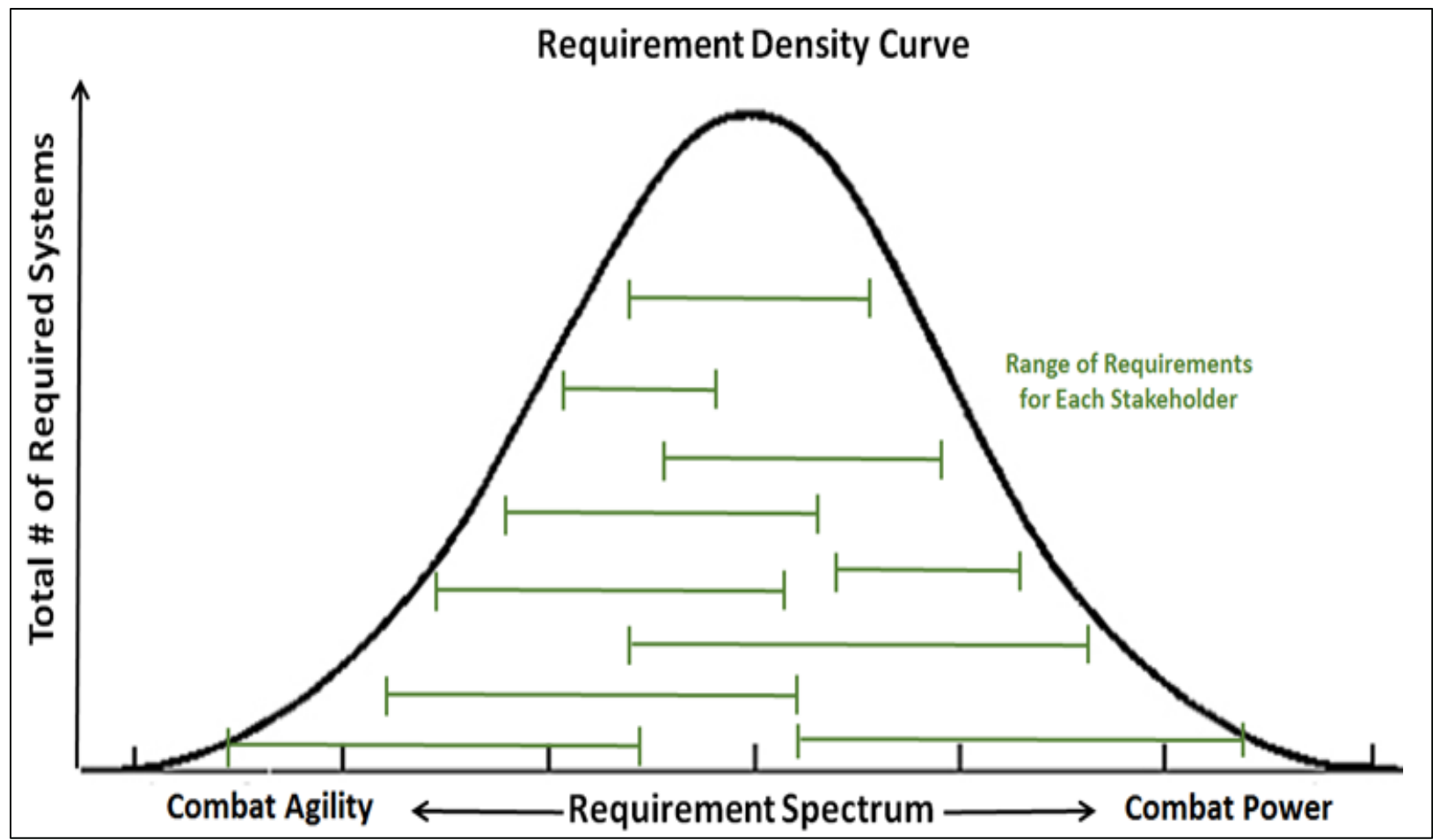


Overview

In the 21st century, Major Defense Acquisition Programs have become increasingly joint efforts. This trend has led to expanding program complexities and interdependencies. The resulting cost, schedule, and performance risks often counterbalance, and potentially outweigh, the efficiencies gained through inter-service program designs. We define these risks as the **cost of commonality**.

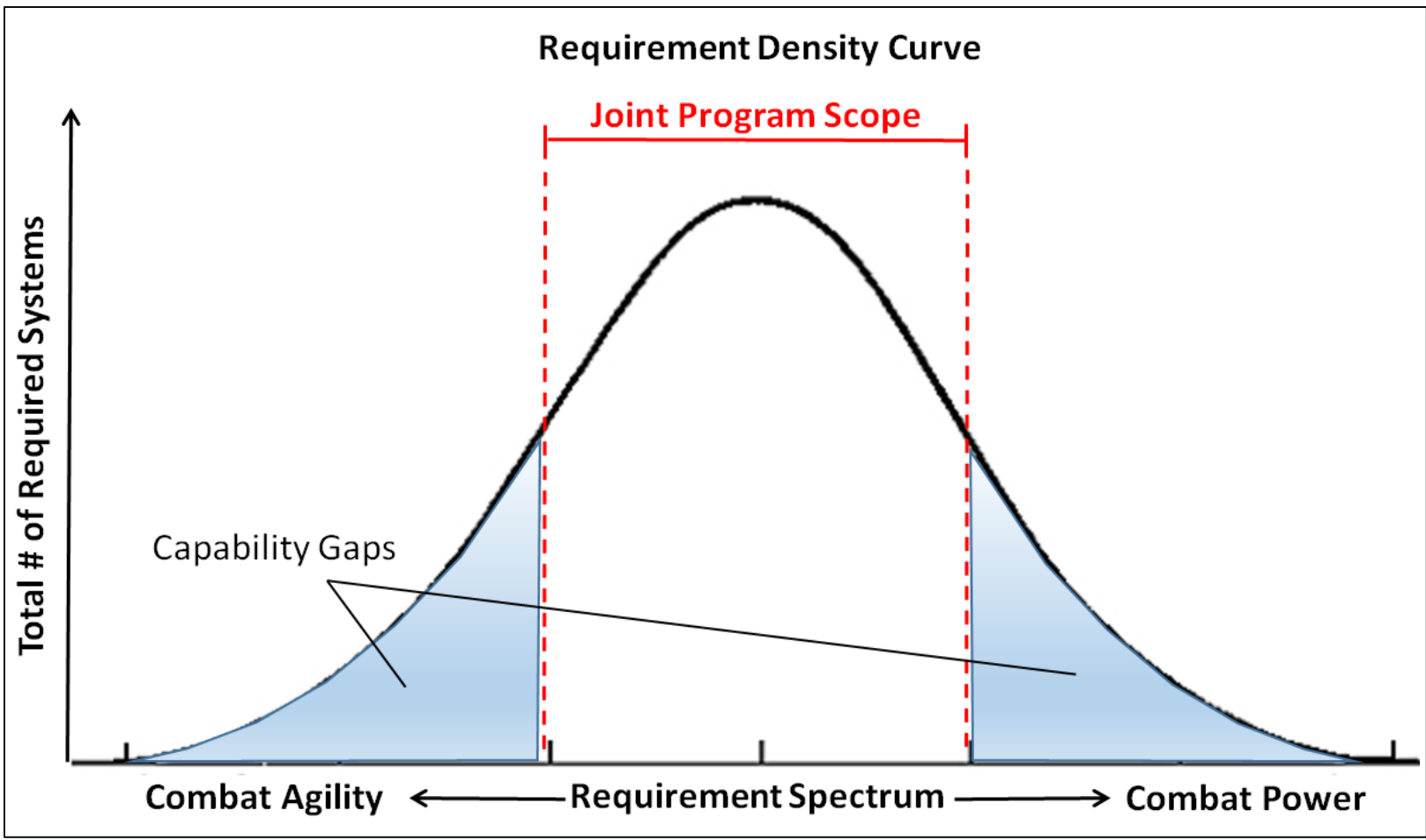


Such costs are often unquantified in cost-benefit analyses in the defense acquisitions process. In this thesis, we first review the results of three joint MDAPs to evaluate ex-post indications of programmatic shortfalls resulting from commonality costs. We then propose a unique cost-effectiveness model to assess value in joint programs from a broader portfolio perspective. Finally, we apply our Joint Value Model to the Joint Light Tactical Vehicle program as a case study to validate the concept.

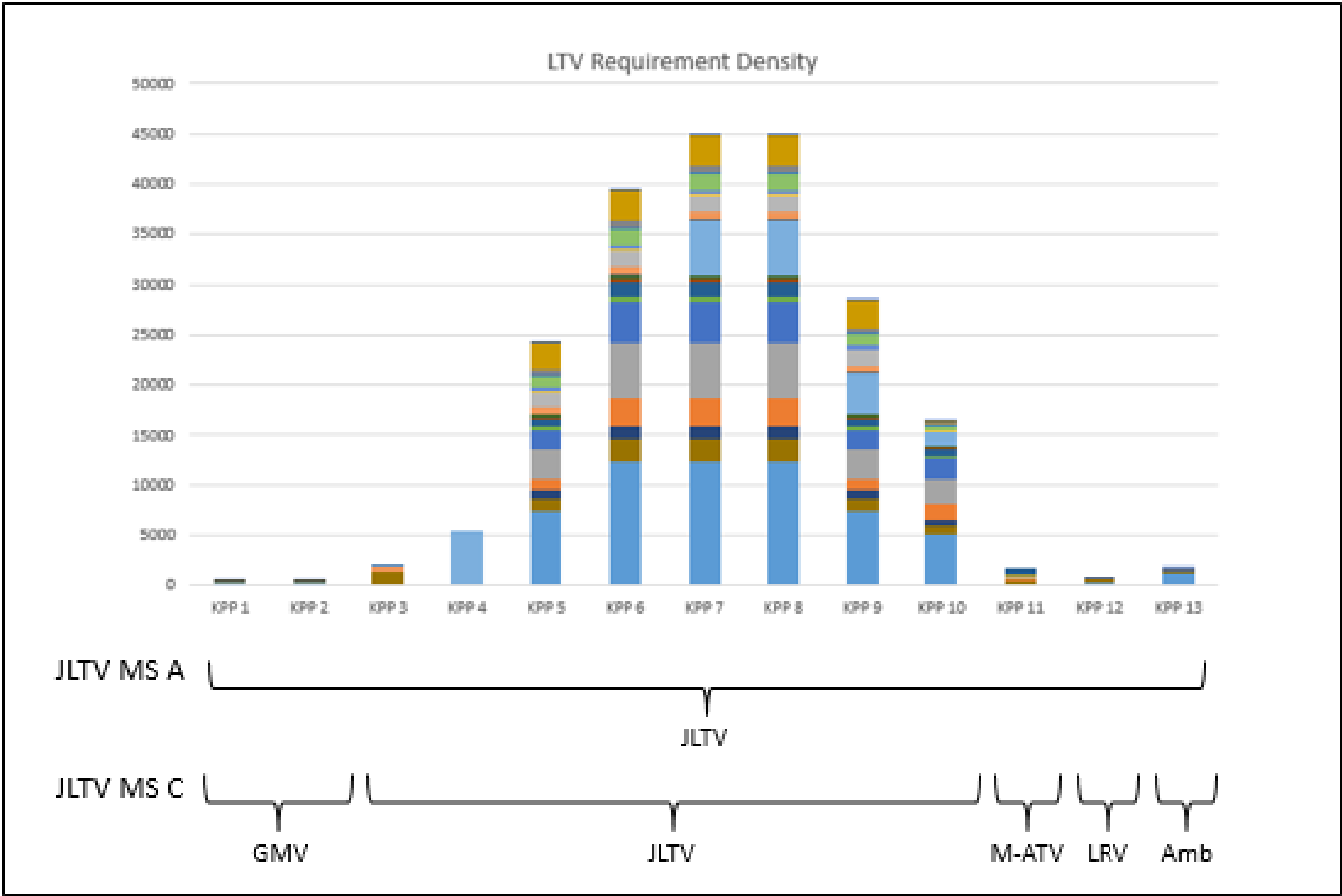
Methods

The effectiveness of a program can be defined as the extent to which it satisfies the breadth of user needs. The costs of commonality limit the scope of joint programs, creating negative externalities in the form of capability gaps for the broader portfolio. Such costs are un-monetized in cost-benefit analyses.

We propose a Joint Value Model that evaluates program cost-effectiveness in the portfolio context, where cost (C) is the weighted average of unit costs within the portfolio, and effectiveness (E) is the sum of requirement densities under the curve.



$$\frac{C}{E} = \frac{\sum_{i=1}^n A_i P_i}{\left(\sum_{x=1}^n D_x\right) \left(\sum_{i=1}^n A_i\right)}$$



Results

Applying the Joint Value Model to the Joint Light Tactical Vehicle program as a case study, we find a contraction in requirement scope and reduction in cost-effectiveness over time. This case study serves as evidence of the model’s utility for assessing value in joint programs.

Conclusions

The Joint Value Model provides a means for managers to evaluate cost-effectiveness in the portfolio context and compare meaningful differences among alternatives to maximize program value.