

# Accounting for Inflation in LCCA

## Problem

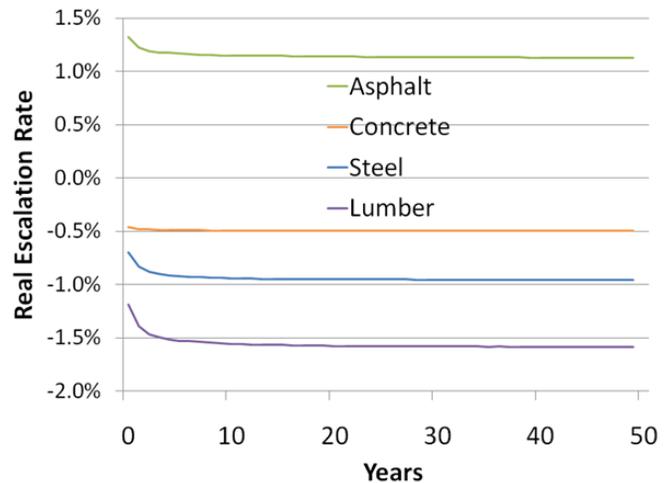
Life Cycle Cost Analysis (LCCA) is the standard method for costing long-lived construction projects. The LCCA process determines the full costs of mutually exclusive construction options, finding the project design with the lowest total lifetime cost. LCCAs have traditionally ignored the possibility of future changes in relative prices by assuming that the real prices of all construction inputs remain fixed. This study examines the historical record to see whether the constant real price assumption is justified.

## Approach

This study reviews the data on real price changes of four basic construction materials: concrete, asphalt, steel, and lumber; and uses those data to perform Monte Carlo analysis. The study identifies a recommended set of data references and a computational structure for performing LCCAs while making use of historic data on changes in relative commodity prices. This allows policymakers to re-compute appropriate LCCAs on a monthly, quarterly, or annual basis, as inputs to their own analysis protocols.

## Findings

Over a fifty year time frame, the simulations predict that the mean real price of concrete decreases by 20%, while the one of asphalt increases by 95%. More specifically, in 86% of the simulations overall inflation outstripped concrete inflation, while it is the opposite case for asphalt. Furthermore, the simulations also highlight the difference in volatility of inflation rates for the different materials considered.



Real escalation rate (the amount that a materials inflation rate will differ from that of overall inflation); as predicted from Monte-Carlo Simulations.

## Impact

This study examines historical data on real prices of construction materials, and finds that the assumption of constant real costs is seriously inconsistent with historical experience. Ignoring that experience can lead to serious cost overruns. To avoid such overruns, this study suggests the use of material-specific escalation rates that can be easily implemented into the LCCA practice to reflect changes in relative commodity prices.

## More

Research presented by L. Lindsey, R. Schmalensee and A. Sacher for the CSHub. The results of this research will be presented at the CSHub@MIT Industry Day on August 11th in the Kresge Auditorium at MIT, Cambridge, Massachusetts. More information on CSHub@MIT Industry Day is available at <http://web.mit.edu/cshub>.



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