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The First Phase of California's High-Speed Rail Project Provides the Greatest Economic Benefits Compared to Full Build Out

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Issue

The California High-Speed Rail (HSR) project aims to transform transportation in the state. To understand the impact of this project as it “rolls out” across the state, we analyzed its economic benefits across each of its planned phases, complementing official projections from the California High-Speed Rail Authority (CHSRA).¹

Our analysis is based on a spatial economic model of the rail system model previously developed by members of our team.² This model captures the direct potential travel benefits of the HSR project, such as quicker and sometimes cheaper transportation, for commuters, business travelers, and leisure travelers. It also captures wider economic benefits such as higher wages and land values stemming from greater concentration of employment in more productive areas.

We estimate these benefits for both Phase 1 (assumed to be completed by 2033) connecting San Francisco to Los Angeles via the Central Valley, and the Full System (assumed to be completed by 2040) representing the entire network, including Sacramento and San Diego extensions. We estimated the impacts both with and without discounting for the money value of time (7% per annum). (The former places greater weight on near-term benefits.) Finally, we assess these benefits against projected costs to evaluate the net economic returns (also called benefit-cost ratio) for Phase 1 and the Full System.

Key Research Findings

Our estimates of the HSR project's economic benefits are lower than the CHSRA estimates. For Phase 1, we project total discounted benefits of \$27.3 billion, with direct travel benefits of \$17.4 billion net of operation and maintenance costs and wider economic benefits of \$9.9 billion compared to the CHSRA's estimates of \$12.5 billion and \$23.5 billion, respectively. The CHSRA's approach relies on a case study comparing economic outcomes in the Acela rail corridor (Amtrak passenger service between Washington, D.C., and Boston), extrapolated to California, whereas our methodology uses an economic model based on how reallocating commuting and business trips affects wages and land values.

There are diminishing returns from expanding HSR beyond the core San Francisco to Los Angeles route. The Full System, including the Sacramento and San Diego extensions, shows only modest incremental gains over Phase 1. Total discounted benefits increase by just \$1.8 billion to \$29.2 billion. This limited additional benefit is because Phase 2 extends the network to regions with comparatively less economic activity than in Phase 1. Specifically, the core route connects regions accounting for over 26 million individuals, whereas the Full System adds connections to only around 8.5 million additional people.

Benefit-cost ratios are also lower than the CHSRA estimates. Given estimated system costs of \$53.7 billion

the San Francisco to Los Angeles route has a benefit-cost ratio of 0.51, while the \$89.1 billion Full System has a ratio of 0.33, indicating that costs outweigh benefits in both cases when discounted to present value. However, the undiscounted figures present a more optimistic picture, with ratios of 1.50 and 0.99 for Phase 1 and the Full System respectively. This underscores the long-term nature of the project, where benefits accrue over many years while costs are front-loaded.

Wider societal benefits quantified by the CHSRA, not included in our analysis, are key to attaining positive economic returns. While we focus solely on quantifiable economic impacts, the CHSRA provides additional projections for non-economic societal benefits in their benefit-cost analysis. These additional benefits, such as emission reductions and safety improvements, amount to \$34.5 billion in the CHSRA’s analysis for Phase 1. While these benefits are undoubtedly important to consider, they fall outside the scope of our economic analysis. However, our analysis demonstrates that attaining a net economic impact from the HSR project crucially hinges on whether these impacts are sizeable or not.

More Information

This brief is based on the paper “Political Preferences and Transport Infrastructure: Evidence from California’s High-Speed Rail” by Fajgelbaum, et al. (2024). For more information about the findings in this brief or in the referenced paper, please contact Pablo Fajgelbaum at fajgelbaum@gmail.com.

References

California High-Speed Rail Authority, “Appendix B: California Phase 1 High-Speed Rail Corridor San Francisco to Los Angeles Benefit Cost Analysis Memorandum,” Technical Report, April 2023.

Fajgelbaum, Pablo D., Cecile Gaubert, Nicole Gorton, Eduardo Morales, and Edouard Schaal, “Political Preferences and the Spatial Distribution of Infrastructure: Evidence from California’s High-Speed Rail,” Technical Report, National Bureau of Economic Research, 2024.

¹California High-Speed Rail Authority, “Appendix B: California Phase 1 High-Speed Rail Corridor San Francisco to Los Angeles Benefit Cost Analysis Memorandum,” Technical Report, April 2023.

²See Fajgelbaum et al. (2024), “[Political Preferences and Transport Infrastructure: Evidence from California’s High-Speed Rail](#),” NBER WP 31438.

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