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Off the rails: Is state ownership bad for productivity?

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ABSTRACT

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The performance of Indian railways in the nineteenth century provides a great context to study the effects of state ownership on productivity and other aspects of firm operations. We rely on a key feature of the institutional background whereby the colonial Government of India purchased a majority ownership stake in private railways at predetermined dates set by contracts negotiated decades before the companies came under state ownership. Controlling for individual railway fixed effects, year fixed effects, and railway-specific time trends, we find no evidence of a decline in TFP following state takeovers of private companies. Instead of reducing productivity, as the recent experiences with privatization would suggest, we find that the Government of India maintained productivity when it became the owner of railways. Government ownership influenced certain areas of operations such as the capital-labor ratio, but not others such as fares. Our results point to the conditions where state ownership is no worse than private ownership in terms of productivity. *Journal of Comparative Economics* 000 () (2015) 1–17. UC Irvine, Irvine, CA, United States; Graduate School of Business and Public Policy, Naval Postgraduate School, Monterey, CA, United States.

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1. Introduction

Economists and policymakers alike have long been interested in the costs and benefits of private versus state ownership. Although state ownership has been on the decline since the 1970s, large and important industries in many developing countries, especially Brazil, India, Russia, and China continue to remain under state ownership. In these and other countries where the state has a large ownership presence it is important to know whether there are any productivity losses from state ownership. The empirical literature on privatization argues that private ownership usually results in increased productivity suggesting that state ownership has efficiency costs (see surveys by [Djankov and Murrell, 2002](#); [Estrin et al., 2009](#); [Guriev and Megginson, 2007](#); [Megginson and Netter, 2001](#)). However, many studies focus on short panels comparing the 3 year pre-privatization performance to the 3 year post-privatization performance of the same firm.¹ Such analyses miss the potential long run impact of an ownership change and are likely to confound the effects of privatization with other macroeconomic changes. Moreover, privatized firms are a selected sample and econometric analyses focusing only on these firms could significantly overstate the positive impact of privatization.

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E-mail addresses: dbogart@uci.edu (D. Bogart), lhartman@nps.edu (L. Chaudhary).¹ [Megginson et al. \(1994\)](#) were the first to exploit such a before-after comparison of the same firm. This was a positive departure from earlier papers that relied on cross-sectional comparisons of private and state owned enterprises. See the summary tables in [Guriev and Megginson \(2007\)](#) for a list of papers that have used the MNR framework.<http://dx.doi.org/10.1016/j.jce.2015.03.003>

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This paper uses the lens of history to better understand the effects of state and private ownership. Our historical setting—railways in colonial India—is especially suited to study this question for four reasons. First, there was a complete transition in the main trunk lines from private ownership to majority state ownership, which eliminates concerns about selection. Second, the timing of state takeovers was exogenous to firm performance because it was predetermined in contracts signed decades before the actual takeovers. As a result, the colonial state could not time takeovers to coincide with periods of increasing or decreasing productivity. Third, we have constructed a long panel of railways from 1874 to 1912 that allows us to distinguish between short and long run effects of state ownership. Fourth, we observe multiple railways being taken-over. By contrast most infrastructure settings study a single private or state firm undergoing an ownership transition.

The initial rail network in India was built and owned by British companies through the 1870s. The companies received a subsidy in the form of a 5% dividend guarantee to investors. A clause in the original contracts allowed the colonial Government of India to purchase railway companies only at specified future dates. Beginning in the 1870s, the Government began to exercise its purchase option and over the next three decades the Government of India took ownership of all the former private railways. By 1910 the Government owned over 70% of railway miles compared to less than 10% in 1875. The general movement to nationalize railways in India was driven by political and fiscal considerations.

In this paper, we examine how state takeovers in India influenced a wide range of performance measures namely, total factor productivity or TFP, partial productivity in capital, fuel and labor, and other aspects of firm behavior such as investment, the capital–labor ratio, and average freight and passenger fares. Following the standard approach in the productivity literature, we measure TFP as a residual from a production function (Syverson, 2011; Van Biesebroeck, 2008) using passenger miles and ton miles as output. The inputs are labor, fuel, and capital. Our baseline specification controls for individual railway fixed effects, year fixed effects, and railway-specific time trends. Thus, we are identifying the effects of ownership by exploiting variation within railways over time.

Our empirical strategy addresses the possibility that railway companies could anticipate takeovers and respond accordingly. The main worry is that firms anticipating takeovers could run down investment and productivity in the years before takeover. Thus, TFP could be trending down in the years before takeover, which would generate a biased coefficient on state ownership. It seems the Government of India was also concerned about such anticipation effects because the original contracts specified that companies would receive the market value of their stock price averaged over the 3 years before takeover. To test for anticipation effects by private companies, we interact state ownership with an indicator variable for the 3-year window before takeover. We also test for differential short and long run effects by interacting state ownership with an indicator variable for the first 3 years after takeover including the year of takeover, and for 3 or more years after takeover.

The empirical results yield a clear conclusion: state ownership had a negligible impact on the TFP of Indian railways. Our period of study was one of high productivity growth in railways. Even after state takeovers, railways did not deviate from this general trend of high productivity growth. In specifications that control for anticipation effects, we find no significant decline in TFP in the years before takeover and the main effect on state ownership is unchanged. There are also no significant differences in the impact of state ownership between the short run (first 3 years after takeover) and the long run (3 or more years after). Moreover, the results on partial productivity and fares find no evidence of a negative impact of state ownership.

Interestingly, we find capital intensity (i.e., capital to labor ratio) increased following state takeovers. This possibly relates to the Government reducing or eliminating dividend guarantees under state ownership. While the guarantees arguably encouraged capital investment in the early phase of Indian railway development, by the late nineteenth century they clearly raised the cost of capital because of declines in the interest rate and hence the Government's cost of borrowing. Unlike contemporary settings, the colonial Government also did not expand employment after takeover, another factor contributing to higher capital–labor ratios.

Overall, the findings relate to a growing literature on the organization and efficiency of Indian railways. Historians have written extensively about regulation and ownership mostly focusing on whether dividend guarantees to private railways was a useful policy.² We have contributed to this literature in our previous work. In Bogart and Chaudhary (2012) we find that variable costs declined following the switch to state ownership without an increase in the number of accidents. In Bogart and Chaudhary (2013) we estimate the aggregate performance of Indian railways and find high TFP growth rates relative to other sectors of the Indian economy and railways in other parts of the world.

In this paper, we return to the question of state ownership using newly constructed railway-level series on capital and fuel inputs along with freight and passenger fares. By expanding our scope to capital and related measures of total and partial productivity, this paper offers a comprehensive study of the effects of state ownership on the performance of Indian railways. Unlike the findings on variable costs (Bogart and Chaudhary, 2012), we find no positive effects of Government ownership on total factor productivity or fares. We find positive effects of state ownership on capital intensity, but interestingly the more capital intensive railway systems did not translate into productivity gains. The overall picture suggests the Government takeover of Indian railways had a neutral effect on performance.

Our findings are different from many empirical studies in the privatization literature. A recent survey by Guriev and Megginson (2007) suggests average productivity improves by 20% following privatization.³ However, in our case a 95% confidence interval

² See Sanyal (1930), Thorner (1977), Kerr (2007), Sweeney (2011), Hurd and Kerr (2012) among others.

³ For similar estimates of privatization see Jones and Mygind (2002), La Porta and Lopez-de Silanes (1999), Claessens and Djankov (2002).

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