

Gilbane

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DATA INCLUDED IN THIS REPORT

DDA Construction Starts through June, released July 22, 2015

US Census Construction Spending (Put-In-Place) through June, released August 3, 2015

BLS Construction Jobs through mid-July, released August 7, 2015

Producer Price Index Materials through June, released July 22, 2015

Producer Price Index Markets through June, released July 22, 2015

released July 22, 2015
Architectural Billings Index through June,

released July 22, 2015

Dodge Momentum Index through July, released August 7, 2015

Consumer Inflation Index through June, released July 17, 2015

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Summary

CONSTRUCTION OUTLOOK

- > Construction spending is increasing at the fastest rate of growth since 2004-2005. The outlook is very encouraging.
- > Construction spending will grow 10%+ for 2015 and 8%+ in 2016.
- > In the first quarter of 2015, the seasonally adjusted annual rate for all spending averaged \$997 billion. In the last quarter of 2015, spending will average greater than \$1.100 trillion.
- > 2015 spending advances will be supported by the strongest gains in nonresidential buildings spending in eight years.
- > Construction starts for new nonresidential buildings for the last five guarters were the five highest since Q3 2008.
- > Residential spending in 2015 will resume the post-recession advance after a lackluster 2014.
- > Spending overall annual rate will increase at an average rate of growth near 1% per month for the next 12 months.
- > Spending for nonresidential buildings will increase at an average rate near 1.5% per month for the next nine months.
- > Residential spending will increase at a rate greater than 1% per month for the next 12 months.
- Nonbuilding infrastructure spending, after a brief gain, will go flat or decline until moderate growth resumes in the fourth quarter of 2015. The better outlook is nonbuilding new starts from January to May 2015, which totaled the highest on record and that will improve spending. In 2016, spending will be up.

Q3 2015 OUTLOOK

\$1.06 Trillion

Average seasonally adjusted annual rate for all spending in Q2 2015



FIGURE A:

All Construction Spending Rate of Growth 2013-2015

Total spending for all types of construction will grow 11% year over year from 2014 to 2015. The year started at an annual rate of spending near \$995 billion and should finish at a rate of \$1,100 trillion.



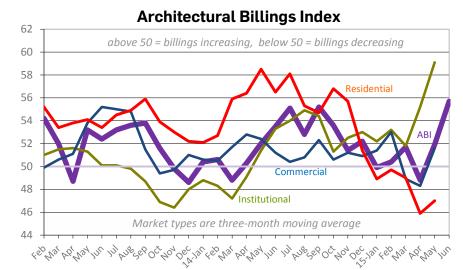
RESTRAINTS TO GROWTH

- > The BLS Job Openings and Labor Turnover Survey (JOLTS) for the construction sector for June is at 143,000 unfilled positions. The number of open positions has been over 100,000 for 26 of the last 28 months and has been trending up since 2012. An increase in job openings generally signifies that employers cannot find people with the right skills to fill open positions.
- > In a recent Associated General Contractors (AGC) survey, 80% of contractors indicated some difficulty in acquiring trained workers.
- A recent National Association of Home Builders (NAHB) survey indicates labor shortages have become more widespread than reported in 2014.
- > New nonbuilding infrastructure work starts have been mixed over the last two years, with both new highs and new lows. Even with the most recent five months of new highs, the up and down spending pattern we've been seeing will continue at least until the end of 2016.
- > Housing starts were off to a slow start. In February and March, new starts dropped well below expectations and will hold down total starts for 2015.



Hiring workers with the right skills will be a key constraint to economic growth in 2015 & 2016.







THE EFFECTS OF RAPID GROWTH

- > From 2012 through 2014, the most current completed period, construction spending grew 21%. Inflation was 11%, so volume increased only 10%. However, work output increased by 13%. In this current growth cycle, productivity loss is at 3%.
- 2015 predicted spending growth is near 11%. The current four-year period of spending growth (2012-2015) will be almost identical to 2003-2006 (33%) and 1996-1999 (32%), which have been the two fastest growth periods on record with two of the highest rates inflation and productivity loss.
- As work volume begins to increase over the next few years, expect productivity to decline. There are many reasons why this will occur, among them: working longer hours until new workers are brought on; working more days; hiring less qualified workers; and acclimating new workers to the crew.
- > Growth in nonresidential buildings and residential construction in 2014 and 2015 will lead to more significant labor demand. This may lead to labor shortages in some trades. This will drive up labor cost.
- > Construction inflation is very likely to advance more rapidly than some owners have planned for, potentially requiring that some project budgets be revisited before projects can begin.
- > Construction inflation in rapid growth years is much higher than average long term inflation.
- > Long-term inflation is 3.3% for nonresidential buildings and 3.5% for residential buildings.
- > During rapid growth periods, inflation is 8% for nonresidential buildings and 9% for residential buildings.



This could be the breakout year for

nonresidential buildings.
The outlook now is for 20% growth in spending. Most of that gain is already recorded in new starts, the strongest in seven years.
Escalation will climb to levels typical of rapidly growing markets.

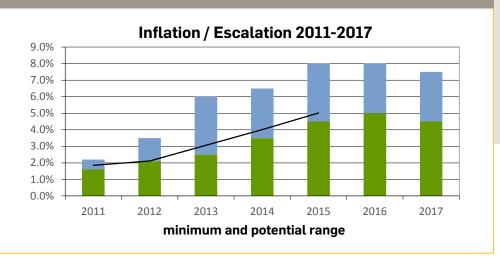
Inflation / Escalation 2011-2017

FIGURE C:

In order to capture increasing margins, future escalation will be higher than normal labor and material cost growth. Lagging regions will take longer to experience high escalation. Residential escalation is currently near, or even above, the upper end of the range.

For escalation back to year 2000, see Figure 30. Recommended range:

- > 4.5% to 8% for 2015
- > 5.0% to 8% for 2016
- > 4.5% to 7.5% for 2017





Construction Starts

Construction Starts data is published monthly by Dodge Data & Analytics (DDA). Each month, they update the data for the previous month and for the 12 months prior. The previous month and year prior updates are incorporated into the charts and tables. Although DDA may publish further updates to its data, this report does not track any data beyond the 12 month update. This may result in values here that differ slightly from other published DDA data.

Construction Starts data is volatile from month to month, and this may cause unusual peaks and valleys in the data. For that reason, a three-month moving average (3mma) of starts data is used. Also, to observe trends in the data, the latest month is compared to the last three months and the last six months of the Seasonally Adjusted Annual Rate (SAAR) data.



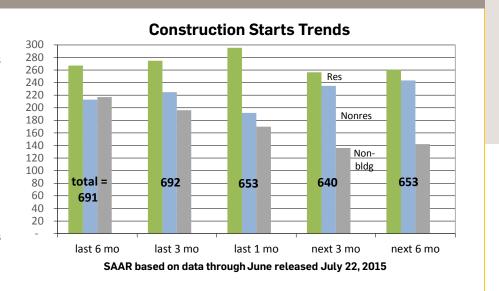
FIGURE 1: Construction Starts Trends 2015

Residential (Res) starts in 2012 and 2013 had rapid growth of 25% to 30%. In 2014, there was only 10% growth. 2015 will show 15% growth and the most total residential starts since 2006.

Nonresidential buildings (Nonres) starts hit a 12-month low in February 2014 but reached a seven-year high in recent months. Growth has already started and is expected to continue to moderate over the next six months.

Nonbuilding (Nonbldg) starts had been declining from a 2012 peak to mid-2014.

Then Q4 2014 was strong, and Jan-May 2015 posted the highest nonbuilding starts on record. Expect second half 2015 starts to slow 40% from Jan-May.



EXPECTATIONS FOR 2015 NEW CONSTRUCTION STARTS

- > June total construction starts dropped 15% below the May eight-year high, yet still closed the best quarter and best first half since 2006. Nonbuilding starts are the surprise contributor to strong growth.
- Nonresidential buildings starts reached a 10-year low in 2012. Nonresidential starts have been increasing at an average of 17% per year since those 2012 lows.
- > Nonresidential buildings starts since March 2014 posted the best five quarters since the third quarter of 2008. Although growth should continue, expect it will do so at a more moderate rate. Nonresidential buildings starts may slow to total only +4.5% in 2015.
- > Residential starts growth stalled from July 2013 through June 2014, but for the five months of January through May 2015, starts have reached a nine-year high. Growth rate is expected to slow but still result in 14% total growth for 2015.
- Nonbuilding infrastructure starts total for the first six months of 2014 is the lowest on record back to January 2008. For the last quarter of 2014, starts improved to the best in a year. Then for the first five months of 2015, nonbuilding starts shot up nearly 50% to the highest on record. Nonbuilding starts experience the most volatility. That rapid growth rate will not continue. Starts are expected to drop by 33% from first half to second half 2015, finishing with 25% growth for 2015.
- > Nonresidential buildings starts help forecast the spending trend for the next one to two years.
- > Residential buildings starts help forecast the spending trend for the next 9 to 18 months.
- > Nonbuilding infrastructure starts help forecast the spending trend for the next two to three years.



TABLE 1:U.S. Construction Market Outlook New Starts 2009-2015

Total Construction Sta	arts						
							GILBANE FORECAST
	2009	2010	2011	2012	2013	2014	2015
NONRESIDENTIAL BUILDINGS	167,955	161,194 -4.0%	165,048 2.4%	158,222 -4.1%	177,362 12.1%	218,911 23.4%	228,785 4.5%
RESIDENTIAL BUILDINGS NONBUILDING	111,851	121,155 8.3%	126,299 4.2%	166,159 31.6%	210,325 26.6%	231,803 10.2%	267,753 13.8%
CONSTRUCTION	141,899	148,088 4.4%	147,851 -0.2%	162,823 10.1%	148,755 -8.6%	142,167 -4.4%	178,057 25.2%
TOTAL CONSTRUCTION PERCENT CHANGE YOY	421,705	430,437 2.1%	439,198 2.0%	487,204 10.9%	536,442 10.1%	592,881 10.5%	670,595 13.1%

dollars in millions

includes Dodge Data Analytics data for June 2015 released July 22, 2015 DDA data includes updates to 12-months ago data through June 2014 all data after June 2015 is predicted

FIGURE 2A: Construction Starts Nonresidential Buildings 2012-2015 Construction Starts 3mo Moving Avg \$bil **Nonresidential Buildings** 280 260 240 220 **Annual Rate** 200 180 160 140 12mo revised nsa 1mo revised nsa 120 100



FIGURE 2B: Construction Starts 3mo Moving Avg \$bil **Nonbuildings Infrastructure** 280 260 240 **Annual Rate** 220 200 180 160 140 120 12mo revised nsa 1mo revised nsa 100

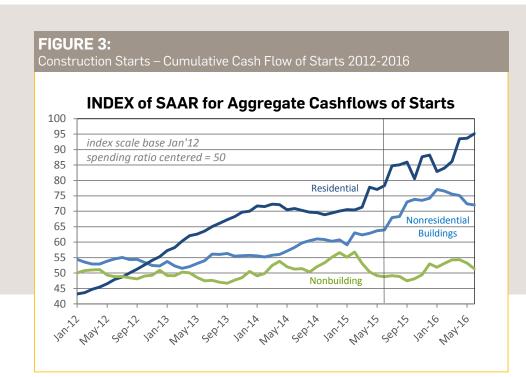


FIGURES 2A, B, C

Note: All DDA Starts seasonally adjusted (SAAR) data is revised one month later, and not seasonally adjusted (NSA) data is revised 12 months later. These plots include both 12-month and one-month adjustments. The vertical lines reflect the revision month.

NEW CONSTRUCTION STARTS AS A LEADING INDICATOR

Dodge Data & Analytics' construction starts act as a leading indicator to spending. Beginning with the three-month moving average of actual starts, using monthly cash flow, the value of the new project starts is spread out over the expected project duration from start to finish. Generally, project durations can range from six to twelve months for small projects and, on average, 24 to 30 months for large projects. Unique large projects can last three to four years. Project duration and cash flow begins in the month the data is posted. Monthly cash flow can be quite uneven due to the variance in the duration of starts. The cumulative cash flow total in the current month from all monthly starts over the previous months/years shows the relative change in spending caused by change in starts. This relative change in cash flow provides the basis to predict changes in future construction spending.





The following index chart (see Figure 4) shows the correlation among nonresidential building starts cash flow, the Architectural Billings Index (ABI), the Dodge Momentum Index (DMI) and actual nonresidential buildings spending. Starts data is from the aggregate cash flow previously explained. ABI and DMI data are moved out to their respective lead times; date and spending is real time. The ABI indicates growth if above 50 and a decline if it drops below 50. The commercial and institutional components of the ABI are shown for reference. Although there may be a one-month to three-month differential, there appears to be a correlation between the ABI and Starts, and they provide an indication of the strength and the direction that spending will move.

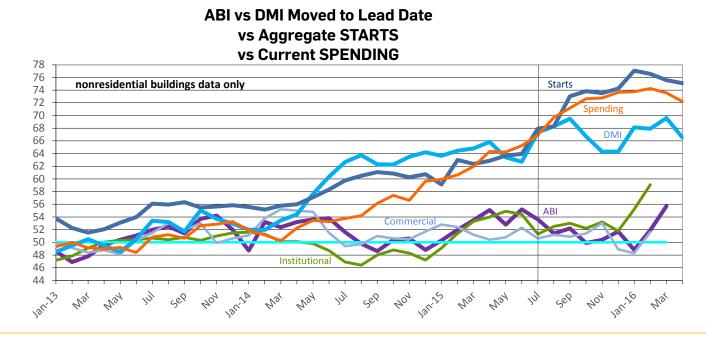
Both ABI and Starts cash flows indicated a mild slowdown in nonresidential buildings construction spending at the end of 2014 before a strong upturn in spending in 2015. Expect another drop in spending late in 2015. Even if new nonresidential buildings starts growth were to turn flat for rest of 2015 (which is not expected), those starts already recorded over the past 12 months predict that spending for nonresidential buildings in 2015 will increase 20% over 2014, the best growth since 2007.

ANALYZING THE ARCHITECTURAL BILLINGS INDEX





FIGURE 4:Overlay of ABI – DMI – Starts – Spending by Lead Time



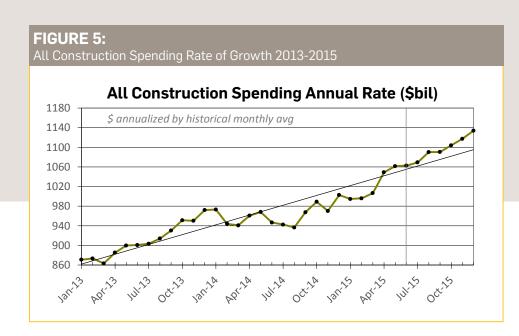


Construction Spending

Total spending for all types of construction in 2015 will reach \$1.067 trillion, up 10.9% year over year from 2014 spending.

- > 2015 spending will record the highest dollar amount year over year growth in 10 years.
- > In Q1 2013, the monthly rate of spending was \$870 billion.
- > In Q1 2014, the monthly rate of spending was \$950 billion.
- > In Q1 2015, the monthly rate of spending was \$997 billion.
- > By Q4 2015, the monthly rate of spending will average over \$1.100 trillion.

For 2015, spending gains will be supported by the strongest gains in nonresidential buildings in eight years. Residential spending will also help total spending advance. Nonbuilding infrastructure spending, after a brief gain, will go flat or decline until growth returns in the fourth quarter.





The most recent (June) monthly construction spending report posted only a slight gain month over month from May, but the data still shows rather exceptional trends. May plus June spending is the highest two-month total in six and one-half years. Q2 2015 is the highest quarter since Q3 2008. At this rate, 2015 is on track to experience the second-highest ever dollar growth in spending, more than \$100 billion. Only 2005 was greater.

- > In the last three quarters, construction spending registered the fastest growth rate in over nine years. 11.5% growth in nine months = +15%/yr annualized. The growth rate will slow in the second half 2015 to finish the year up 11%.
- > Manufacturing spending year-to-date versus same months in 2014 is up 56%. The last four months are each up more than 60% versus the same month in 2014. This level of growth will continue for at least the next three months.
- Nonresidential buildings spending year-to-date versus same months in 2014 increased 21%, the fastest rate of growth on record.
- > Public spending is up 8% in a year and reached the highest level of spending in 12 quarters.



TABLE 2:Total Construction Spending Summary 2007-2015

	TOTALS IN BILLIONS CURRENT U.S. DOLLARS										
		Actual									
	2007	2008	2009	2010	2011	2012	2013	2014	2015		
NONRESIDENTIAL BLDGS	403.9	438.6	377.5	291.9	284.3	300.7	303.1	330.1	396.7		
% CHANGE YEAR OVER YEAR	18.9%	8.6%	-13.9%	-22.7%	-2.6%	5.7%	0.8%	8.9%	20.2%		
NONBUILDING HVY ENGR	248.1	272.1	273.5	265.0	251.3	273.7	274.0	288.2	281.7		
	19.4%	9.7%	0.5%	-3.1%	-5.2%	8.9%	0.1%	5.2%	-2.2%		
RESIDENTIAL	500.5	357.7	253.9	249.1	252.7	286.8	341.2	343.8	388.1		
	-19.3%	-28.5%	-29.0%	-1.9%	1.4%	13.5%	18.9%	0.7%	12.9%		
TOTAL	1152.5	1068.4	904.9	806.0	788.3	861.2	918.3	962.1	1066.5		
	-1.3%	-7.3%	-15.3%	-10.9%	-2.2%	9.2%	6.6%	4.8%	10.9%		

Residential includes new, remodeling, renovation and replacement work.

Source: U.S. Census Bureau, Department of Commerce.

Actual Spending data includes 2013 & 2014 revisions 7-1-2015

A comparison of most recent 2015 spending projections is shown in Table 3. Gilbane projections are compared to CMD Group (CMD) and FMI. While both CMD and FMI have lowered their projections since their early 2015 estimate, Gilbane's projection has increased.

CMD Forecast FMI Forecast

TABLE 3:

Total Spending Predictions Comparisons 2015

2015 Spending Predictions Comparisons

TOTALS IN BILLIONS CURRENT U.S. DOLLARS 2014 Early Estm 2015 Mid-Year Estm 2015 **2014 DATA UPDATED 7-1-15 ACTUAL** Gilbane Gilbane CMD FMI CMD FMI RESIDENTIAL 344 399 419 399 388 384 382 NONRESIDENTIAL BUILDINGS 330 370 342 348 397 354 346

NONBUILDING 288 281 313 300 282 293 **TOTAL NONRES** 618 651 655 648 679 646 **TOTAL ALL** 962 1050 1068 1046 1067 1031 Gilbane data early 2015 = Dec 2014, mid-year 2015 = July 2015

CMD data early 2015 = 12-05-2014 report, mid-year 2015 = 6-3-2015 report FMI data early 2015 = Outlook 2014 Q4, mid-year 2015 = Outlook 2015 Q2

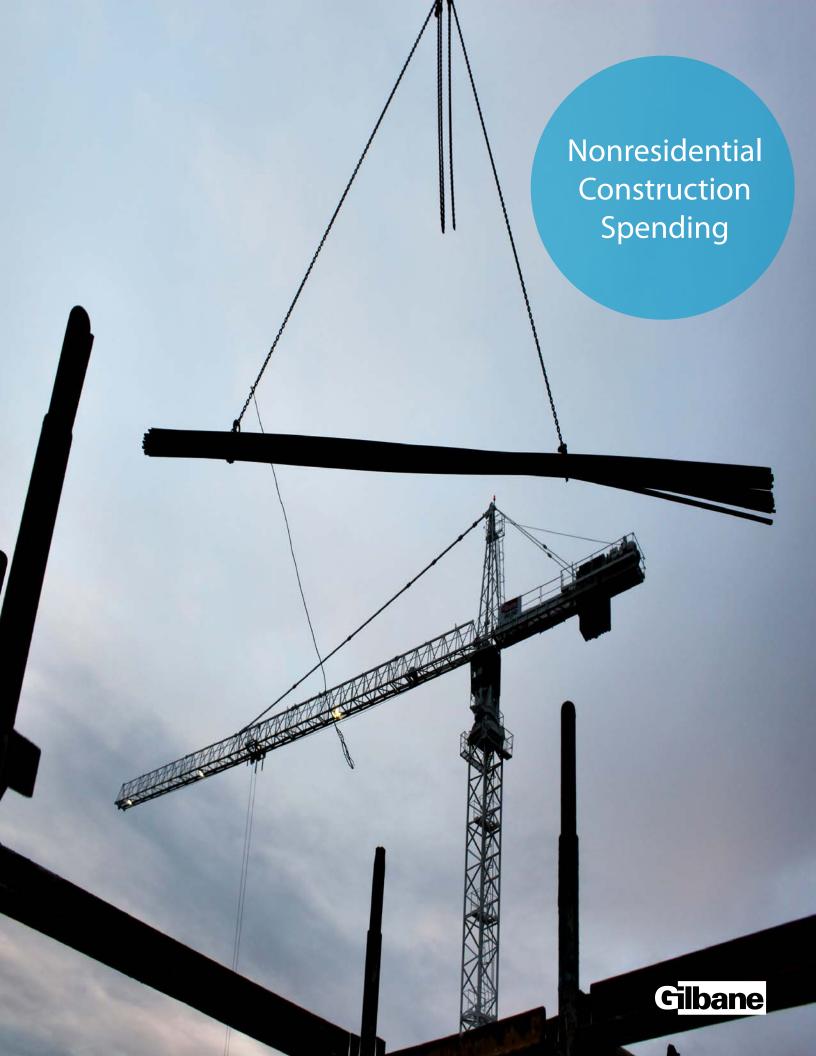
FMI Transportation and Communication moved from Buildings to Nonbuilding to conform



284

630

1012



Nonresidential Construction Spending

Nonresidential construction consists of two main categories, nonbuilding infrastructure projects and nonresidential buildings.

Total spending for all nonresidential construction in 2015 will reach \$678 billion, up 9.7% from 2014. Growth is entirely due to nonresidential buildings, up 21% year-to-date. Nonbuilding infrastructure is down 2.6% year-to-date.

NONBUILDING INFRASTRUCTURE SPENDING

Nonbuilding projects are composed of heavy engineering, heavy industrial and infrastructure projects. They include transportation, communication, power, highway and street, sewage and waste disposal, water supply and conservation and development. Almost 60% of nonbuilding work is public work.

Total spending for nonbuilding infrastructure in 2015 will reach only \$282 billion, a decline of 2.2% from 2014.

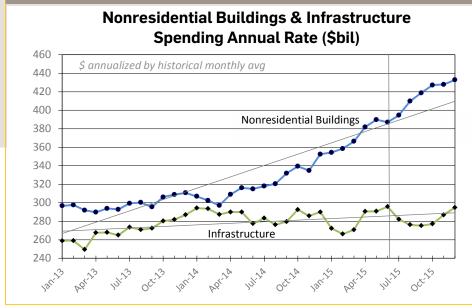
- > In Q1 2013, the monthly rate of spending was \$256 billion.
- > In Q1 2014, the monthly rate of spending increased to an average \$292 billion.
- > In Q1 2015, the monthly rate of spending slipped to only \$270 billion.
- > By Q4 2015, the monthly rate of spending will reach only \$280 billion, but by Q1 2016, spending will be over \$300 billion.

The largest components of nonbuilding infrastructure work are power and highway/street. The power sector represents approximately 40% of all nonbuilding spending and highway/street represents about 35%. Erratic movement in new starts in the power industry causes unusual fluctuations in nonbuilding infrastructure spending. The period from July 2012 through August 2013 had the lowest average new starts for infrastructure work of any period in the last six years, until the first six months of 2014 went even lower. The effect of all of those low starts will result in constrained spending continuing through 2015.

January through May 2015 posted the highest nonbuilding starts on record. Even though new starts will slow in the second half of 2015, this elevated level of nonbuilding starts will result in increased spending over the next few quarters. Nonbuilding infrastructure will realize spending gains into 2016.



FIGURE 6: Nonresidential Buildings and Infrastructure Spending Growth 2013-2015





NONRESIDENTIAL BUILDINGS SPENDING

Nonresidential buildings spending remained relatively flat from August 2011 to March 2014. Both the ABI and cash flow of new starts correlated with that spending pattern, and both also indicated the growth that would occur since then. Nonresidential buildings spending year-to-date versus same months 2014 is up 21%. Nonresidential buildings spending will continue rapid growth through Q3 2015.

Total spending for nonresidential buildings construction in 2015 will reach \$397 billion, a 20.2% increase from 2014.

- > 2015 spending will record the highest dollar amount annual growth since 2007 and the highest percent growth ever recorded.
- > In Q1 2013, the monthly rate of spending was \$295 billion.
- > In Q1 2014, the monthly rate of spending was \$302 billion.
- > In Q1 2015, the monthly rate of spending climbed to \$360 billion.
- > By Q4 2015, the monthly rate of spending will average \$430 billion.

2015 nonresidential buildings spending could reach 20% growth above 2014. Two-thirds of that will come from starts recorded in 2014. Cash flow of starts is indicating big monthly gains through October.

NONRESIDENTIAL BUILDINGS

Spending hit



first half 2015

% growth achieved



first half 2015 vs. first half 2014

TABLE 4:

Spending Predictions Comparisons – Nonresidential Buildings 2015

2015 Spending Predictions Compariso	ns - Non	- Nonresidential Buildings								
		EARLY ESTIMA	MID-YEAR ESTIMATE							
DATA UPDATED 7-1-15	2015		2015							
U.S. CENSUS FINAL ACTUAL 2014 = 330										
GILBANE BUILDING COMPANY		370	1	397	2					
FMI		348	3	346	4					
CONSTRUCTION MARKET DATA CMD		342	5	354	6					
ASSOCIATED BUILDERS & CONTRACTORS		330	7	342	8					
DODGE DATA & ANALYTICS		352	7	358	8					
IHS GLOBAL INSIGHT		357	7	358	8					
MOODY'S ECONOMY.COM		360	7	363	8					
WELLS FARGO		331	7	346	8					
			see notes		see notes					

VALUES ARE BILLIONS OF DOLLARS

Gilbane data 1 = Dec 2014 report, 2= Aug 2015 report

FMI data 3 = Outlook 2014 Q4, 4 = Outlook 2015 Q2

CMD 5 = Dec 2014 report, 6 = June 2015 report

7 = AIA Consensus report January 2015

8 = AIA Consensus report July 2015

FMI Transportation and Communication moved from Buildings to Nonbuilding to conform

TABLE 5:Construction Spending Major Nonresidential Markets 2007-2019

	TOTALS IN BILLIONS CURRENT U.S. DOLLARS										
		Actual									
	2007	2008	2009	2010	2011	2012	2013	2014	2015		
EDUCATIONAL	96.8	104.9	103.2	88.4	85.0	84.7	79.1	79.7	85.3		
% CHANGE YEAR OVER YEAR	13.9%	8.4%	-1.6%	-14.3%	-3.9%	-0.4%	-6.6%	0.8%	7.1%		
HEALTHCARE	43.8	46.9	44.8	39.3	39.7	42.5	40.7	38.4	41.1		
	13.7%	7.2%	-4.4%	-12.3%	0.9%	7.2%	-4.4%	-5.6%	7.0%		
COMMERCIAL RETAIL	89.7	86.2	54.7	40.1	42.8	47.3	53.2	62.7	68.2		
	16.9%	-3.9%	-36.5%	-26.7%	6.8%	10.6%	12.3%	18.0%	8.8%		
OFFICE	65.3	68.6	51.9	37.8	36.0	37.8	38.0	46.1	55.8		
	20.4%	5.1%	-24.3%	-27.1%	-4.9%	5.0%	0.5%	21.3%	21.1%		
MANUFACTURING	40.6	54.1	57.9	41.2	40.6	47.7	50.5	57.8	87.7		
	24.4%	33.2%	7.0%	-28.9%	-1.5%	17.7%	5.9%	14.3%	51.9%		
TOTAL	336.1	360.7	312.6	246.9	244.1	260.1	261.5	284.7	338.2		
-	17.1%	7.3%	-13.3%	-21.0%	-1.1%	6.6%	0.5%	8.9%	18.8%		

Source: U.S. Census Bureau, Department of Commerce.

Includes public and private

Actual Spending data includes 2013 & 2014 revisions 7-1-2015

These five market sectors represent over 80% of all nonresidential buildings spending: educational; healthcare; commercial retail; office and manufacturing.

The major institutional sectors, healthcare and education, both peaked in late 2008 and early 2009. Education spending reached a peak seasonally adjusted annual rate (SAAR) of \$110 billion. Healthcare peaked at \$47 billion. Educational declined 35% to a Q4 2013 low. Healthcare dropped 20% to a low in Q4 2014. Education is 80% public while healthcare is 80% private.

Commercial/retail peaked at a rate of \$98 billion in Q1 2008. Office peaked at \$77 billion in Q1 2008. Commercial/retail experience a rapid decline of 60% to a 15 year low in Q4 2010. Office declined 50% from its peak to a low in Q2 2013. Commercial/retail is 95% private; office is 70% private.

The manufacturing sector peaked in early 2009 at a rate of \$70 billion but then dropped 50% to hit a five-year low in January 2011. It quickly climbed from that bottom but remained between \$40 and \$50 billion until March 2014. Manufacturing is 100% private.

Spending for educational buildings in 2015 will total \$85.3 billion, a 7.1% increase from 2014, the first substantial increase since 2008.

Since Q1 2009, public educational spending declined 30%, from a SAAR of \$90 billion to \$62 billion, but private educational spending declined only 11%, from \$19 billion to \$17 billion. Educational spending hit a low in Q4 2013 not seen since 2004, but since then monthly spending has increased 15% and is projected to reach \$89 billion by December 2015, a 7% gain for 2015 and a 6% gain for 2016.

Total spending for healthcare buildings in 2015 is expected to reach \$41.1 billion, a 7.0% increase from 2014.

Healthcare spending hit an eight-year low in Q4 2014 at \$38 billion. It is now up to \$40 billion. Healthcare spending will reach an annual rate of \$43 billion by year end and will average a 7% gain for 2015 and 6% for 2016.

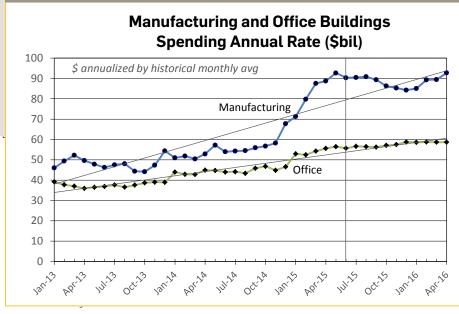
Total spending for commercial/retail buildings in 2015 should reach \$68.2 billion, up 8.8% from 2014. 2014 spending was recently revised upward from \$57.1 billion to \$62.7 billion to reflect 18% above 2013, the largest increase since 2007.





Commercial/retail experienced the most drastic drop in spending of all nonresidential market types. From Q1 2008 to Q4 2010, it dropped 60% from a peak SAAR of \$99 billion to \$37 billion. In inflation adjusted constant dollars, this is the lowest spending on record for commercial/retail buildings. Spending rebounded very nicely in the three years 2012-2014 as the strongest growth market sector during that period. Spending is now up to a rate of \$67 billion, but growth will slow from here on forward. Commercial retail will realize gains of 8.8% for 2015 and 5.4% in 2016.

FIGURE 7: Manufacturing and Office Buildings Spending Growth 2013-2016



lbane |

Total spending for office buildings in 2015 should reach \$55.8 billion, up 21.1% from 2014, on top of a 21.3% increase in 2014. Office spending experienced surges in both early 2014 and early 2015. It will maintain upward momentum in 2016 but at a slower pace.

Office building spending hit its post-recession low in Q2 2013 but very quickly turned up in 2014. Year over year growth in 2014, and now in 2015, is over 20%. However, a slowdown in new starts over the last three quarters will slow growth over the next 12 months to less than 10%. Office spending will gain 21.1% in 2015 but only 8.4% in 2016.

Total spending for manufacturing buildings in 2015 will reach \$86.4 billion, up nearly 50% from 2014. No market sector has ever before recorded a 50% year over year increase.

Manufacturing buildings spending has risen from a SAAR rate of \$50 billion in Q1 2014 to \$90 billion over the last four months, an 80% increase in the rate of spending over 16 months. In 2014, DDA posted an 87% increase in new starts for manufacturing buildings. The cash flow of those starts is indicating spending growth in 2015 of greater than 50% over 2014. Spending should dip 5% to 10% from September 2015 to March 2016 but then resume increasing throughout the second half of 2016 to an average of \$97 billion for the entire second half of 2016.

Even with a second half 2015 decline in new starts of 20% from current levels and a drop in spending from current levels of 5% by December, manufacturing will still finish 2015 up 50% over 2014. This may position manufacturing as the #1 contributor to nonresidential buildings spending, replacing perennial leader educational. Manufacturing buildings spending will average a 50% gain in 2015 and a 9% gain in 2016.



TABLE 6:Construction Spending Major Nonresidential Markets 2014-201!

	Spending Pated Nonresi		•		
GROWTH CHANGE 2014 VERSUS 2013	EDUCATIONAL	HEALTHCARE	COMMERC/RTL	OFFICE	MANUFACTURING
DATA UPDATED 12-10-14	2014	2014	2014	2014	2014
ACTUAL 2014 TOTAL AS OF JULY 1, 2015	0.8%	-5.6%	18.0%	21.3%	14.3%
GILBANE BUILDING COMPANY (GILBANE)	0.9%	-6.5%	10.0%	17.0%	13.7%
CONSTRUCTION MARKET DATA (CMD)	0.2%	-7.1%	10.2%	18.2%	12.6%
FMI	0.6%	-1.1%	13.5%	9.9%	11.0%
ASSOCIATED BUILDERS & CONTRACTORS (ABC)	-1.0%	-6.7%	9.6%	18.4%	11.0%
DODGE DATA & ANALYTICS	-1.9%	-4.6%	9.0%	15.2%	7.0%
GROWTH CHANGE 2015 VERSUS 2014	EDUCATIONAL	HEALTHCARE	COMMERC/RTL	OFFICE	MANUFACTURING
DATA UPDATED 8-3-2015	2015	2015	2015	2015	2015
GILBANE BUILDING COMPANY	7.0%	6.0%	9.0%	21.0%	50.0%
CONSTRUCTION MARKET DATA (CMD)	3.5%	5.5%	12.0%	14.0%	18.0%
FMI	-0.2%	1.5%	13.0%	11.3%	16.9%
ASSOCIATED BUILDERS & CONTRACTORS (ABC)	-1.6%	-0.3%	8.4%	9.8%	19.6%
DODGE DATA & ANALYTICS (DDA)	2.9%	0.4%	13.7%	19.2%	24.6%

Gilbane data 2014 = Dec 2014, 2015 = Jul 2015

CMD data 2014 = 12-05-2014 report, 2015 = June 2015 report

FMI data 2014 = Outlook 2014 Q4, 2015 = Outlook 2015 Q2

ABC data 2014 = Forecast 12-09-14, 2015 = AIA Consensus July 2015

Dodge Data Analytics 2014 = AIA Consensus July 2014, 2015 = AIA Consensus July 2015

PUBLIC/PRIVATE SPENDING

Total spending for public construction in 2015 will reach \$285 billion, an increase of 3.6% from 2014. 2014 ended a four-year decline in public spending.

The largest public construction markets are highway and education. These two markets alone represent more than half of all public construction, followed by transportation, a distant third, and waste disposal fourth. Together, these four markets account for nearly 75% of all public construction. Education is down slightly, but all together these markets are up 5%.

Private spending volume is almost two and one-half times that of public spending. If we take out residential construction, private spending would be only 25% greater than public spending.

Private construction is predominantly residential. Ninety-six percent of all residential work is private and this constitutes just about half of all private work. (A historical note: in 2005-2006, residential work constituted 70% of all private work and more than half of all construction spending). Manufacturing (11%), power (10%), commercial/retail (8%), office (6%) and healthcare (4%) make up the next largest private building sectors.

Total spending for private construction in 2015 will reach \$781 billion, an increase of 13.8% from 2014, although still 14.5% below the peak of \$912 billion in 2006.

This year, private spending is being driven up by manufacturing, which represents 50% of the gains in year-to-date private spending. Power construction, the most volatile sector, is down 25% from this time last year, lowering total private spending growth by almost 4%.

TABLE 7: Total Construction Spending Public vs. Private 2007-2015

	TOTALS IN BILLIONS CURRENT U.S. DOLLARS										
		ACTUAL									
	2007	2008	2009	2010	2011	2012	2013	2014	2015		
PRIVATE	863.4	759.7	590.0	502.1	501.9	581.9	647.7	686.4	781.1		
% change year over year	-5.3%	-12.0%	-22.3%	-14.9%	0.0%	15.9%	11.3%	6.0%	13.8%		
PRIVATE RESIDENTIAL	493.2	350.3	245.9	238.8	244.1	280.6	335.4	338.7	381.9		
PRIVATE NONRESIDENTIAL	370.2	409.4	344.1	263.3	257.8	301.4	312.3	347.7	399.2		
PUBLIC	289.1	308.7	314.9	304.0	286.4	279.3	270.6	275.7	285.4		
	13.1%	6.8%	2.0%	-3.5%	-5.8%	-2.5%	-3.1%	1.9%	3.6%		
TOTAL	1152.5	1068.4	904.9	806.0	788.3	861.2	918.3	962.1	1066.5		
	-1.3%	-7.3%	-15.3%	-10.9%	-2.2%	9.2%	6.6%	4.8%	10.9%		

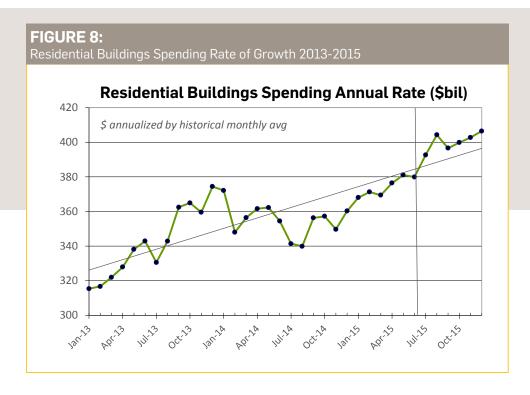
Source: U.S. Census Bureau, Department of Commerce. Actual Spending data includes 2013 & 2014 revisions 7-1-2015

RESIDENTIAL CONSTRUCTION SPENDING

Total spending for residential construction in 2015 will reach \$388 billion, a 12.9% increase from 2014. After two strong years in 2012 and 2013, residential spending increased only 0.7% in 2014.

- > In Q1 2012, the monthly rate of spending was \$253 billion.
- > By Q1 2013, the monthly rate of spending climbed to \$318 billion, up 26% from Q1 2012.
- > In Q1 2014, the monthly rate of spending was \$359 billion, up 13% from Q1 2013.
- > In the second half of 2014, the monthly rate of spending averaged only \$351 billion.
- > For the first half of 2015, spending has averaged \$374 billion.
- > By Q4 2015, the monthly rate of spending will reach \$400 billion.

The rate of growth in residential spending slowed from Q4 2013 to Q4 2014, but it appears the decline has reversed and is now growing at a 14% annual rate. Expect rapid growth in the next few months. In the last 10 months, new construction starts posted by DDA are 14% above the previous 10 months. Cash flow based on these new starts is indicating that the residential spending SAAR will grow 8% just in the May to September period. Residential spending will gain 12.9% in 2015 over 2014 and 12.0% in 2016.



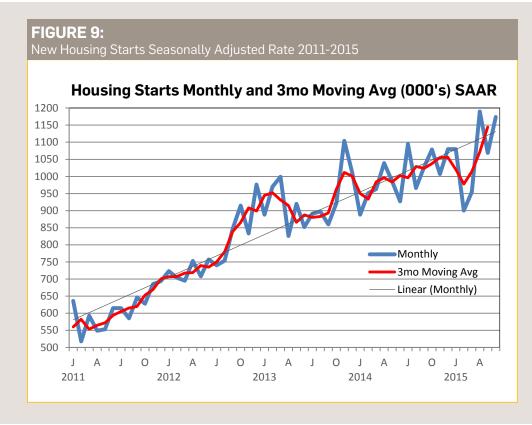


HOUSING STARTS

New Housing starts totaled 1,003,000 in 2014. Early estimates available for New Housing Starts in 2015 included three estimates that were 1,300,000 to 1,500,000, which implies a growth rate of about twice to nearly three times the 30-year historical maximum growth rate. Those three estimates should be considered unachievable.

Housing starts highest growth rates per year in the last 30 years were 186,000 in 1992, 169,000 in 1994 and 172,000 in 2012.

The remaining early estimates range from 1.1 million to 1.17 million with an average of 1.143 million and are well within the achievable range. Seven mid-year estimates range from 1.1 million to 1.2 million with an average of 1.134 million.



2015 housing starts are off to a slow start. From September 2014 to January 2015, monthly starts were fairly consistent. February and March new starts dropped well below expectations and could affect 2015 spending. However, the average of the April-May-June starts jumped up 17% to an eight-year high, probably offsetting any earlier slump.

Our mid-year estimate of new housing starts in 2015, based on starts in place, volume of permits and steady growth from now until year end, is an increase of 130,000 new units above 2014, for a total of 1,133,000.

Permits growth averaged more than 6% per quarter for nine quarters through Q2 2013. For the seven quarters including Q3 2013 through Q1 2015, permits growth averaged only 1.0% per quarter. Based on the very low growth in permits, it was anticipated that starts and spending growth would slow dramatically. In fact, from Q4 2013 through March 2015, new housing starts practically stalled and the rate of residential spending declined.



Inflation Adjusted Volume

Real construction volume can only be found by analyzing spending after inflation.

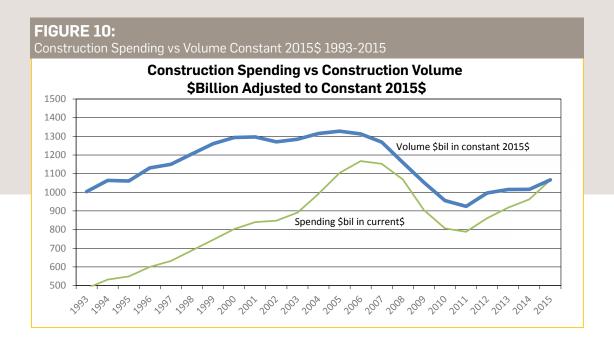
Spending or total revenue is typically reported in unadjusted dollars, or current dollars (for current dollars, see Table 2). Current dollars is a true indication of dollars spent within any given year, but does not give a true comparison of constant dollar volume from year to year. Current dollars are dollars within any given year. Constant dollar is defined as all dollars adjusted for inflation to represent dollars in the year to which they are adjusted, as in this report to 2015. To see a clear comparison of volume from year to year, we must look at inflation adjusted dollars, constant dollars (for constant dollars see Table 8).

If spending increases by 5% from one year to the next, but inflation drives up the cost of buildings by 3% during that same time, then inflation adjusted dollars would show that net volume actually increased by only 2% during that time period.

- Residential buildings, nonresidential buildings, and total construction spending all reached a low in January 2011.
- > For the four-year period from January 2011 to the end of 2014, as measured by five independent well-known indices:
 - Composite total construction inflation was 12%.
 - Nonresidential buildings inflation was 11%.
 - Residential buildings inflation was 15%.
- > Total construction spending (revenue) from January 2011 to the end of 2014 grew 23%, but composite construction inflation during that period was 12%. For that four-year period, real construction volume grew by only 11%. The remainder of 12% revenue growth was due to inflation.
- Nonresidential buildings construction spending (revenue) from January 2011 until the end of 2014 grew 23%. During that period, nonresidential buildings inflation was 11%. Real nonresidential buildings construction volume growth for that four-year period was 12%.
- Residential buildings construction spending (revenue) from January 2011 until the end of 2014 grew 43%. During that period, residential inflation was 15%. Real residential buildings construction volume growth for that four-year period was 28%.

2014 total construction volume just reached back to the level of 1993 and 2010 in constant dollars. 2015 volume will be about equal with 1995 and 2009 volume.





Peak volume was fairly constant from 2004 through 2006. In today's constant dollars, peak volume reached \$1.30 trillion dollars. 2015 predicted spending is still 20% below peak volume.

On average, volume grows less than 3.5% per year historically. At that rate, it will not return to peak volume before 2020.

Table 8 adjusts total construction spending for construction labor and materials inflation in addition to changes in productivity and margin costs. All dollars in Table 8 analysis are adjusted to 2015 constant dollars. The rate of inflation each year is determined individually for nonresidential buildings, nonbuilding heavy engineering and residential.

TABLE 8:Total Construction Spending Summary 2007-2015 (constant 2015\$)

	TOTALS	TOTALS IN BILLIONS U.S. DOLLARS ADJUSTED TO AUGUST 2015 \$									
		ACTUAL									
	2007	2008	2009	2010	2011	2012	2013	2014	2015		
NONRESIDENTIAL BLDGS	456.8	466.6	429.3	346.0	331.5	343.5	334.5	349.3	396.7		
% CHANGE YEAR OVER YEAR	10.3%	2.1%	-8.0%	-19.4%	-4.2%	3.6%	-2.6%	4.4%	13.6%		
NONBUILDING HVY ENGR	296.0	299.4	321.5	307.1	281.9	303.8	296.3	302.9	281.7		
	12.2%	1.2%	7.4%	-4.5%	-8.2%	7.8%	-2.5%	2.2%	-7.0%		
RESIDENTIAL	516.2	393.9	301.7	302.6	311.1	349.3	384.6	363.3	388.1		
	18.8%	-23.7%	-23.4%	0.3%	2.8%	12.3%	10.1%	-5.5%	6.8%		
TOTAL	1269.0	1159.8	1052.5	955.8	924.5	996.6	1015.3	1015.4	1066.5		
	-3.4%	-8.6%	-9.3%	-9.2%	-3.3%	7.8%	1.9%	0.0%	5.0%		

Residential includes new, remodeling, renovation and replacement work.

Source \$ Data: U.S. Census Bureau, Department of Commerce.

Indices references: Gilbane margin index, selling price indices, NAHB New Home Price Index, U S Census New Home Price Index, BLS PPI. see Escalation Growth vs. Margin Cost for inflation/deflation adjusted margin cost



NOT ALL OF REVENUE GROWTH IS REAL VOLUME GROWTH

During the period from 1999 to 2006, total spending increased 55%, but real volume increased only 9%. Inflation accounted for the remainder of the cost growth in that eight-year period.

In the five boom years of constructing nonresidential buildings including 2004 through 2008, spending (on nonresidential buildings only) increased by 53%. However, real inflation adjusted volume increased by only 14%. Total inflation for nonresidential buildings in the five-year period 2004 through 2008 was 38%, an average of near 8% per year.

In eight boom years of residential construction including 1998 through 2005, spending (for residential buildings only) increased by 88%. However, real inflation adjusted volume increased by only 32%. *Total inflation for residential buildings in the eight-year period 1998 through 2005 was 56%, an average of 7% per year.*

When we look at just the four highest spending growth years for residential construction (2003, 2004, 2005 and 2013) we see inflation for residential buildings in those rapid growth years increased at a rate over 9% per year.

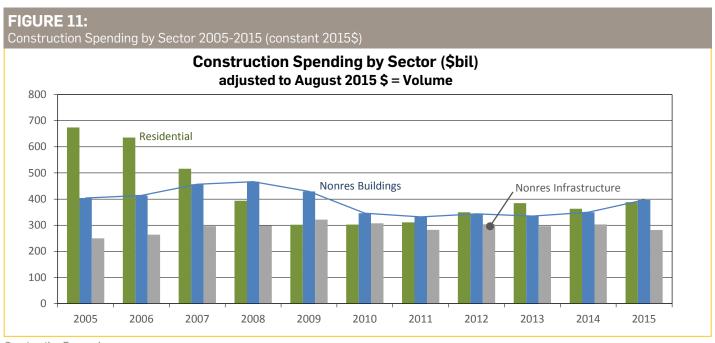
INFLATION IS SIGNIFICANTLY AFFECTED BY RAPID GROWTH?

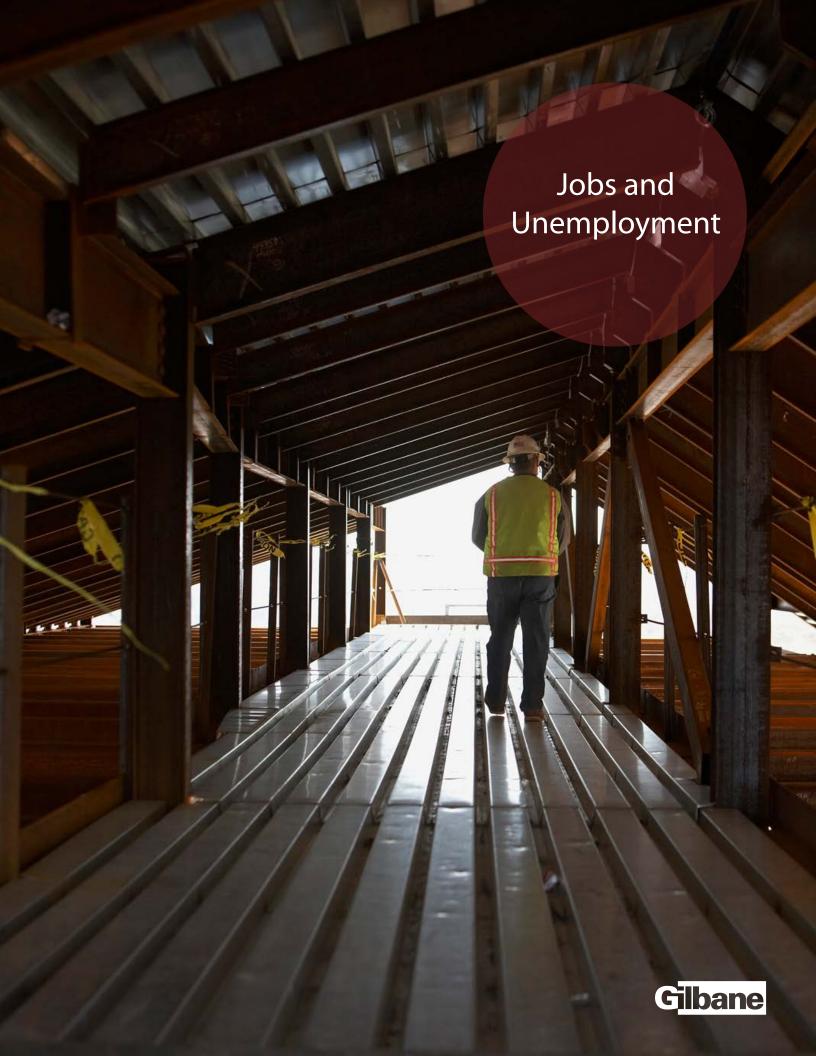
- > Construction inflation in rapid growth years is much higher than average long-term inflation.
- > Long-term 20-year inflation for nonresidential buildings is 3.3%
- > Long-term 20-year inflation for residential buildings is 3.5%.
- > In rapid growth years, inflation for nonresidential buildings is 8%.
- > In rapid growth years, inflation for residential buildings is above 9%.

WHY IS IT SIGNIFICANT TO ANALYZE BOTH REVENUE AND VOLUME?

Contractor fees are generally determined as a percentage of revenue. However, workload volume determines the size of the workforce needed to accommodate the annual workload. It is valuable to know how many employees were required to accomplish the workload volume based on the past several years of data. From the standpoint of workforce planning, there is not so much concern with the value of the revenue as the volume of the work.

For 2015, 10.9% revenue growth is predicted, but due to rapidly increasing escalation, 2015 volume growth will be only about 5%.





Jobs and Unemployment

The number of jobs is tracked as the measure of how many people are currently working to put-in-place the construction spending. The unemployment rate shows how many more people are available to go to work. Both added together shows the size of the workforce. The size of the workforce is important because it tells how many workers are available to draw from for future volume growth.

Table 9 includes both residential and nonresidential construction employment, as well as all trades and management personnel. The BLS suggests not using any single month but instead looking at long term trends in the data.

2014 saw near-record growth of 338,000 jobs, exceeded only by 1998 and 2005, both during the fastest spending growth periods within the past 30 years. In the first seven months of 2015, we've added only 108,000 more jobs. Since the bottom in January, 950,000 jobs have been added at a growth of 17.5%.



TABLE 9:

Construction Employees All 2004 through July 2015

DATA TYPE:	ALL EM	PLOYEES	s, thous	ANDS									
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	YR AVG
2004	6848	6838	6887	6901	6948	6962	6977	7003	7029	7077	7091	7117	6973
2005	7095	7153	7181	7266	7294	7333	7353	7394	7415	7460	7524	7533	7333
2006	7601	7664	7689	7726	7713	7699	7712	7720	7718	7682	7666	7685	7690
2007	7725	7626	7706	7686	7673	7687	7660	7610	7577	7565	7523	7490	7627
2008	7476	7453	7406	7327	7274	7213	7160	7114	7044	6967	6813	6701	7162
2009	6567	6446	6291	6154	6100	6010	5932	5855	5787	5716	5696	5654	6017
2010	5580	5500	5537	5553	5520	5516	5508	5524	5501	5508	5506	5467	5518
2011	5432	5458	5476	5492	5516	5527	5547	5552	5588	5585	5588	5612	5531
2012	5629	5629	5628	5627	5608	5623	5632	5641	5649	5668	5684	5724	5645
2013	5746	5798	5815	5813	5833	5856	5854	5866	5893	5918	5953	5937	5857
2014	6006	6032	6062	6103	6114	6121	6152	6169	6191	6201	6231	6275	6138
2015	6316	6347	6335	6365	6377	6377	6383						

The unemployment rate in construction is now at 5.5% and has been below 7% for the last three months. However, unemployment is seasonal. It is normal for December through March to be much higher than June through November. Comparisons can be made to the same

months in previous years. Average unemployment for the last three months, 6.2%, is at a nine-year low.

The historical long-term average seasonally adjusted unemployment rate is between 6% and 8%. This means, regardless whether markets are very active or slow, there is historically at least 6% of the construction workforce not working. Average unemployment for the last 12 months is 7.7%.

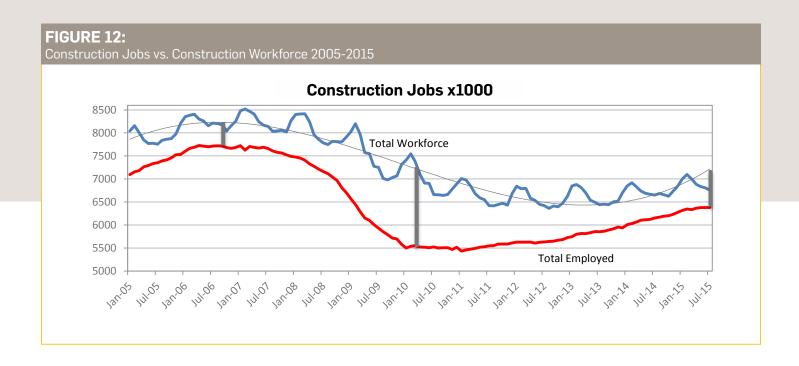
Individually, neither jobs nor unemployment provides us the full picture about the condition of the workforce. The unemployment rate can be headed downward without equally increasing jobs. If the unemployment rate goes down, but there are few gains in the number of new jobs, then the number of people reported still in the workforce has gone down. The workforce can decline because workers have either retired, been discouraged from seeking work and no longer qualify for benefits, or moved on to another profession. For several years, the decline in the construction unemployment rate was almost entirely due to workers dropping out of the workforce.

The reduction in available workers in the workforce will continue to have a detrimental effect on cost and schedule. Without a large volume of available and trained workers in the unemployment pool to draw from, the rate of expansion may be constrained.

The total construction workforce hit a 15-year low in 2013 at about 6.4 million. Currently the workforce is growing and is near 7.0 million, still near a 15-year low, about 1.4 million (\sim 17%) lower than the 2006-2007 peak.

The unemployment rate is not seasonally adjusted. This adds to the short-term fluctuation. The seasonal fluctuation can be seen in Figure 12 where the upper (blue) line shows a repeated annual rise and fall in the unemployment rate. This analysis counts the available workforce or the nonworking pool using the statistical trend line of the unemployment rate.





WORKFORCE SHORTAGES

Some of the workers that were let go, moved on, or dropped out of the workforce had many years of experience and were highly trained. Unfortunately, some will never return. As a result, over the next few years the construction industry is going to be faced with a shortage of skilled, experienced workers. This will have the tendency to **DRIVE COSTS UP** and **QUALITY DOWN** due to the need to pay a premium for skilled workers and the necessity of training new workers in their job and company procedures.

- > During periods of high volume and workforce expansion, productivity declines.
- > Workforce shortages may force extended work schedules.

The BLS Job Openings and Labor Turnover Survey (JOLTS) for the construction industry is now at 143,000 unfilled positions. Although down this month, the openings rate has been trending upward since 2012. A relatively high rate of openings, this generally indicates high demand for labor and could lead to higher wage rates.

The job openings rate has been elevated since January 2013. The last time it stayed this high was 2007, leading into the peak of the previous expansion. A big difference this time around is that we have 1.5 million (or 20%) fewer workers in the workforce. This is a good sign for future hiring, but highlights the importance of workers having the right skills. An increase in job openings generally signifies that employers cannot find people with the right skills to fill open positions.

A recent NAHB survey indicates labor shortages have become more widespread than reported in 2014. *The most common effects of skilled labor shortages have been the need to pay higher wages and difficulty completing projects on time.*

Over the next five years, expect shortages of skilled workers, declining productivity, and rapidly increasing labor cost. If you are in a location where a large volume of pent-up work starts all at once, you will experience these three issues.

MANPOWER EMPLOYMENT OUTLOOK Q2 2015

The Manpower survey measures the percentage of firms planning to hire, minus the percentage of firms planning to lay-off, and reports the results as the net percentage hiring outlook. The overall national employment (all jobs) picture is positive for Q2 2015 with a projected net increase of 16% (seasonally adjusted) of firms planning to hire. This is the strongest employment outlook since Q1 2008.

The Manpower report indicates the construction industry sector should experience increased hiring in Q2 2015 in all regions. Manpower reports total hiring in the construction industry for Q2 2015 is anticipated to be a net increase of 15%. The Northeast expects a net increase of 14%; Midwest \pm 18%; South \pm 13% and West \pm 17%.

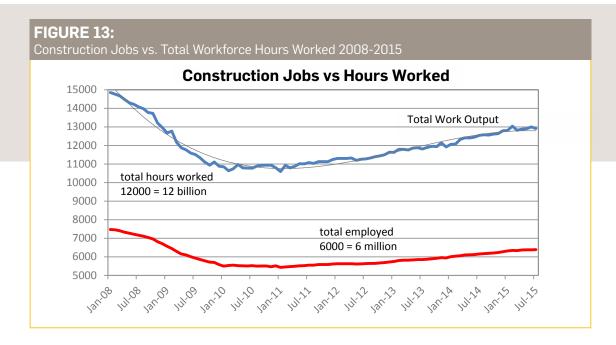




Jobs/Productivity

Productivity is a measure of unit volume per worker output, not dollars put-in-place per worker. To analyze productivity:

- > Use annual inflation adjusted constant volume, not annual unadjusted current spending.
- > Use total work output, which takes into account total employed multiplied by hours worked.



The following productivity analysis is based on put-in-place revenues, inflation adjusted to constant 2015 dollars, and compared to actual manpower at average hours worked.

Figure 14 below shows a line plotted for the number of jobs per \$1 billion spending unadjusted. That is a result obtained by using unadjusted spending current dollars without considering inflation and jobs without consideration of hours worked. The unadjusted analysis should not be used to determine productivity.

Figure 14 shows a line plotting the number of jobs per \$billion in current 2015 dollars adjusted for inflation using jobs adjusted for hours worked. Use this line to track changes in productivity.

To explain how significant these differences might be, see the example below.

- > Total construction spending reached a bottom in January 2011. For the four-year period from January 2011 to the end of 2014:
 - Total construction spending (revenue) grew 23%;
 - Composite total construction inflation was 12%;
 - Real construction volume grew by only 11%;
 - Jobs grew 840,000 from the low of 5,432,000, or 15.5%;
 - Hours worked increased from 37.5/wk to a four-year average of 38.7, or 3.2%.

An unadjusted analysis would compare total construction spending growth of 23% to 15.5% jobs growth. That would indicate more spending got added than jobs, which would show an increase in productivity of 7.5%. But that is not correct.

The adjusted analysis shows that after 12% inflation is factored out, there was only an 11% increase in real construction volume. That volume should be compared to the work output (jobs plus hours on entire workforce) which is an increase of slightly more than 18.7%. In the correct analysis we see over the four-year period, we put in place 11% additional volume of work, but added almost 19% additional work output during the same period. Real productivity declined by 8% in four years.

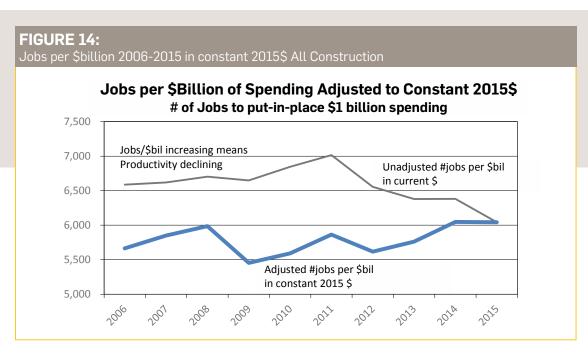
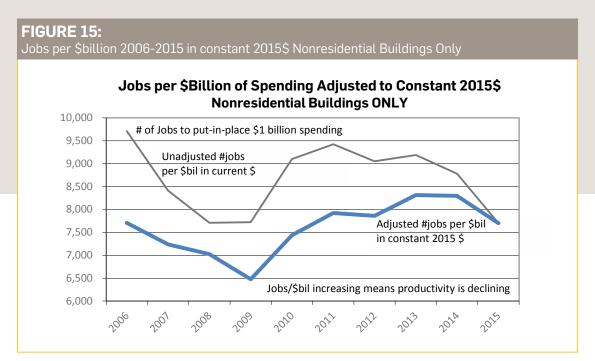
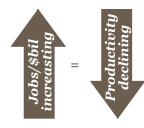




Figure 15 below plots the exact same type of unadjusted and adjusted data as Figure 14, but represents only nonresidential buildings.





All data in the previous charts show national averages. On average, \$1 billion of spending supports approximately 6,000 construction jobs. In a location where the city cost index is 1.2, it would take \$1.2 billion in spending to support 6,000 jobs and in a location where the city cost index is 0.85, only \$850 million in spending would support 6,000 jobs.

When spending and jobs are on the decline, and with diminished workload providing no other options, workers and management find ways to improve out of necessity. But at some point, longer hours and additional work burden causes productivity to decline. Also, a return to volume growth results in an easing of performance.

As workload begins to increase in coming years, net productivity gains will decline somewhat. This net effect cannot go unaddressed. The results of productivity declines are either decreased total output (if workforce remains constant) or increased workforce needed (if total workload remains constant).

JOBS EXPANSION MUST BE BASED ON VOLUME. NOT REVENUE

Contractor fees are often determined as a percentage of revenue. However, workload volume should be used for planning the size of the workforce. It is valuable to know, from the past several years of data, how many employees were required to accomplish the workload volume.

Here is a simple example:

At the 2008 peak of construction cost, a building cost \$12 million and took 100 men per year to build. In 2010, after two years of deflation, that same building potentially cost as little as \$10 million to build, 20% less. Did it take 20% fewer men per year to build it? No, certainly not. That would be the fallacy of trying to determine jobs needed based on unadjusted revenue.

The building has not changed, only its cost has changed. It still has the same amount of steel and concrete, brick, windows, pipe and wire. Using revenue as a basis, we might be led to think we need 20% fewer workers. However, there is a need to base workers on inflation adjusted volume and productivity, not simply on direct annual revenue.

\$1 billion spending supports
6,000 construction jobs

WORKFORCE EXPANSION

What happens in periods of rapid spending growth and workforce expansion?

From 1996 through 1998, during the most rapid sustained period of jobs expansion in the last 30 years, the workforce grew by 1,000,000 jobs over 36 months, 19% over three years. Construction spending during that 36-month span increased 24%. However, inflation adjusted constant dollar volume increased by only 13%. Productivity declined by 6%.

From 2004 through 2006, construction spending increased by 28%, the most rapid pace on record. The workforce added 860,000 jobs, an increase of 15%. But inflation during that three-year period was 25%, the highest ever recorded. Real inflation adjusted volume increased by only 3%. Productivity declined by 12%, the most ever.

These spans were both periods when construction volume was rapidly expanding and approaching or at the all-time peak. Such a rapid workforce expansion during high spending growth led to measurably significant lost productivity. We are currently in a similar period.

From 2012 through 2014, the most current completed period, construction spending grew 21%, approaching the levels in the examples above. Inflation was 11%, so volume increased only 10%. Work output increased by 13%.

In this current growth cycle, we are currently at a productivity loss of 3%. With 2015 predicted spending near 11%, the current four-year period will be almost identical to 2003-2006 (33%) and 1996-1999 (32%), the two fastest growth periods on record with two of the highest rates inflation and productivity loss. 2015 may be similar to these previous periods.

If we continue to experience uninterrupted economic expansion at a rapid level, even for just the next few years, it will produce an extremely active extended duration market unlike anything ever measured. The workforce will expand, but there will be skilled worker shortages, and productivity will decline. When that occurs, it leads to rapidly increasing prices.

HOW MANY JOBS GET CREATED BY CONSTRUCTION?

Here are some details regarding how many jobs get created for every dollar spent on construction. For further reference, see "Jobs and Unemployment".

> Historical averages (adjusted for inflation) since year 2000 show the number of direct construction jobs supported by \$1 billion in construction spending varies +/- from 6,000 jobs. That calculates to one job for every \$165,000 (in 2014 dollars) spent on construction, or 6.0 to 7.0 jobs per

Rapid workforce
expansion during
a period of high
spending growth
leads to significantly
lower productivity.

HISTORICAL AVERAGE

1 = \$165,000

Job 2014 dollars

spent on \$ construction

- \$1,000,000 spent. Direct construction jobs include all Architecture/ Engineering/Construction (AEC), but not, for instance, lumber or steel mill product manufacturing.
- > In part, the wide variation in the number of jobs created is a result of productivity. In times of increasing work volume activity, productivity declines. In times of decreasing activity, productivity climbs. In 2009, construction activity declined drastically, but jobs declined even more, resulting in an 8% average increase of productivity. Because productivity increased, it took fewer workers to put in place the same volume of work. The net result is that \$1 billion in spending supported far less jobs than previous years.
- As work volume starts to increase over the next few years, expect productivity to decline. There are many reasons why this will occur, among them: working longer hours until new workers are brought on; working more days; crowding the work area; hiring less qualified workers; and acclimating new workers to the crew.

There are several studies available, including one by the federal government and one by the Associated General Contractors of America (AGC), that state for every construction job, there are three additional jobs created in the economy. So while \$1 billion of building construction may create 6,000 to 7,000 direct construction jobs, overall it generates approximately as many as 28,000 jobs in the economy.

The data shown previously in this section on jobs, unemployment and productivity includes only jobs counted in the official U.S. Census Bureau of Labor Statistics jobs report. These two recent report references, Pew Research Center – "Share of Unauthorized Immigrant Workers in Production, Construction Jobs Falls Since 2007" and NAHB's HousingEconomics.com "Immigrant Workers in the Construction Labor Force", both document that there is a large unaccounted for shadow workforce in construction. By some accounts, 40% or more of the construction workforces in California and Texas are immigrant workers. Immigrants may comprise between 14% and 22% of the total construction workforce. It is not clear how many within that total may be included or not included in the U.S. Census BLS jobs report. However, the totals are significant enough that they may alter some of the results reported above. Future economic analysis will attempt to identify the impacts on put-in-place construction and productivity but there is currently a level of uncertainty in this data.



Behind the Headlines

JUNE CONSTRUCTION SPENDING FALTERS, SMALLEST GAIN IN FIVE MONTHS

Consensus estimates predicted June spending would come in 0.6% above May. Actual came in at only 0.1% above May, hinting that construction spending is slowing down. So, what's the real story?

The original May reading posted July 1, 2015 was \$88.167 billion in actual spending for the month, giving a seasonally adjusted annual rate (SAAR) reading of \$1.036 trillion. So the consensus was expecting for June a SAAR reading of $$1.036 \times 1.006 = 1.042 trillion.

When the June reading was posted in the Census Construction Spending August 3, 2015 release, the May value had been revised upward to an actual of 90.756 billion that gave May a revised SAAR reading of 1.063 trillion. June was posted at 96.609 billion for a SAAR of 1.065 trillion. June was only 0.1% higher than May, missing the estimate which expected 0.6%.

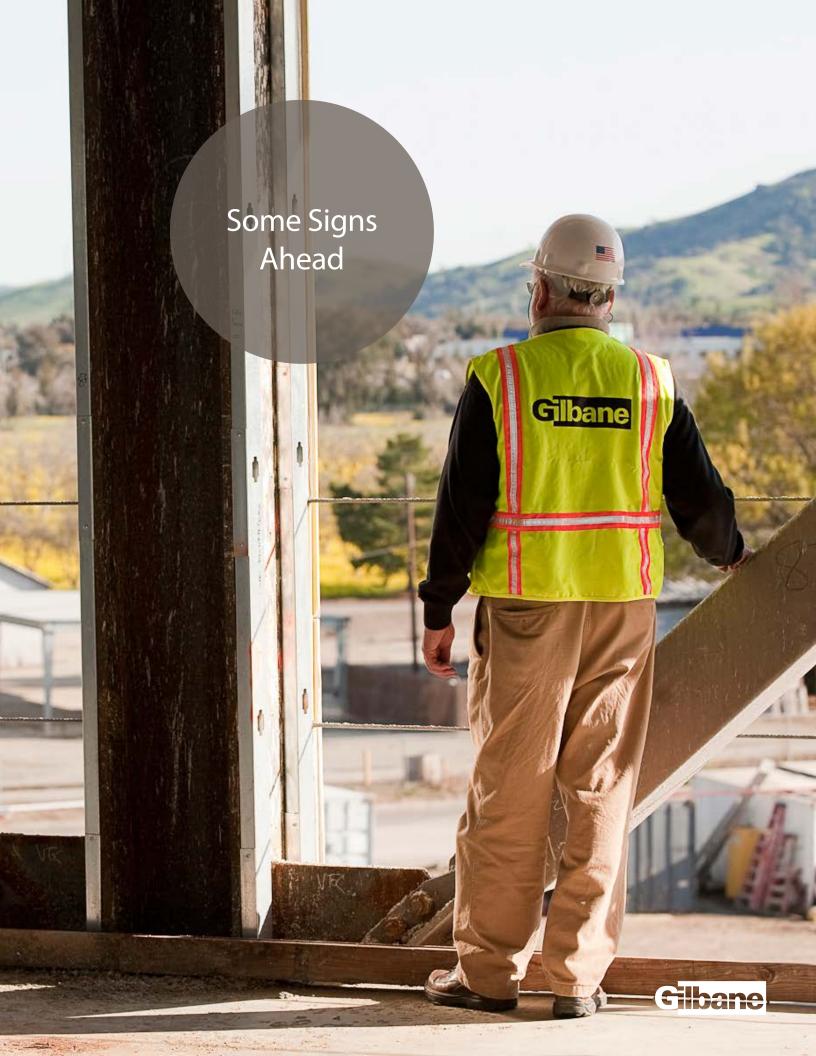
The reality is this: June was predicted to come in at 0.6% over the original May value. June was expected to be \$1.042 trillion. June actually came in at \$1.065 trillion, 0.1% above the revised May value, but May had been revised upward by 2.7%. The headlines called June a miss because it finished up only 0.1% instead of the consensus expectation of 0.6%.

Did June spending falter, hinting at a slowdown? No! Not at all. The June percent was low compared to a revised May but June came in 1.065/1.042 = 2.2% higher than the dollar value that would have resulted from the consensus estimate.

In fact, not only was May revised up, but April was also revised upward. All together, the April and May revisions and June performance on top of an elevated May added \$6 billion to the first six months of 2015 spending which was not predicted. That's enough to push the total growth for the year up by 1%!

The second quarter of 2015 compared to the second quarter of 2014 was the second fastest rate of growth in over nine years. And the last three quarters combined produced the fastest growth rate in over nine years. We're on a roll!





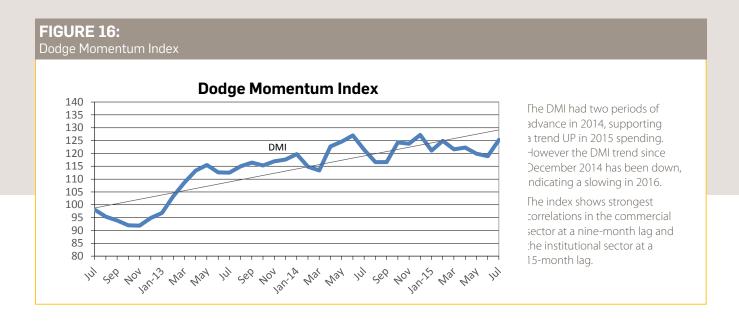
Some Signs Ahead

The following reports can be accessed by clicking on the hyperlinks provided.

Architectural Billings Index (ABI) measures monthly work on the boards in architectural firms. It is a nine- to 12-month leading indicator to construction. Index values above 50 show increasing billing revenues, and below 50 indicates declining revenues. After the ABI Institutional Index went negative for nine months, for 13 consecutive months since May 2014 it has been positive. The Commercial Index has dipped into negative territory only three times in the last 27 months. The residential index remained positive from August 2011 through December 2014. Since then it has been negative.

The Institutional ABI Index, up 13 consecutive months, hit 59 in June, highest in a decade.

Associated Builders and Contractors (ABC) Construction Backlog Indicator (CBI) is a quarterly forward-looking economic indicator reflecting the amount of work that will be performed by commercial and industrial contractors in the months ahead. The CBI is measured in months of backlog and reflects the amount of construction work under contract, but not yet completed.



ABC Charts and Graphs for Q2 2015 show strong advances after Q1 2014 peaking in Q3 2014. Indices are at post-recession highs. Although the index dropped the last two quarters, it is still higher than any time through Q1 2014. The index was created in Q1 2009, so there is no comparison to pre-recession workload.

<u>Dodge Momentum Index (DMI)</u> is a monthly measure of nonresidential projects in planning, excluding manufacturing and infrastructure. It is a leading indicator of specific nonresidential construction spending by approximately 12 to 15 months. It shows two strong advances in the last 12 months and the three-year trend is showing 12% growth per year.

AIA Consensus Second Half 2015 Construction Forecast is a semi-annual survey of construction economists' projections for future spending. Posted on the AIA economics page the Second Half 2015 report of expectations for nonresidential construction shows predicted growth has been revised upward to 8.9% for 2015. It remains at 8.2% for 2016. All commercial sectors and the industrial (manufacturing) sector show expectations for double digit growth in 2015. The AIA consensus of spending growth for manufacturing buildings is 22% for 2015. Gilbane data predicts 50% growth in 2015 spending for manufacturing buildings.

AGC 2015 Construction Hiring and Business Outlook published in January 2015 indicates contractors are more optimistic than they have been since the recession began. It highlights that contractors expect markets to grow but also expect it will be more difficult to hire qualified workers.

Engineering News-Record 2015 Second Quarterly Cost Report shows general purpose cost indices up on average about 2.4% year over year. However, selling price building indices for nonresidential buildings (not reported in the ENR Second Quarter report) are up on average 5%. The difference between these indices is increased margins.

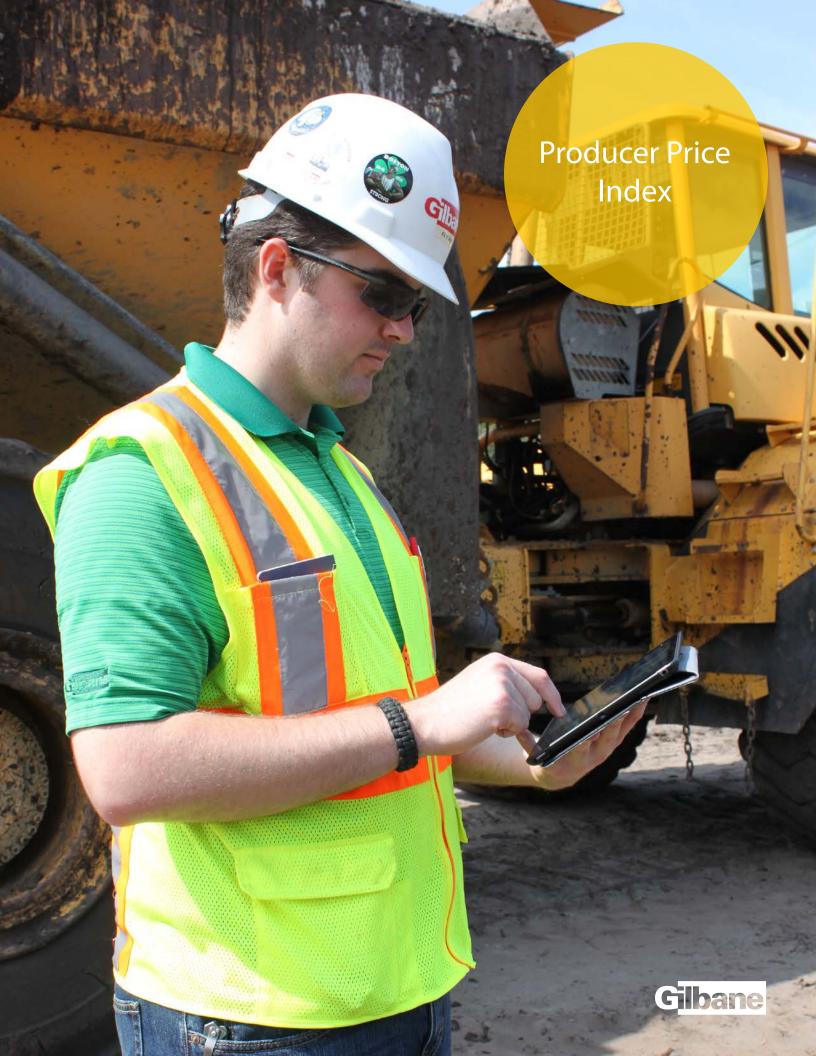
FMI Second Quarter 2015 Nonresidential Construction Index (NRCI) is now 64.9, up only slightly from last quarter but well up from all of 2013. The NCRI is a report based on a survey of opinions submitted by nonresidential construction executives. The NCRI declined in Q3 and Q4 2014 from a very strong Q2 2014. It has rebounded since then but is still just shy of the peak mark set in Q2 2014.

FMI Construction Outlook Second Quarter 2015 Report predicts residential construction will increase 8% in 2015, office construction 11%, commercial/retail construction 13%, educational construction 0% and healthcare construction 2%. FMI is currently predicting 5% spending growth in 2015.

CMD Construction Data June report predicts residential construction will increase 8.5% in 2015, office construction 14%, commercial/retail construction 12%, educational construction 3.5% and healthcare construction 5.5%. CMD is currently predicting 7.3% spending growth in 2015.

Institute for Supply Management (ISM) Non-Manufacturing Index (NMI) Report

for July 2015 is a better indicator of activity in the construction industry than the ISM manufacturing report. The NMI measures economic activity in 13 industries (including construction) not covered in the manufacturing sector. The July NMI is 60.3, above 52 for 66 consecutive months, indicating continued economic growth. Construction reported growth in business activity, new orders, employment, and increased backlog. Construction also reported slower deliveries but no change in prices paid, and increased backlog.



Producer Price Index

The U.S. Census Producer Price Index (PPI) data for June 2015 indicates the PPI for material inputs to all construction increased 0.1% in the month and 0.6% over three months and is up 0.5% year-to-date.

Producer Price Index (PPI) tracks cost to produce construction materials – providing a strong indicator for inflation trends.

TABLE 10: BLS PPI Materials June 2015

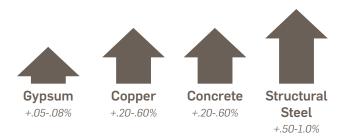
US Construction Producer Price Indexes - June 2015								
MATERIALS PPI	PER	CENT CHANGE V	ERSUS	ANNUAL FOR				
•••	Т	O JUNE 2015 FR	ОМ	12 Months	12 Months	12 Months		
	May-15 1 month	Mar-15 3 months	Jun-14 12 months	2014 last yr	2013	2012		
SUMMARY								
INPUTS TO ALL CONSTRUCTION INPUTS TO NONRESIDENTIAL	0.1 0.1	0.6 0.9		-0.9 -1.9	1.3 0.9	1.4 0.9		
COMMODITIES								
CEMENT	-0.4	1.9	7.1	6.1	4.7	2.9		
IRON & STEEL SCRAP	7.1	9.6	-27.7	-17.1	7.5	-15.6		
MANUFACTURED MATERIALS								
DIESEL FUEL	-1.8	2.8	-35.4	-26.1	-0.9	2.1		
ASPHALT PAVING	-0.6	-2.9	-4.1	2.5	1.0	4.5		
ASPHALT ROOFING/COATINGS	-0.4	-1.0	-2.1	2.5	-0.8	-0.3		
READY MIX CONCRETE	-0.1	1.5	4.6	5.5	2.9	2.6		
CONCRETE BLOCK & BRICK	0.2	-0.7	2.1	3.2	2.1	1.2		
PRECAST CONC PRODUCTS	0.0	0.9	5.5	6.5	1.6	2.4		
BUILDING BRICK	0.2	-0.7	2.1	3.2	1.4	-2.6		
COPPER & BRASS MILL SHAPES	-2.2	3.0	-3.6	-4.5	-6.6	1.5		
ALUMINUM MILL SHAPES	-3.4	-5.7	-2.3	10.9	-4.6	-1.9		
HR STRUCTURAL SHAPES				5.9	-5.3	-8.5		
STEEL PIPE AND TUBE	-1.1	-7.1	-11.0	0.0	-5.1	-6.1		
FAB. STRUCTURAL STEEL	FAB. STRUCTURAL STEEL 0.7		1.1	1.4	-0.6	1.6		
FAB. BAR JOISTS AND REBAR	0.7	1.2	1.3	2.5	0.4	2.6		
GYPSUM PRODUCTS	-1.5	-1.8	-0.1	5.1	16.2	14.1		
INSULATION MATERIALS	-0.1	0.7	-0.4	2.5	6.7	5.4		
LUMBER AND PLYWOOD	-0.5	-3.2	-7.0	3.3	10.0	11.1		
SHEET METAL PRODUCTS	0.0	-0.2	1.3	2.5	-2.2	-1.3		

All data not seasonally adjusted

Source: Producer Price Index. Bureau of Labor Statistics

The relative impact of cost changes for several materials is a function of how much the material is used within a typical building.

For a typical nonresidential building, a 10% increase in the cost of these materials has this impact on the overall cost of the building:



The PPI for construction materials gives us an indication whether costs for material inputs are going up or down. The PPI tracks producers' cost to supply finished products. This tells us if contractors are paying more or less for materials and generally indicates what to expect in the trend for inflation.

PPI TRENDS HELP TO INTERPRET THE DATA

- > 60% of the time, the highest increase of the year in the PPI is in the first quarter.
- > 90% of the time, the highest increase of the year is in the first six months.
- > 75% of the time, two-thirds of the annual increase occurs in the first six months.
- > In 20 years, the highest increase for the year has never been in Q4.
- > 60% of the time, the lowest increase of the year is in Q4.
- > 50% of the time, Q4 is negative, yet in 22 years the PPI was negative only twice.

So when you see monthly news reports from the industry exclaiming, "PPI is up strong for Q1" or "PPI dropped in the 4th Qtr." it helps to have an understanding that this may not be unusual at all and instead may be the norm.

Cement,
precast
products,
and readymix concrete
increased the most
in price year over
year.

Diesel fuel, scrap steel, and steel pipe & tube decreased the most in price year over year.



Material Price Movement

When the cost to the supplier goes up, it almost always gets immediately passed along in full to the consumer. When the cost to the supplier goes down, the savings trickle down to the consumer very slowly.

Cost for material inputs:

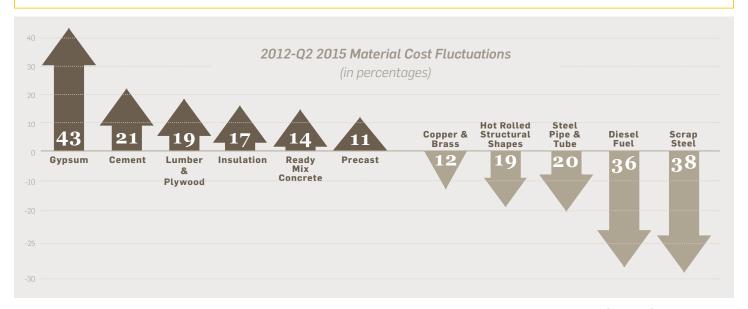
- to all construction decreased 0.9% last year but is up 0.5% for 2015 year-to-date.
- to nonresidential construction decreased 1.9% last year but is up 0.5% for 2015 year-to-date.

TABLE 11:BLS PPI Markets 2011-2015

US Construction Producer Price Indexes - June 2015							
MARKETS Inputs PPI	ANNUAL FOR 6 months 12 months 12 month			12 months	12 months		
	2015	2014	2013	2012	2011		
	YR TO DATE	LAST YEAR					
INPUTS TO ALL CONSTRUCTION	0.5	-0.9	1.3	1.4	5.2		
INPUTS TO NONRESIDENTIAL	0.5	-1.9	0.9	0.9	5.7		
INPUTS TO COMMERCIAL	0.6	-0.3	0.9	1.2	4.9		
INPUTS TO INDUSTRIAL	0.8	-1.5	0.8	0.8	5.2		
INPUTS TO HGHWY/HVY ENGR	0.4	-2.7	0.9	0.8	6.1		
INPUTS TO RESIDENTIAL	0.6	0.0	1.7	2.0	4.8		

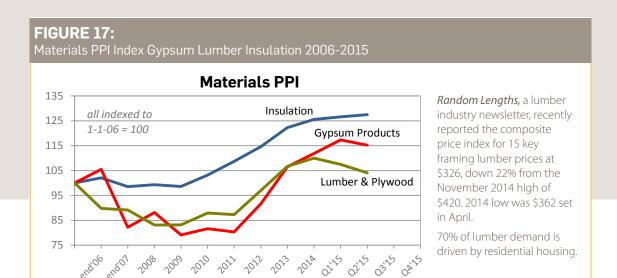
All data not seasonally adjusted

Data Source: Producer Price Index. Bureau of Labor Statistics



This extreme variability means individual trade assessments require individual material index data. Costs of gypsum, lumber and plywood and insulation are driven primarily by residential markets. Structural steel products are driven more by nonresidential markets.

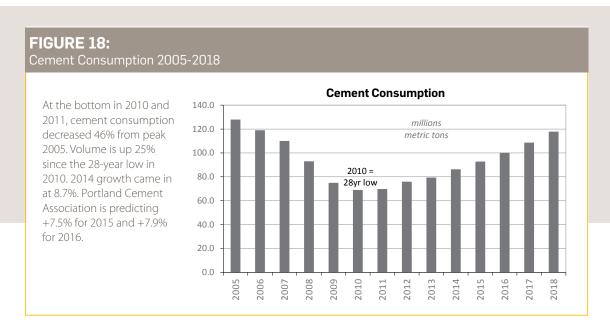
GYPSUM / LUMBER / INSULATION



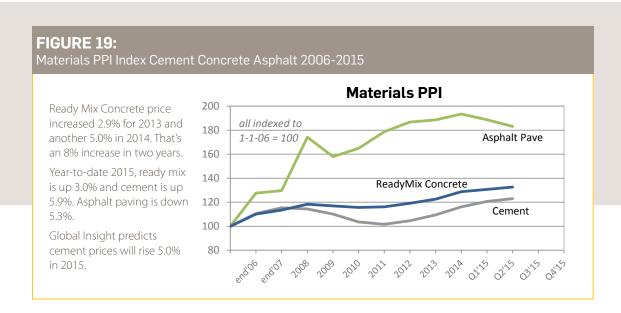
CEMENT / CONCRETE / ASPHALT / BRICK / BLOCK

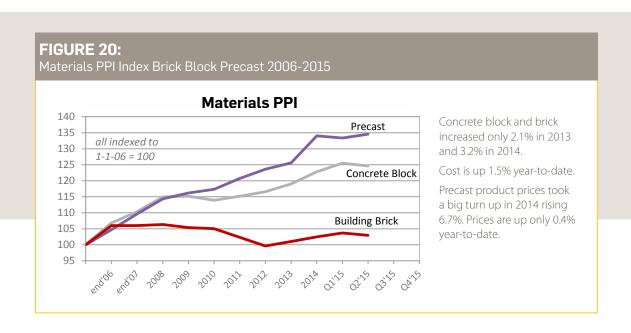
Portland Cement Association (PCA) reports the volume of cement demand as an indicator of economic activity. It is a reliable coincident indicator. PCA reported an 8.9% rise in consumption in 2012, and consumption grew 4.5% in 2013. Consumption grew more than expected in 2014, up 8.7%.

Nearly two-thirds of U.S. cement consumption occurs in the six months between May and October. Rising consumption and prices leading into summer can lead to large shifts in demand and seasonal pricing and is not an indicator of long-term growth but only reflects periodic seasonal fluctuating consumption rates. Look at total annual volumes for trends.



Cement prices increased 2.9% in 2012, after dropping four years in a row. Cement prices increased 4.7% in 2013 and 6.1% in 2014. IHS Global predicted cement prices will rise 5.0% in 2015. Cement price is already up 5.9% year-to-date and demand is increasing.

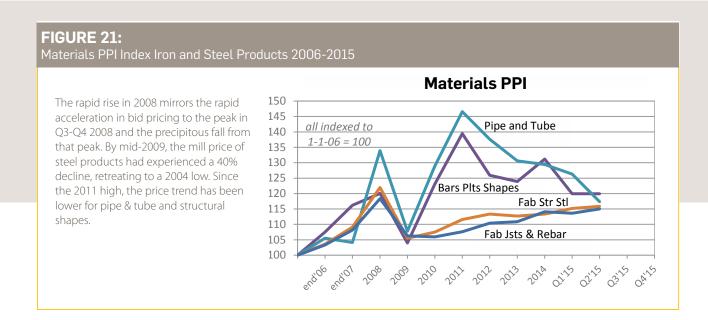




STRUCTURAL STEEL / REINFORCING BAR

The construction industry is the largest consumer of steel products worldwide. Approximately 100 million tons of steel is produced annually in the United States. More than 40 million tons of that is delivered to the construction industry. The next largest industries combined (automotive, equipment and machinery) do not consume as much steel as construction.

Structural steel is the most widely used structural framing material in the United States, with a 58% of market share for nonresidential and multi-story residential buildings, based on square footage built. The next closest framing material, concrete, holds only 21% market share.



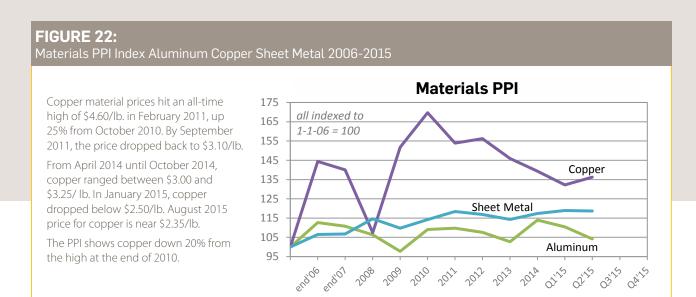
Steel.org reports year-to-date steel mill capacity utilization currently at 73.4% as of August 8, 2015. Capacity utilization a year ago was at 80.2%. Year-to-date, U.S. mills have operated at an average utilization rate of 72.5% and have produced 7.8% less steel than the same period in 2014. This leaves considerable room for capacity expansion and this will tend to hold down prices.

Steel demand in 2013 was flat from 2012. Early in 2013, economic analysis indicated that there was over-capacity in steel production. This did prove to be true, and it helped cause steel prices to fall or remain flat in 2013. Steel demand was up in 2014 and 2015 demand is up.

The June PPI shows fabricated structural steel cost is up only 1.1% in the last 12 months.

Structural steel is very much dependent on recycled steel. Structural steel is made 90% from scrap steel. Scrap prices are down 28% in the last year and down 38% from a 10-year peak in 2011.

COPPER/ALUMINUM/SHEET METAL



What makes copper so important to watch?

Copper is a leading economic indicator that has rarely (if ever) failed to indicate the direction of world economies. When copper rises in price, world economies are leading into expansion. When copper drops in price, a decline in world economies very quickly follows. Copper prices and the U.S. workforce move almost perfectly together. Also, because copper is so widely used in buildings, and manufacturing facilities must be built to see a big increase in production, copper demand is an excellent predictor of industrial production 12 months out.

Click here to view copper price charts on metalprices.com

What drives copper prices up or down? Unlike some other metals, it is not speculation. Quite often it is demand. Increasing demand equals increasing prices. When demand wanes, prices drop.

What effects do copper price changes have on the cost of projects?

Roughly speaking, copper material is about:

- > 10% electrical contract or 1% of cost of project
- > 5% of an HVAC contract or 0.6% of cost of project
- > 10% of a plumbing contract or 0.3% of cost of project

So, for an average project, copper material can represent approximately 2% of the total cost of the project. Therefore, a 10% increase in the cost of copper will increase the cost of a project by 0.2%.

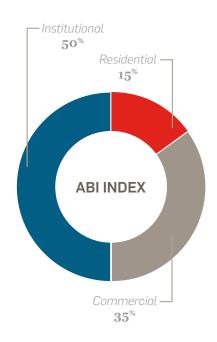
There are exceptions. For example, if copper is 2% of the total cost of the typical project, it is probably 4% to 5% of total cost on a heavy mechanical/electrical project, such as a data center. So a 10% increase in the cost of copper increases the total cost of a data center by 0.4% to 0.5%. For a copper roof, material is 65% of total cost and can represent $\sim 1\%$ of typical project cost.

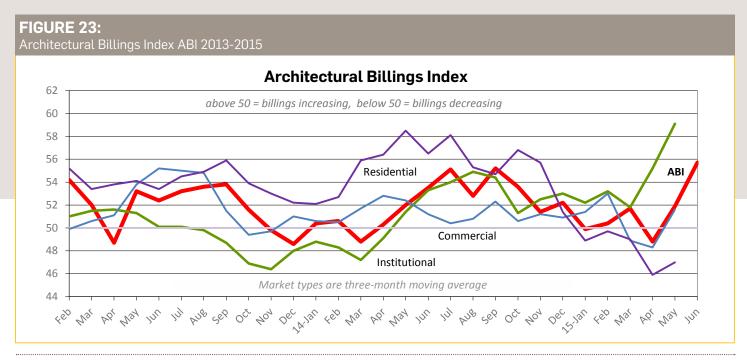


Architectural Billings Index

The Architectural Billings Index (ABI) is a leading indicator for nonresidential work nine to 12 months out. Index values above 50 indicate more architectural firms reporting increasing billings than firms reporting decreasing billings. Index values below 50 indicate declining workload. Index values remaining consistently below 50 indicate there will be a decrease in construction spending nine to 12 months later.

The ABI is primarily a nonresidential indicator. Residential design projects account for only about 15% of the total index. Office buildings, hotels, shopping centers, banks, warehouses, manufacturing plants and other commercial properties represent 35-40% of the index. Institutional buildings account for 45-50% of the index. Typically, institutional facilities are the last nonresidential building sector to recover from a downturn.





Institutional billings are indicating moderate growth until Q4 2015, then strong growth based on a new index high. Commercial billings are indicating slow growth or flat spending until Q4 2015 with a potential dip at year end before growth resumes. The overall ABI index seems to indicate a decline in spending around December or January. This downturn is being influenced by a two-month negative reading in the commercial index coinciding with a five-month negative reading in the residential index.

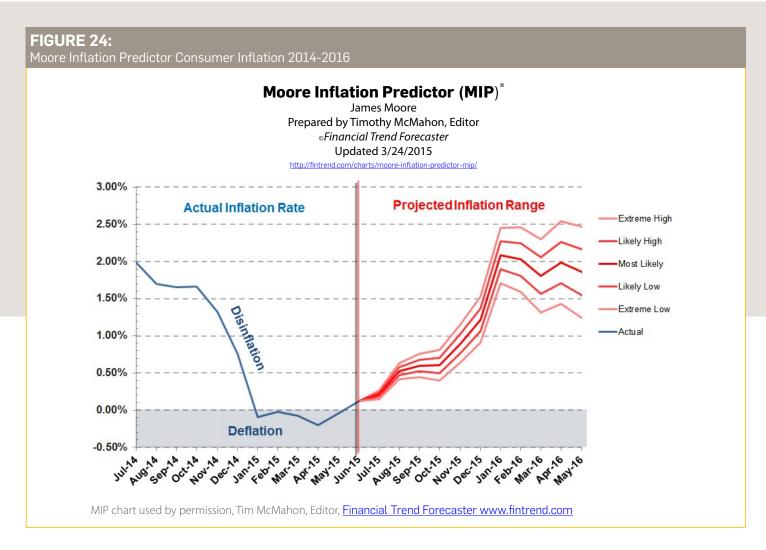
However, the residential ABI does not necessarily track with residential spending. Since the residential ABI has very little input from single family buildings that mostly do not require architectural design work, a shift from multifamily to single family residential construction could cause the residential ABI to drop but still result in active residential markets.



Consumer Inflation / Deflation

The Moore Inflation Predictor[©] (MIP) is a highly accurate graphical representation of the future direction of the inflation rate. It has a 97%+ accuracy rate forecasting inflation rate direction and turning points and over 90% of the time the inflation rate falls within the projected "likely" range.

A review of long-term inflation data shows there are seasonal aspects of inflation with some fairly consistent trends. It appears that the majority of inflation occurs in the first half of the year and then moderates for the second half. Since 2001, there have been eight deflationary fourth quarters and only three inflationary fourth quarters, even though the overall trend is inflationary.



MIP 2013 and 2014 predicted inflation versus actual results that were only 0.1% and 0.2% off. MIP predicted a period of deflation from January 2015 through June 2015 with a rapid rise of 1.5% in the second half of 2015. Actual results show deflation from January through May and a very slight +0.12% inflation in June. MIP is now predicting a most likely rise to 2% inflation by year end.



Construction Inflation

Construction inflation, based on several decades of trends, is approximately double consumer inflation. From mid-2009 to late 2012, that long-term trend did not hold up. During that period, construction inflation/deflation was primarily influenced by depressed bid margins, which had been driven lower due to diminished work volume. Over the last 24 months, that has changed. Work volume has increased and short-term construction inflation, near 5% for both 2013 and 2014 and on track to go above 5% in 2015, has increased to more than double consumer inflation. It appears construction inflation is already advancing well ahead of consumer inflation, which supports that consumer inflation is not an indication of movements in construction inflation.

The U.S. Construction Producer Price Index tables for Buildings Complete, which includes the cost complete as charged by the builder, represents one indicator of construction inflation.



NONRESIDENTIAL BUILDINGS INFLATION

As depicted by US Census PPI completed buildings data:

- > 2013 building cost inflation ranged from 2.8% to 4.1%.
- > 2014 building cost inflation ranged from 1.3% to 2.6%.

As depicted by Industry Selling Price Indices including margins:

- > 2013 building cost inflation ranged from 3.1% to 4.1%.
- > 2014 building cost inflation ranged from 4.2% to 4.4%.

NEW HOUSING PRICE INFLATION

As depicted by US Census and Industry Actual Cost Indices:

- > 2013 building cost inflation ranged from 6.5 to 9.6%.
- > 2014 building cost inflation ranged from 6.6% to 6.7%.

Construction spending is increasing at the fastest rate in over 10 years. That will continue to support increasing margins. Therefore a building's total construction (final cost) inflation will outpace construction labor and materials inflation.

Expect nonresidential construction cost inflation to remain above 4% for several years. See "Escalation" for near-term and long-term recommendations.

These average values, useful for adjusting whole building costs, cannot be considered to adjust a unique contract type. Construction inflation with a historical average range from 3% to 8% would not be accurate to adjust asphalt paving or shingles. Asphalt products increased 10% in 2005 and 2006 and 20% in both 2008 and 2009.

NONRESIDENTIAL TRADES INFLATION

As depicted by PPI complete trades cost data:

- > 2013 trades cost inflation ranged from 1.7% to 4.9%
- > 2014 trades cost inflation ranged from 1.0% to 4.7%





ENR Building Cost Index

The August 2015 Engineering News-Record 20 Cities Average Building Cost Index (ENR-BCI) is 5515, up 2.3% year over year. New York City is at 9.1%. Cincinnati, St. Louis, Boston and Chicago show a higher than average inflation rate. Atlanta, Cleveland, Dallas, Denver, Kansas City, and Los Angeles are below the ENR average inflation rate. Baltimore and Birmingham are showing deflation.

The ENR-BCI is one of the most well-known and most widely-used building cost indices. However, its long-term strengths can also be weaknesses, particularly in times of fluctuating selling prices because:

- It is made up of a small shopping basket of labor and materials. Therefore, it is not always the best representation of all building types, which can vary considerably in composition.
- That shopping basket includes no representation for any mechanical, electrical or plumbing items, which can comprise 30%-50% of the cost of the building. In many cases, the shopping basket comprises less than 20% of the building cost.
- Building materials differ widely in rate and timing of cost growth and can dramatically affect the cost of projects. In 2009, while structural steel products declined in price by 10% to 15%, copper products increased in price by 40%.

Selling Price Fluctuations (in percentages) 2010 2012 2011 2013 3.2 2014



The annual average ENR Index has gone up every year for 70 years.

ENR-BCI Index Fluctuations

ENR-BCI does not take into consideration bid prices, so it often does not represent the final cost of buildings. Bid prices are referred to as Selling Price, and this is not included in the ENR-BCI. Selling prices show increased or reduced margin bids due to market activity.

There were several monthly declines in the ENR index from late 2008 through early 2010, but the annual average has gone up every year for 70 years. More importantly, from Q2 2008 through Q2 2011, during the only recent period in which true deflation occurred, the ENR-BCI would indicate a 10% cost increase! The actual final cost of buildings, documented by several reliable measures, from Q2 2008 through Q4 2010 went down by 8% to 13%.

Whenever there are very active periods or very depressed periods of construction activity, contractor selling prices rise or fall accordingly, and since the ENR-BCI does not track selling price, it cannot reflect accurately what effect selling price had on the cost of buildings during those periods. Nonetheless, the ENR-BCI is often relied upon as an indicator of cost movement over time.

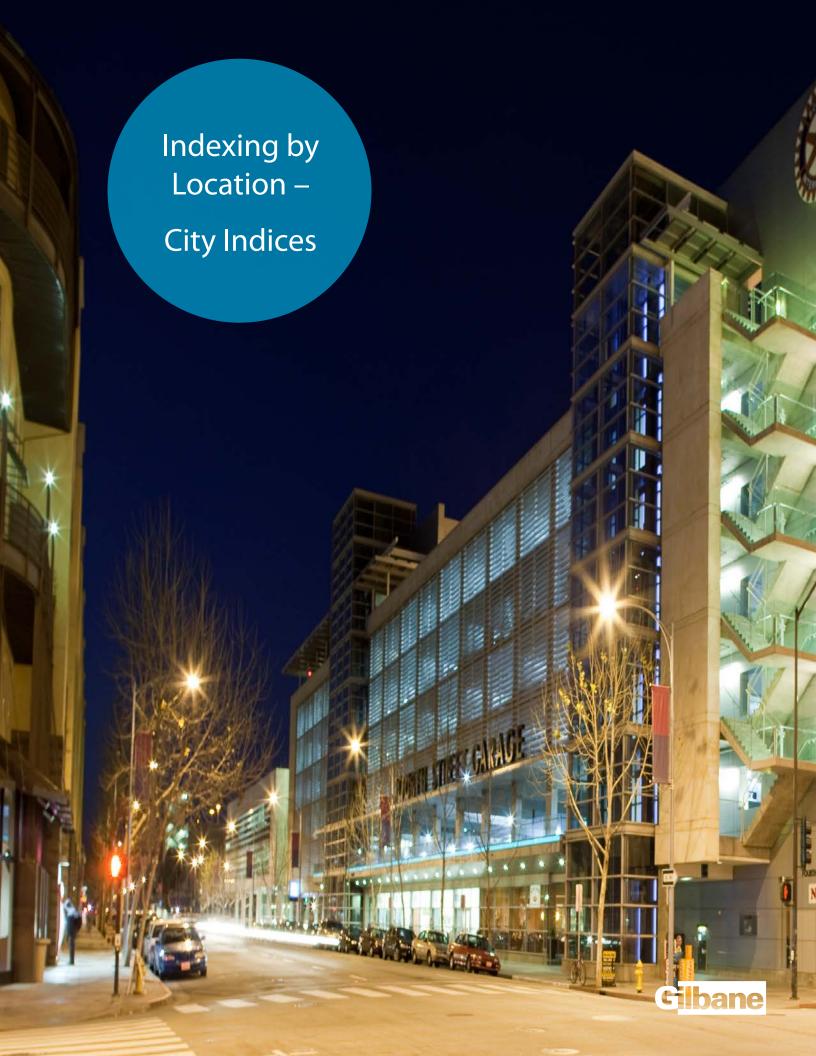
You must take into consideration the selling price of buildings, past and present, if you want to accurately index the cost of buildings over time.

TABLE 12

ENR Building Cost Index History

ENR's Building Cost Index History (2000-2015)													
Base = 1913=100	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	ANNUAL AVERAGE
2000	3503	3523	3536	3534	3558	3553	3545	3546	3539	3547	3541	3548	3539
2001	3545	3536	3541	3541	3547	3572	3625	3605	3597	3602	3596	3577	3574
2002	3581	3581	3597	3583	3612	3624	3652	3648	3655	3651	3654	3640	3623
2003	3648	3655	3649	3652	3660	3677	3683	3712	3717	3745	3765	3757	3693
2004	3767	3802	3859	3908	3956	3996	4013	4027	4102	4129	4128	4123	3984
2005	4112	4116	4127	4168	4189	4195	4197	4210	4242	4265	4312	4329	4205
2006	4335	4337	4330	4335	4331	4340	4356	4359	4375	4431	4462	4441	4369
2007	4432	4432	4411	4416	4475	4471	4493	4512	4533	4535	4558	4556	4485
2008	4557	4556	4571	4574*	4599	4640	4723	4733	4827	4867	4847	4797	4691
2009	4782	4765	4767	4761	4773	4771	4762	4768	4764	4762	4757	4795	4769
2010	4800	4812	4811	4816	4858	4888	4910	4905	4910	4947	4968	4974	4884
2011	4969	5007	5010	5028	5035	5059	5074	5091	5098	5104	5113	5115	5059
2012	5115	5122	5144	5150	5167	5170	5184	5204	5195	5203	5213	5210	5174
2013	5226	5246	5249	5257	5272	5286	5281	5277	5285	5308	5317	5326	5278
2014	5324	5321	5336	5357	5370	5375	5383	5390	5409	5442	5468	5480	5387
2015	5497	5488	5487	5501	5490	5507	5510	5515					
Data reprinted by permission Engineering News-Record - ENR.com													

For a procedure to adjust for actual selling prices see the "Indexing – Addressing the Fluctuation in Margins" section of this report, and refer to Figure 29: Escalation Growth vs. Actual Margin Cost. This is particularly important for those using conceptual cost modeling tools such as the <u>Gilbane CostAdvisor</u>.



Indexing By Location – City Indices

FIGURE 27:

City Location Cost Index 2015

Equally important as indexing for time is the process of indexing for location. The practice of using historical projects, regardless of location, to get an idea of cost of future projects is quite common. Not only must project costs be moved over time, but also move the location. City indices provide the means to move project costs from one location to another.

Suppose the historical project was built in Phoenix and the goal is to determine the cost of a similar project built in Boston.

Assume

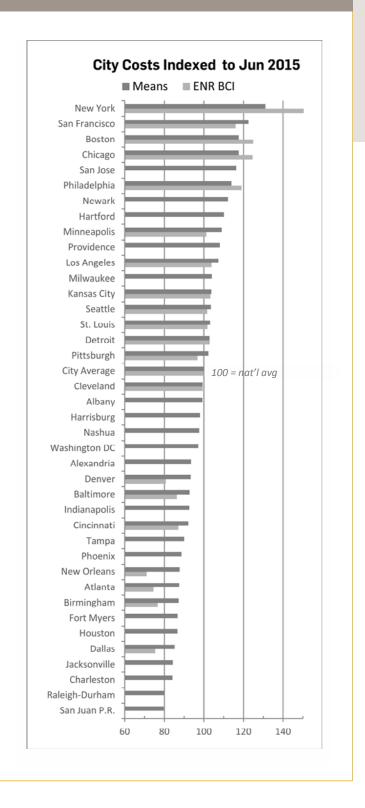
- > Project cost as built = \$10,000,000
- > Boston index = 120
- > Phoenix index = 90

Move costs to Boston from Phoenix; Divide "To" city by "From" city Multiply original cost by factor.

- > Boston / Phoenix = 120/90 = 1.33x
- > \$10,000,000 x 1.33 = \$13,300,000

Through this example, you can see the danger of simply using unadjusted project costs from one location to determine costs in another location. Without adjusting for differences in cost due to location, it is possible to over- or under-state project costs by substantial amounts.

ENR provides city indices for 20 major metropolitan cities. RS Means annually updates tables for hundreds of cities. The chart here lists 40 major cities from highest to lowest RS Means index. The ENR index is shown for those available.





Selling Price

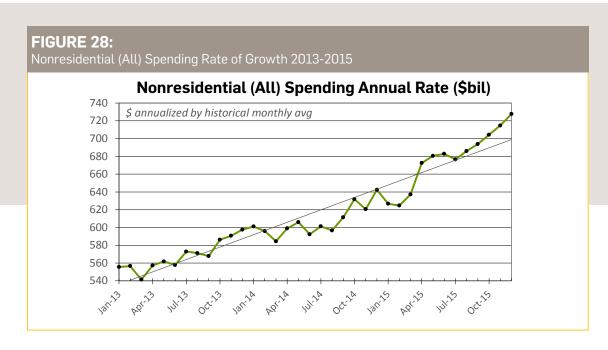
Selling price is the total price at which a contractor is willing to bid to win a project, even if that selling price eliminates all profit from the bid.

Few inflation or material/labor cost predictors address the issue of bidders raising or lowering margins in bids and hence affecting what is known as selling price. Selling price is dramatically affected by economic conditions such as market volume and contractor booked revenue. When market volume is low, contractor's margin, or selling price, comes down. As business volume picks up, and once contractors secure more work, even if material prices stay low, contractors begin to increase their margins and selling price increases.

In some areas, selling prices are still depressed, and it will take time before workload volumes increase to a point that contractors see a return to normal margins. In 2012 and 2013, margins were increasing. The AGC Business Outlook survey for 2014 indicates optimism at a post-recession high. That will lead to increased margins.

The industry is currently in a growth period as reflected in monthly construction spending. Construction spending is increasing at the fastest rate of growth in over 10 years. From beginning to end of 2015, the rate of spending will increase by 15%. Construction spending is projected to grow by 6% to 10% for the next several years. Although it may be several years before building market activity returns to pre-recession levels, there is clear and strong evidence that the rate of activity is increasing. A growth trend leads to higher margins.

Increasing activity leads to higher selling price.



Contractors need to recover the cost for all expenses that affect their cost to build. Any cost not recovered is taken as a reduction to margin or reduced selling price. Cost recovered over and above expenses raises selling price and is a growth to margins.

- > On average, labor cost represents approximately 35% 40% of building cost.
- On average, materials cost represents approximately 50% -55% of building
- > Equipment and contractor services represent 10% of building cost.
- > Margins are applied on all 100% of building costs.

Labor wage cost growth is generally 2% to 3% per year. The labor wage cost long-term average is 3%. Labor demand and changes in labor productivity either increases or decreases total labor cost. In growth periods, labor demand tends to increase wages, and productivity generally declines, increasing overall labor cost.

Materials cost growth is tracked by several reports such as the PPI. Materials costs fluctuate widely, but in general, in times of higher demand, material prices go up.

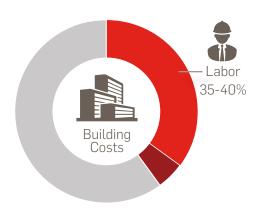
Equipment and services have the least effect on overall project cost. Contractor efficiencies or unusual project conditions may vary this cost. Margins represent contractor overhead and profit. Selling price includes contractor margins and is market activity dependent. Competition will cause project bid margins to move lower. Increasing volume will allow margins to move higher.

If	Then Cost to Project
Labor wage 1 by 3%	+1.2%
Productivity by 2%	+0.8%
Material costs 👚 by 5%	+2.5%
Services costs type by 5%	+0.5%
Margin 1 by 1%	+1.0%

During a period of low volume and competitive pricing (assuming no room for margins to move lower), margins are not increasing. During a period of margin recovery, anticipate a 1% to 1.5% annual increase to margins until margins fully recover.

When there is substantial growth in the volume of projects coming to bid, the need to keep margins reduced will diminish, and margins will return to normal. There is no room left for depressed market activity to move margins lower. Expect margins to increase slowly over time.

Margins vary considerably by market and activity within individual markets.



On average, labor cost represents approximately 35% - 40% of building cost.

MARGINS INCREASING OR DECREASING?

Indices like the PPI MTRLS deal only with materials costs or prices charged at the producer level. They do not include delivery, equipment, installation, or markups, nor do they reflect the cost of services provided by the general contractor or construction manager.

Total project cost encompasses all of these other costs. Whole Buildings Completed PPI doesn't give us any details about the retail price of the materials used, but it does include all of the contractors costs incurred for delivery, labor for installation and markups on the final product delivered to the consumer, the building owner.

The PPI for construction materials IS NOT an indicator of construction inflation. It is missing the selling price. In 2010, the PPI for construction inputs was up 5.3%, but the selling price was flat. In 2009, PPI for inputs was flat, but construction inflation as measured by cost of buildings decreased 8% to 10%.

For several years, many construction firms have been competing for a very low volume of new work. In 2011 and 2012, construction spending, adjusted for inflation to get real volume, reached a 20-year low. There was little work available for bidders, forcing contractors to remain extremely competitive. As a result, contractors had been unable to pass on all cost increases to the owner. This had the effect of keeping selling price low, reducing both contractors' and producers' margins. In some cases, margins may be reduced to a loss just to get work.

Expect whole building costs to rise and remain above material/labor inflation as long as work volume continues to increase.

TABLE 13:

BLS PPI Buildings Completed 2011-2014

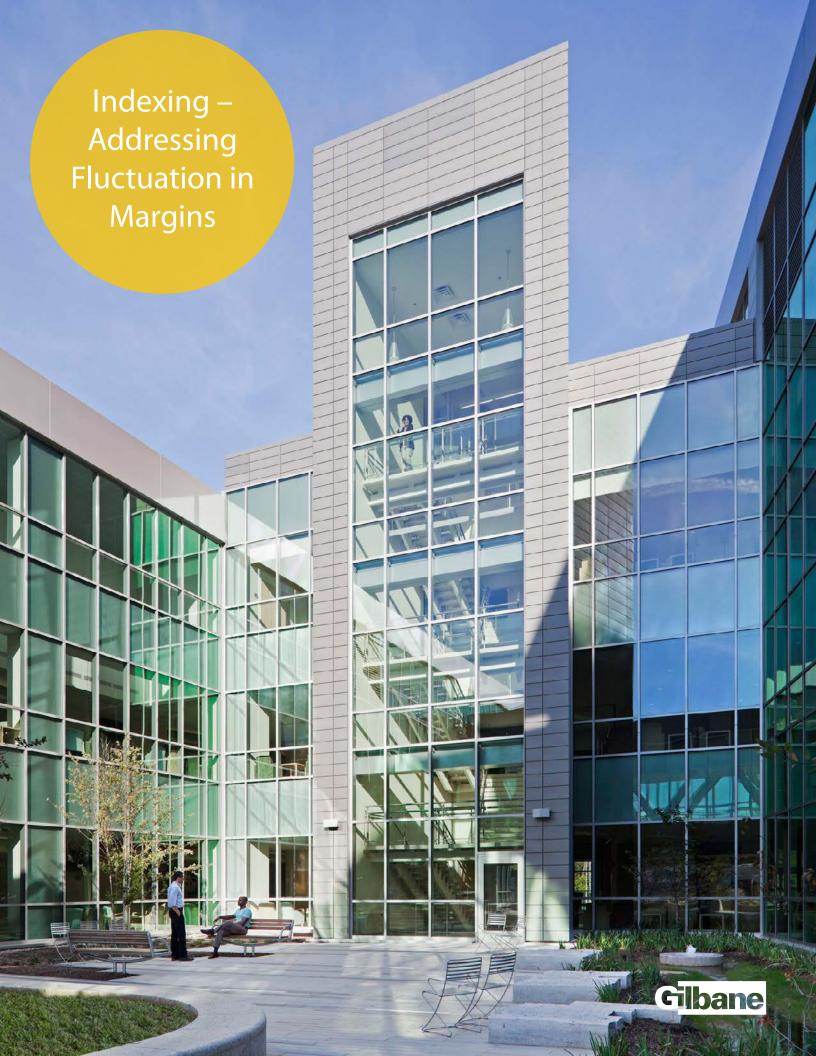
US Construction Producer Price Indexes - June 2015							
BUILDINGS COMPLETED	ANNUAL FOR						
WHOLE BUILDING COST	2014	2013	2012	2011			
INPUTS TO NONRESIDENTIAL	-1.9	0.9	0.9	5.7			
NEW NONRSDNTL BLDGS	2.1	3.3	1.5	4.0			
NEW INDUSTRIAL BLDG	1.8	4.1	1.4	3.1			
NEW WAREHOUSE BLDG	2.6	2.9	2.6	3.7			
NEW SCHOOL BLDG	2.3	3.4	1.2	4.8			
NEW OFFICE BLDG	2.1	2.8	1.2	3.8			
NEW HEALTH CARE BLDG	1.3	4.1	-0.5	NA			

except inputs, includes labor, material overhead and profit Source: Producer Price Index. Bureau of Labor Statistics Margin growth resumed in 2012. Independent selling price indices show 2014 margins increasing by over 2%.

The flow of projects coming to bid during the coming months will strongly influence the cost movement of the bids. If the volume of projects coming to bid decreases, overall construction business will remain depressed and bids will remain low, strongly influenced by depressed margins. When there is a continued increase in the volume of projects coming to bid, the need to keep margins reduced will diminish and margins will continue a return to normal.

Indicators are pointing to growth signs, and that will eventually lead to a more normal bidding environment and higher margins.





Indexing - Addressing Fluctuation in Margins

The cost of previously built buildings is often looked at as a historical guide for what to expect in the future. Escalation indices allow the cost of buildings to be moved over time. City indices allow location to be moved. To index accurately, both margin and productivity movement need to be reviewed to determine what effect they might have on current cost compared to current index.

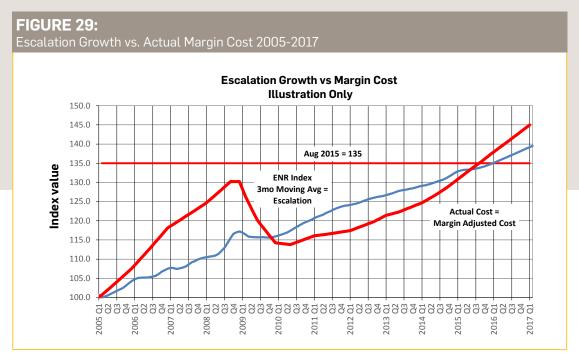
Average costs of buildings from Q2 2008 through Q4 2010 fell by 13% to 15%. However, normal labor/material indices increased by 4% during that time. Normal indices will not account for all changes in individual material costs, wages, productivity changes and margin fluctuations.

Standard labor and material index tables will not address the inflection points in this unusual time period, nor will standard labor and material inflation factors address productivity or margin fluctuation. Figure 29, Escalation Growth vs. Actual Margin Cost, illustrates this unusual period and provides a means to properly account for these unusual occurrences.

In Figure 29, the blue line indicates ENR-BCI actual values through August 2015 and predicted escalation near 3% thereafter. The plotted values are three-month moving averages to smooth out the line. The red (thicker) line indicates Contractor Bid Price Movement or Adjusted Margin Cost representative of as-built cost.

Very low margin cost in mid-2010 reflects contractor bids at low cost to secure a portion of a dramatically reduced amount of available work. Predicted future cost shows long-term cost growth, which accounts for both normal labor/material escalation equal to the escalation outlined above, and a very slow but steady 0.5% per quarter recovery of margins.





How to Use the Above Graph:

If your project is not previously indexed using ENR-BCI, reference only the Margin index (red line).

Pick the date for midpoint of the historical reference project.

At that date, draw a vertical line so it passes through both curves. Now pick today's date.

At that date, draw a vertical line so it passes through both curves. Record the ENR Index at the historical reference date and today.

Record the Margin Cost Index at the historical reference date and today. Subtract historical ENR index from today's ENR index. Label that value A. Subtract historical Margin index from today's Margin index. Label that value B. Pay attention to sign (+ or -).

The difference between the movement due to the ENR index and the Margin Cost Index is the needed correction factor. Use the differences from the ENR Index (A) and the Margin Index (B) to develop an adjustment factor for your project. Since baseline is 100, all factors are the same as percentages.

B minus A = Margin Adjustment factor. Pay attention to signs (+ or -).

<u>CostAdvisor</u> users can record the Margin Adjustment value determined here into the Similarity Adjustment factor field. Treat all system indexing and future escalation as you would normally.



Escalation – What Should You Carry?

Escalation is typically thought of as one simple value. An estimator typically prepares a budget in today's dollars, but then must escalate the total estimate to the midpoint of the project construction schedule. As explained in prior sections, when determining escalation, the value must account for several factors.

Escalation must account for all anticipated differences from today's cost to expected future cost.

TO MOVE COSTS FROM TODAY'S DOLLARS TO FUTURE DOLLARS, WE MUST ACCOUNT FOR THE CUMULATIVE EFFECT OF:

- Market activity
- Labor wage rate changes
- Productivity changes
- Materials cost changes
- Equipment cost changes
- Margins fluctuations

The following escalation recommendations are based on the previous analysis of anticipated market activity, labor and material cost movement, productivity expectations and anticipated margin movement.

- Looking back at Q4 2014, it is expected construction activity growth in most major sectors. Healthcare and infrastructure heavy engineering declined, but manufacturing buildings began to expand rapidly.
- For both 2015 and 2016, the general consensus across several construction economic reports is growth in spending of 8% to 11%.
- Residential construction expanded, although at a somewhat slower rate than 2012-2013.
- Nonresidential buildings activity in 2015 will post the largest percentage gains ever recorded.
- Spending could reach 20%+ growth above 2014. Two-thirds of that will come from starts recorded in 2014.
- In 2015, office construction is expected to register 20%+ growth for the second year in a row.
- Manufacturing will post a 50%+ gain in 2015, a percent gain never before seen in any market.
- The Architectural Billings Index for Institutional building hit an all-time high in June. The institutional sector is the last to recover after a downturn. The institutional ABI has been positive for 13 consecutive months and just reached a new high. This is an indicator that the rate of spending activity will increase 9 to 12 months from now.
- Inflationary pressures may push the rate of material cost increases higher. All material cost increases from the manufacturer through the supplier may be passed along to the owner.

- Labor shortages may be significant resulting in higher labor retention costs.
- > Growing work volume will have the effect of reducing productivity, driving up labor cost.
- > Contractors may increase margins 1% to 2% per year.
- Any assumption of low escalation (3%-3.5%) requires that market activity does not experience strong growth. All signs indicate otherwise.

Historical labor and material index growth is 75% in 20 years. That is 3.75% simple index growth per year or 2.85% compounded inflation cost growth for 20 years.

Historical as-sold building cost growth is 89% for 20 years. That is 4.45% simple index growth per year or 3.25% compounded inflation cost growth for the last 20 years.

Historical average spending growth is 7% per year (not including 2008 to 2011 when spending declined 35%).

Since the U.S. Census began keeping construction spending records in 1993, it has recorded a rate of spending growth over 10% per year only twice and only three other years have exceeded 9% per year growth. In 2015, we will have 10%+ growth.

FOR NONRESIDENTIAL BUILDINGS

In years when nonresidential spending growth exceeded 10%, as-sold cost escalation was 9% to 11%.

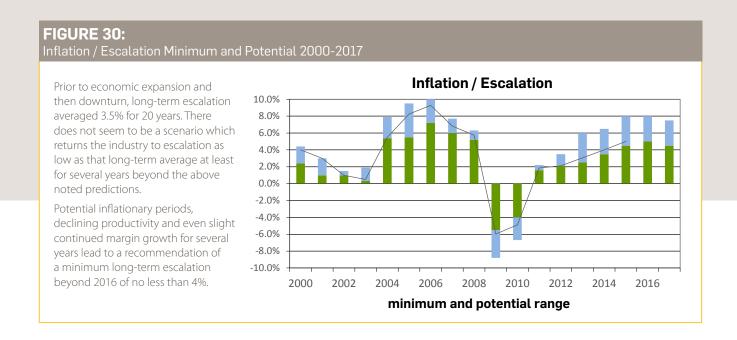
Potentially, there may be escalation similar to the growth years of 2004 through 2008 when (for nonresidential buildings) spending grew 53%, and escalation averaged 8% per year for five years. All leading indicators point to continued growth for the next few years.

For each year above, consider your market. If you are in a market area or sector that has expectations of a huge volume of work that may start within a narrow window of time, then market pricing can turn rapidly for you.

TOTAL ESCALATION



INFLATION / ESCALATION MINIMUM AND POTENTIAL 2000-2017





BUILDING MORE THAN BUILDINGS

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The information in this report is not specific to any one region. The information is limited to the United States and does not address international economic conditions.

Author Ed Zarenski, a 42-year construction veteran and a member of the Gilbane team for 35 years, managed multi-million dollar project budgeting, owner capital plan cost control, value engineering and life cycle cost analysis. As a construction economics analyst, he compiles economic information and provides data analysis and opinion for this quarterly report.

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Data Sources

Along with countless news articles, these sources are used for data in this report:

- American Institute of Architects <u>www.aia.org/practicing/economics/index.htm</u>
- > American Iron and Steel Institute steel.org
- > American Recycler americanrecycler.com
- Associated Builders and Contractors abc.org
- Associated General Contractors of America agc.org
- > Bloomberg L.P. Financial News Bloomberg.com
- > Bureau of Labor Statistics Stats.BLS.gov
- > Construction Industry Round Table cirt.org
- > CMD CMDGroup.com (formerly Reed Construction Data)
- > Data Digest <u>DataDigest</u>
- > Dodge Data & Analytics construction.com/about-us/press
- > Economic Cycle Research Institute businesscycle.com
- > Engineering News-Record ENR.com
- > Financial Trend Forecaster Fintrend.com
- > FMI Management Consulting FMINET.com
- > IHS Global Insight ihs.com
- > Institute for Supply Management ism.ws
- Metal Prices metalprices.com
- > Producer Price Indexes bls.gov/ppi
- > Random Lengths randomlengths.com
- > U.S. Census Bureau census.gov

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