

CSC.554

Pricing Projects in the Hyper-Competitive 2011 Market

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ABSTRACT— The construction marketplace in the US experienced dramatic changes from 2002 through the beginning of 2011. From 2002 to a peak in 2006, overall construction spending increased by 35 percent or an average of almost 7 percent per year. After the peak year of 2006, spending then decreased by almost 30 percent through the end of 2010.

The period of 2002 – 2010 has recorded the most significant upward and then downward change to have occurred in the last 40 years. As a result of the dramatic drop in construction volume, exceptional competition has dropped bid prices 10 percent, 20 percent to even 40 percent.

This paper addresses how construction volume affects competition, how competition affects price, how to react to very low bids/prices, how to properly enhance competition, how to price projects today and budget projects for the future when the market will change, and explores the reasons why construction volume expands and contracts.

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Introduction

The construction marketplace in the US experienced dramatic changes from 2002 through the beginning of 2011. From 2002 to a peak in 2006, overall construction spending increased by 35 percent or an average of almost 7 percent per year. After the peak year of 2006, spending then decreased by almost 30 percent through the end of 2010.

The period of 2002 – 2010 has recorded the most significant upward and then downward change to have occurred in the last 40 years. As a result of the dramatic drop in construction volume, exceptional competition has dropped bid prices 10 percent, 20 percent to even 40 percent.

Predicting the cost of projects is always a challenge for owners and estimators, but when the marketplace is volatile, this challenge becomes even more daunting. This paper addresses how to price projects in the current hyper-competitive marketplace by addressing underlying issues. These issues include:

- How construction volume affects competition.
- How competition affects price.
- What are the reasons why construction volume expands and contracts.
- How to react to very low bids/prices.
- How to properly enhance competition. And,
- How to budget projects for the future.

Economics and Price

A basic law of economics is “supply and demand.” As demand for any product increases, the price for the product goes up and if the demand drops, the price likewise drops. When supply and demand are in reasonable balance, modest price adjustments are sufficient to keep the system smooth. However, when demand becomes extremely strong, prices will soar potentially to the point of price gouging or, if demand drops far enough, products may be sold below their actual cost of production just to “keep them moving,” as with automotive industry rebates and incentives. In some instances supply is kept artificially low in order to keep prices high, as with crude oil.

Construction, as a commodity, generally follows supply and demand except that the “product” of construction, namely a constructed project, tends to be “one of a kind” instead of “off the shelf.” Projects are procured through a multi-step process that includes design and construction with only the simplest of “modular” projects being an exception. There is no real opportunity to “build inventory” in the construction industry and supply and demand are difficult to gauge, predict and control. Interest in any project is usually judged by how many bidders, or in the newer lexicon, “offerors” are competing for the project. Increased use of design-build, construction manager at risk and build-operate-transfer are presenting new and different challenges, especially when negotiation is a prime means of procurement.

Theoretical Relationships

In his book, **Games, Strategies, and Managers - How Managers Can Use Game Theory to Make Better Business Decisions**, John McMillan discusses how competition can affect price, especially in the context of an auction. Bidders calculate a price that includes their direct costs as well as overhead and profit. A reasonably complete assessment of cost would be the bidder's "valuation," or the minimum price that includes costs and a reasonable profit.

In an auction a bidder wants to submit the minimum price that can win. McMillan points out that a bidder should "shade" or "cushion" their bid, by bidding $(N-1)/N$ times their valuation, where N is the total number of bidders expected. This relationship is shown as follows:

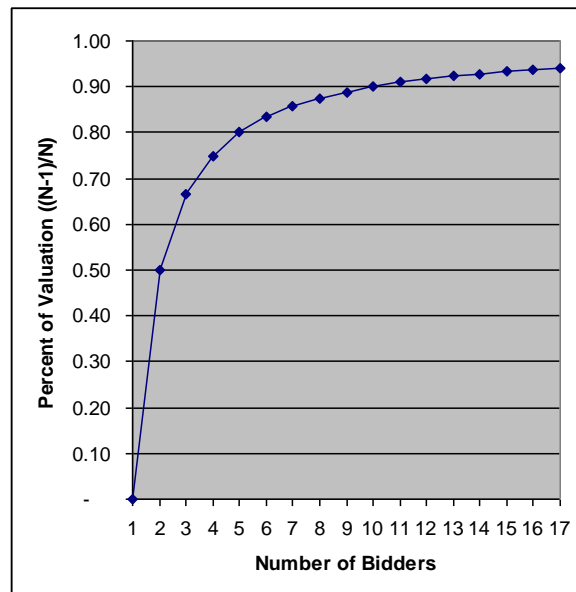


Figure 1 – Relationship of Bidders in an Auction

As the numbers of bidders rise, in order to be competitive an individual's bid will tend to approach their valuation. Conversely, if the number of bidders is limited, the "shade" could be 50 percent for two bidders. A single bid yields an "unknown" result.

Construction bidding is the inverse of an auction in the sense that the bidder wants to achieve the maximum price that can still win. Put in construction terms, the larger the number of bidders, the more likely that the low bidder(s) will drop significantly below the true "valuation" for the project.

Construction spending and the cost of projects

Historically, construction bid prices have tended to follow increases, leveling and decreases in construction volume. Strong demand tends to increase price while weak demand tends to drop price. Extremely strong demand will raise the price to the point that supply will eventually increase, moderating the price. If demand ebbs, the price will continue to drop to the point where, if demand becomes too weak to sustain a reasonable supply, supply will be eliminated and the price also moderates.

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This effect can be even more significant within the industry sectors. Residential spending in 2006 abruptly dropped by almost 70 percent in a three year period and has only very modestly recovered going into 2011. The residential construction industry has been decimated with virtually no demand.

Conversely, the non-residential sector held strong through most of 2008, only to eventually succumb to the effects of a deep recession and drop 9 percent in 2009, and over 11 percent in 2010.

Figure 2 plots annual construction spending from 1977 through the end of 2010, and displays that the period of 2002 – 2010, recorded by far the most significant upward and then downward change to have occurred in the last 40 years.

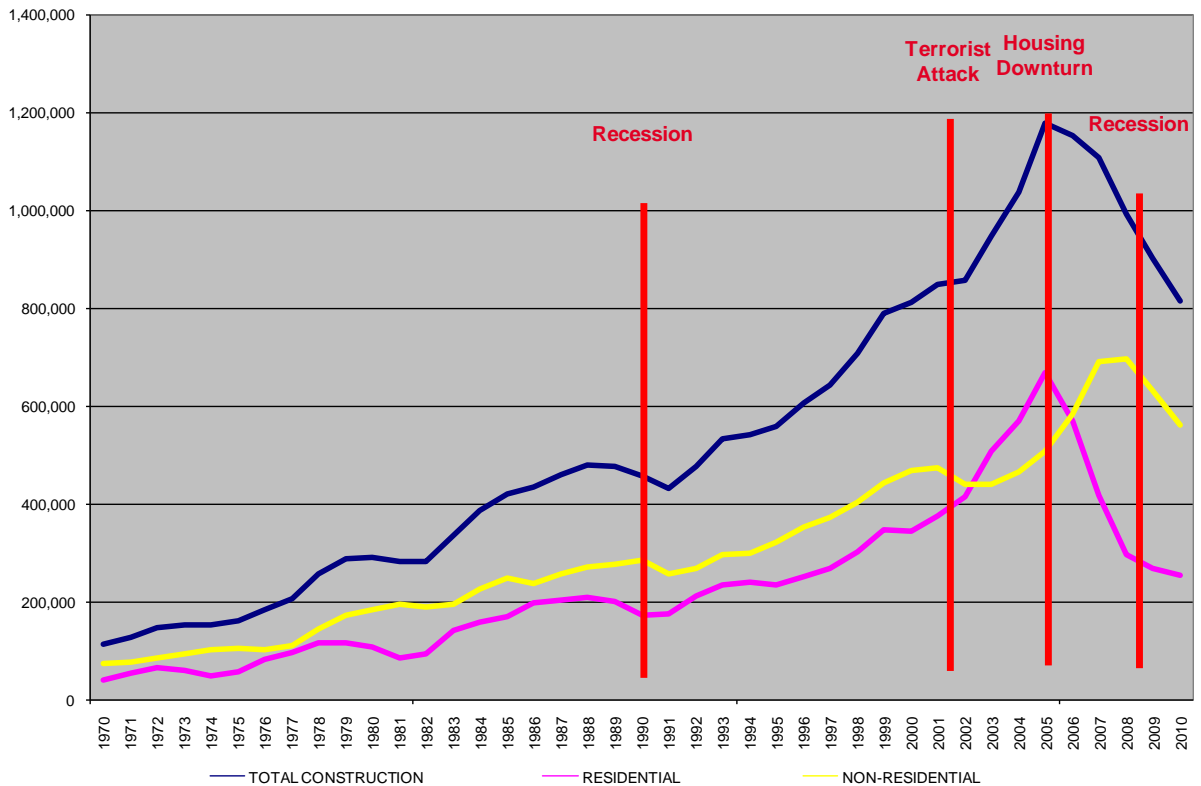


Figure 2 – Construction Spending 1977-2010

When supply and demand factors are in reasonable balance, bid prices tend to be predictable and yearly increases will track inflation in labor and material costs. This balance can be defined as "fair value."

For most of the late 1990's through the mid 2000's, prices were reasonably consistent and predictable. Most owners could plan and program their projects with adequate funds to meet eventual bids and/or negotiated prices. However, starting in 2005 and continuing through 2008, because of the continued increases in non-residential spending, bid prices rose much more rapidly than basic inflation. This was compounded by overseas demand for raw materials that also created "spot" shortages, such as with steel. Many owners found prices exceeding their budgets by 10, 20 or even 40 percent - in spite of considerable contingencies.

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Since 2008, non-residential demand has dropped dramatically and bid prices have also dropped to the point where most owners can comfortably fund their projects including most of their “wish” lists. The downward swing has been as much as 40 percent when compared to peak years of 2006, 2007 and 2008. This is a dramatic change.

Labor costs increase with time and material costs will tend to swing up and down to a certain degree. However, the question arises as to why do construction costs (measured by bid prices) vary so much more than what labor and material costs would indicate?

The answer to the question is competition.

Competition affects prime contractors and subcontractors, so even if the procurement method does not involve direct bidding to a prime contractor, subcontractor pricing is affected in a predictable manner.

Noting that the marketplace of 2004 – 2008 resulted in constrained competition – commonly less than three bidders – premiums were 10% to occasionally over 40 percent. By comparison, in today’s marketplace competition for projects has become extreme with often 6 – 8 prime bidders and even larger numbers among subcontractors competing.

Breakdown of Construction costs

Costs can be subdivided into “direct costs” and “indirect costs.” Direct costs are the costs of procuring and installing material. While these costs usually encompass the majority of a project’s cost, they tend to be relatively consistent between bidders. In other words, bidders tend to draw from similar suppliers and labor pools and on most projects these costs will be very close, barring the occasional circumstance where a particular bidder (usually a subcontractor) has some “edge” on competitors through access or inventory.

The indirect cost side of the equation is much different in that bidders (prime contractors and subcontractors) can allocate overhead costs and define profit-related mark ups.

Figure 3 below displays the relationship between indirect and direct costs.

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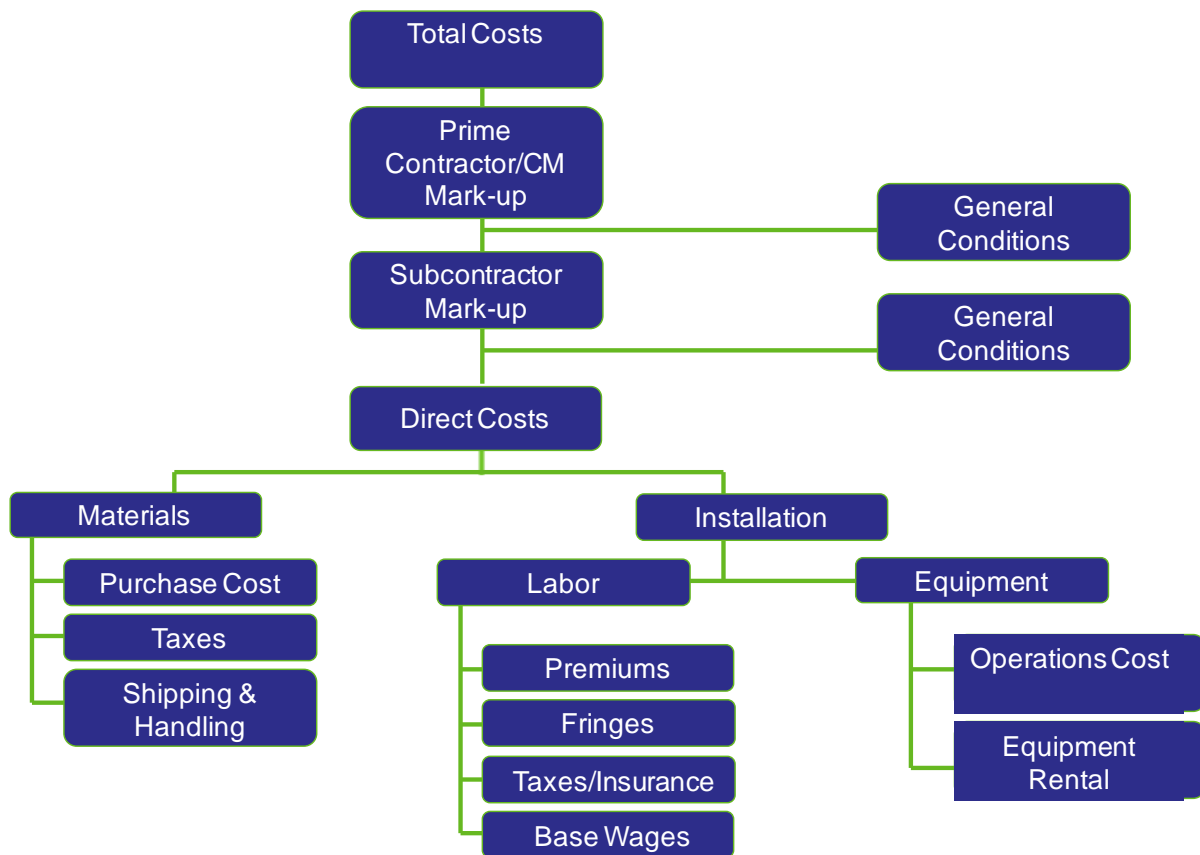


Figure 3 – Breakdown of Construction Costs

How Does Competition Affect Indirect Costs?

In any bidder's response much of their cost is defined and settled. Either they have direct control over their own costs or indirect control through a subcontractor's quote. However, a good deal of their indirect cost is variable. There are several major factors that affect a bidder's variable indirect cost, including:

1. Risk Premium – How much should be added to compensate for risks that cannot otherwise be controlled. The premium can be mitigated by extensive analysis, addition of qualifiers and provisions, more in-depth estimating, transfer of risk to lower tier subcontractors and more in depth general conditions staffing.
2. Purchasing aggressiveness – Aggressive purchasing of subcontractors and suppliers will allow a prime to reduce a bid. Certain contractors will always command better pricing than competitors regardless of market. Also, how aggressively overhead costs are allocated to projects can affect bids, sometimes dramatically. For example, earthwork contractors are heavily equipment intensive and can adjust their bids significantly depending on how equipment overheads are calculated.

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3. Indirect Overhead Costs – Indirect overhead costs affect a contractor's cost of doing business and include internal staff, marketing and business development, insurances and bonding capacity. A contractor's track record with previous projects is an important discriminator.
4. Technological/Informational Advantage – Advantage over competitors can be gained by superior construction methodology and more effective management strategies. High competition can create incentives for creative solutions. Conversely, stringent/literal interpretation of documents and scope of work can limit a bid, potentially provide an advantage and may create future change order opportunities that can be priced at a premium. This is one reason why document quality is so important.
5. Opportunity Cost – What are the implications of winning a bid or of *not* winning a bid? Most contractors view backlog and the prospects of future backlog as critical for long term success. Private sector developers and real estate organizations traditionally have used the prospect of future work as leverage during negotiations with contractors and consultants. The basic need to maintain backlog can also motivate a contractor to bid low to be successful because the cost of losing is more dramatic than taking work at low/no return and making due. The investment required to prepare a bid also figures significantly into the process because a bidder may have other opportunities that do not require as much investment.
6. Profit Margin – Considering all the above issues, profit margin remains a significant decision for the prime contractor and for all subs and suppliers. It's not uncommon for a contractor to calculate a bid with great accuracy only to adjust it upward or downward at the last minute. How much is the work worth?

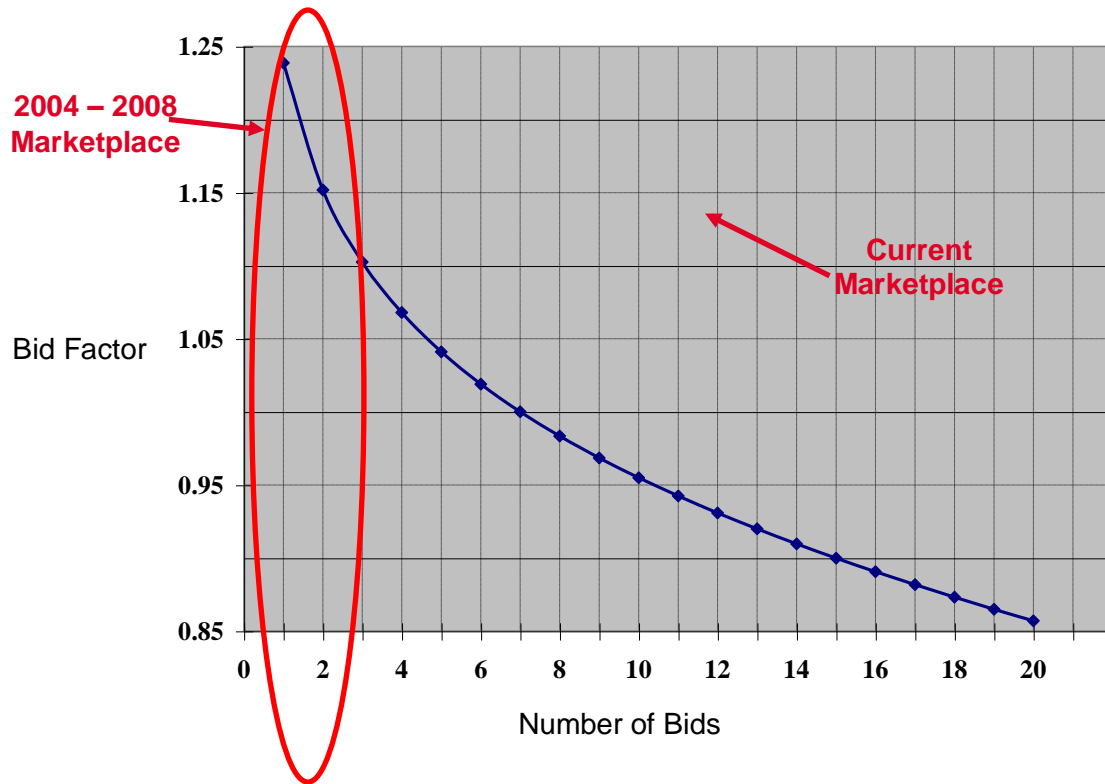
Each of these categories can affect a bid by 5-10 percent and collectively the total combined effect can exceed 30 percent. Competition or the lack of competition is a major factor in how these issues are assessed, how the final bid is prepared and why bids can vary so dramatically depending on competition.

Tracking Competition and Bidding

Several studies have been conducted over the years to assess the impact of the number of bidders on the bid price. Possibly the most extensive study was done in conjunction with the development of Area Cost Factors for the U.S. Army Corps of Engineers in the 1980's. The study examined a large number of projects (in excess of 200) and correlated the low bid with the final government estimate and with the total number of bidders. At the time of the study, the expected norm for the number of bidders was seven, so the zero datum point was set at seven.

The result of the study is presented below. For example, four bidders resulted in a low bid that was 7 percent higher than low bids received from seven bidders, ten bidders 5 percent lower and two bidders 15 percent higher. Today's expectations for the number of bidders are more modest, probably closer to five. In an environment where anticipated bidders are less than seven, the chart can still be used. For example, if two bids instead of five bids were received, the result would be about 11 percent higher than expectations (1.15/1.04).

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Source: Area Cost Factor Study, U.S. Army Corps of Engineers

Figure 4 – Competition and Bidding

It is interesting to note the similarities between the Corps of Engineer's chart and that of McMillan. The two charts are a close inverse of each other, as would be anticipated.

Other studies have assessed the premium associated with reduced competition. The *"Timing and Bundling Projects to Offset the Limitation on the Number of Bidders Created by Contractor Prequalification Criteria on Public Works"*, prepared by Sheng Li and Peter Philips of the Department of Economics/University of Utah in 2000 assessed the effects of reduced competition on publicly bid projects. They concluded, among other issues, that reduced competition increased the gap between bidders and ultimately added a premium to projects. The gap grew to over 15 percent with only three bidders.

The state of South Carolina commissioned *"A Review of Competition for the Department of Transportation's Road Paving Contracts"* in 2001 and concluded *"Improved competition could result in lower costs for road construction projects. We compared SCDOT's project cost estimates to the low bids for projects where there was a single bidder and those for projects with multiple bidders. We found that the average of the low bids on single bid projects was 5 percent above SCDOT's cost estimate while the average of the low bids for projects which had multiple bidders was 4 percent below the cost estimate."*

Collectively, the results support the obvious conclusion – *more competition, lower prices – less competition, higher prices.*

What Drives Construction Volume?

Construction serves many marketplaces – industrial, commercial, institutional, housing, etc. – and responds to the needs of those marketplaces. As economic activity increases there is a corresponding (and somewhat lagging) demand for construction. The need for manufacturing a new product requires a new or modified plant. Increased demand for healthcare creates the need for more hospitals, clinics and infrastructure.

So, construction volume is a direct function of economic activity. If economic activity expands, then construction demand increases and volume goes up. Conversely, if economic activity is weak, then construction activity will constrict.

Gross Domestic Product (GDP) is the most basic measure of economic activity. So, the basic logic is essentially:

- GDP drives construction spending.
- Construction spending drives competition.
- When GDP is robust, spending increases - when GDP is weak, spending drops. And,
- When spending increases, prices rise. When spending drops, prices drop.

The following figure presents the relationship between GDP and construction spending – in this case, nonresidential construction. Note that in periods of sustained positive GDP, construction spending increased significantly and when GDP dropped below 1.5 percent or went negative, there was a rapid and significant drop in spending. Also, note that high inflation in the late 1970's and early 1980's distorted construction spending growth and the terrorist attack of September 11, 2001, resulted in a dramatic but temporary drop in spending, and as discussed previously, the period between 2002 and 2010 represented an extreme set of swings.

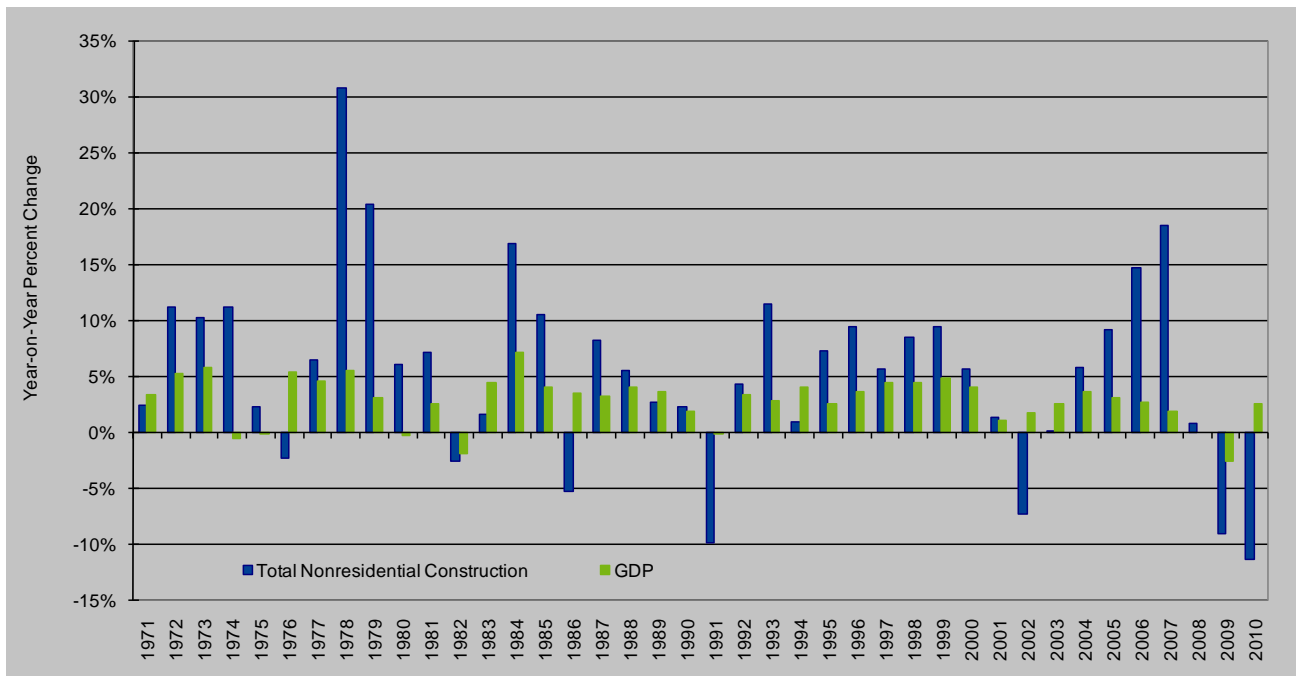


Figure 5 – Nonresidential Spending and Annual Change in Gross Domestic Product (GDP)

Regional Variations

The Department of Commerce started reporting on regional GDP in 2004, and nearly all areas of the country experienced solid growth from 2004 – 2007. As with national GDP, there is also a direct correlation between the regional economy and the money invested in regional construction.

The most recent data is shown in the following chart, and displays a radically different perspective than 2004, where most areas of the country are experiencing negative GDP or at best very modest growth. Care must be taken to understand local and regional differences from national trends.

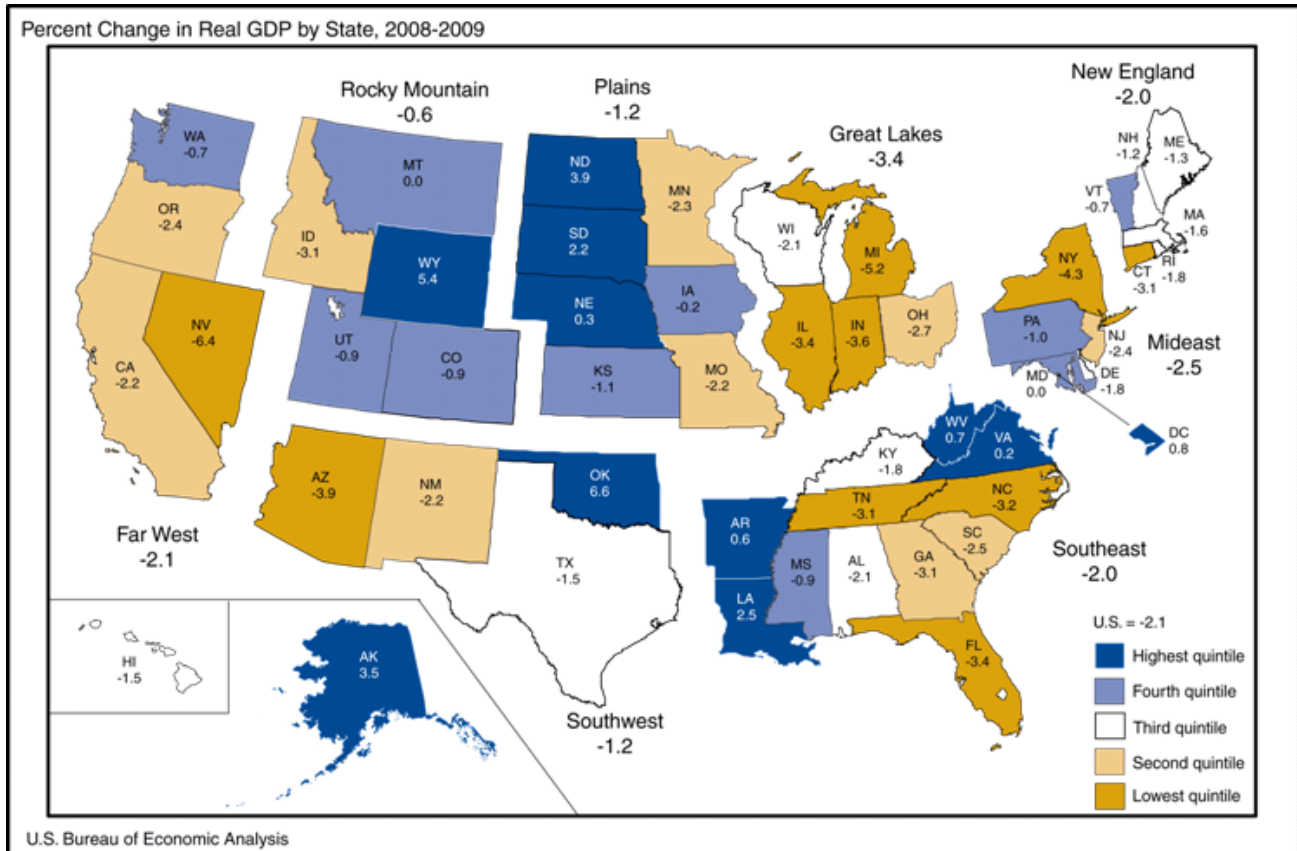


Figure 6 – Regional and State GDP

Long Term Issues to Consider

The current condition of the US economy with reduced spending on construction can be expected to continue for at least a year and possibly longer. So, extreme competition in construction will likely keep bid prices low for that time period. However, there are a number of major issues that will have a longer term impact:

1. **Gross Domestic Product (GDP)** – Even if there is a substantial increase in GDP, construction spending is a lagging indicator that tends to follow GDP increases by at least a year. This will tend to keep prices low even after a GDP increase.

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2. **Government Spending** – Government “stimulus” spending is ebbing but will continue for perhaps a year and while the overall impact on the industry is not yet clear, “grants” can have a profound effect on localized activity and therefore pricing.
3. **Inflation and Debt** – The increasing federal debt has the capacity to lead to general economy inflation of over 5 percent and perhaps even higher. General inflation would spill over to construction labor and material costs, raise prices and also increase the cost of capital to fund construction. This will tend to increase cost.
4. **Supply Constriction** – Many contractors, subcontractors and suppliers are barely managing cash flow and with recent bids offering modest if any profit, a large number may fail in the coming years. This reduces competition and will eventually increase costs.
5. **Overseas Competition** – The economies of China and India, in particular, are still booming and will continue to compete for natural resources, contracting capacity and investment of capital. The net effect tends to raise prices.
6. **Alternate Delivery Methods** – The move to negotiated contracts, design-build and integrated project delivery (IPD) all present significant advantages to owners but have the collateral effect of potentially reducing competition. Care must be taken to assure a fair price is paid.

Projects under design with anticipated bidding within a year will almost certainly benefit from a competitive marketplace. Projects in planning or early design, where the prospective bid date is more than one year in the future will still benefit, but the risk of increasing cost are definitely worth considering. Projects with very long durations – over three years – will present risks to the bidders that are hard to quantify and may be worthy of special consideration.

Projections

Predicting the future cost of projects is a risky business with many variables. However, the most important first step is predicting the economy. A number of sources are available, but one source with a very good track record is The Federal Reserve Bank of Philadelphia that “helps formulate and implement monetary policy, supervises banks and bank holding companies, and provides financial services to depository institutions and the federal government. One of the 12 regional Reserve Banks that, together with the Board of Governors in Washington, D.C., make up the Federal Reserve System, the Philadelphia Federal Reserve Bank serves eastern Pennsylvania, southern New Jersey, and Delaware.”

In their “*Fourth Quarter 2010 Survey of Professional Forecasters*” from November 2010 (the most recent data available) the following predictions were provided. It is interesting to note that the most current projections call for more modest growth than earlier in 2010.

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	Real GDP (%)		Unemployment Rate (%)		Payrolls (000s/month)	
	Previous	New	Previous	New	Previous	New
<i>Quarterly data:</i>						
2010:Q4	2.8	2.2	9.6	9.6	114.1	86.6
2011:Q1	2.3	2.4	9.4	9.5	159.3	104.2
Q2	3.1	2.7	9.3	9.4	190.7	144.3
Q3	3.0	3.3	9.0	9.2	189.9	139.8
Q4	N.A.	2.9	N.A.	9.0	N.A.	170.6
<i>Annual data (projections are based on annual average levels):</i>						
2010	2.9	2.7	9.6	9.7	-45.2	-56.1
2011	2.7	2.5	9.2	9.3	143.8	105.5
2012	3.6	2.9	8.2	8.7	N.A.	N.A.
2013	2.6	3.0	7.3	7.9	N.A.	N.A.

Figure 7 – Philadelphia Fed Projection of GDP, Unemployment and Payrolls

Bidding Factors and budgeting projects

Based on the history of construction spending and the application of historical bidding trends, it is possible to develop a bidding factor that essentially replicates the effects of the bid factors from the Corps of Engineers study presented previously. Bid factors are summarized as follows:

- Bid Factor = 0 *When economic growth and construction spending are all in reasonable balance. This means an estimate based on material, labor and reasonable indirect costs (a “fair value” estimate) will also reasonably predict bids*
- Bid Factor > 0 *This would indicate that demand for construction is in excess of supply and competition would be limited. The bid factor percentage would need to be added to the “fair value” estimate as a premium to predict the bids. The more dramatic the excess, the more significant the bid factor.*
- Bid Factor < 0 *This would indicate that demand for construction is below supply and competition would be enhanced. The bid factor percentage would need to be deducted from the “fair value” estimate as a discount to predict the bids. The more dramatic the downturn, the more negative the bid factor.*

The following chart presents historical bidding factors for nonresidential spending along with a projection into the future using the Philadelphia Fed’s information. Note that this would turn construction spending positive by late 2012 and that the bidding factor would turn positive by 2013. As with all predictions, there are risks, but the projections are consistent with past circumstances.

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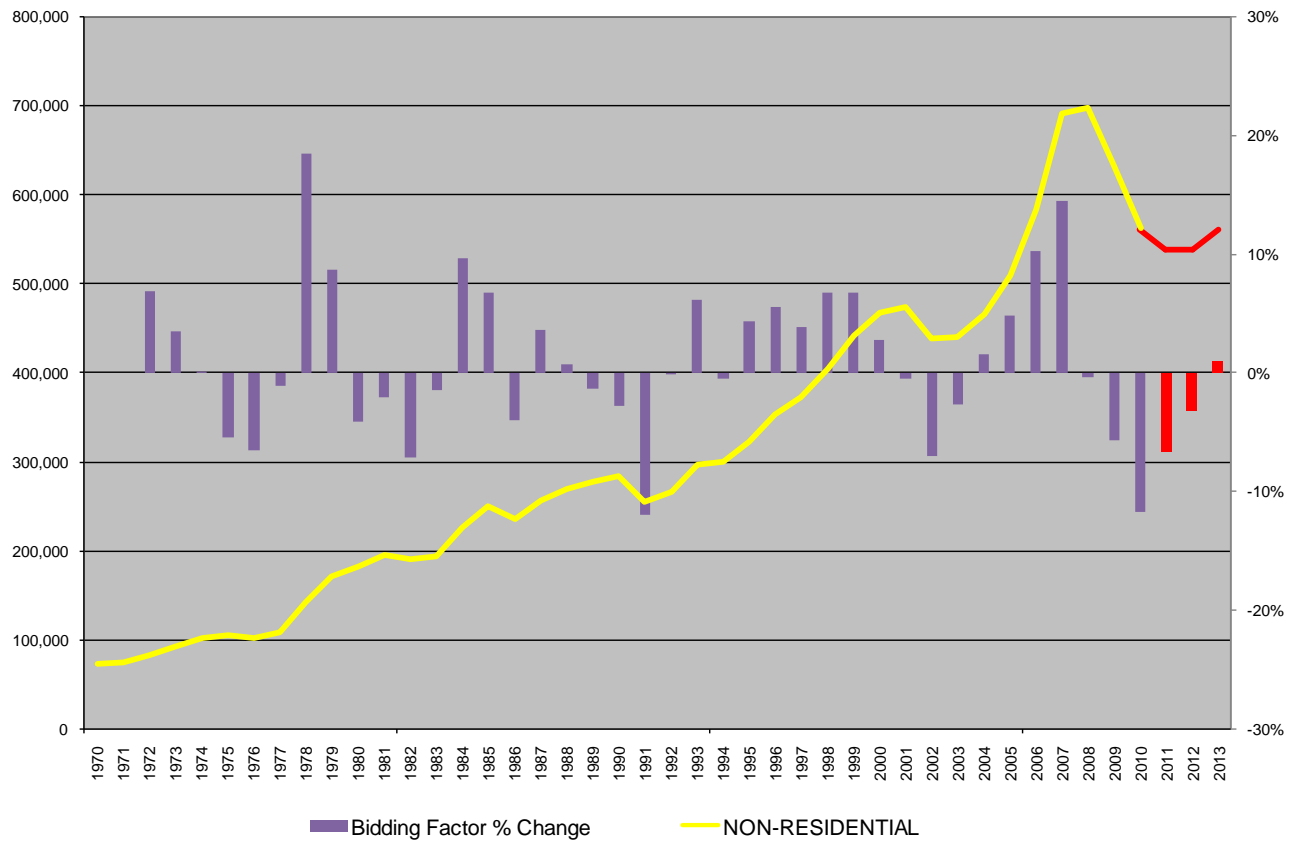


Figure 8 – Annual Nonresidential Spending versus Bidding Factor 1977-2010

Since the bid factor projects a current condition, care must be taken for future bidding relative to the likely market at that time. Also, basic underlying inflation/escalation must also be accounted for in an estimate. Regardless, the bid factor approach presents a methodology to address market-based fluctuations.

It is also worth noting that bids received on projects in 2006 would be reduced by around 35 percent compared to current bids. Many owners have experienced similar results. A few examples are presented in figure 9.

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Courthouse Project, Florida	<ul style="list-style-type: none">• Estimated at \$400/SF in 2007 and put on hold• Bid in early 2010• 10 prime bidders• Low bid at around \$200/SF• Some modest scope and quality adjustments
School Project, New York	<ul style="list-style-type: none">• Originally bid in August 2008• Two bidders• 20% over budget and put on hold• Rebid in Early 2009• 8 bidders• Low bid at 20% below budget
School Projects, Virginia	<ul style="list-style-type: none">• Elementary Schools• One – Bid on late 2007• Two bidders• \$155/SF• Other – Bid mid 2009• 13 bidders• \$124/SF

Figure 9 – Recent Project Examples

Managing Competition and Dealing With Low Bids

Owners are aware of the market to a greater or lesser degree. They understand that prices are down and as a result, their expectations may be growing, and good markets cannot always overcome an increased appetite.

Owners also need to understand that to some degree they control competition directly and indirectly through the perception of their project by the marketplace. The contracts that are used, provisions for local and disadvantaged business, paperwork requirements, payment history, bonding and insurance requirements, liquidated damages, schedule, access to the site, security limitations, environmental limitations and complicated General Requirements all contribute to the marketplace's response. In spite of a highly motivated market, care should always be exercised on any and all of these provisions.

In this market, owners are almost assured that they will receive bids below their budgets – even considering the application of bid factors. There is risk with accepting very low bids. That said, what are some steps that can be taken?

- Essential first step, always advise owner before bid
 - Should be anticipated and planned for
 - Surprises – even good surprises – can be problematic
- Examine bids in as much detail as possible
 - Number of primes is significant
 - But – number of subs per trade may be more significant
 - Talk with second bidder if rules allow to get a better idea of circumstances
- Accepting a very low bid
 - Review owner General Requirements carefully
 - Obtain backup information, but be careful with complicated bid forms
 - Have sensible add options that can be exercised
 - Negotiation (if allowed) may yield excellent collective results

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- Be extremely careful with subcontractors and suppliers
- Obtain reasonable bonding and insurances
- How to “spend” the discount?
 - Allocate up to 60 percent to add options and/or upgrades
 - Keep the balance in reserve for contractor changes – they will come
 - Nobody benefits if the bonding companies finish your project

This process assumes one very important condition - the bidding documents must be clear and represent the full scope of the work, even if they are for preliminary purposes and not 100% complete. If the documents are not clear and complete, then the low bidder will likely be the one who excludes the most or who makes the most limiting assumptions, making evaluation of pricing problematic.. Good documents are an important component of any procurement process regardless of specific delivery method.

Conclusion

The relationship between economic activity, construction spending and pricing is clear:

- GDP drives construction spending.
- Construction spending drives competition.
- When GDP is robust, spending increases - when GDP is weak, spending drops. And,
- When spending increases, prices rise. When spending drops, prices drop.

The dramatic ups and downs of the past years presented a number of challenges that will likely continue for the foreseeable future. Intelligently factoring market conditions into estimating and projections of bidding is an important step in overall project delivery.

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