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The value of flexibility in multi-business firms

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Abstract

Research Summary: Whether diversified firms have advantages over their single-business counterparts is the focus of much research in strategic management. Indeed, there is sparse evidence that corporate advantage exists, on average. We explore one potential driver of corporate advantage—that multi-business firms have more flexibility than single-business firms to cope with uncertainty, because they can internally redeploy resources across businesses. Using Compustat data, we show that uncertainty increases the relative advantage of multi-business firms, a finding robust to controls for endogeneity. Consequently, the paper provides important insight and evidence around when corporate advantage might obtain. Moreover, we find that growth option value is accentuated in the presence of switching flexibility. Finally, multi-business firms with redeployment experience and businesses with more inversely correlated returns benefit more from uncertainty.

Managerial Summary: Multi-business firms have a flexibility advantage over single-business firms as they can reallocate firm resources from one business unit to another depending on inducements. What is the impact of this flexibility on firm value? In this paper, we test whether such a flexibility advantage translates into greater economic returns in more volatile markets. We expect that resource redeployment creates value if it amplifies business-specific positive shocks while alleviating business-specific downturns. Consistent with this argument, we find empirical evidence that with increasing stock market volatility, multi-business firms benefit significantly more in terms of firm value than their single-business counterparts. In particular, in highly volatile stock markets, monthly adjusted returns are 2.3 times higher for multi-business firms than for single-business firms.

KEYWORDS

firm value, firm volatility corporate strategy, multi-business firms, resource redeployment

1 | INTRODUCTION

This paper looks for evidence of whether and when corporate advantage obtains through redeployment flexibility, an emergent perspective emphasizing how multi-business firms have more flexibility than single-business firms to cope with uncertainty (Ansoff, 1957; Bower, 1970). This additional flexibility—recently emphasized by Helfat and Eisenhardt (2004), Levinthal and Wu (2010), Sakhartov and Folta (2014, 2015), Giarratana and Santaló (2020), and Dickler and Folta (2020)—comes from the potential to internally reallocate resources across portfolio businesses (Folta, Helfat, & Karim, 2016). Internal markets might enable quicker and/or more efficient retrenchment from declining businesses, or exercise of growth potential in others. So, while single-business firms rely on external markets to buy or sell resources, multi-business firms have discretion to use either external markets or internal resource markets, whichever is most efficient. This emergent understanding of corporate advantage embodied in real options to switch resources to a different use, coincides with an older literature noting that internal flexibility might constitute a fundamental advantage of multi-business firms. Ansoff and Leontiades (1976, p. 22) encourage headquarters to "configure the firm's resources, capacities, skills and capability in such a way that in case of need, they can be quickly and efficiently transferred" from one business to another. Chandler (1962) details how DuPont, General Motors, Sears Roebuck, and Standard Oil reallocated resources across businesses in their respective portfolios, guided by how opportunities changed across the businesses. Penrose (1959, p. 67) explains that "so long as any resources are not used fully in current operations, there is an incentive for a firm to find a way of using them more fully."

To be clear, many well-managed and respected diversified corporations do not need to manage their firms for strategic flexibility. Those benefitting from strategic flexibility are companies operating under uncertainty. For example, Kuppuswamy and Villalonga (2016) found that diversification advantage is particular present in periods of financial instability. One implication is that since multi-business firms have switching options lacking in single-business firms, volatility will accentuate their relative value, holding all else equal.[1] Surprisingly, currently lacking is evidence around whether switching options confer valuation advantages to multi-business firms, which is the focus of our paper.

One of the main implications of real option theory is that real option value is increasing in the volatility of an underlying process (i.e., demand volatility, cost volatility, or overall volatility of profits). The reason for this relation is that firms can change their operating and investment decisions in the face of bad news while amplifying the effects of good news. Therefore, if real options constitute a significant portion of firm value, there will be a stronger positive effect of firm volatility on firm value. Testing whether real options contribute more to firm value with increases in firm volatility has some precedence. In his seminal work, Duffee (1995) finds that firm stock market returns positively correlate with changes in firm volatility. Grullon, Lyandres, and Zhdanov (2012) find compelling evidence that the positive relation Duffee (1995) observed is driven by a firm's underlying growth options, and Aabo, Pantzalis, and Park (2016) further attribute it to multi-nationality. All ignore whether it is affected by having flexibility to switch resources between businesses. Since the emphasis of the aforementioned studies is on growth options available to both single- and multi-business firms, lacking is an understanding about our key research question—whether increases in volatility accentuate the corporate advantage of multi-business firms.

Using Compustat Segment data, we find increases in firm volatility have over twice the impact on the value of multi-segment firms over single-segment firms, suggesting the benefits of diversification are accentuated with increasing volatility. Of course, the results also imply that decreases in volatility diminish the relative advantage of multi-business firms. These findings are robust when comparing a sample of multi-segment firms to a sample of synthetic control firms active in the exact same industries, along with a host of other approaches to control for the fact that diversification may be endogenous. We also find the value of growth options is enhanced when firms have switching options. This novel finding illuminates that redeployability is an important mechanism explaining return advantages of multi-business firms as theorized in extant literature (Sakhartov & Folta, 2015), but previously untested.

Finally, our explanation for value creation—the potential for resource redeployment—gains support in two of the three mechanisms that should enhance the value of redeployment flexibility: greater inducements to redeploy and greater redeployment capability. Inducements to redeploy are proxied by negatively correlated portfolio businesses, as advocated by Sakhartov and Folta (2015) and demonstrated empirically by Giarratana, Pasquini, and Santaló (2021). The fact that redeployment options are more valuable when portfolio revenues are negatively correlated is consistent with the view that resource redeployment, and not synergy, flourishes with asymmetric opportunities across a portfolio. Measures of redeployment capability are meant to capture that firms may learn to efficiently adjust resources through experience. A third mechanism—lower switching costs, approximated by relatedness—does not enhance the value of the switching option. While relatedness is the most commonly proposed measure for switching costs, it may be confounded, as we discuss later. In sum, the overwhelming weight of evidence suggests that multi-business firms benefit from the right, but not the obligation, to internally reallocate resources. As a result, our paper provides important insight and evidence around when corporate advantage is accentuated.

[1]The terms "uncertainty" and "volatility" are used interchangeably and explained in Section 2.

2 | LITERATURE REVIEW

Whether multi-business firms have advantages over single-business firms in transforming uncertainty into economic value represents our main inquiry. Flexibility takes on more value under uncertainty. Multi-business firms should have added flexibility to pursue growth options or retrench from declining opportunities because of internal markets to redeploy resources across businesses in their portfolio. Thus, the value derived from switching options stems from an ability to exploit upside potential and/or truncate downside risk by efficiently shifting resources across the portfolio to take advantage of changing opportunities. Prior work that recognizes flexibility to efficiently redeploy resources across multi-business firms is synonymous with a switching option (e.g., Bernardo & Chowdhry, 2002; Matsusaka & Nanda, 2002; Sakhartov & Folta, 2014). Resource adjustment costs will decrease value in switching options, but multi-business firms have discretion to efficiently exercise them through redeployment, while single business firms must use the market for resource acquisition and disposal. This explains our emphasis on switching options as a driver of corporate advantage for multi-business firms, which has precedence in the literature.[2] Stein (1997) explains multi-business firms might engage in "winner-picking"—the practice of actively shifting funds from one business to another. Helfat and Eisenhardt (2004) add that non-financial resources might also be reallocated, creating "inter-temporal economies of scope" to exploit changing opportunities over time.

No prior work empirically examines whether the value of redeployment flexibility increases with volatility, even if it has been predicted by Sakhartov and Folta (2014, 2015). Some prior work probes the relationship between redeployability and value. Kuppuswamy and Villalonga (2016) find that excess value in multi-business firms increased during the financial crises more due to a better allocation of financial resources rather than a larger capacity of these resources. This lends support to the view that when external resource markets are constrained, firms with internal resource markets are marginally better off. Lovallo, Brown, Teece, and Bardolet (2020) find that return on assets increases when firms reallocate more capital across businesses, presumably because they can use internal markets to reallocate capital to better performing businesses. Some other work shows that multi-business firms are better able (than single-business firms) to exploit opportunities across the portfolio, whether it be by redeploying labor (e.g., Belenzon & Tsolmon, 2016; Santamaria, 2021; Tate & Yang, 2015), plants (e.g., Sohl & Folta, 2021), or retail shelf-space (e.g., Giarratana & Santaló, 2020). Such adaptations seemingly help in retrenching or expanding revenues (e.g., Dickler & Folta, 2020; Miller & Yang, 2016) or exiting markets (O'Brien & Folta, 2009; Santamaria, 2021; Sohl & Folta, 2021). Finally, some empirical work drives at mechanisms leading to efficient redeployment: lower adjustment costs, greater inducements, and higher external transaction costs (e.g., Belenzon & Tsolmon, 2016; Dickler & Folta, 2020; Giarratana et al., 2021; Giarratana & Santaló, 2020; Sohl & Folta, 2021). None of this prior research tests our research question—whether the relative advantage of multi-business firms is accentuated under uncertainty due to switching options.

Flexibility to respond to uncertainty comes in forms additional to switching options. For example, growth options gain value from the possibility that early investment allows firms to take better advantage of future business opportunities in a *focal* industry by attracting new

[2]While synergy might also drive corporate advantage, its value is determined by systematic risk, not total risk or volatility, and the relation between systematic risk and value is ambiguous because it may affect both expected returns and discount rates (Holland, Ott, & Riddiough, 2000).

customers or more profitably serving existing ones (Kulatilaka & Perotti, 1998). Grullon et al. (2012) prove this point empirically with four different proxies for growth options.[3] Despite our focus on switching options in multi-business firms, it should be apparent that they might interact with growth options in important ways (Trigeorgis, 1993). For example, Helfat and Eisenhardt (2004) have argued that, in the case of multi-business firms, this ability derives from (a) faster exploitation of growth opportunities; (b) faster retrenchment from poor performing businesses; and/or (c) lower overall costs associated with growth or retrenchment. The first two obtain because redeployability lowers sunk costs, and thereby reduces the required performance threshold for investment and divestment (Lieberman, Lee, & Folta, 2017); and (c) obtains if internal redeployment costs are below external transaction costs (Lieberman et al., 2017).

The type of uncertainty affecting real option value is total volatility of an underlying process (e.g., product demand, cost, competition, or overall profitability).[4] A number of factors might influence volatility, including industry uncertainty, market uncertainty, technological uncertainty, and firm-specific uncertainty. While the hypotheses developed below generalize to all of these different types of uncertainty, we focus explicitly on firm-specific volatility for several reasons. First, it is inclusive of all types of uncertainty affecting the underlying process. For example, it captures changes in internal and external inducements over time, where external inducements include positive or negative forces external to the firm that influence demand and profitability, and internal inducements refer to the existence of a pool of unused productive services, resources, and specialized knowledge (Penrose, 1959). Second, it efficiently captures them in a single variable. Third, it is adopted by the most comparable prior research (i.e., Aabo et al., 2016; Grullon et al., 2012), and many other related studies (e.g., Ai & Kiku, 2016; Bulan, 2005; Cao, Simin, & Zhao, 2008; Leahy & Whited, 1996). Finally, an emphasis on total uncertainty through firm volatility, rather than systematic risk, is consistent with the view that multi-business firms have switching options lacking in single-business firms.

Uncertainty drives up the value of switching options because with greater uncertainty comes greater extremes in both upside and downside potential and having flexibility to reallocate resources across businesses might empower multi-business firms to more efficiently truncate downside risk associated with any particular business in a portfolio. At the same time, this flexibility might enable better exploitation of the profitable growth options inside a portfolio, if adjustment costs are lower than external transaction costs. Consequently, greater volatility should increase the relative advantage of multi-business firms compared to single-business firms, holding all else constant. The greater the ability to efficiently reallocate resources between businesses, the more discretion a firm has with respect to the timing of its investment, and hence the larger the value of its switching options. Thus, our first hypothesis reads:

> **Hypothesis (H1a).** *Increases in firm volatility accentuate the relative advantage of multi-business firms over single-business firms.*

[3]Another form of flexibility outside the scope of this study derives from owning a multinational network of subsidiaries, enabling firms to switch resources or production between countries (Kogut & Kulatilaka, 1994). Chang, Kogut, and Yang (2016) predict this flexibility will be reflected in a global premium relative to single-country firms, and find evidence of one after adjusting for the fact that multi-nationality is endogenous. Ioulianou, Leiblein, and Trigeorgis (2021) show that multi-national firms have higher upside potential and lower downside risk, a prediction consistent with real option theory. Aabo et al. (2016) find evidence that volatility accentuates the relative advantage of multi-nationality. None of these studies consider whether options tied to multi-business contributes to value, where multi-business is defined as competing in multiple industries.

[4]A traditional view of firm investment emphasizes systematic risk, not total risk, because it affects cost of capital.

Multi-business firms may vary in the number of portfolio businesses, and hence the number of switching options. Having more businesses should coincide with more economic value created from uncertainty, for several reasons. First, more portfolio businesses should increase the probability and extent of inducements to redeploy, as captured by differences in returns across businesses. Hence, it creates more opportunities to redeploy resources to a more profitable business. Second, having more portfolio businesses increases managerial discretion from where to source resources, and which types of resources get sourced. Thus, the next hypothesis reads:

> **Hypothesis (H1b).** *Increases in firm volatility accentuate the relative advantage of having more businesses in a portfolio.*

3 | EMPIRICAL ANALYSIS

3.1 | Data and method

The relationship between returns and changes in firm volatility is estimated using a sample of single-segment and multi-segment firms from the Compustat firm and business-segment databases from 1997 to 2020. Monthly returns are calculated from stock returns available in CRSP daily and monthly return files, whereas daily and monthly factor returns as well as risk-free rates come from Ken French's website.[5] Firm age was computed using Boyan Jovanovic's website on founding and incorporation years, and Compustat was used to create all other variables.[6] Compustat is extensively used in research on diversified firms, including work ascertaining whether multi-business firms under- or over-perform their single-business counterparts.[7] Our sample of multi-segment and single-segment firms is constructed using criteria similar to those of earlier studies (e.g., Berger & Ofek, 1995; Villalonga, 2004) enabling a comparison with previous findings, executed in the next sections. The initial sample consists of all firms listed in the Compustat firm database having non-missing data in CRSP. For each of the 914,437 firm-months in this initial sample, business units with segments in the same four-digit SIC code were aggregated into a unique business unit. The sample was reduced further in three steps. First, similar to Villalonga (2004) and others, observations were eliminated due to missing or non-positive firm assets or market value; missing segment SIC code, revenues, or assets for any firm segment; or firms having any segments with a one-digit SIC code of zero, six (financial), or nine. Notably, 151,897 firm-months were eliminated due to missing information on control variables, and another 322,717 eliminated due to missing data on growth option variables (i.e., Firm size, Firm age, R&D intensity, Future sales growth, and Residual foreign sales ratio). Appendix A details the data reduction process, which produced a final sample of 341,989 firm-months constituted by 3,975 firms. Notably, 113,059 firm-month observations are diversified (multi-segment) and 228,930 are single-segment.[8]

[5] French's data are available at https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[6] Jovanovic's data are available at https://sites.google.com/a/nyu.edu/boyan-jovanovic-home-page/researchand include firm-level data on founding years, incorporation years, and years of first exchange listing used in Jovanovic and Rousseau (2001).

[7] While referring to "multi-business" and "single-business" firms prior to this section, the terms "multi-segment" and "single-segment" are used throughout the empirical analysis given that the Compustat database firms report "segments." Major changes in the Compustat database in 1997 contributed to limiting our sample to a period subsequent to 1996.

[8] For additional information, please refer to Appendix H that further details the code for sample construction and variable creation.

3.1.1 | Dependent variable

Adjusted returns

A proxy for firm value used extensively in prior finance research (e.g., Duffee, 1995; Grullon et al., 2012) is excess returns, defined as Excess returns$_{i,t} = r_{i,\tau} - r_{f,\tau}$, where $r_{i,\tau}$ is firm i's monthly returns, calculated as the difference between firm i's end of month stock price for month t and $t-1$, and $r_{f,\tau}$ represents the risk-free return rate, measured as the one-month treasury bill rate. When replicating prior work by Grullon et al. (2012) and Aabo et al. (2016), *Excess returns* is used as our dependent variable to closely mimic their approach. However, most of our analysis uses an industry-adjusted dependent variable to account for industry effects that impact firm value.[9] Our dependent variable, *Adjusted returns*, is the difference between a firm's monthly returns and the monthly returns of a synthetic control firm competing in the exact same industries, an approach used by Lang and Stulz (1994), Berger and Ofek (1995), Villalonga (2004), and others:

$$Adjusted\ returns_{i,t} = Returns_{i,t} - SYR_{i,t} \tag{1}$$

where, $SYR_{i,t}$ represents the synthetic returns of firm i in month t, calculated as follows.

$$SYR_{i,t} = \sum_{j=1}^{n} w_{ijt}\left(Returns_{jt}^{ss}\right) \tag{2}$$

w_{ijt} represents the percentage of assets contributed by each segment j of firm i at month t. $Returns_{jt}^{ss}$ represents industry j's average returns, calculated as:

$$Returns_{jt}^{ss} = \sum_{s=1}^{n} w_{market\ cap\ st-1}\left(Returns_{st}\right) \tag{3}$$

$Returns_{st}$ being the return of specialized firm s at month t and $w_{market\ cap\ st-1}$ represents the relative market capitalization of a specialized firm s over the market capitalization of n specialized firms in the same industry j at $t-1$. To create a sample of single-segment firms to form the corresponding synthetic control firm's returns, we adapt approaches followed in prior literature (e.g., Berger & Ofek, 1995; Lang & Stulz, 1994; Santaló & Becerra, 2008; Villalonga, 2004) and match on the most precise level of a segment's four-, three-, or two-digit SIC for which there is at least one single-segment firm in the industry-year. To estimate a segment's imputed value, Berger and Ofek (1995) rely on asset or sales multiples of single-segment firms. Given the study's focus on returns, which are different from firm value because they can exhibit negative values, we follow Cohen and Lou (2012) and apply some slight changes relative to Berger and Ofek (1995) as depicted in Equation (3).

[9] As documented in Appendix G, all results are robust to using *Excess returns* (e.g., Duffee, 1995; Grullon et al., 2012) as an alternative dependent variable.

3.1.2 | Independent variables

ΔVOL

Changes in volatility to a firm's stock price are captured with ΔVOL. Specifically, we follow Grullon et al. (2012) and measure ΔVOL as the difference between the estimated volatility from 1 month to the next, $\Delta VOL_{i,t} = VOL_{i,t} - VOL_{i,t-1}$. Firm i's volatility during month t is estimated as the standard deviation of the firm's daily returns, $VOL_{i,t} = \sqrt{\frac{\sum_{\tau \in t}\left(R_{i,\tau} - \overline{R_{i,t}}\right)^2}{n_t - 1}}$, where $R_{i,\tau}$ is the natural logarithm of daily gross excess returns on firm i's stock, $\overline{R_{i,t}}$is the mean of $R_{i,\tau}$ during month t, and $n_t$is the number of non-missing return observations during month t. Logarithmic returns mitigate skewness on the relation between returns and contemporaneous return volatilities (e.g., Duffee, 1995; Grullon et al., 2012). Whereas positive values of ΔVOLindicate an increase in firm volatility from the previous month to the current one, negative values indicate decreasing firm volatility.

Diversified

Diversified is an indicator variable equal to "1" if a firm reports two or more segments in a distinct four-digit SIC code, and "0" otherwise. Similar to Maksimovic and Phillips (2002), Tate and Yang (2015), and Kuppuswamy and Villalonga (2016), these diversified firms are considered multi-business. This dichotomous variable serves as a first indicator for the presence of switching options.

#Segments

To approximate the number of switching options inside a firm, *#Segments* is the sum of segments having a unique four-digit SIC code.[10]

Control variables are described in Appendix B. Table 1 displays descriptive statistics for all variables (and Table B1 reports pairwise correlations). The first column reveals that our sample firms have similar characteristics to those analyzed by Grullon et al. (2012), while excess returns are slightly higher during our different sample period. The table also suggests some differences across multi-segment and single-segment firms, the most notable being that single-segment firms have lower volatility, and stronger indicators of growth potential (i.e., smaller firm size, younger age, greater R&D intensity, and greater future sales growth). Panels A–C of Figure 1 plot the distribution of *Adjusted returns*, *Volatility*, and *Changes in volatility* (ΔVOL) for single-segment firms and multi-segment firms with different numbers of segments. The fact that single-segment firms have more extreme values for each variable, and less volatility obtains for additional segments, is consistent with the view that diversification provides insurance against negative states of the world.

3.2 | Analysis

The analytical technique adopted is nearly identical to that used by Grullon et al. (2012) focusing on growth options, and by Aabo et al. (2016) focusing on multi-nationality. Grullon et al. (2012) estimate the dependent variable using monthly cross-sectional Fama and MacBeth

[10]In additional analyses, industries are defined increasingly broader by aggregating segment-level data on the three-digit or two-digit SIC level. Results are robust to these alternative specifications.

TABLE 1 Descriptive statistics

	All firms					Multi-segment versus single-segment firms			
	Mean	**SD**	**P5**	**Median**	**P95**	**Mean MS**	**Mean SS**	***t*-stat**	***p*-value**
Adjusted returns	0.353	17.650	−22.929	−0.253	25.208	0.266	0.396	2.0293	.0424
Excess returns	1.229	18.966	−23.982	0.173	28.400	1.163	1.262	1.4379	.1505
Volatility	3.335	2.392	1.049	2.700	7.713	2.826	3.586	88.4987	<.001
ΔVOL	−0.002	2.112	−2.766	−0.028	2.860	−0.004	−0.001	0.3608	.7183
Diversified	0.331	0.470	0	0	1				
#Segments	1.563	1.009	1	1	4				
Market portfolio return	1.066	1.208	−0.549	1.011	2.909	1.040	1.079	8.8477	<.001
Book-to-market ratio	−0.515	0.776	−1.895	−0.433	0.580	−0.297	−0.622	117.8280	<.001
Market value of equity	20.024	2.041	16.866	19.934	23.554	20.594	19.743	116.9228	<.001
6-month lagged return	1.154	1.156	0.409	1.037	2.142	1.128	1.167	9.3517	<.001
Volume	2.093	4.776	0.181	1.303	6.062	1.813	2.231	24.0859	<.001
Financial constraints	−32.303	602.790	−66.791	−2.582	2.783	−11.477	−42.589	14.2032	<.001
Firm size	4,789.642	21,108.371	15.494	325.106	19,306.000	10,202.088	2,116.659	107.1306	<.001
Firm age	33.947	35.011	4.000	22.000	112.000	47.740	27.135	168.4974	<.001
R&D/assets	0.099	0.209	0.000	0.042	0.369	0.045	0.126	1.1e+02	<.001
Future 3-year sales growth	3.037	112.240	−0.575	0.189	2.284	0.454	4.313	9.4601	<.001
Residual foreign sales ratio	−0.022	0.060	−0.034	−0.028	−0.023	−0.025	−0.021	18.0207	<.001
N	341,989					113,059	228,930		

Note: MS, multi-segment firms; SD, standard deviation; SS, single-segment firms; P5, 5th (P95 = 95th) percentile of the distribution.

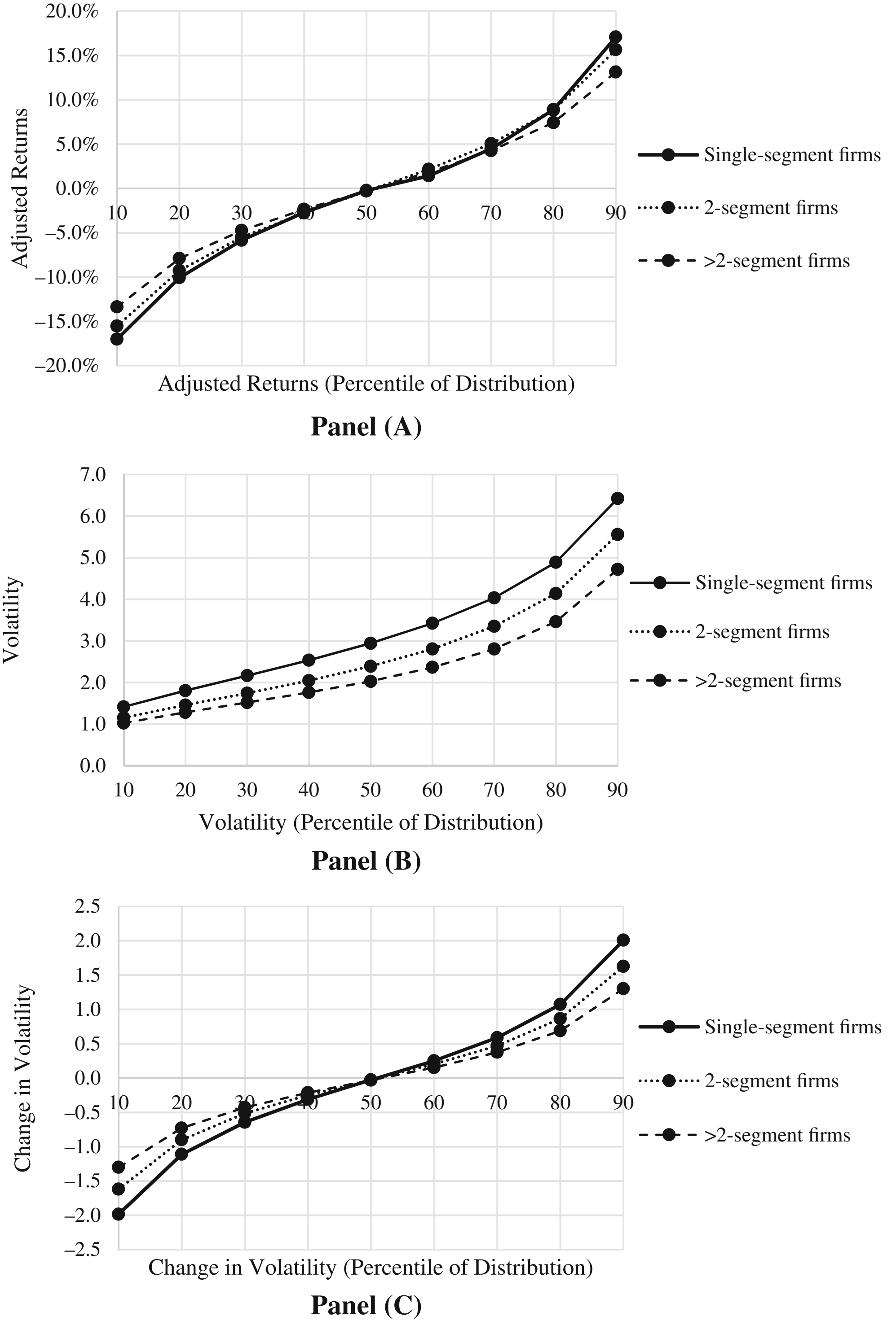

FIGURE 1 Distributions for key variables.

Panel A: Adjusted returns by number of segments operated. Panel B: Volatility by number of segments operated. Panel C: Change in volatility by number of segments operated. All panels display the distribution of the respective variables from the 10th to the 90th percentile for firms operating different numbers of segments as indicated in the chart.

(1973) regressions of firm excess returns on ΔVOL, a vector of growth option variables (*GROW*), interactions between ΔVOL and *GROW*, and a vector of firm characteristics (x):

$$Excess\ returns_{i,t} = \alpha_t + \beta_t \Delta VOL_{i,t} + \gamma_t GROW_{it} + \theta_t \Delta VOL_{i,t} GROW_{it} + \overrightarrow{\delta_t}\, x_{i,t} + \varepsilon_{i,t} \tag{4}$$

They look for evidence of how growth options affect excess returns by the size of the coefficients of the interactions. Aabo et al. (2016) substitute *GROW* with *MN*—a vector of proxies for multi-nationality.

Our estimation includes *GROW*, *MN*, and their interactions with ΔVOL, but differs in that we add *MB*—a vector containing *Diversified* and *#Segments*, plus their interactions with ΔVOL—to ascertain how switching options in a multi-business firms affect *Adjusted returns*. So, our model reads:

$$\begin{aligned} Adjusted\ returns_{i,t} \ = \ & \alpha_t + \beta_t \Delta VOL_{it} + \mu_t MB_{it} + \pi_t \Delta VOL_{it} MB_{it} + \gamma_t GROW_{it} \\ & + \theta_t \Delta VOL_{it} GROW_{it} + \sigma_t MN_{it} + \tau_t \Delta VOL_{it} MN_{it} + \overrightarrow{\delta_t} \quad x_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{5}$$

Accordingly, π, the average coefficients from the cross-sectional regressions across time, should provide evidence of switching option value when all other sources of flexibility are controlled. Newey-West autocorrelation- and heteroskedasticity-consistent standard errors (Newey & West, 1987) are used in all models whereas results produced using alternative estimators are discussed in supplemental analysis.[11]

The empirical strategy is the following.

1. Prior work is replicated (Section 3.3.1).
2. Main results are presented, where *Adjusted returns* are regressed on an interaction between *MB* and ΔVOL. A positive value for π would suggest switching options accentuate the impact of volatility on firms' value (Section 3.3.2).
3. Supplemental analysis controls for the possibility that diversification is endogenous. Specifically, the robustness of our findings is assessed (a) using propensity score matching and (b) employing alternative estimators using different sets of fixed effects and standard errors clustered at the firm level (Section 3.3.3).
4. Further analysis investigates redeployment as a mechanism, looking for evidence whether the volatility-return relation is accentuated by lower adjustment costs, higher inducements, and greater redeployment capability (Section 3.3.4).

[11]Fama and MacBeth (1973) regression is a common approach to estimate parameters for asset pricing models. It does so by first estimating betas for each asset, in our case, a firm's stock price; then estimating the determinants of the asset's price, in our case, excess returns. The approach proceeds by estimating separate regressions for each time period. A primary reason why Fama-MacBeth regressions are preferred, in general, is that it provides standard errors corrected for cross-sectional correlation, which should be severe for observations in the same time period. This approach does not, however, control for autocorrelation across time periods, so Newey-West standard errors are used to correct for time-series autocorrelation.

3.3 | Results

3.3.1 | Replication of prior work

Appendix C replicates Grullon et al. (2012) and in Table C1 Model 1 replicates the positive relationship between Δ*VOL* and *Excess Returns*.[12] The remaining columns use their four approximations for growth opportunities, and incrementally interact them with Δ*VOL*. Table C1 also displays Panel B, replicating Aabo et al. (2016) to assess the importance of multinational flexibility. Both tables produce essentially equivalent results to prior research, giving us confidence in our data, operationalizations, and methods. In the next section, we build explicitly on these findings; first by controlling for these other forms of options when testing for the importance of switching options, then by showing how their effects differ across single- and multi-segment firms.

3.3.2 | Presentation of main results

Table 2 tests our hypotheses around redeployment options by including interactions between *Diversified* and Δ*VOL* and between *#Segments* and Δ*VOL*. Model 1 replicates the positive relationship between Δ*VOL* and *Excess returns* displayed in column 1 of Table C1, but using our adjusted dependent variable, *Adjusted returns* (π = 0.682; *p*-value = .000). Models 2 and 3 include the interactions, respectively, excluding controls for other forms of options (i.e., growth options and multi-nationality) already investigated in Section 3.3.1. In contrast to expectations, both models yield insignificant coefficients for the interaction terms. However, inclusion of controls for growth and multinational options may be crucial if multi-segment firms have systematically different growth opportunities than single-segments firms (Stowe & Xing, 2006). Therefore, to avoid any potential bias in coefficients for the interactions between *Diversified* and Δ*VOL* and *#Segments* and Δ*VOL*, controls are included for growth and multinational opportunities.

When controlling for other forms of options in Models 4–6, volatility accentuates the relative advantage of multi-segment firms over single-segment firms (also see Appendix D, where these other options are added incrementally). The positive coefficient for the interaction between *Diversified* and Δ*VOL* yields effects (π = 0.270; *p*-value = .001) consistent with Hypothesis 1a, and the economic effects are quite large and depicted in Figure 2, which shows that when volatility is increasing, monthly adjusted returns are 2.3 times higher for multi-business firms relative to single-business firms. Specifically, a one standard deviation increase in Δ*VOL* yields an increase in monthly adjusted returns of 1.01% for multi-business firms compared to 0.44% for single-business firms, producing an annual advantage of (1.01–0.44) × 12 = 6.84%. Of course, Model 4 also indicates that decreases in volatility diminish the value of the switching option and thus, the relative advantage of multi-business firms. The implication from these findings is that in the presence of uncertainty, multi-segment firms have a relative advantage

[12]This finding was first established by Duffee (1995). To ensure further comparability of our findings, the results by Grullon et al. (2012) were also replicated for the exact same period of 1964–2008 and indeed yielded very similar findings as those depicted in their table II (p. 1506) and table III (p. 1509). The replication results are available upon request.

TABLE 2 Returns, changes in volatility, and the switching option

DV: Adjusted returns	(1)	(2)	(3)	(4)	(5)	(6)
Controls added	Yes	Yes	Yes	Yes	Yes	Yes
Controls for all other options added	No	No	No	Yes	Yes	Yes
ΔVOL	0.6818	0.6868	0.7682	0.3098	0.2047	0.3170
	(0.0949)	(0.0974)	(0.1155)	(0.0853)	(0.0982)	(0.0848)
Diversified		−0.0024		0.0019		
		(0.0012)		(0.0011)		
Diversified × ΔVOL		−0.0061		0.2696		
		(0.0845)		(0.0789)		
#Segments			−0.0013		0.0012	
			(0.0005)		(0.0005)	
#Segments × ΔVOL			−0.0604		0.1280	
			(0.0472)		(0.0012)	
2-segment firm						0.0012
						(0.0012)
2-segment firm × ΔVOL						0.3300
						(0.0986)
3-segment firm						0.0003
						(0.0016)
3-segment firm × ΔVOL						0.2708
						(0.1831)
4-segment firm						0.0049
						(0.0024)
4-segment firm × ΔVOL						0.6165
						(0.2844)

TABLE 2 (Continued)

DV: Adjusted returns	(1)	(2)	(3)	(4)	(5)	(6)
>4-segment firm						−0.0181
						(0.0230)
>4-segment firm × Δ*VOL*						−3.6608
						(4.0755)
N	341,989	341,989	341,989	341,989	341,989	341,989
R^2	.090	.094	.093	.137	.136	.142
# of months	240	240	240	240	240	240

Note: Controls for *Market portfolio return*, *Book-to-market ratio*, *Market value of equity*, *6-month lagged return*, *Volume*, and *Financial constraints* are included in all models but not reported to conserve space. Controls for all other options are included as indicated in the table but not reported to conserve space. Please see Table D1 in Appendix D for representative effects. In additional analysis, we set missing values for R&D intensity to zero and included an additional indicator for such missing values (Koh & Reeb, 2015), which substantially increases the number of observations. Such an approach produced essentially equivalent main results available upon request. Newey-West autocorrelation- and heteroskedasticity-consistent standard errors of monthly coefficient estimates are provided in parentheses.

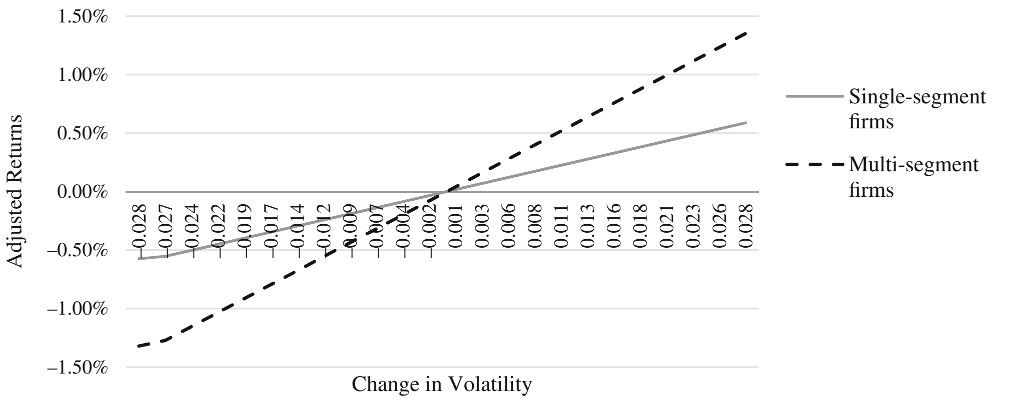

FIGURE 2 Total effect of change in volatility for single- and multi-segment firms.
This figure displays *Adjusted returns* for single-segment and multi-segment firms derived from Model 4 of Table 2.

over single-business firms, and that advantage goes beyond differences attributable to growth options or multi-nationality.

Models 5 and 6 examine whether switching option value is amplified if firms operate more segments in their portfolio. The positive interaction of *#Segments* and ΔVOL in Model 5 ($\pi = 0.128$; p-value = .004) is consistent with Hypothesis 1b. Yet, these results are less supportive when scrutinizing this relationship by regressing *Adjusted returns* on binary variables, each indicating the number of segments operated by a firm, and their interactions with Δ *VOL*. Single-segment firms serve as a reference group. It turns out that coefficients for these interactions are not significantly different from one another. So, it seems that additional segments beyond two do not escalate the benefit of the switching option.

While Table 2 directly tests our hypotheses while controlling for growth options, Table 3 explicitly examines how switching flexibility affects the value deriving from growth options. Models 1–8 show that for three out of four proxies for growth opportunities used by Grullon et al. (2012)—firm age, R&D intensity, and future sales growth—their interactions with volatility are significantly different for multi-segment firms relative to single-segment firms. To provide a more nuanced interpretation of these results, we examine the marginal effects of $\Delta VOL$for multi-segment compared to single-segment firms across all types of growth options as depicted in Figure 3. Note that firm age and size are inverse proxies for growth options. The first stylized fact is that the behavior of switching options is consistent across all four types of growth options as defined by Grullon et al. (2012), sound evidence of the similarity of the mechanisms analyzed. Second, we observe that the larger the growth options, the greater is the difference in economic value created from volatility by multi-segment relative to single-segment firms, consistent with our theory.[13] However, when growth options are weak, single-segment companies

[13]Examining Figure 3, it can be observed that younger firms (i.e., firm age is one standard deviation below the mean) benefit significantly more from increases in volatility if they are multi-segment as compared to focused firms (marginal effect = 0.811 and 0.768 respectively; z-test for difference in coefficients = 1.832, p-value = .067). On the other hand, it also becomes evident that among older firms that lack growth options, multi-segment firms are at a disadvantage relative to their single-business counterparts when it comes to turning increasing volatility into economic value. Similarly, for R&D intensity, a one standard deviation increase is associated with a 0.74 increase in the impact of ΔVOL on *Adjusted returns* for single-segment firms, but an even greater 1.068 increase for multi-segment firms (z-test for difference in coefficients = 2.541, p-value = .011). Finally, similar results obtain for Future sales growth, where a one standard deviation increase is associated with a 0.972 increase in the impact of ΔVOL on *Adjusted returns* for single-segment firms, but an even greater 2.001 increase for multi-segment firms (z-test for difference in coefficients = 1.648, p-value = .099).

TABLE 3 Examining the combined effect of growth and switching option value

DV: Adjusted returns	Firm size		Firm age		R&D intensity		Future sales growth	
	Only SS	Only MS	Only SS	Only MS	Only SS	Only MS	Only SS	Only MS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controls added	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ΔVOL	0.3236	0.4948	0.7019	0.6603	0.6630	0.6861	0.7325	0.8600
	(0.0772)	(0.0904)	(0.0818)	(0.0951)	(0.0828)	(0.1066)	(0.0911)	(0.1482)
Firm size	−0.0308	−0.0145						
	(0.0027)	(0.0019)						
Firm size × ΔVOL	−0.6692	−0.7579						
	(0.0553)	(0.0653)						
Firm age			0.0002	−0.0011				
			(0.0009)	(0.0010)				
Firm age × ΔVOL			−0.1196	−0.2741				
			(0.0534)	(0.0653)				
R&D intensity					0.0059	0.0048		
					(0.0014)	(0.0029)		
R&D intensity × ΔVOL					0.1069	0.5013		
					(0.0478)	(0.1477)		
Future sales growth							0.0068	0.0301
							(0.0020)	(0.0086)
Future sales growth × ΔVOL							0.2306	1.0964
							(0.0841)	(0.5186)
z-test	(1)–(2)	1.0366	(3)–(4)	1.8316	(5)–(6)	−2.5405	(7)–(8)	−1.6480
p-value		[.2999]		[.0670]		[.0111]		[.0993]
N	443,468	221,238	443,468	221,238	301,694	132,552	336,992	186,597

TABLE 3 (Continued)

DV: Adjusted returns	Firm size		Firm age		R&D intensity		Future sales growth	
	Only SS	Only MS	Only SS	Only MS	Only SS	Only MS	Only SS	Only MS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R^2	0.094	0.109	0.082	0.100	0.097	0.135	0.088	0.105
# of months	240	240	240	240	240	240	240	240

Note: Table 3 uses subsamples of single-segment (SS) and multi-segment (MS) firms and depicts the different types of growth options and their interactions with ΔVOL. Note that firm size and age are inverse proxies for growth options. The difference in coefficients for subsamples of single-segment versus multi-segment firms is indicated by a z-test and corresponding two-tailed p-values are reported in squared brackets. The first six control variables from Table D1 in the Appendix D (*Market portfolio return*, *Book-to-market ratio*, *Market value of equity*, *6-month lagged return*, *Volume*, and *Financial constraints*) are included but not reported to conserve space. Newey-West autocorrelation- and heteroskedasticity-consistent standard errors of monthly coefficient estimates are provided in parentheses.

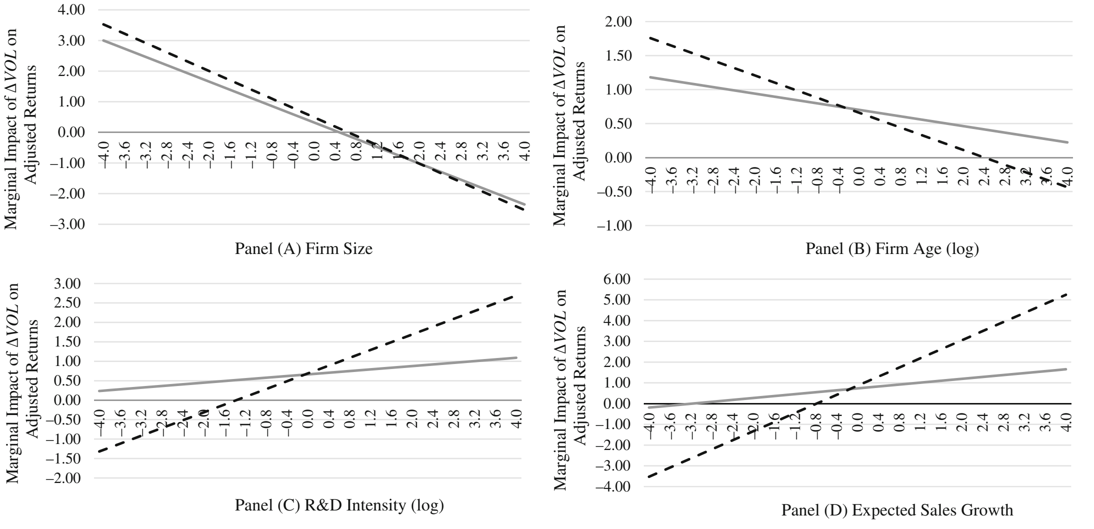

FIGURE 3 Marginal effect of change in volatility for single- and multi-segment firms for different types of growth options.
Panels A and B display the marginal impact of Δ*VOL* on *Adjusted returns* for *single-segment* (——) and *multi-segment firms* (– – –) at different levels of firm size derived from Models 1 and 2 of Table 3 and firm age (Models 3 and 4 of Table 3). Note that firm age and size are inverse proxies for growth options. Panels C and D display the marginal impact of Δ*VOL* on *Adjusted returns* for single-segment and multi-segment firms at different levels of R&D intensity (Models 5 and 6 of Table 3) and expected sales growth (Models 7 and 8 of Table 3).

realize better economic returns. Thus, while it is true that average results are consistent with Hypothesis 1a, a more precise statement is that the hypothesis is supported by our sample data only under the contingency that growth options exceed a certain threshold.

3.3.3 | Supplemental analysis for endogeneity

Appendix E addresses endogeneity concerns in two ways. A first approach imitates Villalonga (2004) by applying a propensity score matching (PSM) procedure to construct a sample of comparable multi-segment and single-segment firms.[14] A second approach is similar to Petersen (2009); where an alternative to the Fama-MacBeth regressions uses OLS panel models with firm-specific and time-specific (month) fixed effects as well as standard errors clustered at the firm level. Both approaches produce similar results as the ones reported in Table 2.

3.3.4 | Investigation of redeployment flexibility as a mechanism

Evidence presented thus far is consistent with the idea that redeployment flexibility creates extra value under uncertainty. To further drive at the mechanism—whether having discretion to redeploy is valuable under uncertainty—analysis examines whether the results are

[14]Coarsend exact matching (CEM) is also implemented specifying a 1:1 match of multi-business and single-business firms. Results are robust to this alternative matching procedure and are available upon request.

accentuated for factors that should drive up the value of redeployability. Three potential conditions elaborated in prior work are examined: lower redeployment costs, higher inducements to redeploy, and greater capability to redeploy. The first two of these have been reasonably well identified by prior work, while the third is less well established.

Adjustment costs to redeploy

Redeployment might involve financial or non-financial resources. Financial resources are highly liquid, and costs of redeploying cash should be inconsequential. Reallocation of non-financial resources to a new context, however, might involve retraining employees, or adjusting technology, plants, or equipment. Lower adjustment costs should lead to enhanced value tied to redeployment of non-financial resources. Helfat and Eisenhardt (2004) and Sakhartov and Folta (2014) suggest portfolio relatedness should drive down adjustment costs, because more related businesses should require more similar resources. This mechanism is tested using several measures of portfolio relatedness including resource similarity in occupational profiles and capital flows across tangible assets (Dickler & Folta, 2020; Farjoun, 1994), firm-level product market relatedness (Hoberg & Phillips, 2016), and the entropy measure (Palepu, 1985). As elaborated in Appendix F, we do not find support that relatedness is tied to redeployment option value. In the discussion section several explanations are offered for this non-finding.

Inducements to redeploy

Firms with higher inducements to redeploy should have more value tied to switching options (Sakhartov & Folta, 2015). Greater inducements obtain with more potential for resources to be used productively elsewhere in the portfolio, raising the opportunity costs of keeping resources in a relatively poor performing business when resources are constrained (Stein, 1997). Sakhartov and Folta (2015) suggest one condition leading to greater inducements is if portfolio businesses have returns that are more negatively correlated because resources in declining segments can be productively used elsewhere. Giarratana et al. (2021) show how diversifiers redeploying in shelf-space dominated industries tend to have portfolios characterized by negative sales growth correlations across different segments.

Consequently, sales growth correlations might be used to approximate inducements to redeploy. This is achieved by first calculating the full-sample correlation of sales growth rates of single-segment firms for each three-digit SIC industry pair. These correlations are then matched with the different segments operated in each multi-segment firm's portfolio and aggregated on firm level using a simple average. The sample is split into two subgroups: one where firms have positive average sales growth correlations in a given year, and one with negative average sales growth correlations. Models 1 and 2 of Panel A in Table 4 confirm that multi-segment firms with a negative correlation of sales growth in their portfolio have a significantly stronger relation between volatility and adjusted returns ($\pi = 11.554$; p-value = .000) than the ones with a positive correlation ($\pi = 3.961$; p-value = .000; z-test for difference in coefficients = 2.5766; p-value = .010). These results around inducements support the view that redeployability is an important mechanism explaining return advantages inside a portfolio as theorized in extant literature (Sakhartov & Folta, 2015), but not tested previously.

Redeployment expertise

Firms having better redeployment capability should have higher market returns tied to switching options, because it increases internal market efficiency by lowering adjustment costs or improving the timing and speed of redeployment. Such an effect has been suggested by

TABLE 4 Redeployment flexibility as a mechanism: Inducements (Panel A) and expertise (Panel B)

Panel A: Inducements to redeploy		
DV: Adjusted returns	**Negative SGC (1)**	**Positive SGC (2)**
Controls added	Yes	Yes
Controls for all other options added	Yes	Yes
ΔVOL	11.5540	3.9608
	(2.7270)	(1.1172)
z-test	(1)–(2)	2.5766
p-value		[.0100]
N	21,216	72,744
R^2	0.381	0.235
# of months	240	240

Panel B: Redeployment expertise				
	Concurrent sales increases and decreases		**Extent of sales expansion and contraction**	
DV: Adjusted returns	**High (1)**	**Low (2)**	**High (3)**	**Low (4)**
Controls added	Yes	Yes	Yes	Yes
Controls for all other options added	Yes	Yes	Yes	Yes
#Segments	0.0010	−0.0004		
	(0.0008)	(0.0007)		
ΔVOL	13.4626	3.8798	15.7081	8.9013
	(3.9304)	(1.6036)	(4.2693)	(5.3937)
z-test	(1)–(2)	2.2569	(3)–(4)	0.9895
p-value		[.0240]		[.3227]
N	31,526	23,265	15,660	15,716
R^2	.291	.309	.39	.381
# of months	180	180	180	180

Note: Panel A examines the value of the switching option for multi-business firms with high (negative sales growth correlation) or low (positive sales growth correlation) inducements to redeploy. Panel B depicts the value of the switching option for firms with different levels of redeployment expertise, where two measures of experience are defined in Sections 3.3.4. Columns 1 and 2 draw on concurrent sales increases and decreases, whereas Columns 3 and 4 examine redeployment experience gained from revenue expansion and contraction, both over a 5-year period. The same control variables as in Table D1 in the Appendix D are included but not reported to conserve space. Newey-West autocorrelation- and heteroskedasticity-consistent standard errors of monthly coefficient estimates are provided in parentheses.

Helfat and Peteraf (2003), and fits within an emerging literature on dynamic capabilities compelling our inquiry (e.g., Helfat et al., 2007; Teece, 2007). Teece, Peteraf, and Leih (2016, p. 17) define organizational agility as "the capacity of an organization to efficiently and effectively redeploy/redirect its resources to value creating and value protecting (and capturing) higher-yield activities as internal and external circumstances warrant." Firm differences in redeployment efficiency should be driven by organizational routines developed over time (Helfat & Peteraf, 2003). This intuition was tested with two distinct approaches and results are displayed in Panel B of Table 4.

The basic insight adopted for both approaches is that firms are likely to gain redeployment experience when they shift revenues between the different segments they operate (e.g., Penrose, 1959; Wu, 2013). Prior research has assumed retrenching from one market while expanding in another to be associated with the redeployment of resources from one segment to another segment within the firm (Dickler & Folta, 2020). We build on existing research and develop a measure capturing concurrent increases and decreases in sales growth for at least one segment pair in a given year.[15] Using a 5-year rolling window, we first counted all such instances and divided this number by the number of years covered, that is, five. Consequently, this score ranges between 0 and 1 and increases with the amount of redeployment experience a firm gained in the past. For example, if over the last 5 years in the portfolio of business segments operated, the firm has had 3 years in which one segment's sales were decreasing while another sibling segment's sales were increasing, this is indicative of higher redeployment experience equal to 3/5 = 0.6. The median redeployment experience of firms in our sample is 0.4. We test the notion that multi-segment firms having had more concurrent increases and decreases in sales growth will have obtained redeployment experience in the past and thus, be better able to obtain value from volatility, using subsample analyses. Results are displayed in Table 4: Panel B, and Models 1 and 2 confirm that multi-segment firms with high (> median of 0.4) sales redeployment experience have a significantly stronger relation between volatility and adjusted returns ($\pi = 13.463$; *p*-value = .001) than the ones with low (<median of 0.4) sales redeployment experience ($\pi = 3.880$; *p*-value = .017; *z*-test for difference in coefficients = 2.257; *p*-value = .024).

An additional measure of redeployment experience is developed directly from Dickler and Folta (2020), who approximate redeployments by the relative difference between multi-segment and single-segment firms in the expansion and contraction of revenues. Following the same logic as before, redeployment expertise is examined by splitting the sample of multi-segment firm into subsamples based on the distribution of cumulative revenue redeployments over the previous 5 years. Panel B of Table 4 further indicates that multi-segment firms having higher sales redeployment experience benefit more from the switching option than those having low experience (Model 3: $\pi = 15.708$; *p*-value = .000; Model 4: $\pi = 8.901$; *p*-value = .101; *z*-test for difference in coefficients = 0.9895; *p*-value = .323). In sum, our results tend to depict the potential to partially redeploy resources as a firm capability that benefits from experience.

4 | DISCUSSION

For some time, it has been emphasized that multi-business firms have an advantage over single-business firms if they can internally reallocate financial, human, or tangible resources

[15]The likelihood of observing at least one concurrent increase and decrease in sales growth among segments inside a firm increases with the number of segments operated. To rule out confounding effects due to the number of segments operated, we created separate measures of redeployment experience adjusting for the number of segments as well as the number of segment pairs operated in the firms. Results are robust to these alternative specifications. In addition, the number of segments is controlled for in all regressions using an unadjusted measure.

across businesses more efficiently than buying and selling these resources in the market (e.g., Ansoff, 1957; Chandler, 1962; Penrose, 1959). Thus, internal flexibility embodied in the real option to switch resources to a different use has been conceived as a fundamental driver of value creation in multi-business firms. A more recent, and mostly theoretical, stream on resource redeployment has taken up this charge (e.g., Helfat & Eisenhardt, 2004; Levinthal & Wu, 2010; Sakhartov & Folta, 2014, 2015), but lacking is empirical evidence around the link between firm value and the option to switch resources between businesses. This paper provides the first empirical evidence that corporate advantage is tied to the flexibility to redeploy resources across its portfolio businesses. This evidence is embodied in the fact that uncertainty is an important factor for understanding why and when multi-business firms perform better than single-business firms. We confirm that multi-business firms are better able to generate economic value from uncertainty compared to single-business firms. The findings provide evidence about when corporate advantage obtains—evidence that is sorely lacking. Several findings are worth elaborating.

First, the relative advantage of multi-business firms over single-business firms is a clear function of firm volatility. Our scrutiny of switching options complements prior work showing growth options contribute more to firm value with increasing uncertainty (Grullon et al., 2012). After controlling for alternative explanations around growth options as implemented by Grullon et al. (2012), we find the average multi-business firm value appreciates over two times more from increases in volatility than their single-business counterparts. Moreover, switching options amplify the value of growth options. This suggests that switching options and growth options interact in important ways (Trigeorgis, 1993), apparently because growth options can be better exploited due to internal markets for resources. However, these findings are confirmed only when growth options are large enough. This seems to suggest that redeployment flexibility to retrench from declining businesses only takes on value with compelling alternatives inside the portfolio. What constitutes "compelling" seems to rest upon growth potential. These findings have not been previous diagnosed and provide new insight into when and how multi-business firms create advantage beyond their single-business rivals.

Second, the value of multi-business firms under uncertainty is accentuated for conditions that should drive up the potential to redeploy. Perhaps most compelling is that multi-business firms having negatively correlated businesses take more advantage from uncertainty. Negative correlation should escalate the potential to redeploy resources away from relatively poor performing ventures but should diminish the potential for synergy.

Third, the finding that multi-business firms having more redeployment experience benefit more from uncertainty reconciles with a growing literature on how dynamic capabilities help firms adapt. Future work should seek to understand how firms are asymmetric in their redeployment capability. This might resemble how prior research shows that acquisition experience helps acquiring firms improve their skills in screening potential targets with refined selection criteria (e.g., Capron & Mitchell, 2009; Capron & Shen, 2007). Moreover, future work might also tease apart whether redeployment capability is driven by resource selection, processes identifying redeployment opportunities, or processes implementing redeployment.

4.1 | Limitations and future research

There are limitations to the study, even if we believe we have developed a unique approach to systematically identify how uncertainty accentuates the corporate advantage of multi-business firms having the option to switch resources to different uses. Switching options were approximated by unique four-digit SIC industries, which may obfuscate switching opportunities at a more fine-grained level. Although, we do not believe this systematically biases our results, since the switching flexibility of both single- and multi-business firms would be underrepresented. We did our best to control for alternative explanations to our findings, including proxies used for these alternative explanations where available, synthetic controls, and propensity score matching.

Future work should further explore how switching options present in multi-business firms activate growth options. Our theory suggests more vibrant internal markets facilitate better exploitation of growth options. This indicates that even if single-business firms have more compelling growth options, they may have less discretion to exercise them because of lower or more costly access to resources. Our descriptive analysis confirms that multi-business firms should have smaller growth options because they are older, larger, have lower R&D intensity, and lower expected sales growth. Indeed, multi-variate analysis confirms these apparent disadvantages for multi-business firms do not translate into lower relative value tied to flexibility, presumably because of greater discretion to exercise their growth options. This certainly suggests advantages to agility tied to diversification that deserve more scrutiny. One potential avenue through which this might be investigated is Helfat and Peteraf's (2003) capability lifecycle theory, which might posit that a firm's growth capability gets transformed through diversification.

We did not find evidence that lower adjustment costs influence the relative advantage of multi-business firms. Following prior work, adjustment costs were approximated using portfolio relatedness. The reasons for this non-finding may be several, and we invite future research to investigate. It may be that relatedness is capturing more than adjustment costs. For example, relatedness may capture correlation of returns, implying it is an inverse proxy for inducements, so the combination of lower adjustment costs and lower inducements cancel each other out. Even though we ran models controlling for return correlations at the industry-level, it is possible that there may be unaccounted for returns at the firm-level. An alternative explanation for the non-finding with relatedness is that the large public diversified companies in our sample enjoy sound advantages of economies of scale in centralizing functions that facilitate cost sharing (Feldman, 2021), generating scarce variation in adjustment costs. Alternatively, the results may be driven by the potential to redeploy cash, which involves no adjustment costs. Future research should study contingencies under which multi-business firms could have larger variations in these types of costs, which may include distinguishing between financial versus non-financial resources for the potential to redeploy.

Much more can be done to explore the importance of redeployment capability. While introduced by Helfat and Peteraf (2003) nearly two decades ago, we know of no empirical efforts to investigate its importance. Several reasons may explain this. First, redeployment is a very difficult thing to observe. Second, even if we could observe it, it is not obvious that actual redeployments should be used, because they do not account for the many times a firm considered redeployment but did not execute. Our two measures suffer these imperfections. One avenue for future research is building off the capability life cycle model of Helfat and Peteraf (2003) to characterize redeployment capability as arising from an "internal selection event"—the decision to diversify. In this view, redeployment capability emerges in the development or mature stage of the capability life cycle. Studying the origins of such a capability, and how they evolve with other growth capabilities would advance understanding of organizational agility.

Future work is needed to diagnose the practical implications of seeking corporate advantage through resource redeployment. One implication seems to be that multi-business firms should seek to build a portfolio of businesses with uncertain returns, because volatility can be more efficiently exploited in multi-business firms. Here, it is important to understand that volatility represents the range of value changes over time. A highly volatile business has dramatic increases and/or decreases in value. New business opportunities often entail such drama. Ecosystem businesses also offer potential for drastic increases or decreases in value. "Betting on" more than one ecosystem may have the added benefit of inversely correlated returns, enabling firms to withdraw resources from a losing ecosystem to reallocate to another. Another implication may be that diversified firms should dynamically adjust their scope to better attend to uncertainty. Rising uncertainty, perhaps around a core business, might be managed by adding a business to allow for redeployment. Declining uncertainty might be accompanied by more focus. Note that these implications are not driven by attempts to manage risk, but to better manage a firm's underlying resources. Otherwise, diversified companies could bear the cost of flexibility in periods of low uncertainty akin to an insurance premium (Kuppuswamy & Villalonga, 2016). In sum, there remains much to explore and understand with this emergent theory around corporate advantage.

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OPEN RESEARCH BADGES

This article has earned an Open Data badge for making publicly available the digitally-shareable data necessary to reproduce the reported results. The data is available at [[insert provided URL from Open Research Disclosure Form]].

DATA AVAILABILITY STATEMENT

Supplemental materials for this study are available in the Online-Appendix. The data that support the findings of this study are available from Compustat, CRSP and other openly available sources cited in the manuscript. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the corresponding author with the permission of Compustat and CRSP. Please refer to Online-Appendix H for further details on the code for sample construction and variable creation.

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REFERENCES

Aabo, T., Pantzalis, C., & Park, J. C. (2016). Multinationality as real option facilitator—Illusion or reality? *Journal of Corporate Finance*, *38*(1), 1–17.

Ai, H., & Kiku, D. (2016). Volatility risks and growth options. *Management Science*, *62*(3), 741–763.

Ansoff, H. I. (1957). Strategies for diversification. *Harvard Business Review*, *35*(5), 113–124.

Ansoff, H. I., & Leontiades, J. C. (1976). Strategic portfolio management. *Journal of General Management*, *4*(1), 13–29.

Belenzon, S., & Tsolmon, U. (2016). Market frictions and the competitive advantage of internal labor markets. *Strategic Management Journal*, *37*(7), 1280–1303.

Berger, P. G., & Ofek, E. (1995). Diversification's effect on firm value. *Journal of Financial Economics*, *37*(1), 39–65.

Bernardo, A. E., & Chowdhry, B. (2002). Resources, real options, and corporate strategy. *Journal of Financial Economics*, *63*(2), 211–234.

Bower, J. L. (1970). *Managing the resource allocation process*. Boston: Harvard University, Graduate School of Business Administration.

Bulan, L. T. (2005). Real options, irreversible investment and firm uncertainty: New evidence from US firms. *Review of Financial Economics*, *14*(3–4), 255–279.

Cao, C., Simin, T., & Zhao, J. (2008). Can growth options explain the trend in idiosyncratic risk? *The Review of Financial Studies*, *21*(6), 2599–2633.

Capron, L., & Mitchell, W. (2009). Selection capability: How capability gaps and internal social frictions affect internal and external strategic renewal. *Organization Science*, *20*(2), 294–312.

Capron, L., & Shen, J. C. (2007). Acquisitions of private vs. public firms: Private information, target selection, and acquirer returns. *Strategic Management Journal*, *28*(9), 891–911.

Chandler, A. (1962). *Strategy and structure: Chapters in the history of the American industrial Enterprise*. Cambridge, MA: MIT Press.

Chang, S., Kogut, B., & Yang, J. S. (2016). Global diversification discount and its discontents: A bit of self-selection makes a world of difference. *Strategic Management Journal*, *37*(11), 2254–2274.

Dickler, T. A., & Folta, T. B. (2020). Identifying internal markets for resource redeployment. *Strategic Management Journal*, *41*(13), 2341–2371.

Duffee, G. R. (1995). Stock returns and volatility a firm-level analysis. *Journal of Financial Economics*, *37*(3), 399–420.

Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy*, *81*(3), 607–636.

Farjoun, M. (1994). Beyond industry boundaries: Human expertise, diversification and resource-related industry groups. *Organization Science*, *5*(2), 185–199.

Feldman, E. (2021). The corporate parenting advantage, revisited. *Strategic Management Journal*, *42*, 114–143.

Folta, T. B., Helfat, C. E., & Karim, S. (2016). Examining resource redeployment in multi–business firms. In *Resource redeployment and corporate strategy* (pp. 1–17). London: Emerald Group Publishing Limited.

Giarratana, M. S., Pasquini, M., & Santaló, J. (2021). Leveraging synergies versus resource redeployment: Sales growth and variance in product portfolios of diversified firms. *Strategic Management Journal*, *42*, 2245E.

Giarratana, M. S., & Santaló, J. (2020). Transaction costs in resource redeployment for multiniche firms. *Organization Science*, *31*(5), 1159–1175.

Grullon, G., Lyandres, E., & Zhdanov, A. (2012). Real options, volatility, and stock returns. *The Journal of Finance*, *67*(4), 1499–1537.

Helfat, C. E., & Eisenhardt, K. M. (2004). Inter–temporal economies of scope, organizational modularity, and the dynamics of diversification. *Strategic Management Journal*, *25*(13), 1217–1232.

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2007). *Dynamic capabilities: Understanding strategic change in organizations*. Malden, MA: Blackwell.

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, *24*(10), 997–1010.

Hoberg, G., & Phillips, G. (2016). Text-based network industries and endogenous product differentiation. *Journal of Political Economy*, *124*(5), 1423–1465.

Holland, A. S., Ott, S. H., & Riddiough, T. J. (2000). The role of uncertainty in investment: An examination of competing investment models using commercial real estate data. *Real Estate Economics*, *28*(1), 33–64.

Ioulianou, S. P., Leiblein, M. J., & Trigeorgis, L. (2021). Multinationality, portfolio diversification, and asymmetric MNE performance: The moderating role of real options awareness. *Journal of International Business Studies*, *52*(3), 388–408.

Jovanovic, B., & Rousseau, P. L. (2001). Why wait? A century of life before IPO. *AEA Papers and Proceedings*, *91*(3), 336–341.

Kogut, B., & Kulatilaka, N. (1994). Operating flexibility, global manufacturing, and the option value of a multinational network. *Management Science*, *40*(1), 123–139.

Koh, P. S., & Reeb, D. M. (2015). Missing R&D. *Journal of Accounting and Economics*, *60*(1), 73–94.

Kulatilaka, N., & Perotti, E. C. (1998). Strategic growth options. *Management Science*, *44*(8), 1021–1031.

Kuppuswamy, V., & Villalonga, B. (2016). Does diversification create value in the presence of external financing constraints? Evidence from the 2007–2009 financial crisis. *Management Science*, *62*(4), 905–923.

Lang, L. H., & Stulz, R. M. (1994). Tobin's q, corporate diversification, and firm performance. *Journal of Political Economy*, *102*(6), 1248–1280.

Leahy, J., & Whited, T. (1996). The effects of uncertainty on investment: Some stylized facts. *Journal of Money, Credit and Banking*, *28*(1), 64–83.

Levinthal, D. A., & Wu, B. (2010). Opportunity costs and non–scale free capabilities: Profit maximization, corporate scope, and profit margins. *Strategic Management Journal*, *31*(7), 780–801.

Lieberman, M. B., Lee, G. K., & Folta, T. B. (2017). Entry, exit, and the potential for resource redeployment. *Strategic Management Journal*, *38*(3), 526–544.

Lovallo, D., Brown, A., Teece, D. J., & Bardolet, D. (2020). The relationship between resource allocation flow and firm performance. *Strategic Management Journal*, *41*(8), 1365–1380.

Maksimovic, V., & Phillips, G. (2002). Do conglomerate firms allocate resources inefficiently across industries? Theory and evidence. *The Journal of Finance*, *57*(2), 721–767.

Matsusaka, J. G., & Nanda, V. (2002). Internal capital markets and corporate refocusing. *Journal of Financial Intermediation*, *11*(2), 176–211.

Miller, D. J., & Yang, H. S. (2016). Product turnover: Simultaneous product market entry and exit. In *Resource redeployment and corporate strategy*. Bingley: Emerald Group Publishing Limited.

Newey, W. K., & West, K. (1987). A simple, positive semi-definite, heteroskedasticity autocorrelation consistent covariance matrix. *Econometrica*, *55*, 703–708.

O'Brien, J., & Folta, T. (2009). Sunk costs, uncertainty and market exit: A real options perspective. *Industrial and Corporate Change*, *18*(5), 807–833.

Palepu, K. (1985). Diversification strategy, profit performance and the entropy measure. *Strategic Management Journal*, *6*(3), 239–255.

Penrose, E. T. (1959). *The theory of the growth of the firm*. New York, NY: John Wiley.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies*, *22*(1), 435–480.

Sakhartov, A., & Folta, T. B. (2014). Resource relatedness, redeployability, and firm value. *Strategic Management Journal*, *35*(12), 1781–1797.

Sakhartov, A., & Folta, T. B. (2015). Getting beyond relatedness as a driver of corporate value. *Strategic Management Journal*, *36*(13), 1939–1959.

Santaló, J., & Becerra, M. (2008). Competition from specialized firms and the diversification–performance linkage. *The Journal of Finance*, *63*(2), 851–883.

Santamaria, S. (2021). Portfolio Entrepreneurs' behavior and performance: A resource redeployment perspective. Management Science.

Sohl, T., & Folta, T. B. (2021). Market exit and the potential for resource redeployment: Evidence from the global retail sector. *Strategic Management Journal*, *42*, 2273–2293.

Stein, J. C. (1997). Internal capital markets and the competition for corporate resources. *The Journal of Finance*, *52*(1), 111–133.

Stowe, J. D., & Xing, X. (2006). Can growth opportunities explain the diversification discount? *Journal of Corporate Finance*, *12*(4), 783–796.

Tate, G., & Yang, L. (2015). The bright side of corporate diversification: Evidence from internal labor markets. *The Review of Financial Studies*, *28*(8), 2203–2249.

Teece, D. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319–1350.

Teece, D., Peteraf, M., & Leih, S. (2016). Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy. *California Management Review*, *58*(4), 13–35.

Trigeorgis, L. (1993). The nature of option interactions and the valuation of investments with multiple real options. *Journal of Financial and Quantitative Analysis*, *28*(1), 1–20.

Villalonga, B. (2004). Does diversification cause the "diversification discount"? *Financial Management*, *33*(2), 5–27.

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