



Behind the Headlines

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WHAT IS INCLUDED THE DATA WE USE?

Construction Starts - Backlog – Spending - Forecasting

HOW DO WE GET FROM START TO FINISH?

Current \$ - Inputs - Inflation – Final Cost – Constant \$

WHAT RISK TO YOUR PROJECT / BUSINESS PLAN?

Revenue – Inflation - Volume – Jobs - Growth

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NEW STARTS AND STARTING BACKLOG

New Starts = Contract Awards

Cash Flow = Project Spending over time

Spending = Sum of Cash Flow this month from all Projects

Backlog = Remaining Estimate to Complete Under Contract

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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 spending forecast. It could be an increase in market share captured in the survey. It takes several years of data to see this.

Forecasting – Starts vs Spending

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Construction Analytics Starts vs Spending \$ billions	Construction Starts						Spending Put-in-Place					
	2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
ALL CONSTRUCTION	786	817	856	801	932	1,120	1,280	1,333	1,391	1,500	1,626	1,799
RESIDENTIAL	307	330	331	352	426	419	546	564	553	644	803	910
OFFICE	43	48	55	44	41	54	69	77	89	93	87	88
MANUFACTURING	26	32	34	17	32	90	71	73	81	75	79	108
HIGHWAY	73	78	75	84	83	104	90	92	99	102	101	110
TRANSPORTATION	37	25	29	21	23	34	46	53	57	61	57	57

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Starts is not Spending. Starts must be adjusted for share of total market, then spread out over time using cash flow curves 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.

Forecasting – New Starts

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Construction Analytics		FORECAST STARTS ADJUSTED									
		2021		2022		2023		2024		2025	
NEW STARTS ONLY	\$ in thousands_000	Change Yr/Yr	Change Yr/Yr	Change Yr/Yr	Change Yr/Yr	Change Yr/Yr	Change Yr/Yr	Change Yr/Yr	Change Yr/Yr	Change Yr/Yr	
TOTAL ALL MARKETS	1,785,400	13.9%	1,947,128	9.1%	1,989,618	2.2%	2,095,894	5.3%	2,212,102	5.5%	
RESIDENTIAL	836,213	19.8%	884,133	5.7%	839,201	-5.1%	889,920	6.0%	983,203	10.5%	
MANUFACTURING	121,503	25.7%	147,742	21.6%	165,096	11.7%	173,289	5.0%	171,901	-0.8%	
OFFICE	92,020	3.3%	98,789	7.4%	103,124	4.4%	106,757	3.5%	112,150	5.1%	
COMMERCIAL/RETAIL	115,033	17.6%	130,379	13.3%	129,923	-0.3%	121,460	-6.5%	118,095	-2.8%	
EDUCATIONAL	103,897	2.5%	115,544	11.2%	127,251	10.1%	137,033	7.7%	148,973	7.3%	
LODGING	19,233	-9.2%	22,835	18.7%	26,374	15.5%	30,298	14.9%	35,762	18.0%	
HEALTHCARE	53,882	8.3%	60,772	12.8%	68,445	12.6%	74,969	9.5%	80,550	7.4%	
AMUSEMENT/RECREATION	27,975	5.3%	30,880	10.4%	33,529	8.6%	36,703	9.5%	41,268	12.4%	
OTHER NONRES BLDGS	14,438	-11.1%	15,178	5.1%	17,316	14.1%	19,091	10.3%	20,801	9.0%	
TOAL NONRES BLD MRKTS	547,982	9.9%	622,119	13.5%	671,058	7.9%	699,600	4.3%	727,500	4.0%	
POWER	120,456	3.5%	128,111	6.4%	136,614	6.6%	141,823	3.8%	136,144	-4.0%	
HIGHWAY/BRIDGE	129,606	13.4%	146,646	13.1%	162,876	11.1%	176,706	8.5%	175,119	-0.9%	
TRANSPORTATION	59,845	4.4%	63,462	6.0%	67,321	6.1%	68,219	1.3%	67,069	-1.7%	
ENVIRON PUB WORKS	66,529	13.0%	77,299	16.2%	86,700	12.2%	93,253	7.6%	95,903	2.8%	
COMMUNICATIONS	24,769	1.5%	25,358	2.4%	25,647	1.9%	26,373	2.0%	27,164	3.0%	
TOTAL NONBLDG MRKTS	401,205	8.2%	440,876	9.9%	479,360	8.7%	506,374	5.6%	501,399	-1.0%	

Source: includes Dodge Data & Analytics Starts thru APR 2023 edzarenski.com

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2021+2022
2 yr totals

TOTAL+24%

RSDN +35%

Mnfg +53%

Comm +33%

BLDGS +25%

HiWay +28%

PubWrks+32%

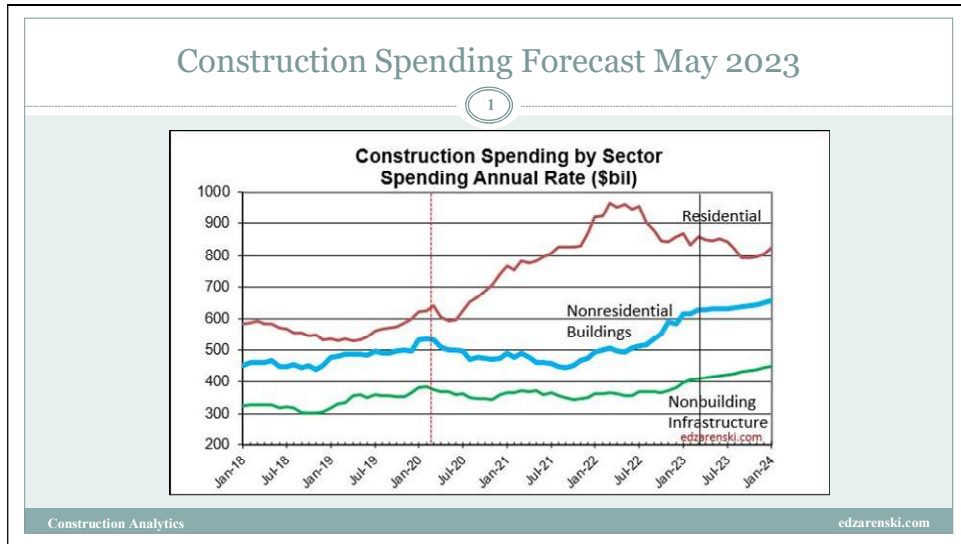
INFRA +19%

A New Start is a contract award. New Starts in this analysis are forecast from raw data and are adjusted by Construction Analytics to represent full spending. Starts are also adjusted for historical Dodge average annual revision.

Summary Starts and Backlog			
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New Construction Starts	2021	2022	2023
Residential	20%	6%	-5%
Nonresidential Bldgs	10%	13%	8%
Manufacturing	26%	22%	12%
Non-bldg Infra	8%	10%	9%
Starting Backlog Jan.1	2021	2022	2023
Residential	19%	20%	6%
Nonresidential Bldgs	2%	8%	13%
Non-bldg Infra	3%	6%	8%

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Residential Starts in 2020 were up 19%. Nonres Bldgs and Nonbldg were only 1% to 3%. In 2022 and 2023, Residential is slowing and Nonresidential is picking up. Nonresidential Bldgs starts in the 2nd half of 2022 recorded best growth ever.



Nonres Bldgs Spending reversed in Q3 2021, now headed up. Decline in Starts held down spending for 16 months. Keep in mind nominal spending data still includes inflation which does not add to volume growth.

Summary Spending Forecast			
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Nonres Bldgs and Non-bldg Infrastructure Outlook for 2023 adds \$150 billion in new work in 2023, \$80 billion in 2024.			
Spending Actual/Forecast	2021	2022	2023
TOTAL	8.5%	10.6%	4.7%
Residential	25%	13%	-9%
Nonresidential Bldgs	-6%	12%	21%
Non-bldg Infrastructure	-1%	2%	16%
Spending Includes Inflation		Spending = Revenue	
Revenue IS NOT Business Volume			
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Residential starts have been booming.

Nonresidential starts began climbing in mid-2021 and really took off in 2nd half 2022. Most spending from starts occurs in the year following the start, (Nonres bldgs 2023 +21%).

Types of Construction Inflation Indices

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INPUT INDICES	OUTPUT INDICES
<ul style="list-style-type: none">• Labor & Material• PPI Materials• Input Indices DO NOT include margins	<ul style="list-style-type: none">• Selling Price• PPI Trade Cost• PPI Building Type• Output Indices DO include margins = Final Cost

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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 final cost estimate of a building over time. Output indices represent total project cost.

Inflation Output or **Final Cost Indices**

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NONRESIDENTIAL BUILDINGS

- Construction Analytics Building Cost Index
- Turner, Rider Levett Bucknall, Mortenson

INFRASTRUCTURE

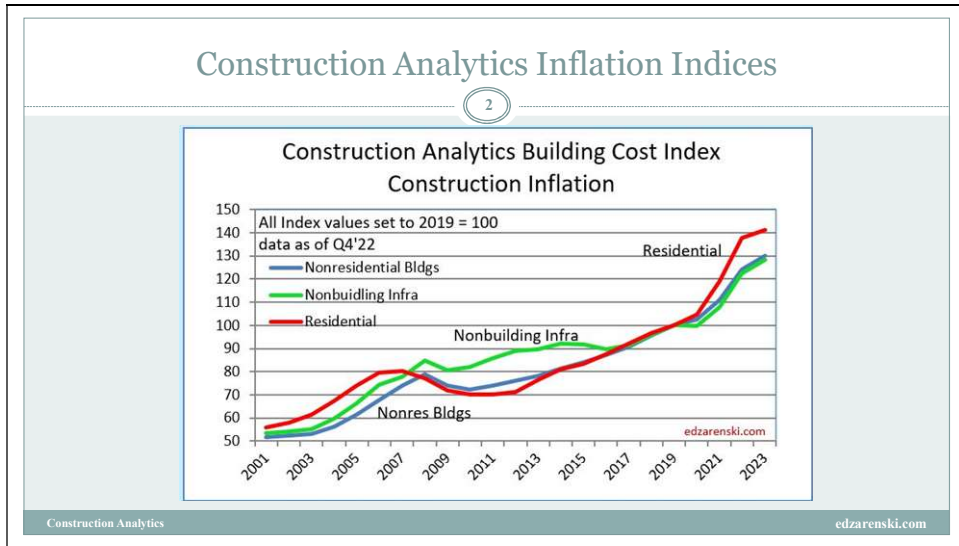
- I H S Power Plant, Pipeline, Refinery Costs
- National Highway Construction Cost Index

RESIDENTIAL

- U S Census Constant Quality Single Family Home

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These Output cost or Final cost indices can be used to move whole project costs over time. Nonresidential Buildings, Non-building Infrastructure and Residential Indices vary greatly from each other. Use an index that applies to building type.



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

Summary Inflation Inputs/Outputs

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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.

**Nonresidential Bldgs Final Cost Inflation 30 yr average is 3.75%.
2014-2019 - 6 yrs avg = 4.4% 2021 = 8% highest since 2007**

2022 INFLATION Rsdn +16% Nonres Bldgs +12% Nonbldg +14%

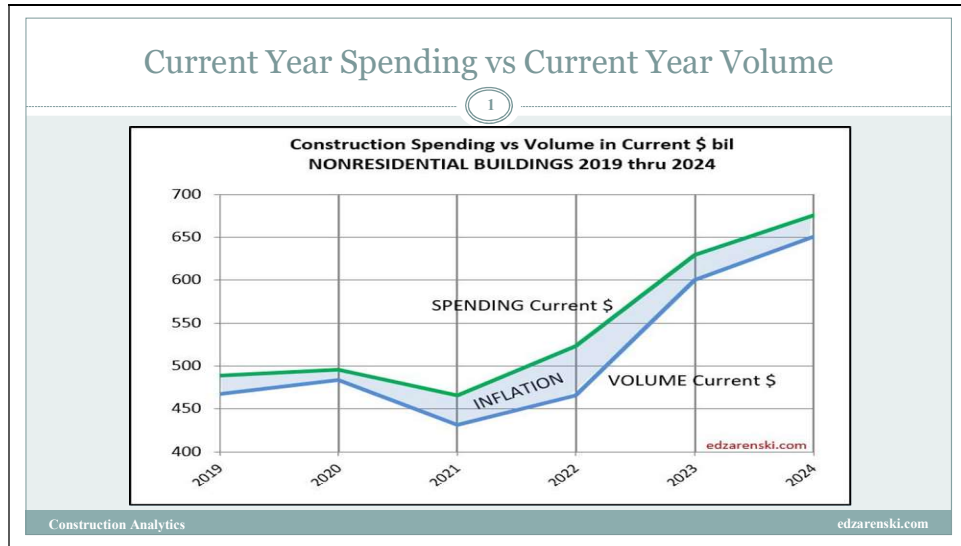
Current Year Spending vs Current Year Volume

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Construction Spending Current \$	2019	2020	2021	2022	2023	2024
Non-residential Buildings Spending Sbil	489	495	466	523	631	661
% change year over year	8.0%	1.3%	-6.0%	12.3%	20.7%	4.7%
NONRES BLDGS INFLATION	4.6%	2.4%	8.2%	11.9%	4.9%	3.8%
SPENDING W/O INFLATION CURRENT \$	2019	2020	2021	2022	2023	2024
Non-residential Buildings Volume Sbil	467	484	430	467	602	636
% change year over year	8.8%	3.5%	-11.1%	8.6%	28.8%	5.7%

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This table shows actual spending, inflation and volume (spending minus inflation) in current \$ each year. These are the values plotted in the following plot.



Spending is the value commonly tracked. It does not represent real business volume growth. Volume is spending minus inflation.

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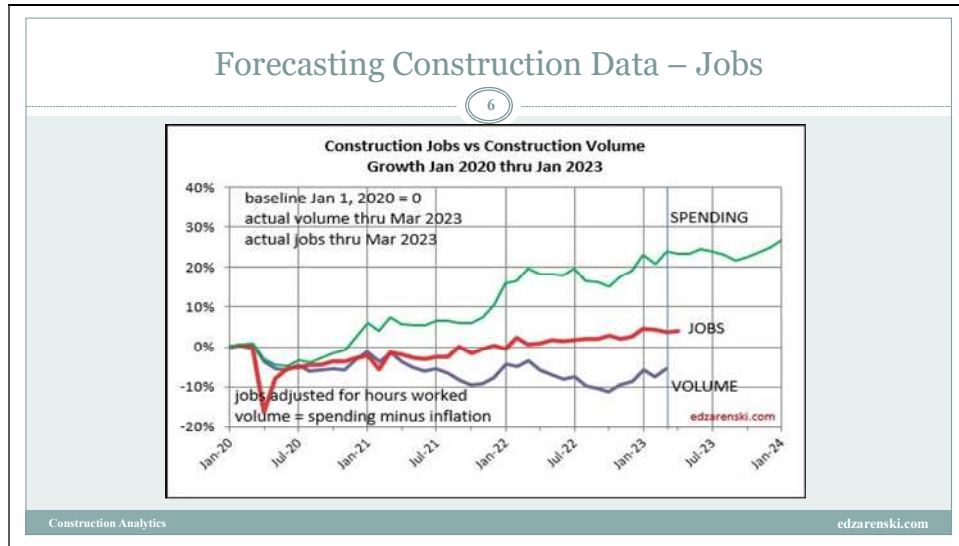
CONSTANT \$ = VOLUME OVER TIME

Revenue = Current \$ With Inflation

Volume = Current \$ minus Inflation

Constant \$ = Volume Over Time

Jobs Need is Dependent in Volume Growth



Construction SPENDING since Jan 2020 +24%

Construction INFLATION since Jan 2020 +30%

Construction VOLUME since Jan 2020 -6%

Construction JOBS since Jan 2020 +4%

Jobs should move at the same rate as Volume (spending minus inflation)

Summary Revenue vs Volume & Jobs

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Current \$ = Spending = Revenue

Current \$ minus Inflation = Volume

Constant \$ = true growth in volume over time

Volume dictates Staffing Needs

Business Risk Due to Inflation

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ASSESSING RISK

Business Plan – Are you tracking Revenue or Volume?

Project Estimate – Have you addressed Inflation?

Staffing Needs – Are you basing on Volume?

Thank You

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