Construction Analytics 2019 Construction Economic Forecast

This Nov. 2018 Construction Economic Forecast analysis addresses New Construction Starts, Inflation, Cash Flow or distribution of construction work over time, Annual Backlog and Spending. New Starts is new work entering Backlog. Cash Flow gives the pattern of Spending. Inflation differentiates between Revenue and Volume. Backlog, which can be referenced to assess expected future Volume and Spending, provides an indication of when Volume occurs or in what year Revenues occur. Starts data is from Dodge Data & Analytics. Spending data is from the U.S. Census Bureau. Jobs data is from the Bureau of Labor Statistics. Inflation data is from the source labeled. Cash flow, Backlog and Inflation forecast data are developed internally. All data in this report is national level data. All forecast data is by Construction Analytics.

NOTE 12-6-18: Dodge Data and Analytics new construction starts for October, released 11-20-18, reached the 2nd highest seasonally adjusted annual rate ever, 2nd only to June 2018. Most spending from these new starts will occur in 2020. U.S. Census construction spending for October posted large reductions to several months of residential spending. Construction Starts for October, the Dodge end-of-year report and October spending, all released between 11-21-18 and 12-3-18 significantly alter this analysis, by far most of the 2019 and 2020 changes are significant reductions in residential spending. This analysis was edited to include the most recent starts data and the U S Census October spending data.

Summary

Total of All construction spending is forecast to increase 6.0% to $1.321 trillion in 2018 and 1.5% to $1.341 trillion in 2019. Spending in 2020 is forecast to reach $1.426 trillion.

$ in billions % growth vs prior yr	Actual 2016		Actual 2017		Forecast 2018		Forecast 2019		Forecast 2020	
U.S. Total Construction Spending Summary										
Total Construction	1192	7%	1246	5%	1321	6.0%	1341	1.5%	1426	6.3%
Residential	474	11%	532	12%	562	6%	564	1%	577	2%
Nonresidential Buildings	415	9%	419	1%	444	6%	443	0%	482	9%
Nonbuilding Infrastructure	303	-1%	295	-3%	316	7%	334	6%	367	10%
Educational	90.3	7%	91.2	1%	96.5	6%	92.8	-4%	103.4	11%
Healthcare	40.2	3%	41.9	4%	42.2	1%	41.1	-3%	46.6	14%
Amusement / Recreation	23.2	14%	24.9	7%	27.8	12%	31.1	12%	31.7	2%
Commercial / Retail	78.2	19%	87.7	12%	91.7	5%	90.8	-1%	90.3	-1%
Lodging	27.0	23%	28.7	6%	32.3	13%	31.0	-4%	31.6	2%
Office	67.6	22%	66.9	-1%	74.1	11%	78.6	6%	84.2	7%
Manufacturing	76.4	-4%	66.4	-13%	66.7	0%	65.3	-2%	82.2	26%
Other Nonres Bldgs	11.7	-3%	11.7	-1%	12.3	5%	12.3	0%	12.3	0%
Power	101.4	-2%	96.5	-5%	102.0	6%	108.6	6%	106.6	-2%
Highway / Bridge / Street	92.7	2%	89.1	-4%	92.1	3%	93.3	1%	105.3	13%
Transportation / Air / Rail	43.3	-4%	45.2	4%	54.5	21%	62.1	14%	75.1	21%
Sewer / Water / Conservation	43.8	-3%	39.4	-10%	43.1	9%	46.4	8%	56.2	21%
Communication	22.2	2%	24.8	12%	24.5	-1%	23.3	-5%	23.4	0%
Forecast includes U.S.Census October 2018 year-to-date spending										
Forecast includes Dodge construction starts data as of 11-21-18									edzarenski.com	

Nonresidential Buildings construction spending is forecast to increase 5.8% to $444 billion in 2018, dip -0.2% to $443 billion in 2019 and climb 8.9% to $482 billion in 2020. Office (which includes data centers) and Amusement/Recreation support the 2019 but there is downward pressure from slowdowns or timing of cash flow in Manufacturing, Lodging, Healthcare and Educational. Educational, Healthcare, Recreation, Office and Manufacturing all support growth in 2020.

Residential construction spending for 2018 was recently revised down and starts for 2019 are expected flat to down slightly. The forecast is now for an increase of 5.6% to $562 billion in 2018, 0.5% to $564 billion in 2019 and 2.3% to $577 billion in 2020. Although residential spending is still increasing, growth has slowed to less than inflation. Real volume after inflation is declining.

Nonbuilding Infrastructure construction spending is forecast to increase 7.2% to $316 billion in 2018, 5.5% to $334 billion in 2019 and 9.9% to $367 billion in 2020. Transportation spending provides strong growth for the next three years from record new starts in 2017 and the 2nd best year of starts in 2018. Public Works had strong growth in 2018 starts and Highway starts hit a new high in 2018.
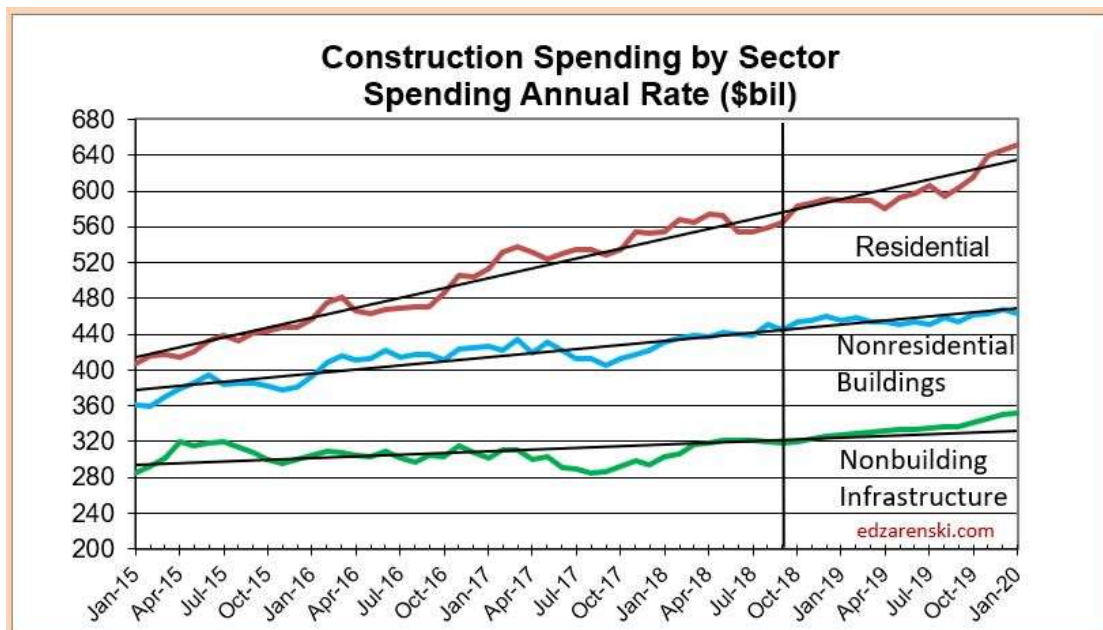
Dodge Data construction starts are initially anticipated to finish 2018 flat compared to 2017. However, starts are always revised upward in the following year. I expect revisions will show 2018 starts increased by 4% over 2017. Even with revisions, 2018 starts will post the slowest growth since 2011. Starts increased 84% in the period 2012-2017, residential 150% and nonresidential buildings 80%. This forecast includes only a total of 10% new starts growth for the 3-year period 2018-2020.

Starting backlog, currently at an all-time high, increased on average 10%/year the last three years. For 2019 starting backlog is forecast up 10% over 2018. 80% of all Nonresidential spending within the year will be generated from projects in starting backlog. Due to long duration jobs, 2019 nonresidential buildings starting backlog is up 50% in the last 4 years. Current indications are that 2019 backlog will be up 6%-8% across all sectors.

Construction Inflation Indices

When construction is very actively growing, total construction costs typically increase more rapidly than the net cost of labor and materials. In active markets overhead and profit margins increase in response to increased demand. These costs are captured only in Selling Price, or final cost indices.

General construction cost indices and Input price indices that don't track whole building final cost do not capture the full cost of inflation on construction projects.

Revenue is spending but real volume is spending minus inflation. Outside of recession years, nonresidential buildings construction spending year over year growth dropped below 4% only SIX times in 50 years. The long-term average inflation is 3.75%. Every year that spending dropped below 4% growth, nonresidential buildings real volume declined.

To differentiate between Revenue and Volume you must use actual final cost indices, otherwise known as selling price indices, to properly adjust the cost of construction over time.

Construction Analytics Nonresidential buildings inflation forecast for 2018 is 4.9%. Current reliable inflation forecasts range from 4.7% to 5.6%. Spending needs to grow at a minimum of 4.7% just to stay ahead of construction inflation. Inflation in this sector has been at 4% or higher the last four years.

Selling Price is whole building actual final cost. Selling price indices track the final cost of construction, which includes, in addition to costs of labor and materials and sales/use taxes, general contractor and sub-contractor margins or overhead and profit.

Construction Analytics Building Cost Index, Turner Building Cost Index, Rider Levett Bucknall Cost Index, Beck Cost Index and Mortenson Cost Index are all examples of whole building cost indices that measure final selling price of nonresidential buildings only. The individual average annual growth for all these indices over the past 4-years is 4.6%/year.

Producer Price Index (PPI) for Construction Inputs is an example of a commonly referenced construction cost index that does not represent whole building costs. The PPI tracks material cost at the producer level, not prices or bids at the contractor as-built level.

Engineering News Record Building Cost Index (ENRBCI) and RSMeans Cost Index are examples of commonly used indices that DO NOT represent whole building costs yet are commonly used to adjust project costs. The ENRBCI tracks a limited market basket of labor and materials. RSMeans holds the quantity of materials and labor for a building constant. Neither index addresses contractor margins. However, they are useful in that they also publish input cost indices from many cities. This provides a reference to compare those cities to the national average, but still, only for a limited basket of labor and materials. Neither gives any indication of the level of market activity in an area.

Residential construction saw a slowdown in inflation to only +3.5% in 2015. However, the average inflation for six years from 2013 to 2018 is 5.7%. It peaked at 8% in 2013. It climbed back over 5% for 2016 and currently is near 5.5% in 2018. **Anticipate national average residential construction inflation for 2018 at least 5.5 % to 6%.**

Nonresidential Buildings indices have averaged 4% to 4.5% over the last five years and have reached over 5% in the last three years. Nonresidential buildings inflation totaled 18% in the last four years. My forecast shows nonresidential buildings spending in 2018 will reach the fastest rate of growth in three years, which historically has led to accelerated inflation.

There are clear signs of increasing construction activity and a tightening construction labor market. The national construction unemployment rate recently posted below 4%, the lowest on record with data back to 2000. During the previous expansion it hit a low average of 5%. During the recession it went as high as 25%. The average has been below 5% for the last 18 months. An unemployment rate this low potentially signifies labor shortages. The Job Openings and Labor Turnover Survey (JOLTS) for construction is at or near all-time highs. A tight labor market will keep labor costs climbing at the fastest rate in years. Labor shortages cause contractors to pay premiums over and above normal wage increases to keep workers from leaving. Some premiums accelerate labor cost inflation but are not recorded in published wage data.

Recent news of tariffs has extended beyond just steel. I calculated a 25% tariff on raw steel would add 1% to the cost of nonresidential steel buildings. Hi-rise residential buildings, if building is structural steel, would fall in this category. Wood framed residential impact would be small. A 25% increase in mill steel could add 0.65% to final cost of building just for the structure. It adds 1.0% for all steel in a building. If your building is not a steel structure, steel still potentially adds 0.35%.

Anticipate national average construction inflation for nonresidential buildings for 2018 and 2019, including steel impact, of 4.25% to 5.5%, rather than the long-term growth average of 4%. Adjust for any other yet unknown tariffs that may hit after Jan 1, 2019.

In the following plot, Construction Analytics Building Cost Index annual percent change for nonresidential buildings is plotted as a line against a bar chart background of the range of all other nonresidential building inflation indices. Usually the lows are formed by market basket input indices while the highs are formed by other selling price indices.
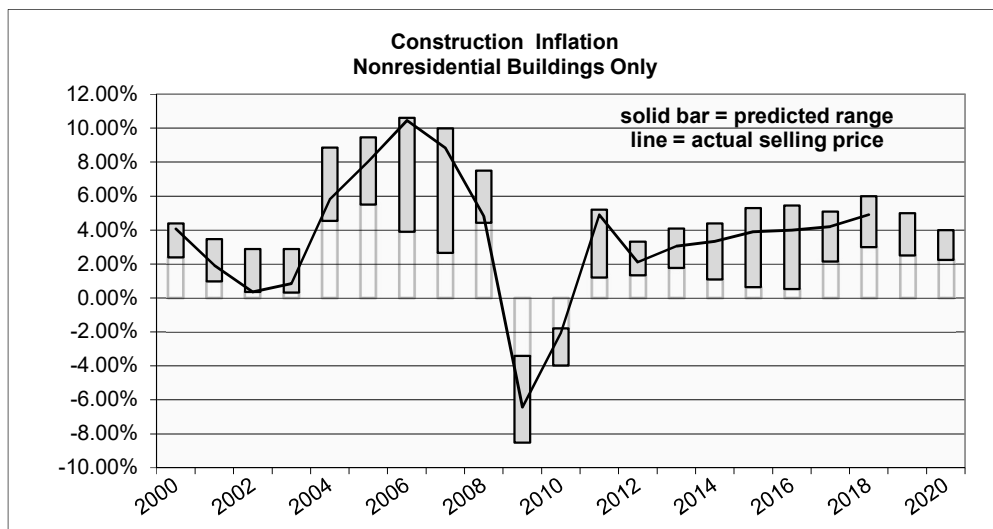
As noted above, some reliable nonresidential selling price indexes have been over 4% since 2014. Currently most selling price indices are over 5% inflation in 2018. Notice during that same period seldom did any input indices climbed above 3%.

REFERENCE INFLATION INDICES						ANNUAL ESCALATION PERCENT					
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Final Cost National Avg											
Constr Analytics Nonresidential Bldgs	**4.90%**	**2.12%**	**3.06%**	**3.34%**	**3.90%**	**4.00%**	**4.21%**	**4.91%**	**4.27%**	**3.63%**	**3.63%**
Turner Index actual cost	1.63%	2.22%	4.10%	4.40%	4.57%	4.80%	5.01%	5.60%	5.00%	4.00%	4.00%
Rider Levett Bucknall Index Actual Cost	1.20%	1.82%	3.14%	4.23%	5.29%	5.45%	4.58%	4.70%	4.50%	4.00%	4.00%
Beck Cost Report 5 cities	3.69%	1.33%	2.32%	1.10%	5.03%	5.08%	5.09%	5.20%	4.50%	4.00%	4.00%
Mortenson avg 6 cities nonres bldg	5.21%	2.97%	2.88%	3.74%	2.70%	3.51%	3.39%	7.00%	4.00%	4.00%	4.00%
Inputs Indices											
RS Means Index Inputs Public JULY	4.20%	1.78%	3.39%	1.84%	0.63%	0.53%	3.04%	3.00%	2.50%	2.25%	2.25%
ENR BCI Index annual avg Inputs	3.58%	2.27%	2.01%	2.08%	2.39%	2.24%	3.34%	3.00%	3.00%	2.50%	2.50%
PPI AVG 4 NONRES BLDGS	2.36%	3.31%	1.77%	2.94%	1.73%	1.18%	2.15%	3.25%	3.37%	2.38%	2.38%
PPI AVG 4 TRADES NONRES BLDGS	1.73%	2.41%	1.66%	2.79%	2.18%	1.65%	2.30%	3.62%	3.13%	2.38%	2.37%
PPI Inputs to NONRES BLDGS	7.90%	1.67%	0.64%	0.82%	-4.58%	-1.69%	3.93%	8.30%	4.00%	3.50%	3.50%
Residential Final Cost	-1.33%	1.16%	8.01%	6.34%	3.54%	5.16%	5.76%	5.50%	5.00%	4.00%	4.00%
US Cen Bur NEW Homes Lasperyes	1.04%	1.03%	6.50%	6.11%	2.52%	5.09%	5.09%	4.50%	4.50%	4.00%	4.00%
S&P/Case Shiller HomePrice NATIONAL	-3.75%	1.29%	9.61%	6.58%	4.59%	5.23%	6.43%	6.50%	5.50%	4.00%	4.00%
All data updated to Q3'2018 where available										edzarenski.com	

Every index as published has its own base year = 100, generally the year the index was first created, and they all vary. All indices here are converted to the same base year, 2017 = 100, for ease of comparison. No data is changed from the original published indices.

REFERENCE INFLATION INDICES						INDEX CONVERTED TO BASE YR = 100					
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Final Cost National Avg											
Constr Analytics Nonresidential Bldgs	**81.7**	**83.4**	**85.9**	**88.8**	**92.3**	**96.0**	**100.0**	**104.9**	**109.4**	**113.4**	**117.5**
Turner Index actual cost	78.2	80.0	83.2	86.9	90.9	95.2	100.0	105.6	110.9	115.3	119.9
Rider Levett Bucknall Index Actual Cost	78.7	80.1	82.6	86.1	90.7	95.6	100.0	104.7	109.4	113.8	118.3
Beck Cost Report 5 cities	82.3	83.3	85.3	86.2	90.6	95.2	100.0	105.2	109.9	114.3	118.9
Mortenson avg 6 cities nonres bldg	82.8	85.2	87.7	91.0	93.4	96.7	100.0	107.0	111.3	115.7	120.4
Inputs Indices											
RS Means Index Inputs Public JULY	89.5	91.1	94.2	95.9	96.5	97.1	100.0	103.0	105.6	108.0	110.4
ENR BCI Index annual avg Inputs	86.8	88.8	90.6	92.4	94.7	96.8	100.0	103.0	106.1	108.7	111.5
PPI AVG 4 NONRES BLDGS	87.9	90.8	92.4	95.1	96.8	97.9	100.0	103.3	106.7	109.3	111.9
PPI AVG 4 TRADES NONRES BLDGS	87.9	90.1	91.6	94.1	96.2	97.8	100.0	103.6	106.9	109.4	112.0
PPI Inputs to NONRES BLDGS	99.4	101.1	101.8	102.6	97.9	96.2	100.0	108.3	112.6	116.6	120.7
Residential Final Cost	74.8	75.6	81.7	86.8	89.9	94.6	100.0	105.5	110.8	115.2	119.8
US Cen Bur NEW Homes Lasperyes	77.4	78.2	83.2	88.3	90.5	95.2	100.0	104.5	109.2	113.6	118.1
S&P/Case Shiller HomePrice NATIONAL	72.1	73.1	80.1	85.4	89.3	94.0	100.0	106.5	112.4	116.9	121.5
All data updated to Q3'2018 where available										edzarenski.com	

Nonbuilding Infrastructure indices are far more market specific than any other type of index. Reference specific Infrastructure indices rather than any average.

These links point to comprehensive coverage of the topic inflation and are recommended reading.

Click Here for Link to a 20-year Table of 25 Indices

Click Here for Cost Inflation Commentary – text on Current Inflation

Current$ vs Constant$

Comparing current $ spending to previous year spending does not give any indication if business volume is increasing. The inflation factor is missing. If spending is increasing at 5%/year at a time when inflation is 4%/year, real volume is increasing by only 1%.

The current Nonresidential buildings forecast of spending growth at 6.0% for 2018 would suggest that after inflation, nonresidential buildings construction volume is growing slightly. So expect volume growth in 2018, but next year 4.3% inflation and no spending growth is signaling a volume decline in 2019.

Nonresidential spending increased 43% since 2010, but there was 30% inflation. Real nonresidential volume since 2010 has increased by only 12%. Nonresidential jobs increased by 27% during that period, 15% greater than volume growth.

Residential spending reached a current $ peak of $630 billion in 2005. 2018 pending is still 10% below that peak. In constant $, adjusted for inflation, all years from 1998 through 2007 were higher than 2018. In constant $, 2018 spending is still 27% below the 2005 peak.

Residential spending increased by 110% since 2010, but after inflation, real residential volume increased by only 57%. Jobs increased by only 37%, 20% short of volume growth.

When comparing inflation adjusted constant dollars, 2018 spending will still be lower than all years from 1998 through 2007. **In 2005 constant $ volume reached a peak at $1,450 billion**. At current rates of growth, we would not eclipse the previous high before 2022.
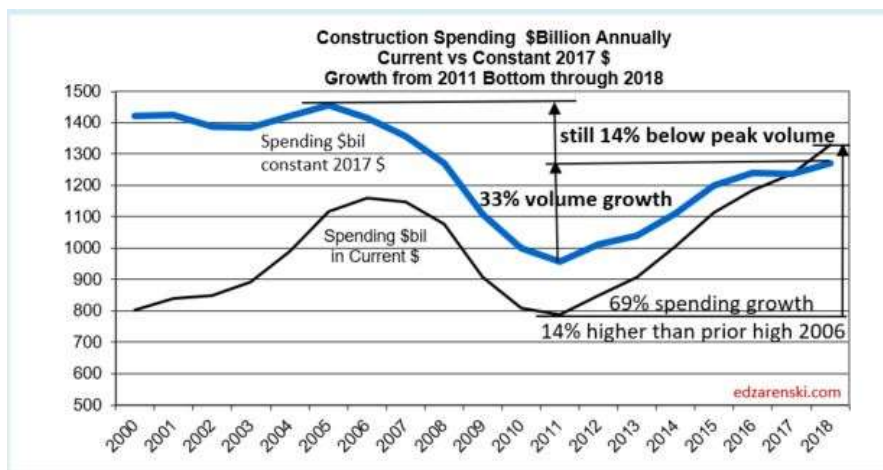
Spending in current $ is 14% higher than the previous 2006 high spending.

Volume after adjusting for inflation is still 14% lower than the previous 2005 high volume.

Jobs and Volume

The period 2011-2017 shows both spending and jobs growth at or near record highs.

A spending forecast of 6.6%+ in 2018, or an increase of $83 billion in construction spending, demands a few words on jobs growth. Construction requires about 5000 workers for every added $1 billion in construction "volume". But construction jobs growth seems to closely follow growth in spending. Construction jobs have increased by 400,000 in a year only four times in the last 50 years, each time accompanied by one of the four highest spending growth increases in 50 years. However, $80 billion in added spending is not the same as $80 billion in volume, and jobs needed is based on volume.

Although spending will increase 6.6%, construction inflation has been hovering near 4.5% for the last five years. Real volume growth in 2018 after inflation is expected to be near 2% or only $26 billion. That would mean the need, if there are no changes in productivity, is to add only about 130,000 additional jobs in 2018, a rate of growth that is well within reach. That is less than the average jobs growth for the last seven years.

Construction added 1,400,000 jobs in the last 5 years, an average of 280,000/year. The only time in history that exceeded jobs growth like that was the period 1993-99 with the highest 5-year growth ever of 1,483,000 jobs. That same 1993-99 period had the previous highest 5-year spending and volume growth going back to 1984-88.

Total spending increased 60%+ since 2010, but with 30% inflation. Real total volume since 2010 has increased by only about 30%. Jobs also increased by 30%, in balance with need. But the results are much different for Residential than Nonresidential.

Nonresidential spending increased 50% since 2010 with 35% inflation. Nonresidential volume since 2010 has increased by only 15%. Jobs increased by 27%, 12% in excess of volume growth.

Residential spending increased by 125% since 2010, but after 40% inflation, real residential volume increased by 85%. Jobs increased by only 40%, 45% short of volume growth.

Residential construction labor cannot be directly compared to residential volume because

- Some residential high-rise jobs, for example structure, are performed by firms whose primary activity is commercial construction. Those jobs are classified as nonresidential.
- Buildings that are multi-use commercial retail and residential, even lo-rise, may be built by contractors whose firms are classified nonresidential labor. The construction spending would be broken out to residential and nonresidential, but the labor would not.
- Some residential immigrant labor is not counted

For these reasons, it is best to simplify comparisons of spending activity to total labor.

For more on Jobs see Construction Jobs and Residential Construction Jobs Shortages

New Construction Starts

New construction starts for the six months in the 1st half 2018 reached an all-time high.

New Construction Starts three-month average for May-Jun-Jul is $840 billion, all-time high.

Year-to-date (YTD) 2018 starts are currently reported as up only 2% from 2017, but **2017 starts through September have already been revised up by 9%**, 10% in nonresidential buildings, 16% in non-buildings and 3% in residential. **2018 starts will not be revised until next year. Revisions have always been up**.

Revisions for the last 10 years averaged more than +7%/yr., with most of the upward revision in nonresidential buildings. Revisions to nonresidential buildings have been greater than 10%/year for the last 7 years. Therefore, 2018 starts growth is very likely under-reported.

All construction starts data in this report references [Dodge Data & Analytics Starts Data](#).
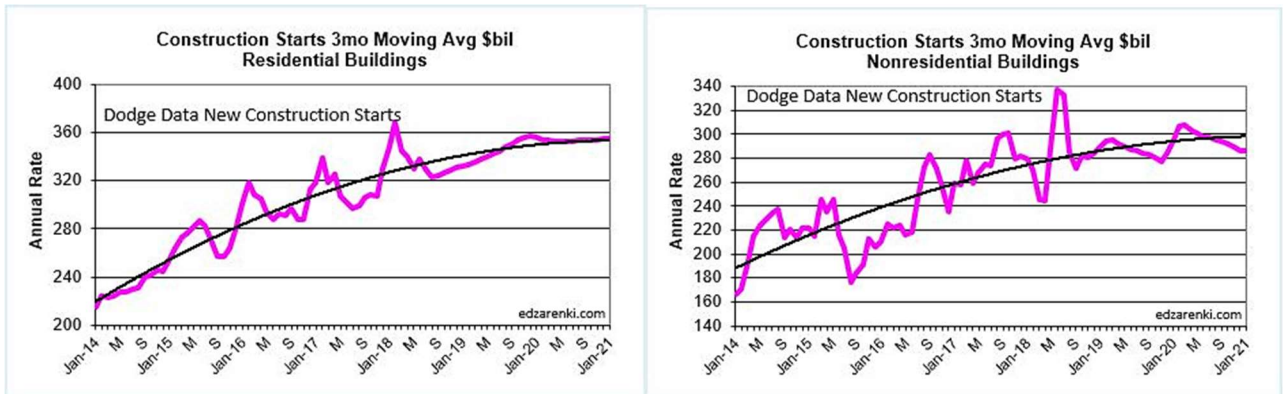
Dodge releases its first forecast of next year's starts every year in the 4th quarter. Last year the first forecast for 2018 was for starts to increase 3% to $765 billion. 2018 starts, based on data as of September, could reach $806 billion, but at first appearing to show no gain from 2017. That's because 2017 has already been revised up by $50 billion. After 2018 revisions are posted next year, 2018 starts could reach $830-$840 billion. Dodge forecast 2019 starts at $808 billion, no change from 2018. This will be subject to two upward revisions.

- Previous year starts always later get revised upwards. Therefore, current year starts YTD growth is always understated. This analysis compensates for that.
- New starts will generate record high starting backlog for every sector in 2019.
- Even a low forecast for starts in 2019 produces record backlog for 2020.

For nonresidential buildings spending, long duration jobs can sometimes have a 5 to 6-year schedule. On average most years have at least some projects start that will be under construction for 4 years. For an entire year's worth of starts, approximately 20% of the spending occurs in the year started, 50% in the next year, 25% in the third year and only 5% in the fourth year or later year. Residential starts contribute spending into the third year. This means that nonresidential spending growth in 2019 is still being affected by starts from 2016 and residential growth from starts in 2017.
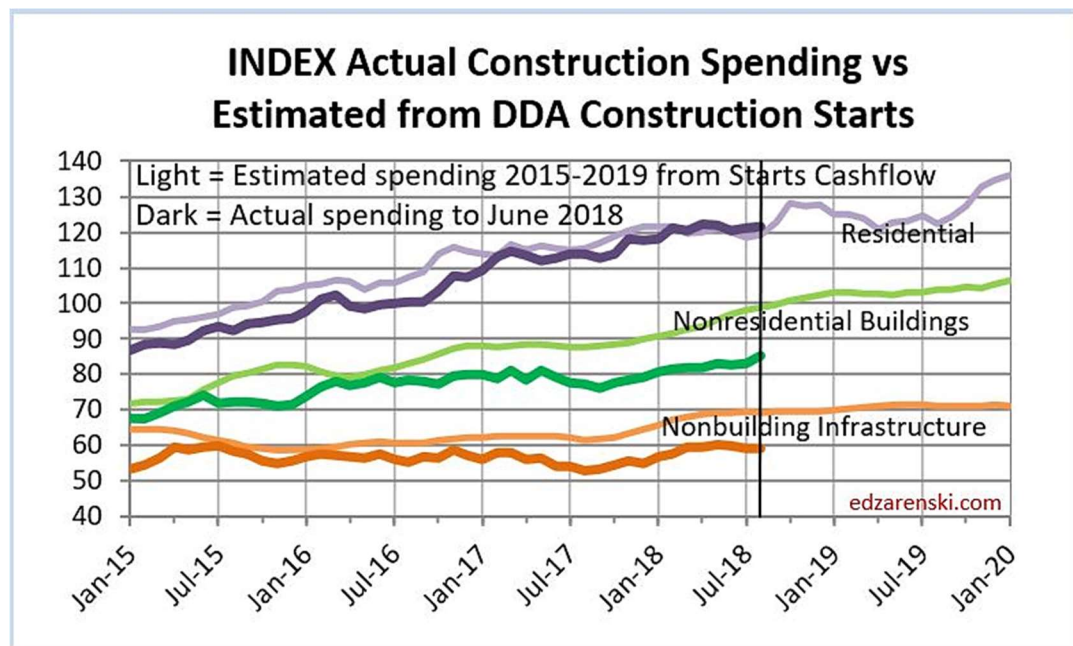
The next two plots show the 3month moving average and trend line of starts for Residential and Nonresidential Buildings. Starts can be erratic from month to month. The trend line gives a better impression of how starts impact spending. It is the rate of change in starts cashflows that provides a predicting tool for spending.

Construction Starts 3mo Moving Avg $bil Residential Buildings — Dodge Data New Construction Starts

Construction Starts 3mo Moving Avg $bil Nonresidential Buildings — Dodge Data New Construction Starts

The plot below is an index. The plot shows greater accuracy in the forecast when the slope of the predicted cash flow and actual spending plot lines move in the same direction. It's not the spread between the lines that gives any indication. If the slope of the lines is the same, then the cash flow accurately predicted the spending.

The light green line for nonresidential buildings spending estimated from starts cash flow shows smooth spending, even though actual monthly starts are erratic (see nonres bldgs plot shown above). The actual spending often follows close to the pattern estimated from cash flows.

INDEX Actual Construction Spending vs Estimated from DDA Construction Starts

Light = Estimated spending 2015-2019 from Starts Cashflow
Dark = Actual spending to June 2018

Residential
Nonresidential Buildings
Nonbuilding Infrastructure

Starts are sometimes misinterpreted in common industry forecasting articles. Starts dollar values represent a survey of about 50% to 60% of industry activity, therefore Starts dollar values cannot ever be used directly to indicate the volume of spending. Also, Starts do not directly indicate changes in spending per month or per year. Only by including an expected duration for all Starts and producing a forecast Cash Flow from Starts data can the expected pattern of spending be developed.
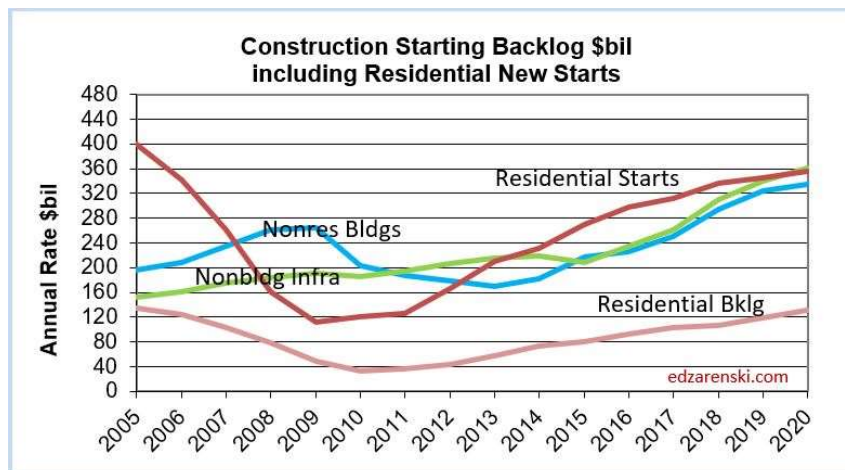
Starting Backlog

Nonresidential Buildings starting backlog at the beginning of 2018 reached an all-time high. For nonresidential buildings this backlog will contribute spending until the end of 2021. 2019 Backlog is forecast to increase 8%. For purposes of this analysis, I've set only moderate or low increases in starts for 2020 and 2021, so this forecast may hold down the future backlog and spending forecast. However, backlog leading into 2019 is up 70% in 5 years.

Cash Flow from Backlog	NonRes	Change	NonRes	Change	NonRes	Change	NonRes	Change	NonRes	Change
NONRESIDENTIAL BLDGS	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	250,938	10.9%	288,495	15.0%	312,049	8.2%	328,734	5.3%	350,122	6.5%
Backlog CF Within Year	180,989	7.9%	201,569	11.4%	208,680	3.5%	211,413	1.3%	232,592	10.0%
Backlog ETC at End Yr	69,950		86,926		103,369		117,320		117,530	
New Starts in Year	270,302	11.1%	274,734	1.6%	275,183	0.2%	284,295	3.3%	285,600	0.5%
New Bklg CF Within Yr	52,179	1.4%	49,644	-4.9%	50,232	1.2%	51,921	3.4%	52,343	0.8%
New Bklg ETC at End Yr	218,122		225,090		224,951		232,374		233,257	
Total CashFlow in Year	233,168	6.4%	251,214	7.7%	258,912	3.1%	263,335	1.7%	284,935	8.2%
Backlog ETC End Year	288,072	15.1%	312,016	8.3%	328,320	5.2%	349,694	6.5%	350,787	0.3%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Table header: FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG

Starting Backlog is the Estimate-to-Complete (ETC) value of all projects under contract at the beginning of a period. Projects in starting backlog could have started last month or last year or several years ago.

- 75%-80% of all **Nonresidential Buildings spending** within the year will be generated from projects in starting backlog.
- 80%-85% of all **Non-Building Infrastructure spending** within the year will be generated from projects in starting backlog.
- **70% of All Residential spending within the year is generated from new starts**, but this is weighted because 85% of all residential work is short duration single family and renovation work.
- 65% on long duration **Multifamily Residential spending** within the year will be generated from projects in starting backlog.

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Non-building Infrastructure starting backlog at the beginning of 2018 reached an all-time high. Some of this is very long-term work that will contribute spending until the end of 2025. In fact, more than half of all spending in 2019 comes from projects that started prior to Jan 2018. 2019 Backlog is forecast to increase 10%. Backlog is up 45% in 5 years but is up 50% in just the last 3 years.

Cash Flow from Backlog **NONBUILDING INFRASTRCTR**	FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG									
	NonBldg infra	Change Yr/Yr	NonBldg infra	Change Yr/Yr	NonBldg infra	Change Yr/Yr	NonBldg infra	Change Yr/Yr	NonBldg infra	Change Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	258,143	14.9%	307,261	19.0%	337,766	9.9%	372,161	10.2%	414,079	11.3%
Backlog CF Within Year	135,886	3.6%	152,207	12.0%	159,498	4.8%	159,671	0.1%	173,360	8.6%
Backlog ETC at End Yr	122,257		155,054		178,268		212,490		240,719	
New Starts in Year	214,357	14.9%	209,263	-2.4%	215,478	3.0%	224,547	4.2%	227,539	1.3%
New Bklg CF Within Yr	29,340	-5.6%	25,404	-13.4%	21,708	-14.6%	23,133	6.6%	23,311	0.8%
New Bklg ETC at End Yr	185,017		183,859		193,770		201,414		204,228	
Total CashFlow in Year	165,226	1.8%	177,612	7.5%	181,206	2.0%	182,804	0.9%	196,671	7.6%
Backlog ETC End Year	307,274	19.0%	338,913	10.3%	372,038	9.8%	413,904	11.3%	444,948	7.5%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Multifamily residential has a longer duration and a greater percentage of spending comes from backlog. But, due to the shorter duration of projects, about 75% of single family and residential renovation spending within the year is generated from new starts. Unlike nonresidential, backlog does not contribute nearly as much short-term residential spending within the year.

Cash Flow from Backlog **RESIDENTIAL BLDGS**	FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG									
	Rsdn Bldgs	Change Yr/Yr	Rsdn Bldgs	Change Yr/Yr	Rsdn Bldgs	Change Yr/Yr	Rsdn Bldgs	Change Yr/Yr	Rsdn Bldgs	Change Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	94,300	6.6%	93,807	-0.5%	105,021	12.0%	109,865	4.6%	110,381	0.5%
Backlog CF Within Year	90,167	7.2%	91,202	1.1%	100,010	9.7%	104,293	4.3%	104,812	0.5%
Backlog ETC at End Yr	4,133		2,605		5,011		5,571		5,569	
New Starts in Year	310,088	4.3%	336,111	8.4%	332,013	-1.2%	333,258	0.4%	336,607	1.0%
New Bklg CF Within Yr	220,413	6.3%	233,695	6.0%	227,160	-2.8%	228,449	0.6%	230,496	0.9%
New Bklg ETC at End Yr	89,674		102,416		104,853		104,810		106,111	
Total CashFlow in Year	310,580	6.6%	324,897	4.6%	327,170	0.7%	332,742	1.7%	335,308	0.8%
Backlog ETC End Year	93,807	-0.5%	105,021	12.0%	109,865	4.6%	110,381	0.5%	111,680	1.2%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Cash Flow

Simply referencing total new starts or backlog does not give an indication of spending within the next calendar year. Projects, from start to completion, can have significantly different duration. Whereas a residential project may have a duration of 6 to 12 months, an office building could have a duration of 18 to 24 months and a billion-dollar infrastructure project could have a duration of 3 to 4 years. New starts within any given year could contribute spending spread out over several years. Cash flow totals of all jobs can vary considerably from month to month, are not only driven by new jobs starting but also by old jobs ending, and are heavily dependent on the type, size and duration of jobs.

Cash flow from all starts in backlog supports a 2018 spending forecast of $1,321 billion, an increase of 6.0% over 2017. The forecast for 2019, based on a minimal increase in starts, is $1,341 billion, an increase of only 1.5% over 2018. Dodge initial November 2018 forecast for 2019 construction starts is for $808 billion, no gain over 2018. However, subsequent revisions may increase that a few percent.

The following table illustrates the difference between Starts and Cash flow. It shows Manufacturing Bldgs. projects in backlog as of October 2018 and predicted starts in 2018 through 2021. Note there are sometimes vast differences between amounts of Starts, whether already in Backlog at beginning of year or New Starts within the year, and Cash Flow from Backlog and New Starts.

			FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG							
		MNFG	Change	MNFG	Change	MNFG	Change	MNFG	Change	MNFG	Change
MANUFACTURING BLDGS		Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions		**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year		28,172	-17.1%	32,156	14.1%	40,505	26.0%	48,676	20.2%	51,367	5.5%
Backlog CF Within Year		17,920	**-18.5%**	18,770	**4.7%**	18,719	**-0.3%**	23,193	**23.9%**	29,957	**29.2%**
Backlog ETC at End Yr		10,253		13,386		21,785		25,483		21,410	
New Starts in Year		25,851	27.3%	30,540	18.1%	30,774	0.8%	30,952	0.6%	30,675	-0.9%
New Bklg CF Within Yr		3,947	**-4.6%**	3,421	**-13.3%**	3,883	**13.5%**	5,068	**30.5%**	4,905	**-3.2%**
New Bklg ETC at End Yr		21,903		27,118		26,890		25,885		25,769	
Total CashFlow in Year		21,867	-16.3%	22,191	1.5%	22,603	1.9%	28,261	25.0%	34,863	23.4%
Backlog ETC End Year		32,156	14.1%	40,505	26.0%	48,676	20.2%	51,367	5.5%	47,179	-8.2%
Source Starts data: Dodge Data & Analytics Oct 2018										edzarenski.com	

Cash Flow modeling predicted a huge decline of -16% in manufacturing spending in 2017. This was in stark contrast to seven other economic analysts who predicted spending would be between -7% and +7%, for an average of +0.4% as reported in the January 2017 AIA Consensus. Manufacturing spending actually ended the year at -13.0%. Obviously, there is no corellation between a 25% increase in new starts within the year and a predicted -16% drop in spending. The actual -13% drop in 2017 spending reflects a return to normal after an unusually large volume of spending in 2015 and 2016 that was generated by a record volume of starts in 2014.

Note that new manufacturing starts were up 27% in 2017 and could be up 18% in 2018, yet 2018 spending is forecast to increase only 1.5%. This is due to projects that started several years ago but are now coming to an end. They are dropping out of the monthly cash flows and holding down 2018 spending even though starts have been up substantially for two years. This substantial volume of new starts in 2017 and 2018 will be providing a boost to spending in 2020 and 2021.

Spending Total

Total of All construction spending is forecast to increase 6.0% to $1.321 trillion in 2018 and 1.5% to $1.341 trillion in 2019 and 6.3% to $1.426 trillion in 2020.

U.S. Total Construction Spending Summary							
$ in billions % growth vs prior yr	totals in billions current U.S. dollars				Forecast	Forecast	Forecast
	2014	2015	2016	2017	2018	2019	2020
Nonresidential Bldgs	332.7	379.5	414.5	419.3	443.6	442.9	482.2
	9.7%	14.1%	9.2%	1.2%	5.8%	-0.2%	8.9%
Nonbuilding Hvy Engr	298.0	305.4	303.4	295.0	316.2	333.7	366.6
	8.8%	2.5%	-0.7%	-2.8%	7.2%	5.5%	9.9%
Residential	374.9	428.8	473.9	531.7	561.6	564.4	577.2
	13.9%	14.4%	10.5%	12.2%	5.6%	0.5%	2.3%
Total	1005.6	1113.6	1191.8	1246.0	1321.4	1341.0	1426.0
% growth vs prior yr	11.0%	10.7%	7.0%	4.5%	6.0%	1.5%	6.3%
Source $ Data: U.S. Census Bureau, Department of Commerce.							
Actual Spending data includes revisions 2016-2017 issued 7-2-18							
Forecast includes U.S.Census October 2018 year-to-date spending					edzarenski.com		

Construction spending is strongly influenced by the pattern of continuing or ending cash flows from the previous two to three years of construction starts. Current month/month, year/year or year-to-date trends in starts often do not indicate the immediate trend in spending.

The following table clearly shows there is not a correlation between starts in any year with spending in either the current or the following year. The practice of using construction starts directly to predict spending can be very misleading in an industry that relies on data for predictive analysis to plan the future. Not only does it not predict the volume of spending in the following year, it does not even consistently predict the direction spending will take, up or down, in the following year. It's a false indicator and it's not a good use of data.

Total Construction Starts & Total Construction Spending										
Growth year over year										
		2009	2010	2011	2012	2013	2014	2015	2016	2017
Nonresidential Bldgs	Starts	-30.8%	-4.0%	2.4%	-4.1%	12.1%	24.8%	-0.8%	15.3%	18.5%
	Spending	-13.9%	-22.7%	-2.6%	5.7%	0.8%	9.7%	14.1%	9.2%	1.2%
Nonbuilding Hvy Engr	Starts	-6.2%	4.4%	-0.2%	10.1%	-3.5%	-8.6%	26.6%	-3.0%	11.8%
	Spending	0.5%	-3.1%	-5.2%	8.9%	0.1%	8.8%	2.5%	-0.7%	-2.8%
Residential	Starts	-30.9%	8.3%	4.2%	31.6%	26.6%	10.3%	16.6%	9.8%	4.8%
	Spending	-30.3%	-1.3%	0.1%	9.3%	19.3%	13.9%	14.4%	10.5%	12.2%
Total	Starts	-24.2%	2.1%	2.0%	10.9%	10.1%	11.3%	12.6%	4.0%	4.7%
	Spending	-15.9%	-10.7%	-2.6%	7.9%	6.6%	11.0%	10.7%	7.0%	4.5%
Source Spending Data: U.S. Census Bureau, Department of Commerce.										
Source Starts Data: Dodge Data & Analytics updated to 12mo revision									edzarenski.com	

Residential Buildings Spending

Residential construction spending for 2018 was recently revised down and starts for 2019 are expected flat to down slightly. The forecast is now for an increase of 5.6% to $562 billion in 2018, 0.5% to $564 billion in 2019 and 2.3% to $577 billion in 2020.

Residential spending hit a 12-year high in 2018, but then slowed after six years of growth all over 10%/year. Average spending growth the last seven years is 12%/year. Although residential spending is still increasing, growth has slowed to less than inflation. Real volume after inflation is declining.

Residential spending in 2018 is 50% single family, 13% multi-family and 37% improvements. In 2011, improvements were 48% of residential spending. Single Family Residential spending is more dependent on new starts within the most recent 12 months than on backlog from previous starts.

Cash Flow from Backlog		FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG								
Cash Flow from Backlog	Rsdn	Change	Rsdn	Change	Rsdn	Change	Rsdn	Change	Rsdn	Change
RESIDENTIAL BLDGS	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year	94,300	6.6%	93,807	-0.5%	105,021	12.0%	109,865	4.6%	110,381	0.5%
Backlog CF Within Year	90,167	**7.2%**	91,202	**1.1%**	100,010	**9.7%**	104,293	**4.3%**	104,812	**0.5%**
Backlog ETC at End Yr	4,133		2,605		5,011		5,571		5,569	
New Starts in Year	310,088	4.3%	336,111	8.4%	332,013	-1.2%	333,258	0.4%	336,607	1.0%
New Bklg CF Within Yr	220,413	**6.3%**	233,695	**6.0%**	227,160	**-2.8%**	228,449	**0.6%**	230,496	**0.9%**
New Bklg ETC at End Yr	89,674		102,416		104,853		104,810		106,111	
Total CashFlow in Year	310,580	6.6%	324,897	4.6%	327,170	0.7%	332,742	1.7%	335,308	0.8%
Backlog ETC End Year	93,807	-0.5%	105,021	12.0%	109,865	4.6%	110,381	0.5%	111,680	1.2%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Total starts for the last 6 months are the highest since 2006, but % growth has slowed considerably. New starts in 2017 which initially posted only 2% growth have already been revised up to 4%. I expect that to be revised up to 5%. Growth of 7% is expected for 2018. Slower growth is now expected after 5 years (2012-2016) of starts increasing at an average 20%/year.

Multi-Family Residential spending is more dependent on backlog.

| Cash Flow from Backlog		FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG								
Cash Flow from Backlog	Rsdn	Change	Rsdn	Change	Rsdn	Change	Rsdn	Change	Rsdn	Change
RESIDENTIAL MULTIFAM ONL	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year	31,407	10.2%	29,771	-5.2%	31,372	5.4%	33,456	6.6%	34,130	2.0%
Backlog CF Within Year	27,273	**13.3%**	27,166	**-0.4%**	26,385	**-2.9%**	27,953	**5.9%**	28,604	**2.3%**
Backlog ETC at End Yr	4,133		2,605		4,987		5,503		5,526	
New Starts in Year	40,311	-3.1%	43,484	7.9%	42,717	-1.8%	42,987	0.6%	43,419	1.0%
New Bklg CF Within Yr	14,674	**0.3%**	14,718	**0.3%**	14,248	**-3.2%**	14,361	**0.8%**	14,480	**0.8%**
New Bklg ETC at End Yr	25,638		28,767		28,469		28,627		28,939	
Total CashFlow in Year	41,947	8.4%	41,883	-0.2%	40,633	-3.0%	42,314	4.1%	43,084	1.8%
Backlog ETC End Year	29,771	-5.2%	31,372	5.4%	33,456	6.6%	34,130	2.0%	34,466	1.0%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Nonresidential Buildings Spending

Nonresidential Buildings construction spending is forecast to increase 5.8% to $444 billion in 2018, dip -0.2% to $443 billion in 2019 and climb 8.9% to $482 billion in 2020. Office (which includes data centers) and Amusement/Recreation support the 2019 but there is downward pressure from slowdowns or timing of cash flow in Manufacturing, Lodging, Healthcare and Educational. Educational, Healthcare, Recreation, Office and Manufacturing all support growth in 2020.

U.S. Total Construction Spending Summary

$ in billions % growth vs prior yr	2014	2015	2016	2017	Forecast 2018	Forecast 2019	Forecast 2020
Educational	79.7	84.8	90.3	91.2	96.5	92.8	103.4
	0.8%	6.4%	6.6%	1.0%	5.8%	-3.9%	11.4%
Healthcare	38.6	39.1	40.2	41.9	42.2	41.1	46.6
	-5.0%	1.3%	2.6%	4.4%	0.7%	-2.7%	13.5%
Amusement / Recreation	16.8	20.3	23.2	24.9	27.8	31.1	31.7
	10.3%	20.8%	14.3%	7.3%	11.7%	12.0%	2.0%
Commercial Retail	62.8	65.9	78.2	87.7	91.7	90.8	90.3
	18.2%	4.9%	18.6%	12.3%	4.5%	-1.0%	-0.5%
Lodging	16.7	21.9	27.0	28.7	32.3	31.0	31.6
	24.1%	30.9%	23.1%	6.3%	12.6%	-3.9%	1.7%
Office	46.6	55.5	67.6	66.9	74.1	78.6	84.2
	22.7%	19.2%	21.8%	-1.1%	10.9%	6.1%	7.1%
Manufacturing	58.6	79.9	76.4	66.4	66.7	65.3	82.2
	16.0%	36.3%	-4.4%	-13.0%	0.4%	-2.2%	25.9%
Other Nonres Buildings	12.8	12.1	11.7	11.7	12.3	12.3	12.3
	-2.1%	-6.0%	-2.6%	-0.7%	5.3%	0.0%	0.0%
Subtotal Nonres Buildings	332.7	379.5	414.5	419.3	443.6	442.9	482.2
% growth vs prior yr	9.7%	14.1%	9.2%	1.2%	5.8%	-0.2%	8.9%

Source $ Data: U.S. Census Bureau, Department of Commerce.
Actual Spending data includes revisions 2016-2017 issued 7-2-18
Forecast includes U.S. Census October 2018 year-to-date spending

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Nonresidential Buildings Construction Spending Annual Rate ($bil)
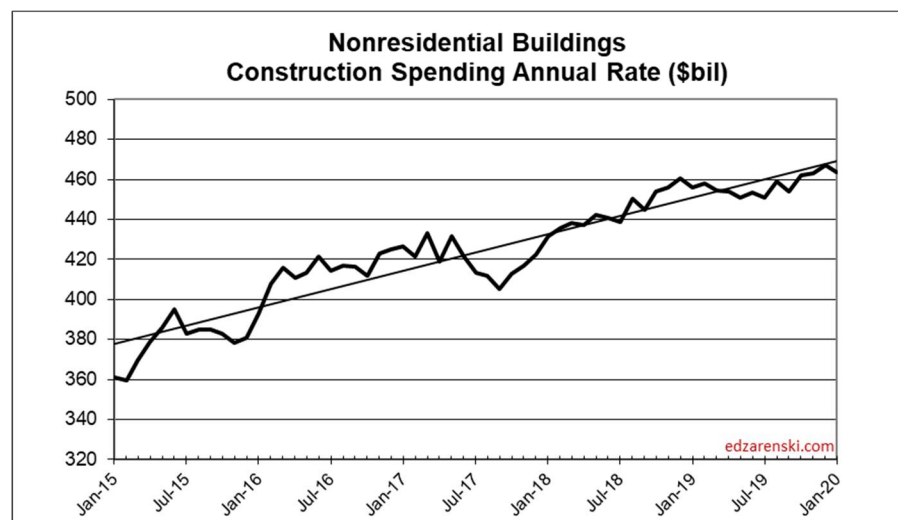
Nonresidential buildings construction spending in constant $ (inflation adjusted $) reached as high as $440 billion in 2017 but averaged only $419 billion in 2017. In 2018 it will reach a high of $430 billion but average only $424 billion. The yearly average recently peaked at $431 billion in 2016. Constant $ spending or real volume growth shows all years from 1996 through 2010 had higher volume than the 2018 forecast. Volume reached a peak $536 billion in 2000 and went over $500 billion again in 2008. In constant $ 2018 is still 20% below that 2000 peak.
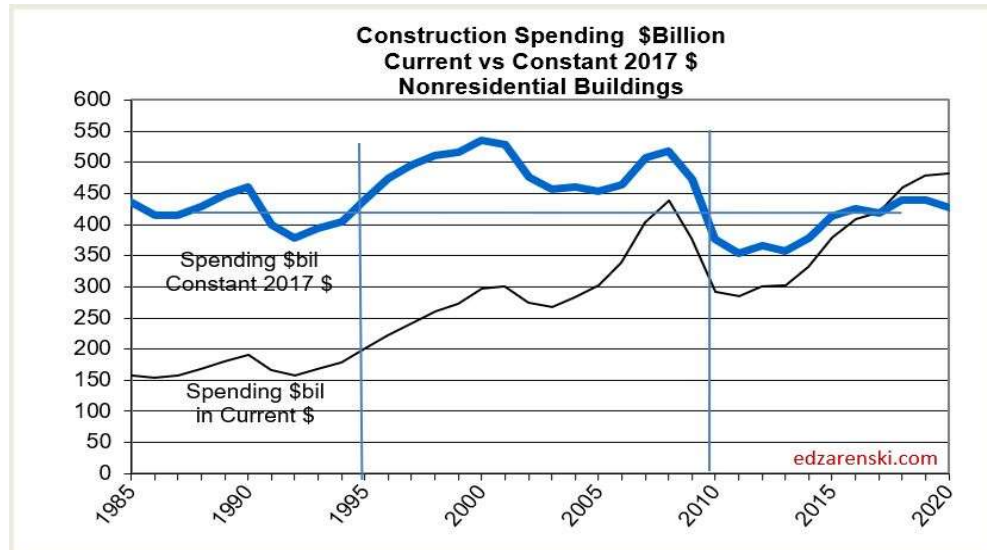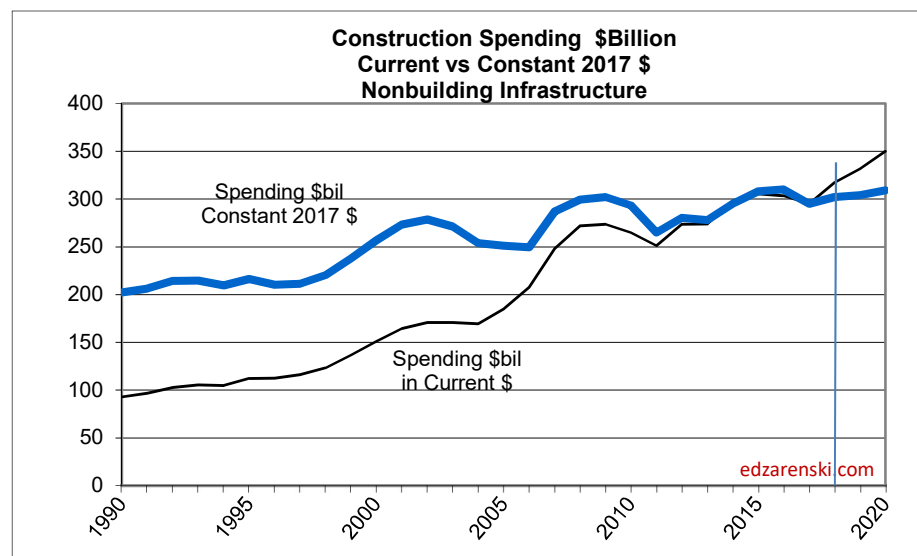
Non-building Infrastructure Spending

Non-building Infrastructure construction spending is forecast to increase 7.2% to $316 billion in 2018, 5.5% to $334 billion in 2019 and 9.9% to $367 billion in 2020. The forecast growth for 2019 will be supported by Transportation and Public Works but will be held down somewhat by Highway. Transportation terminals and rail project starts both increased more than 100% in 2017 and both are long duration projects types that will contribute spending for several years. Environmental Public Works had strong 20% growth in 2018 starts and Highway starts hit a new high in 2018.

U.S. Total Construction Spending Summary							
$ in billions % growth vs prior yr	totals in billions current U.S. dollars				Forecast	Forecast	Forecast
	2014	2015	2016	2017	2018	2019	2020
Power / Electric / Gas	110.1	103.0	101.4	96.5	102.0	108.6	106.6
	18.0%	-6.5%	-1.5%	-4.8%	5.7%	6.4%	-1.8%
Highway / Bridge / Street	84.7	90.6	92.7	89.1	92.1	93.3	105.3
	4.2%	6.9%	2.3%	-4.0%	3.4%	1.4%	12.8%
Transportation / Air / Rail	42.0	44.8	43.3	45.2	54.5	62.1	75.1
	6.5%	6.7%	-3.5%	4.4%	20.5%	14.0%	21.0%
Sewer / Water / Conservation	43.9	45.3	43.8	39.4	43.1	46.4	56.2
	4.5%	3.2%	-3.3%	-9.9%	9.4%	7.7%	21.1%
Communication	17.3	21.7	22.2	24.8	24.5	23.3	23.4
	-2.7%	25.4%	2.2%	12.0%	-1.1%	-5.1%	0.4%
Subtotal Infrastructure	298.0	305.4	303.4	295.0	316.2	333.7	366.6
% growth vs prior yr	8.8%	2.5%	-0.7%	-2.8%	7.2%	5.5%	9.9%

Source $ Data: U.S. Census Bureau, Department of Commerce.
Actual Spending data includes revisions 2016-2017 issued 7-2-18
Forecast includes U.S. Census October 2018 year-to-date spending

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Non-building Infrastructure construction spending in constant $ (inflation adjusted $) reached $311 billion in 2016, an all-time high, but then dropped to $296 billion in 2017. In 2018 it will reach $302 billion. Constant $ spending or real volume growth has been within +/- 3% for the last 5 years.

Non-building Infrastructure spending, always the most volatile sector, in mid-2017 dropped to 2013 lows. However, this short dip was predicted. Cash flow models of Infrastructure starts from the last several years predicted that dips in monthly spending would be caused by uneven project closeouts from projects that started several years ago, particularly in Power and Highway markets.
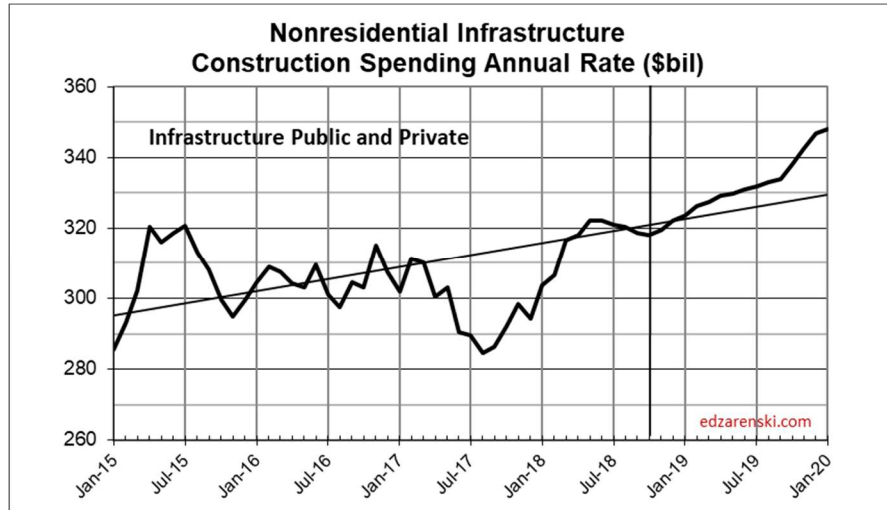
Current backlog is at an all-time high, up 10%+ each of the last 3 years, and spending is expected to follow the increased cash flows from the elevated backlog. Transportation terminals new starts in 2017 jumped 120%. Rail project starts increased more than 100%. Starting backlog for all transportation work is the highest ever, up 100% in the last two years. Transportation spending is projected to increase 15-20%/year for the next two years.

No future growth is included from infrastructure stimulus and yet 2018 spending is projected to increase by 8%. 2019 and 2020 are forecast to increase 5% to 6%.

Public Infrastructure and Public Institutional

Less than 60% of all Non-building Infrastructure spending, about $170 billion, is publicly funded. That public subset of work averages growth of less than $10 billion/year.

About 25% of all Nonresidential Buildings spending, about $110 billion, is publicly funded, mostly Educational. Nonresidential buildings spending makes up almost 40% of Public spending.

- Infrastructure = $300 billion, ~25% of all construction spending.
- Infrastructure is about 60% public, 40% private. In 2005 it was 70% public.
- **Public Infrastructure = $170 billion**. Private Infrastructure = $130 billion.
- Power and Communications are privately funded infrastructure.
-
- Nonresidential Buildings is 25% public (mostly institutional), 75% private.
- Educational, Healthcare and Public Safety are Public Nonres Institutional Bldgs
- Public Commercial construction is not included.
- **Public Institutional = $100 billion**, mostly Education ($70b).

U.S. Total Construction Spending Summary					
2017 $ in millions	Total	Private		Public	
% of total					
Total Construction	1,246,002	962,563	77%	281,970	23%
Residential	531,657	524,947	99%	6,710	1%
Nonresidential Buildings	419,339	307,109	73%	110,891	26%
Nonbuilding Infrastructure	295,006	130,507	44%	164,369	56%
Lodging	28,672	27,985	98%		0%
Office	66,850	58,564	88%	8,286	12%
Commercial	87,733	84,637	96%	3,096	4%
Health care	41,916	32,645	78%	9,271	22%
Educational	91,213	20,263	22%	70,950	78%
Religious	3,366	3,366	100%		0%
Public safety	8,290	96	1%	8,194	99%
Amusement/Rec	24,851	13,757	55%	11,094	45%
Manufacturing	66,448	65,796	99%		0%
Transportation	45,173	14,779	33%	30,394	67%
Communication	24,831	24,701	99%		0%
Power	96,513	90,615	94%	5,898	6%
Highway and street	89,053		0%	89,053	100%
Sewage/Waste Water	20,386	226	1%	20,160	98.9%
Water supply	11,806	186	2%	11,620	98.4%
Conservation	7,244		0%	7,244	100.0%
U.S.Census Dec 2017 year-to-date spending issued 2-1-18				edzarenski.com	

Public Infrastructure + Public Institutional = $280 billion, 23% of total construction spending.

Public Infrastructure + Institutional average growth is $12 billion/year. It has never exceeded $30 billion in growth in a single year.

See also Publicly Funded Construction

See also Down the Infrastructure Rabbit Hole
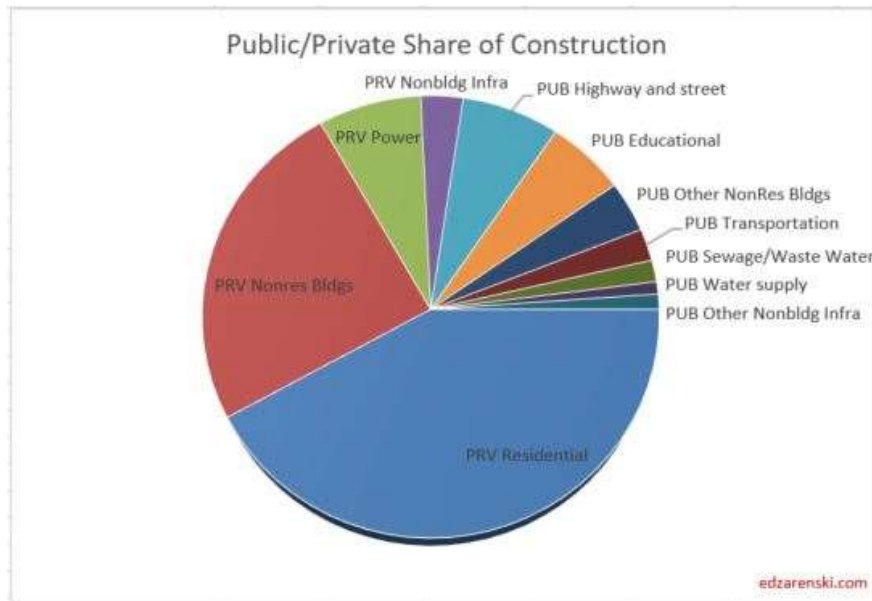
Public Spending

Total public spending for 2018 is projected to finished up 9.5% at $320 billion. Every major public market is projected to finish up for 2018. By far, the largest Public spending increases for 2018 are Highway, Transportation, Sewer and Waste Disposal and Water Supply.

U.S. Total Construction Spending Summary							
$ in billions % growth vs prior yr	totals in billions current U.S. dollars				Forecast	Forecast	Forecast
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Private	729.5	823.3	898.7	954.3	1001.8	984.8	1029.6
	14.8%	12.9%	9.2%	6.2%	5.0%	-1.7%	4.5%
Private Residential	369.8	422.1	466.6	517.6	551.1	557.3	569.9
Private Nonresidential	359.7	401.2	432.1	436.7	450.8	427.5	459.7
Public	276.1	290.3	293.1	291.8	319.5	356.2	396.4
	2.0%	5.1%	1.0%	-0.5%	9.5%	11.5%	11.3%
Total	1005.6	1113.6	1191.8	1246.0	1321.4	1341.0	1426.0
% growth vs prior yr	11.0%	10.7%	7.0%	4.5%	6.0%	1.5%	6.3%
Share Private % of Total	*72.5%*	*73.9%*	*75.4%*	*76.6%*	*75.8%*	*73.4%*	*72.2%*
Share Public % of Total	*27.5%*	*26.1%*	*24.6%*	*23.4%*	*24.2%*	*26.6%*	*27.8%*
Source $ Data: U.S. Census Bureau, Department of Commerce.							
Actual Spending data includes revisions 2016-2017 issued 7-2-18							
Forecast includes U.S.Census October 2018 year-to-date spending					edzarenski.com		

The two largest markets contributing to public spending are Highway/Bridge (32% of total public spending) and Educational (25%), together accounting for nearly 60% of all public construction spending. At #3, Transportation is only about 10% of public spending. Environmental Public Works combined makes up almost 15% of public spending, but that consists of three markets, Sewage/Waste Water, Water Supply and Conservation. Office, Healthcare, Public Safety and Amusement/Recreation each account for about 3%.

Educational is 80% public, Transportation 70%, Amusement/Rec 50% and Healthcare 20% public. Power is about 6% public, along with few other smaller shares.

Public spending hit a 4-year low in mid-2017. It has been increasing since then and is now near an all-time high. I'm expecting to see strong growth through 2020.

Due to long duration job types, 2018 starting backlog is up 30% in the last 3 years. In 2018, 40% of all spending comes from jobs that started before 2017. Leading 2018 growth are Educational (+15%) and Transportation (+35%), with a combined total forecast 20% growth in public spending.

Current levels of backlog and predicted new starts gives a projection that Public Non-building Infrastructure spending will reach an all-time high in 2018 and again in 2019.

			FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG								
		Change		Change		Change		Change		Change
PUBLIC	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year	212,196	7.0%	236,783	11.6%	273,080	15.3%	309,454	13.3%	335,716	8.5%
Backlog CF Within Year	129,435	**3.0%**	136,546	**5.5%**	143,707	**5.2%**	163,662	**13.9%**	187,424	**14.5%**
Backlog ETC at End Yr	82,761		100,237		129,372		145,791		148,292	
New Starts in Year	185,310	8.6%	201,847	8.9%	208,468	3.3%	222,846	6.9%	220,966	-0.8%
New Bklg CF Within Yr	28,138	**-9.0%**	30,146	**7.1%**	28,386	**-5.8%**	32,921	**16.0%**	32,551	**-1.1%**
New Bklg ETC at End Yr	157,171		171,701		180,082		189,924		188,414	
Total CashFlow in Year	157,574	0.6%	166,692	5.8%	172,093	3.2%	196,584	14.2%	219,975	11.9%
Backlog ETC End Year	239,932	13.1%	271,938	13.3%	309,454	13.8%	335,716	8.5%	336,706	0.3%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	