



# The effects of corporate spin-offs on productivity<sup>☆</sup>



Thomas J. Chemmanur<sup>a,\*</sup>, Karthik Krishnan<sup>b,1</sup>, Debarshi K. Nandy<sup>c,2</sup>

<sup>a</sup> Finance Department, Fulton Hall 440, Carroll School of Management, Boston College, Chestnut Hill, MA 02467, United States

<sup>b</sup> Finance Group, D'Amore Mc-Kim School of Business, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, United States

<sup>c</sup> International Business School, Brandeis University, 415 South Street, Waltham, MA 02453, United States

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## ABSTRACT

Using a unique sample of plant level data from the Longitudinal Research Database of the U.S. Census Bureau, which enables us to correctly identify the parent and spun-off entities prior to spin-offs, we establish that efficiency improves following spin-offs. A spin-off refers to the separation of the management of some assets of a firm into a separate entity (which we term as the spun-off entity or subsidiary). We investigate the underlying mechanisms and the real effects of spin-offs after correcting for potential endogenous selection using treatment effect estimators and propensity score matching in our analysis. We identify *how* (the precise channel and mechanism), *where* (parent or subsidiary), and *when* (the dynamic pattern) efficiency improvements arise following spin-offs. We show that spin-offs increase total factor productivity (TFP) and that such productivity improvements are long-lived. This post spin-off productivity improvement can be attributed to cost savings but not to higher sales. Further, such improvements arise primarily in plants remaining with the parent. However, contrary to speculation in the previous literature, we show that plants that are spun-off do not underperform parent plants prior to the spin-off. We identify acquisitions following spin-offs and find that while productivity improvements occur immediately after the spin-off in non-acquired plants, they start only after being taken over by another firm in acquired plants. Finally, we show that unrelated spun-off entities show greater improvements in productivity compared to related spun-off entities.

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## 1. Introduction

It is well documented that there is a significant improvement in the accounting performance and a corresponding increase in the combined stock market value of firms following corporate spin-offs.<sup>3</sup> The existing literature has supported the idea that spin-offs are generally associated with overall value improvements (as evidenced by positive stock price reactions at announcement and improved accounting performance, or by increases of investment efficiency measures, such as the relative investment ratio (RINV) or the sensitivity of investment to industry-median  $q$ ). However, prior studies that are based only on accounting data are unable to answer many important questions regarding corporate restructuring in general and spin-offs in

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\* Corresponding author. Tel.: +1 617 552 3980; fax: +1 617 552 0431.

E-mail addresses: [chemmanu@bc.edu](mailto:chemmanu@bc.edu) (T.J. Chemmanur), [k.krishnan@neu.edu](mailto:k.krishnan@neu.edu) (K. Krishnan), [dnandy@brandeis.edu](mailto:dnandy@brandeis.edu) (D.K. Nandy).

<sup>1</sup> Tel.: +1 617 373 4707.

<sup>2</sup> Tel.: +1 781 736 8364; fax: +1 781 736 2269.

<sup>3</sup> A corporate spin-off occurs when a firm creates a subsidiary to hold a portion of its assets, and then distributes the shares of the subsidiary on a pro-rata basis to its existing shareholders to create an independent company. Thus, no new capital is raised by the joint firm in spin-offs.

particular. For example, little is known about the mechanisms through which performance and value improvements are generated following spin-offs. Do these efficiency improvements arise from better aggregate product market performance (sales) by the two entities (parent firm and spun-off entity) resulting from the spin-off, compared to the pre-spin-off (joint) firm? Or do they arise from savings in various costs by the two entities relative to the pre-spin-off joint firm?<sup>4</sup> Alternately, do they arise from the reallocation of capital from less efficient to more efficient plants due to the spin-off?

Thus, the precise source of post-spin-off performance and efficiency gains and the mechanism leading to the generation of such gains have not been established. This is because much of corporate restructuring either occur at the divisional level (i.e., below the firm level) or involve privately-held companies, making it virtually impossible to assess precisely the accounting profitability effects of these restructurings. In order to overcome these limitations, several studies involving corporate restructuring have asserted that a more desirable methodology is to assess the total factor productivity (TFP) of plants before and after such restructurings, using detailed plant-level data (see e.g., [Lichtenberg and Siegel \(1990\)](#), [McGuckin and Nguyen \(1995\)](#), and [Schoar \(2002\)](#)). Thus, the first objective of this paper is to identify the precise source of efficiency gains in spin-offs by studying how spin-offs lead to changes in various product market, labor, input cost, and investment variables in the plants belonging to firms undergoing such restructuring by using plant level data from the Longitudinal Research Database (LRD) of the U.S. Census Bureau.

A recent paper by [Colak and Whited \(2007\)](#) has argued that such improvements in efficiencies following spin-offs are an artifact of endogenous selection and measurement error, since factors that induce firms to spin-off or divest divisions, may also improve investment efficiency. To address this issue, they propose using treatment effect estimators and find that, after controlling for endogenous selection, spin-offs do not lead to an increase in investment efficiency. Clearly, their findings call the large literature documenting performance improvements in spin-offs using accounting data (e.g., [Desai and Jain \(1999\)](#), [Daley et al. \(1997\)](#)) into question. However, their conclusions are based on a sample of spin-offs and divestitures using Compustat segment-level data which has been shown to be systematically biased in prior studies (see, e.g., [Harris \(1998\)](#) and [Villalonga \(2004\)](#)), since it does not properly capture within-firm disaggregations accurately.<sup>5</sup> Given this data limitation of the Compustat segment-data and the contradictory nature of the evidence relating value improvements to spin-offs, a related goal in this paper is to take an approach different from that adopted in the previous spin-off literature, and investigate the underlying mechanisms and the real effects of spin-offs after correcting for potential endogenous selection using treatment effect estimators and propensity score matching algorithms. Moreover, since the plant-level LRD provides data on all establishments within firms, it is able to capture within-firm disaggregations accurately.

The second objective of this paper is to identify where the performance improvements in spin-offs occur: do these efficiency improvements occur predominantly in parent plants (plants continuing with the parent firm) or do they occur predominantly in the plants belonging to the spun-off entity or subsidiary, or do they occur substantially in both entities? This question is particularly relevant in the context of speculation by prior firm-level empirical studies that firms spin-off their underperforming divisions. This speculation has been based on the fact that, subsequent to the spin-off, the spun-off entity underperforms the parent (recall that firm-level studies are unable to observe the performance of the spun-off entity prior to the spin-off). In contrast to firm-level studies, we are able to separately study the performance of plants belonging to both parents and spun-off subsidiaries before and after the spin-off. This allows us to not only identify whether the efficiency improvements from spin-offs arise predominantly in parent plants or in subsidiary plants (or in both), but also allows us to compare the performance of parent and subsidiary plants prior to the spin-off, and thus verify whether firms indeed spin off their underperforming divisions.

The third objective of this paper is to study when performance improvements occur following spin-offs: i.e., the dynamic pattern of performance improvements around the spin-off. Thus, we split-up the overall changes in firm efficiency before and after spin-offs into performance changes occurring from six years before to six years after the spin-off. Moreover, in order to link these overall improvements in efficiency following spin-offs to the different channels through which they may arise, we also study the dynamic pattern of changes in the various product and labor market variables discussed before. Finally, we analyze the dynamic pattern of these efficiency changes for plants belonging to the parent and subsidiary separately. It is worth noting again that this is the first study in the literature to conduct such an analysis, perhaps because firm level studies using accounting data are unable to observe the performance and various cost variables of the parent and spun-off entity separately prior to a spin-off.

The fourth (and a secondary) objective of this paper is to identify the mechanisms through which these efficiencies are generated following spin-offs. Several theoretical rationales have been proposed in the literature for the performance and efficiency improvements in firms following spin-offs – we focus in particular, on four of them. [Chemmanur and Yan \(2004\)](#) argue that such improvements arise from the disciplining effects of spin-offs on firm management. In their setting, incumbent firm management not only enjoys security benefits like all other shareholders (arising from any increases in the equity value of the firm) but also enjoys private benefits from control, which are lost in the event of a takeover by another management team. Thus, spin-offs discipline management by increasing the probability of a takeover by a rival management team subsequent to the

<sup>4</sup> Thus, such efficiency improvements may arise from reducing the aggregate level of employment in these post-spin-off entities relative to the joint firm, or by reducing the average wage per employee (or both), reducing total labor costs. Another possibility is that they may arise from the management of these post-spin-off entities reducing materials and other input costs by engaging in more aggressive negotiations with suppliers or using such inputs more efficiently. Finally, they could also arise from reductions in overhead costs, such as rental and administrative expenses by these entities.

<sup>5</sup> [Villalonga \(2004\)](#) finds that the “diversification discount” is purely an artifact of Compustat segment data and once establishments are assigned properly (based on establishment-level data from the U.S. Census Bureau) the diversification discount manifests as a premium. Similar evidence related to the diversification discount is also presented in [Schoar \(2002\)](#), who uses plant-level data of the U.S. Census Bureau and finds that plants in diversified firms are, on average, 7% more productive than plants in comparable single-segment firms, contrary to prior evidence based on Compustat segment data.

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