

Welcome



Advancing Building Estimation

Forecasting Costs

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5-22-17

Forecasting Overview

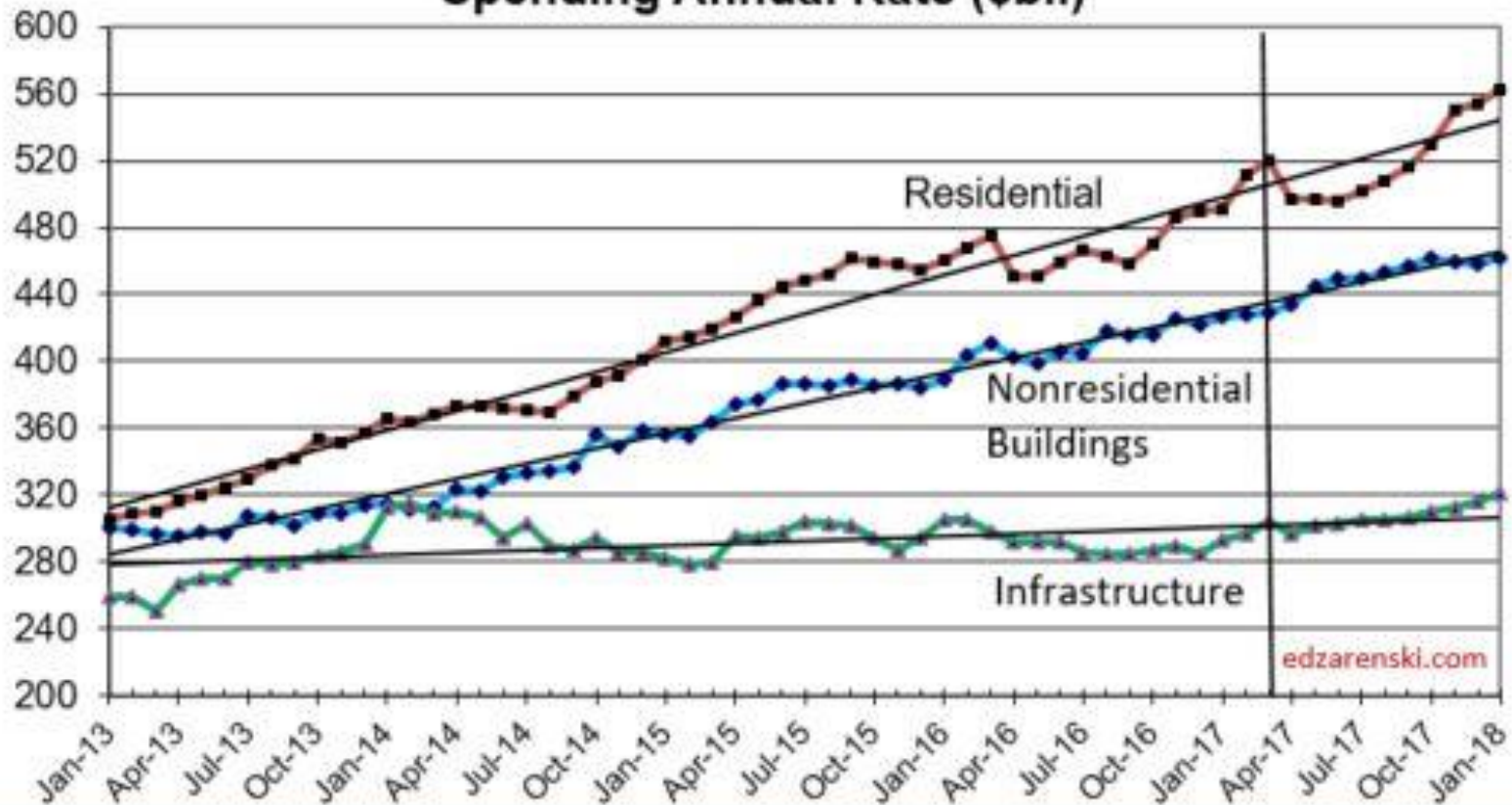


- Labor - wages, availability and productivity
- Material cost and availability
- Inputs / Bid price / Final price
- Industry workload
- Contractor workload
- Inflation
- Project Cost

Forecasting the Future



Construction Spending by Sector
Spending Annual Rate (\$bil)



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Forecasting the Future



Common Errors in Forecasting

- Misusing Starts Data
- Not Adjusting History for Inflation
- Using Inappropriate Indices
- Ignoring Productivity
- Considering Revenue = Volume
- Staffing to meet Revenue

Forecasting the Future



Project Perspective

- Resources
- Inflation
- Budget / Cost

Corporate Perspective

- Market Share
- Growth = Work Volume
- Size = Revenue and Staff

Project Inflation Impact



- Labor = 30% to 40% of project
- A 3% increase = 0.9% to 1.2% inflation

- Material = 40% to 50% of project
- Increase 3% = 1.2% to 1.5% inflation

- Margins = applied to 100% of project
- Increase 3% = 3% to inflation

Project Inflation Impact



Project Cost Inflation Impact of
+10% increase in cost of material

-  • +0.06% Gypsum Board
-  • +0.40% Concrete
-  • +0.40% Copper
-  • +1.00% Steel

Additional Causes of Inflation

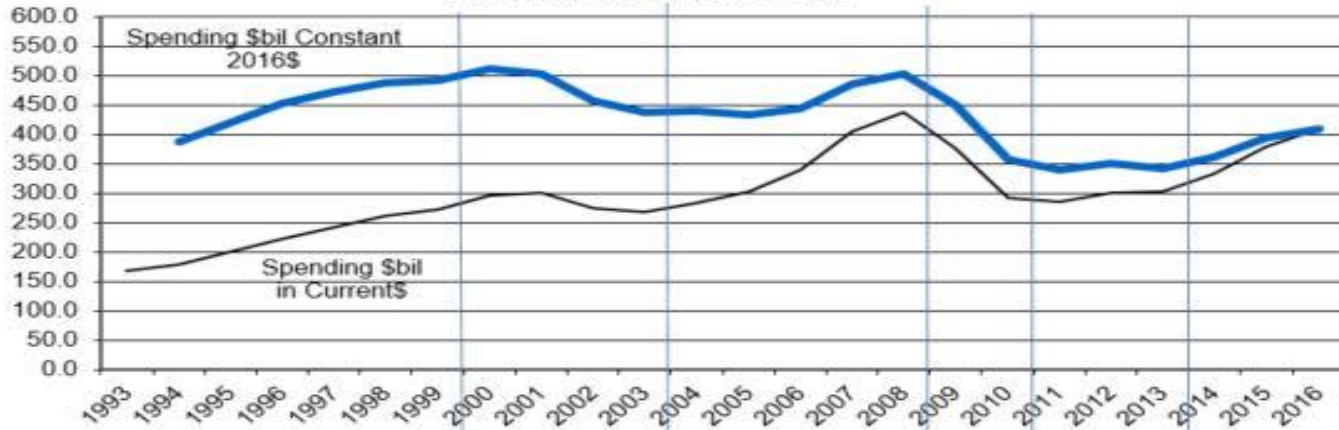


- Labor Availability
- Productivity
- Schedule Extension
- Spending / Work Volume

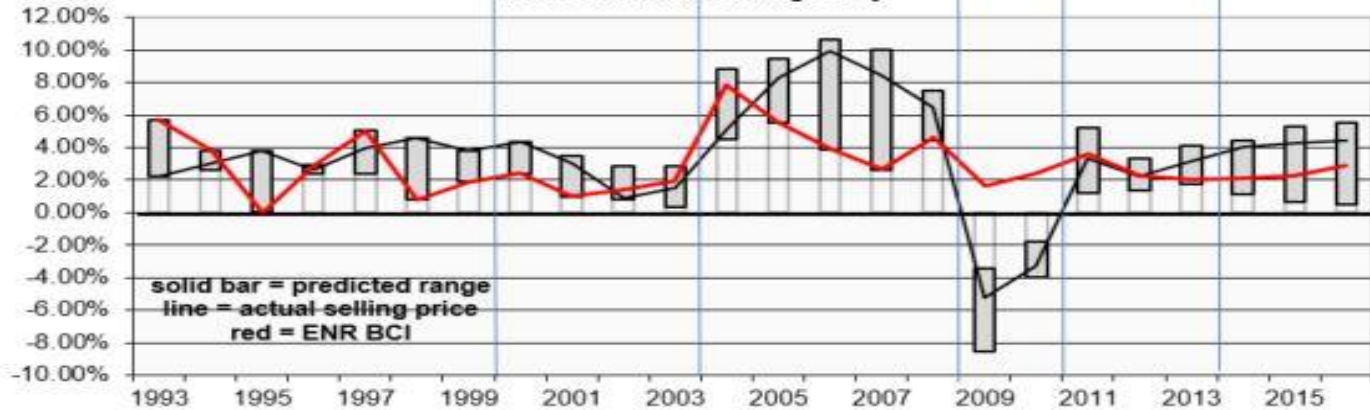
How spending is moving has more impact on inflation than labor & mtrl

Inflation vs Spending/Volume

**Construction Spending \$Billion
Current vs Constant 2016\$
Nonresidential Buildings Only**



**Construction Inflation
Nonresidential Buildings Only**



Sources of Forecasting Data



Starting Backlog + New Starts creates Cash Flow

- Nonres Bldgs Spending 70%-75 from Starting Backlog
- Residential Spending 70% from New Starts

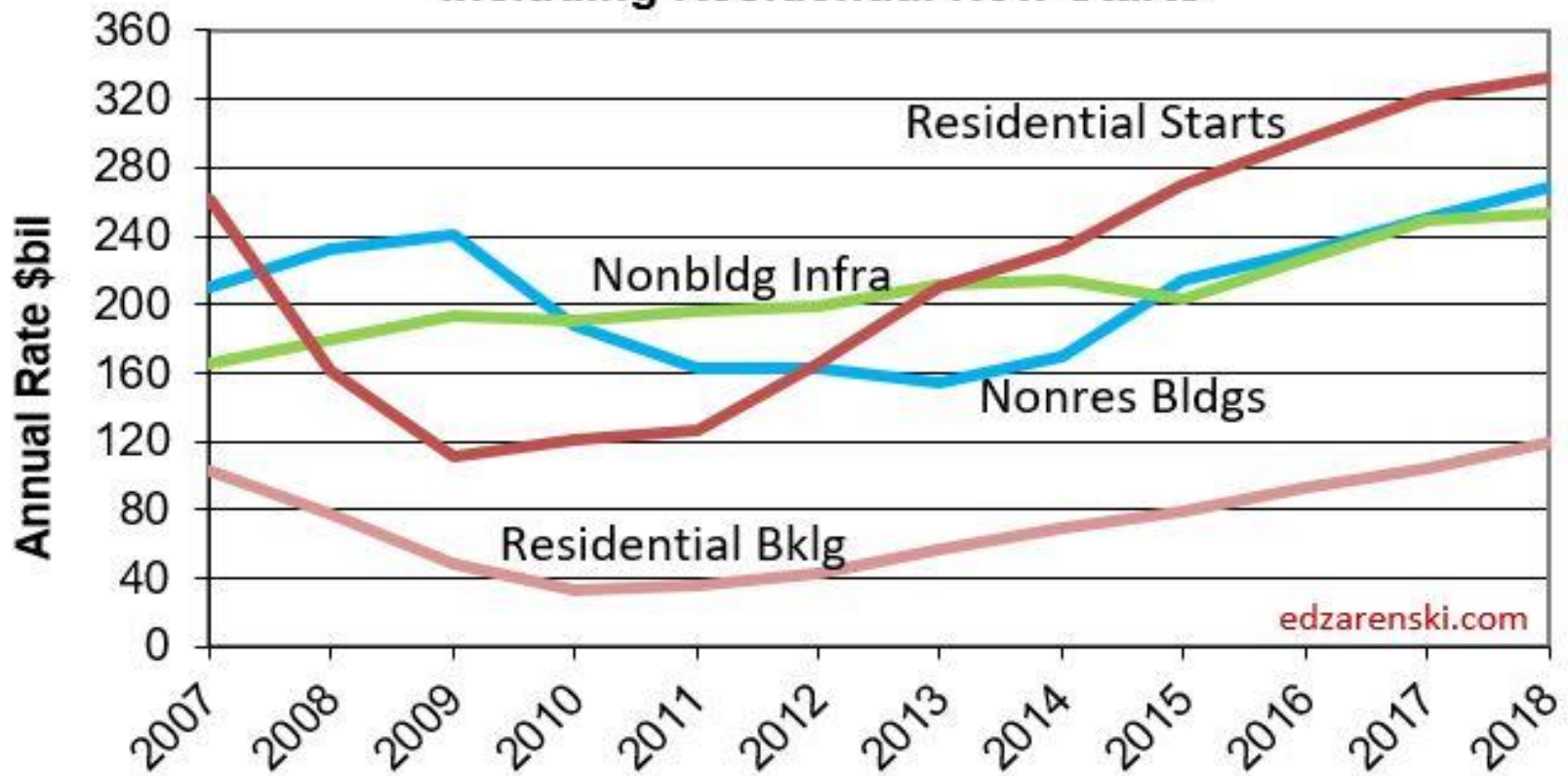
Cash Flow = Spending

- Backlog and New Starts is not Spending
- Cash Flow is Spending

Sources of Forecasting Data



**Construction Starting Backlog \$bil
including Residential New Starts**



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Sources of Forecasting Data



Spending = Revenue

Constant \$ Spending is Volume

Constant \$ Spending = adjusted for inflation

Volume dictates Staffing Needs

Sources of Forecasting Data



**Construction Jobs vs Construction Volume
Growth Since January 2011**



Types of Inflation Indices

• LESS USEFUL

- Inputs
- PPI
- Labor & Material
- Market Basket
- Composite

• MORE USEFUL

- Outputs
- Selling Price
- Final Cost
- Trade
- Building Type
- Market Sector

Complete Cost Indices



NONRESIDENTIAL BUILDINGS

- Construction Analytics Building Cost Index
- Turner Cost Index
- Rider Levett Bucknall Actual Cost Index

INFRASTRUCTURE

- I H S Power Plant, Pipeline, Refine Costs
- National Highway Construction Cost Index
- Bureau of Reclamation Construction Cost Trends

RESIDENTIAL

- U S Census Constant Quality Single Family House

Construction Inflation Indices

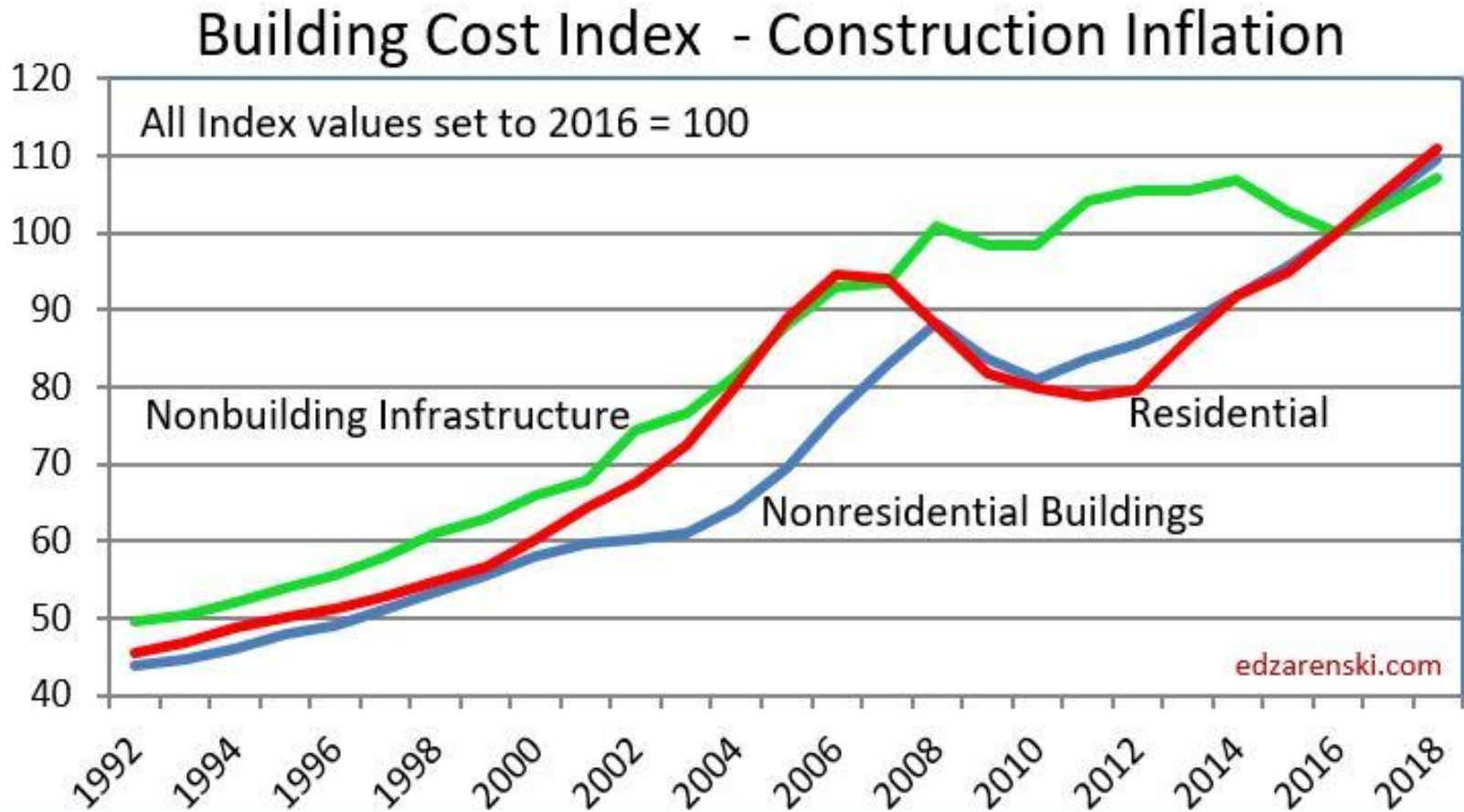


CONSTRUCTION COST INDEX SET TO CURRENT YEAR = 100	2010	2011	2012	2013	2014	2015	2016	2017	2018
NONRESIDENTIAL BLDGS	81.0	83.7	85.5	88.3	91.8	95.8	100.0	104.7	109.4
Turner Index actual cost	80.8	82.1	83.9	87.4	91.2	95.4	100.0	105.0	110.3
Rider Levett Bucknall Index actual cst	81.3	82.2	83.7	86.4	90.0	94.8	100.0	105.5	110.8
PPI School Bldg actual cost	87.2	89.6	92.7	94.1	97.2	99.1	100.0	102.5	105.1
PPI Office Bldg actual cost	87.8	89.6	92.1	93.4	96.1	98.4	100.0	102.5	105.1
PPI Concrete Contractor actual cost	88.8	89.2	90.0	91.5	93.0	95.9	100.0	104.0	107.1
PPI Electrical Contractor actual cost	88.1	90.6	92.7	93.5	94.7	97.9	100.0	102.5	105.1
BECK COST REPORT 5 cities	84.2	87.3	88.5	90.6	91.5	96.2	100.0	104.0	108.2
Mortenson avg 6 cities nonres bldg	81.4	85.6	88.1	90.7	94.1	96.6	100.0	103.5	107.1
RS Means Index Inputs	88.5	92.2	93.9	97.1	98.8	99.5	100.0	102.0	104.0
ENR BCI Index annual avg Inputs	86.1	89.2	91.3	93.1	95.0	97.2	100.0	102.5	105.1
PPI BNIS Industrial Structures Inputs	94.9	101.2	103.1	103.7	104.4	101.2	100.0	102.5	105.6
INFRASTRUCTURE Composite	98.5	104.0	105.6	105.5	106.9	102.9	100.0	103.6	107.1
FHWA Hiway Index NHCCI output	98.6	98.7	105.9	102.4	101.7	105.6	100.0	103.0	106.1
I H S UCCI Pipeline, LNG	111.1	117.8	122.2	128.9	129.4	111.1	100.0	104.0	108.2
I H S DCCI Refine, Petrochemical	93.5	100.5	104.9	107.6	108.1	108.1	100.0	104.0	108.2
RESIDENTIAL	79.9	78.8	79.7	86.1	91.8	94.9	100.0	105.8	111.0
US Cen Bur NEW Homes Lasperyes	79.9	80.8	81.6	86.9	92.7	94.8	100.0	106.0	111.3
S&P/Case Shiller HomePrice NATION	79.8	76.8	77.8	85.3	90.9	95.0	100.0	105.5	110.8

All data updated to Dec. 2016 where available

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Construction Inflation Indices



Thank You



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