mini-storage	0.3%	173.1%	203.5%	115.5%	116.7%	102.6%	82.4%	76.3%	73.6%	57.1%	49.2%	64.8%	99.2%	84.5%
Public	0.4%	76.2%	66.7%	37.9%	8.2%	-17.3%	3.0%	11.5%	9.6%	15.2%	3.3%	-8.9%	-9.6%	-23.3%
State	0.2%	98.7%	69.7%	36.1%	-11.9%	-29.0%	-22.8%	-0.7%	-15.5%	-12.7%	-22.9%	-19.1%	-18.8%	-32.9%
Automotive	0.1%	86.1%	61.7%	22.8%	-25.7%	-50.0%	-57.0%	-53.1%	-44.0%	-31.6%	-29.4%	-50.7%	-46.9%	-53.7%
Parking	0.1%	56.3%	13.6%	-36.5%	-21.4%	-48.0%	-56.4%	-51.9%	-41.9%	-28.7%	-25.0%	-14.6%	-10.5%	-40.0%
Federal	0.2%	56.7%	63.2%	39.6%	31.4%	-0.9%	36.6%	23.3%	50.5%	62.0%	31.9%	5.0%	1.6%	-12.8%
Health Care	**5.9%**	**8.2%**	**2.6%**	**5.2%**	**-1.2%**	**-4.7%**	**2.1%**	**-0.7%**	**2.9%**	**-2.5%**	**5.5%**	**5.9%**	**-0.1%**	**-1.5%**
Private	4.7%	9.5%	3.0%	8.7%	0.0%	-5.2%	-0.4%	-2.7%	3.5%	-3.5%	6.2%	7.3%	-0.5%	-1.1%
Hospital	3.0%	13.8%	3.5%	10.4%	6.0%	6.3%	10.4%	8.8%	-0.8%	-3.3%	4.9%	5.4%	-2.6%	2.9%
Medical building	1.1%	13.4%	11.1%	14.4%	-10.1%	-28.8%	-21.5%	-27.7%	12.3%	-4.7%	14.7%	11.6%	5.0%	-8.3%
Special care	0.6%	-13.4%	-12.0%	-9.1%	-6.9%	0.3%	0.6%	4.8%	11.0%	-2.1%	-1.5%	8.9%	0.3%	-7.9%
Public	1.2%	3.9%	1.1%	-7.3%	-5.8%	-2.8%	12.8%	7.7%	0.6%	1.6%	2.9%	0.8%	1.5%	-3.1%
State	0.7%	1.8%	-0.2%	-14.3%	-8.7%	-5.7%	6.2%	-3.5%	3.0%	-1.5%	-10.9%	-13.1%	-7.7%	-10.3%
Hospital	0.5%	0.0%	-5.6%	-15.5%	-17.8%	-16.3%	-3.6%	-13.0%	-4.7%	-10.3%	-17.8%	-21.4%	-19.1%	-21.4%
Medical building	0.1%	-7.4%	18.8%	-22.6%	21.1%	23.9%	22.4%	5.3%	14.6%	28.4%	12.3%	16.2%	34.9%	29.3%
Special care	0.1%	41.2%	15.4%	18.9%	31.6%	39.5%	72.7%	83.9%	54.3%	28.2%	9.5%	-6.0%	17.5%	2.1%
Federal	0.5%	7.3%	3.6%	7.5%	0.4%	1.9%	23.6%	24.0%	-3.8%	7.4%	31.4%	31.3%	17.2%	7.8%

Source: US Census
Note: Due to rounding, statistical analysis, and selective reporting, not all figures add to the total

Figure 149: Detailed US Construction Dashboard (section 2 of 3)

	% of Total	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
Educational	**12.7%**	**13.9%**	**6.8%**	**1.1%**	**2.9%**	**-0.9%**	**3.4%**	**5.2%**	**9.2%**	**10.2%**	**4.9%**	**8.9%**	**5.0%**	**1.1%**
Private	2.8%	12.9%	8.6%	6.8%	4.0%	7.1%	10.0%	17.9%	15.2%	22.4%	18.3%	21.4%	20.7%	14.5%
Preschool	0.1%	7.4%	0.0%	16.1%	13.2%	47.1%	-18.2%	43.3%	79.2%	50.0%	96.6%	13.7%	19.0%	62.1%
Primary/Secondary	0.5%	1.2%	-2.8%	-3.6%	-16.9%	-10.9%	-7.2%	6.1%	16.5%	34.2%	20.4%	24.1%	29.1%	22.1%
Higher Education	1.9%	12.5%	8.7%	4.8%	4.8%	9.4%	15.5%	21.8%	11.7%	18.3%	11.2%	19.8%	15.8%	10.4%
Instructional	0.9%	6.1%	7.3%	-2.9%	5.8%	19.1%	23.2%	33.5%	16.5%	25.2%	21.7%	26.2%	22.7%	11.9%
Dormitory	0.7%	20.4%	12.5%	17.7%	15.0%	20.2%	26.0%	34.3%	22.8%	22.0%	3.5%	15.8%	16.8%	7.9%
Sports/Recreation	0.2%	-5.4%	-3.6%	2.3%	-15.0%	-26.5%	0.0%	15.6%	-9.6%	0.0%	6.8%	21.7%	7.1%	32.9%
Other Educational	0.3%	44.4%	35.1%	56.9%	50.0%	19.4%	16.3%	3.2%	15.7%	14.3%	39.8%	8.6%	14.7%	6.3%
Gallery/Museum	0.2%	41.7%	34.2%	67.1%	64.0%	45.9%	26.0%	17.1%	27.1%	18.2%	59.3%	8.8%	23.2%	8.8%
Public	9.9%	14.2%	6.3%	-0.5%	2.6%	-2.7%	1.9%	2.2%	7.7%	7.1%	1.3%	5.4%	0.5%	-2.6%
State	9.7%	15.2%	6.8%	0.2%	3.2%	-2.1%	2.3%	3.1%	8.0%	7.7%	1.8%	6.1%	1.0%	-3.0%
Primary/Secondary	6.0%	22.9%	15.1%	9.6%	13.0%	4.1%	2.4%	6.5%	11.8%	11.4%	7.3%	16.8%	7.4%	4.2%
Elementary	1.8%	26.8%	11.6%	22.9%	39.4%	31.1%	30.2%	9.6%	9.7%	23.2%	3.0%	16.6%	7.6%	0.0%
Middle/Junior high	1.3%	38.3%	41.5%	16.6%	22.5%	-0.5%	-1.1%	11.1%	22.4%	23.2%	31.1%	34.6%	22.6%	18.9%
High	2.8%	16.0%	6.5%	-0.1%	-6.5%	-12.4%	-12.0%	2.6%	7.6%	-1.6%	-2.3%	8.2%	-2.4%	-2.8%
Higher Education	3.3%	2.9%	-3.3%	-10.0%	-8.3%	-14.1%	2.0%	-2.8%	3.4%	0.9%	-5.0%	-8.6%	-4.2%	-10.3%
Instructional	1.9%	10.1%	2.1%	-4.1%	0.3%	-14.1%	-5.9%	-8.0%	3.8%	0.9%	0.5%	-2.0%	3.7%	-5.3%
Dormitory	0.6%	6.8%	10.4%	0.6%	-4.9%	-2.8%	47.0%	10.7%	-7.2%	-5.0%	-11.1%	-21.6%	-15.6%	-18.7%
Sports/Recreation	0.4%	-7.3%	-21.9%	-22.8%	-24.2%	-15.3%	2.3%	18.7%	12.7%	18.4%	1.1%	-5.0%	1.3%	-8.9%
Infrastructure	0.2%	-56.8%	-47.5%	-43.8%	-39.0%	-40.2%	-23.9%	12.7%	46.3%	7.2%	-20.7%	1.4%	-21.6%	-21.4%
Other Educational	0.2%	54.0%	-9.0%	-36.7%	-16.1%	-4.9%	-2.4%	-8.1%	-7.1%	19.5%	-22.4%	-7.3%	-19.9%	-31.2%
Library/Archive	0.2%	87.1%	42.9%	29.0%	24.0%	16.2%	-16.0%	-1.7%	-20.0%	3.0%	-20.9%	-11.0%	-38.2%	-51.1%
Federal	0.2%	-14.7%	-9.5%	-22.9%	-21.0%	-31.7%	-16.9%	-25.5%	-5.1%	-13.6%	-13.8%	-15.8%	-16.7%	11.7%
Religious	**0.5%**	**17.3%**	**19.6%**	**5.7%**	**3.4%**	**-4.8%**	**3.7%**	**-9.6%**	**-13.8%**	**0.3%**	**1.4%**	**-6.5%**	**-3.8%**	**-8.7%**
Private	0.5%	17.7%	19.6%	6.0%	3.8%	-4.8%	4.0%	-9.4%	-13.5%	0.3%	1.4%	-6.5%	-3.8%	-8.7%
House of Worship	0.5%	22.2%	25.2%	1.9%	3.3%	-1.3%	4.0%	-6.9%	-7.1%	7.1%	6.3%	-3.7%	-4.4%	-10.8%
Other Religious	0.1%	-4.8%	-6.4%	31.7%	6.5%	-24.5%	6.8%	-22.6%	-45.0%	-28.6%	-22.4%	-18.4%	0.0%	5.0%
Auxiliary Building	0.1%	-41.0%	-30.2%	-18.9%	-34.1%	-35.0%	-22.5%	-24.4%	-32.6%	-13.5%	12.5%	28.0%	40.9%	52.2%
Public Safety	**1.1%**	**-10.4%**	**-6.9%**	**-3.6%**	**-7.8%**	**-10.0%**	**-11.9%**	**-11.4%**	**-10.8%**	**-1.9%**	**3.7%**	**-10.1%**	**-4.2%**	**2.6%**
Private	0.0%													
Public	1.1%	-7.5%	-4.0%	-1.2%	-6.4%	-9.5%	-11.6%	-11.4%	-10.6%	-2.4%	4.4%	-10.4%	-4.8%	3.1%
State	0.8%	-8.7%	1.7%	0.0%	-2.1%	-9.0%	-9.7%	-5.6%	-1.7%	-0.2%	0.4%	-11.2%	-3.7%	6.9%
Correctional	0.5%	-13.9%	4.1%	-1.4%	-0.6%	-7.7%	-5.5%	-7.2%	-3.9%	4.1%	-3.8%	-15.5%	-11.1%	13.7%
Detention	0.3%	-10.8%	1.2%	5.5%	8.7%	4.7%	2.2%	-3.4%	4.5%	-8.2%	-6.4%	-26.0%	-3.3%	11.5%
Police/sheriff	0.2%	-17.1%	7.9%	-10.7%	-12.9%	-21.0%	-13.6%	-11.4%	-12.6%	22.3%	-0.8%	0.9%	-19.7%	15.9%
Other public safety	0.3%	0.6%	-1.7%	2.2%	-4.0%	-11.1%	-17.3%	-2.4%	1.5%	-6.8%	7.9%	-3.0%	10.7%	-3.7%
Fire/rescue	0.2%	7.1%	3.5%	-0.8%	-0.7%	-3.5%	-7.7%	18.1%	7.0%	2.0%	29.1%	19.1%	21.6%	3.3%
Federal	0.3%	-5.0%	-17.5%	-3.1%	-16.7%	-11.3%	-15.6%	-22.1%	-30.6%	-8.0%	14.8%	-8.5%	-7.6%	-5.3%
Amusement and Recreation	**3.2%**	**16.0%**	**11.5%**	**9.7%**	**3.8%**	**3.7%**	**7.2%**	**4.0%**	**8.2%**	**14.1%**	**10.9%**	**11.8%**	**9.7%**	**9.1%**
Private	1.7%	34.6%	21.6%	21.0%	17.4%	17.2%	23.9%	19.7%	15.8%	23.2%	24.7%	16.7%	13.3%	12.2%
Theme/Amusement park	0.3%	54.3%	112.3%	95.3%	86.3%	144.7%	122.5%	63.6%	58.0%	29.1%	65.5%	22.0%	9.1%	18.5%
Sports	0.7%	50.2%	27.1%	27.0%	28.8%	6.1%	5.4%	2.0%	-8.6%	15.5%	25.2%	19.6%	30.8%	33.4%
Fitness	0.2%	-2.4%	-18.9%	-20.4%	-15.1%	-6.2%	46.3%	17.6%	32.2%	48.1%	27.2%	21.4%	18.7%	-3.7%
Performance/meeting center	0.1%	40.0%	23.1%	32.7%	32.7%	49.1%	87.5%	85.7%	48.9%	89.8%	59.6%	48.0%	22.2%	11.4%
Social center	0.1%	29.2%	0.0%	5.6%	-16.0%	-16.9%	-4.7%	1.2%	20.8%	-12.0%	-36.8%	-14.1%	-17.6%	-31.0%
Movie theater/studio	0.1%	-21.9%	-10.8%	-15.6%	-15.3%	-1.5%	-7.8%	47.6%	66.2%	34.8%	-1.5%	-7.3%	-37.5%	-19.3%
Public	1.4%	-0.5%	2.2%	0.0%	-8.1%	-8.9%	-7.6%	-10.5%	0.6%	4.6%	-3.5%	5.9%	5.0%	5.3%
State	1.4%	0.0%	3.6%	1.1%	-6.2%	-7.7%	-7.4%	-11.0%	1.8%	6.8%	-4.2%	4.4%	4.9%	3.9%
Sports	0.2%	9.2%	-4.2%	-2.6%	-41.2%	-7.2%	-18.5%	-15.0%	-9.0%	10.6%	-13.4%	-9.5%	-28.3%	-20.6%
Performance/meeting center	0.2%	-2.3%	13.8%	13.6%	39.4%	-5.6%	9.3%	-4.1%	34.8%	38.1%	2.8%	18.4%	29.7%	-2.4%
Convention Center	0.1%	-10.3%	-5.4%	16.2%	15.5%	11.0%	-7.6%	8.7%	0.0%	6.3%	15.3%	23.8%	22.8%	18.0%
Social Center	0.2%	7.5%	34.5%	28.4%	12.4%	-2.0%	-1.0%	-20.0%	5.6%	-4.5%	4.8%	2.3%	38.0%	20.9%
Neighborhood Center	0.1%	-9.6%	13.6%	13.1%	-5.9%	-11.7%	-14.7%	-33.6%	1.0%	-15.5%	8.1%	3.9%	35.1%	34.8%
Park/camp	0.7%	-3.7%	-5.5%	-6.5%	-1.0%	-9.4%	-10.4%	-6.3%	1.2%	4.8%	-4.3%	7.2%	7.9%	13.5%
Federal	0.1%	-11.1%	-27.0%	-22.7%	-45.8%	-35.0%	-10.3%	4.9%	-28.9%	-31.3%	11.1%	55.0%	10.0%	34.4%
Transportation	**5.9%**	**0.9%**	**-7.2%**	**-3.7%**	**-4.3%**	**-5.1%**	**-13.1%**	**-14.4%**	**-9.3%**	**-9.4%**	**-7.3%**	**-8.6%**	**-6.8%**	**-12.2%**
Private	1.7%	-10.1%	-2.8%	-3.9%	-2.7%	-4.0%	-15.9%	-15.2%	-8.3%	-16.6%	-14.2%	-5.5%	-3.3%	-7.8%
Air	0.2%	36.6%	30.1%	46.3%	54.0%	54.9%	43.8%	41.9%	45.9%	26.3%	52.2%	100.0%	105.3%	61.9%
Land	1.5%	-12.2%	-3.2%	-5.8%	-5.2%	-6.9%	-19.0%	-17.7%	-10.5%	-18.9%	-18.3%	-15.2%	-15.4%	-16.8%
Public	4.2%	5.2%	-9.0%	-3.6%	-4.9%	-5.5%	-11.9%	-14.1%	-9.7%	-5.9%	-4.1%	-9.9%	-8.0%	-13.6%
State	3.9%	4.7%	-11.5%	-5.3%	-6.7%	-5.9%	-13.5%	-13.6%	-10.0%	-5.9%	-3.1%	-8.5%	-5.8%	-13.4%
Air	1.5%	-16.1%	-8.4%	-7.0%	2.6%	5.9%	-23.3%	-13.7%	-9.8%	8.1%	28.6%	12.3%	5.9%	2.3%
Passenger Terminal	0.9%	-5.4%	7.0%	1.9%	12.8%	23.1%	1.3%	22.9%	32.2%	48.1%	72.5%	33.6%	27.1%	19.6%
Runway	0.5%	-34.1%	-25.7%	-20.9%	-7.2%	-7.0%	-43.2%	-37.6%	-37.2%	-30.4%	-22.6%	-26.1%	-36.2%	-22.2%
Land	2.2%	14.8%	-12.6%	-2.9%	-12.2%	-13.3%	-9.2%	-14.3%	-11.5%	-15.5%	-19.3%	-16.9%	-10.7%	-18.0%
Passenger Terminal	0.6%	35.5%	-8.0%	-5.4%	-12.5%	-17.5%	-24.5%	-29.2%	-24.4%	-25.4%	-33.7%	-35.1%	-40.9%	-36.6%
Mass transit	1.0%	4.4%	-13.2%	6.6%	-9.2%	-12.8%	-9.1%	-10.6%	-9.8%	-13.4%	-9.3%	-2.7%	18.3%	-5.3%
Water	0.2%	32.5%	-17.6%	-16.2%	-8.8%	-4.0%	-7.5%	-22.7%	-15.4%	-13.2%	-5.1%	-22.3%	-13.8%	-34.1%
Dock/marina	0.2%	30.4%	-16.2%	-24.1%	-1.1%	0.0%	10.4%	-20.2%	-5.7%	-4.2%	8.0%	-11.3%	-3.3%	-24.2%
Federal	0.3%	11.4%	30.1%	20.7%	20.8%	0.0%	12.2%	-19.9%	-6.0%	-6.1%	-16.0%	-25.6%	-31.4%	-16.3%

Source: US Census
Note: Due to rounding, statistical analysis, and selective reporting, not all figures add to the total

Figure 150: Detailed US Construction Dashboard (section 3 of 3)

	% of Total	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
Communication	**2.9%**	**2.1%**	**-8.9%**	**-8.0%**	**-6.5%**	**-13.6%**	**-7.1%**	**-13.3%**	**-10.7%**	**-2.0%**	**1.2%**	**6.5%**	**6.8%**	**18.4%**
Private	2.8%	2.8%	-8.9%	-8.2%	-6.4%	-13.4%	-7.1%	-12.9%	-10.4%	-1.8%	1.3%	6.9%	7.2%	19.0%
Public	0.0%													
Power	**13.8%**	**7.8%**	**4.1%**	**5.9%**	**6.4%**	**0.8%**	**-1.6%**	**-1.8%**	**0.8%**	**0.7%**	**2.8%**	**4.1%**	**5.3%**	**5.0%**
Private	12.7%	12.3%	6.7%	6.8%	6.0%	5.5%	5.7%	3.3%	2.8%	3.6%	5.3%	7.6%	10.5%	8.2%
Electric	9.7%	16.5%	12.3%	14.1%	13.6%	13.1%	14.3%	11.0%	11.8%	12.7%	14.9%	17.3%	19.9%	14.8%
Public	1.1%	-25.6%	-14.2%	-1.5%	9.1%	-32.7%	-45.5%	-38.8%	-17.8%	-27.7%	-22.9%	-30.5%	-41.1%	-31.7%
State	0.9%	-28.1%	-15.1%	-6.0%	5.8%	-41.1%	-47.7%	-43.4%	-15.1%	-29.4%	-23.1%	-29.8%	-41.1%	-31.2%
Federal	0.2%	-11.2%	-6.8%	28.1%	34.9%	48.9%	-22.5%	-4.2%	-37.8%	-17.3%	-22.9%	-36.0%	-41.7%	-35.0%
Highway and Street	**12.8%**	**15.8%**	**-1.9%**	**-1.2%**	**-3.3%**	**-6.1%**	**-3.7%**	**-0.2%**	**3.2%**	**10.8%**	**-8.4%**	**-9.8%**	**-4.8%**	**-1.8%**
Private	0.0%													
Public	12.8%	16.0%	-1.9%	-1.1%	-3.3%	-5.9%	-3.6%	0.1%	3.5%	10.9%	-8.2%	-9.9%	-5.0%	-1.8%
State	12.6%	15.2%	-2.2%	-1.3%	-3.2%	-5.7%	-3.7%	-0.5%	3.3%	10.5%	-9.0%	-11.0%	-5.4%	-2.6%
Pavement	7.5%	25.2%	-0.8%	0.8%	-7.4%	-10.5%	0.1%	0.3%	2.7%	7.9%	-7.5%	-6.9%	-1.4%	1.2%
Lighting	0.3%	-43.0%	-56.6%	-40.0%	4.6%	20.1%	41.6%	77.7%	94.4%	56.0%	66.0%	63.3%	173.8%	172.6%
Bridge	4.3%	2.5%	-5.4%	-4.8%	3.5%	4.7%	-10.0%	-3.9%	-0.2%	8.8%	-16.9%	-23.6%	-14.4%	-9.6%
Rest facility	0.1%	57.8%	73.7%	20.3%	23.1%	2.8%	4.9%	3.7%	-17.4%	-15.0%	12.0%	-41.2%	-54.4%	-45.1%
Federal	0.1%	237.5%	60.0%	48.6%	-8.9%	-25.6%	15.8%	77.9%	46.2%	67.4%	91.7%	129.4%	31.3%	70.4%
Sewage and Waste Disposal	**3.0%**	**-0.5%**	**-0.9%**	**-9.7%**	**-16.3%**	**-16.8%**	**-10.0%**	**-15.4%**	**-12.6%**	**-9.8%**	**-19.4%**	**-25.9%**	**-23.8%**	**-21.4%**
Private	0.0%													
Public	2.9%	-1.2%	-1.6%	-10.2%	-17.0%	-17.7%	-10.8%	-15.5%	-12.5%	-9.5%	-19.5%	-25.5%	-23.2%	-21.2%
State	2.8%	2.4%	-0.4%	-9.5%	-16.6%	-17.4%	-10.4%	-15.6%	-12.3%	-9.5%	-19.5%	-24.6%	-22.1%	-20.1%
Sewage/dry waste	1.7%	8.2%	6.1%	-11.0%	-15.3%	-19.6%	-12.8%	-21.1%	-17.3%	-15.0%	-23.2%	-28.3%	-25.0%	-23.6%
Plant	0.3%	1.6%	6.5%	0.9%	-21.8%	-20.8%	-23.0%	-21.9%	-18.9%	-22.8%	-32.6%	-23.9%	-16.3%	-14.1%
Line/pump station	1.3%	8.2%	5.3%	-15.2%	-14.6%	-20.4%	-11.3%	-20.4%	-16.1%	-13.3%	-20.9%	-30.2%	-26.9%	-24.8%
Waste water	1.2%	-4.8%	-8.4%	-7.5%	-18.4%	-14.0%	-6.2%	-6.0%	-3.9%	-0.1%	-13.8%	-19.3%	-17.9%	-15.0%
Plant	0.9%	-6.5%	-5.3%	-7.8%	-13.9%	-8.3%	1.4%	-5.2%	-0.3%	1.6%	-11.1%	-14.2%	-14.8%	-11.9%
Line/drain	0.3%	0.5%	-18.0%	-6.2%	-32.9%	-30.5%	-26.4%	-8.6%	-12.7%	-4.1%	-22.2%	-33.3%	-25.5%	-24.0%
Federal	0.7%	0.6%	-18.8%	5.1%	8.2%	-16.7%	-13.7%	-7.8%	-15.7%	-7.9%	11.4%	-7.5%	-7.7%	10.2%
Water Supply	**1.6%**	**-3.5%**	**-8.0%**	**-9.4%**	**-16.0%**	**-17.9%**	**-14.3%**	**-12.7%**	**-9.8%**	**-6.0%**	**5.3%**	**-6.9%**	**-13.1%**	**-12.9%**
Private	0.0%													
Public	1.6%	-0.1%	-5.2%	-6.6%	-13.8%	-15.3%	-10.6%	-9.6%	-7.3%	-3.0%	4.8%	-9.3%	-13.4%	-13.6%
State	1.6%	-0.2%	-5.2%	-6.9%	-14.5%	-15.8%	-11.8%	-10.3%	-7.6%	-3.6%	4.7%	-10.5%	-14.3%	-14.8%
Plant	0.6%	-22.7%	-16.6%	-17.6%	-27.7%	-18.4%	-9.6%	-6.0%	-3.2%	12.4%	22.3%	-11.4%	2.5%	5.6%
Line	0.7%	7.1%	-3.1%	-10.3%	-15.0%	-20.6%	-17.8%	-20.9%	-13.1%	-19.4%	-9.5%	-12.0%	-32.6%	-31.3%
Pump station	0.1%	75.6%	22.2%	82.9%	38.2%	14.3%	15.8%	12.3%	38.3%	16.4%	-3.2%	-23.5%	-11.3%	-11.4%
Federal	0.0%													
Conservation and development	**1.1%**	**1.6%**	**-6.6%**	**1.9%**	**2.5%**	**-18.2%**	**-16.3%**	**-8.2%**	**-8.5%**	**-1.8%**	**8.8%**	**-4.3%**	**-12.9%**	**-3.0%**
Private	0.0%	-53.8%	-50.0%	-55.6%	42.9%	12.5%	33.3%	-44.4%	-68.8%	-50.0%	-28.6%	-33.3%	-75.0%	-66.7%
Public	1.1%	2.8%	-6.0%	2.7%	2.0%	-18.5%	-16.7%	-7.8%	-7.0%	-1.0%	9.2%	-4.0%	-12.1%	-2.4%
State	0.4%	6.2%	14.2%	-0.7%	-6.3%	-21.1%	-20.7%	-7.1%	6.1%	12.3%	4.7%	3.6%	-20.8%	-20.3%
Dam/levee	0.1%	78.4%	51.6%	-8.6%	-12.0%	-29.9%	-24.3%	-11.9%	-7.8%	-9.7%	-18.8%	-22.1%	-36.4%	-24.2%
Breakwater/jetty	0.2%	-15.3%	9.8%	18.0%	-4.8%	-8.9%	-17.6%	-14.3%	5.1%	14.0%	11.7%	-5.3%	-18.9%	-27.6%
Federal	0.7%	0.6%	-18.8%	5.1%	8.2%	-16.7%	-13.7%	-7.8%	-15.7%	-7.9%	11.4%	-7.5%	-7.7%	10.2%
Manufacturing	**10.4%**	**2.2%**	**-4.7%**	**-3.9%**	**-8.0%**	**-2.7%**	**0.9%**	**-7.2%**	**-10.1%**	**-7.1%**	**-8.6%**	**-7.8%**	**-10.8%**	**-10.9%**
Private	10.3%	2.2%	-4.9%	-3.9%	-8.0%	-2.4%	0.7%	-7.2%	-9.8%	-7.1%	-8.6%	-7.8%	-10.6%	-11.0%
Food/beverage/tobacco	0.9%	-4.9%	-15.2%	-5.3%	-13.3%	-6.0%	4.9%	-3.0%	4.5%	18.0%	20.5%	11.8%	6.1%	-8.0%
Chemical	5.1%	6.4%	-2.4%	-8.7%	-2.4%	0.2%	5.7%	-7.2%	-11.3%	-6.2%	-12.2%	0.7%	2.9%	2.3%
Plastic/rubber	0.4%	2.3%	30.0%	20.3%	15.8%	5.6%	37.4%	24.1%	21.3%	-9.0%	-9.0%	-46.0%	-60.2%	-51.5%
Nonmetallic mineral	0.2%	5.7%	-24.2%	-37.4%	-33.9%	-5.9%	-36.3%	-22.3%	2.8%	0.0%	-25.2%	52.9%	21.1%	13.0%
Fabricated metal	0.3%	138.7%	275.6%	311.5%	253.7%	271.0%	156.8%	91.0%	76.9%	61.0%	65.3%	36.2%	24.8%	-21.6%
Computer/electronic/electrical	0.2%	-30.3%	-41.0%	-41.4%	-16.3%	-51.4%	-43.0%	-31.2%	-51.6%	-52.1%	-50.9%	-43.0%	-46.4%	-41.2%
Transportation equipment	1.5%	19.2%	5.1%	22.4%	-5.0%	1.6%	-9.6%	-8.8%	-8.0%	-10.3%	-14.9%	-16.1%	-24.4%	-29.1%
Other	1.7%	-15.6%	-21.6%	-16.7%	-31.8%	-16.1%	-11.4%	-16.1%	-20.4%	-12.4%	3.2%	-23.4%	-26.2%	-15.4%
Public	0.0%													

Source: US Census
Note: Due to rounding, statistical analysis, and selective reporting, not all figures add to the total

Appendix: Construction Definitions from US Census

Definitions of Construction

Construction includes the following:

- New buildings and structures.
- Additions, alterations, conversions, expansions, reconstruction, renovations, rehabilitations, and major replacements (such as the complete replacement of a roof or heating system).
- Mechanical and electrical installations such as plumbing, heating, electrical work, elevators, escalators, central air-conditioning, and other similar building services.
- Site preparation and outside construction of fixed structures or facilities such as sidewalks, highways and streets, parking lots, utility connections, outdoor lighting, railroad tracks, airfields, piers, wharves and docks, telephone lines, radio and television towers, water supply lines, sewers, water and signal towers, electric light and power distribution and transmission lines, petroleum and gas pipelines, and similar facilities that are built into or fixed to the land.
- Installation of the following types of equipment: boilers, overhead hoists and cranes, and blast furnaces.
- Fixed, largely site-fabricated equipment not housed in a building, primarily for petroleum refineries and chemical plants, but also including storage tanks, refrigeration systems, etc.
- Cost and installation of construction materials placed inside a building and used to support production machinery; for example, concrete platforms, overhead steel girders, and pipes to carry paint, etc. from storage tanks.

The following are excluded from construction:

- Maintenance and repairs to existing structures or service facilities.
- Cost and installation of production machinery and equipment items not specifically covered above, such as heavy industrial machinery, printing presses, stamping machines, bottling machines, and packaging machines; special purpose equipment designed to prepare the structure for a specific use, such as steam tables in restaurants, pews in churches, lockers in school buildings, beds or X-ray machines in hospitals, and display cases and shelving in stores.
- Drilling of gas and oil wells, including construction of offshore drilling platforms; digging and shoring of mines (construction of buildings at mine sites is included); work that is an integral part of farming operations such as plowing and planting of crops.
- Land acquisition.

Value of Construction Put in Place

The "value of construction put in place" is a measure of the value of construction installed or erected at the site during a given period. For an individual project, this includes—

- Cost of materials installed or erected.
- Cost of labor (both by contractors and force account) and a proportionate share of the cost of construction equipment rental.
- Contractor's profit.
- Cost of architectural and engineering work.
- Miscellaneous overhead and office costs chargeable to the project on the owner's books.
- Interest and taxes paid during construction (except for state and locally owned projects).

The total value-in-place for a given period is the sum of the value of work done on all projects underway during this period, regardless of when work on each individual project was started or when payment was made to the contractors. For some categories, published estimates represent payments made during a period rather than the value of work actually done during that period. For other categories, estimates are derived by distributing the total construction cost of the project by means of historic construction progress patterns.

Classification of Construction

Residential Buildings

New single family

Includes new houses and town houses built to be sold or rented and units built by the owner or for the owner on contract. The classification excludes residential units in buildings that are primarily non-residential. It also excludes manufactured housing and houseboats.

New multi-family

Includes new apartments and condominiums. The classification excludes residential units in buildings that are primarily non-residential.

State and local includes remodeling, additions, and major replacements to multi-family properties subsequent to completion of original building as well as construction of additional housing units in existing residential structures, the addition of swimming pools and garages, and replacement of major equipment items such as water heaters, furnaces, and central air-conditioners. Maintenance and repair work is excluded.

Improvements

Includes remodeling, additions, and major replacements to owner occupied properties subsequent to completion of original building. It includes construction

of additional housing units in existing residential structures, finishing of basements and attics, modernization of kitchens, bathrooms, etc. Also included are improvements outside of residential structures, such as the addition of swimming pools and garages, and replacement of major equipment items such as water heaters, furnaces and central air-conditioners. Maintenance and repair work is not included.

Improvements to state and locally owned multi-family units are included in the state and local multi-family category.

Non-Residential

Lodging

Includes hotels, motels, resort lodging, tourist courts and cabins, and similar facilities.

Office

In addition to the types of offices listed below, it also includes motion picture, television, and radio offices.

Office buildings at manufacturing sites are classified as "manufacturing"; however, an office building owned by a manufacturing company and not located at a manufacturing site is classified as "office."

General - Includes administration buildings, computer centers, office buildings, and professional buildings.

State and local and federal also includes city halls, borough halls, municipal buildings, courthouses, and state capitol buildings.

Financial - Includes banks, financial institutions, building & loans, saving & loans, and credit unions.

Commercial

Includes buildings and structures used by the retail, wholesale and selected service industries.

Automotive - Includes the following:

- **Sales** – includes auto dealerships, motorcycle dealerships, auto showrooms, and truck dealerships.
- **Service/parts** – includes auto service centers, auto parts centers, auto repair centers, tire service centers, car washes, car rental centers, gas stations, and emissions testing centers.
- **Parking** – includes commercial parking lots and garages.

Food/beverage - Includes the following:

- **Food** – includes supermarkets, bakeries, dairies, markets, convenience stores, and delicatessens.
- **Dining/drinking** – includes liquor stores, bars, nightclubs, cafés, diners, restaurants, cafeterias, taverns, inns (eat & drink only), and bistros.

- **Fast food** – includes drive-in restaurants and fast food restaurants.

Multi-retail - In addition to the types of multi-retail establishments listed below, it also includes warehouse-type retail stores.

- **General merchandise** – includes department stores and variety stores.
- **Shopping center** – includes shopping centers, shopping plazas, and town centers.
- **Shopping mall** – includes shopping malls.

Other commercial - In addition to the types of stores listed below, it also includes beauty salons, nail shops, crematories, funeral homes, animal shelters, kennels, veterinary clinics, florists, nurseries, pawnshops, photo shops, dance schools, dry cleaners, laundromats, and post offices.

- **Drug store** – includes drug stores and pharmacies.
- **Building supply store** – includes hardware stores and lumber yards.
- **Other stores** – includes clothing stores, jewelry stores, salesrooms (non-auto), furniture stores, office supply stores, storerooms, and electronics stores.

Warehouse - Warehouses and storage buildings, cold storage plants, grain elevators, and silos located at manufacturing sites are included in the manufacturing category.

In addition to the types of warehouses listed below, it also includes grain elevators and greenhouses.

- **General commercial** – includes commercial warehouses, storage warehouses, and distribution buildings.
- **Mini-storage** – includes mini-storage centers and self-storage centers.

Farm - Includes buildings and structures such as barns, storage houses, smokehouses, and fences; land improvements such as land leveling, terracing, tile drainage; and the construction of ponds, roads and lanes on establishments having annual agricultural sales of $1,000 or more.

Health Care

Hospital - Includes hospitals, mental hospitals, infirmaries, and infrastructure.

Medical building - Includes clinics, medical offices, medical labs, doctor & dentist offices, outpatient clinics, and research labs (non-manufacturing, non-educational, or non-hospital).

Special care - Includes nursing homes, hospices, orphan homes, sanatoriums, drug clinics, rehabilitation centers, rest homes, and adult day-care centers.

Educational

In addition to the types of educational facilities listed below, it also includes nursing schools, cosmetology and beauty schools, trade schools, military training facilities, schools for the handicapped, and modeling schools.

Schools on Indian reservations are included in federal construction.

Preschool - Includes childcare and day-care centers, nurseries, and preschools.

Primary/secondary - In addition to the types of primary and secondary schools listed below, it also includes academies, parochial schools, and vocational schools.

- **Elementary** – includes elementary schools.
- **Middle/junior high** – includes middle and junior high schools.
- **High** – includes high schools.

Higher education - In addition to the types of higher education facilities listed below, it also includes health centers and clinics located at colleges (including junior and community colleges) and universities.

- **Instructional** – includes instructional buildings and laboratories.
- **Parking** – includes parking lots and garages.
- **Administration** – includes administration buildings.
- **Dormitory** – includes dormitories, living/learning centers and residence halls.
- **Library** – includes libraries (school).
- **Student union/cafeteria** – includes student union buildings and cafeterias.
- **Sports/recreation** – includes gymnasiums and athletic field houses, arenas, coliseums and stadiums, outdoor courts or fields, racquetball courts, rinks, tennis courts, and swimming pools.
- **Infrastructure** – includes power plants, water supply facilities, sewage and other infrastructure.

Other educational - In addition to the types of facilities listed below, it also includes zoos, arboreta, botanical gardens, planetariums and observatories.

- **Gallery/museum** – includes art galleries, cultural centers, and museums.
- **Library/archive** – includes libraries (nonschool) and archives.

<u>Religious</u>

Certain buildings, although owned by religious organizations, are not included in this category. These include educational or charitable institutions, hospitals, and publishing houses.

House of worship - Includes churches, chapels, mosques, synagogues, tabernacles, and temples.

Other religious - In addition to the types of facilities listed below, it also includes sanctuaries, abbeys, convents, novitiates, rectories, monasteries, missions, seminaries, and parish houses.

- **Auxiliary building** – includes fellowship halls, life centers, camps and retreats, and Sunday schools.

<u>Public Safety</u>

Correctional - Includes the following:

- **Detention** – includes cell blocks, detention centers, jails, penitentiaries, and prisons.
- **Police/sheriff** – includes police stations and sheriffs' offices.

Other public safety - In addition to the types of facilities listed below, it also includes armories and military structures that could not be assigned to a specific type of construction.

- **Fire/rescue** – includes fire stations, rescue squads, dispatch and emergency centers.

Amusement and Recreation

In addition to the types of facilities listed below, it also includes racetracks, equestrian centers, riding academies, bowling alleys, rifle ranges, casinos, pool halls, and driving ranges.

Theme/amusement park - Includes amusement buildings or rides, theme parks, and arcades.

Sports - Includes the following types of structures not located at schools or colleges: gymnasiums and athletic field houses, arenas, coliseums and stadiums, outdoor courts or fields, racquetball courts, rinks, tennis courts, and swimming pools.

Fitness - Includes fitness centers, health or athletic clubs, YMCAs, YWCAs, cabanas, saunas, and spas.

Performance/meeting center - In addition to the types of facilities listed below, it also includes civic centers, concert halls, opera houses, theaters for the performing arts, amphitheaters, pavilions, and auditoriums.

- **Convention centers** – includes convention and trade centers.

Social center - In addition to the types of facilities listed below, it also includes banquet halls, lodge buildings, golf courses, community houses, community centers, fraternal halls, and country clubs.

- **Neighborhood center** – includes community houses, community centers, and neighborhood centers.

Park/camp - Includes parks, seasonal camps, and tourist camps.

Movie theater/studio - Includes movie theaters, drive-ins, and movie, radio, and television studios.

Transportation

Air - In addition to the types of facilities listed below, it also includes pavement and lighting, hangars, air freight terminals, space facilities, air traffic towers, aircraft storage and maintenance buildings.

- **Passenger terminal** – includes air passenger terminals.
- **Runway** – includes airport runway pavement and lighting.

Land - In addition to the types of facilities listed below, it also includes maintenance facilities and freight terminals (bus, railroad, or truck).

- **Passenger terminal** – includes bus and railroad passenger terminals.
- **Mass transit** – includes light rail, monorail, streetcar, and subway facilities.
- **Railroad** – includes railroad track and bridges.

Water

- **Dock/marina** – includes docks, piers, wharves, and marinas.
- **Dry dock/marine terminal** – includes dry docks, boatels, and maritime freight terminals.

Communication

Includes telephone, television, and radio, distribution and maintenance buildings and structures.

Power

Electric - In addition to the types of facilities listed below, it also includes power plants (nuclear, oil, gas, coal, wood), nuclear reactors, hydroelectric plants, dry-waste generation, thermal, wind and solar energy facilities.

- **Distribution** – includes electric distribution systems, electrical substations, switch houses, transformers, and transmission lines.

Gas - Includes buildings and structures for the distribution, transmission, gathering, and storage of natural gas.

Oil - Includes buildings and structures for the distribution, transmission, gathering, and storage of crude oil.

Highway and Street

Pavement - includes highways, roads, streets, culverts, gutters, and sidewalks.

Lighting -includes traffic lights, signals and highway lighting systems.

Retaining wall - includes retaining walls and fences.

Tunnel - includes highway tunnels (vehicular or pedestrian).

Bridge - includes bridges and overhead crossings (vehicular or pedestrian).

Toll/weigh - includes toll facilities, weigh and inspection stations. Federal includes border-crossing stations.

Maintenance building - includes maintenance and storage buildings and salt domes.

Rest facility - includes rest facilities, travel centers, median improvements, beautification projects, and welcome centers.

Sewage and Waste Disposal

Sewage/dry waste- In addition to the types of facilities listed below, it also includes resource recovery and recycling centers, and pond sewage systems.

- **Plant** – includes solid waste disposals (incinerator or burial), sewage treatment plants, and sewage disposal plants.

- **Line/pump station** – includes sanitary sewers, sewage pipeline, interceptors and lift/pump stations.

Waste water

- **Plant** – includes waste water disposal plants.
- **Line/drain** – includes water collection systems (nonpotable water) and storm drains.

Water Supply

Plant - includes filtration, treatment, water supply, and water softening plants.

Well - includes water wells.

Line - includes culverts (water supply), water transmission pipelines, tunnels and water lines.

Pump station - includes gatehouses and lift/pump stations.

Reservoir - includes potable water supply reservoirs.

Tank/tower - includes water storage tanks and towers.

Conservation and Development

In addition to the types of projects listed below, it also includes facilities constructed for irrigation (draining, dredging, water collection systems, nonpotable reservoir), mine reclamation, fish hatcheries and wetlands.

Dam/levee - includes non-power dams, dikes, levees, locks and lock gates.

Breakwater/jetty - includes breakwaters, bulkheads, tide-gates, jetties, erosion control, retaining walls, and sea walls.

Dredging - includes non-irrigation related dredging.

Manufacturing

Includes all buildings and structures at manufacturing sites. Office buildings and warehouses owned by manufacturing companies but not constructed at a manufacturing site are classified as "office" and "commercial" respectively. Includes LNG export terminals.

Food/beverage/tobacco - Food industries transform livestock and agricultural products into products for intermediate or final consumption. These products are typically sold to wholesalers or retailers for distribution to consumers.

Beverage industries include manufacturing of nonalcoholic and alcoholic beverages. Ice manufacturing is included with nonalcoholic beverage manufacturing.

Tobacco industries include the redrying and stemming of tobacco and the manufacturing of tobacco products, such as cigarettes and cigars.

Textile/apparel/leather/furniture - Textile industries transform a basic fiber (natural or synthetic) into a product, such as yarn or fabric.

Apparel industries purchase fabric to cut and sew to make a garment.

Leather and allied industries transform hides into leather products. Also included are leather substitutes, such as rubber (ex. rubber footware) and plastic (ex. plastic purses or wallets).

As of 2009, furniture is in textile/apparel/leather/furniture.

Wood - Wood industries manufacture wood products, such as lumber, plywood, veneers, wood containers, wood flooring, wood trusses, manufactured homes (i.e., mobile home), and prefabricated wood buildings.

Paper - Paper industries manufacture pulp, paper, or converted paper products.

Print/publishing - Print/publishing industries print products, such as newspapers, books, periodicals, business forms, greeting cards, and other materials, and perform support activities, such as bookbinding, platemaking services, and data imaging.

Petroleum/coal - Petroleum/coal industries transform crude petroleum and coal into usable products.

Chemical - Chemical industries transform organic and inorganic raw materials by a chemical process and form products.

Plastic/rubber - Plastic/rubber industries make goods by processing plastics materials and raw rubber.

Nonmetallic mineral - Nonmetallic mineral industries transform mined or quarried nonmetallic minerals, such as sand, gravel, stone, clay, and refractory materials, into products for intermediate or final consumption.

Primary metal - Primary metal industries smelt and/or refine ferrous and nonferrous metals from ore, pig or scrap, using electrometallurgical and other process metallurgical techniques. The output of smelting and refining, usually in ingot form, is used in rolling, drawing, and extruding operations to make sheet, strip, bar, rod, or wire, and in molten form to make castings and other basic metal products.

Fabricated metal - Fabricated metal industries transform metal into intermediate or end products, other than machinery, computers and electronics, and metal furniture or treating metals and metal formed products fabricated elsewhere.

Machinery - Machinery industries create end products that apply mechanical force, for example, the application of gears and levers, to perform work.

Computer/electronic/electrical - Computer/electronic industries manufacture computers, computer peripherals, communications equipment, and similar electronic products, and the components for such products.

Electrical industries manufacture products that generate, distribute, and use electrical power. Included are manufacturers of electric lighting equipment, household appliances, and other electrical equipment and components.

Transportation equipment - Transportation equipment industries produce equipment for transporting people and goods.

Furniture - Furniture industries make furniture and related articles, such as mattresses, window blinds, cabinets, and fixtures. As of 2009, furniture is in textile/apparel/leather/furniture.

Miscellaneous - Miscellaneous industries make a wide range of products that are not produced in the specified manufacturing categories. Examples are medical equipment and supplies, jewelry, sporting goods, toys, and office supplies.

**UBS Evidence Lab provides our research analysts with rigorous primary research. The team conducts representative surveys of key sector decision-makers, mines the Internet, systematically collects observable data, and pulls information from other innovative sources. They apply a variety of advanced analytic techniques to derive insights from the data collected. This valuable resource supplies UBS analysts with differentiated information to support their forecasts and recommendations—in turn enhancing our ability to serve the needs of our clients.*

For this report, Evidence Lab Macro estimates of US economic indicators, including NonResi spending, are based upon high-frequency public data sources being collected from a diverse set of sources - transaction data being aggregated and made available by third parties, business and consumer surveys, on-line activities - that contain real-time information on economic activities. We continually evaluate new data sources for their efficacy and value to our estimation process. Our process relies on obtaining data sets pertinent to specific economic indicators, and then transforming, calibrating and combining them using statistical techniques. Our estimates for NonResi spending are based upon the details of permits filed with a sample of jurisdictions in the country. Since Permits contain information on planned future construction projects and future spending intentions, we believe it is a good early indicator for private residential and non-residential construction. For more information on Evidence Lab Macro research, see our note "Launching Big-Data Driven Early Read on US Economy, Nov 11 2015".

Valuation Method and Risk Statement

The primary risks to the sector include potential declines in commodity prices (particularly oil), slowing US and global economic activity, weaker than expected industrial and non res construction markets, failure to execute on backlogs/cost overruns on fixed price contracts, potential for constrained growth due to rising construction costs and labor availability.

Required Disclosures

This report has been prepared by UBS Securities LLC, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

For information on the ways in which UBS manages conflicts and maintains independence of its research product; historical performance information; and certain additional disclosures concerning UBS research recommendations, please visit www.ubs.com/disclosures. The figures contained in performance charts refer to the past; past performance is not a reliable indicator of future results. Additional information will be made available upon request. UBS Securities Co. Limited is licensed to conduct securities investment consultancy businesses by the China Securities Regulatory Commission. UBS acts or may act as principal in the debt securities (or in related derivatives) that may be the subject of this report. This recommendation was finalized on: 24 May 2017 07:00 AM GMT.

Analyst Certification: Each research analyst primarily responsible for the content of this research report, in whole or in part, certifies that with respect to each security or issuer that the analyst covered in this report: (1) all of the views expressed accurately reflect his or her personal views about those securities or issuers and were prepared in an independent manner, including with respect to UBS, and (2) no part of his or her compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in the research report.

UBS Investment Research: Global Equity Rating Definitions

12-Month Rating	Definition	Coverage[1]	IB Services[2]
Buy	FSR is > 6% above the MRA.	46%	30%
Neutral	FSR is between -6% and 6% of the MRA.	38%	28%
Sell	FSR is > 6% below the MRA.	16%	18%
Short-Term Rating	**Definition**	**Coverage[3]**	**IB Services[4]**
Buy	Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%
Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

Source: UBS. Rating allocations are as of 31 March 2017.
1:Percentage of companies under coverage globally within the 12-month rating category.
2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
3:Percentage of companies under coverage globally within the Short-Term rating category.
4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

KEY DEFINITIONS:Forecast Stock Return (FSR) is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months. **Market Return Assumption (MRA)** is defined as the one-year local market interest rate plus 5% (a proxy for, and not a forecast of, the equity risk premium). **Under Review (UR)** Stocks may be flagged as UR by the analyst, indicating that the stock's price target and/or rating are subject to possible change in the near term, usually in response to an event that may affect the investment case or valuation. **Short-Term Ratings** reflect the expected near-term (up to three months) performance of the stock and do not reflect any change in the fundamental view or investment case. **Equity Price Targets** have an investment horizon of 12 months.

EXCEPTIONS AND SPECIAL CASES:UK and European Investment Fund ratings and definitions are: Buy: Positive on factors such as structure, management, performance record, discount; **Neutral:** Neutral on factors such as structure, management, performance record, discount; **Sell:** Negative on factors such as structure, management, performance record, discount. **Core Banding Exceptions (CBE):** Exceptions to the standard +/-6% bands may be granted by the Investment Review Committee (IRC). Factors considered by the IRC include the stock's volatility and the credit spread of the respective company's debt. As a result, stocks deemed to be very high or low risk may be subject to higher or lower bands as they relate to the rating. When such exceptions apply, they will be identified in the Company Disclosures table in the relevant research piece.

Research analysts contributing to this report who are employed by any non-US affiliate of UBS Securities LLC are not registered/qualified as research analysts with FINRA. Such analysts may not be associated persons of UBS Securities LLC and therefore are not subject to the FINRA restrictions on communications with a subject company, public appearances, and trading securities held by a research analyst account. The name of each affiliate and analyst employed by that affiliate contributing to this report, if any, follows.

UBS Securities LLC: Steven Fisher, CFA; Cleve Rueckert; Ajit Agrawal, PhD; Shannon O'Callaghan; Erika Jackson.

Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report. For a complete set of disclosure statements associated with the companies discussed in this report, including information on valuation and risk, please contact UBS Securities LLC, 1285 Avenue of Americas, New York, NY 10019, USA, Attention: Investment Research.

Global Disclaimer

This document has been prepared by UBS Securities LLC, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

Global Research is provided to our clients through UBS Neo and, in certain instances, UBS.com (each a "System"). It may also be made available through third party vendors and distributed by UBS and/or third parties via e-mail or alternative electronic means. The level and types of services provided by Global Research to a client may vary depending upon various factors such as a client's individual preferences as to the frequency and manner of receiving communications, a client's risk profile and investment focus and perspective (e.g., market wide, sector specific, long-term, short-term, etc.), the size and scope of the overall client relationship with UBS and legal and regulatory constraints.

All Global Research is available on UBS Neo. Please contact your UBS sales representative if you wish to discuss your access to UBS Neo.

When you receive Global Research through a System, your access and/or use of such Global Research is subject to this Global Research Disclaimer and to the terms of use governing the applicable System.

When you receive Global Research via a third party vendor, e-mail or other electronic means, your use shall be subject to this Global Research Disclaimer and to UBS's Terms of Use/Disclaimer (http://www.ubs.com/global/en/legalinfo2/disclaimer.html). By accessing and/or using Global Research in this manner, you are indicating that you have read and agree to be bound by our Terms of Use/Disclaimer. In addition, you consent to UBS processing your personal data and using cookies in accordance with our Privacy Statement (http://www.ubs.com/global/en/legalinfo2/privacy.html) and cookie notice (http://www.ubs.com/global/en/homepage/cookies/cookie-management.html).

If you receive Global Research, whether through a System or by any other means, you agree that you shall not copy, revise, amend, create a derivative work, transfer to any third party, or in any way commercially exploit any UBS research provided via Global Research or otherwise, and that you shall not extract data from any research or estimates provided to you via Global Research or otherwise, without the prior written consent of UBS.

This document is for distribution only as may be permitted by law. It is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or would subject UBS to any registration or licensing requirement within such jurisdiction. It is published solely for information purposes; it is not an advertisement nor is it a solicitation or an offer to buy or sell any financial instruments or to participate in any particular trading strategy. No representation or warranty, either expressed or implied, is provided in relation to the accuracy, completeness or reliability of the information contained in this document ("the Information"), except with respect to Information concerning UBS. The Information is not intended to be a complete statement or summary of the securities, markets or developments referred to in the document. UBS does not undertake to update or keep current the Information. Any opinions expressed in this document may change without notice and may differ or be contrary to opinions expressed by other business areas or groups of UBS. Any statements contained in this report attributed to a third party represent UBS's interpretation of the data, information and/or opinions provided by that third party either publicly or through a subscription service, and such use and interpretation have not been reviewed by the third party.

Nothing in this document constitutes a representation that any investment strategy or recommendation is suitable or appropriate to an investor's individual circumstances or otherwise constitutes a personal recommendation. Investments involve risks, and investors should exercise prudence and their own judgement in making their investment decisions. The financial instruments described in the document may not be eligible for sale in all jurisdictions or to certain categories of investors. Options, derivative products and futures are not suitable for all investors, and trading in these instruments is considered risky. Mortgage and asset-backed securities may involve a high degree of risk and may be highly volatile in response to fluctuations in interest rates or other market conditions. Foreign currency rates of exchange may adversely affect the value, price or income of any security or related instrument referred to in the document. For investment advice, trade execution or other enquiries, clients should contact their local sales representative.

The value of any investment or income may go down as well as up, and investors may not get back the full (or any) amount invested. Past performance is not necessarily a guide to future performance. Neither UBS nor any of its directors, employees or agents accepts any liability for any loss (including investment loss) or damage arising out of the use of all or any of the Information.

Any prices stated in this document are for information purposes only and do not represent valuations for individual securities or other financial instruments. There is no representation that any transaction can or could have been effected at those prices, and any prices do not necessarily reflect UBS's internal books and records or theoretical model-based valuations and may be based on certain assumptions. Different assumptions by UBS or any other source may yield substantially different results.

This document and the Information are produced by UBS as part of its research function and are provided to you solely for general background information. UBS has no regard to the specific investment objectives, financial situation or particular needs of any specific recipient. In no circumstances may this document or any of the Information be used for any of the following purposes:

(i) valuation or accounting purposes;

(ii) to determine the amounts due or payable, the price or the value of any financial instrument or financial contract; or

(iii) to measure the performance of any financial instrument.

By receiving this document and the Information you will be deemed to represent and warrant to UBS that you will not use this document or any of the Information for any of the above purposes or otherwise rely upon this document or any of the Information.

UBS has policies and procedures, which include, without limitation, independence policies and permanent information barriers, that are intended, and upon which UBS relies, to manage potential conflicts of interest and control the flow of information within divisions of UBS and among its subsidiaries, branches and affiliates. For further information on the ways in which UBS manages conflicts and maintains independence of its research products, historical performance information and certain additional disclosures concerning UBS research recommendations, please visit www.ubs.com/disclosures.

Research will initiate, update and cease coverage solely at the discretion of UBS Research Management, which will also have sole discretion on the timing and frequency of any published research product. The analysis contained in this document is based on numerous assumptions. All material information in relation to published research reports, such as valuation methodology, risk statements, underlying assumptions (including sensitivity analysis of those assumptions), ratings history etc. as required by the Market Abuse Regulation, can be found on NEO. Different assumptions could result in materially different results.

The analyst(s) responsible for the preparation of this document may interact with trading desk personnel, sales personnel and other parties for the purpose of gathering, applying and interpreting market information. UBS relies on information barriers to control the flow of information contained in one or more areas within UBS into other areas, units, groups or affiliates of UBS. The compensation of the analyst who prepared this document is determined exclusively by research management and senior management (not including investment banking). Analyst compensation is not based on investment banking revenues; however, compensation may relate to the revenues of UBS and/or its divisions as a whole, of which investment banking, sales and trading are a part, and UBS's subsidiaries, branches and affiliates as a whole.

For financial instruments admitted to trading on an EU regulated market: UBS AG, its affiliates or subsidiaries (excluding UBS Securities LLC) acts as a market maker or liquidity provider (in accordance with the interpretation of these terms in the UK) in the financial instruments of the issuer save that where the activity of liquidity provider is carried out in accordance with the definition given to it by the laws and regulations of any other EU jurisdictions, such information is separately disclosed in this document. For financial instruments admitted to trading on a non-EU regulated market: UBS may act as a market maker save that where this activity is carried out in the US in accordance with the definition given to it by the relevant laws and regulations, such activity will be specifically disclosed in this document. UBS may have issued a warrant the value of which is based on one or more of the financial instruments referred to in the document. UBS and its affiliates and employees may have long or short positions, trade as principal and buy and sell in instruments or derivatives identified herein; such transactions or positions may be inconsistent with the opinions expressed in this document.

United Kingdom and the rest of Europe: Except as otherwise specified herein, this material is distributed by UBS Limited to persons who are eligible counterparties or professional clients. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. **France:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities France S.A. UBS Securities France S.A. is regulated by the ACPR (Autorité de Contrôle Prudentiel et de Résolution) and the Autorité des Marchés Financiers (AMF). Where an analyst of UBS Securities France S.A. has contributed to this document, the document is also deemed to have been prepared by UBS Securities France S.A. **Germany:** Prepared by UBS Limited and distributed by UBS Limited and UBS Europe SE. UBS Europe SE is regulated by the Bundesanstalt fur Finanzdienstleistungsaufsicht (BaFin). **Spain:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities España SV, SA. UBS Securities España SV, SA is regulated by the Comisión Nacional del Mercado de Valores (CNMV). **Turkey:** Distributed by

UBS Limited. No information in this document is provided for the purpose of offering, marketing and sale by any means of any capital market instruments and services in the Republic of Turkey. Therefore, this document may not be considered as an offer made or to be made to residents of the Republic of Turkey. UBS AG is not licensed by the Turkish Capital Market Board under the provisions of the Capital Market Law (Law No. 6362). Accordingly, neither this document nor any other offering material related to the instruments/services may be utilized in connection with providing any capital market services to persons within the Republic of Turkey without the prior approval of the Capital Market Board. However, according to article 15 (d) (ii) of the Decree No. 32, there is no restriction on the purchase or sale of the securities abroad by residents of the Republic of Turkey. **Poland:** Distributed by UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce regulated by the Polish Financial Supervision Authority. Where an analyst of UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce has contributed to this document, the document is also deemed to have been prepared by UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce. **Russia:** Prepared and distributed by UBS Bank (OOO). **Switzerland:** Distributed by UBS AG to persons who are institutional investors only. UBS AG is regulated by the Swiss Financial Market Supervisory Authority (FINMA). **Italy:** Prepared by UBS Limited and distributed by UBS Limited and UBS Limited, Italy Branch. Where an analyst of UBS Limited, Italy Branch has contributed to this document, the document is also deemed to have been prepared by UBS Limited, Italy Branch. **South Africa:** Distributed by UBS South Africa (Pty) Limited (Registration No. 1995/011140/07), an authorised user of the JSE and an authorised Financial Services Provider (FSP 7328). **Israel:** This material is distributed by UBS Limited. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. UBS Securities Israel Ltd is a licensed Investment Marketer that is supervised by the Israel Securities Authority (ISA). UBS Limited and its affiliates incorporated outside Israel are not licensed under the Israeli Advisory Law. UBS Limited is not covered by insurance as required from a licensee under the Israeli Advisory Law. UBS may engage among others in issuance of Financial Assets or in distribution of Financial Assets of other issuers for fees or other benefits. UBS Limited and its affiliates may prefer various Financial Assets to which they have or may have Affiliation (as such term is defined under the Israeli Advisory Law). Nothing in this Material should be considered as investment advice under the Israeli Advisory Law. This Material is being issued only to and/or is directed only at persons who are Eligible Clients within the meaning of the Israeli Advisory Law, and this material must not be relied on or acted upon by any other persons. **Saudi Arabia:** This document has been issued by UBS AG (and/or any of its subsidiaries, branches or affiliates), a public company limited by shares, incorporated in Switzerland with its registered offices at Aeschenvorstadt 1, CH-4051 Basel and Bahnhofstrasse 45, CH-8001 Zurich. This publication has been approved by UBS Saudi Arabia (a subsidiary of UBS AG), a Saudi closed joint stock company incorporated in the Kingdom of Saudi Arabia under commercial register number 1010257812 having its registered office at Tatweer Towers, P.O. Box 75724, Riyadh 11588, Kingdom of Saudi Arabia. UBS Saudi Arabia is authorized and regulated by the Capital Market Authority to conduct securities business under license number 08113-37. **Dubai:** The information distributed by UBS AG Dubai Branch is intended for Professional Clients only and is not for further distribution within the United Arab Emirates. **United States:** Distributed to US persons by either UBS Securities LLC or by UBS Financial Services Inc., subsidiaries of UBS AG; or by a group, subsidiary or affiliate of UBS AG that is not registered as a US broker-dealer (a **'non-US affiliate'**) to major US institutional investors only. UBS Securities LLC or UBS Financial Services Inc. accepts responsibility for the content of a document prepared by another non-US affiliate when distributed to US persons by UBS Securities LLC or UBS Financial Services Inc. All transactions by a US person in the securities mentioned in this document must be effected through UBS Securities LLC or UBS Financial Services Inc., and not through a non-US affiliate. UBS Securities LLC is not acting as a municipal advisor to any municipal entity or obligated person within the meaning of Section 15B of the Securities Exchange Act (the "Municipal Advisor Rule"), and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of the Municipal Advisor Rule. **Canada:** Distributed by UBS Securities Canada Inc., a registered investment dealer in Canada and a Member-Canadian Investor Protection Fund, or by another affiliate of UBS AG that is registered to conduct business in Canada or is otherwise exempt from registration. **Mexico:** This report has been distributed and prepared by UBS Casa de Bolsa, S.A. de C.V., UBS Grupo Financiero, an entity that is part of UBS Grupo Financiero, S.A. de C.V. and is an affiliate of UBS AG. This document is intended for distribution to institutional or sophisticated investors only. Research reports only reflect the views of the analysts responsible for the reports. Analysts do not receive any compensation from persons or entities different from UBS Casa de Bolsa, S.A. de C.V., UBS Grupo Financiero, or different from entities belonging to the same financial group or business group of such. For Spanish translations of applicable disclosures, please see www.ubs.com/disclosures. **Brazil:** Except as otherwise specified herein, this material is prepared by UBS Brasil CCTVM S.A. to persons who are eligible investors residing in Brazil, which are considered to be: (i) financial institutions, (ii) insurance firms and investment capital companies, (iii) supplementary pension entities, (iv) entities that hold financial investments higher than R$300,000.00 and that confirm the status of qualified investors in written, (v) investment funds, (vi) securities portfolio managers and securities consultants duly authorized by Comissão de Valores Mobiliários (CVM), regarding their own investments, and (vii) social security systems created by the Federal Government, States, and Municipalities. **Hong Kong:** Distributed by UBS Securities Asia Limited and/or UBS AG, Hong Kong Branch. **Singapore:** Distributed by UBS Securities Pte. Ltd. [MCI (P) 007/09/2016 and Co. Reg. No.: 198500648C] or UBS AG, Singapore Branch. Please contact UBS Securities Pte. Ltd., an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110); or UBS AG, Singapore Branch, an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110) and a wholesale bank licensed under the Singapore Banking Act (Cap. 19) regulated by the Monetary Authority of Singapore, in respect of any matters arising from, or in connection with, the analysis or document. The recipients of this document represent and warrant that they are accredited and institutional investors as defined in the Securities and Futures Act (Cap. 289). **Japan:** Distributed by UBS Securities Japan Co., Ltd. to professional investors (except as otherwise permitted). Where this document has been prepared by UBS Securities Japan Co., Ltd., UBS Securities Japan Co., Ltd. is the author, publisher and distributor of the document. Distributed by UBS AG, Tokyo Branch to Professional Investors (except as otherwise permitted) in relation to foreign exchange and other banking businesses when relevant. **Australia:** Clients of UBS AG: Distributed by UBS AG (ABN 47 088 129 613 and holder of Australian Financial Services License No. 231087). Clients of UBS Securities Australia Ltd: Distributed by UBS Securities Australia Ltd (ABN 62 008 586 481 and holder of Australian Financial Services License No. 231098). This Document contains general information and/or general advice only and does not constitute personal financial product advice. As such, the Information in this document has been prepared without taking into account any investor's objectives, financial situation or needs, and investors should, before acting on the Information, consider the appropriateness of the Information, having regard to their objectives, financial situation and needs. If the Information contained in this document relates to the acquisition, or potential acquisition of a particular financial product by a 'Retail' client as defined by section 761G of the Corporations Act 2001 where a Product Disclosure Statement would be required, the retail client should obtain and consider the Product Disclosure Statement relating to the product before making any decision about whether to acquire the product. The UBS Securities Australia Limited Financial Services Guide is available at: www.ubs.com/ecs-research-fsg. **New Zealand:** Distributed by UBS New Zealand Ltd. UBS New Zealand Ltd is not a registered bank in New Zealand. You are being provided with this UBS publication or material because you have indicated to UBS that you are a "wholesale client" within the meaning of section 5C of the Financial Advisers Act 2008 of New Zealand (Permitted Client). This publication or material is not intended for clients who are not Permitted Clients (non-permitted Clients). If you are a non-permitted Client you must not rely on this publication or material. If despite this warning you nevertheless rely on this publication or material, you hereby (i) acknowledge that you may not rely on the content of this publication or material and that any recommendations or opinions in such this publication or material are not made or provided to you, and (ii) to the maximum extent permitted by law (a) indemnify UBS and its associates or related entities (and their respective Directors, officers, agents and Advisors) (each a 'Relevant Person') for any loss, damage, liability or claim any of them may incur or suffer as a result of, or in connection with, your unauthorised reliance on this publication or material and (b) waive any rights or remedies you may have against any Relevant Person for (or in respect of) any loss, damage, liability or claim you may incur or suffer as a result of, or in connection with, your unauthorised reliance on this publication or material. **Korea:** Distributed in Korea by UBS Securities Pte. Ltd., Seoul Branch. This document may have been edited or contributed to from time to time by affiliates of UBS Securities Pte. Ltd., Seoul Branch. **Malaysia:** This material is authorized to be distributed in Malaysia by UBS Securities Malaysia Sdn. Bhd (Capital Markets Services License No.: CMSL/A0063/2007). This material is intended for professional/institutional clients only and not for distribution to any retail clients. **India:** Distributed by UBS Securities India Private Ltd. (Corporate Identity Number U67120MH1996PTC097299) 2/F, 2 North Avenue, Maker Maxity, Bandra Kurla Complex, Bandra (East), Mumbai (India) 400051. Phone: +912261556000. It provides brokerage services bearing SEBI Registration Numbers: NSE (Capital Market Segment): INB230951431, NSE (F&O Segment) INF230951431, NSE (Currency Derivatives Segment) INE230951431, BSE (Capital Market Segment) INB010951437; merchant banking services bearing SEBI Registration Number: INM000010809 and Research Analyst services bearing SEBI Registration Number: INH000001204. UBS AG, its affiliates or subsidiaries may have debt holdings or positions in the subject Indian company/companies. Within the past 12 months, UBS AG, its affiliates or subsidiaries may have received compensation for non-investment banking securities-related services and/or non-securities services from the subject Indian company/companies. The subject company/companies may have been a client/clients of UBS AG, its affiliates or subsidiaries during the 12 months preceding the date of distribution of the research report with respect to investment banking and/or non-investment banking securities-related services and/or non-securities services. With regard to information on associates, please refer to the Annual Report at: http://www.ubs.com/global/en/about_ubs/investor_relations/annualreporting.html

The disclosures contained in research documents produced by UBS Limited shall be governed by and construed in accordance with English law.