Received: 25 January 2021 | Revised: 11 June 2024 | Accepted: 19 June 2024

DOI: 10.1002/smj.3641

RESEARCH ARTICLE

SMS | Strategic Management Journal

WILEY

How do US firms grow? New evidence from a growth decomposition

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Abstract

Research Summary: Firm growth and its underlying modes are rarely examined on their own, which impedes our understanding of their relative importance, correlations among them and their associations with competition and future performance. We address these using a comprehensive seven-mode decomposition of employment growth in all US firms (2004–2013). We find that organic modes such as opening or closing plants contribute more than transactional modes such as acquisitions and selloffs, and that growth modes exhibit age-size differences and are generally positively correlated within firms. Trade competition in manufacturing increased closures and decreased acquisitions but had no effect on new units. Transactional growth positively correlates with future survival, unlike organic growth. Together, our findings expand our understanding of firm growth as a composite of multiple growth modes.

Managerial Summary: Managers have many ways to grow a firm, but studies typically emphasize transactional

modes such as acquisitions and selloffs. Using data on all US firms over 2004–2013, we study seven growth modes in an integrated and comprehensive model. We find that organic modes contribute more to growth than transactional modes, that young, large firms grow less relative to old, large firms, that when firms grow (shrink), they tend to grow (shrink) using multiple modes simultaneously and that growth modes vary in their association with competition. Importantly, transactional growth positively correlates with future survival, unlike organic growth. Together, these findings not only suggest that growth modes vary in their contribution to firm growth but also that they may differently influence subsequent performance.

KEYWORDS

age-size growth heterogeneity, firm growth, firm performance, growth modes, organic growth and acquisitions

1 | INTRODUCTION

How firms grow has been of enduring interest to strategy scholars (Agarwal et al., 2020; Penrose, 1955, 1959), with the literature considering two broad modes of growth—transactional modes through acquisitions and selloffs and organic modes. Of these, transactional modes have been widely studied in strategic management. Acquisitions are recognized as critical to strategic renewal for acquirers (Agarwal & Helfat, 2009) and to reallocate managerial talent to productive capital (Braguinsky et al., 2015). Similarly, selloffs are an important exit route for acquirees (Moeen & Agarwal, 2017). In contrast, studies in macroeconomics pay significant attention to organic modes such as additions of new plants (Cao et al., 2017) and closures (Asturias et al., 2023). Indeed, studies such as Haltiwanger et al. (2013, "HJM") that estimate the empirical importance of growth modes ignore transactional modes, noting that expansion from acquisitions must equal the contraction from selloffs.

While that accounting identity is true for the economy as a whole, this stark contrast between the two literatures raises the question of how important transactional modes really are to firm growth: Are acquisitions the most important as strategy literature implies or are they marginal as macroeconomics studies suggest? This is a largely unanswered question, not only because of the singular emphasis on either transactional or organic growth but also because as Helfat (2021) notes, firm growth is "rarely examined as a separate topic in its own right" (p. 72). Consequently, we lack a big-picture view of how firms grow (Coad, 2021). Nor do we have much empirical evidence on the relative importance of various growth modes and any heterogeneity therein.

The lack of such a big-picture view has led to some important gaps in our theoretical understanding of firm growth. First, without simultaneously and comprehensively examining growth

modes, we cannot know if they are substitutes or complements. Understanding these correlations is critical if we want to theorize about follow-on questions such as how a barrier or incentive to a specific growth mode, say acquisitions, will affect overall growth and other growth modes. Second, while scholars have noted that competition may be associated with individual growth modes, such as acquisitions (Furr & Kapoor, 2018) or organic growth (Klepper, 1996), a fuller understanding of how growth modes relate to competition still eludes us. This is not only because firms may substitute one growth mode with another in response to competition, but also because individual growth modes themselves may be affected differently by competition. Finally, the question of how growth modes are associated with subsequent performance can only be partly answered by examining individual modes. In sum, the focus on individual growth modes has meant that theoretical arguments and empirical evidence on these important questions are mixed or limited.

The main goal of this article is to develop a big-picture view of firm growth and relatedly, provide generalizable answers to the aforementioned questions. To better achieve these goals, we use a descriptive, question-driven approach rather than a conventional hypothesis-based exposition. As the foundational tool for our analyses, we develop a granular decomposition of firm growth, which we apply to all US employer firms over 2004–2013 (∼61 million firm-year observations). Starting with the employment growth decomposition in HJM as the baseline, we split organic modes into growth from new establishments (or units), growth from existing units, and closures. We then make the decomposition more strategy-relevant by adding transactional modes (i.e., acquisitions and selloffs) and by decomposing growth from existing units further into growth from old units, recently set-up units, and recently acquired units. As a result, our decomposition measures seven growth modes in total. An advantage of our decomposition is that it simultaneously considers transactional and organic modes as well as expansionary and contractionary components. Moreover, it not only measures organic modes more precisely than most prior studies in strategy, but also ensures that individual components of growth aggregate consistently within and across firms and avoids many common econometric issues, including selection bias from excluding new entrants and firm exits.

Together, the decomposition and related analyses inform and further strategic management research at two levels. At the individual research question level, they significantly extend prior studies of growth modes (e.g., Lockett et al., 2011; McKelvie & Wiklund, 2010; Moatti et al., 2014) and shed new light by presenting new, more generalizable descriptive statistics on aspects where prior evidence is mixed and by challenging some commonly held notions about growth modes. On the first research question about overall pattern of growth modes, we find that although acquisitions are a sizeable contributor to firm growth, growth from organic modes is a larger contributor, even for continuing firms. This runs counter to the emphasis on acquisitions in the strategy literature and highlights the need for scholars to further investigate organic growth modes. Also, contrary to the conventional wisdom that young firms grow faster (HJM; Le Mens et al., 2011), we find that among big firms, young ones grow slower than old ones, which indicates a more complicated interplay of size, age and growth than currently understood. Regarding correlations among growth modes, we find that at the firm level, organic and transactional growth are complements; in contrast, the literature generally studies these two categories of growth modes as substitutes (e.g., Lee & Lieberman, 2010; Moatti et al., 2014). With regard to the question of how competition is associated with growth modes, we find that most of the post-2001 decline in US manufacturing due to trade competition is accounted for by a decline in growth from old units and acquisitions, and from increased closures and selloffs, rather than by a decline in growth from new units. This is different from studies that predict

that competition will tend to increase acquisitions (e.g., Agarwal et al., 2002; Furr & Kapoor, 2018; Mitchell & Mulherin, 1996). Finally, in terms of how firm performance is associated with different growth modes, we find that in contrast to the generally negative perception of how acquisitions affect acquirers' performance (King et al., 2004), acquisitions are positively associated with future performance. This result appears to be more in line with acquisitions being a tool for strategic renewal (Agarwal & Helfat, 2009) or facilitating better matching between managerial talent and productive capital (Braguinsky et al., 2015).

In addition to shedding light on individual research questions, at a broader level, our study can further both theory development regarding growth modes and their empirical analyses within strategy. From a theoretical perspective, by simultaneously examining multiple growth modes, our study highlights the gist of firm growth strategy, which is "about coordination and resource allocation *inside the firm*" (Rumelt et al., 1991, p. 19, italics in original). Our approach provides a summary of how managers allocate human capital across different types of units (old, recently opened/acquired, and new/acquired), and allows exploration of how these allocations co-vary and relate to other firm characteristics. Borrowing from the macroeconomic perspective in HJM, our study also brings to the fore that firm growth is inherently a process of reallocation, from shrinking entities to growing ones, both across and within firms. Our work highlights that while the predominant flow is from shrinking to growing firms (with different growth modes generally positively correlated within firms), the magnitudes of flows do vary by firm size and age, and that growth mode choices are significantly correlated with future performance. Importantly, a reallocation-based view of firm growth can aid further development of theories that often study individual modes. As an example, transaction cost economics (TCE) explains "make-or-buy" decisions (Capron & Mitchell, 2012) by focusing on only one side of the transaction. Our findings suggest that studying both sides of the transaction together (i.e., acquisitions and selloffs) may yield a richer understanding. Furthermore, a reallocation-based view also brings into focus the role of barriers to reallocation in firm growth.

On the empirical front, our methodology can further research in strategy by helping incorporate multiple growth modes within a common model, scaling up from the unit level to the firm level, and thus arriving at more informed conclusions. More generally, since our firm-level decomposition can be progressively and cohesively aggregated all the way to the economy level, it can also help better relate growth modes cross sectionally with each other, across levels, and over time, as called for by Coad (2021).

2 | FRAMING THE RESEARCH QUESTIONS

We inquire along three pastures relevant to strategy. We first discuss the need for a comprehensive treatment of growth modes and for descriptive statistics on patterns of growth modes. We then examine how growth modes relate to two important topics in strategic management: competition and future performance.

2.1 | Overall patterns in growth modes

2.1.1 | Relative importance and heterogeneity

Firms can use several modes of growth. As an anecdotal example, consider Procter & Gamble (P&G), which over time, acquired Gillette ($57 billion; Wall Street Journal, 2005), Tampax

($1.85 billion; Lipin & Narisetti, 1997), and Ambi Pur ($470 million; Byron, 2011). It also divested its perfume, haircare, and makeup businesses to Coty Inc. for $12.5 billion (Ng & Byron, 2015), and Iams, Eukanuba, and Natura brands to Mars Inc. for $2.9 billion (Ng & Gasparro, 2014). It built a new manufacturing plant in Berkeley, West Virginia ($500 million; Terlep, 2016), and expanded the Lima, Ohio, manufacturing plant ($500 million; Kelly, 2022). P&G closed plants in Augusta, Georgia, and Avenal, New Jersey, in recent years (Kelly, 2022; Martin, 2014). Finally, P&G also planned to cut 5700 of its 57,000 non-manufacturing jobs (total workforce of 129,000) during the 2012–2015 time period (Glazer & Ziobro, 2012).

Although P&G is a large, visible public company, and perhaps an atypical firm, the example highlights the range of growth modes available to firms. Of these various growth modes, acquisitions tend to get a high level of press visibility, potentially due to their scale. They are also the most studied in research (see Duhaime et al., 2021, Chap 2.1; Haleblian et al., 2009, for recent reviews), likely due to the ease of data availability and subsequent poor returns often associated with them (Malmendier et al., 2018). Analogous to acquisitions, firms can also use transactions to contract (e.g., divestitures). These get some press visibility—consider P&G's divestitures above as illustrative examples—but relatively less academic scrutiny. Empirically, studies have measured such contraction in diverse, potentially inconsistent, ways, as a dummy variable (Bergh, 1997), the number of divestitures (Berry, 2010), or the ratio of divested assets to total assets (Hoskisson et al., 1994). Moreover, although they are two sides of the same coin, studies often examine acquisitions and divestitures separately, focusing only on one side (Feldman et al., 2019).

Firms also grow organically, as the P&G example shows. While organic growth has received wide attention in macroeconomics (e.g., Asturias et al., 2023; HJM; Cao et al., 2017), this mode typically gets limited press visibility and is academically studied in strategy mostly in its relation to acquisitive growth (e.g., Kim et al., 2011; Lockett et al., 2011). Further, from a measurement perspective, few databases capture this dimension, and studies often compute organic growth by subtracting acquisitive growth from overall growth. Using such an approach may misestimate organic growth since it does not separate out unit selloffs or closures. Furthermore, within organic growth, growth from existing units (e.g., the P&G Lima plant), new units (e.g., the P&G Berkeley plant), and recently acquired units (e.g., the P&G Ambi Pur plants) may require different managerial skills (Penrose, 1955; Schoar, 2002), and measuring them precisely may be valuable. Firms can also contract organically, say, by closing their units. However, such closure of units by continuing firms has received limited attention in the strategy literature.

In sum, the focus of strategy research has been largely on acquisitive growth. The prominence of high-profile acquisitions or the research focus on acquisitions might render the impression that acquisitions are the main growth mode for firms. However, is that true? Are they more important than organic growth, say growth from new units? Similarly, how does contraction via divestitures compare with contraction by closures? Currently, we do not have systematic, generalizable evidence on the relative importance of these growth modes.

Beyond differences in their overall importance, it is reasonable to expect growth modes to exhibit some heterogeneity. In this regard, the most widely studied heterogeneity in *overall* firm growth relates to firm age and size, with the consensus being that younger or smaller firms grow faster (Coad, 2007). Within organic modes, HJM find that young firms are less likely to grow by opening new units. However, systematic evidence across growth modes is lacking. Similarly, growing firms (i.e., those with total growth greater than zero) may differ from shrinking firms (i.e., those with total growth less than or equal to zero) in their choice of growth modes. Motivated by these gaps in the literature, we ask:

Question 1. How important are the various growth modes? Do they vary across growing and shrinking firms? How do they vary by firm size and age?

2.1.2 | Correlations among growth modes

Another important question in the strategy literature that relates to overall patterns in growth modes is whether alternative growth modes are complements or substitutes within a firm. That is, are they positively or negatively correlated within a firm? Studies have noted the trade-offs between different growth modes (Capron & Mitchell, 2012; Duhaime et al., 2021) and generally suggested a negative correlation between organic and acquisitional growth (Hitt et al., 1990; Kim et al., 2011). However, such studies generally ignore closures. On the other hand, if acquisitions are motivated primarily by the desire to obtain idiosyncratic knowledge (Vermeulen & Barkema, 2001), we may expect this mode to be uncorrelated with other modes within the firm. Alternatively, if firm-level financial constraints are the predominant driver of growth through acquisitions, as proposed in the corporate finance literature (Shleifer & Vishny, 1992), it could be that some alternative modes of growth are complements (i.e., positively correlated), as lower financial constraints would also facilitate investments to expand existing units and open new units. In a different vein, Penrose (1955) argues that underutilized managerial services are essential for planning and executing expansion, and the firm-specific nature of these services means that the "production of these services requires time, and this limits the scope of firm's expansion plans at any given time" (p. 535). Thus, if limited underutilized resources restrict firms from simultaneously pursuing alternative modes, the correlation across modes may be limited, or even negative. Given this mixed evidence, we ask:

Question 2. How are growth modes correlated within the firm? Are they complements or substitutes?

2.2 | Firm growth modes and competition

Strategy research generally suggests that increased competition is likely to motivate acquisitions, divestitures, and closures. Studies such as Agarwal et al. (2002) and Mitchell and Mulherin (1996) highlight how industries consolidate when demand growth declines, with less successful firms exiting both through acquisitions and closures. Similarly, Harrigan (1980) and Furr and Kapoor (2018) suggest that in declining industries where competition is likely to be high, acquisitions become one exit strategy in addition to closure, and Anand and Singh (1997) find that consolidation-oriented acquisitions tend to perform well in declining industries. Thus, these studies would suggest that we should observe increased acquisitions and closures as industry competition increases. While research examining the effect of competition on organic growth is limited, studies that implicitly consider it generally suggest a negative link (Giarratana et al., 2021; Greve, 2008). In sum, growth modes may differ in how they relate to competition. So, we ask:

Question 3. How do firm growth modes change in the face of increased competition?

2.3 | Firm growth modes and subsequent firm performance

Strategy scholars have studied how some of the individual growth modes are associated with firm performance. Focusing on expansions, results on how organic and acquisitional growth relate to performance are ambiguous. Generally, organic growth is considered to be slower but less risky (Coad, 2007; Lee & Lieberman, 2010), while acquisitions are considered challenging to integrate (Graebner et al., 2017; Zollo & Singh, 2004) and as not creating much value for the acquiring firms' shareholders (King et al., 2004; Malmendier et al., 2018). In contrast, a few studies argue that acquisitions may expose firms to a broader range of ideas, thereby improving firm performance (Lockett et al., 2011; Vermeulen & Barkema, 2001). Along the same lines, some scholars have recognized acquisitions as critical to strategic renewal for acquirers (Agarwal & Helfat, 2009) that allow better matching of managerial talent to productive capital (Braguinsky et al., 2015). Moatti et al. (2014) compare acquisitions with organic growth and offer a nuanced view: while acquisitions offer bargaining power advantages, organic growth helps improve operational efficiency. On the contractionary side, studies examining the effect of divestitures on firm performance have found mixed results (see Table 1 summary in Vidal & Mitchell, 2018). While a meta-analysis by Lee and Madhavan (2010) conclude that divestitures positively affect subsequent firm performance, Vidal and Mitchell (2018) find that the effects vary across high- and low-performing firms, and across performance measures used. Studies relating closures to subsequent firm performance seem limited, potentially because of lack of data. In sum, evidence on how growth modes relate to performance appears to be mixed (as in the cases of acquisitions and divestitures) or sparse (as in the case of closures). So, we ask:

> **Question 4.** How are the various modes of growth associated with subsequent firm performance?

3 | DECOMPOSING FIRM GROWTH

Firm growth has been measured in several ways, most commonly as the change in sales, with changes in assets or employment being other commonly used measures (Weinzimmer et al., 1998). We use employment growth in this study. As Coad and Hölzl (2012) note, employment-based measures are well suited for multi-industry analysis. Using sales may be confounded by price differences, while asset-based measures may be problematic when intangible assets are important. Sales and assets are also susceptible to measurement issues related to financial variables, especially among smaller firms (Coad & Hölzl, 2012).

We follow HJM and note that employment for a firm is the sum of employment at its units so that:

$$Y_t = \sum_{i \in S_t} y_{it} \tag{1}$$

where Y_t is the firm employment in year t, y_{it} is the employment in unit i of that firm in year t, and S_t is the set of units of that firm in that year. Then, for that firm, we can write the change in employment from year $t-1$ to year t as:

$$\Delta Y_t = Y_t - Y_{t-1} = \sum_{i \in S_t} y_{it} - \sum_{i \in S_{t-1}} y_{it-1} \quad (2)$$

The set of units in year t (S_t) can be divided into those that existed in year $t-1$ and continued in year t, and those that entered the firm in the current year t. We divide the latter into those founded by the firm and those acquired by the firm. Thus, $S_t = S^t_{exist} + S^t_{new} + S^t_{acq}$. Similarly, the set of units that existed in year $t-1$ (S_{t-1}) can be divided into those that continued into year t and those that did not continue into the firm in year t. The latter can be further divided into units that were closed and units that were sold. So, $S_{t-1} = S^t_{exist} + S^t_{closed} + S^t_{sold}$. Thus, these extend the HJM decomposition and make it more relevant to strategy by considering acquisitions and selloffs. Finally, the set of existing units that continued in the firm in both years (S^t_{exist}) can be divided into old units which existed in the firm in period $t-2$ (S^t_{old}), recently acquired units in period $t-1$ ($S^t_{recentacq}$), and recently founded units in period $t-1$ ($S^t_{recentnew}$). This breakdown also extends HJM and is motivated by findings that firms grow new units at the expense of old ones (Schoar, 2002) and that they treat internally developed units differently from acquired ones (Karim, 2006). Together, these extensions not only enable a more systematic and accurate measurement of growth from various modes (particularly organic modes), but also make the decomposition more relevant to strategy.

Applying this breakdown to (2) and dividing all terms by $\overline{Y}_t$, the average total employment of the firm in years t and $t-1$, we can write the growth in employment from $t-1$ to t as the sum of seven growth components:

$$\begin{aligned} g_t = \frac{\Delta Y_t}{\overline{Y}_t} &= \frac{\left(\sum_{i \in S_t} Y_{it}\right) - \left(\sum_{i \in S_{t-1}} Y_{it-1}\right)}{\overline{Y}_t} = g^t_{old} + g^t_{recentnew} + g^t_{recentacq} + g^t_{new} + g^t_{acq} + g^t_{closed} + g^t_{sold} \\ &= \sum_{i \in S^t_{old}} \frac{(y_{it} - y_{it-1})}{\overline{Y}_t} + \sum_{i \in S^t_{recentnew}} \frac{(y_{it} - y_{it-1})}{\overline{Y}_t} + \sum_{i \in S^t_{recentacq}} \frac{(y_{it} - y_{it-1})}{\overline{Y}_t} + \sum_{i \in S^t_{new}} \frac{y_{it}}{\overline{Y}_t} \\ &\quad + \sum_{i \in S^t_{acq}} \frac{y_{it}}{\overline{Y}_t} - \sum_{i \in S^t_{closed}} \frac{y_{it-1}}{\overline{Y}_t} - \sum_{i \in S^t_{sold}} \frac{y_{it-1}}{\overline{Y}_t} \end{aligned} \quad (3)$$

This yields the decomposition we use in our empirical analyses. Note here that g^t_{new} and g^t_{acq} are always positive (or zero), while g^t_{closed} and g^t_{sold} are always negative (or zero). Importantly, also note that the terms on the right-hand side do not directly correspond to unit-level growth rates. For instance, $\sum_{i \in S^t_{old}} \frac{(y_{it} - y_{it-1})}{\overline{Y}_t}$ is not the average growth rate of old units. However, as an anonymous reviewer helpfully noted, the right-hand side in Equation (3) can be rewritten so that total firm growth rate is equivalent to a weighted average sum of unit-level growth rates. For example, the first term, $\sum_{i \in S^t_{old}} \frac{(y_{it} - y_{it-1})}{\overline{Y}_t} = \sum_{i \in S^t_{old}} \frac{(y_{it} - y_{it-1})}{\overline{y}_{it}} . \frac{\overline{y}_{it}}{\overline{Y}_t}$, where $\overline{y}_{it} = \frac{y_{it} + y_{it-1}}{2}$, the average employment of unit i in the two periods. Thus, this expression recasts the growth component in Equation (3) relating to growth from old units to a weighted average of unit-level growth rates where an old establishment i's growth rate, $\frac{(y_{it} - y_{it-1})}{\overline{y}_{it}}$ is weighted with its size relative to average firm size, that is, $\frac{\overline{y}_{it}}{\overline{Y}_t}$. The other two components relating to existing units, recent-new and recent-acquired can be similarly rewritten. For new units, one can rewrite

$\sum_{i \in S^t_{new}} \frac{y_{it}}{\overline{Y}_t} = \sum_{i \in S^t_{new}} \frac{(y_{it}-0)}{\overline{y}_{it}} . \frac{\overline{y}_{it}}{\overline{Y}_t}$ since all new units have zero employment in the year before they are founded. Similarly, for closed units, $\sum_{i \in S^t_{closed}} \frac{y_{it-1}}{\overline{Y}_t} = \sum_{i \in S^t_{closed}} \frac{(0-y_{it-1})}{\overline{y}_{it}} . \frac{\overline{y}_{it}}{\overline{Y}_t}$ since all closed units have zero employment in year t. For acquired units, we can rewrite $\sum_{i \in S^t_{acq}} \frac{y_{it}}{\overline{Y}_t} = \sum_{i \in S^t_{acq}} \frac{(y_{it}-0)}{\overline{y}_{it}} . \frac{\overline{y}_{it}}{\overline{Y}_t}$. A nuance here is that while this expression suggests that the unit had zero employment in the year before, that should be viewed in the context of the unit's contribution to the focal firm (which was zero since the establishment was not part of the firm in $t-1$). A similar logic applies to sold units, which can be rewritten as $\sum_{i \in S^t_{sold}} \frac{y_{it}}{\overline{Y}_t} = \sum_{i \in S^t_{sold}} \frac{(0-y_{it})}{\overline{y}_{it}} . \frac{\overline{y}_{it}}{\overline{Y}_t}$. In sum then, we can regard each growth component as arising from unit-level growth rates, which can then be aggregated to the firm level with appropriate weights.

Furthermore, because (3) is linearly additive in its terms, and because our data comprise all US firms, we can obtain a full accounting of employment change of the economy by summing each of the seven terms over all firms (weighting each firm observation by the average employment $\overline{Y}_{it}$) to obtain the corresponding employment growth term for the economy. Further, HJM note, dividing by the average (rather than total employment in $t-1$) offers some advantages. It yields growth rates that are symmetric about zero and bounded between −2 and +2, which reduces the impact of outliers. It also allows an integrated treatment of births, deaths, and continuers. To achieve this, we set firm (or unit) employment to zero in the year prior to its entry and in the year after its exit, which allows us to use (3) across all years a firm is present.

The property of linear additivity can be helpful in linking regressions results across growth modes. For instance, consider g^{new}_{it} and g^{acq}_{it}, growth from new units and growth from acquired units, respectively. Suppose we estimate two regressions of the form $g^{new}_{it} = \beta_{new} Z_{it} + \epsilon_{it}$ and $g^{acq}_{it} = \beta_{acq} Z_{it} + \epsilon_{it}$ to understand how these components vary with some Z. Typically, we cannot directly compare the two β coefficients or manipulate them (e.g., add) in a meaningful way since they have different means. One could center and standardize, but the coefficients would be harder to interpret. However, in our decomposition, the two growth components are additive and have the same denominator. Hence, we can estimate weighted regressions with average employment as weights, making the coefficients comparable and manipulable.

4 | DATA

The baseline data for this study come from establishment-level information from the US Census Bureau's Longitudinal Business Database (LBD) over the 10-year period from 2004 to 2013 (we consider the previous decade in robustness checks). This dataset contains annual establishment-level employment for all employers in the United States. It also provides information on ownership, which we use to link units to firms. Jarmin and Miranda (2002) provide details about this dataset. We do not exclude any units or firms from our analysis. Thus, our baseline analyses cover all firms in the United States that had employees and were present for some or all of the 10-year period. This translates to an average of about 6.1 million firms per year.

As noted by HJM, new firm identifiers are assigned in the LBD when a single-unit firm transitions to a multiunit firm. Because we wish to track only firm identifier changes associated

with changes in firm ownership or opening of a new firm, we adjust firm identifiers to try to account for such transitions. Hence, when a new firm identifier is associated with multiple establishments in the first year of appearance, we replace this new firm identifier with the prior year firm identifier for the largest of its establishments. Mostly, this adjustment affects only the magnitude of growth from acquisitions and selloffs. We discuss alternative adjustments later. Additional details on data cleaning and setup are provided in the Online Data Appendix.

5 | FINDINGS

5.1 | Overall patterns in growth modes

Column 1 of Table 1 presents statistics on the relative importance of the various growth modes. Figure A1 presents this as a waterfall chart; all tables and figures with prefix A or B are in the Online Appendix. The average net growth is 0.4% per year, which agrees well with US employment growth during this period of 0.4% (https://fred.stlouisfed.org/series/PAYEMS). Closures are the single largest component by magnitude (−4.1%). The biggest expansionary component is

TABLE 1 Relative importance of growth modes.

	All firms (1)	Growing (2)	Shrinking (3)	Big (4)	Small (5)
1. Old units	−0.003	0.109	−0.150	−0.011	0.006
2. Recent new units	0.018	0.034	−0.004	0.006	0.031
3. Recent acquired units	0.000	0.003	−0.003	−0.001	0.002
4. New units	0.030	0.046	0.010	0.023	0.038
5. Acquired units	0.019	0.031	0.002	0.019	0.018
Gross growth	0.064	0.223	−0.144	0.036	0.094
Less					
6. Closed units	−0.041	−0.008	−0.085	−0.033	−0.049
7. Sold units	−0.019	−0.001	−0.042	−0.025	−0.012
Net growth	0.004	0.214	−0.271	−0.023	0.033
Gross organic growth (1 + 2 + 3 + 4)	0.045	0.192	−0.147	0.017	0.077
Net organic growth (1 + 2 + 3 + 4 + 6)	0.004	0.184	−0.231	−0.017	0.027
Gross transactional growth (5)	0.019	0.031	0.002	0.019	0.018
Net transactional growth (5 + 7)	0.000	0.029	−0.039	−0.006	0.006
N	60,530,000	40,310,000	20,230,000	243,000	60,290,000
Category share of firms		66.60%	33.42%	0.40%	99.60%
Category share of employment		56.7%	43.3%	51.8%	48.2%

Note: This table provides decompositions of total employment growth into various growth modes. The statistics are weighted by average firm employment in the previous and current years. In some cases, the sum of the components may not match the aggregate due to rounding errors. Growing (shrinking) firms are those experiencing positive (negative or zero) firm-level employment growth in that year. Big (small) firms are defined as those with lagged employment greater than (less than or equal to) 500 employees. The employment-weighted sum of growth components of growing and shrinking firms (or big and small) will equal that for all firms (e.g., for old units, 0.109 × 0.567–0.150 × 0.433 = −0.003).

the addition of new units (3.0%). Expansion through acquisitions (1.9%) is exactly offset by contraction from unit selloffs (−1.9%). This is expected since the sale of a unit by one firm is the acquisition of that unit by another firm, and so transactional growth does not contribute to overall growth in the economy. Nevertheless, to our knowledge, this has not been documented empirically in any prior studies. In additional exploratory analyses, we find that this is largely true even within NAICS-2 sectors and that transactional growth does not contribute much to overall growth at the sector level.

On the expansionary side, both gross organic growth (sum of growth from old units, recent new units, recent acquired units, and new units) and growth from acquisitions are important drivers of overall firm growth, but on average, gross organic growth is more than twice that of growth from acquisitions (4.5% vs. 1.9% per year). Interestingly, firms do not seem to grow their acquired units; the growth in recently acquired units is zero. In contrast, recent new units (i.e., those founded in the previous year) contribute 1.8% per year. Thus, over 2 years, new units contribute 4.8% (0.018 + 0.030 = 0.048) to average gross firm growth, compared with 1.9% for acquisitions. Although the contribution from acquisitions is smaller, the magnitude is notable given that acquisitions involve only a small fraction of firms. This is mirrored on the contractionary side with unit selloffs accounting for 31.7% (0.019/(0.041 + 0.019)) of total contractions. These patterns are similar in the 1994–2003 period (Table A1, Figure A2) and for continuing firms (Table A2).

Turning to heterogeneity in growth modes, we present the growth decomposition separately for growing firms (i.e., those with total growth greater than zero; Col. 2) and shrinking firms (i.e., those with total growth less than or equal to zero; Col. 3). Contractionary components for growing firms are close to zero, and the expansionary components are very small for shrinking firms. This suggests that when firms are growing (shrinking), they are not engaging in much contemporaneous contractionary (expansionary) activities.

Table 1 also presents the growth decomposition for big firms (i.e., those with lagged employment greater than 500 employees; Col. 4) and small firms (i.e., those with lagged employment less than or equal to 500 employees; Col. 5). Overall, big firms contract during the study period, in line with findings in the literature (Coad, 2009). Small firms grow on all expansionary modes but have greater contraction from closures (−4.9%) relative to big firms (−3.3%), consistent with their greater exit rates (Jovanovic, 1982). Unlike small firms, big firms experience a contraction in old units (−1.1%) and recently acquired units (−0.1%). They also experience greater contraction from sold units (−2.5%) relative to small firms (−1.2%). Interestingly, the contribution of acquisitions is similar for both types of firms (1.9% for big firms vs. 1.8% for small firms).

As noted in Section 4, these baseline results are based on an adjustment that replaces a new firm identifier with the prior year firm identifier for the largest of its establishments when a new firm identifier is associated with multiple establishments in the first year of appearance. As one alternative, we reestimated the decomposition without any adjustment. Expectedly, without any adjustments the magnitude of acquisitions and selloffs are higher than the baseline (0.030 vs. 0.019). As another alternative, we made two broad additional adjustments suggested in Dent et al. (2018). First, for a single-unit firm in year t that remains a single-unit firm in $t + 1$ with the same unit identifier but with a different new firm identifier, we continued the firm identifier from t. Second, in cases where all the (surviving) establishments of a multiunit parent firm transitioned into one or more multi- and/or single-unit descendant firms with new firm identifiers, we impute the parent firm's identifier to the biggest descendent firm. Note that both these adjustments rule out a complete sale of a firm as a going concern to a new entrant. The results (Table 1) show that the contributions of transactional growth modes are close to the baseline results (0.017 vs. 0.019).

5.2 | Size-age correlations

We explore the heterogeneity in growth modes by firm size and age in Table 2. Given space constraints, here we focus on cross-sectional variations across joint size-age categories (within-firm variations by joint size-age categories are in Table A3b). We divide firms into five categories, entrants (age 1), small young (≤500 employees, age 2–10), small old (≤500 employees, age ≥11), big young (>500 employees, age 2–10), and big old (>500 employees, age ≥11). We estimate employment-weighted regressions with this categorical variable as the independent variable and growth components as the dependent variables. We include industry-year fixed effects and set "small young" to be the omitted (reference) category.

The results in Table 2 (Figure A3 provides a graphical illustration) provide evidence for the negative size effects documented in prior literature (Coad, 2009; Jovanovic, 1982). Among young firms, big ones grow slower than small ones by about 21.1 p.p. per year. Among old firms, big ones grow more slowly than small ones by about 2.1 p.p. per year (−7.6% vs. −5.5%), largely attributable to slower growth in old units (−4.4% vs. −2.9%).

The effect of age on firm growth is more nuanced. On the one hand, we find a negative age effect (Coad, 2009) among small firms. Specifically, small old firms grow more slowly than small young ones by about 5.5 p.p. per year, suggesting liability of aging (Le Mens et al., 2011). This slow growth is almost entirely due to slower growth in old units (−2.9 p.p.) and recent new units (−8.5 p.p.). Offsetting some of these are more expansion from acquisitions (0.8 p.p.) and less contraction from closures (5.1 p.p.), which is consistent with Jovanovic (1982) as they

TABLE 2 Size-age heterogeneity in growth modes (disaggregated).

Dependent variable (growth mode) →	Old units (1)	Recent new (2)	Recent acquired (3)	New units (4)	Acquisitions (5)	Closed units[a] (6)	Sold units[a] (7)	Total growth (8)
Entrants	−0.026	−0.090	−0.006	1.542	0.431	0.094	0.018	1.963
	(0.001)	(0.001)	(0.000)	(0.012)	(0.012)	(0.001)	(0.001)	(0.002)
Small young firms	Omitted category							
Small old firms	−0.029	−0.085	−0.005	0.003	0.008	0.051	0.001	−0.055
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Big young firms	−0.059	−0.092	−0.009	0.006	0.009	−0.029	−0.037	−0.211
	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.004)	(0.002)	(0.007)
Big old firms	−0.044	−0.082	−0.007	0.009	0.009	0.053	−0.012	−0.076
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
R^2	.008	.032	.003	.465	.073	.017	.009	.115

Note: Each row presents the regression coefficients and standard errors from an employment-weighted linear regression of the column variable on five size-age categories. We divide firms into five categories, entrants (age 1), small young firms (≤500 employees, age 2–10), small old firms (≤ 500 employees, age ≥11), big young firms (>500 employees, age 2–10), and big old firms (>500 employees, age ≥11). The coefficient on total growth (Column 8) is equal to the sum of the coefficients on the individual growth components, except for rounding errors. All regressions include industry and year fixed effects. Standard errors clustered by firm in parentheses. $N = 60{,}530{,}000$ in all regressions.

[a]Because a decrease in closures/selloffs increases growth, note that a positive coefficient for the dependent variable *Closed Units* (*Sold Units*) implies lower contractions from closures (unit sales) relative to the omitted category.

learn over time. On the other hand, we find a positive age effect for big firms: Among big firms, young ones grow more slowly than old ones by about 13.5 p.p. per year (−21.1% vs. −7.6%), suggesting liability of adolescence (Le Mens et al., 2011). Relative to big old firms, big young firms appear to have greater closures (−2.9% vs. 5.3%) and selloffs (−3.7% vs. −1.2%). This suggests that on average, big young firms struggle to grow, which translates into the lowest total growth among all size-age categories.

These results are robust using industry-by-year fixed effects, instead of industry and year separately. As additional robustness checks, we replicated Table 2 split by tech industries, as defined in Paytas and Berglund (2004), and non-tech industries (all others). The overall patterns are similar across the two subsamples. Incorporating additional adjustments to changes in firm identifiers yielded similar results (Table A3a). In Table A3c, we replicate Table 2 with a finer eight-category classification {size ≤ 500, size > 500} × {1 yr, 2–5 yrs, 6–10 yrs, >10 yrs}. We find that the youngest, large firms grow the slowest with overall patterns being similar to Table 2.

5.3 | Correlations among growth modes

The breakdown by growing versus shrinking firms (Table 1, Cols. 4–5) suggests that within firms, the expansionary components are likely positively correlated with each other, and the contractionary components positively correlated with each other. We formally examine this in Table 3, which presents coefficients from employment-weighted regressions of the following form:

$$g_{it}^{j} = \beta g_{it}^{k} + D_t + \mu_i + \epsilon_{it} \quad (4)$$

where g_{it}^{j} and g_{it}^{k} are the alternative modes of growth, and D_t and μ_i are the year and firm fixed effects. Thus, the coefficient β denotes how much g_{it}^{j} varies for a unit change in g_{it}^{k} on average within firms, conditional on year effects. For instance, when growth from new units increases by 1 p.p., net growth from old units declines by −0.036 p.p. (Col. 1, Row 4). Thus, when read *vertically*, each column presents how that growth mode (listed as the column variable) is associated within firms with the other growth modes (listed as row variables). Another useful property of these coefficients is that they can then be summed *horizontally* to obtain the relationship of individual components to aggregated categories. For example, the association of organic modes with growth from old units (Col. 8, Row 1; 0.005) is the sum of columns 2, 3, 4, and 6. Thus, this *summed* coefficient can be interpreted as the change in the other components of organic modes for a unit change in the growth from old units.

Most coefficients in Table 3 are positive, suggesting that alternative growth modes are complements within firms. Focusing on the two aggregates (Cols 8–9), the within-firm associations of individual growth components with both organic and transactional modes, and consequently total firm growth, are all positive (for a graphical representation of these results, see Figure A4). Notably, a 1 p.p. firm-specific increase in growth from new units is associated with a sizable 0.218 p.p. (0.184 + 0.034 = 0.218; sum of Col. 8 and 9, Row 4) contemporaneous increase in growth from *other* modes. About 0.034 p.p. of this is with transactional modes, suggesting that firms tend to simultaneously acquire and add new units. The remaining 0.184 p.p. comes from other organic modes, primarily reduced closures (0.197; note that a positive coefficient on closures implies lower closures). Similarly, a 1 p.p. increase in growth from acquisitions is associated with a 0.062 p.p. increase in organic modes and a 0.057 p.p. increase from lower selloffs

TABLE 3 Within-firm associations between growth modes and total firm growth.

Dependent variable →	Old units (1)	Recent new (2)	Recent acquired (3)	New units (4)	Acquisitions (5)	Closed units[a] (6)	Sold units[a] (7)	Organic (1) + (2) + (3) + (4) + (6) (8)	Transactional (5) + (7) (9)
1. Old units		0.013	0.002	−0.012	−0.0003	0.002	0.003	0.005	0.003
2. Recent new	0.039		0	0.026	−0.006	0.116	0.015	0.181	0.009
3. Recent acquired	0.061	0.002		−0.020	0.099	0.032	0.017	0.075	0.117
4. New units	−0.036	0.025	−0.002		0.011	0.197	0.023	0.184	0.034
5. Acquisitions	−0.002	−0.009	0.014	0.018		0.041	0.057	0.062	0.057
6. Closed units	0.004	0.067	0.002	0.12	0.015		−0.0005	0.192	0.015
7. Sold units	0.009	0.016	0.002	0.026	0.039	−0.001		0.052	0.039

Note: Each cell in columns 1–7 presents the coefficient estimate from an employment-weighted regression of the column variable on the row variable, with firm and year fixed effects, that is, β in Equation (4) of the text. Thus, for instance, a 1 p.p. increase in growth from recent new units is associated with a 0.039 p.p. increase in growth from old units (Col. 1, Row 2). These estimates can also be summed *horizontally* across a row by adding the non-diagonal elements to get the relevant aggregate growth components in columns 8 and 9. For example, Row 1, Col. 8 (0.005) is obtained by adding Cols. 2 (0.013), 3 (0.002), 4 (−0.012), and 6 (0.002) and shows that a 1 p.p. increase in growth from old units is associated with a 0.005 p.p. increase in the other components of organic growth (Col. 8, Row 1). Similarly, Col. 9 (0.003) is obtained by adding Col. 5 (−0.0003) and Col. 7 (0.003). Because these are bivariate regressions, the signs of coefficients in row *i* column *j* match those in row *j* column *i*, but the magnitudes differ. Deeper shades of red denote more negative coefficients; deeper shades of green denote greater positive coefficients (so yellow denotes small positive and orange denotes small negative correlations). Diagonal elements are all uniformly 1 by construction and omitted for sake of clarity.

[a]Note that because growth from closed and sold units is always negative, a positive coefficient on those growth modes implies lower closures/selloffs. For instance, a 1 p.p. *decrease* in closures is associated with a 0.192 p.p. *increase* in organic growth (Col. 8, Row 6).

(a positive coefficient on selloffs implies lower selloffs). Growth from old units has a very small association with other modes (Row 1).

A notable exception to the generally positive associations across growth modes is the negative association between growth from old units and growth from new units. This suggests that firms open new units typically as a substitute for growing old units. We verified that these correlation patterns are robust to the exclusion of entrants (i.e., firms in entry year who have very high growth by definition) or small firms. This robustness is unsurprising as our baseline estimates are based on employment-weighted regressions and hence not disproportionately influenced by small firms.[1]

5.4 | Firm growth modes and competition

We assess the link between competition and firm growth modes by focusing on one important sector, namely, manufacturing, and examining the impact of one form of competition, namely, trade competition. We broadly follow Pierce and Schott (2016) and examine the impact of the grant of permanent normal trade relations (NTR) to China by the United States and the subsequent entry of China into the WTO in 2001. This event caused a significant decline in US manufacturing employment as well as a sharp decline in the number of firms starting around 2001, consistent with an industry facing a shakeout or decline (Figure A5). Importantly, this increase in competition, primarily from Chinese manufacturing firms, was not uniform across all industries within the sector, and thus provides plausibly exogenous variations to study the impact of competition (Pierce & Schott, 2016).

We use data on the universe of US manufacturing firms over 1990–2013 and difference-in-differences specifications that broadly follow Pierce and Schott (2016) to compare how growth modes changed from 2002 onward relative to the period before. Specifically, we use employment-weighted regressions of the form:

$$g_{ijt} = \alpha.Post.NTRGAP_j + \boldsymbol{Z_{ijt}} + \mu_i + \delta_t + \epsilon_{ijt} \quad (5)$$

where g is growth from a specific growth mode (e.g., from new units) for firm i in industry j (4-digit NAICS) at year t, *Post* is a dummy variable that is 1 for the period after 2001, *NTRGAP* is the difference between the NTR rate and the non-NTR rate from Pierce and Schott (2016) and serves as a measure of increase in industry competition (specifically, decline in tariff barriers to trade competition), and $\boldsymbol{Z_{ijt}}$ is a vector of variables that includes logged firm age and log of lagged firm size (number of employees). Thus, the coefficient α measures the change in growth from a specific mode in response to an increase in trade competition. Given the additive nature of our decomposition and the use of weighted regressions, the sum of the coefficients on different modes equates to the results for aggregates such as organic modes. To further examine the moderating effect of other important industry characteristics, we also interact *Post* with industry capital intensity (capital to labor ratio, from the NBER-CES Dataset), industry skill

[1]We also examined the correlation of each of the growth modes with one and two lags of each of the other growth modes, with industry fixed effects, and separately with firm fixed effects. Consistent with the "Penrose" effect (Penrose, 1959, discussed in Mahoney & Pandian, 1992) or mean reversion (HJM), we found almost all coefficients were negative, especially with industry fixed effects. A notable exception was that almost all organic growth modes were positively correlated with lagged growth from acquisitions. This is consistent with the positive effects of transactional modes on future survival and firm growth, documented later in this article.

intensity (ratio of non-production to production workers, from the NBER-CES Dataset), industry R&D intensity (R&D expenditure to sales ratio, from Compustat), and industry labor productivity index (normalized to 100 for the year 2007, from the Bureau of Labor Statistics). All the industry-level variables except *NTRGAP* are measured at the beginning of the sample period.

The results for the seven growth modes are presented in Table 4. Panel a presents the results from a simple within-firm before-after specification without any controls. Firm growth post-2001 is much lower (about 13.3 p.p. per year; Col. 8), consistent with the decline in US manufacturing (Pierce & Schott, 2016). Growth from all modes declined, but with interesting differences across modes. Growth from old units fell the most (−0.041), followed closely by growth from acquisitions (−0.029). Closures and selloffs increased, and this reduced overall growth by 2.6 p.p. and 2.1 p.p. per year, respectively. Other modes show smaller decreases. Thus, consistent with prior theory about declining industries (e.g., Harrigan, 1980), firms appear to contract and close, but contrary to an expectation of consolidation during decline, growth from acquisitions decreases. Interestingly, growth from new units (and recent new units) declines to a much smaller extent than growth from acquisitions. Consistent with these, organic growth declines to a larger extent than transactional growth (8.2 p.p. vs. 5.1 p.p. per year, respectively, Table A4), largely due to the decline in growth from old units.

Turning to Panel b where the interaction term $Post \times NTRGAP$ captures relative changes in industries facing greater competition, consistent with results in Pierce and Schott (2016), we see that an increase in competition is associated with a large decline in the overall firm growth rate (see Figure A6 for a graphical representation). Based on the coefficient estimates, the decline is about 9.4 p.p. per year for a unit increase in *NTRGAP* or about 1.5 p.p. per year for a 1-s.d. increase in *NTRGAP* ($0.094 \times 0.16 = 0.015$). As in Panel a, growth from old units declines the most, accounting for more than half ($0.054/0.094 = 57.4\%$) of the decline in total growth. The second largest contributor is lower growth from acquisitions (1.8 p.p. per year for a unit increase in *NTRGAP*), followed by more contraction from closures (about 1.1 p.p. per for a unit increase in *NTRGAP* year). Growth from new units declines to a much smaller extent (0.2 p.p. per year for a unit increase in *NTRGAP*) while contractions from selloffs increase by about 0.6 p.p. per year for a unit increase in *NTRGAP*.

Focusing on the other industry-level variables in Panel b, skill intensity is associated with higher overall growth after 2001, as is labor productivity growth. This is consistent with employment decline being more pronounced in industries with low-skilled labor (e.g., Kemeny et al., 2015). The skill-intensity result arises mainly from *higher* growth at older units and new units, and less closures, with limited contributions from acquisitions. Acquisitions play a bigger role in labor productivity growth. In contrast, R&D intensity is associated with *lower* growth, particularly organic growth. We verified robustness of these results to using industry effects (instead of firm fixed effects) and to including interactions of the industry characteristics one at a time.

5.5 | Firm growth modes and subsequent firm performance

To study how differences in *past* use of particular growth modes are associated with *subsequent* firm performance, we examine how growth patterns in the past 3 years are associated with firm survival and growth 3 years into the future. While we cannot completely rule out unobserved selection into specific growth patterns, as discussed below, we include fine-grained fixed effects

TABLE 4 Growth in manufacturing (difference-in-differences, disaggregated).

Dependent variable (growth mode) →	Old units (1)	Recent new (2)	Recent acquired (3)	New units (4)	Acquisitions (5)	Closed units[a] (6)	Sold units[a] (7)	Total growth (8)
Panel a (*Only Firm F.E.*)								
Post (year ≥2002)	−0.041	−0.009	−0.001	−0.006	−0.029	−0.026	−0.021	−0.133
	(0.002)	(0.000)	(0.000)	(0.001)	(0.002)	(0.001)	(0.002)	(0.005)
R^2	.103	.226	.196	.247	.150	.206	.156	.071
Panel b								
Post × NTR Gap	−0.054	−0.003	0.000	−0.002	−0.018	−0.011	−0.006	−0.094
	(0.014)	(0.006)	(0.003)	(0.013)	(0.019)	(0.008)	(0.019)	(0.047)
Post × Capital Intensity	0.013	0.003	0.001	−0.005	−0.010	0.012	0.002	0.017
	(0.003)	(0.001)	(0.001)	(0.002)	(0.004)	(0.002)	(0.005)	(0.010)
Post × Skill intensity	0.044	0.006	0.003	0.021	0.007	0.013	0.003	0.098
	(0.007)	(0.004)	(0.001)	(0.008)	(0.011)	(0.004)	(0.009)	(0.020)
Post × R&D intensity	−0.356	−0.064	−0.033	−0.188	−0.070	−0.084	0.206	−0.588
	(0.102)	(0.042)	(0.018)	(0.094)	(0.131)	(0.049)	(0.130)	(0.247)
Post × Labor Prod. Index	0.029	−0.002	0.003	0.003	0.031	0.007	0.014	0.086
	(0.010)	(0.004)	(0.002)	(0.007)	(0.012)	(0.006)	(0.009)	(0.024)
R^2	.141	.294	.213	.370	.425	.228	.168	.411

Note: The sample period is 1990–2013. The table presents estimates from employment-weighted regressions of a growth component (or total growth) on a post dummy (Panel a) and its interaction with different industry characteristics (Panel b). Note that the coefficient on total growth (Column 8) equates to the sum of the coefficients on the individual components, subject to any rounding errors. All Panel a models include firm fixed effects. All Panel b models include firm and year fixed effects. *Log Firm Age* and *Log Lagged Size* are included as controls in all models in Panel b. Robust standard errors clustered by firm in parentheses. $N = 7{,}249{,}000$ in all models.

[a]Note that when the dependent variable is *Closed Units* (*Sold Units*), a negative coefficient of the *Post*(*Year* ≥ *2002*) variable or the interaction variable of *Post* implies greater closures (selloffs).

that control for a range of potential unobserved confounding factors. Specifically, for the case of two growth modes (i.e., organic growth as mode 1 and transactional as mode 2), we estimate employment-weighted regressions of the following form:

$$\pi_{it+3} = \gamma_1 . \bar{g}^1_{i(t-1 \text{ to } t-3)} + \gamma_2 . \bar{g}^2_{i(t-1 \text{ to } t-3)} + \boldsymbol{Z'_{it}} + \epsilon_{it+3} \quad (6)$$

where π is the future firm performance (either survival or average firm growth), $\bar{g}^1_{i(t-1 \text{ to } t-3)}$ is the average employment-weighted mean growth from mode 1 in years $t-1$ to $t-3$, $\bar{g}^2_{i(t-1 \text{ to } t-3)}$ is the corresponding average employment-weighted mean growth from mode 2 in years $t-1$ to $t-3$, and $\boldsymbol{Z'_{it}}$ is a vector of variables that includes logged firm age, joint (past size quintile)x(current size quintile) fixed effects, and joint industry-year fixed effects. Survival is measured as 1 if the firm identifier is observed at $t+3$ or later and as 0 otherwise. Three-year overall firm growth is computed as the difference in employment between the 2 years divided by the average employment during those years. Here, industry-year fixed effects control for time-varying industry-specific variables (e.g., changes in industry demand driving restructuring; Mitchell & Mulherin, 1996). The quintile-to-quintile fixed effects control for differences in overall growth by limiting comparison to firms that are in the same size quintiles, both today and in the past. Hence, they control for potential selection bias, for example, from faster growing firms selectively adopting a certain growth mode. Thus, the coefficients γ_1 and γ_2 measure how variation in growth from mode 1 and mode 2, respectively, is associated with subsequent firm performance. Note that because the growth measures are used as independent variables, and can be arbitrarily correlated with each other, the additive property of our decomposition does not apply here. Also, the sample size in these regressions is smaller because the use of lagged growth measures excludes firms that do not survive to at least age three and because we exclude observations after 2011 to avoid potential right-censoring.

The results are presented in Table 5. Growth from organic modes is negatively associated with future survival. A one-standard-deviation increase in growth from organic modes (49 p.p.) is associated with a 0.4 p.p. (0.008×49) decrease in the probability of survival (or about 4.6% higher relative to the mean weighted probability of exit). In contrast, growth from transactional modes is positively correlated with both measures of future performance. A one-standard-deviation increase in growth from transactional modes (24 p.p.) is associated with a 0.55 p.p. (0.023×24) increase in the probability of survival. Similarly, an increase in growth from transactional modes is associated with an increase in future growth, while the effect of growth from organic modes is positive but small and noisy. Consistent with the aggregated results, the detailed breakdown results on the transaction modes are more consistent than those on the organic side. Growth from acquisitions and having less selloffs are both positively correlated with survival and growth. Of the organic modes, growth from old units is negatively correlated with while less closures is positively associated with both measures of future performance. Growth from new units and recent new units exhibit a mixed pattern; they are negatively associated with survival but positively with firm growth. These results seem consistent with the thesis that growth from new units is risky, so that while it results in high growth when successful, it risks exit when it fails.

Results from a range of checks have similar signs and *p-values* as our baseline results, including: (i) incorporating additional adjustments to changes in firm identifiers (Table A7b), (ii) in the previous decade (Table A7a, Figure A7), (iii) in specifications with only industry-year fixed effects and linear size control, (iv) in specifications with only industry-year fixed effects and past size quintile, (v) with alternative time horizons (2 and 5 years instead of three),

TABLE 5 Growth modes and future performance (overall).

Dependent variable →	3-Year survival		3-Year growth	
	(1)	(2)	(3)	(4)
Past Growth Mode				
Growth from Organic Modes	−0.008		0.006	
(1 + 2 + 3 + 4 + 6)	(0.002)		(0.006)	
Growth from Transactional Modes	0.023		0.042	
(5 + 7)	(0.005)		(0.017)	
1. Growth from old units		−0.009		−0.008
		(0.002)		(0.005)
2. Growth from recent new		−0.015		0.041
		(0.004)		(0.011)
3. Growth from recent acquired		−0.013		−0.000
		(0.024)		(0.052)
4. Growth from new units		−0.006		0.033
		(0.007)		(0.019)
5. Growth from acquisitions		0.023		0.033
		(0.005)		(0.018)
6. Growth from closed units[a]		0.011		0.075
		(0.015)		(0.034)
7. Growth from sold units[a]		0.018		0.152
		(0.012)		(0.032)
R^2	.062	.062	.075	.076

Note: The table presents estimates from employment-weighted regressions of future performance on past growth modes. All models include joint past size quintile-current size quintile fixed effects and NAICS4-Year fixed effects. *Log Firm Age* is included as a control throughout. Robust standard errors clustered by firm in parentheses. $N = 28{,}180{,}000$ in all models.
[a]Because a decrease in closures/selloffs increases growth, a positive coefficient implies that a decrease in closures/selloffs increases growth/survival.

(vi) including age as a categorical variable (1–5, 6–10, 11–20, >20) instead of log age, and (vii) winsorizing past organic and transactional growth at the 1% level. As another check, we redefined survival to include any firms that exited primarily by selling their units, since a firm identifier disappears even in that case. As in the baseline results, past organic growth is strongly negatively, and past transactional growth is strongly positively correlated with 3-year survival (now defined inclusive of exit via sales). In some of these checks, past organic growth had a stronger positive association with future growth (instead of the near-zero found in Table 5) but was always negatively correlated with survival. Thus, the results, especially the findings of transactional growth being positively correlated with future firm performance and organic growth being negatively associated with survival, appear robust across a range of specifications.

We also briefly examine if there are any non-linearities in these associations. We replicate Table 5 allowing for the slopes and intercepts on past organic growth and transactional growth to vary depending on whether they are above zero or not. We find that survival has an inverted-V-shaped association with past organic growth, consistent with the thesis that very high or very

low growth increase the risk of exit. In contrast, past transactional growth has positive slope for negative values of transactional growth and zero slope for positive values. Past organic and past transactional growth have an inverted V-shaped association with future growth.

We briefly explore inter-industry heterogeneity in Table 5 by estimating equations of the same form as Equation (6) while interacting the past growth terms with industry characteristics. We limit our analyses to the two aggregate levels (growth from organic modes or transactional modes). We focus on capital intensity (logged number of employees to total assets from Compustat), R&D intensity (ratio of R&D expenditure to sales from Compustat), and human capital intensity (share of college-educated workers in industry employment from the Quarterly Workforce Indicators) as they have been argued to influence the need for acquisitions (Blonigen & Taylor., 2000; Coff, 1999). We divide industries into two categories on each of these characteristics based on the median value in 1993 (which is the earliest available date for human capital intensity).

The results are presented in Figure 1 with the underlying regression estimates in Table A6 (note that the un-interacted terms would denote industries that are below median on *all* intensities). The interaction of growth from organic modes and industry R&D intensity is positive, suggesting that organic growth is more favorably associated with future firm performance in such industries. In contrast, the positive association between growth from transactional modes and future firm performance is higher in capital-intensive industries. These results are

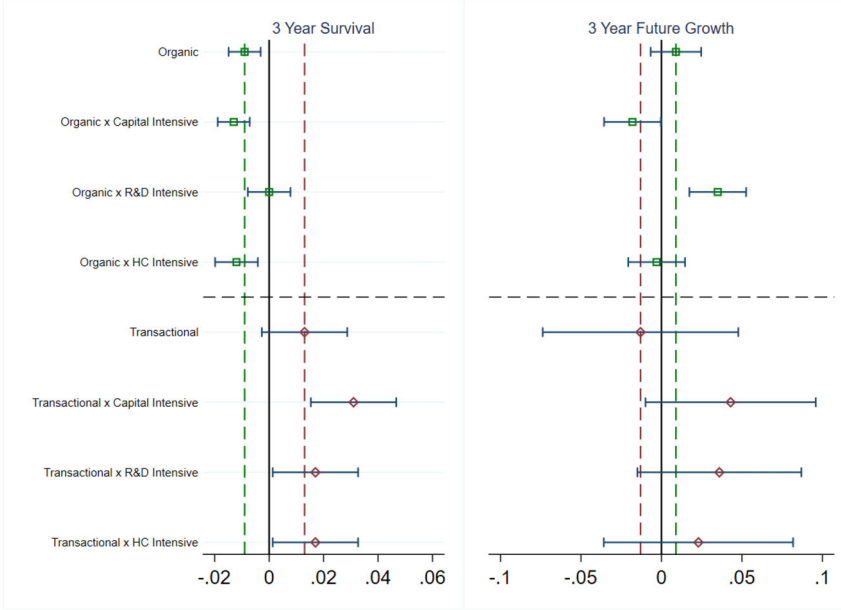

FIGURE 1 Future performance versus growth modes: Heterogeneity by Industry Characteristics. The figure presents estimates from regressions of future performance on past growth modes and their interactions with three industry dummies. $N = 28{,}140{,}000$ in all models. All models include joint past size quintile-current size quintile fixed effects and NAICS4-Year fixed effects. *Log Firm Age* is included as a control throughout. The confidence intervals bands are based on robust standard errors clustered by firm. The confidence intervals bands for interactions are relative to the baseline coefficient (indicated by the dashed vertical lines; green for organic and red for transactional). Note that the direct "organic" and "transactional" terms reflect survival and growth for firms that are below median on all three industry characteristics.

consistent with greater asset specificity and information asymmetry in R&D-intensive industries, which favor organic growth, and lower asset specificity and information asymmetry in capital-intensive industries, which favor transactional growth (Coff, 1999; Cuypers et al., 2021). We do not find a large or consistent role for industry human capital intensity in moderating the relationship between growth modes and future performance.

As another exploration of heterogeneity in these results, we reestimated Table 5 for tech firms, as defined in Paytas and Berglund (2004). We find that the results are similar to the baseline results, except that the coefficient of past organic growth on future growth increases. Thus, for tech firms, it appears that past growth (both organic and transactional) is a generally strong predictor of future growth, although stronger past organic growth continues to be associated with lower survival. Redefining survival to include exit via sales yields results substantively similar to the baseline results. We also reestimated Table 5 for young (age < =10) and old firms separately. The results are generally stronger for the younger firms. For older firms, the survival results are weaker, but in the same direction. Thus, firm age appears to be a moderator of the relationships observed in Table 5.

6 | IMPLICATIONS OF FINDINGS FOR FUTURE RESEARCH

Table 6 summarizes our results as stylized findings as related to each research question, delineates our key contributions and implications for research. Below, we elaborate on some of the aspects discussed in Table 6. We discuss a set of broader contributions in the next section.

6.1 | Implications: Overall patterns of growth modes (stylized findings 1 and 2)

Our analyses show that acquisitions are important, but less so than organic growth. Compared with growth from new units (~3% from Table 1), acquisitional growth contributed 1.9% during 2004–2013. Even within big or growing firms, new units contribute more than acquisitions (4.6% vs. 3.1% for growing firms, and 2.3% vs. 1.9% for big firms; Table 1). The same is true within continuing firms (1.6% vs. 1.3% in Table A2). These suggest that growth from new units, particularly in the context of continuing firms, deserves more attention. In this regard, our decomposition can help measure organic growth more precisely than the typical approach of computing it as firm growth less growth from acquisitions, which tends to obscure its importance.

Similarly, on the contractionary side, closures consistently dominate selloffs in the overall sample and among growing, shrinking, big and small firms. Closures also outweigh selloffs within continuing firms (1.3% vs. 0.8%, Table A2). Thus, increasing the emphasis of strategy research beyond divestitures (e.g., Feldman et al., 2019) and restructuring (e.g., Barkema & Schijven, 2008) to closures seems merited. While research has examined closures in the context of firm exit or bankruptcy, the focus is at the firm level and in the latter case, for a small set of firms experiencing extreme financial distress. Studying the antecedents or the consequences of closures in "going concern" firms during normal times may be insightful. From a measurement perspective, our decomposition can help better account for the scale of divestitures (often measured as a dummy variable) and explore unit sales and closures simultaneously.

TABLE 6 Stylized findings, contributions and implications for future research.

Stylized findings	Contributions to strategic management literature and implications for future research
RQ1: Overall pattern of growth modes ***Relative importance*** *Stylized Finding 1* • *Organic modes (old units, recent units, recent acquired units, and new units) in total account for about 70% of gross growth, while transactional modes (acquisitions) account for about 30% of gross growth.* • *Closures are the largest contractionary growth component, and growth from new units is the largest expansionary component by magnitude.* • *Net growth contributions from old and recently acquired units are very small.* • *These patterns are similar for continuing firms.* ***Age-size heterogeneity*** *Stylized Finding 2* *In the cross-section, among large firms, young firms have lower growth and greater closures and selloffs than old firms; among small firms, old firms have lower growth but lower closures and more acquisitions than young firms.*	• Counter to the dominant focus on transactional modes in strategy research, organic modes appear more important. Although acquisitions and sell-offs are important components of growth, they seem relatively less important than growth from new units and recent new units, even among continuing firms. ○ Deepen investigations into organic growth, particularly, closures and new units in continuing firms. ○ Although firm exits have been studied, closures of units/divisions within firms deserve more attention. ○ While the literature has studied acquisitions as a mode of renewal or allocation of productive capital to talent, more work needed on the significant resource reallocation occurring from organic components, i.e. from closure and shrinkage of old units toward new and recent new units. • Seemingly contradicts conventional notion that younger firms grow faster, but consistent with Penrose (or mean reversion) effect, as young-large firms likely grew rapidly in early years. ○ Investigate the mechanisms underlying the effect and explore heterogeneity therein, including potentially examining closure vs. sell-off decisions for young, large firms relative to old, large firms. ○ Study managerial capabilities and other constraints (e.g., experience, geographic etc.) that may limit performance of young, large firms relative to older large firms. ○ Understand drivers of growth within size-age groups, rather than just across age or size.
RQ2: Correlations among growth modes *Stylized Finding 3* *The various modes of growth are generally positively correlated within firms. As an exception to this regularity, growth from new units and acquisitions appear to be substitutes for growth in old units.*	• Complementarity between transactional growth and organic growth within firms is inconsistent with literature that commonly views these as substitutes or alternative paths to growth (e.g., build vs. acquire). ○ Assess common growth drivers and barriers across multiple growth modes • Short-term restructuring within firms through simultaneous growth and contraction is relatively limited. ○ Explore heterogeneity across sectors and develop theory to understand sectors/contexts where restructuring may be more prevalent than evident in aggregate data

TABLE 6 (Continued)

Stylized findings	Contributions to strategic management literature and implications for future research
	• Correlations in sub-components of organic and transactional growth are more nuanced than at more aggregated levels. ○ Understand and explain richer patterns of correlations across granular modes.
RQ3: **Competition and growth modes** *Stylized Finding 4* • *Most of the trade competition induced decline in manufacturing after 2001 is accounted for by decline in growth from old units and acquisitions, and from increased closures and selloffs, rather than by a decline in growth from new units.*	• Inconsistent with expectations that acquisitions increase when industries face increasing competition or decline. ○ Understand whether and how firm responses (in terms of growth mode choices) to decline in differ from responses to new entry • New unit growth (especially from entrants) surprisingly resilient in the face of trade competition. ○ Study what industry conditions under which industry competition negatively affect old vintage capital/capabilities, but potentially provides opportunities for new entrants or new technology.
RQ4: Growth modes and future performance *Stylized Finding 5* • *Growth from acquisitions is positively associated with future growth and survival, more so in capital-intensive industries. Organic growth is negatively associated with future survival, but less so in R&D-intensive industries.* • *Growth from selloffs* (i.e., *lower magnitude of selloffs*) *is positively associated with future performance.* • *Growth from old units is negatively associated with future performance.*	• Inconsistent with thesis that acquisitions are challenging to integrate and do not deliver returns to acquirers; more consistent with acquisitions providing an avenue for strategic renewal or reallocating productive capital to better management. ○ Examine if selection or learning drives positive acquisitional growth-performance association. ○ Investigate links between growth modes, future performance, and industry conditions, including the roles of physical/intangible capital, competition, and life cycle. • Inconsistent with selloffs improving performance. ○ Assess heterogeneity in the association between selloffs and firm performance.

Relatedly, there is little growth in units after they are acquired. Thus, on average, firms appear to be acquiring "right-sized" units rather than "right-sizing" them after acquisition. While this is consistent with acquisitions allowing firms to grow faster (Singh & Montgomery, 1987), one would expect units to grow after they are acquired if acquisitions allow better matching of talent to capital (e.g., Braguinsky et al., 2015). Future studies could reconcile this, perhaps using sales or profits, which may reveal that better matching works by improving productivity as reflected in sales or profits. Potential heterogeneity in these results could also be explored.

It is worth noting that, contrary to conventional wisdom, we find that young firms do not always grow faster on average. Instead, among big firms, young firms tend to grow slower than old firms, which is largely attributable to greater closures and selloffs (Table 2). Because big

young firms likely grew fast over their initial years (Coad, 2009), the overall slower growth could reflect mean reversion or the so-called Penrose effect, whereby the managerial constraint on firm growth leads to a decline in growth rate for fast-growing firms (Mahoney & Pandian, 1992; Penrose, 1959). Our finding of the manifestation of the Penrose effect in the form of greater sell-offs and closures appears to be novel, and worthy of further study. Interestingly, in terms of future growth and survival, we find (in unreported results) that while big young firms perform worse than big old firms, they perform better relative to small young firms. Thus, from a theoretical perspective, this finding also suggests some interesting interplay among organizational inertia, learning, and firm growth, akin to the adjustment costs for organization capital in Prescott and Visscher (1980).

6.2 | Implications: Correlations among growth modes (stylized finding 3)

Our findings on the correlations among growth modes lead to three important implications. First, at the aggregate level, organic and transactional modes are complements instead of substitutes, as shown by the positive correlations in Columns 8 and 9 in Table 3. In contrast, the literature generally studies these two categories of growth modes as substitutes (e.g., Brouthers & Brouthers, 2000; Lee & Lieberman, 2010; Moatti et al., 2014; Singh & Montgomery, 1987). One potential reason for the difference is the level of analyses. For example, prior studies tend to consider specific ventures such as entry into a particular market (e.g., Brouthers & Brouthers, 2000; Lee & Lieberman, 2010). At that level, it is possible organic growth and acquisitions are substitutes since simultaneously adopting a combination of two modes for a specific venture may be challenging. At the firm level, however, multimodal growth might be a preferred approach, although it is not clear what renders the two categories of growth modes complementary at the firm level. Developing new theories that touch upon these issues may be valuable.

Second, the generally positive within-firm correlation among growth modes suggests that growth contribution from short-term restructuring within firms (i.e., through simultaneously growing and contracting) is relatively limited. This is different from studies such as those by Capron et al. (1998) and Karim and Mitchell (2000), who suggest that firms redeploy resources or sell after acquisitions (and hence predict a negative correlation between expansion from acquisitions and contraction from closures). One possible explanation for this is that we examine contemporaneous correlations, but our checks of lagged correlations suggest that greater growth from acquisitions is generally followed by less closures. Another explanation is that such restructuring is more common in some industries or some types of firms. While we do not study such heterogeneity here, developing richer theoretical models that examine the costs and benefits of restructuring and factors that influence the extent of restructuring (and its success) and empirically testing them can be productive.

Third, our correlation analyses illustrate the importance of a systematic and precise measurement of the growth modes, especially organic modes. For example, if firms treat old units and new units differently from acquired ones (Karim, 2006; Schoar, 2002), then we should expect differences in how acquisitions relate to these two organic modes. Indeed, we find that acquisitions are largely uncorrelated with growth from old units but positively correlated with growth from new units (Table 3). In this regard, combining growth from new units and old units, which is implicitly done in many prior studies, to examine organic growth provides an

incomplete picture, as it seems that slow growth in old units may be spurring both growth from new units and acquisitions. Our correlations also highlight the utility of considering the two contractionary growth modes (i.e., closure and selloffs) separately in terms of their association with organic growth. For instance, a 1 p.p. decrease in closures is associated with 0.192 p.p. increase in other components of organic growth, while a 1 p.p. decrease in selloffs is associated with a 0.052 p.p. increase in organic growth.

6.3 | Implications: Growth modes and competition (stylized finding 4)

Our analysis of manufacturing shows that increased trade competition and the associated industry decline decreased acquisitions. This differs from studies that suggest an industry may face more acquisitional growth during a shakeout or decline (Furr & Kapoor, 2018; Mitchell & Mulherin, 1996). A possible reason for this divergence is that competition in this case comes from the entry of (foreign) firms with a significant factor cost advantage, rather than from decreased demand growth (in a shakeout) or demand (in declining industries). This not only reduces incumbent profits (through price competition) but also lowers the value of their existing assets, making them unattractive for buyers within the manufacturing sector. This effect is akin to how the value of an older technology declines when a newer, more efficient technology emerges (e.g., Hobijn & Jovanovic, 2001). In this case, the value from manufacturing in the US declined sharply, which lowered the value of US manufacturing plants, making their acquisitions less attractive.[2] As another parallel to this new-technology-displacing-old-technology analogy, we observe that growth from new *firm* entry *increased* in the post-2001 period in contrast to growth from the entry of new establishments of existing firms (Table A5). Together, these facts suggest that a possible avenue for new theory on competition and industry evolution would be to identify and evaluate factors that influence which growth modes are dominant during periods of intensified competition.

6.4 | Implications: Firm growth modes and subsequent firm performance (stylized finding 5)

Our results on growth patterns and future performance, although not strictly causal, strongly suggest a link between differences in growth modes and future firm performance and imply that two firms with the same overall growth but different growth patterns in the past may have different future performances. The primary finding that future performance is positively correlated with growth from transactional modes challenges some of the conventional wisdom in the existing literature. For example, it appears to run contrary to that from a meta-analysis (King et al., 2004), which provides evidence that acquisitions either have null or a modest negative effect on an acquiring firm's financial performance. Our finding pertaining to growth from organic modes also differs from recent empirical research (e.g., Moatti et al., 2014) that documents an overall positive effect of organic growth on firm performance. In this regard, our

[2]This is also consistent with US manufacturing firms offshoring their (now higher cost) US operations to China (where costs are lower). However, the total number of firms also declined (Figure A5). So, there was considerable firm exit (in addition to potential offshoring).

findings are closer to those of Lockett et al. (2011) who find that past acquisitions are positively correlated with current organic growth. Moreover, we find that lower closures have a weak positive correlation with future performance, while lower selloffs are positively correlated with future performance; by contrast, recent meta-analysis (Lee & Madhavan, 2010) and longitudinal (Brauer et al., 2017) studies find that (greater) selloffs positively impact subsequent performance.

One possible explanation for the differing results is that studies typically use market or accounting measures of performance rather than survival or growth. While this can be explored in future research, to the extent these measures are positively correlated, differences in measures are unlikely to be the main driver. Another explanation is that most research focuses on public firms where managers can make decisions on transactional growth (such as acquisitions and selloffs) to enhance their own personal utility (Berger & Ofek, 1995; Jensen & Murphy, 1990). By contrast, our dataset includes private firms where transactions are exposed to fewer agency conflicts. Indeed, in additional unreported analysis we find that restricting the sample to public firms yielded generally positive but weak correlations with future performance for both organic and transactional growth. This weakening is not just because public firms are larger; restricting the sample to big (>500 employees) firms does not change the baseline results we observed.

This surprisingly robust positive correlation between transactional growth and future performance, which appears to hold across decades and subsamples, deserves further study. In this regard, studies can examine selection into acquisitions. Our findings are broadly consistent with arguments that growing through acquisitions is costlier or requires superior capabilities and knowledge (Kaul & Wu, 2016), which allows only some firms with the requisite capabilities to undertake acquisitions, and these capabilities, in turn, lead to observed superior performance (Kim et al., 2011). Note that the inclusion of size quintile-to-quintile fixed effects in our specifications means that these differences in resources and knowledge are unlikely to arise from differences in past size, but rather from aspects not completely proxied by firm size (as measured by employment). Future research could examine what other factors (e.g., managerial talent, worker quality, patent portfolio, location, or other "isolating mechanisms" discussed in the resource-based view; Mahoney & Pandian, 1992) may both be correlated with long-term performance and likelihood of transactional growth, *conditional on firm size*.

Besides selection, researchers can examine potential causal mechanisms linking acquisitions to superior future performance. Our results are consistent with arguments that acquisitions allocate productive capital to superior managerial talent (Braguinsky et al., 2015), and that firms that undertake acquisitions for strategic renewal (Agarwal & Helfat, 2009). Because in a simple rational expectations framework we could expect firms to adopt transactional growth if it were indeed superior for all firms, the learning channel would either need to be unanticipated or require the presence of some differentiating factor (not perfectly correlated with size) that enables some firms to gain from acquisitions.

The negative correlation of past organic growth with future survival is intriguing, especially since it contrasts with past transactional growth. A possible explanation connects back to Penrose's (1959) insight that firm growth may be limited by the availability and slow scalability of experienced managers, so that when a firm expands rapidly, "a period of "stagnation" may follow" (p. 47). This constraint may be more pronounced for organic growth modes, whereas acquisitions come with experienced managers from the acquired firm. Future research can explore this possibility, including by further investigating potential non-linearities and moderators.

7 | DISCUSSION AND CONCLUSION

At its broadest, our study is a commentary on the relevance of growth modes to strategy. Incorporating a macroeconomic perspective that emphasizes organic expansionary and contractionary growth and extending it by including transactional growth modes relevant to strategic management, we study the universe of employers in the United States and show that not all modes contribute equally to overall firm growth. We further show that the different growth modes are generally complementary to each other, and that growth modes vary in their association with industry competition and future performance. Although extensive literatures on overall firm growth and individual modes exist within strategic management, our investigation differs in offering a comprehensive juxtaposition of the growth modes. Such a perspective that considers all firms in the economy and builds up to economy-level (growth) outcomes from the firm level not only sheds new light on our research questions as discussed earlier but also brings into prominence two aspects.

First, from a theoretical perspective, by simultaneously studying the various growth modes, our analysis highlights opportunities to extend many theories of growth. Current theoretical perspectives generally focus on one aspect of growth from the perspective of one firm and ignore growth as a reallocation process, thus missing parts of the overall picture. For instance, most work in agency theory focuses on managers pursuing (suboptimal) overexpansion manifesting as undertaking "empire building" (e.g., acquisitions; Amihud & Lev, 1981), or pursuing "the quiet life" (i.e., lack of new unit growth and lack of unit closures; Bertrand & Mullainathan, 2003) due to incentive misalignment with shareholders. However, our work suggests an important role for contractions, and thus, suboptimal contractions may be an important margin missing in existing work. Similarly, while TCE research considers the transaction to be the focal unit of analysis, research often focuses on only one side of the transaction using asset specificity and/or uncertainty to predict one party's governance choice. This approach could benefit by simultaneously considering the actions of both parties to the transaction (e.g., Feldman et al., 2019). Similarly, research based on the behavioral theory of the firm could consider how managers choose different growth modes in response to both social and historical performance feedback (Gavetti et al., 2012) and examine how growth modes might be adjusted in response to aspiration levels or how negative feedback may be differentially associated with the various expansionary and contractionary growth modes (e.g., Greve, 2008). Penrosean research can be augmented by focusing on managerial choices with respect to different growth modes (e.g., managers' experience may drive choice of growth modes) or by analyzing how underutilized resources at existing units favor firm expansion choices (new units vs. acquisitions) due to the possibility of human resource redeployment (Kor et al., 2016). Similarly, our study can motivate work examining influence of mimetic pressures and geography on strategic choices. For example, institutional theorists find that firm entry and acquisition (Haunschild, 1993) and new market entry (Haveman, 1993) decisions are influenced by mimetic pressures. Do these mimetic influences matter similarly for starting new plants or closing old ones, or for other modes of growth? Similarly, does being in a cluster increase the use of acquisitions, while isolation increases the tendency to grow organically?

The second aspect that comes into prominence is reallocation. Some strategy scholars have viewed firm growth as a process of resource reallocation inside the firm (Karim & Mitchell, 2000; Lieberman et al., 2017; Rumelt et al., 1991). Our decomposition reflects the outcomes of such resource reallocation as reflected in the magnitude of growth modes (e.g., as increased acquisitional growth or closures). In addition, our decomposition also highlights that

firm growth is also often a process of resource reallocation *across* firms. For instance, every acquisition is associated with a sale. Similarly, employees needed for organic growth must come from closures, contractions, or new individuals joining the workforce. We briefly highlight this perspective in Figure 2. It recasts Table 1 (and corresponding breakdowns for key sectors) using Sankey diagrams and shows the growth modes are related to each other from a reallocation perspective (Table A9 presents these statistics in a tabular format). It presents the direction of net reallocation of employees (note that because we do not observe movement of individuals, we cannot determine gross flows). Underlying the total growth (e.g., −2% in manufacturing) are significant reallocation flows (e.g., 3.2% from transactional flows; 4.0% from units and firms that closed to expansions of existing units, openings of new units and to outside manufacturing). Such reallocation happens in all sectors despite wide differences in their total growth (noted in the title). Interestingly, although the transactional channel (lower part of the figures, in purple) is significant in all sectors, its importance relative to the new and recent units (green and brown channels) varies across sectors. Importantly, most of the net reallocation through this transactional channel is within sectors (as can be seen from the small net acquisitional channels to or from outside sectors).

Within strategic management, taking such a reallocation perspective to growth can yield interesting research avenues. For instance, the last finding suggests that most of the resource reallocation from transactions happens within industries, and so theories that explain a proclivity for acquisitions for some firms need to also explain why other firms in the same

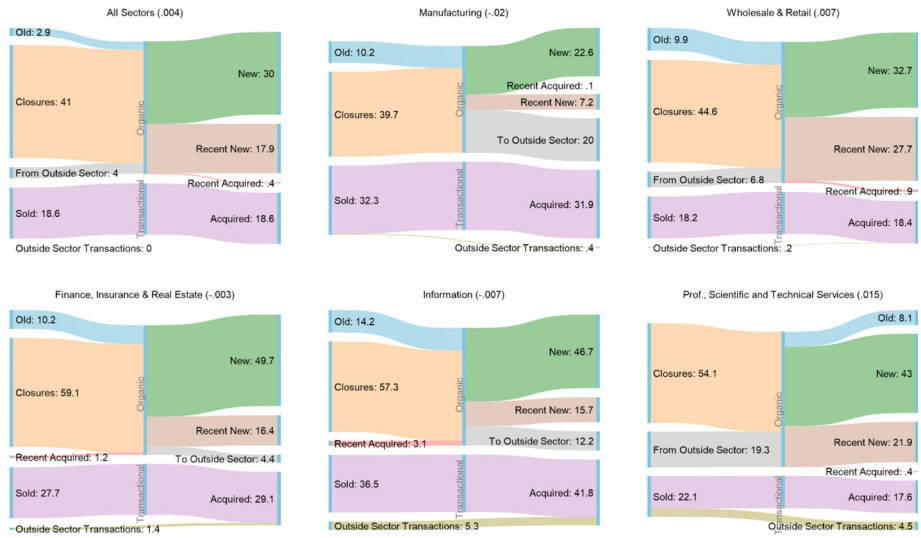

FIGURE 2 Reallocation perspective of growth: Net reallocation in key sectors. These Sankey diagrams present the employment-weighted means (multiplied by 1000 for readability) of various growth components over 2004–2013 for overall economy and each sector as *net* flows. In each figure, the net flows go from left to right. For instance, in manufacturing, the mean growth contributions of −0.0323 from units sold and 0.0319 from units acquired are presented as a net flow of 32.3 from sold to acquired, with the remaining 0.4 being accounted for by transactions outside manufacturing (i.e., sales to nonmanufacturing firms). Similarly, for organic growth, employees from contracting old units (10.2) and closures (39.7) were (net) reallocated to new units (22.6), recent acquired (0.1), recent new (7.2) and the remaining (20) flowed to outside the manufacturing sector. Overall sector (or economy) growth rate in parentheses next to title. Relative sizes are comparable *within* each sector. See Table A8 for sector definitions.

industry are willing to sell. More generally, if we observe that some firms grow faster than others, then this view suggests an examination of barriers, either external or internal, to resource reallocation. For example, is it possible that those firms are located in contexts where reallocation of resources from shrinking to growing firms may be easier. Industry, technology, and geography naturally come to mind as such contexts, but there are likely to be more fine-grained factors (e.g., firm capabilities, overlapping supplier, employee, or buyer networks, etc.) within these broader contexts that influence resource reallocation and, consequently, growth. Similarly, it will be interesting to study how managers shape strategies in a way that eases (hinders) resource reallocation away (toward) from their competitors. A related topic is mobility frictions (e.g., Starr et al., 2018). Viewing growth as a process of reallocation suggests that such frictions will not only affect expansions and new firm entry but also closures and contractions.

Our approach can also be used to explore other aspects of growth. For instance, while we have focused on within-firm correlations among growth modes, one could explore inter-industry correlations. Also, because our approach is additive, one could take many of the disaggregated statistics we have presented and sum them to potentially underexamined aggregates (Figure A8). For instance, we could examine intensive margins (i.e. expansions of existing units) and extensive margins (net addition of units) of growth by adding the appropriate modes from Table 1 (Figure A9). Similarly, one could obtain correlations of these two margins with the underlying modes using Table 3. Such analyses could help further recent studies of firm growth through addition of new establishments (e.g., Cao et al., 2017).

Some caveats apply when interpreting our results. One, the nature and role of growth modes depend on the time horizon. Our analyses examine a 1-year horizon (though for new and acquired firms, our decomposition captures growth in the second year as well). A longer horizon may reveal a larger share for growth from new and acquired firms, as well as larger magnitudes for closures and selloffs (especially if units shrink before being sold or closed).[3] Two, and related to the point above, we only estimate the net growth in old units, and hence, reallocations within old units (from growing to shrinking units) are not considered. Three, our data allow us to examine only net changes in unit size from year to year. This may miss firm size changes and reallocations that may be captured in higher frequency data. While the shorter horizon we use has the advantage of capturing more of the openings-closures, and sales-acquisitions transactions that could be missed when examining longer-term changes, we still miss worker flows within the year. Finally, our analysis is mainly descriptive. We are careful not to ascribe causal relationships to the correlations across growth modes, or of growth modes with future performance.

In conclusion, by presenting new empirical evidence on the economic relevance of growth modes and some associated research implications, our paper has taken a step toward highlighting the benefits of adopting an integrated treatment of growth modes. We hope that this will catalyze further theoretical and empirical work to develop and expand our understanding of firm growth and growth modes.

[3]Also, as noted by a referee, there is some noisiness in ownership tracking at annual frequencies in the Census data. While we expect this to be smoothed out over our 10-year period, the noisiness could also be mitigated by using data from the Economic Census years.

8 | US CENSUS BUREAU DISCLAIMER

Research results in this article are those of the authors, and do not necessarily represent the views of the US Census Bureau. The results presented here have been screened to ensure that no confidential data are revealed and are based on disclosure requests 9616, 9810, 9988, and 11,037.

ACKNOWLEDGMENTS

The authors thank the editor, Rajshree Agarwal, and two anonymous reviewers for their constructive comments and suggestions. The authors are grateful to seminar participants at the UCLA Anderson School for their insightful comments on an earlier version of this study. The authors also thank the Michigan Census Research Data Center for their support and Clint Carter for assistance with disclosure requests. The authors gratefully acknowledge the financial support of the Whitman School of Management at Syracuse University, the Ross School of Business at the University of Michigan, and the School of Arts and Sciences at the University of Pennsylvania.

DATA AVAILABILITY STATEMENT

The data and underlying codes are available at the US Census Bureau, subject to approval by the US Census Bureau.

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How to cite this article: Sivadasan, J., Balasubramanian, N., Dharwadkar, R., & Ren, C. (2025). How do US firms grow? New evidence from a growth decomposition. *Strategic Management Journal*, *46*(1), 49–81. https://doi.org/10.1002/smj.3641