

Escalation Estimating: Lessons Learned in Addressing Market Demand



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**AACE International's 52nd Annual Meeting
and ICEC's 6th World Congress
on Cost Engineering, Project Management, and Quantity Surveying**

Objectives

- Review the authors' approach to escalation estimating (adjusting for Capex)
 - Recap a few points from the authors' 2007 AACE paper (it was a primer on escalation estimating)
- Describe *Lessons Learned*
 - in method and tool implementations at owner and contractor companies in 2006 and 2007
- Snapshot of a tool implementation

Escalation Basics; Definitions

- Escalation is the cost of changes in price levels driven by underlying economic conditions
 - Reflects changes in price-drivers such as productivity and technology as well as changes in market conditions such as high demand, labor shortages, profit margins and so on
 - Varies for different cost items, regions, procurement strategies, and so on
 - Includes, but differs from inflation which is caused by monetary policy (i.e., debasement of a currency)
- Differs from contingency
 - Both cover risks, but contingency excludes escalation

Escalation Basics; Price Indices

- Indices are measures of price levels, usually normalized (e.g., 1990 = 1.00)
- Economists forecast future price indices
 - Correlate outcomes of their macroeconomic models to trends for specific price indices
- Escalation is typically estimated using index ratios:

$$= \$\text{base} \times [(\text{index for date committed})/(\text{index for est. basis date})-1]$$

$$= \$100 \times [1.15 / 1.00 - 1] = \$100 \times 0.15 = \$15$$

Escalation Estimating: Best Practices

- Differentiate between escalation & contingency
- Use indices that address...
 - ...differential price trends between accounts
 - ...levels of detail for various estimate classes
- Leverage economist's knowledge
 - forecasts based on macroeconomics
- Ensure that indices address capex market demand
 - consistent approach, calibrated with project data
- Probabilistic methods
- Consistent approach
 - tool that facilitates best practice
- Use the same economic scenarios for business planning and capital estimating

Escalation Estimating: Best Practices

- Differentiate between escalation & contingency
- Use indices that address...
 - ...differential price trends between accounts
 - ...levels of detail for various estimate classes
- Leverage **Lesson Learned #1:**
 - forecast
- Ensure the **Few argue with these principles, and**
 - consistent **but authors have yet to come**
- Probabilistic **across a company that was putting**
- Consistent **them in practice**
 - tool that facilitates best practice
- Use the same economic scenarios for business planning and capital estimating

Adjusting for the Capex Market

- In post-2003 seller's market, most indices no longer reflect EPFC* prices
 - The prices you pay \neq what the BLS* surveys
- Prices are correlated with the seller's leverage
 - high demand + low supply = seller pricing power
- Reliable price indices can be derived if you have a measure of the market (i.e., demand)
 - Price Index = Base Index (i.e., BLS) x Market Factor

**EPFC=Engineering, Procurement, Fabrication, Construction; *BLS = US Bureau of Labor Statistics*

Capex Market Factor

- EPC market = Capital Expenditure (Capex)
- Economists forecast capex for various regions and industries
- The capex market adjustment factor used by the authors is an exponent applied to the capex increase. For example:
 - Given:
 - underlying wages and other costs to a contractor increase by 8%
 - capex in the associated EPC market increases by 25% (1.25x),
 - capex exponent in hot market (i.e., capex market factor) is 0.5,
 - Bid price increase = $1.08 \times 1.25^{0.5} = 1.08 \times 1.12 = 1.21$ or 21%
- Varies from 0 (many suppliers) to 0.5 (few bidders).
 - Each cost type will have its own capex factor
 - Factor increases with project size (fewer bidders)
 - When capex decreases, suppliers may work at a loss



Escalation: What Happened in 2007?

- Government index-based forecasters called for escalation to “head downhill”*
- Process industry project costs escalated by 5 to 15% depending on region, size, etc.
- A few forecasters were seeing the light
 - *CERA*, Feb07: “no relief to costs rises during 2007”
 - *Business Week*, Apr07: “Forget those antiquated government statistics”
- What about 2008?
 - Capex? *Oil, gas and chemical capex to increase 10-15%*
 - Prices? *Capex trends indicative of ≈10% increases*
 - Publications? *Escalation to be “reeled in” ???**

**Engineering News Record*; December 2006

Escalation: What Happened in 2007

- Government index-based forecasters called for escalation to “head downhill” in 2007*
- Process industry project costs escalated by 5 to 15% in 2007
- A few forecasts are still married to BLS and don't “get it” (but there is hope for others using true market intelligence)
 - CERA, FERC
 - Business Week
- What about 2008?
 - Capex? *Oil, gas and chemical capex to increase 10-15%*
 - Prices? *Capex trends indicative of ≈10% increases*
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Lesson Learned #2:

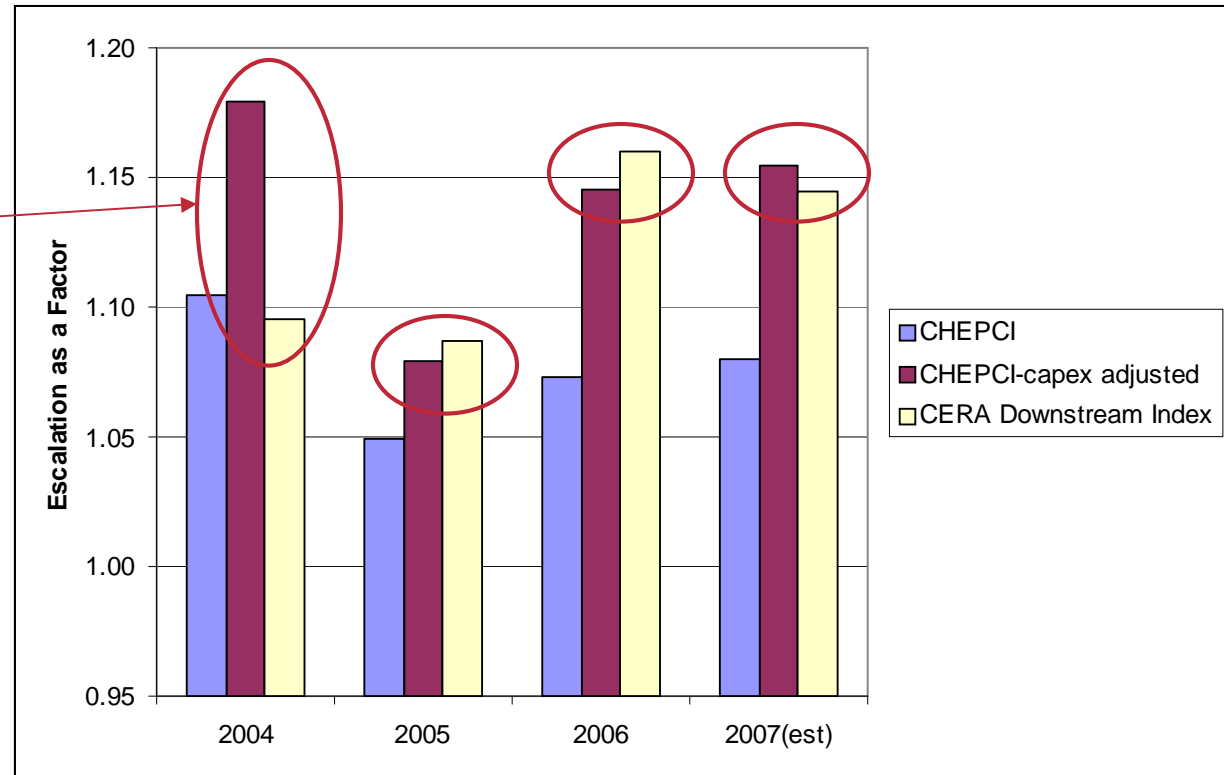
Publications are still married to BLS and don't “get it” (but there is hope for others using true market intelligence)

**Engineering News Record; December 2006 & December 2007*

Evidence of Capex Factor Validity

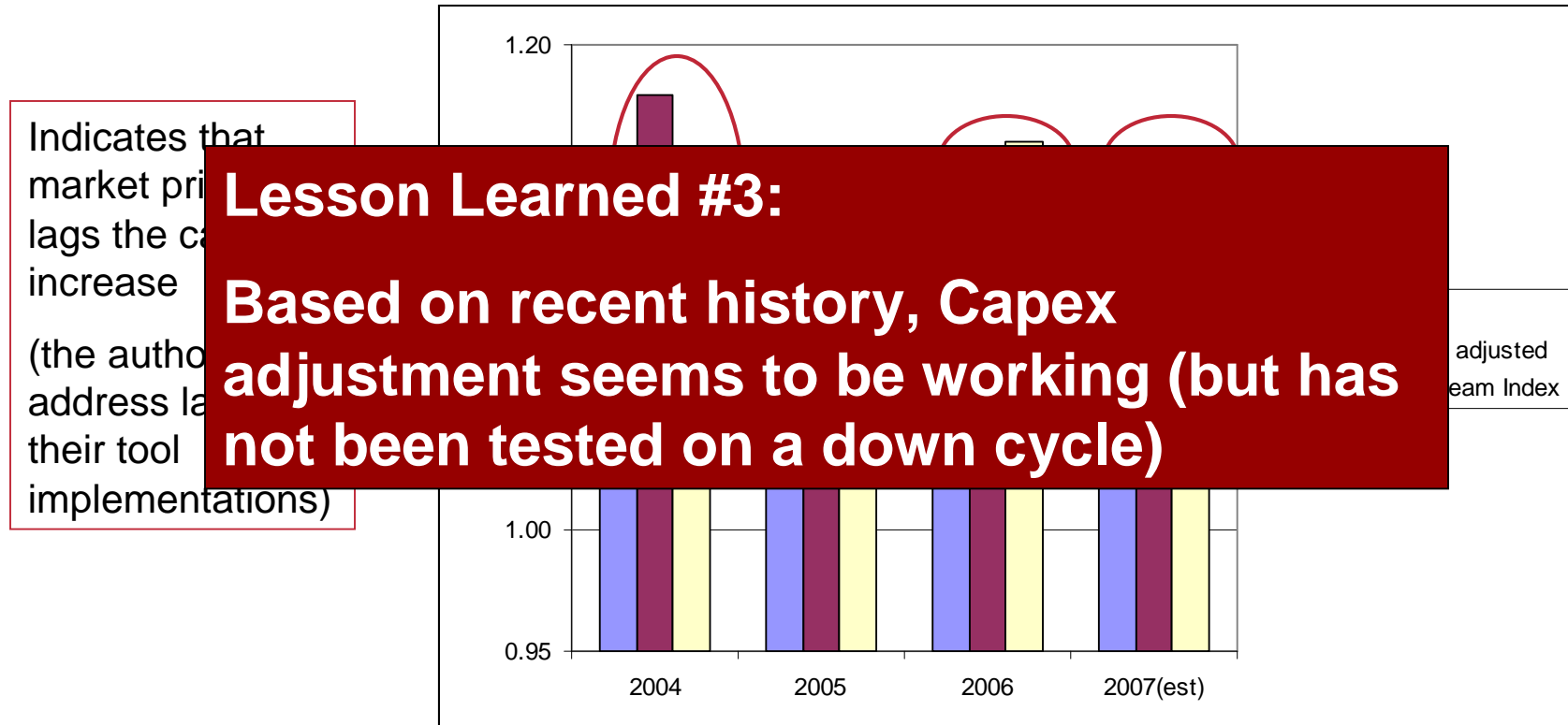
- Comparison of adjusted BLS-based index (adjusted-CHEPCI) vs. market based benchmark (CERA)

Indicates that market pricing lags the capex increase
(the authors address lag in their tool implementations)



Evidence of Capex Factor Validity

- Comparison of adjusted BLS-based index (adjusted-CHEPCI) vs. market based benchmark (CERA)



*CHEPCI=Chemical Engineering Plant Cost Index; CERA=Cambridge Energy Research Associates Downstream Cost Index

Economists: Coming Around Slowly

- In 2005, all that was available were BLS-based index forecasts; no capex forecasts
- Authors have worked with *Global Insight*
 - Coming up the learning curve on capex forecasts; getting closer to off-the-shelf products
 - Still must deal with one-off consulting contracts
 - Top notch economic modeling, but extension to micro-markets takes some work
- Firms such as CERA and IPA have recently released new index products that are not BLS based
 - They are good benchmarks, but not a tool basis

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 - Com close
 - Still
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Lesson Learned #4:

Expect to spend time in specifying what you need and in working with the cost engineers and economists to get it done

getting

micro-

Accuracy: A Work in Progress

Client: *“how well did this method do in forecasting the recent market?”*

Consultant: *“its getting better, but its not there yet”.*

- Challenge 1: getting labor rate and capex indices out of economists that meet your needs
 - e.g., tracking building permits instead of plant construction
- Challenge 2: calling the market turn
 - Economists (and their models) hate deviations from the norm and keep calling for quick “market correction”
 - e.g., called for steel prices to drop every year since '04
- Result: 1st year forecast good, 2nd year understated

Accuracy: A Work in Progress

- Client: *“how well did this method do in forecasting the recent market?”*
 - Consultant: *“getting better, but its not there yet”.*
- Challenge 1: getting labor rate and capex indices out of
Lesson Learned #5:
 - e.g., **Use probabilistic methods so** construction
- Challenge 2: **management can understand the risks and make appropriate decisions**
 - Economic (and financial) conditions far from the norm and keep calling for quick “market correction”
 - e.g., called for steel prices to drop every year since '04
- Result: 1st year forecast good, 2nd year understated

Probabilistic Methods (Ranges)

- Several methods available
 - Predetermined ranges
 - e.g., for p70 add 2% to each index value
 - Range estimating
 - assess high/low on indices and cash flow burn rate and incorporate Monte-Carlo modeling
 - Scenario analysis
 - working with business & economists, develop various economic scenarios, assign probabilities and index ranges, and incorporate Monte-Carlo modeling
 - good for linking estimate w/business assumptions

Roadblocks (and Opportunities)

- Unrealistic mgmt expectations of accuracy
 - no one predicted the 2004 steel price event
- Getting business to use the same economic scenarios in their business models
- Uncertainty about new approach
 - the authors' papers are “all there is”
- Economists
 - need to hire “another high-priced consultant” that talks like someone from Planet X
- Maintenance
 - lack of resources and in-house cost knowledge

Roadblocks

- Unrealistic mgmt expectations of accuracy
 - no one predicted the 2004 steel price event

- Getting

Lesson Learned #6:

- scenar

Communication, communication, communication (be prepared to talk principles, practices, objectives, roles and responsibilities)

- Uncert

- the a

- Econo

- need
some

This might be the projects largest cost account—don't you think this deserves our best effort?

talks like

- Maintenance

- lack of resources and in-house cost knowledge

Conclusions

Lessons Learned

- 1. No one is using best practices (but you can't say you didn't know anymore)**
- 2. Most published sources still don't get it**
- 3. Evidence that method is working**
- 4. Invest in relationship with economists**
- 5. Use probabilistic methods**
- 6. Know your stuff and be prepared to communicate**

