



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Rural-Urban Water Transfer and Urban Economic Growth: Chinatown Revisited

Sherzod B. Akhundjanov
Utah State University

Arpita Nehra
North Carolina State University

Reza Oladi
Utah State University

Arthur J. Caplan
Utah State University

Selected Paper prepared for presentation at the 2024 Agricultural & Applied Economics
Association Annual Meeting, New Orleans, LA; July 28-30

Copyright 2024 by [authors]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Rural-Urban Water Transfer and Urban Economic Growth: Chinatown Revisited

Rapid urban development in the Western US since the dawn of last century, along with the region's arid environment, has put tremendous pressure on the region's water resources, particularly in the presence of climate change. Since the region's urban economies face recurring conditions of water scarcity, their future development requires water importation, mostly from nearby rural areas. It is therefore paramount to have a firm grasp of the role water plays in the growth and development of the region's urban economies. This paper contributes to our understanding of the effects of a rural-urban water transfer on urban economic growth and sprawl, using the 1920s Owens Valley water transfer to Los Angeles (LA) County as a case study.

The Owens Valley Water Transfer (henceforth, OVWT), negotiated between 1905 and 1935, is one of the largest water acquisitions by any local government in US history (Libecap, 2007). The transfer involved the city of LA purchasing agricultural lands in Owens Valley to acquire the contingent water rights, since all of these rights had been appropriated by the valley's farmers. The city's ownership of these rights subsequently enabled the building of the LA Aqueduct, which provided 283 cubic feet of water per second as opposed to the 68 cubic feet per second supplied by the LA basin.

Motivated by the OVWT, we begin by developing a growth-theoretic model that emulates the main aspects of a rural-to-urban water transfer within a given region. At the heart of our theory is a water equation of motion, through which we formulate the main features of the model. Specifically, our regional economy is endowed with local water resources, be it groundwater or surface water. Some of this water naturally outflows from the system (via evaporation, surface outflow, etc.), and some is consumed either by the residential sector or as an input in the production of an aggregate (composite) good. The region's urban economy also imports water from a nearby rural area, in addition to its temporal, natural water inflows. The urban economy produces the aggregate good using labor and water. A representative urban consumer consumes the composite good and water. Water in the natural system also provides non-consumptive value to the representative consumer. Our theoretical results characterize the conditions under which the OVWT results in urban GDP growth, an increase in the natural system's steady-state water stock, and an improvement in urban welfare.

Guided by our theoretical model, we next set out to use the historical case of OVWT to empirically quantify the causal effects of the OVWT on the economic growth of, and associated sprawl within, LA County. We implement synthetic control and difference-in-differences techniques to measure the extent to which the water transfer from Owens Valley (i.e., treatment effect) spurred subsequent economic growth and associated sprawl in LA County. Our synthetic control results demonstrate that GDP per capita increased by roughly \$175 per year, on average, over the 30-year period between 1920 (when the transfer began) and 1950 as a consequence of the OVWT. To put this into perspective, this represents an increase of 32% in per-capita income, on average, during the period. Underpinning this growth in GDP per capita in LA County was an average annual increase in manufacturing product per capita of \$157, and a decrease in agricultural product per capita of roughly \$55. At the same time, our synthetic control results indicate that the county's urban sprawl increased by 7.65% per year, on average, as a result of the OVWT. Taken together,

the evidence suggests that LA County experienced pronounced causal growth effects from the OVWT.

An expansive literature has assessed the feasibility and efficacy of these short-term lease markets, finding that in general the markets' theoretically favorable outcomes can indeed materialize in practice, particularly in the absence of excessive transaction costs and institutional constraints (Hagerty, 2023). Our paper fills a yawning gap in the literature regarding permanent sales of water rights---the investigation of causal relationships between water farming (in particular, a large-scale sale of water rights from an agricultural area to an urban area), and the sale's impacts on an urban area's subsequent economic growth and sprawl. To the best of our knowledge, the only other paper to estimate a causal relationship between a large-scale water transfer and its impacts is Akhundjanov et al. (2023). They establish a direct linkage between the water transfer and effects experienced in Imperial County. Our results likewise establish a causal link between a large-scale water transfer and its impacts, but in our case the impacts are experienced in the importing region, LA County.

As Libecap (2004) points out, negative publicity, which coalesced in what came to be known as the "Owens Valley syndrome", jeopardized future agriculture-to-urban water transfers in the state. A disproportionate share of the surplus generated by transfer had accrued to LA County due to the combination of relatively inelastic urban water demand and elastic rural supply (Libecap, 2009). The syndrome was fed by the transfer's value to LA County, which was difficult to ascertain at the time (Libecap, 2004, 2009). It is because of this controversy that our basic research question concerning the transfer's subsequent effect on LA County's economic growth and concomitant urban sprawl is so compelling. As such the paper positions itself to generate productive discussions at the AAEA meetings.

References

Akhundjanov, S.B., Edwards, E.C., Ge, M., and Oladi, R. (2023). Left in the dust? Pecuniary and environmental externalities in water markets. *CEnREP Working Paper 21-005*, Raleigh, North Carolina.

Hagerty, N. (2023). What holds back water markets? Transaction costs and the gains from trade. *Working Paper*.

Libecap, G.D. (2004). Chinatown: Owens Valley and western water reallocation—Getting the record straight and what it means for water markets. *Texas Law Review*, 83:2055-2089.

Libecap, G.D. (2007). *Owens Valley Revisited: A Reassessment of the West's First Great Water Transfer*. Stanford University Press.

Libecap, G.D. (2009). Chinatown revisited: Owens Valley and Los Angeles—Bargaining costs and fairness perceptions of the first major water rights exchange. *Journal of Law, Economics, & Organization*, 25(2):311-338.