Slide 1


Welcome
1
Construction Economic Forecast 2021
Behind the Headlines
Midyear Presentation
August 2021
Construction Analytics
edzarenski.com

Slide 2

Introduction

2

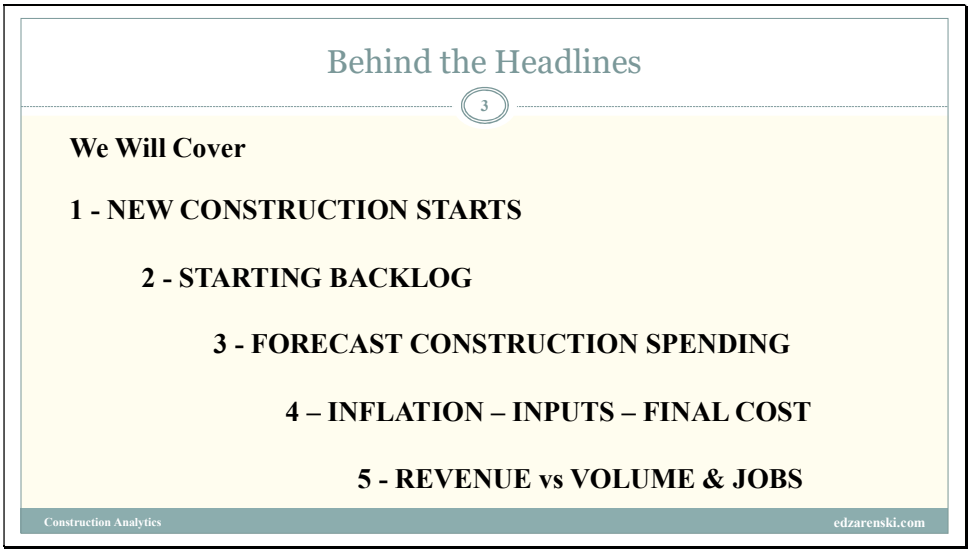
About Ed Zarenski

45+ yrs in Construction

30+ yrs Estimating Executive

20+ yrs Economic Analysis

Slide 3


Behind the Headlines
3
We Will Cover
1 - NEW CONSTRUCTION STARTS
2 - STARTING BACKLOG
3 - FORECAST CONSTRUCTION SPENDING
4 – INFLATION – INPUTS – FINAL COST
5 - REVENUE vs VOLUME & JOBS
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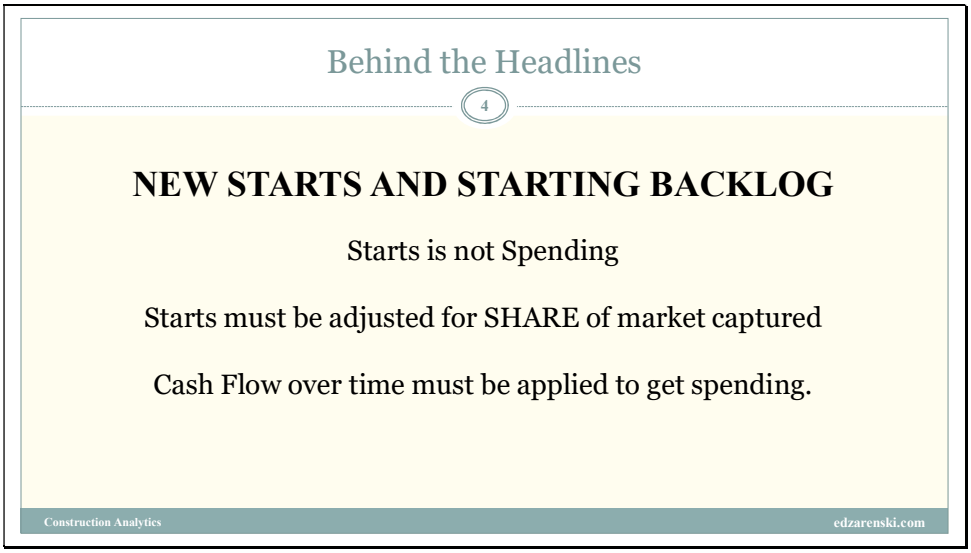
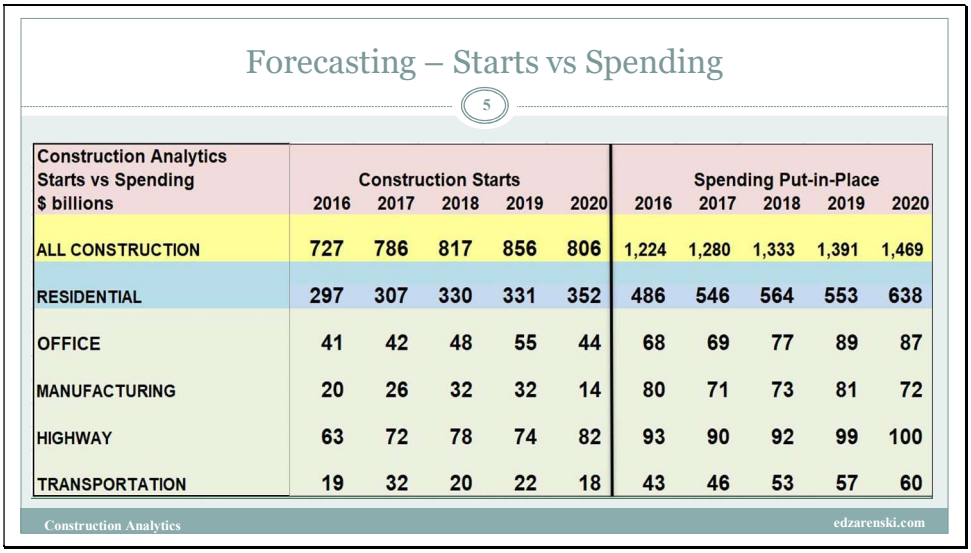
Slide 4



Market SHARE captured in the Dodge New Construction Starts survey is a critical factor in utilizing Starts data to forecast spending activity. We could see a 5% increase in New Construction Starts and yet not see an increase in the forecast. It could be an increase in market share captured in the survey. It takes several years of data to see this.

Slide 5



Forecasting – Starts vs Spending

5

Construction Analytics Starts vs Spending $ billions	Construction Starts 2016	2017	2018	2019	2020	Spending Put-in-Place 2016	2017	2018	2019	2020
ALL CONSTRUCTION	727	786	817	856	806	1,224	1,280	1,333	1,391	1,469
RESIDENTIAL	297	307	330	331	352	486	546	564	553	638
OFFICE	41	42	48	55	44	68	69	77	89	87
MANUFACTURING	20	26	32	32	14	80	71	73	81	72
HIGHWAY	63	72	78	74	82	93	90	92	99	100
TRANSPORTATION	19	32	20	22	18	43	46	53	57	60

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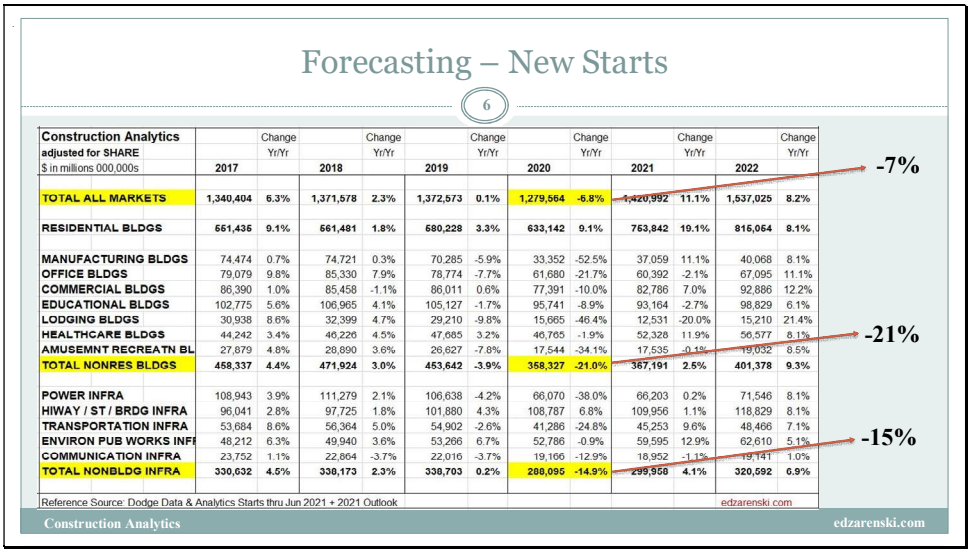
Starts is not Spending. Starts must be adjusted for share of total market, then cash flowed over time to get spending. Need to look at a minimum of 3 to 4 years of starts to predict spending in the next year. Starts here is Dodge Data.

Slide 6



Forecasting – New Starts

6

Construction Analytics adjusted for SHARE $ in millions 000,000s	2017	Change Yr/Yr	2018	Change Yr/Yr	2019	Change Yr/Yr	2020	Change Yr/Yr	2021	Change Yr/Yr	2022	Change Yr/Yr
TOTAL ALL MARKETS	**1,340,404**	**6.3%**	**1,371,578**	**2.3%**	**1,372,573**	**0.1%**	**1,279,564**	**-6.8%**	**1,420,992**	**11.1%**	**1,537,025**	**8.2%**
RESIDENTIAL BLDGS	**661,436**	**9.1%**	**661,481**	**1.8%**	**680,228**	**3.3%**	**633,142**	**9.1%**	**753,842**	**19.1%**	**816,064**	**8.1%**
MANUFACTURING BLDGS	74,474	0.7%	74,721	0.3%	70,285	-5.9%	33,352	-52.5%	37,059	11.1%	40,068	8.1%
OFFICE BLDGS	79,079	9.8%	85,330	7.9%	78,774	-7.7%	61,680	-21.7%	60,392	-2.1%	67,095	11.1%
COMMERCIAL BLDGS	86,390	1.0%	85,458	-1.1%	86,011	0.6%	77,391	-10.0%	82,786	7.0%	92,886	12.2%
EDUCATIONAL BLDGS	102,775	5.6%	106,965	4.1%	105,127	-1.7%	95,741	-8.9%	93,164	-2.7%	98,829	6.1%
LODGING BLDGS	30,938	8.6%	32,399	4.7%	29,210	-9.8%	15,665	-46.4%	12,531	-20.0%	15,210	21.4%
HEALTHCARE BLDGS	44,242	3.4%	46,226	4.5%	47,685	3.2%	46,765	-1.9%	52,328	11.9%	56,577	8.1%
AMUSEMNT RECREATN BL	27,879	4.8%	28,890	3.6%	26,627	-7.8%	17,544	-34.1%	17,535	-0.1%	19,032	8.5%
TOTAL NONRES BLDGS	**458,337**	**4.4%**	**471,924**	**3.0%**	**453,642**	**-3.9%**	**358,327**	**-21.0%**	**367,191**	**2.5%**	**401,378**	**9.3%**
POWER INFRA	108,943	3.9%	111,279	2.1%	106,638	-4.2%	66,070	-38.0%	66,203	0.2%	71,546	8.1%
HIWAY / ST / BRDG INFRA	96,041	2.8%	97,725	1.8%	101,880	4.3%	108,787	6.8%	109,956	1.1%	118,829	8.1%
TRANSPORTATION INFRA	53,684	8.6%	56,364	5.0%	54,902	-2.6%	41,286	-24.8%	45,253	9.6%	48,466	7.1%
ENVIRON PUB WORKS INFR	48,212	6.3%	49,940	3.6%	53,266	6.7%	52,786	-0.9%	59,595	12.9%	62,610	5.1%
COMMUNICATION INFRA	23,752	1.1%	22,864	-3.7%	22,016	-3.7%	19,166	-12.9%	18,952	-1.1%	19,141	1.0%
TOTAL NONBLDG INFRA	**330,632**	**4.5%**	**338,173**	**2.3%**	**338,703**	**0.2%**	**288,095**	**-14.9%**	**299,958**	**4.1%**	**320,592**	**6.9%**

Reference Source: Dodge Data & Analytics Starts thru Jun 2021 + 2021 Outlook

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-7%

-21%

-15%

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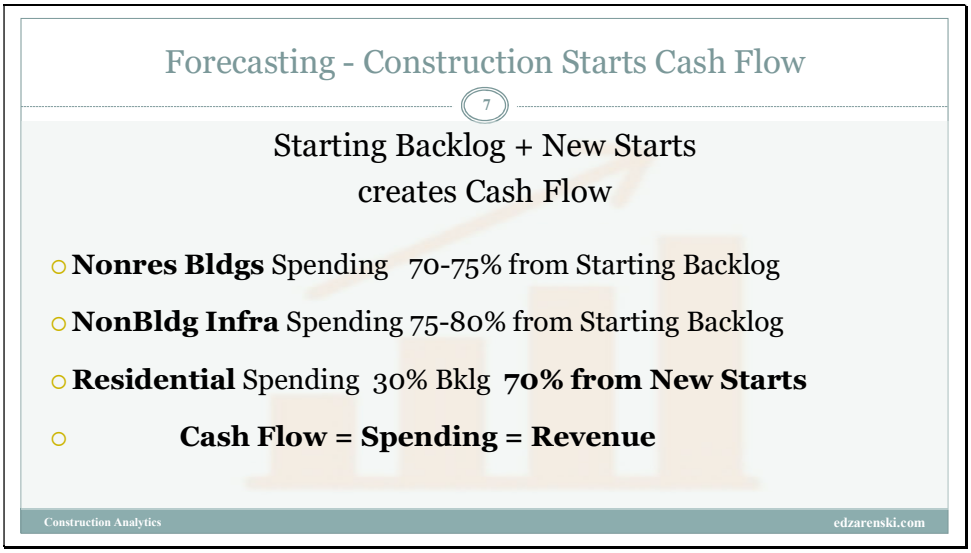
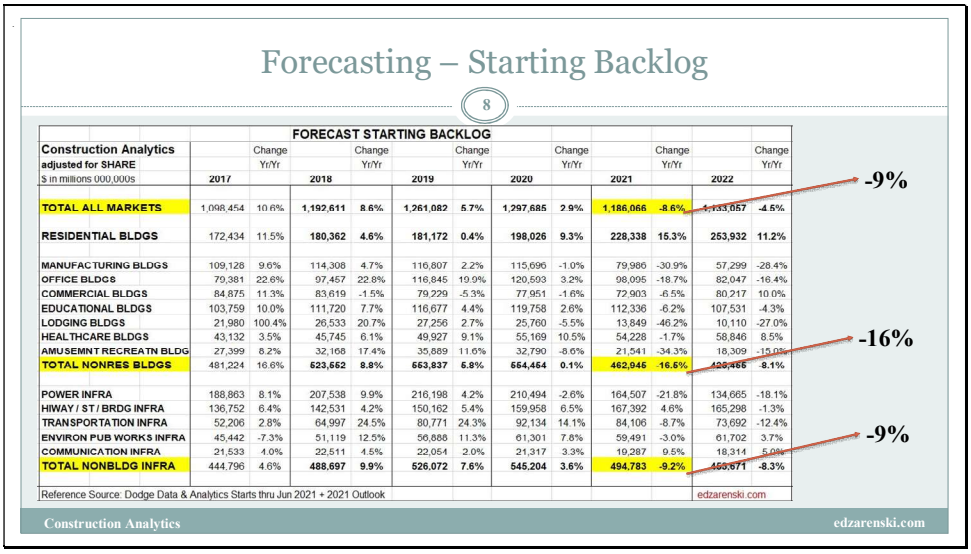
New Starts in this analysis are adjusted to represent full spending. Starts are also adjusted for historical Dodge average annual revision.

Slide 7



For nonresidential work we have 70% to 80% of expected spending this year already in backlog as the year began. For new starts within the year, approximately 20% of the spending occurs in the year started, 50% in the next year, 25% in the third year. This means nonresidential spending growth in 2021 is still being affected by starts from 2018.

Slide 8



Forecasting – Starting Backlog

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FORECAST STARTING BACKLOG

Construction Analytics adjusted for SHARE $ in millions 000,000s	2017	Change Yr/Yr	2018	Change Yr/Yr	2019	Change Yr/Yr	2020	Change Yr/Yr	2021	Change Yr/Yr	2022	Change Yr/Yr
TOTAL ALL MARKETS	1,098,454	10.6%	**1,192,611**	**8.6%**	**1,261,082**	**5.7%**	**1,297,685**	**2.9%**	**1,186,066**	**-8.6%**	**1,133,057**	**-4.5%**
RESIDENTIAL BLDGS	172,434	11.5%	**180,362**	**4.6%**	**181,172**	**0.4%**	**198,026**	**9.3%**	**228,338**	**15.3%**	**253,932**	**11.2%**
MANUFACTURING BLDGS	109,126	9.6%	114,308	4.7%	116,807	2.2%	115,696	-1.0%	79,986	-30.9%	57,299	-28.4%
OFFICE BLDGS	79,381	22.6%	97,457	22.8%	116,845	19.9%	120,593	3.2%	98,095	-18.7%	82,047	-16.4%
COMMERCIAL BLDGS	84,875	11.3%	83,619	-1.5%	79,229	-5.3%	77,951	-1.6%	72,903	-6.5%	80,217	10.0%
EDUCATIONAL BLDGS	103,759	10.0%	111,720	7.7%	116,677	4.4%	119,758	2.6%	112,336	-6.2%	107,531	-4.3%
LODGING BLDGS	21,980	100.4%	26,533	20.7%	27,256	2.7%	25,760	-5.5%	13,849	-46.2%	10,110	-27.0%
HEALTHCARE BLDGS	43,132	3.5%	45,745	6.1%	49,927	9.1%	55,169	10.5%	54,228	-1.7%	58,846	8.5%
AMUSEMNT RECREATN BLDG	27,399	8.2%	32,168	17.4%	35,889	11.6%	32,790	-8.6%	21,541	-34.3%	18,309	-15.0%
TOTAL NONRES BLDGS	481,224	16.6%	**523,662**	**8.8%**	**563,837**	**6.8%**	**564,464**	**0.1%**	**462,945**	**-16.6%**	**428,466**	**-8.1%**
POWER INFRA	188,863	8.1%	207,538	9.9%	216,198	4.2%	210,494	-2.6%	164,507	-21.8%	134,665	-18.1%
HIWAY / ST / BRDG INFRA	136,752	6.4%	142,531	4.2%	150,162	5.4%	159,958	6.5%	167,392	4.6%	165,298	-1.3%
TRANSPORTATION INFRA	52,206	2.8%	64,997	24.5%	80,771	24.3%	92,134	14.1%	84,106	-8.7%	73,692	-12.4%
ENVIRON PUB WORKS INFRA	45,442	-7.3%	51,119	12.5%	56,888	11.3%	61,301	7.8%	59,491	-3.0%	61,702	3.7%
COMMUNICATION INFRA	21,533	4.0%	22,511	4.5%	22,054	2.0%	21,317	3.3%	19,287	9.5%	18,314	5.0%
TOTAL NONBLDG INFRA	444,796	4.6%	**488,697**	**9.9%**	**526,072**	**7.6%**	**545,204**	**3.6%**	**494,783**	**-9.2%**	**453,671**	**-8.3%**

Reference Source: Dodge Data & Analytics Starts thru Jun 2021 + 2021 Outlook

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-9%

-16%

-9%

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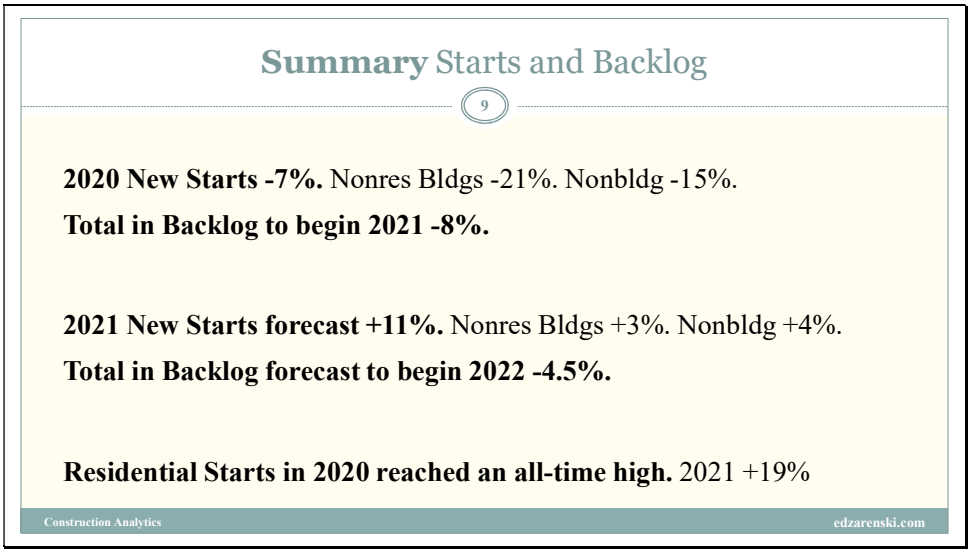
New Starts in this analysis are adjusted to represent full spending. Starts are also adjusted for historical Dodge average annual revision.
Backlog = value of all work remaining estimate to complete for all projects under contract.

Slide 9


Summary Starts and Backlog
9
2020 New Starts -7%. Nonres Bldgs -21%. Nonbldg -15%.
Total in Backlog to begin 2021 -8%.
2021 New Starts forecast +11%. Nonres Bldgs +3%. Nonbldg +4%.
Total in Backlog forecast to begin 2022 -4.5%.
Residential Starts in 2020 reached an all-time high. 2021 +19%
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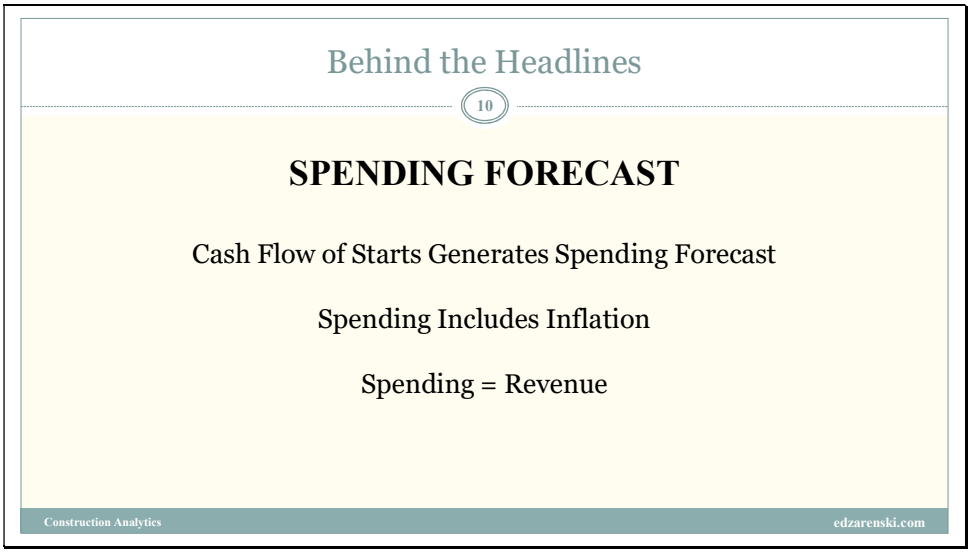
Behind the Headlines
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SPENDING FORECAST
Cash Flow of Starts Generates Spending Forecast
Spending Includes Inflation
Spending = Revenue
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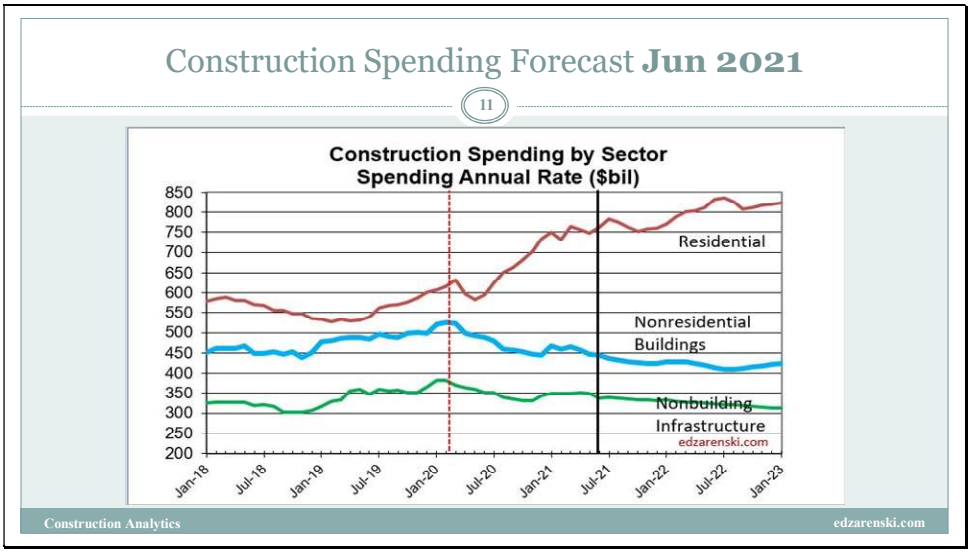
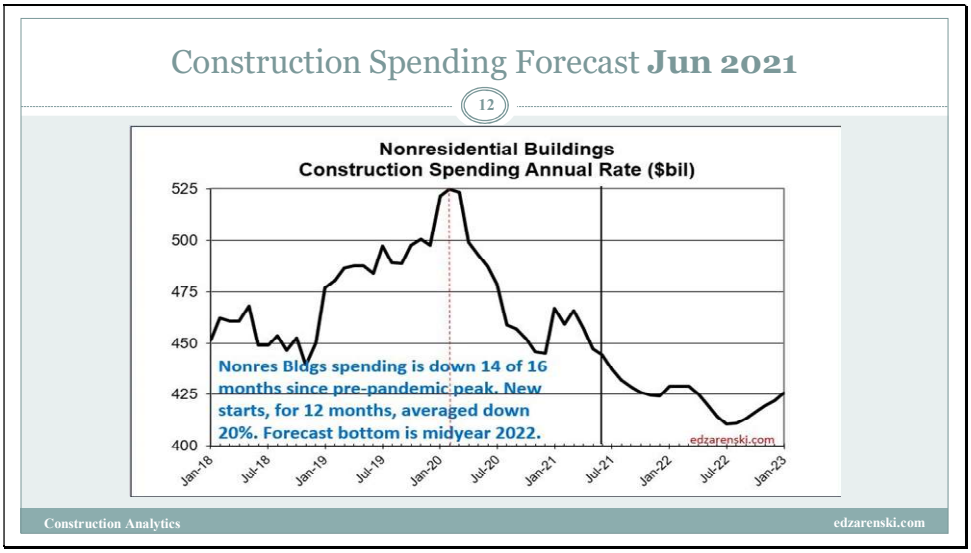
Slide 11



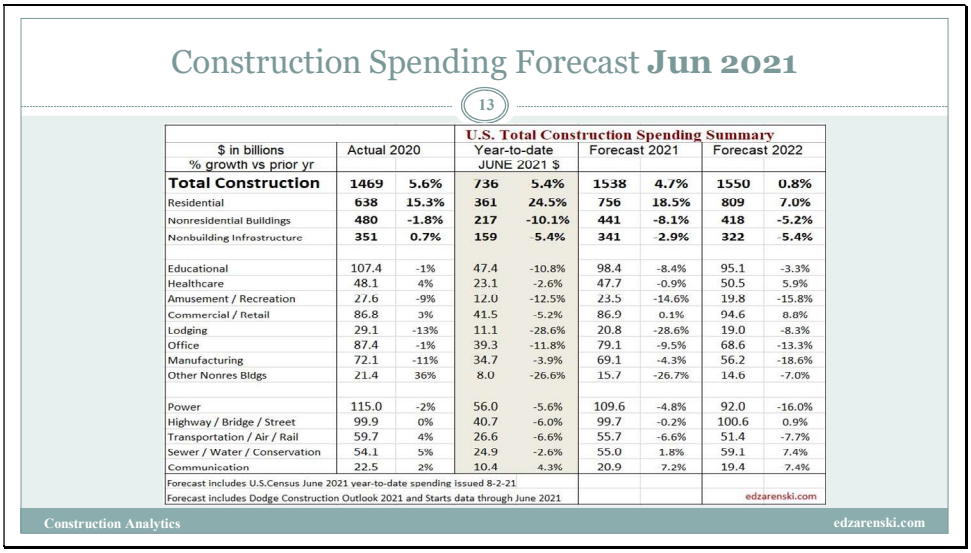
The initial drop in Q1 2020 is from jobs shut down temporarily. A percentage of jobs shut down will not restart. Lack of growth in 2021 and 2022 is due mostly to new construction starts being canceled between April 2020 and March 2021.

Slide 12



Lack of growth in 2021 and 2022 is due to a decline in new construction starts. Nonres Bldgs Starts down 20% for 12 months.

Slide 13



Construction Spending Forecast **Jun 2021**

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U.S. Total Construction Spending Summary

$ in billions % growth vs prior yr	Actual 2020		Year-to-date JUNE 2021 $		Forecast 2021		Forecast 2022	
Total Construction	**1469**	**5.6%**	**736**	**5.4%**	**1538**	**4.7%**	**1550**	**0.8%**
Residential	**638**	**15.3%**	**361**	**24.5%**	**756**	**18.5%**	**809**	**7.0%**
Nonresidential Buildings	**480**	**-1.8%**	**217**	**-10.1%**	**441**	**-8.1%**	**418**	**-5.2%**
Nonbuilding Infrastructure	**351**	**0.7%**	**159**	**-5.4%**	**341**	**-2.9%**	**322**	**-5.4%**
Educational	107.4	-1%	47.4	-10.8%	98.4	-8.4%	95.1	-3.3%
Healthcare	48.1	4%	23.1	-2.6%	47.7	-0.9%	50.5	5.9%
Amusement / Recreation	27.6	-9%	12.0	-12.5%	23.5	-14.6%	19.8	-15.8%
Commercial / Retail	86.8	3%	41.5	-5.2%	86.9	0.1%	94.6	8.8%
Lodging	29.1	-13%	11.1	-28.6%	20.8	-28.6%	19.0	-8.3%
Office	87.4	-1%	39.3	-11.8%	79.1	-9.5%	68.6	-13.3%
Manufacturing	72.1	-11%	34.7	-3.9%	69.1	-4.3%	56.2	-18.6%
Other Nonres Bldgs	21.4	36%	8.0	-26.6%	15.7	-26.7%	14.6	-7.0%
Power	115.0	-2%	56.0	-5.6%	109.6	-4.8%	92.0	-16.0%
Highway / Bridge / Street	99.9	0%	40.7	-6.0%	99.7	-0.2%	100.6	0.9%
Transportation / Air / Rail	59.7	4%	26.6	-6.6%	55.7	-6.6%	51.4	-7.7%
Sewer / Water / Conservation	54.1	5%	24.9	-2.6%	55.0	1.8%	59.1	7.4%
Communication	22.5	2%	10.4	4.3%	20.9	7.2%	19.4	7.4%

Forecast includes U.S.Census June 2021 year-to-date spending issued 8-2-21

Forecast includes Dodge Construction Outlook 2021 and Starts data through June 2021

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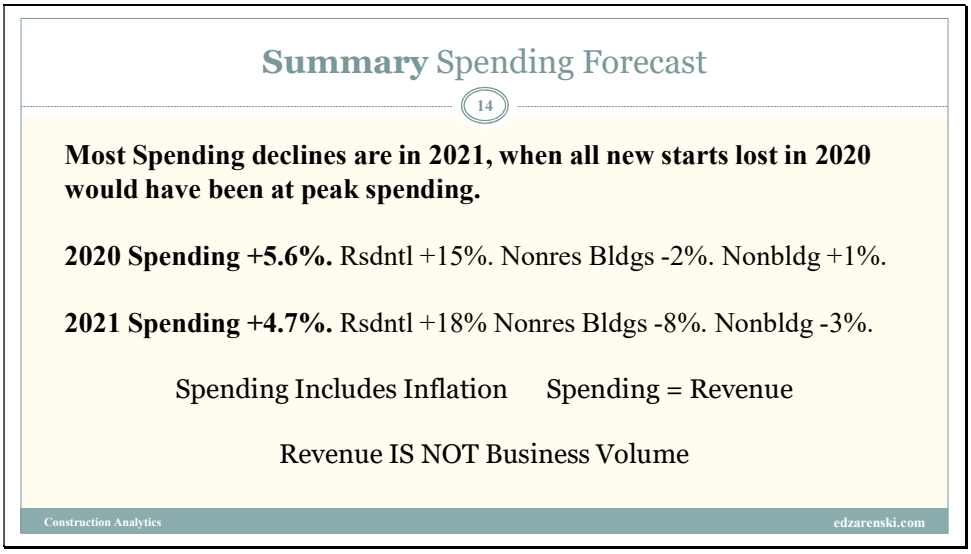
Lack of growth in 2021 and 2022 is due to a decline in new construction starts. Volume declines 3%/yr to 4%/yr next 3 years.

Slide 14


Summary Spending Forecast
14
Most Spending declines are in 2021, when all new starts lost in 2020 would have been at peak spending.
2020 Spending +5.6%. Rsdntl +15%. Nonres Bldgs -2%. Nonbldg +1%.
2021 Spending +4.7%. Rsdntl +18% Nonres Bldgs -8%. Nonbldg -3%.
Spending Includes Inflation
Spending = Revenue
Revenue IS NOT Business Volume
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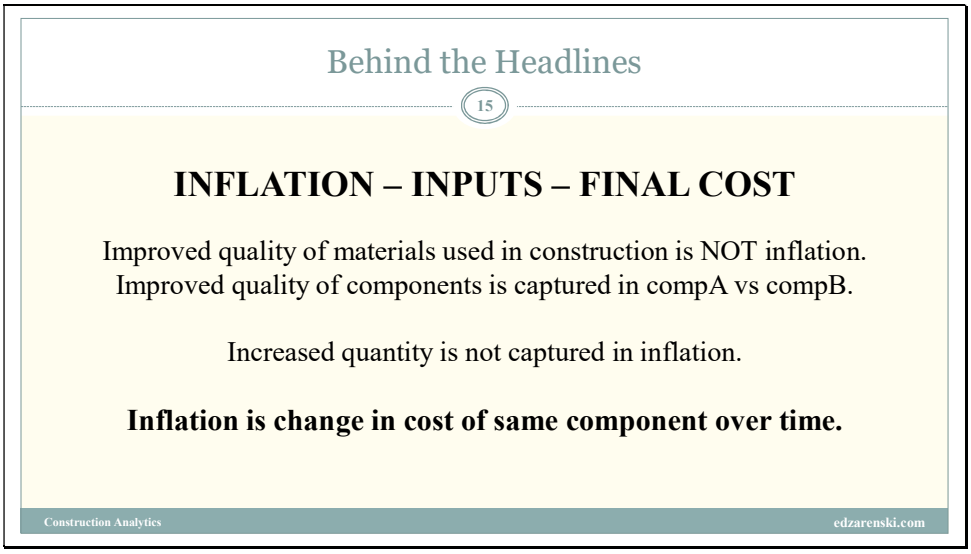
Slide 15


Behind the Headlines
15
INFLATION – INPUTS – FINAL COST
Improved quality of materials used in construction is NOT inflation.
Improved quality of components is captured in compA vs compB.
Increased quantity is not captured in inflation.
Inflation is change in cost of same component over time.
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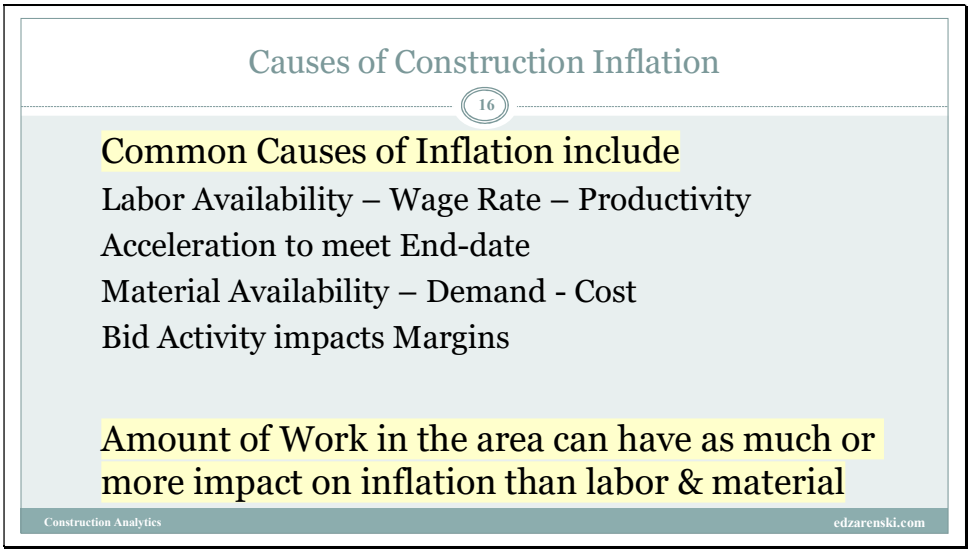
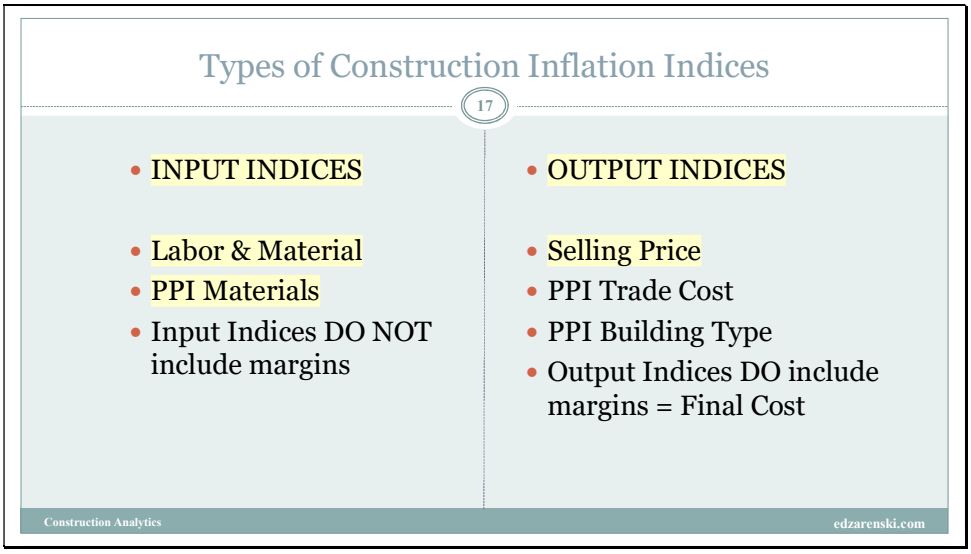
Slide 16



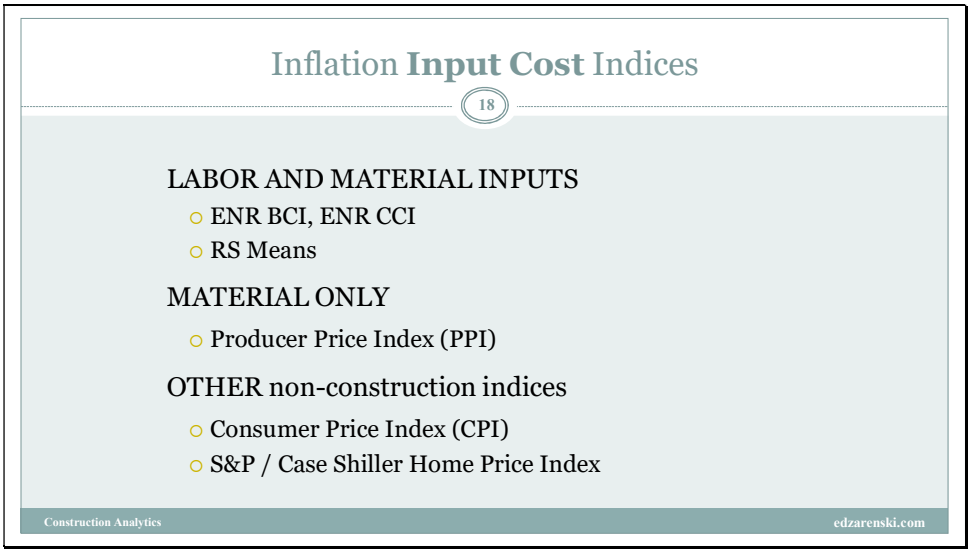
The level of construction activity in a metropolitan area has a significant impact on labor availability and bid activity. Margins tend to increase when work is plentiful and decrease when work is scarce. One-third of businesses report negative impacts due to trade policy.

Slide 17



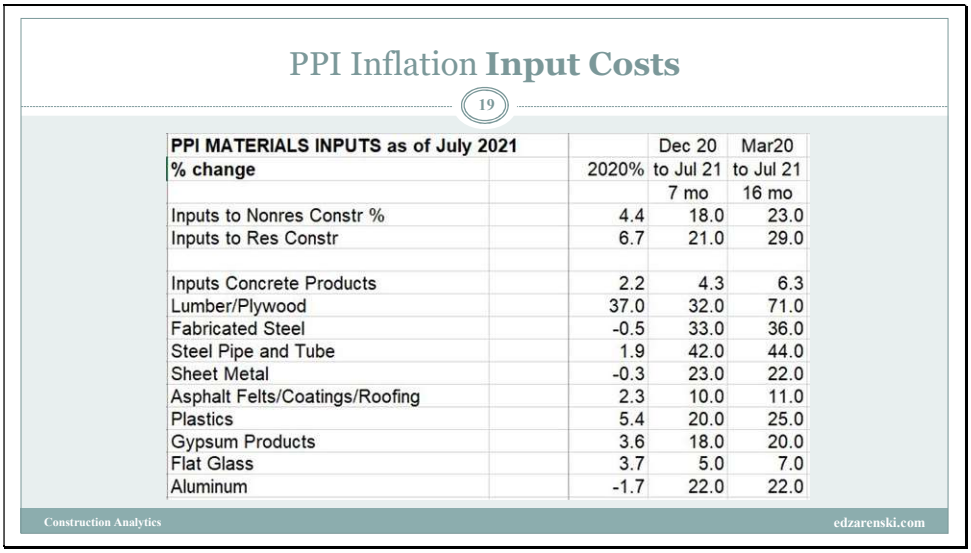
Trade subcontractors may use Input indices to develop labor or material bid pricing, but an owner or CM/GC would need an Output index to adjust the cost estimate of a building over time. Output indices represent total project cost.

Slide 18



No Input cost index accounts for changes in margins. Some input indices don't account for changes in labor. Input indices should not be used to forecast inflated final cost of a building.

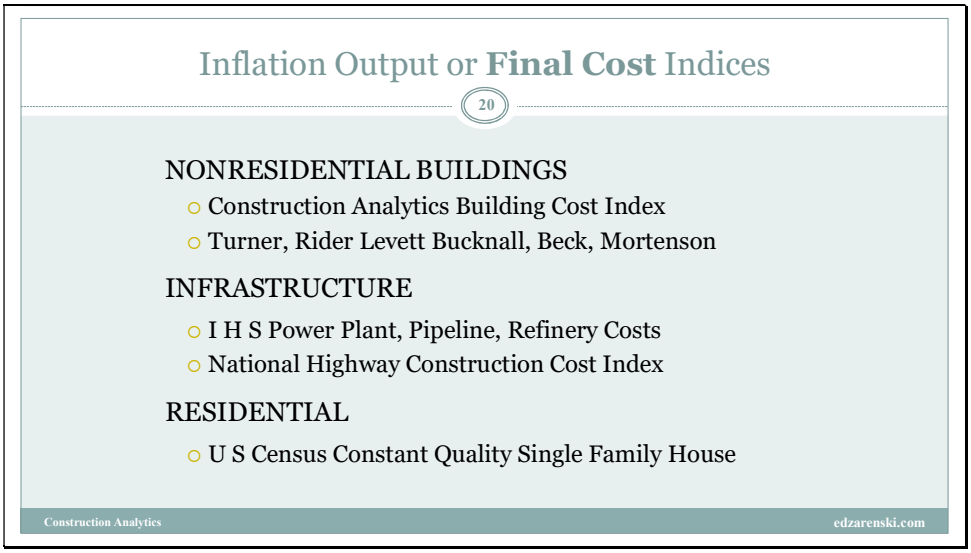
Slide 19



PPI MATERIALS INPUTS as of July 2021		Dec 20	Mar20
% change	2020%	to Jul 21	to Jul 21
		7 mo	16 mo
Inputs to Nonres Constr %	4.4	18.0	23.0
Inputs to Res Constr	6.7	21.0	29.0
Inputs Concrete Products	2.2	4.3	6.3
Lumber/Plywood	37.0	32.0	71.0
Fabricated Steel	-0.5	33.0	36.0
Steel Pipe and Tube	1.9	42.0	44.0
Sheet Metal	-0.3	23.0	22.0
Asphalt Felts/Coatings/Roofing	2.3	10.0	11.0
Plastics	5.4	20.0	25.0
Gypsum Products	3.6	18.0	20.0
Flat Glass	3.7	5.0	7.0
Aluminum	-1.7	22.0	22.0

PPI contractors and buildings indices attempt to account for all final cost. All other PPI indices are input costs at various levels of input. Some of them represent pre-wholesale cost changes. Manufacturing Capacity Utilization (CapU) went from 75% to 61%. Manufacturing jobs declined 9%. CapU is now back above 70%.

Slide 20



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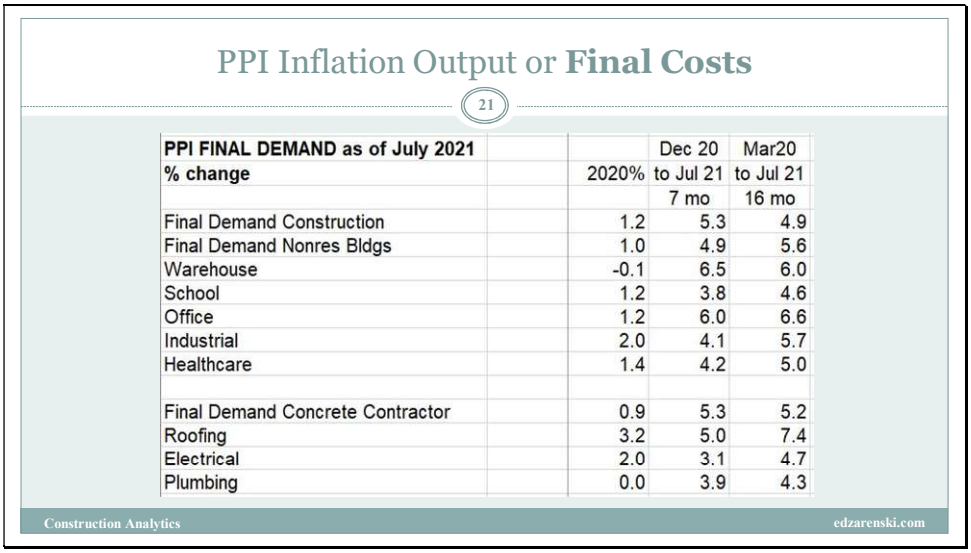
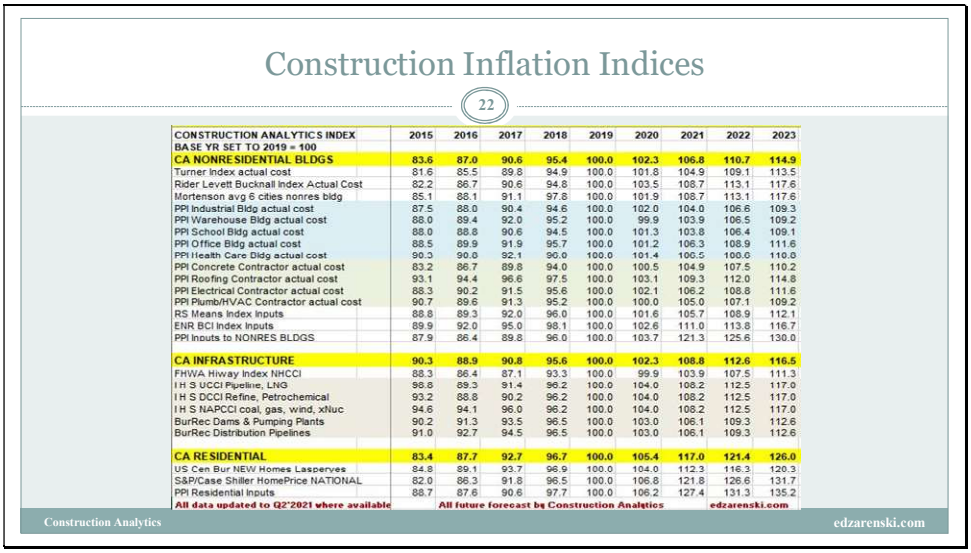


PPI FINAL DEMAND as of July 2021		Dec 20	Mar20
% change	2020%	to Jul 21	to Jul 21
		7 mo	16 mo
Final Demand Construction	1.2	5.3	4.9
Final Demand Nonres Bldgs	1.0	4.9	5.6
Warehouse	-0.1	6.5	6.0
School	1.2	3.8	4.6
Office	1.2	6.0	6.6
Industrial	2.0	4.1	5.7
Healthcare	1.4	4.2	5.0
Final Demand Concrete Contractor	0.9	5.3	5.2
Roofing	3.2	5.0	7.4
Electrical	2.0	3.1	4.7
Plumbing	0.0	3.9	4.3

PPI contractors and buildings indices attempt to account for all final cost. All other PPI indices are input costs at various levels of input. Some of them represent pre-wholesale cost changes. Manufacturing Capacity Utilization (CapU) went from 75% to 61%. Manufacturing jobs declined 9%. CapU is now back above 70%.

Slide 22



Construction Inflation Indices

22

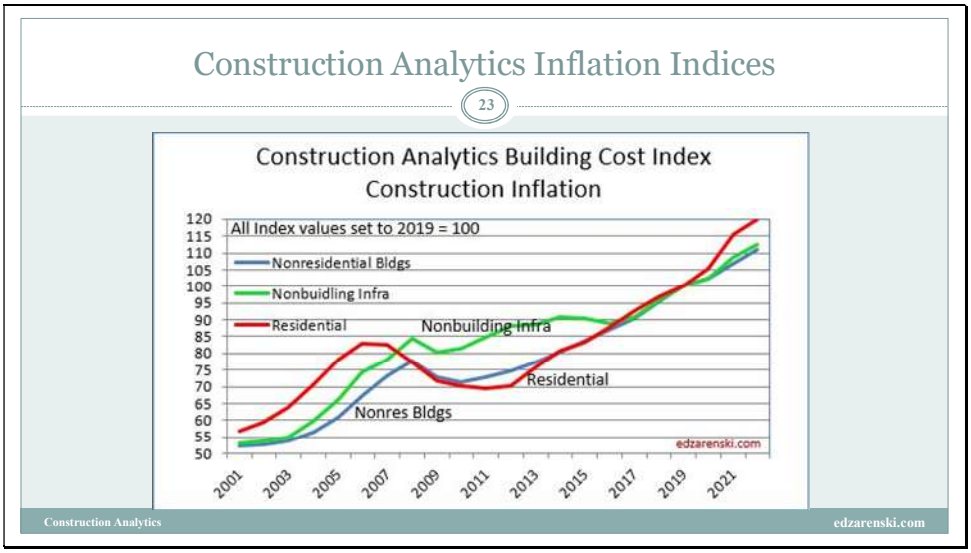
CONSTRUCTION ANALYTICS INDEX BASE YR SET TO 2019 = 100	2015	2016	2017	2018	2019	2020	2021	2022	2023
CA NONRESIDENTIAL BLDGS	**83.6**	**87.0**	**90.6**	**95.4**	**100.0**	**102.3**	**106.8**	**110.7**	**114.9**
Turner Index actual cost	81.6	85.5	89.8	94.9	100.0	101.8	104.9	109.1	113.5
Rider Levett Bucknall Index Actual Cost	82.2	86.7	90.6	94.8	100.0	103.5	108.7	113.1	117.6
Mortenson avg 6 cities nonres bldg	85.1	88.1	91.1	97.8	100.0	101.9	108.7	113.1	117.6
PPI Industrial Bldg actual cost	87.5	88.0	90.4	94.6	100.0	102.0	104.0	106.6	109.3
PPI Warehouse Bldg actual cost	88.0	89.4	92.0	95.2	100.0	99.9	103.9	106.5	109.2
PPI School Bldg actual cost	88.0	88.8	90.6	94.5	100.0	101.3	103.8	106.4	109.1
PPI Office Bldg actual cost	88.5	89.9	91.9	95.7	100.0	101.2	106.3	108.9	111.6
PPI Health Care Bldg actual cost	90.3	90.6	92.1	96.0	100.0	101.4	106.5	108.6	110.8
PPI Concrete Contractor actual cost	83.2	86.7	89.8	94.0	100.0	100.5	104.9	107.5	110.2
PPI Roofing Contractor actual cost	93.1	94.4	96.6	97.5	100.0	103.1	109.3	112.0	114.8
PPI Electrical Contractor actual cost	88.3	90.2	91.5	95.6	100.0	102.1	106.2	108.8	111.6
PPI Plumb/HVAC Contractor actual cost	90.7	89.6	91.3	95.2	100.0	100.0	105.0	107.1	109.2
RS Means Index Inputs	88.8	89.3	92.0	96.0	100.0	101.6	105.7	108.9	112.1
ENR BCI Index Inputs	89.9	92.0	95.0	98.1	100.0	102.6	111.0	113.8	116.7
PPI Inputs to NONRES BLDGS	87.9	86.4	89.8	96.0	100.0	103.7	121.3	125.6	130.0
CA INFRASTRUCTURE	**90.3**	**88.9**	**90.8**	**95.6**	**100.0**	**102.3**	**108.8**	**112.6**	**116.5**
FHWA Hiway Index NHCCI	88.3	86.4	87.1	93.3	100.0	99.9	103.9	107.5	111.3
I H S UCCI Pipeline, LNG	98.8	89.3	91.4	96.2	100.0	104.0	108.2	112.5	117.0
I H S DCCI Refine, Petrochemical	93.2	88.8	90.2	96.2	100.0	104.0	108.2	112.5	117.0
I H S NAPCCI coal, gas, wind, xNuc	94.6	94.1	96.0	96.2	100.0	104.0	108.2	112.5	117.0
BurRec Dams & Pumping Plants	90.2	91.3	93.5	96.5	100.0	103.0	106.1	109.3	112.6
BurRec Distribution Pipelines	91.0	92.7	94.5	96.5	100.0	103.0	106.1	109.3	112.6
CA RESIDENTIAL	**83.4**	**87.7**	**92.7**	**96.7**	**100.0**	**105.4**	**117.0**	**121.4**	**126.0**
US Cen Bur NEW Homes Lasperyes	84.8	89.1	93.7	98.9	100.0	104.0	112.3	116.3	120.3
S&P/Case Shiller HomePrice NATIONAL	82.0	86.3	91.8	96.5	100.0	106.8	121.8	126.6	131.7
PPI Residential Inputs	88.7	87.6	90.6	97.7	100.0	106.2	127.4	131.3	135.2

All data updated to Q2'2021 where available — All future forecast by Construction Analytics — edzarenski.com

Construction Analytics — edzarenski.com

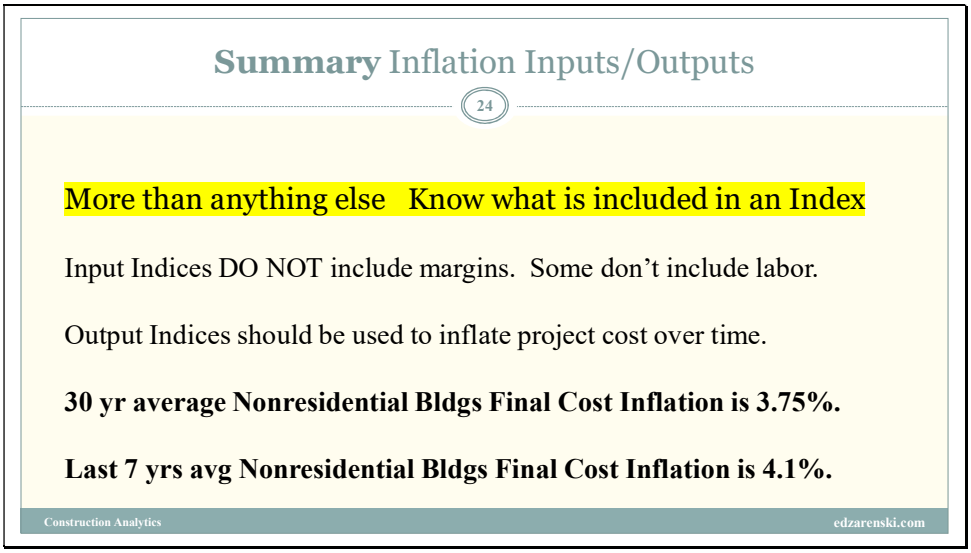
This table normalizes all indices to the same baseline 2019 = 100. That allows indices to be compared. This is a small subset of the index data published in Construction Inflation Tables on edzarenski.com Construction Analytics website.

Slide 23

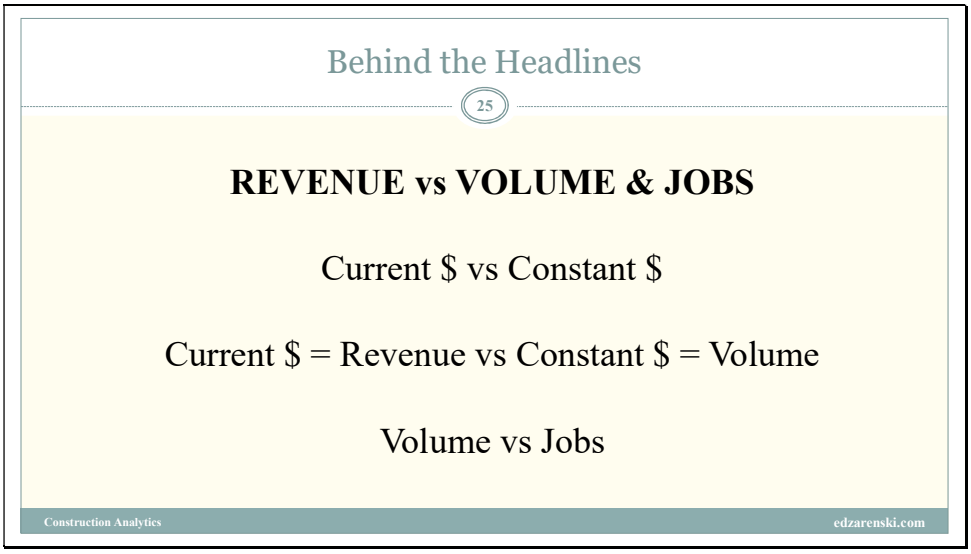


The plots here show Construction Analytics indices (the highlighted data in the table above).

Slide 24


Summary Inflation Inputs/Outputs
24
More than anything else Know what is included in an Index
Input Indices DO NOT include margins. Some don't include labor.
Output Indices should be used to inflate project cost over time.
30 yr average Nonresidential Bldgs Final Cost Inflation is 3.75%.
Last 7 yrs avg Nonresidential Bldgs Final Cost Inflation is 4.1%.
Construction Analytics
edzarenski.com

Slide 25


Behind the Headlines
25
REVENUE vs VOLUME & JOBS
Current $ vs Constant $
Current $ = Revenue vs Constant $ = Volume
Volume vs Jobs
Construction Analytics
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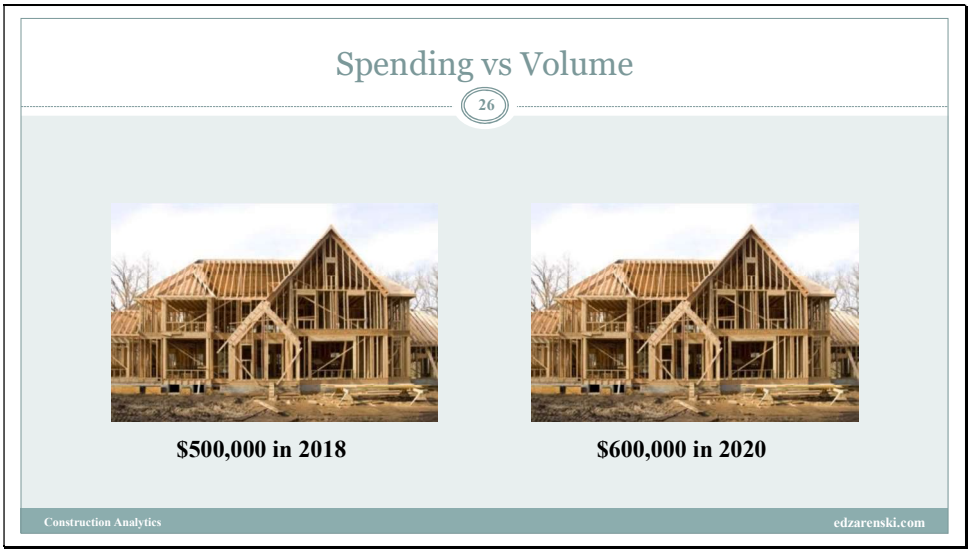
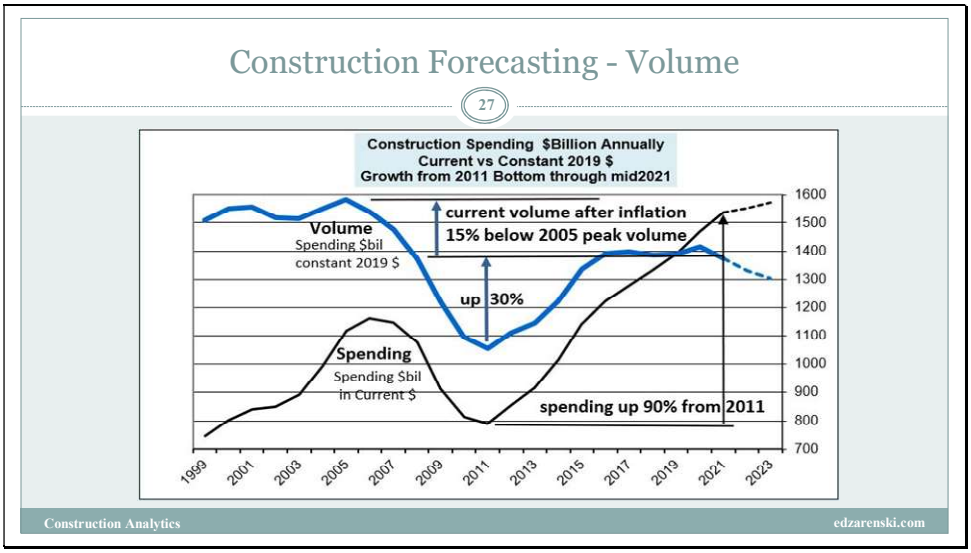
Slide 26



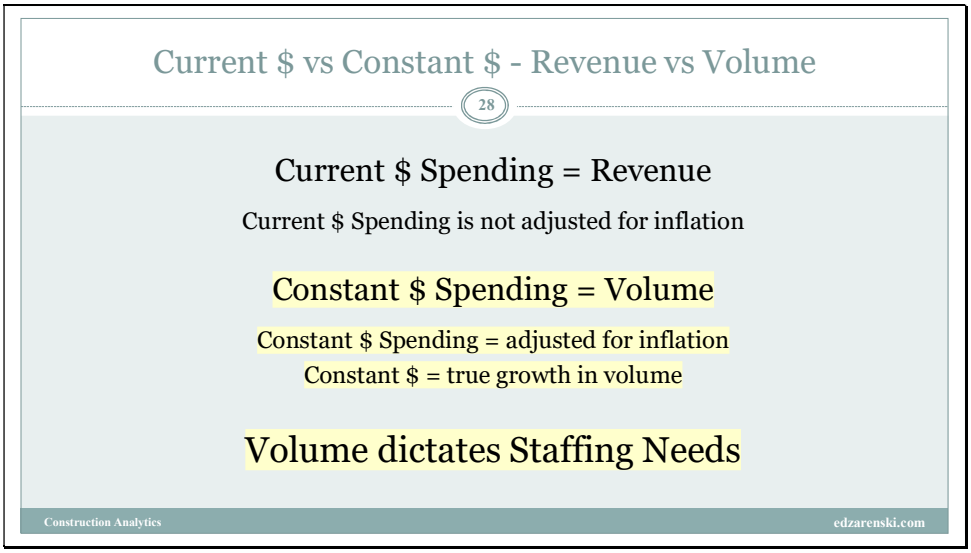
Example: If a developer built a house two years ago for $500,000 and the same size house this year for $600,000. His revenue increased 20% but the amount of business volume did not increase. It's still exactly the same one house, same materials, same labor. All the increase in revenue was inflation.

Slide 27



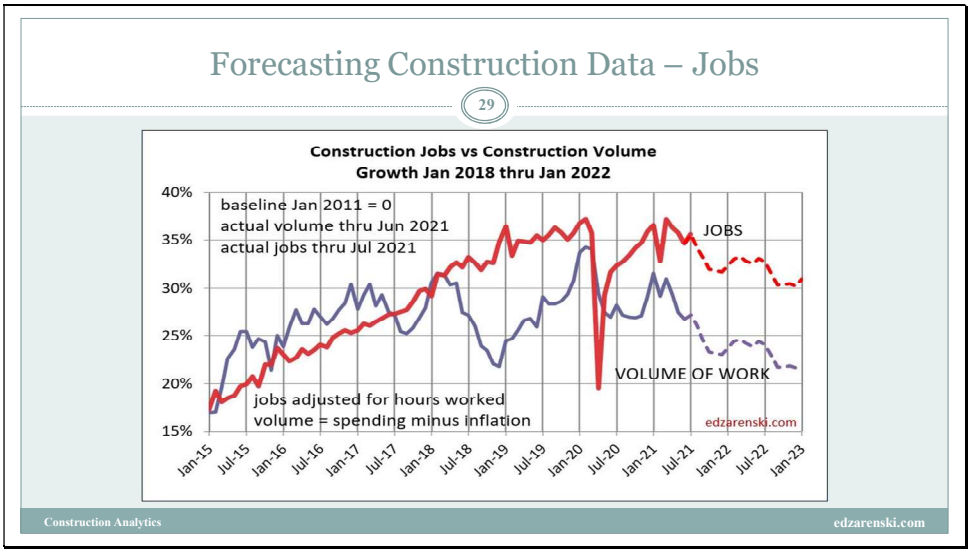
Spending up 90% from 2011 low point. But inflation averaged 4% for last 6 years. Real volume growth 2011-2019 is only 30%. Real Volume still 15% below previous peak high in 2005. Volume is not growing as fast as spending (or Revenue) would indicate.

Slide 28



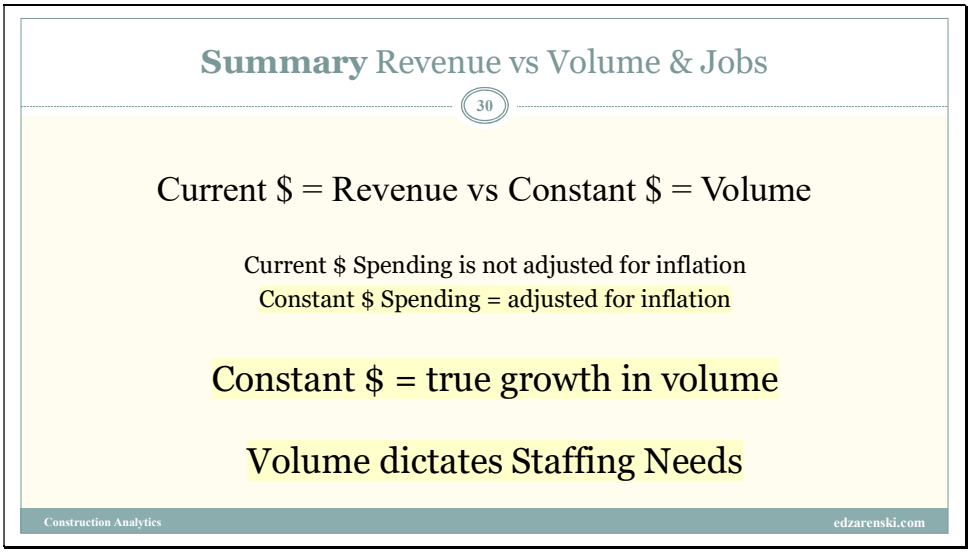
Prior to recession, in 2003-2007, spending was increasing near 10%+/year. Jobs increased +15% in 3 years. But inflation was 8%+/year. Real volume increased only 2% in 3 years, but jobs increased 15%. High rate of inflation in the spending led to excess jobs growth.

Slide 29



From the Feb 2020 peak to July of 2021, jobs recovered 7% but volume recovered only 3%.. Annual AVG 2020 jobs are down 216,000. Expect losses of up to another 200,000 in 2021. Residential up but Nonresidential down steeply.

Slide 30


Summary Revenue vs Volume & Jobs
30
Current $ = Revenue vs Constant $ = Volume
Current $ Spending is not adjusted for inflation
Constant $ Spending = adjusted for inflation
Constant $ = true growth in volume
Volume dictates Staffing Needs
Construction Analytics
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Where to Find More Information
31
Much more information on these topics,
Forecast, New Starts, Backlog, Jobs,
Inflation Indices, Volume
with links to all source materials
can be accessed at
edzarenski.com
Construction Analytics
edzarenski.com

Slide 32


Thank You
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