



The Effects of Inter-Industry Competition in the Paving Sector

Jeremy Gregory, Omar Swei, Travis Reed Miller, Mehdi Akbarian, Randolph Kirchain

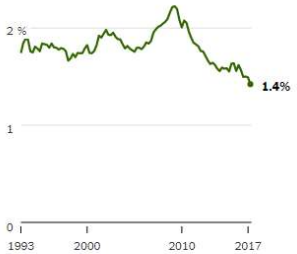

Concrete Pavement Technology Center
American Concrete Paving Association
April 6, 2021

Infrastructure spending is at an all-time low

More Potholes? This Might Be Why.
Infrastructure spending as a percentage of G.D.P. has fallen to the lowest level in decades.

The New York Times
Public Works Funding Falls as Infrastructure Deteriorates

By BINYAMIN APPELBAUM AUC. 8, 2017

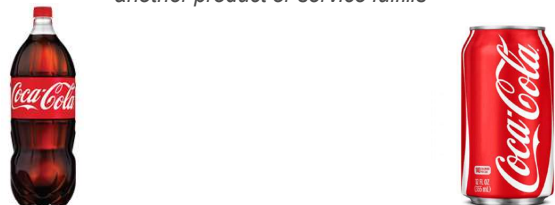


Source: U.S. Census Bureau

A water main and sewer renovation project in Somerville, Mass., this month. Public works projects have slowed across the country. Brian Snyder/Reuters

MIT CSHub

How do we do more with less? Competition among product substitutes could lower prices

Substitute: A product or service that satisfies the need of a consumer that another product or service fulfills

↑ \$ ↓

↑

MIT CSHub

Inter-industry competition could lower paving prices

Does the presence of competition between material substitutes impact paving material prices?



VS



MIT CSHub

Slide 4

The pavement sector makes for an interesting case study due to the presence of two forms of competition

- **Intra-Industry Competition:** Between firms that pave with *the same material*
- **Inter-Industry Competition:** Between firms that pave with *material substitutes*
- **Focus of this study:** Characterize the effect of increased inter-industry competition in the paving sector



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How would you measure competition or competitiveness?

Intra – industry

- Typical indicator – **number of bidders** for a given job



Inter – industry

- Number of firms or participants
- Market concentration
 - Department of Justice uses this for monopolies
- **Market Share**



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To characterize the effects of competition in the paving sector we conducted a statistical analysis of 10 years of bids

- Oman BidTABS database
 - Bids, not actual costs
- Includes most highway works projects
 - Some large and PPP projects excluded
- We analyze competitive bid data:
 - Spread out over 10 years (2005-2014)
 - Across 47 states (excludes HI, NJ, and AK)
 - 298k pay items, 164k jobs, filtered down to 30,000 data points that are relevant to mainline paving

Details on method: [Swei et al. 2020](#)

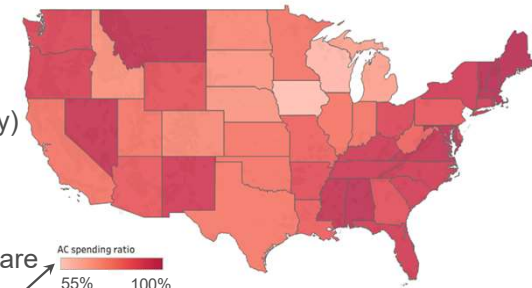
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Parameters of interest in Oman BidTABS data

- Project size (quantity)
- State market size (annual spending)
- Price adjustment clauses (asphalt only)
- Number of bidders (intra-industry competition)
- Dominant market share (% spending on AC; inter-industry competition)

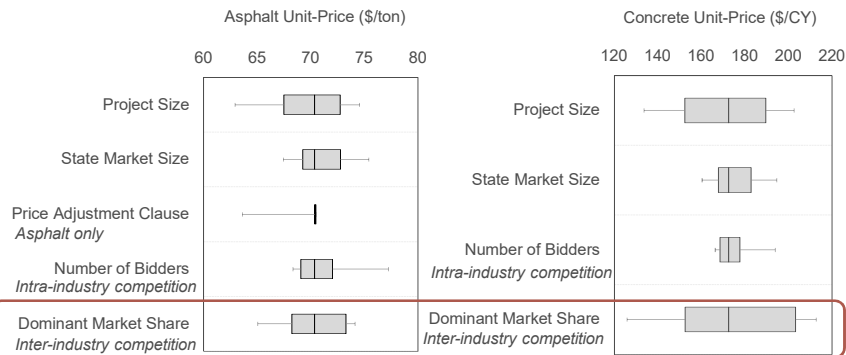
10-Year Average Percent Spending on AC



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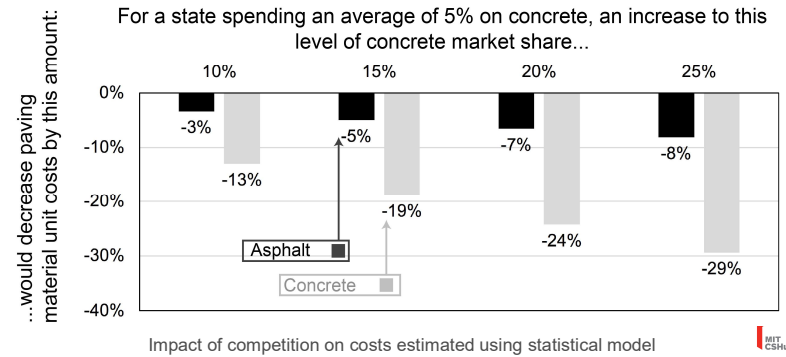


Statistical model shows large impact of inter-industry competition



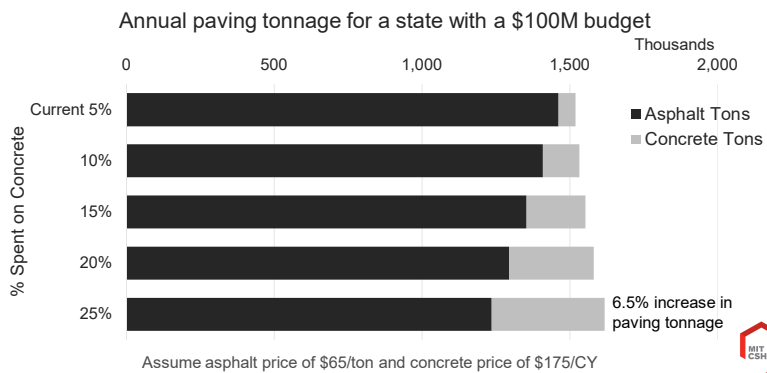
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Lower unit-prices for bid items are correlated with increased concrete spending



Slide 10

Increased competition can translate into more paving



Slide 11

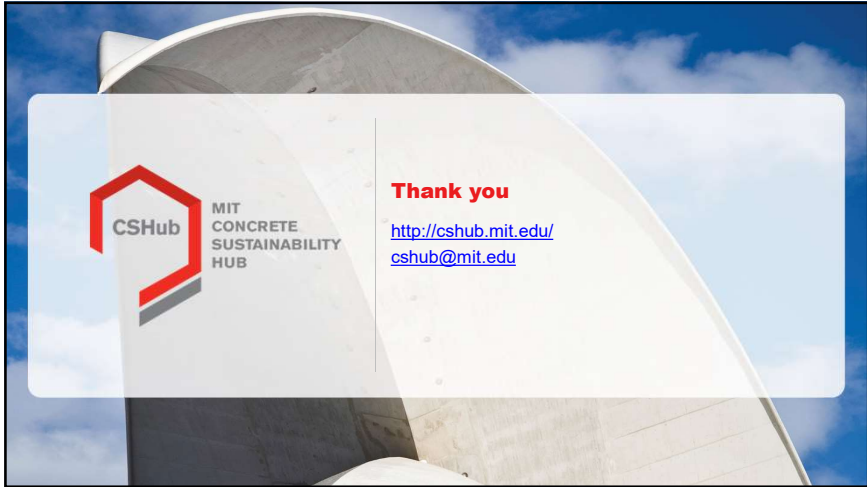
Next step: explore mechanism of competition's impact on prices

Understand correlation vs. causation, just like medical studies

Correlation between	and
Smoking	Lung Cancer
Exercise	Mental Health
Healthy Diet	Life Expectancy

What is the mechanism?

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Understanding the Value of Competition [Part 2]

“Technology Tuesday” Webinar
April 6th, 2021

Leif G. Wathne, P.E.
American Concrete Pavement Association

MIT: Inter-Industry Competition Lowers Pavement Costs!

Passes the gut-check, and verified by the most comprehensive and rigorous scientific analysis ever undertaken on this subject ✓

- Extends the purchasing power of our highway dollar.
- Including asphalt and concrete not only **lowers pavement costs**, it also **improves quality**, and **spurs innovation**.
- Healthy industries can INVEST in training, people and technology



So... What's the Problem?



- Competition is probably the single-most overlooked aspect of getting the most from our pavement investments...!?!
- Most agencies are **NOT** adequately capitalizing on the benefits of competition between paving industries

NOTE: A few states do, and use a healthy two-pavement system to their advantage...

Rooted in Self-Reinforcing Analyses

- Sole project-by-project focus can cause you to inadvertently miss the bigger opportunity... (i.e. miss the forest for the trees)
- Stewardship involves a **program of projects...** and stepping back allows for a better perspective



Fictional State of Missitucky...



EXAMPLE

- Slowly shifted to a one-pavement system over a few decades
- Potential driver: First cost decision-making...
- Systematic deselection has essentially led to elimination of concrete pavement lettings and the industry with it...
- PTS Process? Based largely on LCCA. "Data Driven".
 - Cost inputs for LCCA? No slip form jobs to draw from. Slab replacement? Repair jobs? Ramps? Approach slabs? Such costs are vastly inflated!
 - **No meaningful concrete pavement cost data for LCCA..!**
- Tried implementing ADAB. Concrete cost inputs still not competitive (LCCA, design, mobilization, equipment, training, supply chain etc.). BUT, asphalt unit bid prices did drop.... for those select few projects.

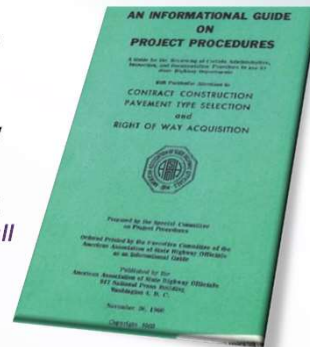
Fictional State of Missitucky



- So.... the analysis continues to reinforce decision-making that allows only one industry to flourish!
- A starving concrete pavement industry is being asked to compete with a mature and dominant asphalt pavement industry that have dozens if not hundreds of projects to bid on year after year...?
- The pavement costs reflected in this process does not reflect the price Missitucky should be paying...
FOR EITHER CONCRETE OR ASPHALT!
- Lulled into a false sense that they are somehow saving \$\$

Of course, this is nothing new...

- AASH(T)O knew this over 60 years ago and warned agencies about it in a document written SPECIFICALLY to reinstall faith in the interstate highway program!
- Covers a lot of information... including PTS, aiming "*to assure the public of full value for their highway dollar.*"



<http://aasho.acpa.org>

1960 AAS(T)HO Guide

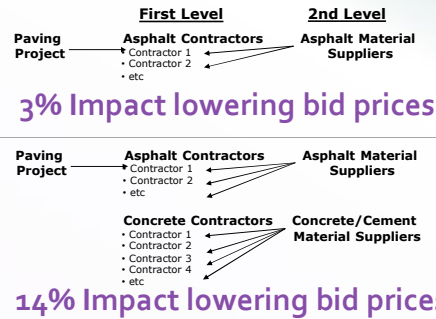


- In section on cost comparisons (LCCA): "*doubt as to the validity [of such analysis] arises in the case where on[e] type of pavement has been given monopoly status by the long-term exclusion of a competitive type.*" i.e. cost data is not meaningful
- In section discussing competition, they write "*...It is desirable that monopoly situations be avoided, and that improvement in products and methods be encouraged through continued and healthy competition among industries involved in the production of paving materials.*"
- Highway officials recognized the importance of establishing and maintaining competing industries.

Having Multiple Bidders on Projects Isn't Enough...

Contractor Competition
Limits competition at the supplier level, which can limit effectiveness

Industry Competition
Assures competition happens between both contractors and suppliers



WHAT DOES ALL THIS MEAN?



- Inter-industry competition is **foundational** to meaningful cost analyses (i.e. LCCA)!
- And by extension... any stewardship program, including ADAB, mix-of-fixes, planning, asset management, etc.



What can Missitucky do?

- Acknowledge that they are a monopsony... and leverage that opportunity!
- Fundamentally, send a **clear signal** to both paving industries – serious about marshalling benefits of competition. **Programmatic view!**
- Industry **will** respond (both concrete and asphalt)
- Must be confident that the state is committed to the health of both industries... involves investment in training, education, equipment, research, etc.
- All is in the best interest of Missitucky!

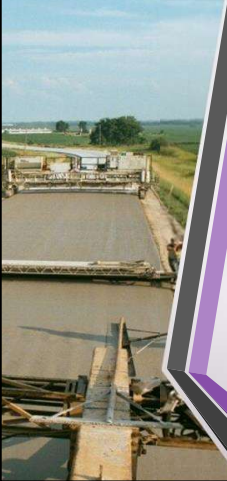
How to get there...?

Several Paths to Spur and Maintain Inter-Industry Competition...

Announce letting of a program of concrete projects (as done w/ HMA)

- Multiple projects each year over several years signals a sustained commitment
- Limits “buying” of jobs...
- Can also focus on regions/locations with single bidder lettings
- Example: Florida






Another Path to Spur and Maintain Inter-Industry Competition...

Maintain healthy industries by balancing quantities (e.g. square yards to tons, \$s)

- Used successfully by agencies who recognize its in their best interest to have more than one industry
- Can smooth the peaks and valleys for each industry to enhance certainty and stability, contributing to consistent competitive pricing and quality
- Generates lowest unit prices for both concrete and asphalt pavement
- Example: Iowa, Wisconsin...




Another Means to Spur and Maintain Inter-Industry competition...

Commit to a program of alternate bid projects (ADAB)

- Can be effective tool IF done in accordance with FHWA ADAB guidance (T5040.39) and is sustained!
- Design equivalence, LCCA bid adjustments no price escalation clauses, equivalent quantity measures, etc.
- Example: Pennsylvania, Kentucky, Louisiana, West Virginia...

How to get there?

- No single way... but only with two healthy industries will agencies be able to maximize the purchasing power of highway dollars!
- An agency can employ LCCA, ADAB, AM, etc., but will never know what they **SHOULD** be paying for pavement without inter-industry competition!
- An aging network, growing needs and constrained resources demand a rethinking of how we stretch and steward investment
- Reason why **competition** is foundational to American way of doing business... it pays dividends!




How to get there?



- Involves a **programmatic approach** to a healthy two pavement system (i.e. diversify)
 - Have to recognize the ‘forest’!
- Must send clear signal to both industries
- NOT about one being better than the other
- Diversify concrete solutions portfolio across all applications (Mix of Fixes)
- Benefit from competition in multiple markets (highways, county roads, streets, airfields) across solutions (minor rehab, major rehab, overlays, reconstruct, new construction)

How to get there?



Mix of Fix treatments applicable to existing Asphalt and Composite Pavements

Category	Treatment Techniques	Material Used	Perform Period*
Preventive maintenance	Seals (chip/fog/slurry/micro-)	AC	1-5
	Asphalt Rejuvenation	AC	1-5
Corrective maintenance	Asphalt Patching/Pothole filling	AC	1-5
Preservation	Asphalt cold/hot in place recycling	AC	5-10
	Open gradation friction course	AC	5-10
	Full Depth Reclamation w/ cement	AC	10-20
	Mill / Thin Asphalt overlay (2-4")	AC	5-15
	Thin asphalt overlay (2-4")	AC	8-15
Minor Rehabilitation	Ultrathin concrete overlay (2-4")	PCC	8-15
	Thin concrete overlay (4-8")	PCC	10-20+
	RCC overlay (4-8")	RCC	10-20+
	Asphalt overlay (4-8")	AC	5-20
Major Rehabilitation	Asphalt overlay (>8")	AC	10-20
	Concrete overlay (8-12")	PCC	20-35+
	RCC overlay (>8")	RCC	15-25+
	New asphalt	AC	10-20
Reconstruction	New concrete	PCC	25-35+
	New Roller Compacted Concrete	RCC	15-30+

Understanding the Value...

The value of inter-industry competition is that it enables our stewardship tools like LCCA, ADAB, planning, mix-of-fixes, and asset management to function properly!



Particularly Important...



- In the face of massive infrastructure investment. \$2 trillion, \$3 trillion? Reauth.
- Must apply lessons learned from the past!
 - Cannot afford public and Congress to lose confidence in program administration
 - "...assure the public of full value for their highway dollar..."
 - "... through continued and healthy competition among industries involved in the production of paving materials."
- Ensuring inter-industry competition is a critical component good stewardship!

Questions?

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