



# Where does privatization work? Understanding the heterogeneity in estimated firm performance effects<sup>☆</sup>

David J. Brown<sup>a</sup>, John S. Earle<sup>b</sup>, Almos Telegdy<sup>c,d,\*</sup>

<sup>a</sup> IZA, Bonn, Germany

<sup>b</sup> George Mason University, United States, Central European University, Hungary, Research Centre for Economic and Regional Studies, Institute of Economics - HAS, Hungary

<sup>c</sup> National Bank of Hungary, Central European University, Hungary

<sup>d</sup> Institute of Economics, Research Centre for Economic and Regional Studies – HAS, Hungary

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## ABSTRACT

Why do the reported effects of privatization on firm performance vary so much? This paper provides new estimates of these effects and tests potential explanations for heterogeneity using comprehensive, long-panel data for 70,000 firms in five East European economies. We estimate that privatization raises measures of profitability, productivity, and growth by about 5–12% on average, but with substantial variation across countries and time periods. Analyzing heterogeneity in privatization effectiveness, we find little systematic role for firm size, financial dependence, exchange listing, or technological complexity, but important variation by fraction privatized, ownership concentration, firm quality, and the macroeconomic and institutional environment.

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## 1. Introduction

An enduring puzzle in research on the firm performance effects of privatization is why there is such a wide range in the reported estimates. Beginning with the classic paper on privatized firms by Megginson et al. (1994), most firm-level studies find positive effects on various measures of performance. However, the magnitudes vary widely across studies, with some large and some small estimates, some cases of a zero effect, and a few where the effects are estimated to be negative. Possible explanations

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\* Corresponding author at: National Bank of Hungary, Central European University, Hungary

E-mail addresses: [earle@gmu.edu](mailto:earle@gmu.edu) (J.S. Earle), [Telegdy@mnb.hu](mailto:Telegdy@mnb.hu) (A. Telegdy).

for this variability include differences in the design of privatization programs, in the types of firms privatized, or in other aspects of the economic environment. Then again, the differences may result from variation in the types of data available for different countries, and in the outcome variables and estimation methods used in different studies. Therefore, it is uncertain whether the variability represents genuine differences or merely reflects the constraints and choices of different researchers estimating the privatization-performance relationship.<sup>1</sup> Moreover, if the differences are genuine, it remains unclear what underlying characteristics of policies, firms, and the environment may account for these differences.

The purpose of this paper is to examine several important dimensions of heterogeneity in the firm performance effects of privatization. In order to obtain estimates that are reliable and comparable, we analyze most privatizations over a long time period with similar data for five countries: Hungary, Lithuania, Romania, Russia, and Ukraine. We also use a common set of firm performance measures, including measures of profitability, efficiency, and growth, to examine robustness in the patterns and sources of variation in estimated privatization effectiveness. The data size is much larger in both the cross-sectional and time-series dimensions than any previous study of privatization and it facilitates the use of econometric methods to identify causal effects, estimate how the estimates vary with observable factors, and carry out specification checks of alternative identification methods. Our empirical approach for estimating the average effects generally follows Brown et al.'s (2006) method for analyzing productivity, including a control group of state-owned firms within the same country-industry-years, fixed-effect and random growth models estimated with deviations from firm-specific means and trends, and specification checks for selection bias. However, our data set is more than twice as large and adds non-manufacturing sectors and a broader set of outcome measures. Our data also contain measures of firm, industry, and economy-wide characteristics that we use to investigate heterogeneity in privatization effectiveness, the main focus of this paper.

Our first step is to estimate the average effects of privatization with our large sample, examining alternative regression methods and dependent variables, including proxies for profitability (return on sales), efficiency (labor productivity), and growth (output or sales). The results are consistent with the findings from most previous studies in implying positive and highly statistically significant effects for firm performance. The magnitudes depend somewhat on the specification, and our specification checks reject OLS estimates as unreliable but provide some support for both a specification with only firm fixed effects (FE) and for one with firm-specific time trends also included (i.e., a random growth model, which we label FE&FT). The results for the FE and FE&FT specifications lie in the five to 12% range for each of the outcome variables. When estimating separately by country, we find substantial variation that largely confirms, although with a much larger database and more firm performance measures, the general pattern reported in Brown et al. (2006); we also find significant variation over time periods and across industries. The evidence further suggests that the cross-country variation is an artifact neither of sample coverage nor of reporting behavior.

Having established that at least some of the variation in privatization effectiveness appears to be real, we turn to the principal question of this paper: what factors are responsible for the heterogeneity? Although previous research on privatization offers much discussion on this question, it provides relatively little systematic analysis of the sources. The closest papers to ours are Frydman et al. (1999), D'Souza et al. (2005), and Boubakri et al. (2005), who analyze variation in privatization effects along some of the same dimensions. A disadvantage of those studies is that the samples consist of short time series on 218, 129, and 230 privatized firms respectively, and data limitations preclude the use of control groups, comparisons within industries and years, and adjustments for trends. Brown et al. (2009) examine heterogeneity in privatization effects across Russian regions, but only for manufacturing firms and with a focus on interactions with state bureaucracy. Bartel and Harrison (2005) analyze privatization in Indonesia with a focus on hardening budget constraints. We build on this research in our analysis below.

Our analysis of the heterogeneous effects considers three sets of hypotheses, discussed here only briefly but explored more thoroughly in the relevant sections below. The first concerns variation in privatization policies and in the resulting new ownership structures. We first confirm previous findings with our much larger samples that the effectiveness of privatization is considerably higher when the new owners are foreign investors rather than domestic individuals or businesses. To focus the remaining discussion, we restrict attention subsequently to domestic privatizations. Concerning the domestic privatization effects, we find a strong relationship with the fraction of shares privatized, so that 100% privatizations produce larger performance effects than do majority privatizations short of 100%. In contrast to both types of "control privatization" types, partial privatizations that lead to a minority of shares in private hands (minority or "revenue privatizations") are estimated to produce little or no positive impact on any of the measures of firm performance.<sup>2</sup> The data for two countries (Hungary and Romania) permit us to distinguish different methods of domestic privatization resulting in different levels of ownership concentration and insider involvement: direct sales to large blockholders, mass privatization with vouchers that leads to extremely dispersed outside shareholding, and management-employee buyouts (MEBOs) that result in predominance of insiders. Voucher privatization estimates sometimes imply little or no effect, while MEBO estimates show consistently positive effects. Both, however, tend to have smaller effects on efficiency than the domestic blockholders, which, again, are dominated by foreign investors. On the other hand, we find no consistent evidence that

<sup>1</sup> Other early multi-country studies include Boubakri and Cosset (1998), D'Souza and Megginson (1999), Frydman et al. (1999), and Claessens and Djankov (2002). Brown et al. (2006) represents a paper reporting a negative privatization effect for one country, Russia, although Brown et al. (2013) find the Russian effect becomes positive in 2003–2005, as discussed below. The extensive literature estimating an average privatization effect consists primarily of studies of either single countries or small samples from many countries; excellent surveys can be found in Megginson and Netter (2001), Djankov and Murrell (2002), and Estrin et al. (2009).

<sup>2</sup> Previous research on minority privatization is somewhat inconclusive. Li and Xu (2004) find no effects in telecommunications, Gupta (2005) finds positive effects in India, Sun and Tong (2003) find no effects in China, while Jiang et al. (2009) and Bai et al. (2009) do find effects in China. Berger et al. (2009) also find positive effects in banking, although their privatizations involve foreign ownership. A difference between these studies and ours is that they focus on share issue privatizations, where the effect of ownership change and the disciplinary effect of listing on the stock exchange appear simultaneously, while we are able to distinguish these two mechanisms.

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