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Article

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Do firm boundaries matter? The impact of Chinese imports on US conglomerates

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Impact of
Chinese
imports on US
conglomerates

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Abstract

The purpose of this paper is to use China's World Trade Organization accession as a quasi-natural experiment and examine whether conglomeration affects firms' ability to respond to a significant increase in competitive pressure. Conglomerate segments have higher sales growth and higher profitability than single-segment firms, when they face intensified import competition. Conglomerates' outperformance is not observed when the markets in which segments operate already have high product market competition. Overall, conglomeration encourages competitiveness, and internal resources are allocated to relatively competitive segments.

Keywords China's World Trade Organization accession, Conglomerates, Import competition

Paper type Research paper

1. Introduction

Given the prevalence of conglomerates and business groups, how firm boundaries affect resource allocation has fascinated researchers. While early studies criticize conglomerates for diversification discount, others suggest that internal capital markets relax the financial constraints on conglomerate segments or group-affiliated firms, which explains why these firms engage more in corporate innovation (Belenzon and Berkovitz, 2010) and plant acquisitions (Maksimovic and Phillips, 2008) [1]. Gopalan and Xie (2011) demonstrate that conglomeration enables the segments to avoid financial constraints during industrial distress and, hence, to perform better during such times. Despite the large body of research, the differences in reaction to competitive threats between conglomerate segments and single-segment firms have not been explored.

Current studies do not clearly predict a competitive advantage for conglomerates over single-segment firms when faced with intense competition. Cestone and Fumagalli (2005) argue that when business group internal capital markets allocate more resources to subsidiaries facing tough competition, these firms more likely to enter or remain in the

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JEL classification – Classification: L22, L25

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market. Conversely, their model also suggests that internal resource reallocation hinders group-affiliated firms' competitiveness, when group headquarters engage in winner-picking owing to scarce resources. This is similar to the commitment cost of internal capital markets, as suggested by [Matsusaka and Nanda \(2002\)](#).

This study examines the product market outcomes of US firms using China's World Trade Organization (WTO) accession in 2001 as an event that significantly increased competition for firms. Using Compustat segment data for 1997–2006, this study reveals that, for industries facing an increase in Chinese imports, conglomerate segments show larger sales growth in 2002–2006. With a fixed market size in the short term, market shares increase for conglomerate segments and decrease for single-segment firms, and conglomerate segments outperform in terms of profitability. Finally, when market competition was not intense prior to the WTO access, conglomerates' outperformance is more pronounced. The result suggests that conglomerates engage in winner-picking and focus on core segments with promising prospects.

This study provides large sample evidence of conglomerates' outperformance using an exogenous shock to the level of import competition. This study is similar to [Bai \(2019\)](#) and [Swanburg \(2014\)](#), who examine conglomerate acquisitions and investments, respectively, compared to single-segment firms when import tariff rates are reduced. This study is consistent with [Bai \(2019\)](#), which documents conglomerates' higher resilience against tough competition. On the other hand, [Swanburg \(2014\)](#) shows that conglomerates reduce investments more than single-segment firms do. This study builds on [Khanna and Tice \(2001\)](#), who showed that conglomerates respond quicker when Walmart enters the market.

This study is also closely related to the literature that explores the effect of import competition on domestic firms [2]. [Pierce and Schott \(2016\)](#) and [Bloom et al. \(2016\)](#) examine the effect of Chinese import competition on US employment and European innovation in the period following China's WTO accession. This paper adds to the literature by documenting that Chinese imports can affect conglomerate and single-segment firms differently.

The remainder of the paper is organized as follows: Section 2 reviews the related literature. Section 3 explains the data and empirical methodology. Section 4 reports and discusses the empirical results. Section 5 concludes the paper.

2. Related literature

Since [Coase \(1937\)](#), researchers have studied the effect of firm boundaries on resource allocation. Several studies show that conglomerate segments' access to internal capital markets generates behaviors or values different than those of single-segment firms [3]. Group firms and conglomerates are shown to engage more in corporate innovation ([Belenzon and Berkovitz, 2010](#)) and plant acquisitions ([Maksimovic and Phillips, 2008](#)). [Gopalan and Xie \(2011\)](#) argue that conglomerate internal capital markets lead conglomerate segments perform better during recessions.

Existing studies do not clearly predict whether conglomerates are more competitive than single-segment firms under intense competition, where internal capital markets impact product market competition. [Cestone and Fumagalli \(2005\)](#) indicate that business groups' internal capital markets can allocate more resources to subsidiaries facing competition, thereby making group firms more likely to enter or stay in the market. On the other hand, the model also suggests that internal resource reallocation hinders group-affiliated firms' competitiveness when group headquarters engage in winner-picking owing to scarce resources. This is similar to the commitment cost of internal capital markets suggested by [Matsusaka and Nanda \(2002\)](#), who reveal that internal capital markets reduce conglomerates' competitiveness, as they may withdraw financial support from a division facing more intense competition. [Mathews and](#)

Robinson (2008) outline the strategic impacts of internal capital markets in a conglomerate setting and develop an equilibrium model where firm boundaries are endogenously shaped after considering the strategic impacts.

A few studies empirically explore the effects of access to internal capital markets on competitive outcomes. Khanna and Tice (2001) demonstrate that conglomerate segments quickly respond to the entry of Walmart in a market, irrespective of whether they decide to stay or exit. While they test how conglomerate segments versus single-segment firms react differently to tougher competition, the evidence is limited to the discount store industry. Boutin *et al.* (2013) showed that conglomerates' financial backing deters entry to their market. Kim (2014) documents that firms supported by weak internal capital markets lose market shares to those backed by strong internal capital markets. Neither of these two studies directly tests the impact of internal capital markets in response to intensified competition.

Several studies use intensified import competition as an exogenous change in the level of competition. Xu (2013) presents evidence that firms decrease leverage in response to expected decreased profitability caused by increased import penetration. Fresard and Valta (2012) show that tariff reductions, which increase foreign competition, cause firms to reduce capital and R&D investment and increase cash reserves. Valta (2012) also uses large tariff reductions to show that bank debt becomes costlier when firms encounter tougher competition. Huang and Kim (2019) document that supplier firms reduce their leverage in response to a reduction of tariff rates [4].

In particular, two recent studies examined large tariff reductions and how conglomerates react differently than single-segment firms when the level of competition increases. Bai (2019) shows that conglomerates withstand import competition through less reduction in productivity compared to single-segment firms, and conglomerates are more aggressive in their response to increased competition when the competitive shocks occur in core businesses. Swanburg (2014) shows that conglomerate divisions reduce investment more compared to standalone firms when facing intensified import competition.

3. Methodology and data

3.1 Empirical strategy

To explore the relationship between product market outcomes and organization types, it is important to identify an exogenous variation in product market competition that is not caused by a firm. While domestic competition is largely affected by incumbent firms' performance and strategies, import competition is driven by trade barriers and rivals' strategies. Specifically, China's WTO accession provides a natural experiment setting to test the effect of an exogenous increase in Chinese import competition on US firms (Pierce and Schott, 2016; Bloom *et al.*, 2016).

US imports from non-market economies such as China are subject to higher tariffs (known as "non-normal trade relations (NTR)") set under the Smoot-Hawley Tariff Act of 1930, while imports from WTO members have lower tariffs, "NTR." Although China was not a WTO member, the USA began granting NTR rates to China in 1980, though annual approval by the US Congress was required for renewal, which created uncertainty about the longevity of low tariffs. However, China's accession to the WTO in December 2001 eliminated this uncertainty, and Chinese exporters made investments that substantially increased competition in the US markets. Pierce and Schott (2016) show there was an increase in import competition, which leads to reduced employment in the USA after the WTO accession.

This study uses the NTR gap, following [Pierce and Schott \(2016\)](#), to measure variations in the increase of Chinese import competition by industry. The NTR gap represents the difference between the non-NTR rate to which tariffs would have risen if annual renewal had failed and the NTR tariff rate that was locked in by PNTR:

$$\text{NTR gap} = \text{Non-NTR rate} - \text{NTR rate} \quad (1)$$

Most of the variations in the NTR gap across industries are derived from variation in non-NTR rates, which were set 70 years before NTR implementation. Following [Pierce and Schott \(2016\)](#), this study uses NTR gaps for 1999, one year before the passage of PNTR.

3.2 Data and empirical model

The data sample is from the Compustat Industry Segment data base and identifies firms as conglomerates every year if the Compustat business segment files report positive assets and sales in more than one four-digit standard industrial classification (SIC) industry during the year [5]. Following [Berger and Ofek \(1995\)](#), the sample is restricted to firms having total segment sales within 1% of the firm's total sales annually. The sample excludes firms in financial industries (SIC 6000–6999). Finally, the segment sample was merged with the NTR gap calculated by [Pierce and Schott \(2018\)](#) based on four-digit SICs, and observations with missing NTR gap were eliminated.

The link between firm boundaries and product market performance was examined using a difference-in-differences-in-differences approach. I first measure whether changes of corporate performance in industries with higher NTR gaps (first difference) are different after the imposition of PNTR (second difference) compared to its counterpart with lower NTR gaps. Then, I compare the changes between conglomerate segments and single-segment firms (third difference). Segment fixed effects capture the impact of time-invariant firm (segment) characteristics, and year fixed effects account for aggregate shocks that affect all industries equally. I estimate the following equation:

$$y_{i,j,t} = \alpha + \beta_1 \times \text{Conglomerate}_{i,t-1} + \beta_2 \times \text{Post2001}_t + \beta_3 \times \text{Post2001}_t \times \text{NTRgap}_j + \beta_3 \times \text{Conglomerate}_{i,t-1} \times \text{NTRgap}_j + \beta_4 \times \text{NTRgap}_j + \gamma \times \text{Controls} + \mu_t + \mu_i \quad (2)$$

where subscript i refers to the segment, subscript j refers to the industry, subscript t refers to time in years, μ_t refers to the year fixed effects and μ_i refers to segment fixed effects. The dependent variable y is a measure of segment performance, *segment sales growth* and *segment cash flows*. *Segment sales growth* is the change in net sales divided by previous year net sales, and *segment cash flows* is earnings before interest depreciation and taxes divided by assets. The analysis treats years after 2001 as being “post-PNTR,” which is captured by *Post2001*, a dummy variable taking the value of 1 for years greater than 2001. *NTRgap* is defined in the previous section. *Conglomerate* is a dummy variable that takes a value of one for segments of conglomerates. In the equation, β_3 is the measure of the differential impact of import penetration on performance between conglomerate segments and single-segment firms. Controls include lagged values of *segment sales growth*, *segment cash flows*, *segment size*, *segment industryQ* and *segment investment*. *size* is the logarithm of segment assets, and *investment* is the segment capital expenditure divided by assets.

IndustryQ is the average Tobin's Q in a four-digit SIC industry. The standard errors in all specifications are clustered at the firm level and are robust to heteroscedasticity.

The final sample includes observations without missing value of variables defined above. The final sample includes annual firm (segment)-level observations from 1997 to 2005, which consists of 27,797 firm-year observations. Table 1 provides details of the sample. Panel A shows sample distribution by industry (two-digit SIC). The sample represents various industries in the USA, and about 50% of the sample observations are from manufacturing industries. Panel A of Table 2 reports summary statistics of the main variables; all variables are winsorized at the top and bottom 1%. Panel B of Table 2 compares conglomerate segments to single-segment firms. There are 8,582 conglomerate observations and 19,215 single-segment observations. Mean value comparison suggests that single-segment firms on average show greater sales growth than conglomerate segments. Single-segment firms operate in industries with higher growth potential, as indicated by the higher industry Q values. On average, conglomerate segments are larger and have higher profitability.

4. Empirical results

4.1 Effect of the Chinese WTO accession

Baseline results reported in Table 3 compare product market performance of single-segment firms and conglomerate segments. In the first two columns, the dependent variables are *salesgrowth* and *cashflows*. The positive coefficient of *conglomerate* in Columns (1) and (2) indicates that, on average, conglomerate segments have higher sales growth and profitability than single-segment firms. The negative coefficient of *Post2001 × NTRgap* indicates that an increase in Chinese imports results in decreased sales growth and profitability. Conversely, the positive coefficient of *Conglomerate × Post2001 × NTRgap* indicates that an increase in Chinese imports results in conglomerate segments performing better than single-segment firms. The sum of the coefficients on *Post2001 × Ntrgap* and *Conglomerate × Post2001 × NTRgap* is negative, indicating that conglomerate segments also experience declining performance when they face intense import competition.

Columns (3) and (4) include industry fixed effect rather than the segment fixed effect. The *NTRgap* varies by industry, and industry factors affect the proportion of conglomerate segments in that industry. The coefficient of *conglomerate × Post2001 × NTRgap* is statistically and economically significant.

The coefficients of the control variables indicate that segments in industries with higher growth potential (positive coefficient of *industryQ* in *salesgrowth* regressions and negative coefficient of *industryQ* in *cashflows* regressions) have higher sales growth and lower profitability. While larger segments have less growth in sales, their

Two-digit SIC	N	% of sample
10, 12, 13, 15, 16, 17	1,693	6.09
20, 21, 22, 24, 25, 26, 27, 28, 29	6,044	21.74
30, 32, 33, 34, 35, 36, 37, 38, 39	13,009	46.80
42, 45, 47, 48, 49	1,338	4.81
50, 51, 52, 55, 56, 57, 58, 59	927	3.33
70, 73, 78, 79	4,704	16.92
80, 87	82	0.29

Note: This table reports industry distribution of my sample by two-digit SIC

Table 1.
Sample description:
distribution of firm-
year observations by
industry

	<i>N</i>	Mean	25%	Median	75%	
<i>Panel A: all segments</i>						
Salesgrowth	27,797	0.486	-0.096	0.059	0.302	
Cashflows	27,797	-0.126	0	0	0.022	
Investment	27,797	0.063	0.015	0.036	0.074	
Size	27,797	4.274	2.653	4.199	5.897	
IndustryQ	27,797	2.148	1.645	2.162	2.606	
Conglomerate	27,797	0.309	0	0	1.00	
Ntrgap	27,797	0.328	0.284	0.361	0.378	
<i>Panel B: comparison between conglomerate segments and single-segment firms</i>						
	<i>N</i>	Conglomerate		Single segment		
		Mean	Median	<i>N</i>	Mean	Median
Salesgrowth	8,582	0.414	0.040	19,215	0.519	0.074
Cashflows	8,582	-0.006	0	19,215	-0.180	0
Investment	8,582	0.059	0.037	19,215	0.064	0.036
Size	8,582	4.905	5.033	19,215	3.992	3.942
IndustryQ	8,582	1.902	1.828	19,215	2.258	2.262

Notes: This table presents the descriptive statistics for main variables of the analyses. The definition of the variables is described in the [Appendix](#). Panel A reports the number of observations, mean, bottom 25%, median and the 75% percentile of the entire sample. Panel B reports key statistics for conglomerate segments and single-segment firms separately

Table 2.
Summary statistics

profitability is greater than smaller segments. The coefficients of investment indicate that higher investment boosts sales growth, though it may decrease profitability.

The results indicate that conglomerate segments have higher sales growth and cash flow compared to single-segment firms when confronted by import competition. The significant difference in performance between single-segment firms and conglomerate segments is obtained after controlling segment characteristics. Furthermore, firm fixed effects control unobservable time-invariant differences between single-segment and multi-segment firms [6]. Given the fixed market size in the short term, higher sales growth and profitability suggest conglomerate segments may gain market share when competition intensifies from increased Chinese imports. The higher sales growth and cash flow support the argument that conglomerate segments can compete more aggressively owing to their deep pockets of internal capital markets, compared to single-segment firms. The results are consistent with that conglomerate segments cross-subsidize and hence less financially constrained when facing intense competition. However, the result does not support the hypothesis that conglomerate headquarters pull resources out of those facing tough competition.

4.2 Effect conditional on the level of existing competition before the event

In Section 4.2, I repeat the tests after differentiating between industries with high and low competition levels and the study to test whether the level of competition affects conglomerates' support of segments. Firms in competitive industries are likely to have lower margins and lower cash flows, and they are more likely to depend on external financial markets and face greater constraints when competition intensifies. In this situation, it is an empirical question whether conglomerate divisions will perform better than single-segment firms when headquarters engage in winner-picking to allocate resources. To determine if Chinese import competition

	(1) Sales growth	(2) Cashflows	(3) Sales growth	(4) Cashflows
Conglomerate	0.236** (2.181)	0.056*** (2.643)	0.033 (0.868)	-0.015** (-2.027)
Post2001	0.003 (0.028)	-0.043* (-1.877)	0.134* (1.764)	-0.057*** (-2.962)
Post2001 × NTRgap × Conglomerate	0.489** (2.477)	0.315*** (7.096)	0.393*** (2.775)	0.570*** (15.664)
Post2001 × NTRgap	-0.960*** (-4.599)	-0.415*** (-6.630)	-0.829*** (-5.234)	-0.506*** (-11.531)
NTRgap	-1.646 (-1.325)	-0.251 (-1.244)	-4.063*** (-3.135)	0.086 (0.741)
IndustryQ	0.225*** (4.177)	-0.022** (-2.025)	0.175*** (3.883)	-0.051*** (-3.848)
Investment	0.526 (1.419)	-0.024 (-0.264)	1.224*** (4.514)	-0.240*** (-3.302)
Size	-0.547*** (-12.396)	0.087*** (7.104)	-0.100*** (-12.098)	0.097*** (28.311)
Cashflows	-0.031 (-0.374)	-	-0.320*** (-6.204)	-
Salesgrowth	-	0.001 (0.384)	-	-0.009*** (-3.986)
Constant	2.941*** (6.374)	-0.289*** (-3.533)	0.543*** (2.632)	-0.285*** (-8.460)
Segment fixed effect	Yes	Yes	No	No
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	No	No	Yes	Yes
<i>N</i>	27,797	24,178	27,797	24,178
<i>R</i> -squared	0.053	0.037	0.081	0.182

Table 3.
Performance of
conglomerate
segments and single-
segment firms in the
periods before and
after the Chinese
WTO accession

Notes: This table presents the regression results of whether segment sales growth and cash flows are different depending on conglomerate in industries facing intense Chinese import competition (*Conglomerate* × *Post2001* × *NTRgap*). The sample includes segments of US firms obtained from Compustat Industrial Segments data base. The definition of the variables is described in the [Appendix](#). T-statistics based on robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5 and 1% levels, respectively

disproportionately affects firms in industries that were already competitive before the WTO accession, I use two measures of existing competition:

- (1) Herfindahl–Hirschman index (HHI), which is calculated using Compustat firms; and
- (2) import penetration index (IPI), which is calculated as imports divided by domestic production plus imports.

If the HHI measured in 2000 is below the sample median or the IPI 2000 value is above the sample median, the industry is classified as having high competition.

The regression results on whether the different performances reported in [Table 3](#) are conditional on the level of competition before the WTO accession are reported in [Table 4](#). When the dependent variable is sales growth, the coefficient of *Conglomerate* × *Post2001* × *NTRgap* is statistically significant and positive only in sub-sample regressions for firms in industries with low competition. In regressions of cash flows, the coefficient is significant only in the sample of low competition when the competition is measured by HHI. When existing competition is measured by IPI, the coefficient is significant in both subsamples, but the magnitude is slightly larger for low competition. This indicates that conglomerate segments do not perform better than single-segment firms when existing competition is intense. Conglomerate headquarters provide support to divisions that were operating in less competitive industries. The segments with existing intense competition and that anticipate

Table 4.
Does the level of
existing competition
matter in
determining
conglomerate
performance?

Variables	Existing competition measured by HHI (domestic competition)		
	Low competition	Cashflows	High competition
	Sales growth	Cashflows	Sales growth
Conglomerate	0.151* (1.695)	0.049*** (2.600)	0.079 (0.259)
Post2001	-0.044 (-0.469)	-0.042** (-2.169)	0.328 (0.568)
Post2001 × NTRgap	-0.842*** (-3.766)	-0.461*** (-9.914)	-1.771* (-1.650)
Conglomerate × Post2001 × NTRgap	0.623*** (2.969)	0.324*** (7.314)	-0.179 (-0.321)
NTRgap	0.184 (0.316)	0.065 (0.535)	-20.453*** (-10.444)
IndustryQ	0.192*** (3.759)	0.002 (0.193)	0.420** (2.041)
Investment	0.671*** (2.673)	-0.090* (-1.665)	-0.062 (-0.091)
Size	-0.527*** (-22.393)	0.086*** (17.477)	-0.470*** (-9.532)
Cashflows	0.014 (0.346)	-	-0.017 (-0.239)
Salesgrowth	-	0.001 (0.658)	0.002 (0.329)
Constant	2.385*** (10.223)	-0.427*** (-8.777)	-0.290 (-0.817)
Segment fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	24,074	21,009	3,169
R-squared	0.043	0.038	0.131

Notes: This table presents the subsample regression results of whether the outperformance of conglomerate segments over single segment firms are conditional on the level of existing market competition. The dependent variables are segment sales growth and cash flows. The sample includes segments of US firms obtained from Compustat Industrial Segments data base. The definition of the variables is described in [Appendix](#). T-statistics based on robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively

(continued)

Variables	Existing competition measured by IPI (import competition)			
	Low competition		High competition	
	Sales growth	Cashflows	Sales growth	Cashflows
Conglomerate	0.067 (0.411)	0.016 (0.469)	0.260** (2.496)	0.070*** (2.870)
Post2001	-0.059 (-0.294)	-0.070* (-1.652)	0.062 (0.610)	-0.034 (-1.447)
Post2001 × NTRgap	-0.936** (-2.065)	-0.386*** (-4.016)	-1.056*** (-4.792)	-0.415*** (-8.036)
Conglomerate × Post2001 × NTRgap	0.889*** (2.778)	0.347*** (5.151)	0.328 (1.312)	0.315*** (5.215)
NTRgap	1.298 (1.257)	0.085 (0.401)	-2.582*** (-4.044)	-0.350*** (-2.308)
IndustryQ	0.211** (2.149)	-0.004 (-0.195)	0.182*** (3.207)	-0.031** (-2.367)
Investment	-0.329 (-0.619)	0.151 (1.306)	0.841*** (3.194)	-0.085 (-1.333)
Size	-0.431*** (-8.825)	0.109*** (10.749)	-0.559*** (-23.447)	0.082*** (14.579)
Cashflows	0.003 (0.037)	-	-0.015 (-0.372)	-
Salesgrowth	1.631*** (3.314)	-0.002 (-0.654)	3.299*** (13.134)	0.002 (1.367)
Constant	Yes	Yes	Yes	Yes
Segment fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	8,251	7,238	19,546	16,940
Observations	0.025	0.040	0.062	0.036
R-squared				

Table 4.

increased competition are not allocated additional resources. This result may suggest that conglomerates engage in winner-picking and focus on core segments with promising prospects.

5. Conclusion

This study provides the first empirical evidence that conglomerate segments perform better than single-segment firms during periods of heightened import competition. The findings support a key economic issue – firm boundaries influence firm policies. Furthermore, this study demonstrates that conglomerate internal capital market allocation is conditional on existing competition, indicating that conglomerates engage in winner-picking. The evidence is consistent with [Gopalan and Xie \(2011\)](#), who reported that conglomerates support segments with greater past performance during industrial distress. Overall, this study suggests that internal capital markets benefit conglomerate segments during difficult times and internal resource allocation is efficient.

Notes

1. See Stein (2003) for reviews.
2. For earlier studies, see DeRosa and Goldstein (1981), Katics and Petersen (1994), and Pugel (1980).
3. This study focuses on business diversification. See Seok *et al.* (2018) and Kim (2013) for geographical diversification and its effect in Korea.
4. See Choe (2004), which examines the effect of global trade deregulation on the Korean financial market.
5. All segments within a firm that share a common four-digit SIC code are aggregated into one segment.
6. The possibility exists that endogenous selection of conglomerate segments may cause better performance during difficult times.

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Table A1.
Variable definitions

Variable name	Definition
Salesgrowth	Segment sales minus segment sales of previous year, divided by the previous year's segment sales
Cashflows	The ratio of segment operating income before depreciation to segment total assets
Size	The logarithm of segment total assets
Investment	Segment capital expenditure divided by total assets
IndustryQ	Average Tobin's Q of all firms in an industry based on four-digit-SIC (Tobin's Q is 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)
Conglomerate	A dummy variable that identifies firms with more than one segment with positive sales and assets in more than one four-digit-SIC industries
Post2001	A dummy variable indicating years from 2001 onward
NTRgap	Non-NTR rate – NTR rate

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