

The Effects of Private Equity on Operational Efficiency and Market Power^{* †}

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Extended Abstract

Do private equity funds increase operational efficiency at portfolio companies or are they more interested in generating returns by exploiting market power? If private equity funds do deliver efficiency improvements, how much of the cost reduction is passed on to the customers of their portfolio companies? The answers to these questions can have profound implications for assessing the overall impact private equity has on economic welfare, something which is not well understood. There is limited evidence to date regarding the effects of private equity on company-level efficiency and market power, and it remains unclear whether the returns private equity funds generate for their investors result from efficiency improvements (a potential net positive for the economy) or increases in market power (a potential net negative).

Against this background, we investigate how private equity firms affect the real outcomes of their portfolio companies on the one hand and investor returns on the other. For the former, we draw on recent advances in the estimation of production functions to estimate changes in labor productivity and total factor productivity and in company-level price markups. Following prior literature, we also examine changes in investment in capital stock and innovation as well as changes in financial performance. We relate these real outcomes to soft information about the value creation strategies pursued by the private equity firms in each of their portfolio companies. For the latter, we draw on proprietary deal-level cash flow data (which allow us to estimate returns to investors) and relate the variation in investor returns to company-level changes in efficiency and market power.

Our empirical approach allows us to examine when the economic and financial returns of private equity deals diverge. Existing evidence suggests that persistence of returns in private equity deals has declined over time (Braun et al. 2017), as the private equity industry has

matured and competition for deal flow has increased. However, it is unclear whether there are also structural reasons behind this decline. For instance, greater product market competition due to increased import penetration may make it more difficult for portfolio companies to maintain high sales margins. More generally, it is unclear if investor returns derive mainly from cost efficiencies (i.e., the real effects of improved monitoring, which may, for example, lead to higher quality management and ‘lean’ production technologies) or changes in pricing policies and market power. Our empirical approach is designed to disentangle changes in efficiency from changes in market power and to relate each of these to investor returns.

Identifying the impact of private equity (PE) involvement on company-level productivity and market power is challenging due to a host of endogeneity and selection issues. A key empirical challenge arises due to the endogenous selection by PE firms of which companies to invest in. It is plausible that selection reflects, in part, a PE fund’s expectations of the scope for changes in productivity and market power. For instance, PE firms may target industries undergoing market consolidation or deregulatory changes – changes which may provide a boost to the efficiency or pricing power of companies operating in these industries regardless of the involvement of PE firms.

We combine a traditional difference-in-differences strategy with matching methods to address this selection challenge. We form three alternative sets of control companies to minimize selection bias. Each set is matched on country, industry, size, and the year of the private equity transaction. The first set of controls consists of all eligible matched companies that were never subject to an acquisition. These controls are comparable in spirit to those used by Bharath et al. (2014) and Davis et al. (2014) in their studies of private equity, jobs, and productivity in the U.S. The rich nature of our data allows us to improve on their identification strategy by narrowing the set of controls to companies likely to be similar on not just observable but also unobservable characteristics that correlate with selection.

Specifically, our second set of controls consists of companies that are acquired by a strategic acquirer (i.e., a domestic or foreign corporation) rather than by a PE firm. To the extent that strategic acquirers are similar to PE firms in their ability to identify promising targets, this control group helps minimize selection on unobservables. Our third set of controls is based on a propensity score matching model, which allows us to predict the probability of receiving PE financing based on a number of pre-investment characteristics: total assets, sales, sales growth, TFP, and markup.

A second empirical challenge relates to the measurement of productivity and market power and their endogeneity to receiving PE funding. Disentangling productivity improvements from changes in market power is challenging when micro-level data on the prices companies charge for their products are unavailable. Absent micro-level price data, researchers need to rely on a set of assumptions about how companies compete in the product market to estimate market power, which is typically measured by price markups over production costs. We follow recent advances in the industrial organization literature on production function estimation suggested by De Loecker and Warzynski (2012) and De Loecker and Eeckhout (2017), who impose minimal assumptions on market competition while accommodating endogenous productivity processes. This approach allows us to estimate time-varying company-level markups consistently so that we can track how a company's productivity and market power change while under PE ownership.

Summary of principal findings

Our results provide evidence of a significant and positive impact of private equity investment on revenue growth, employment, investment, and operational efficiency at portfolio companies. Over the time companies spend in a private equity firm's portfolio – an average of five years in our sample – their revenues increase by an average of 58%, employment by 35%, the capital stock per employee by 33%, labor productivity by 17%, and

total factor productivity by 3%, over and above the corresponding changes at matched control companies, all else equal. At the same time, we find that markups charged by portfolio companies go down by an average of 5%. This suggests that cost reductions achieved through operational improvements are passed on to consumers via lower prices.

We explain how much of the gains in efficiency and employment can be attributed to PE firms' ability to identify promising companies, and how much can be attributed to operational improvements. When we restrict the control group of companies to those that are acquired by foreign strategic acquirers or publicly listed companies, some of the company-level effects we document decrease in size. Companies in a private equity firm's portfolio now experience an average increase of 40% in revenues, 26% in employment, and 13% in labor productivity, over and above the corresponding changes at matched foreign-owned subsidiaries or listed companies. Hence, between a third and a quarter of the documented rise in revenue growth, employment, and labor productivity can be attributed to selection on unobservable factors. We find that total factor productivity behaves similarly under the management of both private equity firms and strategic acquirers, while markups are lower by 3% under PE management compared with strategic acquirers.

To shed more light on these alternatives and how different types of investors create value, we hand-collect textual information on the value creation strategies followed by PE firms, chiefly from proprietary quarterly reports the PE firms supply to their investors. These reports provide information on the operational changes at each portfolio company and how instrumental PE firms have been in enacting them. To validate whether PE firms actually carry out the operational improvements that they say they do, we correlate the textual information with post-investment effects on debt, capital investment, inventories, and management of working capital. We then relate detailed soft information on each portfolio company's operational changes – such as product introductions, market expansion, and

pricing strategy – to changes in labor productivity, TFP, and markups.

Related literature and contribution

The effects of private equity and venture capital on real economic outcomes and productivity are a growing area of interest in the academic literature. Boucly et al. (2011) show that targets in leveraged buyouts in France increase capital expenditures and grow faster than their peer group. Chemmanur et al. (2011) show that venture capital improves total factor productivity in the U.S., even after accounting for selection effects. Davis et al. (2014) find that buyouts in the U.S. contribute to a net job destruction of 1% but increase operational efficiency at the company level by reallocating resources to more productive plants. Along similar lines, Bharath et al. (2014) document that public firms that go private do not experience efficiency gains relative to similar peers but extensively restructure their portfolios of plants.

Prior work is largely silent on the effects of private equity on market power. The only other study of market power and pricing that we are aware of is Fracassi et al. (2017), who draw on product-level price data to show that U.S. consumer-goods companies acquired by PE firms raise prices only marginally on their existing products and instead grow their revenue by introducing new higher-priced products, developing new sales channels, and selling into new geographical areas. Fracassi et al. conclude that PE investment benefits consumer-goods customers through new product introductions and increased variety. Unlike Fracassi et al., our data encompass all industries PE firms have targeted (not just consumer goods). The drawback of our more comprehensive sample is that we do not observe product-level prices (though production-function estimation helps mitigate this drawback).

Our finding that PE-backed companies do not increase their markups generalizes Fracassi et al.'s (2017) conclusion that PE deals are not harmful to U.S. consumers to a wider range of industries and countries. More importantly, we add nuance to this conclusion by showing that

consumers benefit as the gains of productivity improvements are passed on to consumers in the form of lower prices. We are able to pinpoint the exact operational changes that PE firms carry out in their portfolio companies to enable them to pass on cost savings to consumers.

Our analyses are based on unique data for a 25-year panel of 1,444 deals in 20 transition economies in Central, Eastern, and Southern Europe, the Baltics, the Commonwealth of Independent States (CIS), and the Middle East and North Africa that were financed by 178 private equity funds. This somewhat unusual setting has several advantages. First, as large shareholders, the private equity funds have skin in the game and thus an incentive to engage in value creation and active monitoring of their investments. Second, as a first approximation, we know what the fund manager knows. We have access to quarterly summaries of the hard and soft information fund managers have about their portfolio companies and the conclusions they draw from it. Our data thus allow us to capture each fund's intended strategy to create value at the time of investment and how they achieve it over time at the deal level. Third, we also know what actions fund managers take in response to the information they collect. Specifically, the quarterly reports that we have access to provide comments on how fund managers change their strategies when intended plans are not realized on time or at all.

We complement the soft information from quarterly reports with hard data from the annual balance sheets and income statements of each portfolio company. In order to do so, we manually match each deal to a company in Orbis, a global database provided by Bureau van Dijk. Orbis provides harmonized balance sheet information on a rich set of public and private companies. This allows us to calculate measures of efficiency and market power in a consistent manner across countries, and also to create comparable control groups for our econometric analysis.

We contribute to the PE literature in two novel ways. First, we provide evidence that private equity activity leads to increases in operational efficiency, employment, and

investment at portfolio companies. Our empirical setup allows us to document how private equity funds differ from other investors in their value creation strategies. Our findings also help improve our understanding of how the private equity industry affects competition and market power. PE portfolio companies typically have much higher markups when compared to other firms in the same industry. This suggests that they are able to take advantage of some market power. However, PE firms do not raise markups any further after they acquire target companies; in fact, they lower them. This behavior appears to reflect a strategy among PE firms to increase portfolio company values by expanding markets and increasing sales.

Second, we provide new evidence on PE returns at the portfolio company level and document the drivers behind them. PE funds increasingly turn to generating returns through increasing growth and carrying out efficiency improvements (Gompers et al. 2016), such as using better cost control or realigning businesses into higher margin products. In line with this, Acharya et al. (2013) show that the better financial performance of PE deals can be traced to improvements in sales and operating margins. We contribute to this literature by collecting detailed “soft” information on changes that PE firms carry out in their investments and relating these changes to economic and financial outcomes.