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Conglomerates and Industry Distress

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Focusing on economic distress episodes in an industry, we estimate the effect of conglomeration on resource allocation. Distressed segments have higher sales growth, higher cash flow, and higher expenditure on research and development than single-segment firms. This is especially true for segments with high past performance, for unrated firms, and in competitive industries. Single-segment firms increase cash holding, and the diversification discount reduces during industry distress. Firms with high past performance acquire their industry counterparts, and firms with low past performance exit the distressed industry. Industries more prone to distress have greater conglomeration. Overall, conglomeration enables segments to avoid financial constraints during industry distress. (*JEL* G)

How does conglomeration affect resource allocation? This fundamental question in corporate finance has attracted significant research interest. While single-segment firms rely on the external financial markets for finance and are subject to market monitoring, conglomerate segments rely on the internal capital market (ICM), which in turn governs and monitors their performance. Understanding the relative investment efficiency of these "decentralized" and "centralized" modes of resource allocation will provide insights into the determinants of firm boundaries (Coase 1937).[1] Despite its importance, answering this question has proved a difficult empirical task. Observed organizational forms are endogenous, and any systematic difference in the performance or valuation of conglomerate segments and single-segment firms may be due to some unobserved heterogeneity (see Campa and Kedia 2002; Maksimovic and Phillips 2002).

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[1] See Stein (2003) and Maksimovic and Phillips (2007) for important summaries of the current research in this area.

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In this article, we tackle this important question by doing an event study around *unexpected* episodes of industry distress. Our experimental setting offers a number of advantages. Both the bright and dark sides of conglomeration are likely to gain prominence during industry distress. Information problems in the external financial markets will increase during industry distress, and in turn, enhance the "more money" advantage of conglomeration (the Financial Constraints Hypothesis of Stein 1997). Periods of distress will also depress segment investment opportunities, increase the diversity among conglomerate segments, and enhance the ICM's incentives to cross-subsidize (the Cross-Subsidization Hypothesis of Scharfstein and Stein 2000 and Rajan, Servaes, and Zingales 2000). By comparing the performance and value of conglomerates and single-segment firms during industry distress, one can test the relevance of the different theories of conglomeration.

Focusing on industry distress also aids in empirical identification. Since the distress episodes we study are *unexpected*, segments are less likely to alter their organizational form in anticipation. We employ segment fixed effects—controlling for *all* time-invariant differences across conglomerate segments and single-segment firms—and perform cross-sectional difference-in-difference (DID) tests of the predictions of the theories. To control for time-varying unobserved factors, we also perform an instrumental variable (IV) regression.

To identify industries in economic distress, we follow Opler and Titman (1994). We classify an industry as distressed if the median sales growth of single-segment firms in the industry is negative and the median stock return is less than −30%. A definition of distress based on stock return ensures that it is unanticipated by the market and firm managers. This procedure results in classifying 4% of the segment-years—spread uniformly over our sample period of 1986–2008—as distressed. Searching news reports, we find that the common causes for industry distress include a fall in demand and an increase in input prices.

We obtain data for our analysis from standard sources. Stock return data are from the Center for Research in Security Prices (CRSP), and financial data on conglomerates and single-segment firms are from the Compustat business segment files. We classify firms as conglomerates if they report positive assets and sales in segments in more than one three-digit Standard Industrial Classification (SIC) code industry. To account for the problems with Compustat segment industry affiliation (Villalonga 2004), we perform a number of robustness tests that we discuss later.

We begin our empirical analysis by comparing the sales growth, cash flow, and research and development (R&D) expenditure of conglomerate segments and single-segment firms in distressed industries. We use R&D as a measure of segment investment because long-term R&D projects are more likely to benefit from lower financial constraints and also suffer more from information problems—an important cause for cross-subsidization.

Conglomerate segments in distress have higher sales growth, cash flow, and R&D expenditure compared with distressed single-segment firms.[2] While an average distressed segment experiences a 12.6% (4.1%) decline in sales growth (cash flow), conglomerate segments in distress experience 7.6% (2.4%) higher sales growth (cash flow) compared with single-segment firms. While distressed single-segment firms reduce R&D expenditure by 14%, distressed conglomerate segments do not reduce R&D expenditure. The better performance of distressed conglomerate segments is consistent with both the Financial Constraints and Cross-Subsidization Hypotheses.

When we differentiate segments and industries based on past performance, we obtain some divergent results. While the higher sales growth and cash flow of conglomerate segments in distress are confined to those with high past performance, the higher R&D expenditure is present in segments with both high and low past performance. When we differentiate industries into growing and declining based on long-term sales growth, we find that distressed conglomerate segments have higher sales growth and R&D expenditure in both growing and declining industries but have higher cash flows only in declining industries. While the higher R&D expenditure of distressed conglomerate segments with low past performance and in declining industries is consistent with inefficient cross-subsidization, our subsequent results show that conglomerate R&D expenditure in distressed segments has a positive incremental effect on future cash flows.

Following existing literature (see Dimitrov and Tice 2006), we identify firms without credit ratings as likely to face greater financial constraints and find that the higher sales growth and cash flow of the distressed conglomerate segments are confined to the subsample of unrated firms. This is consistent with the Financial Constraints Hypothesis (see also Billett and Mauer 2003; Hubbard and Palia 1999; Lins and Servaes 1999). Using the census data to measure industry concentration (see Ali, Klassa, and Yeung 2009), we find that the higher cash flow and R&D expenditure of conglomerate segments in distressed industries is confined to competitive industries. This is consistent with firms in competitive industries facing greater financial constraints during industry downturns.[3]

When we estimate the effect of industry distress on firm investment in working capital, we find that distressed single-segment firms disproportionately reduce their investment in receivables and the level of payables in comparison to conglomerates. This may highlight one possible channel linking firm financial constraints and performance. We also find that distressed single-segment firms

[2] Hereafter, for brevity, we refer to single-segment firms and conglomerate segments in distressed industries as being in distress.

[3] In unreported tests, we differentiate conglomerates based on their propensity to cross-subsize but do not find any consistent evidence for the Cross-Subsidization Hypothesis. We offer further details of the test and results in Section 3.1.

significantly increase the amount of cash balance they retain, indicating greater precautionary savings motive (see Almeida, Campello, and Weisbach 2004).

To ensure that our results are robust to the endogeneity of segment organizational form, we perform an IV estimation using instruments for segment organizational form identified in the prior literature (Campa and Kedia 2002; Maksimovic and Phillips 2008). Our IV results confirm our ordinary least squares (OLS) estimates. We also find our results to be robust to alternate industry classifications (Fama and French 1997; Hoberg and Phillips 2010).

Consistent with the Financial Constraints Hypothesis, the behavior of conglomerate segments during industry distress is value enhancing. The diversification discount goes down by 65% during industry distress. The announcement returns of acquisitions by conglomerates (and single-segment firms) during industry distress are positive and significant, and R&D expenditure by distressed conglomerate segments has a positive incremental effect on future cash flows.

We find industry distress to be an active period for industry consolidation. While single-segment firms, especially those with high past performance, expand in the distressed industry through acquisitions, conglomerates are less likely to engage in such acquisitions. This is the case even in growing industries. On the other hand, while conglomerate segments with low past performance exit the distressed industry through a segment sale, single-segment firms with low past performance exit the distressed industry through bankruptcy, liquidation, or a merger. Overall, our evidence is consistent with segments with better past performance expanding and those with poor performance exiting the distressed industry.

Consistent with conglomeration benefiting segments during industry distress, we find that segments are more likely to conglomerate in industries that have low sales growth in the past five years, have been more prone to distress in the past, and experience low long-run growth in sales and number of segments.

Summarizing, our results highlight that the bright side of conglomeration dominates during industry distress. Segments of conglomerates in distress appear less financially constrained than comparable single-segment firms. The lower financial constraints improve performance and significantly enhance the value of conglomerates in comparison with single-segment firms. Distress episodes also play an important role in promoting industry consolidation. While segments with high past performance acquire their industry counterparts, those with low past performance exit the distressed industry. Anticipating the benefits from conglomeration, segments are more likely to conglomerate in industries that are more prone to distress.

The rest of the article proceeds as follows. Section 1 outlines our hypothesis and derives the main testable predictions. Section 2 describes the data, lays out the empirical methodology, and provides the summary statistics of the key variables we employ. Section 3 provides the main results stemming from the tests of our predictions. Section 4 concludes.

1. Hypotheses

We group the hypotheses that are relevant for our setting into three: the Financial Constraints, Cross-Subsidization, and Flexibility Hypotheses.

The Financial Constraints Hypothesis highlights the frictions, such as information problems, in the external financial markets. Such frictions will worsen during industry distress and disproportionately affect single-segment firms that depend on the external financial markets to a greater extent. Conglomerate segments, on the other hand, can obtain funds from their ICMs. Not only will the ICM be less subject to information problems, but the conglomerate's diversified nature may enable the ICM to access either internal or external finance. Thus, the Financial Constraints Hypothesis predicts higher sales growth, cash flow, and investment among distressed conglomerate segments in comparison with single-segment firms. Since financial constraints are less likely to discriminate among firms based on past performance, and to the extent that conglomerate ICMs do discriminate, we expect the differences to be present in segments with high past performance and also expect an increase in the valuation of distressed conglomerates in comparison with single-segment firms. These effects are likely to be more pronounced in the subsample of firms that are ex ante more likely to face external financial constraints. The Financial Constraints Hypothesis also predicts that constrained single-segment firms will exit the distressed industry at a greater frequency.

The Cross-Subsidization Hypothesis, as formulated by Scharfstein and Stein (2000) and Rajan, Servaes, and Zingales (2000), argues that conglomerate ICMs inefficiently transfer resources from the productive segments to the less productive segments. Such transfers occur either to reduce inefficient rent seeking by division managers (Scharfstein and Stein 2000), or to ensure sufficient investment by division managers in efficient joint technologies (Rajan, Servaes, and Zingales 2000). Segments in distressed industries are likely to have lower productivity in comparison with those in non-distressed industries. In light of this, the Cross-Subsidization Hypothesis predicts a transfer of resources by conglomerates *into* the distressed segments. Such transfers are likely to boost the sales growth, cash flow, and investment of the distressed segments above that of single-segment firms. Since cross-subsidization by definition is inefficient, this hypothesis predicts the better performance to be present among segments with both high and low past performance as well as a fall in the valuation of conglomerates compared with single-segment firms. All these effects are likely to be greater among conglomerates more prone to cross-subsidize. The Cross-Subsidization Hypothesis also predicts that single-segment firms will exit distressed industries at a greater frequency.

Finally, the Flexibility Hypothesis highlights the ability of conglomerates to redistribute resources internally into the most productive segments. If industry distress reduces the investment opportunities of a segment, then the conglomerate's ICM may engage in "winner picking" and redirect resources toward

the more productive non-distressed segments (Guedj and Scharfstein 2004; Mathews and Robinson 2008; Matsusaka and Nanda 2002; Stein 1997). Single-segment firms, on the other hand, lack such alternate investment opportunities and may hence continue investing in the distressed industry. Hence, the Flexibility Hypothesis predicts that distressed segments of conglomerates will have lower sales growth, cash flow, and investment than comparable single-segment firms. Since the redirection of resources by conglomerates is likely ex post efficient, the Flexibility Hypothesis predicts a higher value for conglomerates in comparison with single-segment firms during industry distress. Unlike the other two hypotheses, the Flexibility Hypothesis predicts that conglomerate segments will exit distressed industries at a greater frequency.

2. Data, Empirical Specification, and Summary Statistics

2.1 Data

We obtain data from three standard sources. Stock returns and firm financials are from the CRSP-Compustat merged database, financial data on conglomerate segments are from the Compustat business segment files, and data on mergers and acquisitions are from Securities Data Company (SDC) Platinum. Our sample period extends from 1986 to 2008, and we include all segments with non-missing positive values for sales and assets in our sample. We exclude financial firms (SIC codes 6000–6999), regulated firms (SIC codes 4900–4941), and industries with less than four segments. We identify firms as conglomerates during a year if the Compustat business segment files report positive assets and sales in more than one three-digit SIC code industry during the year. For robustness, we repeat all our tests with alternate industry and conglomerate definitions and describe them in greater detail later.

We identify distressed industries using the methodology outlined by Opler and Titman (1994). Specifically, for every year, we calculate the stock return and sales growth for all single-segment firms during the two-year period starting from the beginning of the year. We classify a three-digit SIC code industry as distressed during a year if the median two-year sales growth of all single-segment firms in that industry is negative and the median two-year stock return of all such firms is less than −30%. A definition of distress based on stock return ensures that it is at least partly unanticipated by the market and firm insiders. This makes it less likely that firms will have adjusted their organization and behavior in anticipation. We classify about 4% of the segments in our sample as distressed (2,372 out of 56,547). This is slightly higher than the 3% by Opler and Titman (1994), mainly because of the larger fraction of distressed industries during the second half of our sample period. While the number of segments in distress increases during recessions as identified using the National Bureau of Economic Research classification, there are also a number of idiosyncratic episodes of industry distress in our sample.

2.2 Empirical specification and key variables

We compare the performance of segments of conglomerates with that of single-segment firms during industry distress using variants of the following model:

$$y_{i,j,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t} + \beta_2 \times \text{Distress}_{j,t} + \beta_3 \times \text{Conglomerate}_{i,t} \times \text{Distress}_{j,t} + \gamma \times \text{Controls} + \mu_t + \mu_{i,j}, \quad (1)$$

where subscript i refers to the firm, subscript j refers to the industry, subscript t refers to time in years, μ_t refers to time fixed effects, and $\mu_{i,j}$ refers to segment fixed effects. The dependent variable y is a measure of segment performance or investment, and in the first set of tests we model *Segment sales growth*, *Segment cash flows*, and *Segment R&D*. All the variables we use are defined in Appendix A. We use *Segment R&D* as a measure of investment by conglomerates and single-segment firms. As mentioned, we do this because long-term R&D projects are more likely to benefit from the continuity of funding afforded by the conglomerate ICM during industry distress. They are also more likely to suffer from information problems—between their sponsors and the head office—one of the main causes for cross-subsidization identified by existing theories.[4] *Conglomerate* is a dummy variable that takes a value of one for segments of conglomerates. *Distress* is a dummy variable that takes a value of one if the industry is in distress during the year. In the above specification, β_3 is a measure of the difference in performance between conglomerate segments and single-segment firms in distress. X refers to two sets of control variables. The first set includes lagged values of *Segment sales growth*, *Segment cash flows*, *Industry Tobin's Q*, and *Segment investment*. The specific variables that we include from this set vary with the dependent variable being modeled. The second set of control variables—which we include in all specifications—includes *Five year industry sales growth*, *Industry sales growth*$_{t-1}$, *GDP growth*, *GDP growth*$_{t-1}$, *Recession months*, *Recession months*$_{t-1}$, and *S&P index*. The standard errors in all the specifications are clustered at the level of three-digit SIC code industry and are robust to heteroscedasticity.

The research design in our article is similar to that of Lamont (1997), Campello (2002), and Khanna and Tice (2000). Unlike Lamont (1997), we compare the performance of segments of conglomerates and single-segment firms in the distressed industry. The main difference between Campello's (2002), Khanna and Tice's (2000), and our article is our ability to study distress in multiple industries. This enables us to understand how industry characteristics such as the level of competition and long-term trends interact with segment organizational form to affect the segment's response to industry distress. We also estimate how long- and short-run industry trends affect segment organizational form.

[4] Seru (2010) argues that the information problems lead to less innovative R&D projects among conglomerates.

The identifying assumption in our analysis is that, conditional on the control variables employed, segment organizational form, i.e., *Conglomerate*, is exogenous. This assumption will allow us to interpret the coefficient on *Conglomerate* × *Distress* as a measure of the causal effect of organizational form on segment performance during industry distress. Our assumption will be violated by either an omitted factor that affects both segment organizational form and performance or reverse causality. We now discuss our remedial measures.

The segment fixed effects we employ will control for *all* observed and unobserved time-invariant factors. We do two sets of tests to control for time-varying unobserved factors. First, we perform cross-sectional tests, to see if, as predicted by our hypothesis, the effects we document are concentrated in specific subsamples. Any alternate explanation based on omitted factors should explain not only the baseline results but also why they are concentrated in specific subsamples. Second, we perform an IV estimation where we instrument for segment organizational form. We describe this in greater detail in Section 3.2.

Reverse causality, wherein segments with specific characteristics conglomerate in anticipation of industry distress, can also violate our identifying assumption. To the extent the distress episodes we identify are unexpected, it will diminish the problem of reverse causality. Notwithstanding this, we believe that reverse causality is likely to attenuate our estimates. Existing theories suggest that weaker segments are likely to conglomerate in anticipation of difficult times (e.g., Maksimovic and Phillips 2002). Thus, the segments that remain focused during industry distress should be the relatively stronger ones, thereby improving the performance of distressed single-segment firms compared with conglomerate segments. Our results actually show better performance among distressed conglomerate segments. The IV tests we perform will control for reverse causality as well.[5]

Similar to Maksimovic and Phillips (2002), in some of our tests we differentiate between segments (and single-segment firms) based on past performance. We classify segments as having high past performance if their abnormal cash flows over the previous two years are above the sample median. We measure abnormal cash flow as the difference between *Segment cash flows* and the median cash flow of all segments in the same three-digit SIC industry during the year. We then estimate Equation (1) after including interaction terms among *High performance*, a dummy variable that identifies segments with high past performance, and *Conglomerate*, *Distress*, and *Conglomerate* × *Distress*.

We also estimate the effect of industry distress on firm-level variables including measures of working capital such as *Receivable/Assets*, *Inventory/*

[5] Consistent with reverse causality attenuating our estimates, we find some of our IV estimates to be significantly larger than the OLS estimates.

Assets, *Payable/Assets*, and *Cash/Assets*. To compare these variables across conglomerates and single-segment firms, we use a model similar to Equation (1) with a few important changes. The sample includes one observation per firm-year, and we replace *Distress* with *Firm distress*, a dummy variable that takes a value of one if *any* of the segments of the conglomerate are in distress. For single-segment firms, *Firm distress* is the same as *Distress*. We also include firm fixed effects, and the standard errors are clustered at the industry level and are robust for heteroscedasticity.

We also test how the diversification discount, *Q-Difference*, varies during industry distress. *Q-Difference* is the difference between the conglomerate's Tobin's Q and an asset-weighted average industry-Q. We use the fraction of book value of assets of the conglomerate's segments as the weights for measuring average industry-Q. We offer further discussion of the specification we use to model *Q-Difference* in Section 3.3. Finally, we use a model similar to Equation (1) to compare the level of acquisition activity of distressed conglomerates and single-segment firms, the propensity of firms to exit distressed industries, and the dynamics of segment organizational form. We describe the dependent variables we model in these regressions in greater detail in Section 3.4, along with a discussion of the results.

2.3 Summary statistics

Table 1 provides the summary statistics for the key variables we use in our analysis. We have a total of 56,547 segment-year observations with non-missing values for *Segment assets*. These include 22,147 conglomerate segment-year observations and 34,400 single segment-year observations. Comparing Panel A and Panel B, we find that segments of conglomerates and single-segment firms are similar in terms of average book value of total assets ($1221.5 million and $979 million). While conglomerate segments have a lower average sales growth (.107 compared with .194), they have a higher average *Segment cash flows* (.16 in comparison with .086). Conglomerate segments have significantly lower R&D expenditure but comparable levels of capital expenditure. Single-segment firms are in industries with higher average Tobin's Q. About 4.4% (4.1%) of conglomerate segment- (single-segment firm-) years are distressed, and a slightly larger fraction of conglomerate segments have high past performance.

In terms of firm-level variables, as expected, conglomerates are significantly larger than single-segment firms, as seen from the average book value of total assets. Conglomerates also have lower Tobin's Q but have higher average leverage ratios. The other important difference across the two panels is that single-segment firms have higher *Cash/Assets* than conglomerates. We also find that a greater proportion of conglomerates than single-segment firms have short-term credit ratings from Standard & Poor's (S&P). The average conglomerate discount in our sample is 21.2%, comparable to earlier studies.

Table 1
Summary statistics

Panel A: Summary statistics for conglomerates

Segment level variables				
Variable	N	Mean	Median	Std. dev.
Segment assets ($ million)	22147	1221.548	139.046	5475.25
Segment sales growth	22147	0.107	0.051	0.425
Segment cashflows	22147	0.16	0.151	0.208
Segment R&D	22147	0.004	0	0.028
Segment investment	22147	0.014	0	0.072
Industry Tobin's Q	21770	1.818	1.634	0.718
Distress	22147	0.044	0	0.204
High performance	18415	0.56	1	0.496
Firm level variables				
	N	Mean	Median	Std.dev.
Asset ($ million)	11225	3440.582	408.214	13641.8
Tobin's Q	11225	1.631	1.336	1.015
Leverage	10796	0.459	0.454	0.196
Inventory/Assets	11143	0.167	0.138	0.147
Receivables/Assets	11167	0.208	0.181	0.139
Payables/Assets	11225	0.101	0.081	0.079
Cash/Assets	11223	0.104	0.052	0.133
Rated	11225	0.381	0	0.486
Q-Difference	11225	0.212	0.278	0.983

Panel B: Summary statistics for single segment firms

Segment level variables				
Variable	N	Mean	Median	Std. dev.
Segment assets ($ million)	34400	979.344	107.094	5004.939
Segment sales growth	34400	0.194	0.098	0.484
Segment cashflows	34400	0.086	0.118	0.227
Segment R&D	34400	0.06	0	0.099
Segment investment	34400	0.02	0	0.079
Industry Tobin's Q	34378	2.126	1.908	0.841
Distress	34400	0.041	0	0.198
High performance	28847	0.467	0	0.499
Firm level variables				
	N	Mean	Median	Std. dev.
Assets ($ million)	34400	979.344	107.094	5004.939
Tobin's Q	34400	2.067	1.506	1.563
Leverage	33765	0.414	0.393	0.228
Inventory/Assets	34063	0.155	0.103	0.171
Receivables/Assets	34194	0.2	0.169	0.161
Payables/Assets	34400	0.101	0.073	0.091
Cash/Assets	34398	0.192	0.102	0.217
Rated	34400	0.164	0	0.37

This table reports the summary statistics of the key variables used in our analysis. Panel A summarizes the data for segments of conglomerates, while Panel B summarizes the data for single-segment firms. *Distress* is a dummy variable that takes a value of one for segments in distressed industries. We identify industries in distress using the methodology in Opler and Titman (1994). *High performance* is a dummy variable that identifies segments that have above-median abnormal cash flows during the past two years. We measure abnormal segment cash flows as the difference between segment cash flows and the median cash flows of all firms in the same three-digit SIC industry during the year; *Q-Difference* is the difference between the conglomerate's Tobin's Q and an asset-weighted average industry-Q of all the segments of the conglomerate; *High diversity* is a dummy variable that identifies conglomerates that have a diversity index (computed using the procedure outlined in Rajan, Servaes, and Zingales 2000) above the sample median. All other variables are defined in Appendix A. The data covers the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files.

We next perform a univariate comparison of conglomerate segments and single-segment firms in both distressed and non-distressed industries. Prior research (see Campa and Kedia 2002; Chevalier 2004; Graham, Lemmon, and Wolf 2002) and our analysis in Table 1 highlight a number of important differences between conglomerate segments and single-segment firms along observable dimensions. Taking this into account, we perform the univariate comparison on a set of single-segment firms and conglomerate segments that are comparable along observable characteristics. Specifically, we estimate the likelihood of any segment to belong to a conglomerate using a panel regression model. We use prior literature (see Campa and Kedia 2002; Maksimovic and Phillips 2008) to identify the observable characteristics that are related to segment organizational form. The dependent variable in the model is *Conglomerate*, and we include the following independent variables: *Major exchange*, *Foreign*, *S&P index*, *GDP growth*, *GDP growth*$_{t-1}$, *Recession*, *Recession*$_{t-1}$, *Distress*, *Industry Tobin's* Q_{t-1}, *Capital intensity*, *Five-year industry sales growth*, *Industry sales growth*$_{t-1}$, *Fraction conglomerate*$_{t-1}$, *Fraction conglomerate sales*$_{t-1}$, *Number of mergers*, and *Value of mergers*. All the variables are defined in Appendix A. We take care to include *all* the variables that prior research has identified to be related to segment organizational form. We also include time and industry fixed effects at the three-digit SIC code level.[6]

Table 2 reports the results of our panel OLS regression. In column (1) of Panel A, we provide the results of the segment-level regressions.[7] Consistent with prior literature, we find that conglomerates are more likely to be listed in a major exchange (positive coefficient on *Major exchange*) and belong to the S&P index (positive coefficient on *S&P index*). Segments are more likely to conglomerate during good economic times (positive coefficient on *GDP growth* and *GDP growth*$_{t-1}$, and negative coefficient on *Recession months*). We also find significant persistence in the extent of conglomeration in an industry. After we control for the lagged level of conglomeration in an industry using *Fraction conglomerates*$_{t-1}$, the coefficient on all the other industry-level variables is insignificant. As we see in Panel C of Table 8, when we exclude *Fraction conglomerates*$_{t-1}$ and *Fraction conglomerate sale*$_{t-1}$, a number of industry-level variables are significant predictors of segment organizational form.

Our results from the firm-level regressions are slightly different from the segment-level regressions. A number of industry-level variables are now significant predictors of firm organizational form. Here again, the persistence in the extent of conglomeration within industries and the inclusion of *Fraction conglomerate*$_{t-1}$ distorts the interpretation of the coefficients on the other

[6] All the variables included here are unlikely to satisfy the exclusion restriction with respect to segment performance and thus may not be good instruments for segment organizational form in our IV regressions. We discuss this in greater detail in Section 3.2, where we describe our IV estimation.

[7] Because of the inclusion of the industry fixed effects, we employ an OLS specification instead of a non-linear probit specification to avoid the incidental parameters problem (see Neyman and Scott 1948).

Table 2
Univariate analysis

Panel A: Segment and industry characteristics and likelihood of conglomeration

	Pr(Conglomerate)	
	Segment level	Firm level
	(1)	(2)
Firm level variables		
Major exchange	.064	.036
	(.016)***	(.011)***
Foreign	.021	−.032
	(.025)	(.017)*
S&P index	.286	.195
	(.019)***	(.019)***
Economic conditions		
GDP growth	.009	.008
	(.004)**	(.003)*
GDP growth$_{t-1}$	.007	.007
	(.003)**	(.002)***
Recession months	−.006	−.001
	(.003)**	(.003)
Recession months$_{t-1}$	−.001	−.001
	(.003)	(.004)
Number of mergers ($\times 10^3$)	−.02	−.02
	(.02)	(.02)
Value of mergers ($\times 10^8$)	−2.23	−1.59
	(2.03)	(1.53)
Industry conditions		
Distress	−.016	.157
	(.010)	(.011)***
Industry Tobin's Q$_{t-1}$	−.00005	.004
	(.005)	(.006)
Capital intensity	−.137	−.335
	(.103)	(.075)***
Five year industry sales growth	−.007	.114
	(.027)	(.031)***
Industry sales growth$_{t-1}$	.0005	.017
	(.005)	(.006)***
Fraction conglomerates$_{t-1}$	.623	1.038
	(.040)***	(.05)***
Fraction conglomerate sale$_{t-1}$	.029	−.057
	(.023)	(.025)**
Obs.	46689	43466
R^2	.227	.28

This table compares the mean values of the key variables for segments of conglomerates and single-segment firms that are matched on the propensity score. In Panel A, we present the results of the model we use to estimate the propensity score. Specifically, we estimate the model:

$$Conglomerate_{i,j,t} = \alpha + \beta_1 \times X_{i,j,t} + \text{Time FE} + \text{Industry FE},$$

where X includes variables that prior research has identified to be associated with segment organizational form. All variables are defined in Appendix A. Based on the coefficient estimates from the first stage, we predict the likelihood of any segment to belong to a conglomerate. We also repeat this procedure at the firm level by suitably modifying the panel model by replacing segment-level variables with equivalent firm-level variables. The results of the firm-level regression are presented in column (2). The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files.

(continued)

Table 2
Continued

Panel B: Univariate comparison of conglomerates and propensity score matched single segment firms

Segment level variables

Variable	Non distress years				Distress years			
	N	Conglomerate segments	Single segment firms	Difference	N	Conglomerate segments	Single segment firms	Difference
Pr(Conglomerate)	16949	0.484	0.484	0	632	0.438	0.438	0
Segment assets	16949	1207.698	2312.273	−1104.58***	632	738.263	1261.767	−523.504***
Segment sales growth	16949	0.097	0.162	−0.065***	632	0.031	0.021	0.01
Segment cash flow	16949	0.169	0.145	0.024***	632	0.118	0.094	0.024**
Segment R&D	16949	0.005	0.034	−0.029***	632	0.002	0.043	−0.041***
Segment investment	16949	0.014	0.02	−0.006***	632	0.011	0.006	0.005**
Industry Tobin's Q	16949	1.824	1.867	−0.043***	632	1.593	1.654	−0.061*
High performance	16949	0.565	0.52	0.045***	632	0.546	0.544	0.002

Firm level variables

Variable	Non distress years				Distress years			
	N	Conglomerate segments	Single segment firms	Difference	N	Conglomerate segments	Single segment firms	Difference
Pr(Conglomerate)	8507	0.402	0.402	0	839	0.55	0.55	0
Assets	8507	2873.892	1708.295	1165.597***	839	2993.017	1483.657	1509.36***
Tobin's Q	8507	1.652	1.858	−0.206***	839	1.492	1.508	−0.016
Leverage	8507	0.455	0.433	0.022***	839	0.456	0.459	−0.003
Inventory/Assets	8507	0.17	0.177***	−0.007	839	0.168	0.162	0.006
Receivables/Assets	8507	0.208	0.214	−0.006***	839	0.198	0.176	0.022***
Payables/Assets	8507	0.101	0.108	−0.007***	839	0.098	0.094	0.004
Cash/Assets	8507	0.104	0.137	−0.033***	839	0.105	0.138	−0.033***
Rated	8507	0.368	0.266	0.102***	839	0.344	0.274	0.07***
Q-Difference	8507	0.224			839	0.187		

This panel compares the mean values of the key variables for segments of conglomerates and single-segment firms that are matched on the propensity score. We estimate the propensity score based on the coefficient estimates from the first-stage regression given in Panel A. For each conglomerate segment in our sample, we randomly identify a matched single-segment firm that has a propensity score within 1% point. We drop the conglomerate segments for which we are not able to obtain a matched single-segment firm as well as the single-segment firms that we do not match with a conglomerate segment. We repeat this procedure for distress and nondistress periods separately. We also repeat this procedure at the firm level using the coefficients estimated in column (2) of Panel A. *Pr(Conglomerate)* is the propensity score. All other variables are defined in Appendix A. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files.

(continued)

industry-level variables.[8] As mentioned before, our results are quite different when we exclude *Fraction conglomerate*$_{t-1}$ and *Fraction conglomerate sale*$_{t-1}$ (see Panel C of Table 8). Hence, we defer further discussion of the determinants of segment organizational form till then.

We use the coefficient estimates from column (1) to predict the likelihood of any segment to belong to a conglomerate—the propensity score. For each conglomerate segment in our sample, we then randomly identify a matched single-segment firm that has a propensity score within 1% of that of the conglomerate segment. We drop both the conglomerate segments for which we are not able to obtain a matched single-segment firm as well as the unmatched single-segment firms. We repeat this procedure for non-distress and distress periods.

In Panel B, we provide the mean values for the key variables for conglomerate segments and comparable single-segment firms. *Pr(Conglomerate)* is the propensity score, and we see that the samples of conglomerate segments and single-segment firms are comparable in terms of the average propensity score. Conglomerate segments are smaller than single-segment firms. They have lower sales growth during non-distress years but have comparable sales growth during distress years. This is consistent with single-segment firms experiencing a greater decline in sales growth during industry distress, as predicted by both the Cross-Subsidization and the Financial Constraints Hypotheses. Conglomerate segments have higher cash flow and lower R&D expenditure during both non-distress and distress years. While conglomerate segments have lower levels of investment during non-distress years, they actually have higher levels of investment during distress years. Conglomerate segments are from industries with lower Tobin's Q, and we are more likely to classify a conglomerate segment as having high past performance, especially during non-distress years.

Using the coefficient estimates from column (2) of Panel A, we repeat the procedure of identifying matched single-segment firms for the conglomerates in our sample. In Panel B, we provide the mean values for the key variables for conglomerates and comparable single-segment firms. Here again, we find that the samples of conglomerates and single-segment firms are similar in terms of the average propensity score. Conglomerates are significantly larger than single-segment firms but have lower Tobin's Q, especially during non-distress years. Conglomerates have higher leverage ratios only during non-distress years. While conglomerates have lower *Receivables/Assets* during non-distress years, they have higher levels during distress years. Conglomerates have lower levels of *Payables/Assets* only during non-distress years.

[8] In the presence of *Fraction conglomerate*$_{t-1}$ and industry fixed effects, the coefficients on the industry-level variables measure the correlation between annual elasticity of the extent of conglomeration within an industry and changes in industry conditions. Such changes are a very small part of the variation in segment organizational form. The industry and time fixed effects along with *Fraction conglomerate*$_{t-1}$ and *Fraction conglomerate sale*$_{t-1}$ account for 90% of the R^2 of the regression.

Conglomerates have significantly lower *Cash/Assets* during both non-distress and distress years. A larger fraction of conglomerates have a short-term credit rating, and the mean value of *Q-Difference* is lower during distress years compared with non-distress years.

3. Empirical Results

3.1 Segment performance and industry distress

In the first set of tests, we compare *Segment sales growth*, *Segment cash flows*, and *Segment R&D* of single-segment firms and segments of conglomerates during industry distress. We do this by estimating Equation (1) and report the results in Table 3. In the first two columns, the dependent variable is *Segment sales growth*. The negative coefficient on *Conglomerate* in column (1) indicates that, on average, conglomerate segments have lower sales growth than single-segment firms. The negative coefficient on *Distress* indicates that, on average, firms experience a fall in sales growth during industry distress. On the other hand, the positive coefficient on *Conglomerate* × *Distress* shows that segments of conglomerates in distressed industries have higher sales growth compared with single-segment firms. The sum of the coefficients on *Distress* and *Conglomerate* × *Distress* is −.05 and is statistically significant. Thus, segments of conglomerates also experience a fall in sales growth during industry distress. The coefficients on the control variables indicate that segments in industries with higher past sales growth and during good economic times (positive coefficient on $GDP\ growth_{t-1}$ and negative coefficient on *Recession months* and $Recession\ months_{t-1}$) have higher sales growth. Segments that generated lower cash flows in the past, that did more capital expenditure in the past, and that are in industries with higher Tobin's Q experience higher sales growth.

In column (2), we differentiate segments based on past performance. To better contrast the response of segments with high and low past performance to industry distress, we include both interaction terms *Conglomerate* × *Distress* × *High performance* and *Conglomerate* × *Distress* × *Low performance*, where *Low performance* = 1− *High performance*. The positive and significant coefficient on *Conglomerates* × *Distress* × *High performance* indicates that the higher *Segment sales growth* of conglomerate segments during industry distress is confined to the segments with high past performance. If the higher sales growth of conglomerate segments in distress is due to the support provided by the conglomerate ICM, then this result is consistent with the ICM managers differentiating segments based on past performance.

In columns (3) and (4), we compare *Segment cash flows* across conglomerate segments and single-segment firms. The results in column (3) show that, while all segments experience a fall in cash flow during industry distress (negative coefficient on *Distress*), segments of conglomerates in distressed industries have higher cash flow than single-segment firms (positive coefficient on

Table 3
Performance of conglomerate segments and single-segment firms in distressed industries

Panel A: Segment performance and industry distress

	Segment sales growth		Segment cash flow		Segment R& D	
	(1)	(2)	(3)	(4)	(5)	(6)
Conglomerate	−.132	−.135	.009	.008	−.023	−.024
	(.011)***	(.014)***	(.006)	(.007)	(.004)***	(.005)***
Distress	−.126	−.096	−.041	−.021	−.008	−.007
	(.017)***	(.022)***	(.006)***	(.007)***	(.002)***	(.002)***
Conglomerate × Distress	.076		.024		.008	
	(.022)***		(.007)***		(.002)***	
Conglomerate × Distress × High performance		.098		.021		.008
		(.022)***		(.010)**		(.003)***
Conglomerate × Distress × Low performance		.050		.009		.005
		(.040)		(.011)		(.002)**
Conglomerate × High performance		−.003		−.006		.004
		(.011)		(.004)		(.001)***
Distress × High performance		−.052		−.030		−.0004
		(.023)**		(.007)***		(.002)
High performance		.004		.046		−.002
		(.008)		(.005)***		(.001)*
Five year industry sales growth	−.060	−.077	−.003	−.006	.00009	−.001
	(.030)**	(.033)**	(.013)	(.014)	(.003)	(.003)
Industry sales growth$_{t-1}$	.0009	−.002	.001	.001	.0005	.0006
	(.006)	(.006)	(.002)	(.002)	(.0003)	(.0003)*
GDP growth	.001	.002	−.0006	.0003	.0002	.0003
	(.002)	(.003)	(.0009)	(.001)	(.0002)	(.0003)
GDP growth$_{t-1}$	.007	.007	−.0001	8.28e−06	.0005	.0003
	(.003)**	(.002)***	(.001)	(.001)	(.0002)**	(.0003)
Recession months	−.007	−.005	−.001	−.0003	−.00005	.00004
	(.002)***	(.003)*	(.0009)	(.001)	(.0003)	(.0004)
Recession months$_{t-1}$	−.023	−.023	−.002	−.002	−.00006	.00004
	(.003)***	(.003)***	(.0006)***	(.0006)***	(.0002)	(.0002)
S& P index	−.031	−.015	−.013	−.010	−.005	−.005
	(.019)	(.019)	(.009)	(.010)	(.003)*	(.003)*
Segment cashflow$_{t-1}$	−.332	−.324			−.012	−.009
	(.063)***	(.073)***			(.007)*	(.007)
Segment investment$_{t-1}$	.426	.346	−.0003	−.040		
	(.058)***	(.059)***	(.015)	(.016)**		
Segment sales growth$_{t-1}$			.013	.013	.0004	.0003
			(.003)***	(.004)***	(.0006)	(.0006)
Industry Tobin's Q$_{t-1}$	.033	.030	.009	.009	.0003	.00007
	(.008)***	(.009)***	(.005)*	(.004)**	(.001)	(.001)
Obs.	56547	47262	56547	47262	56547	47262
R^2	.347	.324	.703	.701	.849	.851

This table reports the results of a panel data regression of segment performance on segment and firm characteristics. Specifically, we estimate the following panel regression model:

$$y_{i,j,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t} + \beta_2 \times \text{Distress}_{j,t} + \beta_3 \times \text{Conglomerate}_{i,t} \times \text{Distress}_{j,t} + \gamma \times \text{Controls} + \text{Time FE} + \text{Segment FE},$$

where the dependent variable y is *Segment sales growth* in columns (1) and (2), *Segment cash flows* in columns (3) and (4), and *Segment R&D* in columns (5) and (6). *Distress* is a dummy variable that takes a value of one for segments in distressed industries. We identify industries in distress using the methodology in Opler and Titman (1994). All other variables are defined in Appendix A. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

(continued)

Table 3
Continued

Panel B: Differentiating between growing and declining industries

	Segment sales growth	Segment cash flow	Segment R&D
	(1)	(2)	(3)
Conglomerate	−.135	.008	−.022
	(.012)***	(.006)	(.004)***
Distress	−.129	−.036	−.009
	(.022)***	(.008)***	(.002)***
Conglomerate × Distress	.074	.014	.010
× Growing industry	(.023)***	(.010)	(.003)***
Conglomerate × Distress	.077	.040	.003
× Declining industry	(.038)**	(.013)***	(.002)*
Declining industry	.011	−.004	.002
	(.009)	(.004)	(.001)**
Conglomerate ×	.006	.001	−.0009
Declining industry	(.010)	(.004)	(.001)
Distress × Declining	.008	−.012	.003
industry	(.027)	(.014)	(.003)
Segment cashflow$_{t-1}$	−.332		−.012
	(.063)***		(.007)*
Segment investment$_{t-1}$	.428	−.0007	
	(.058)***	(.015)	
Segment sales growth$_{t-1}$		.013	.0004
		(.003)***	(.0006)
Industry Tobin's Q$_{t-1}$	.033	.009	.0003
	(.008)***	(.005)**	(.001)
Obs.	56547	56547	56547
R^2	.347	.703	.849

This panel reports the results of an OLS regression of segment performance on segment and firm characteristics. Specifically, we estimate the following panel regression model:

$$y_{i,j,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t} + \beta_2 \times \text{Distress}_{j,t} + \beta_3 \times \text{Conglomerate}_{i,t} \times \text{Distress}_{j,t} \times \text{Declining industry}_{j,t} + \beta_4 \times \text{Conglomerate}_{i,t} \times \text{Distress}_{j,t} \times \text{Growing industry}_{j,t} + \gamma \times \text{Controls} + \text{Time FE} + \text{Segment FE},$$

where the dependent variable y is *Segment sales growth* in columns (1) and (2), *Segment cash flows* in columns (3) and (4), and *Segment R&D* in columns (5) and (6). *Declining industry* (*Growing industry*) is a dummy variable that identifies industries with below- (above-) median five-year sales growth. The control variables whose coefficients are suppressed include, *Five-year industry sales growth*, *Industry sales growth*$_{t-1}$, *GDP growth*, *GDP growth*$_{t-1}$, *Recession months*, *Recession months*$_{t-1}$, and *S&P index*. All the variables are defined in Appendix A. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

Conglomerate × *Distress*). The sum of the coefficients on *Distress* and *Conglomerate* × *Distress* is −.017 and is statistically significant. From column (4), we find that the higher *Segment cash flows* of distressed conglomerate segments compared with single-segment firms is confined to segments with high past performance.

In columns (5) and (6), we compare the R&D expenditures of the segments of conglomerates and single-segment firms. Our results in column (5) indicate that, while firms on average reduce R&D expenditure during industry distress (negative coefficient on *Distress*), segments of conglomerates in distressed industries have a higher R&D expenditure than single-segment firms (positive coefficient on *Conglomerate* × *Distress*). Overall, the sum of the coefficients on *Distress* and *Conglomerate* × *Distress* is insignificant. Comparing the coefficient on *Distress* of .008 to the average level of *Segment R&D* among single-segment firms of .057 (see Table 1), we find that single-segment firms in distress reduce R&D expenditure by 14% (.008/.057). From column (6), we find that the higher R&D expenditure of conglomerate segments is present for segments with both high and low past performance. Thus conglomerates not only ensure segment R&D expenditure but also do not differentiate across segments based on past performance. While insurance should especially be valuable for long-lived R&D projects, the higher R&D expenditure in segments with low past performance is consistent with inefficient cross-subsidization.

Summarizing, our results so far indicate that conglomerate segments have higher sales growth, higher cash flow, and higher R&D expenditure in comparison with single-segment firms during industry distress. The higher sales growth and cash flow of conglomerate segments are confined to those with high past performance, while the higher R&D expenditure is present for segments with both high and low past performance. Our results are consistent with the Cross-Subsidization and Financial Constraints Hypotheses, but are inconsistent with the Flexibility Hypothesis.

In Panel B, we repeat our tests after differentiating between growing and declining industries. We classify industries as growing if the past-five-year sales growth is above the sample median. We then estimate Equation (1) after including interaction terms between *Growing industry*, a dummy variable that identifies growing industries, and *Conglomerate*, *Distress*, and *Conglomerate* × *Distress*. To better contrast the response of segments in growing and declining industries to distress, we also include *Conglomerate* × *Distress* × *Declining industry*, where *Declining industry* = 1 − *Growing industry*. Our results in column (1) indicate that conglomerate segments have higher sales growth in both growing and declining industries. From column (2), we find that distressed segments of conglomerates have higher cash flow only in declining industries. Finally, our results in column (3) show that distressed conglomerate segments have higher R&D expenditure in both growing and declining industries, although the effect is much greater in growing industries. In unreported tests, we find that the coefficients on the triple interaction terms in column (3) are significantly different from each other. This is consistent with conglomerate managers continuing to invest in R&D projects in growing industries even if the industry is in distress.

If the better performance of conglomerate segments during industry distress is due to lower financial constraints, then the difference in performance

between conglomerate segments and single-segment firms should be greater among the subsample of firms that face greater financial constraints. Following the existing literature, we classify firms with credit ratings as less constrained than firms without credit ratings and test this prediction.

The dependent variable in columns (1) and (2) of Panel A of Table 4 is *Segment sales growth*. Our results show that the higher sales growth of conglomerate segments with better past performance is confined to the subsample of unrated firms. Although the coefficient on *Conglomerate* × *Distress* × *High performance* for the unrated sample is twice that for the rated sample, due to noise in our estimation, in unreported tests we find that the coefficient is not significantly different across the two subsamples.

In columns (3) and (4), we repeat our tests with *Segment cash flows* as the dependent variable and again find that the higher cash flow of distressed conglomerate segments with high past performance is confined to the subsample of unrated firms. Finally, the results in columns (5) and (6) show that segments of both rated and unrated conglomerates with high past performance have higher R&D expenditure during industry distress. Overall, our results in this panel indicate that the higher sales growth and cash flow of distressed conglomerate segments with high past performance are confined to the subsample of unrated firms. This offers significant support for the Financial Constraints Hypothesis. Our evidence of conglomerate segments not reducing R&D expenditure during industry distress is complementary to and consistent with the evidence in Maksimovic and Phillips (2008), who show that conglomerates moderate the link between segment-financial dependence and plant acquisitions. Our evidence is also consistent with the findings by Dimitrov and Tice (2006), who show that, during recessions, unrated conglomerates have higher sales growth than focused firms.[9]

Apart from credit ratings, industry structure may also affect the extent of firm financial constraints. Firms in competitive industries are likely to have lower margins and hence lower cash flows. Such firms are more likely to depend on the external financial markets and face greater constraints during industry distress. To see if industry distress disproportionately affects firms in competitive industries, in Panel B we use the industry Herfindahl index as a measure of competition and compare conglomerate segments and single-segment firms in concentrated and competitive industries. Following Ali, Klassa, and Yeung (2009), we use the census data of manufacturing establishments to calculate the Herfindahl index. We obtain concentration measures for the years 1982, 1987, 1992, 1997, and 2002 from the census data and, similar to Ali, Klassa, and Yeung (2009), use the most recent year's concentration

[9] We also repeat our estimates after including two terms *Recession* and *Recession* × *Conglomerate* to our specification, where *Recession* is a dummy variable that takes a value of one for the years 1989, 1990–91, 2001, and 2007–08. We find that our results are robust to the inclusion of these controls. This ensures that our finding is not just driven by difference in performance of unrated conglomerate segments and single-segment firms during recessions. The results of the tests are available in the Online Appendix that accompanies the article.

Table 4
Further tests within subsamples

Panel A: Differentiating between better- and under-performing segments: Rated vs Unrated firms

	Segment sales growth		Segment cash flow		Segment R& D	
	Rated firms	Unrated firms	Rated firms	Unrated firms	Rated firms	Unrated firms
	(1)	(2)	(3)	(4)	(5)	(6)
Conglomerate	−.132	−.140	−.020	.014	−.007	−.031
	(.024)***	(.019)***	(.009)**	(.008)*	(.002)***	(.006)***
Distress	−.073	−.101	−.005	−.025	−.002	−.007
	(.061)	(.024)***	(.016)	(.008)***	(.002)	(.002)***
Conglomerate × High performance	−.013	−.004	.011	−.004	−.003	.005
	(.020)	(.014)	(.007)	(.007)	(.001)**	(.002)***
Distress × High performance	−.063	−.046	−.002	−.034	−.008	.002
	(.079)	(.025)*	(.020)	(.008)***	(.006)	(.003)
Conglomerate × Distress × High performance	.062	.118	−.006	.023	.010	.006
	(.047)	(.030)***	(.016)	(.012)*	(.004)**	(.003)**
Conglomerate × Distress × Low performance	.042	.052	−.005	.016	.002	.004
	(.081)	(.049)	(.021)	(.015)	(.003)	(.003)
High performance	.002	.005	.015	.050	.002	−.002
	(.020)	(.009)	(.006)**	(.005)***	(.0008)**	(.001)*
Segment cashflow$_{t-1}$	−.248	−.361			.009	−.012
	(.053)***	(.086)***			(.006)	(.008)
Segment investment$_{t-1}$	.230	.355	−.084	−.029		
	(.081)***	(.071)***	(.033)**	(.019)		
Segment sales growth$_{t-1}$			−.007	.016	−.001	.00007
			(.004)*	(.004)***	(.001)	(.0007)
Industry Tobin's Q$_{t-1}$	.030	.029	.010	.009	.0005	−.00003
	(.015)*	(.008)***	(.005)*	(.005)*	(.0007)	(.001)
Obs.	12644	34618	12644	34618	12644	34618
R^2	.382	.33	.635	.716	.818	.852

This panel reports the results of an OLS regression of segment performance on segment and firm characteristics. Specifically, we estimate the panel regression

$$y_{i,j,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t} + \beta_2 \times \text{Distress}_{j,t} + \beta_3 \times \text{Conglomerate}_{i,t} \times \text{Distress}_{j,t} + \gamma \times \text{Controls} + \text{Time FE} + \text{Segment FE},$$

where the dependent variable y is *Segment sales growth* in columns (1) and (2), *Segment cash flows* in columns (3) and (4), and *Segment R&D* in columns (5) and (6). All variables are defined in Appendix A. The control variables whose coefficients are suppressed include *Five-year industry sales growth*, *Industry sales growth*$_{t-1}$, *GDP growth*, *GDP growth*$_{t-1}$, *Recession months*, *Recession months*$_{t-1}$, and *S&P index*. All the variables are defined in Appendix A. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

(continued)

Table 4
Continued

Panel B: Segment performance and industry distress: Concentrated vs Competitive manufacturing industries

	Segment sales growth		Segment cash flow		Segment R&D	
	Concentrated	Competitive	Concentrated	Competitive	Concentrated	Competitive
	(1)	(2)	(3)	(4)	(5)	(6)
Conglomerate	−.126	−.185	.021	.007	−.041	−.039
	(.031)***	(.036)***	(.012)*	(.011)	(.009)***	(.009)***
Distress	−.129	−.055	−.035	−.006	−.005	−.004
	(.030)***	(.069)	(.014)**	(.014)	(.002)**	(.003)
Conglomerate × High performance	−.003	.042	−.033	−.020	.005	.007
	(.021)	(.029)	(.010)***	(.011)*	(.004)	(.003)**
Distress × High performance	−.028	−.116	−.045	−.060	.0007	−.004
	(.043)	(.073)	(.011)***	(.014)***	(.006)	(.004)
Conglomerate × Distress × High performance	.099	.107	.023	.026	.013	.008
	(.029)***	(.048)**	(.018)	(.016)*	(.008)	(.003)***
Conglomerate × Distress × Low performance	.049	.046	.006	.0001	.001	.004
	(.054)	(.080)	(.025)	(.021)	(.004)	(.004)
High performance	.021	−.032	.054	.046	.001	−.005
	(.019)	(.023)	(.008)***	(.011)***	(.002)	(.003)**
Segment $cashflow_{t-1}$	−.451	−.344			−.014	−.010
	(.181)**	(.095)***			(.019)	(.009)
Segment $investment_{t-1}$	.218	.116	−.088	−.037		
	(.104)**	(.099)	(.041)**	(.034)		
Segment $sales\ growth_{t-1}$			.019	.014	−.00008	−.001
			(.005)***	(.005)***	(.002)	(.0009)
Industry Tobin's Q_{t-1}	.054	.041	.010	.019	−.002	−.002
	(.014)***	(.015)***	(.009)	(.005)***	(.001)	(.001)**
Obs.	11075	10918	11075	10918	11075	10918
R^2	.344	.348	.76	.743	.868	.843

This panel reports the results of a regression whose specification is similar to the one in Panel A. The sample in columns (1), (3), and (5) is confined to segments in concentrated manufacturing industries, while the sample in columns (2), (4), and (6) is confined to segments in competitive manufacturing industries. We identify an industry as competitive (concentrated) if it has a Herfindahl index value below (above) the 20th percentile. Following Ali, Klassa, and Yeung (2009), we use data from the U.S. Census of all manufacturing establishments to measure industry concentration. We obtain concentration values for the years 1982, 1987, 1992, 1997, and 2002 and use the most recent year's concentration measure for the missing years. The data and the control variables are similar to the ones employed in Panel A.

measure for the missing years. Our sample in this table is confined to manufacturing firms. We divide our sample into firms in industries with below 20th percentile of Herfindahl (*Competitive* industries) and those in industries with above 20th percentile of Herfindahl (*Concentrated* industries) and repeat our estimation in the two subsamples.[10]

Our results in columns (1) and (2) of Panel B show that, while conglomerate segments with high past performance in both concentrated and competitive industries have higher sales growth compared with single-segment firms, the difference is slightly greater in competitive industries compared with concentrated ones (.107 compared with .099). We also find that only distressed conglomerate segments with high past performance in competitive industries have higher cash flow and higher R&D expenditure compared with single-segment firms. Overall, our results show that the difference between conglomerate segments and single-segment firms in distress is greater in competitive industries compared with concentrated ones. This is consistent with single-segment firms in competitive industries facing greater financial constraints.

To test the Cross-Subsidization Hypothesis, we repeat our tests after differentiating conglomerates based on their propensity to cross-subsidize. Following Rajan, Servaes, and Zingales (2000), we use the diversity among the segments of a conglomerate in terms of asset size as a measure of the conglomerate's propensity to cross-subsidize. We do not find any consistent evidence that the subsample of conglomerates more prone to cross-subsidize drives the difference in performance between distressed conglomerate segments and single-segment firms. The results are available in the Online Appendix that accompanies this article.

The better performance of distressed segments of unrated conglomerates in comparison with similar single-segment firms is consistent with the latter set of firms facing greater financial constraints. An important question that arises in this context is why financial constraints affect firm performance. One possible channel is by constraining a firm's ability to invest in non-cash working capital such as inventory and receivables. Constrained single-segment firms may be forced to disproportionately cut down on their working capital investment, which in turn may affect their performance. To test this, in Table 5 we compare the individual working capital items for conglomerates and single-segment firms. For lack of segment-level data, we do this comparison at the firm level, using *Firm distress* instead of *Distress*.[11] As mentioned, *Firm distress* takes a value of one for all single-segment firms in distressed industries and also for all conglomerates that have at least one segment in distress.

[10] We use the 20th percentile to obtain comparable sizes for the concentrated and competitive industries subsamples.

[11] Since conglomerates are diversified, even if the distressed segment of the conglomerate changes its working capital to the same extent as a single-segment firm, our tests are likely to indicate a greater fall in working capital for single-segment firms compared with conglomerates. Our results have to be interpreted with this caveat in mind.

Table 5
Other firm characteristics and industry distress

	Receivable/Assets	Inventory/Assets	Payable/Assets	Cash/Assets
	(1)	(2)	(3)	(4)
Conglomerate	.011	.003	.003	−.014
	(.002)***	(.003)	(.002)*	(.003)***
Firm distress	−.019	−.007	−.006	.011
	(.005)***	(.004)*	(.002)***	(.003)***
Conglomerate × Firm distress	.014	.005	.005	−.007
	(.005)***	(.004)	(.002)**	(.004)*
Sales growth	.074	.043	.037	−.013
	(.013)***	(.009)***	(.006)***	(.004)***
Tobin's Q	.011	.003	.006	.013
	(.001)***	(.001)**	(.0008)***	(.001)***
Leverage	.033	.032	.089	−.232
	(.006)***	(.005)***	(.006)***	(.013)***
Rated	−.012	−.007	−.014	.009
	(.003)***	(.003)**	(.002)***	(.004)**
Obs.	44375	44260	44561	44557
R^2	.789	.862	.767	.823

This table reports the results of an OLS regression of firm investment in working capital on firm and industry characteristics. Specifically, we estimate the panel regression

$$y_{i,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t} + \beta_2 \times \text{Firm distress}_{i,t} + \beta_3 \times \text{Conglomerate}_{i,t} \times \text{Firm distress}_{i,t} + \gamma \times \text{Controls} + \text{Time FE} + \text{Firm FE},$$

where the dependent variable y is *Receivables/Assets* in column (1), *Inventory/Assets* in column (2), *Payable/Assets* in column (3), and *Cash/Assets* in column (4). All variables are defined in Appendix A. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

In column (1) of Table 5, we estimate Equation (1) with *Receivable/Assets* as the dependent variable. The sample includes one observation per firm-year, and we include *Sales growth*, *Tobin's Q*, *Leverage*, and *Rated* as additional control variables. The significant negative coefficient on *Firm distress* indicates that all firms reduce their receivable levels during industry distress. The positive coefficient on *Conglomerate* × *Firm distress* indicates that conglomerates have a higher *Receivable/Assets* during industry distress. The sum of the coefficients on *Firm distress* and *Conglomerate* × *Firm distress* is insignificant. In column (2), we repeat our regression with *Inventory/Assets* as the dependent variable and find that, while all firms reduce inventory levels during industry distress, there is no significant difference between conglomerates and single-segment firms. In column (3), we repeat the estimation with *Payable/Assets* as the dependent variable and find that, while single-segment firms significantly reduce the level of payables, conglomerates actually increase the level of payables during industry distress. This evidence is consistent with single-segment firms having less access to trade credit during industry distress.

In column (4), we repeat our tests with *Cash/Assets* as the dependent variable and find that, compared with conglomerates, distressed single-segment firms significantly increase the amount of cash they retain. This is consistent

with single-segment firms having greater precautionary savings motive during industry distress. This again is consistent with greater financial constraints among such firms (see Almeida, Campello, and Weisbach 2004).

3.2 Controlling for endogeneity of segment organizational form

A legitimate concern with our analysis is that some unobserved time-varying factor such as segment ability may affect both organizational form and performance and thus bias our conclusions. To rule out such unobserved factors, we repeat our baseline regressions using an IV procedure. We refer to prior literature to identify instruments for segment organizational form. The ideal instrument should affect segment organizational form but not have a direct effect on segment performance, i.e., satisfy the exclusion restriction. Employing this criterion, we identify *Capital intensity* (from Maksimovic and Phillips 2008), *Fraction conglomerate*$_{t-1}$, *Fraction conglomerate sales*$_{t-1}$, *Number of mergers*, and *Value of mergers* (from Campa and Kedia 2002) as candidate instruments. We define all variables in Appendix A.

In implementing the IV, as suggested by Wooldridge (2002, p. 236), we instrument for both *Conglomerate* and *Conglomerate* × *Distress* in the first stage.[12] We interact our instruments for *Conglomerate* with *Distress* and use them as instruments for *Conglomerate* × *Distress*. We repeat the analysis from columns (1), (3), and (5) of Panel A of Table 3, using the IV procedure, and present the results in Table 6. We include industry fixed effects instead of segment fixed effects in the IV estimation because the inclusion of the latter greatly reduces the power of the instruments. In columns (1) and (2), we present the results of the first-stage regression for the tests that have *Segment sales growth* as the dependent variable. To ensure consistent estimates, we include both sets of instruments and *all* the exogenous variables from the second stage in both the first-stage regressions.

From column (1), we find that segments are more likely to conglomerate during non-distress periods and in industries with low capital intensity. We also find persistence in the extent of conglomeration in an industry (positive coefficients on *Fraction conglomerate*$_{t-1}$ and *Fraction conglomerate sale*$_{t-1}$). Segments are also less likely to conglomerate in the years when there are more mergers and acquisitions. Our instruments are strong, as seen from the *F*-statistic for the excluded instruments in the first stage. In column (3), we present the results from our second-stage estimation. Consistent with our OLS results, we find that the coefficient on *Conglomerate* × *Distress* is positive and significant. Its magnitude of 0.088 is slightly larger than our OLS estimate of 0.076 (see Panel A of Table 3). We next repeat our tests with *Segment cash flows* as the dependent variable and present the results of the second-stage

[12] To the extent that *Distress* is correlated with *Conglomerate*, the interaction term is likely to be a non-linear function of *Conglomerate*. Hence, we separately instrument for both *Conglomerate* and *Conglomerate* × *Distress* in the first stage.

Table 6
Instrumental variables estimation

	All firms					Unrated firms		
	Conglomerate	Conglomerate Distress	Sales growth	Segment cash low	Segment R& D	Sales growth	Segment cash flow	Segment R& D
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conglomerate			−.032	.060	−.025	−.029	.073	−.029
			(.026)	(.022)***	(.006)***	(.029)	(.024)***	(.007)***
Distress	−.51	−.06	−.140	−.050	−.017	−.151	−.059	−.019
	(.035)***	(.018)***	(.028)***	(.013)***	(.004)***	(.029)***	(.013)***	(.005)***
Conglomerate × Distress			.088	.024	.024	.131	.036	.031
			(.052)*	(.025)	(.007)***	(.068)*	(.034)	(.010)***
	Exogenous instruments							
Capital intensity	−.222	.002						
	(.075)***	(.007)						
Fraction conglomerate$_{t-1}$	.66	−.02						
	(.036)***	(.005)***						
Fraction conglomerate sales$_{t-1}$	.036	−.002						
	(.017)***	(.002)						
Number of mergers ($\times 10^3$)	−.034	−.002						
	(.02)*	(.003)						
Value of mergers ($\times 10^8$)	1.62	.711						
	(1.73)	(.344)**						
Distress × Capital intensity	.692	−.263						
	(.24)***	(.151)*						
Distress × Fraction conglomerate$_{t-1}$	.007	.928						
	(.07)	(.05)***						
Distress × Fraction conglomerate sale$_{t-1}$	.190	.10						
	(.055)***	(.04)**						
Distress × Number of mergers ($\times 10^3$)	.264	.007						
	(.012)***	(.004)*						

(continued)

Table 6
Continued

	All firms					Unrated firms		
	Conglomerate	Conglomerate Distress	Sales growth	Segment cash low	Segment R& D	Sales growth	Segment cash flow	Segment R& D
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Distress × Value of mergers ($\times 10^7$)	−3.75	.242						
	(.311)***	(.137)*						
Segment investment	−.182	−.004	.665	.224	.005	.687	.245	.003
	(.046)***	(.005)	(.065)***	(.041)***	(.006)	(.065)***	(.037)***	(.007)
Segment cash flow	.278	.01	−.155		−.078	−.165		−.081
	(.035)***	(.003)***	(.060)***		(.027)***	(.060)***		(.027)***
Segment sales growth				.003	.012		.007	.013
				(.010)	(.004)***		(.010)	(.003)***
Industry Tobin's Q	.002	.0009	.032	.007	.007	.034	.007	.008
	(.005)	(.001)	(.006)***	(.004)*	(.002)***	(.006)***	(.004)*	(.002)***
F-statistic of excluded instruments	141.25	114.01		(149.71, 111.9)	(142.03, 113.5)	(97.0, 55.3)	(105.5, 55.57)	(95.88, 55.41)
Obs.	55073	55073	55073	55073	55073	40422	40422	40422

This table reports the results of a instrumental variables estimation of segment performance on segment and firm characteristics. Specifically, we estimate the following panel regression model:

$$y_{i,j,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t} + \beta_2 \times \text{Distress}_{j,t} + \beta_3 \times \text{Conglomerate}_{i,t} \times \text{Distress}_{j,t} + \gamma \times \text{Controls} + \text{Time FE} + \text{Industry FE},$$

after instrumenting for *Conglomerate* and *Conglomerate* × *Distress*. We use *Capital intensity*, *Fraction conglomerates*$_{t-1}$, *Fraction conglomerate sale*$_{t-1}$, *Number of mergers*, and *Value of mergers* as instruments for *Conglomerate*. We interact the instruments for *Conglomerate* with *Distress* and use them as instruments for *Conglomerate* × *Distress*. Columns (1) and (2) provide the results of the first-stage regression with *Conglomerate* and *Conglomerate* × *Distress* as the dependent variables. Column (3) provides the results of the second-stage regression with *Segment sales growth* as the dependent variable. Columns (4)–(8) provide the results of the second-stage regression with alternate outcome variables. The outcome variable is *Segment cash flows* in columns (4) and (7), *Segment R&D* in columns (5) and (8), and *Segment sales growth* in column (6). The specification for the first stage corresponding to each of these columns is different because of the exogenous control variables we employ. We suppress the results of the first-stage regression to conserve space. All variables are defined in Appendix A. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

regression in column (4).[13] While the coefficient on *Conglomerate* × *Distress* is positive and is of the same magnitude as our OLS estimate (see Panel A of Table 3), due to the noise in our estimation, it is not significant at conventional levels. In column (5), we present the results of the second stage with *Segment R&D* as the dependent variable and, consistent with our OLS results, we do find that conglomerate segments in distress have higher R&D expenditure. Our IV estimate of .021 is much larger than the OLS estimate of .007 (see Panel A of Table 3). This shows that, if anything, the endogeneity of segment organizational form biases our estimates downward.

In columns (6)–(8), we present the results of the second-stage regression after confining the sample to unrated firms. Our results again show that unrated conglomerate segments in distress have higher sales growth and R&D expenditure. We do not find evidence that such segments have higher cash flow. Thus, our IV results are broadly consistent with our OLS estimates. Note that our instruments are strong in all our specifications, as seen from the *F*-statistic for the two first-stage regressions presented in parentheses. In tests presented in the Online Appendix, we repeat the estimation for the subsample of rated firms and find that there is no significant difference in *Segment sales growth*, *Segment cash flows*, and *Segment R&D* across distressed segments of rated conglomerates and single-segment firms. These results are consistent with the Financial Constraints Hypothesis.[14]

Overall, our results with the IV procedure are consistent with our OLS estimates and ensure that unobserved time-varying factors are not driving our results.

3.3 Is conglomerate behavior during industry distress value enhancing?

We next estimate how the diversification discount—a measure of conglomerate value in comparison with single-segment firms—changes during industry distress. To do this, we plot the average value of the diversification discount around industry distress in Figure 1. Specifically, we plot the coefficient estimates from the following OLS model:

$$\begin{aligned}\text{Q-Difference}_{i,t} = \beta_0 \times \text{Firm distress}_{i,t} + \sum_{s=1}^{3} \beta_s \times \text{Pre-distress(s)}_{i,t} + \beta_4 \\ \times \text{Pre distress(3+)}_{i,t} + \sum_{s=1}^{3} \gamma_s \times \text{Post-distress(s)}_{i,t} + \gamma_4 \\ \times \text{Post distress(3+)}_{i,t} + \epsilon_{i,t}, \qquad (2)\end{aligned}$$

[13] Note that the first-stage model for this regression is slightly different from that presented in columns (1) and (2) because the exogenous control variables we employ in the second stage, which we include in both first stages, are different. We suppress the results of the first-stage estimation to conserve space.

[14] To ensure that our results with firm-level outcome variables in Table 5 are robust to controlling for the endogeneity of firm organizational form, we repeat the tests with an IV procedure. Our choice of instruments and procedure is similar to that in Table 6. Our results again show that, consistent with our OLS estimates, conglomerates with segments in distressed industries have lower cash balance compared with single-segment firms. The results of the tests are available in the Online Appendix.

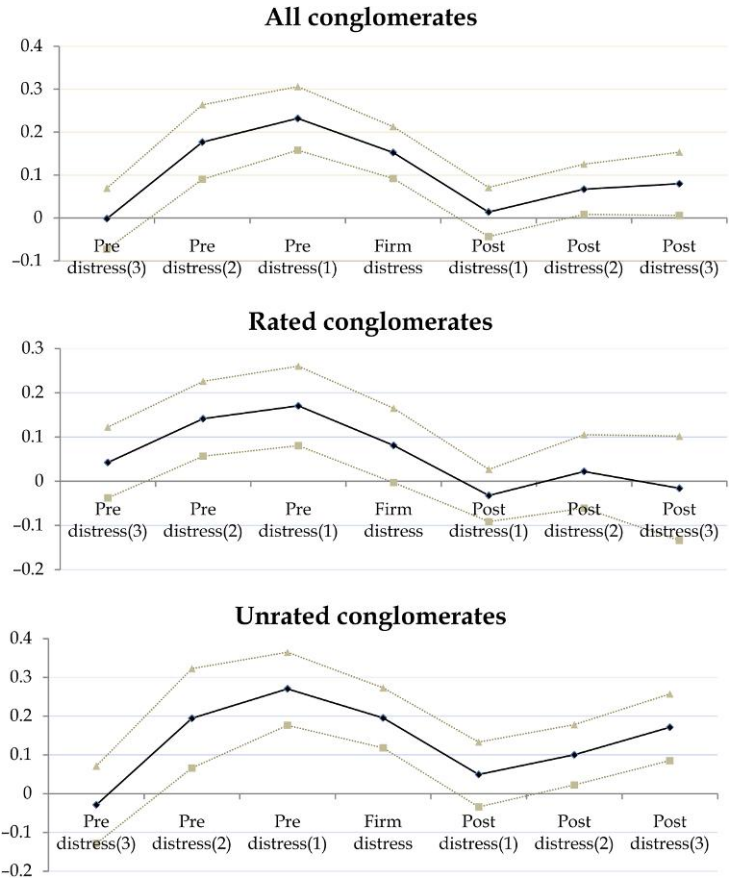

Figure 1
Q-Difference around industry distress
Each figure plots the point estimates from a separate OLS regression with *Q-Difference* as the dependent variable. *Q-Difference* is the difference between the Tobin's Q of the conglomerate and the asset weighted *Industry Tobin's Q* of all the segments. The model includes dummy variables for the seven years around the year of distress and two dummy variables for more than three years before and after the year of industry distress. We present the point estimates for the seven–year period around the year of distress. The sample includes all conglomerates with at least one segment in distress during our sample period, 1986–2008. The stock price data are from CRSP; segment-level financial data are from the Compustat Business Segment Files; and firm-level data are from the Compustat Industrial Annual Files. The standard errors are clustered at the industry level, and gray lines represent the 95th-percentile confidence intervals.

where *Q-Difference* is the difference between the conglomerate's Tobin's Q and the asset-weighted industry Tobin's Q of all the segments of the conglomerate. *Pre-distress(s)* (*Post-distress(s)*) is a dummy variable that takes a value of one if it is *s* years before (after) industry distress. *Pre distress(3+)* (*Post distress(3+)*) is a dummy variable that takes a value of one if it is more than

three years before (after) industry distress. The sample includes all conglomerates with at least one division in distress during our sample period. In Figure 1, we plot the point estimates of $\{\beta_0, \beta_1, \beta_2, \beta_3, \gamma_1, \gamma_2, \gamma_3\}$ and the 95% confidence interval. To ensure that the estimates are meaningful, we do not include a constant term, time, or firm effects in the regression. From the first graph, it is clear that the diversification discount significantly reduces during industry distress. The average discount reduces from 20% in the year before industry distress to 6.9% in the year after industry distress. From the other two graphs, we see that the fall in discount is present for both rated and unrated conglomerates. We also see that the fall in discount persists for three years after the year of industry distress. This clearly indicates that the better performance and greater R&D expenditure of conglomerate segments during industry distress are perceived to be value enhancing by the market.[15]

In Panel A of Table 7, we present the results of our formal regression analysis. The model is similar to Equation (2) except that we now include all conglomerates and augment the model with time and firm fixed effects and a constant term. The results indicate that, in the full sample, the diversification discount significantly reduces both in the year of and in the year following industry distress. From columns (2) and (3), we find that, consistent with Figure 2, the discount goes down for both rated and unrated firms. While the discount goes down significantly in both the year of and in the year following industry distress for rated firms, it goes down significantly in the year following industry distress for unrated firms. In columns (4)–(6), we repeat our tests with Δ *Q-Difference* as the dependent variable where Δ *Q-Difference* is the first difference of *Q-Difference* and obtain similar results. We find that Δ *Q-Difference* is significantly lower in the year of industry distress both in the full sample and in the two subsamples. Overall, our results indicate that conglomerates experience a significant reduction in the diversification discount when one of their segments is in distress. This is consistent with the Financial Constraints Hypothesis. Compared with the average discount of 21.2% in our sample, the coefficients in column (4) indicate that the discount reduces by more than 65% in the year of distress.

While a fall in the *Q-Difference* during industry distress is consistent with the markets perceiving conglomerate behavior as value enhancing relative to that of single-segment firms, a more direct measure of the value implications of conglomerate investments during industry distress will be the stock price announcement effects. Since firms do not usually announce R&D expenditure, we are unable to perform the test. As an alternative, we estimate the announcement returns of acquisitions by conglomerates and single-segment

[15] Note that the fall in discount for rated conglomerates is not inconsistent with the Financial Constraints Hypothesis because the hypothesis only predicts that unrated single-segment firms will face financial constraints in comparison to unrated conglomerates. It does not have anything to say about rated conglomerates.

firms around industry distress. Specifically, we identify all acquisitions announced by single-segment firms and conglomerates in the three-year period around industry distress. We do this by obtaining data on all completed mergers and acquisitions from SDC Platinum where the merged entity is a U.S. firm or had a U.S. parent. We then match the acquisition data to our sample based on the Committee on Uniform Security Identification Procedures (CUSIP) code

Table 7
Value implications of conglomerate behavior during industry distress

Panel A: Q-Difference and industry distress

	Q-Difference			Δ Q-Difference		
	Full sample	subsamples on rating		Full sample	subsamples on rating	
		Rated	Non-Rated		Rated	Non-Rated
	(1)	(2)	(3)	(4)	(5)	(6)
Pre distress (3+)	−.053	−.074	−.009	−.040	−.056	−.032
	(.031)*	(.037)**	(.057)	(.027)	(.028)**	(.047)
Pre distress (3)	−.039	−.034	−.066	−.060	−.052	−.069
	(.032)	(.030)	(.045)	(.029)**	(.032)	(.044)
Pre distress (2)	.068	.036	.080	.076	.071	.084
	(.029)**	(.038)	(.040)**	(.034)**	(.038)*	(.049)*
Pre distress (1)	.070	.041	.086	.014	.011	.024
	(.029)**	(.033)	(.042)**	(.035)	(.036)	(.052)
Firm distress	−.086	−.107	−.069	−.139	−.141	−.126
	(.034)**	(.048)**	(.051)	(.038)***	(.044)***	(.058)**
Post distress (1)	−.091	−.101	−.090	−.035	−.048	−.006
	(.026)***	(.035)***	(.038)**	(.030)	(.031)	(.045)
Post distress (2)	−.029	−.057	−.018	.048	.013	.085
	(.028)	(.036)	(.037)	(.026)*	(.035)	(.038)**
Post distress (3)	−.020	−.089	.040	−.009	−.062	.047
	(.030)	(.047)*	(.043)	(.027)	(.041)	(.043)
Post distress (3+)	−.072	−.051	−.062	−.019	−.031	−.0006
	(.030)**	(.042)	(.053)	(.024)	(.030)	(.037)
Obs.	14071	5326	8745	10736	4262	6474
R^2	.649	.617	.679	.204	.23	.216

This panel reports the results of a panel regression that investigates the effect of industry distress on *Q-Difference*. Specifically, we estimate the panel regression

$$y_{i,t} = \alpha + \beta_0 \times \text{Firm distress}_{i,t} + \sum_{s=1}^{3} \beta_s \times \text{Pre-distress(s)}_{i,t} + \beta_4 \times \text{Pre distress(3+)}_{i,t} + \sum_{s=1}^{3} \gamma_s \times \text{Post-distress(s)}_{i,t} + \gamma_4 \times \text{Post distress(3+)}_{i,t} + \text{Time FE} + \text{Firm FE},$$

where y is *Q-Difference* in columns (1)–(3) and Δ *Q-Difference* in columns (4)–(6). *Q-Difference* is the difference between the conglomerate's Tobin's Q and an asset-weighted average industry-Q of all the segments of the conglomerate. We use the fraction of book value of assets of the conglomerate's segments as the weights for measuring the average industry-Q. Δ *Q-Difference* is the first difference of *Q-Difference*. *Firm distress* is a dummy variable that takes a value of one if the firm's or one of its segments' industry is in distress. All other variables are defined in Appendix A. In columns (1) and (4), we estimate the regression on all conglomerates, while the sample in columns (2) and (5) (columns (3) and (6)) is confined to conglomerates with (without) a credit rating. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

(continued)

Table 7
Continued

Panel B: Merger abnormal announcement returns and industry distress

	N	Mean	Median	S.D.
Acquisitions by distressed firms				
Return(−1,0)	167	1.20%**	0.50%	6.80%
Return(−1,1)	167	1.90%**	0.30%	9.90%
Return(−2,2)	167	2.70%***	0.80%*	11.60%
Return(−5,5)	167	2.70%**	0.50%	14.70%
Acquisitions by distressed conglomerates				
	N	Mean	Median	S.D.
Return(−1,0)	110	0.80%	−0.10%	6.60%
Return(−1,1)	110	1.50%**	0.30%	7.30%
Return(−2,2)	110	2.50%***	0.70%*	9.30%
Return(−5,5)	110	1.90%*	0.20%	11.10%
Acquisitions by distressed single segment firms				
	N	Mean	Median	S.D.
Return(−1,0)	57	2.00%**	1.60%**	7.10%
Return(−1,1)	57	2.70%	1.40%	13.70%
Return(−2,2)	57	3.00%	1.00%	15.20%
Return(−5,5)	57	4.20%	1.50%	20.10%

This panel reports the mean and median abnormal announcement returns for mergers announced by firms in the three-year period around industry distress. We use the market model with parameters estimated during the one-year period that ends 45 days before the event date to estimate abnormal returns. The mergers and acquisition data are from SDC Platinum, stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files

(continued)

of the acquirer or its parent. We are able to identify 167 such acquisitions, of which 110 are by conglomerates and 57 are by single-segment firms.

In Panel B of Table 7, we provide the mean and median abnormal announcement returns for the acquisitions for different event windows. We use the market model with parameters estimated during the one-year period that ends forty-five days before the event date to estimate abnormal returns. We find that the average abnormal announcement return is positive and significant for all event windows. While the median abnormal announcement return is also positive for all event windows, it is significant for only the five-day window around the event date. The mean announcement return is positive for acquisitions by both conglomerates and single-segment firms, but the returns for conglomerate acquisitions are more likely to be statistically different from zero.[16] This offers some evidence that the acquisitions undertaken by conglomerates (and single-segment firms) during industry distress are perceived to be positive net present value (NPV) by the market.

[16] When we divide the acquisitions into those of distressed and non-distressed targets, we find that the announcement returns for acquisitions of distressed targets are significantly larger than the announcement returns for non-distressed targets for the five- and ten-day event windows. The results of these tests are available in the Online Appendix.

Table 7
Continued

Panel C: Segment cashflows and segment R&D during industry distress

	Segment cash flows		
	All firms	Rated firms	Unrated firms
	(1)	(2)	(3)
(Conglomerate × Distress × Segment R&D)$_{t-1}$	.682	−1.163	.899
	(.583)	(1.654)	(.462)*
(Conglomerate × Distress × Segment R&D)$_{t-2}$	.674	.628	.697
	(.235)***	(.691)	(.345)**
Conglomerate$_{t-1}$	.044	.067	.036
	(.007)***	(.016)***	(.007)***
Conglomerate$_{t-2}$	−.0006	−.002	.002
	(.008)	(.011)	(.011)
Distress$_{t-1}$	−.034	−.050	−.032
	(.009)***	(.011)***	(.009)***
Distress$_{t-2}$	−.039	−.044	−.043
	(.011)***	(.012)***	(.013)***
Segment R&D$_{t-1}$	−.099	−.026	−.104
	(.082)	(.097)	(.089)
Segment R&D$_{t-2}$	.038	−.050	.050
	(.023)	(.096)	(.030)*
(Conglomerate × Distress)$_{t-1}$	.019	−.024	.015
	(.017)	(.056)	(.017)
(Conglomerate × Distress)$_{t-2}$	.039	.056	.022
	(.013)***	(.030)*	(.018)
(Conglomerate × Segment R&D)$_{t-1}$	.024	.319	−.077
	(.127)	(.311)	(.087)
(Conglomerate × Segment R&D)$_{t-2}$	.015	.088	−.027
	(.175)	(.241)	(.206)
(Distress × Segment R&D)$_{t-1}$	−.096	−.489	−.081
	(.061)	(.144)***	(.057)
(Distress × Segment R&D)$_{t-2}$	−.033	−.441	−.020
	(.109)	(.249)*	(.104)
Conglomerate	−.010	−.038	.003
	(.005)*	(.009)***	(.007)
Distress	−.038	−.014	−.043
	(.008)***	(.012)	(.008)***
Conglomerate × Distress	.007	−.010	.009
	(.008)	(.012)	(.010)
Industry Tobin's Q	.008	.010	.008
	(.005)*	(.005)*	(.006)
Obs.	43981	11924	32057
R^2	.683	.637	.697

This table reports the results of an OLS regression of segment cash flows on segment R&D expenditure. Specifically, we estimate the panel regression

$$\begin{aligned}\text{Segment cash flows}_{i,j,t} = \alpha &+ \beta_1 \times (\text{Conglomerate}_{i,t} \times \text{Distress}_{j,t} \times \text{Segment R\&D}_{i,j,t})_{t-1} \\ &+ \beta_2 \times (\text{Conglomerate}_{i,t-2} \times \text{Distress}_{j,t} \times \text{Segment R\&D}_{i,j,t})_{t-1} + \gamma \\ &\times \text{Controls} + \text{Time FE} + \text{Segment FE}.\end{aligned}$$

The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

As an additional test of the profitability of conglomerate segment R&D expenditure during industry distress, in Panel C of Table 7 we estimate the effect of segment R&D expenditure on future segment cash flows. Specifically, we

estimate a panel model similar to Equation (1) with *Segment cash flows* as the dependent variable. The key independent variables are multiple-lagged values of *Segment R&D*, *Distress*, *Conglomerate*, and interactions between the three. We include time and segment fixed effects in the specification. The coefficient on $(Conglomerate \times Distress \times Segment\ R\&D)_{t-1}$ will capture the incremental effect of R&D expenditure by distressed conglomerate segments on next year's cash flow. A similar interpretation applies to the twice-lagged triple-interaction term. We control for any mechanical increase in cash flow after industry distress. Our results in column (1) show that, in the full sample, the coefficients on both the triple-interaction terms are positive, while the one on $(Conglomerate \times Distress \times Segment\ R\&D)_{t-2}$ is statistically significant. This indicates that R&D expenditure by conglomerate segments during industry distress has a positive incremental effect on segment cash flow two years out. In columns (2) and (3), we repeat our tests after splitting the sample into rated and unrated firms and find that R&D expenditure by segments of unrated conglomerates has a positive incremental effect on future cash flows. Thus, our results are consistent with conglomerate R&D expenditure during industry distress having a positive effect on future cash flows.

Overall, the reduction in *Q-Difference* during industry distress, the positive abnormal announcement returns for acquisitions by conglomerates during industry distress, as well as the positive incremental effect of *Segment R&D* on future segment cash flows are all consistent with conglomerate behavior during industry distress being positive NPV.

3.4 Segment organization dynamics and industry distress

In this section, we estimate the effect of industry distress on the dynamics of segment organization. We look at three measures of changes in segment organizational form. We begin by estimating the propensity of conglomerates and single-segment firms to expand in a distressed industry through horizontal acquisitions. We then estimate the propensity of conglomerates and single-segment firms to exit a distressed industry, and finally we study the effect of industry conditions on the choice of a segment to conglomerate.

To test if conglomerates and single-segment firms differ in their propensity to expand in a distressed industry through acquisitions, in Panel A of Table 8 we estimate Equation (1) with *Horizontal acquisition* as the dependent variable. *Horizontal acquisition* is a dummy variable that takes a value of one in the year in which a firm undertakes at least one horizontal acquisition. To construct this variable, we match data on completed mergers and acquisitions from SDC Platinum to our sample based on the CUSIP of the acquirer or its parent and identify all acquisitions in which the target and the acquirer (or one of its segments) are from the same three-digit SIC code industry. The sample includes one observation per firm-year, and we use *Firm distress* instead of *Distress*. We include lagged values of *Industry Tobin's Q*, *Cash/Assets*, and *EBITDA/TA* as control variables.

Table 8
Segment organizational dynamics and industry distress

Panel A: Acquisition activity and industry distress

	Pr(Horizontal acquisition)			
	(1)	(2)	(3)	(4)
Conglomerate	−.007	−.007	−.007	−.007
	(.004)*	(.003)*	(.003)*	(.003)*
Firm distress	.004			
	(.003)			
Conglomerate × Firm distress	−.010			
	(.006)*			
Declining firm distress		−.002		
		(.004)		
Growing firm distress		.007		
		(.003)**		
Conglomerate × Growing firm distress		−.014		
		(.006)**		
Conglomerate × Declining firm distress		−.002		
		(.008)		
High performance distress			.012	
			(.005)**	
Low performance distress			−.001	
			(.003)	
Conglomerate × High performance distress			−.014	
			(.009)	
Conglomerate × Low performance distress			−.013	
			(.007)*	
High performance declining distress				.003
				(.007)
High performance growing distress				.016
				(.007)**
Low performance declining distress				−.004
				(.007)
Low performance growing distress				.0005
				(.004)
Conglomerate × High performance declining distress				−.003
				(.013)
Conglomerate × High performance growing distress				−.022
				(.011)**
Conglomerate × Low performance declining distress				−.008
				(.012)
Conglomerate × Low performance growing distress				−.013
				(.011)
Obs.	45621	45621	45621	45621
R^2	.196	.196	.196	.196

This panel reports the results of an OLS regression that investigates the effect of industry distress on the likelihood of firm doing a horizontal acquisition. Specifically, we estimate the panel regression

$$\text{Horizontal acquisition}_{i,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t} + \beta_2 \times \text{Firm distress}_{j,t} + \beta_3 \times \text{Conglomerate}_{i,t} \times \text{Firm distress}_{j,t} + \gamma \times \text{Controls} + \text{Time FE} + \text{Firm FE},$$

where *Horizontal acquisition* is a dummy variable that takes a value of one in the year in which a firm announces an acquisition of a target in its three-digit SIC code industry. All other variables are defined in Appendix A. The control variables whose coefficients are suppressed include lagged values of *Industry Tobin's Q, EBITDA/TA,* and *Cash/Assets*. The data cover the period 1986–2008. The mergers and acquisition data are from SDC Platinum, stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level

(continued)

Table 8
Continued

Panel B: Firm exit and industry distress

	Distress segment sold				Firm delisted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conglomerate	−.002	−.001	−.0004	−.0002	−.006	−.006	−.005	−.005
	(.001)	(.001)	(.001)	(.001)	(.005)	(.005)	(.005)	(.005)
Firm distress	.018				.013			
	(.004)***				(.009)			
Conglomerate × Firm distress	.014				−.005			
	(.007)*				(.011)			
Growing firm distress		.021				.019		
		(.005)***				(.012)*		
Declining firm distress		.013				.001		
		(.005)***				(.011)		
Conglomerate × Growing firm distress		.006				−.014		
		(.008)				(.014)		
Conglomerate × Declining firm distress		.014				.006		
		(.011)				(.013)		
High performance distress			.027				.009	
			(.006)***				(.010)	
Low performance distress			.015				.045	
			(.005)***				(.015)***	
Conglomerate × High performance distress			−.002				−.004	
			(.012)				(.011)	
Conglomerate × Low performance distress			.026				−.035	
			(.013)**				(.018)*	
High performance declining distress				.025				−.011
				(.010)**				(.012)
High performance growing distress				.029				.021
				(.008)***				(.011)*

(*continued*)

Table 8
Continued

Panel B: Firm exit and industry distress

	Distress segment sold				Firm delisted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low performance declining distress				.008				.032
				(.006)				(.017)*
Low performance growing distress				.019				.053
				(.007)***				(.020)***
Conglomerate × High performance declining distress				.0008				.016
				(.018)				(.017)
Conglomerate × High performance growing distress				−.015				−.013
				(.013)				(.014)
Conglomerate × Low performance declining distress				.006				−.004
				(.017)				(.024)
Conglomerate × Low performance growing distress				.028				−.065
				(.021)				(.022)***
Obs.	36746	36746	36746	36746	36746	36746	36746	36746
R^2	.445	.444	.445	.444	.436	.436	.437	.437

This panel reports the results of an OLS regression that investigates the effect of industry distress on the likelihood of a firm exiting the industry. Specifically, we estimate the panel regression

$$\begin{aligned} y_{i,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t} + \beta_2 \times \text{Firm distress}_{j,t} + \beta_3 \times \text{Firm distress}_{j,t} \times \text{Conglomerate}_{i,t} \\ + \gamma \times \text{Controls} + \text{Time FE} + \text{Firm FE}, \end{aligned}$$

where $y_{i,t}$ is *Distress segment sold* in columns (1)–(4) and *Firm delisted* in columns (5)–(8). *Distressed segment sold* is a dummy variable that takes a value of one if a firm or segment in a distressed industry is sold through a merger or an acquisition during the year; *Firm delisted* is a dummy variable that takes a value of one in the year in which a firm delists from the stock exchange. All other variables are defined in Appendix A. The control variables whose coefficients are suppressed include lagged values of *Current Assets/Current Liabilities*, *Total Liabilities/Total Assets*, *EBITDA/TA*, *Retained earnings/TA*, *Net Income/TA*. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

(continued)

Table 8
Continued
Panel C: Conglomeration and industry conditions

	Pr(Conglomerate)			
	OLS	OLS	Probit	OLS
	(1)	(2)	(3)	(4)
Five year industry sales growth	−.059			
	(.027)**			
Fraction distress		.095	.299	
		(.035)***	(.109)***	
Group 1				
Group 2				.010
				(.008)
Group 3				.003
				(.007)
Group 4				.003
				(.002)**
Industry sales growth$_{t-1}$	.007	.002	.006	.004
	(.004)*	(.004)	(.012)	(.004)
GDP growth	.012	.011	.032	.012
	(.003)***	(.004)***	(.014)**	(.003)***
GDP growth$_{t-1}$	.006	.006	.016	.006
	(.003)**	(.003)*	(.011)	(.003)**
Recession months	−.006	−.003	−.007	−.006
	(.003)**	(.003)	(.011)	(.003)**
Recession months$_{t-1}$	.003	.007	.031	.004
	(.002)	(.005)	(.010)***	(.002)
Number of mergers ($\times 10^3$)	−.02	−.02	−.05	−.02
	(.02)	(.02)	(.07)	(.02)
Value of mergers ($\times 10^8$)	−1.78	−1.85	−6.50	−1.78
	(1.61)	(1.63)	(5.34)	(1.61)
Capital intensity	−.406	−.373	−1.406	−.405
	(.155)***	(.156)**	(.661)**	(.153)***
Distress	−.012	−.011	−.030	−.012
	(.011)	(.011)	(.034)	(.011)
Major exchange	.065	.066	.208	.066
	(.012)***	(.012)***	(.034)***	(.012)***
S& P index	.297	.299	.923	.297
	(.016)***	(.016)***	(.056)***	(.016)***
Foreign	.037	.036	.112	.037
	(.023)	(.023)	(.072)	(.023)
Obs.	56547	59945	59808	56547
R^2	.218	.218		.218

This panel reports the results of a panel OLS regression that investigates the relationship between conglomeration and industry conditions. Specifically, we estimate the regression

$$\text{Conglomerate}_{i,t} = \alpha + \beta_1 \times \text{X}_{j,t} + \gamma \times \text{Controls} + \text{Time FE} + \text{Industry FE},$$

where $X_{i,t}$ measures industry conditions. All variables are defined in Appendix A. The data cover the period 1986–2008. The stock price data are from CRSP, segment-level financial data are from the Compustat Business Segment Files, and firm-level data are from the Compustat Industrial Annual Files. The standard errors are robust to heteroscedasticity and clustered at the three-digit SIC code industry level.

The results in column (1) show that, while industry distress does not have a significant effect on a firm's propensity to engage in a horizontal acquisition, conglomerates are less likely to engage in such acquisitions. This evidence is consistent with the Flexibility Hypothesis. Since we estimate a linear probability model, the coefficients represent the marginal probabilities of an acquisition. In column (2), we differentiate between distress in growing and declining industries and find that distressed single-segment firms are more likely to engage in a horizontal acquisition if their industry is growing. Conglomerates, on the other hand, are less likely to expand in a distressed industry through acquisitions even if the industry is growing. In column (3), we differentiate between distress in an industry in which the segment has high versus low past performance. We find that conglomerates with distressed segments with low past performance are less likely to engage in horizontal acquisitions. Finally, in column (4), we differentiate distress based on both the long-run industry growth and past segment performance and find that high-performance single-segment firms in growing industries are more likely to engage in horizontal acquisitions during industry distress. Conglomerates, on the other hand, are less likely to engage in such acquisitions.[17]

Overall, our results are consistent with the Flexibility Hypothesis and highlight both the greater propensity of distressed single-segment firms with high performance to expand through acquisitions in growing industries and the reluctance of conglomerates to expand in a distressed industry.

To explore whether conglomerate segments and single-segment firms differ in the likelihood of exiting a distressed industry, in Panel B of Table 8 we conduct a multivariate analysis with two alternative measures of firm exit. Our first measure identifies exit through mergers or acquisitions, while our second measure is an all-encompassing one that identifies exit due to bankruptcy, liquidation, or a merger. To analyze whether conglomerates (and single-segment firms) engage in the sale of distressed segments, in columns (1) to (4) we model *Distress segment sold*, a dummy variable that identifies single-segment firms and conglomerate segments that are sold during industry distress. We construct this variable by matching the SDC completed acquisition sample to our firm financial data using the CUSIP of the target or its ultimate parent. Note that *Distress segment sold* will take a value of one only in the year of industry distress. Thus, it will be positively correlated with *Firm distress* by construction. This is not a problem because we are only interested in identifying differences between conglomerates and single-segment firms in their propensity to sell distressed segments. We are able to identify 81 instances of sale of distressed firms and segments in our sample. Of these, 40 involve single-segment firms and 41 involve segments of conglomerates. Our sample in these regressions includes one observation per firm-year and, apart from time and firm fixed effects, we

[17] In unreported tests, we differentiate between rated and unrated firms and do not find any significant difference across the two subsamples.

also include lagged firm financials as control variables. Our choice of control variables is guided by the bankruptcy prediction literature (see Altman 1968; Ohlson 1980) and include *Current Assets/Current Liabilities*, *Total Liabilities/Assets*, *EBITDA/Assets*, *Retained earnings/Assets*, and *Net Income/Assets*. We drop single-segment firms from our sample the year after they are sold.

Our results in column (1) show that conglomerates are more likely to sell distressed segments during industry distress. In column (2), we differentiate between growing and declining industries but do not find any significant difference between conglomerates and single-segment firms in their propensity to exit a distressed industry. In column (3), we differentiate between distress in segments with high versus low past performance and find that conglomerates are more likely to sell distressed segments that have low past performance. This behavior is again consistent with the Flexibility Hypothesis. Finally, in column (4), we simultaneously differentiate between distress in growing and declining industries affecting segments with high versus low past performance and find that conglomerates are likely to sell segments with low past performance, especially in growing industries. The greater likelihood of conglomerates to engage in the sale of segments with poor past performance is consistent with prior evidence of conglomerates being more active participants in the market for mergers and acquisitions (Maksimovic and Phillips 2008).

In columns (5) to (8), we analyze a more comprehensive measure of firm exit. Our dependent variable in these columns is *Firm delisted*, a dummy variable that identifies firms that delist from the stock exchange during the year due to bankruptcy, liquidation, or a merger. We identify 1,912 firms that delist during our sample period. Of these, 1,663 are single-segment firms and 249 are conglomerates. Our sample and control variables in these regressions are similar to those in the earlier columns.

The results in column (5) do not show any significant effect of industry distress on the likelihood of a firm to delist. In column (6), we differentiate between growing and declining industries and find that firms are more likely to delist if distress affects a growing industry. In column (7), we differentiate between distress that affects segments with high versus low past performance and find that while single-segment firms with low past performance are significantly more likely to delist during industry distress, conglomerate segments with similar performance are less likely to exit the industry through delisting. In column (8), we simultaneously differentiate between distress in growing and declining industries affecting segments with high and low past performance. Our results indicate that single-segment firms with low past performance in both growing and declining industries are more likely to delist when their industry is in distress. We also find that even single-segment firms with high past performance in growing industries are likely to delist during industry distress. Interestingly, we find that conglomerate segments in a growing industry with poor past performance are less likely to delist during industry distress.

Overall, our results indicate that conglomerate segments and single-segment firms with low past performance exit distressed industries. While conglomerate segments with low past performance exit through mergers, single-segment firms with low past performance delist from the stock exchange. Overall, these results are consistent with neo-classical firm behavior during industry distress and complement the findings by Maksimovic and Phillips (2001), who show that firms sell their less productive plants following positive demand shocks.

If conglomeration is beneficial during industry distress, then segments should be more likely to conglomerate in industries more prone to distress. To see if this is the case, we estimate a panel model similar to Equation (1) with *Conglomerate* as the dependent variable. This is similar to the model we present in column (1) of Panel A of Table 2. Of the independent variables we include in that estimation, we exclude *Fraction conglomerate*$_{t-1}$ and *Fraction conglomerate sale*$_{t-1}$ because, as mentioned earlier (see footnote 8), their inclusion will distort the interpretation of the coefficients on the other industry-level variables.

In column (1) of Panel C of Table 8, we use past-five-year industry sales growth, *Five-year industry sales growth*, to identify declining industries. If conglomeration is beneficial in declining industries, then we expect a negative coefficient on *Five-year industry sales growth*, indicating greater conglomeration in industries with low sales growth. Our evidence in column (1) is consistent with this prediction. In column (2), we repeat our tests using *Fraction distress* to measure long-run industry conditions. *Fraction distress* measures the fraction of time period in the past five years that the industry was in distress, as per the Opler–Titman methodology. Our results again show that segments are more likely to conglomerate in industries that are more prone to distress. Our results are also economically significant. The coefficient in column (2) indicates that one extra year of distress during the past five years—*Fraction distress* increasing by 0.2—is associated with a 2% increase in the likelihood of a segment belonging to a conglomerate. In column (3), we repeat our tests using a probit model and obtain consistent results.

Finally, in column (4), we group industries into four categories based on the methodology of Maksimovic and Phillips (2008). Specifically, the groups are based on the past-five-year change in industry sales and number of segments. *Group 1* (*Group 2*) identifies industries with above-median change in sales and above- (below-) median change in the number of segments. Similarly, *Group 3* (*Group 4*) identifies industries with below-median change in industry sales and above- (below-) median change in the number of segments. We repeat our estimates with the four dummy variables, with *Group 1* as the excluded category. The results in column (4) show that segments in *Group 4* industries are more likely to belong to conglomerates. Note that these industries have below- median change in both sales and the number of segments. This again is consistent with conglomeration being beneficial in declining industries that are also consolidating.

We also find that *Industry sales growth*$_{t-1}$ is insignificant in all but the first specification, while *Distress* is insignificant in all the specifications. This indicates that short-run changes in industry conditions do not have a significant effect on segment organizational form. Overall, our results in Panel C show that segments are more likely to conglomerate in declining industries. Since such industries are likely to be more prone to distress, this is consistent with conglomeration benefiting segments in distressed industries.

3.5 Additional tests

We do a number of robustness tests. To control for noise in the industry classification of Compustat segment files, we repeat our tests with alternate industry and conglomerate definitions based on both Fama and French (1997) and Hoberg and Phillips (2010) methodologies. To control for the changes in the segment reporting requirements in 1997, we repeat our regressions separately for the pre- and post-1997 samples. While our results are similar to the ones reported here, detailed descriptions of the tests and their results are available in the Online Appendix.

4. Conclusion

How does conglomeration affect resource allocation? Research on this question has focused on unconditionally comparing the investment efficiency of conglomerates and single-segment firms. Stein (2003) suggests that, instead of treating the bright-side and dark-side models of conglomerates as competing hypotheses, it might be more fruitful to ask, "When are internal capital markets most likely to add value?" Our article takes such an approach. We focus on periods of economic distress in an industry and compare conglomerate segments to single-segment firms.

Distressed conglomerate segments have higher sales growth, higher cash flow, and higher R&D expenditure than single-segment firms. The difference in performance is greater among segments with high past performance, in unrated firms, and in competitive industries. Distressed single-segment firms reduce receivables and increase cash holding. Consistent with value-enhancing conglomerate behavior during industry distress, the conglomerate value discount significantly reduces when one of the segments is in distress, acquisitions by distressed conglomerates are accompanied by a positive stock price reaction, and distressed conglomerate segment R&D expenditure has a positive incremental effect on future cash flows.

Distress periods are active periods for industry consolidation. While firms with high past performance acquire their industry counterparts, both conglomerate segments and single-segment firms with low past performance exit the distressed industry at a greater frequency. Consistent with conglomeration benefiting segments during industry distress, segments are more likely to conglomerate in industries that are more prone to distress. Overall, our evidence is

consistent with conglomerates enabling segments to overcome financial constraints during industry distress. We find scant evidence for inefficient cross-subsidization by conglomerates during industry distress.

Appendix A: Variable definitions

- *Assets*: Book value of firm's total assets in $ million.
- *Capital intensity*: The median ratio of the book value of property, plant, and equipment over book value of total assets of all segments in the three-digit SIC code industry.
- *Cash/Assets*: The ratio of the book value of cash and marketable securities to lagged book value of total assets.
- *Conglomerate*: A dummy variable that identifies firms with more than one segment with positive sales and assets in different three-digit SIC code industries.
- *Current Assets/Current Liabilities*: The ratio of current assets over current liabilities.
- *Declining firm distress*: A dummy variable that takes a value of one if a single-segment firm or one of the segments of a conglomerate is in a distressed industry and the industry's past-five-year sales growth is below sample median.
- *Declining industry:* A dummy variable that identifies industries with below-median five-year sales growth.
- *Distress*: A dummy variable that takes a value of one for segments in distressed industries. We identify industries in distress using the methodology of Opler and Titman (1994). Specifically, for every year, we calculate the stock return and sales growth for all single-segment firms during the two-year period starting from the beginning of the year. We classify a three-digit SIC code industry as distressed during a year if the median two-year sales growth of all single-segment firms in that industry is negative and the median two-year stock return of all such firms is less than −30%.
- *Distress segment sold*: A dummy variable that identifies instances where a distressed firm or segment is sold.
- *EBITDA/Assets*: The ratio of earnings before interest depreciation and taxes over total assets.
- *Firm delisted*: A dummy variable that takes a value of one in the year in which a firm delists from the stock exchange due to liquidation, bankruptcy, or a merger.
- *Firm distress*: A dummy variable that takes a value of one if the firm's or one of its segments' industry is in distress.
- *Five-year industry sales growth*: The rate of growth of industry sales during the past five years. We measure industry sales as the aggregate sales of all segments in the same three-digit SIC code industry.
- *Foreign*: A dummy variable that identifies foreign firms.
- *Fraction conglomerate*: The proportion of conglomerates in an industry. We identify industry at the level of three-digit SIC codes.
- *Fraction conglomerate sales*: The proportion of sales by multi-segment firms in an industry. We identify industry at the level of three-digit SIC codes.
- *Fraction distress:* The fraction of time in the past five years when the industry was in distress as per the Opler–Titman methodology.

- *GDP growth*: The rate of growth of U.S. GDP.
- *Group 1:* A dummy variable that identifies industries with above-median changes in sales and above-median change in the number of segments.
- *Group 2:* A dummy variable that identifies industries with above-median changes in sales and below-median change in the number of segments.
- *Group 3:* A dummy variable that identifies industries with below-median change in industry sales and above-median change in the number of segments.
- *Group 4:* A dummy variable that identifies industries with below-median change in industry sales and below-median change in the number of segments.
- *Growing firm distress:* A dummy variable that takes a value of one if a single-segment firm or one of the segments of a conglomerate is in a distressed industry and the industry's past-five-year sales growth is above sample median.
- *Growing industry:* A dummy variable that identifies industries with above-median five-year sales growth.
- *High performance*: A dummy variable that identifies segments that have high past performance. We classify segments as having high past performance during a year if the average abnormal cash flow over the previous two years is above sample median. We measure abnormal segment cash flow as the difference between segment cash flow and the median cash flow of all firms in the same three-digit SIC industry during the year.
- *High-performance distress:* A dummy variable that takes a value of one if a single-segment firm or one of the segments of a conglomerate is in a distressed industry and if the distressed firm or segment has above-median abnormal cash flow during the past two years. We measure abnormal segment cash flow as the difference between segment cash flow and the median cash flow of all firms in the same three-digit SIC industry during the year.
- *High-performance declining distress:* A dummy variable that takes a value of one if a single-segment firm or one of the segments of a conglomerate is in a distressed industry, the industry has below-median five-year sales growth, and the distressed firm or segment has above-median abnormal cash flow during the past two years.
- *High-performance growing distress:* A dummy variable that takes a value of one if a single-segment firm or one of the segments of a conglomerate is in a distressed industry, the industry has above-median five-year sales growth, and the distressed firm or segment has above-median abnormal cash flow during the past two years.
- *Horizontal acquisition*: A dummy variable that identifies years in which a firm undertakes at least one horizontal acquisition.
- *Industry sales growth*: The rate of growth of industry sales during the year. We measure industry sales as the aggregate sales of all segments in the same three-digit SIC code industry.
- *Industry Tobin's Q*: The median Tobin's Q of all firms in the same three-digit SIC code industry during the year.
- *Inventory/Assets*: The ratio of the book value of inventory at the end of the year to lagged book value of total assets.
- *Leverage*: The ratio of the book value of total debt to the book value of total assets.
- *Low performance*: A dummy variable that identifies segments that do not have high past performance. It equals 1 − *High performance*.

- *Low-performance distress:* A dummy variable that takes a value of one if a single-segment firm or one of the segments of a conglomerate is in a distressed industry and if the distressed firm or segment has below-median abnormal cash flow during the past two years. We measure abnormal segment cash flow as the difference between segment cash flow and the median cash flow of all firms in the same three-digit SIC industry during the year.
- *Low-performance declining distress:* A dummy variable that takes a value of one if a single-segment firm or one of the segments of a conglomerate is in a distressed industry, the industry has below-median five-year sales growth, and the distressed firm or segment has below-median abnormal cash flow during the past two years.
- *Low-performance growing distress:* A dummy variable that takes a value of one if a single-segment firm or one of the segments of a conglomerate is in a distressed industry, the industry has above-median five-year sales growth, and the distressed firm or segment has below-median abnormal cash flow during the past two years.
- *Major exchange*: A dummy variable that identifies firms that are listed in one of NYSE, Amex, or Nasdaq.
- *Net Income/Assets*: The ratio of net income over total assets.
- *Number of mergers*: The number of completed mergers announced during the year.
- *Payable/Assets*: The ratio of the book value of payables at the end of the year to lagged book value of total assets.
- *Pr(Conglomerate)*: The propensity score of a segment belonging to a conglomerate.
- *Pre-distress(s)*: A dummy variable that takes a value of one if it is *s* years before industry distress in one of the segments of the conglomerate.
- *Pre-distress(3+)*: A dummy variable that takes a value of one if it is more than three years before industry distress in one of the segments of the conglomerate.
- *Post-distress(s)*: A dummy variable that takes a value of one if it is *s* years after industry distress in one of the segments of the conglomerate.
- *Post-distress(3+)*: A dummy variable that takes a value of one if it is more than three years after industry distress in one of the segments of the conglomerate.
- *Q-Difference*: The difference between the conglomerate's Tobin's Q and an asset-weighted average industry-Q of all the segments of the conglomerate. We use the fraction of book value of assets of the conglomerate's segments as the weights for measuring average industry-Q.
- Δ*Q-Difference*: The first difference value of *Q-Difference*.
- *Rated*: A dummy variable that takes a value of one if the firm has a short-term credit rating from Standard & Poor's.
- *Receivable/Assets*: The ratio of the book value of receivables at the end of the year to lagged book value of total assets.
- *Recession months*: A variable that counts the number of months in a year the NBER classifies as recessionary.
- *Retained earnings/Assets*: The ratio of retained earnings over total assets.
- *S&P index*: A dummy variable that identifies firms whose stock is a constituent of one of the major Standard & Poor's stock indices.

- *Segment assets*: The book value of segment total assets in $ million.
- *Segment cash flows*: The ratio of segment cash flows (segment operating profit + segment depreciation) to lagged value of segment total assets.
- *Segment investment*: The ratio of segment capital expenditure to lagged value of segment total assets.
- *Segment sales growth*: The annual rate of growth of segment sales.
- *Segment R&D*: The ratio of segment research and development expenditure to lagged value of segment total assets.
- *Tobin's Q*: The ratio of market value of total assets to the book value of total assets, where market value of total assets is the sum of book value of total assets and the market value of equity less the book value of equity.
- *Total Liabilities/Assets*: The ratio of total assets over total liabilities.
- *Value of mergers*: The aggregate dollar value of completed mergers announced during the year.

References

Ali, A., S. Klassa, and E. Yeung. 2009. The Limitations of Industry Concentration Measures Constructed with Compustat Data: Implications for Finance Research. *Review of Financial Studies* 22:3839–71.

Almeida, H., M. Campello, and M. S. Weisbach. 2004. The Cash Flow Sensitivity of Cash. *Journal of Finance* 59:1777–804.

Altman, E. I. 1968. Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy. *Journal of Finance* 23:589–609.

Billett, M. T., and D. C. Mauer. 2003. Cross-Subsidies, External Financing Constraints, and the Contribution of the Internal Capital Market to Firm Value. *Review of Financial Studies* 16:1167–201.

Campa, J. M., and S. Kedia. 2002. Explaining the Diversification Discount. *Journal of Finance* 57:1731–62.

Campello, M. 2002. Internal Capital Markets in Financial Conglomerates: Evidence from Small Bank Responses to Monetary Policy. *Journal of Finance* 57:2773–805.

Chevalier, J. 2004. What Do We Know About Cross-Subsidization? Evidence from Merging Firms. *Advances in Economic Analysis & Policy* 4: Article 3.

Coase, R. 1937. The Nature of the Firm. *Economica* 4:386–405.

Dimitrov, V., and S. Tice. 2006. Corporate Diversification and Credit Constraints: Real Effects Across the Business Cycle. *Review of Financial Studies* 19:1465–98.

Fama, E. F., and K. R. French. 1997. Industry Costs of Equity. *Journal of Financial Economics* 43:153–93.

Graham, J. R., M. L. Lemmon, and J. G. Wolf. 2002. Does Corporate Diversification Destroy Value? *Journal of Finance* 57:695–720.

Guedj, I., and D. Scharfstein. 2004. Organizational Scope and Investment: Evidence from the Drug Development Strategies and Performance. *NBER* Working Paper 10933.

Hoberg, G., and G. Phillips. 2010. Product Market Synergies in Mergers and Acquisitions: A Text-Based Analysis. *Review of Financial Studies* 23:3773–811.

Hubbard, Glenn R., and D. Palia. 1999. A Reexamination of the Conglomerate Merger Wave in the 1960s: An Internal Capital Markets View. *Journal of Finance* 54:1131–52.

Khanna, N., and S. Tice. 2000. Strategic Responses of Incumbents to New Entry: The Effect of Ownership Structure, Capital Structure, and Focus. *Review of Financial Studies* 13:749–79.

Lamont, O. 1997. Cash Flow and Investment: Evidence from Internal Capital Markets. *Journal of Finance* 52:83–109.

Lins, K., and H. Servaes. 1999. International Evidence on the Value of Corporate Diversification. *Journal of Finance* 54:2215–39.

Maksimovic, V., and G. Phillips. 2001. The Market for Corporate Assets: Who Engages in Mergers and Asset Sales and Are There Efficiency Gains? *Journal of Finance* 56:2019–65.

———. 2002. Do Conglomerate Firms Allocate Resources Inefficiently Across Industries? Theory and Evidence. *Journal of Finance* 57:721–67.

———. 2007. Conglomerate Firms and Internal Capital Markets. In B. E. Eckbo (ed.), *Handbook of Corporate Finance: Empirical Corporate Finance*. Amsterdam North-Holland.

———. 2008. The Industry Life Cycle, Acquisition, and Investment: Does Firm Organization Matter? *Journal of Finance* 63:673–708.

Mathews, R. D., and D. T. Robinson. 2008. Market Structure, Internal Capital Markets, and the Boundaries of the Firm. *Journal of Finance* 63:2703–36.

Matsusaka, J. G., and V. Nanda. 2002. Internal Capital Markets and Corporate Refocusing. *Journal of Financial Intermediation* 11:176–211.

Neyman, J., and E. L. Scott. 1948. Consistent Estimates Based on Partially Consistent Observations. *Econometrica* 16:1–32.

Ohlson, J. A. 1980. Financial Ratios and the Probabilistic Prediction of Bankruptcy. *Journal of Accounting Research* 18:109–31.

Opler, T. C., and S. Titman. 1994. Financial Distress and Corporate Performance. *Journal of Finance* 49: 1015–40.

Rajan, R., H. Servaes, and L. Zingales. 2000. The Cost of Diversity: The Diversification Discount and Inefficient Investment. *Journal of Finance* 55:35–80.

Scharfstein, D. S., and J. C. Stein. 2000. The Dark Side of Internal Capital Markets: Divisional Rent-Seeking and Inefficient Investment. *Journal of Finance* 55:2537–64.

Seru, A. Forthcoming. Firm Boundaries Matter: Evidence from Conglomerates and R&D Activity. *Journal of Financial Economics*.

Stein, J. C. 1997. Internal Capital Markets and the Competition for Corporate Resources. *Journal of Finance* 52:111–33.

———. 2003. Agency, Information, and Corporate Investment. In G. Constantinides, M. Harris, and R. M. Stulz (eds.), *Handbook of the Economics of Finance*, vol. 1, pp. 111–165. Amsterdam: Elsevier.

Villalonga, B. 2004. Diversification Discount or Premium? New Evidence from Bits Establishment-Level Data. *Journal of Finance* 59:475–502.

Wooldridge, J. M. 2002. Econometric Analysis of Cross-Section and Panel Data. Cambridge, MA: MIT Press.