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TECHNICAL
REPORT

Using the Steel-Vessel Material-Cost Index to Mitigate Shipbuilder Risk

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Prepared for the United States Navy

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Summary

The U.S. Navy wants to provide its shipbuilders with appropriate incentive to produce militarily effective vessels at minimum cost to the Navy.

The Navy can induce a shipbuilder to agree to any contractual arrangement by offering the shipbuilder a high enough price. But it is likely to be preferable, at least ex ante, for the Navy to dissipate risk external to its shipbuilder to pay less for the systems the Navy needs. The Navy uses external labor- and material-cost indexes to attempt to correct for significant cost risks outside its shipbuilders' control. Shipbuilder profits are greater when actual cost growth is less than the indexes' cost growth and conversely.

A longtime material-cost index in Navy shipbuilding is the steel-vessel index. It is a weighted average of three Bureau of Labor Statistics (BLS) producer price indexes (45 percent iron and steel, 40 percent general-purpose machinery and equipment, and 15 percent electrical machinery and equipment).

One criticism of the steel-vessel index is that it does not accurately cover the materials used in building a modern ship. No modern U.S. Navy ship, for instance, has 45 percent of its material costs in iron and steel. To combat this shortcoming, the DDG-51 and T-AKE programs created their own material-cost indexes with lower weighting on iron and steel.

Historically, BLS's iron and steel price index has been much more volatile than has the general-purpose machinery index, the electrical machinery index, or economywide inflation. Consequently, the steel-vessel index has been more volatile than have material-cost indexes with lower weights on iron and steel.

The known mismatch between the steel-vessel index's composition and a shipbuilder's actual material cost structure is problematic. The shipbuilder bears a risk that the prices of iron and steel may tumble while the shipbuilder's costs do not. A risk-averse shipbuilder will require a premium to bear this cost structure–mismatch-driven risk.

We urge the Navy to develop a modern-vessel index that more appropriately represents the material used in constructing ships. The more accurately a material-cost index captures a shipbuilder's external material cost risk, the less we expect the Navy to have to pay its shipbuilders.