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Does geographic dispersion affect firm valuation?☆

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ABSTRACT

We find that the geographic dispersion of a corporation affects its firm valuation. Firms with subsidiaries located in different regions of the United States experience a valuation discount of 6.2% after controlling for the impact of both global and industrial diversifications. The valuation discount increases as firms expand their operations to different regions nationwide. Results show that firms with more anti-takeover provisions are more likely to be geographically diverse, and that these firms experience greater value discounts compared with their counterparts with fewer such provisions. Our overall evidence suggests that the geographic location of corporate activities is an essential component of corporate policies and has important market valuation implications.

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1. Introduction

Many corporations are expanding their operations far beyond their headquarters' region to tap into locational assets such skilled workforce, larger customer base, proximity of natural resources, corporate tax breaks, among many others. This corporate growth trend has generated a lot of interest among academics and practitioners. Of particular interest is the impact of corporate locations on management decisions and on investor behavior. In a recent study, Landier et al. (in press) find that the geographic dispersion of firms affects corporate decision-making. The authors show that social and informational considerations bias management to favor their own interest as opposed to the interests of shareholders. This misalignment between managerial incentives and shareholders' objectives in geographically dispersed firms potentially has an important implication for firm valuation. The purpose of our study is to contribute to this strand of literature by examining whether geographic dispersion affects corporate value.

We use a new database, Directory of Corporate Affiliations (DCA), to document the geographic distribution of U.S. firms and analyze the impact of geographic dispersion on firm value. The DCA database, produced by LexisNexis Group, contains business profiles and geographic distribution of parent firms and subsidiaries. It allows us to identify whether and the extent to which firms expand their businesses and operating units across regions over the sample period of 1993 to 2003. We define a firm as being geographically dispersed if it has main subsidiaries outside the region of the firm's headquarters, and we measure its degree of geographic dispersion by the number of regions in which the firm has operations.

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We find that the geographic dispersion of a corporation affects its value. Geographically dispersed firms, on average, experience a 6.2% valuation discount relative to their geographically concentrated counterparts, after controlling for firm-specific characteristics as well as industrial and global diversifications. The valuation discount increases as firms expand their operations to a greater number of regions. The evidence of value discount is robust to a host of sensitivity tests, including alternative measures of geographic dispersion and firm valuation metrics, as well as different sample selection criteria. We further verify that the valuation discounts are unlikely to be driven by the geographic expansion of firms with low valuations or by acquisitions of firms with low valuations. In particular, while firms expanding geographically through acquisitions experience a significant value loss after such expansion, these firms only represent a small fraction of the sample.

Our study proceeds to explore plausible explanations for why geographically dispersed firms are worth less than their geographically concentrated counterparts. We examine the agency problem-based explanations. Geographic expansions can arise from agency problems as such activities, while might not be value maximizing to shareholders, provide monetary and non-monetary incentives to management. Studies of industrial diversification offer some insights on the relation between agency problems and diversification decisions (see Denis et al., 1997).

In addition, expanding business and operating units across different regions might further increase costs of both external monitoring by shareholders and internal monitoring within the firm. Weaker external and internal control mechanisms in geographically dispersed firms would result in greater agency problems between management and shareholders and between divisional managers and firm management. For example, Landier et al. (in press) find that "[The] managerial alignment with shareholders is associated with the extent of a firm's geographic dispersion."

We find evidence consistent with the agency problem-based explanations. Based on the Investor Responsibility Research Center (IRRC) governance index as a proxy for quality of corporate governance (or the severity of agency problems), about 71% of our sample firms with weak corporate governance expand their operating units across regions, compared to about 56% of well governed firms. Geographically dispersed firms with low corporate governance quality experience an economically significant drop of 9.5% in firm value, whereas geographically dispersed firms with good governance exhibit no significant change in firm value.

Our study has several implications. The results suggest that the geographic location decisions of corporate activities form an essential component of corporate policies and are closely related to agency problem considerations. Existing studies of corporate location and expansion decisions in the economic and management literature generally focus on the benefits of regional assets such as skilled workforce, customer base, proximity of natural resources, corporate tax breaks, among many others. We show that agency problems are an important determinant of geographic expansion decisions and that geographic dispersion has significantly negative value implications. The results also provide evidence on the interaction between corporate governance and corporate organizations and its impact on shareholder value. Geographic dispersion aggravates agency problems and leads to greater value loss.

The remainder of this paper is organized as follows. The next section describes the sample and summary statistics. Section 3 presents the results on the relation between geographic dispersion and firm value. Section 4 explores possible causes of the valuation discount and the final section concludes.

2. Data description

2.1. Sample selection and measures of geographic dispersion

The data come from two main sources: the DCA and Compustat annual industrial and business segment files. The DCA database is available from the LexisNexis Group, a division of Reed Elsevier Inc., and contains business profiles and corporate linkages ("who owns whom") for approximately 184,000 public and private companies worldwide. It provides profiles of all major domestic and international companies for both parents and affiliates (subsidiaries and major divisions) and their locations. To be included in the database, U.S.-based companies must demonstrate annual sales in excess of $10 million and non-U.S.-based companies must demonstrate annual sales in excess of $50 million.

The principal organization of the DCA data is geographical (by parent company) and then hierarchical (by company reportage). U.S. companies or international companies are the ultimate parents, with subsidiaries of the same reporting level, irrespective of locations, classified in the same category. The corporate hierarchies can reach to the ninth level, but the database primarily reports main subsidiaries.[3] Although corporate hierarchies can extend to the ninth level, our study considers only first level subsidiaries of firms. Information on the geographic locations of these subsidiaries as well as of their parent firms offers us an opportunity to investigate the impact of a firm's geographic dispersion on its market value.[4] We select firms whose headquarters or holding companies are located in the United States and that have information available from both the DCA and Compustat databases.

Our study employs the DCA data to measure the extent of a firm's geographic distribution of its business and operating units or divisions. Our primary geographic dispersion classification is based on the Bureau of Economic Analysis' nine census regions in the

[3] According to the ownership information in the DCA, 89.2% of these first-level subsidiaries that have ownership information are wholly owned by parent firms, while the rest are at least 50% owned by parent firms.

[4] Compared with the DCA, the Compustat geographic segment file provides much less detailed information on geographic dispersion of firm operations. Compustat only reports up to four geographic segments, including the domestic segment. For more information about the definition of geographic segments in Compustat, see Denis et al. (2002).

United States. If a firm and its subsidiaries are located in different regions, the firm is classified as a geographically dispersed firm. For geographically dispersed firms, we further construct a variable measuring the number of regions where a firm has presence. For robustness checks, our analysis also uses an alternative measure of geographic dispersion based on the states of the locations of firm headquarters and its subsidiaries.

We also construct two corporate structure variables that are measures of corporate diversification. The first variable measures the level of industrial diversification of a firm. Firms that operate in different regions are more likely to be industrially diversified as well, and furthermore, industrial diversification is found to have a significant impact on firm value. We control for the impact of industrial diversification in our analysis. Following Berger and Hann (2003), we use the Compustat business segment file to determine the extent of a firm's industrial diversification. We aggregate all SFAS 131 operating segments that belong to the same line of business, i.e., having the same primary 4-digit SIC industry code. We exclude utility and financial firms (SIC codes 4900–4999 and 6000–6999, respectively) and firms with any industrial segment in utility or financial industries. We also exclude firm-years in which the consolidated firm sales are less than $20 million. The other variable measures the extent of a firm's global diversification. Firms that are geographically dispersed also tend to have significant global presence. Denis et al. (2002) show that global diversification affects firm value. We use the DCA information to construct a measure of global diversification based on the presence of a firm's subsidiaries in foreign countries.

For the period 1993–2003, our selection procedure results in a sample of 23,844 firm-years associated with 5117 firms that have the relevant information from both the DCA and Compustat databases. We first divide the full sample into two categories based on the level of geographic dispersion: (i) non-dispersed firms—firms with no subsidiaries outside the regional location of the firms' headquarters; (ii) dispersed firms—firms with subsidiaries outside the regional location of the firms' headquarters. For both groups of firms, we further intersect with our classification of global diversification. Finally, we classify the firms into four categories along the line of industrial diversification.

2.2. Summary statistics

Table 1 displays the distribution of geographic dispersion and industrial and global diversification measures for four firm categories within the single- (one business line and hence no industrial diversification) and multi-segment firms (at least two business lines and hence industrially diversified). 64.4% of the total number of observations consists of single-segment firms. Out of the single-segment firms, 51.8% have no geographic dispersion, as opposed to 28.0% in the case of multi-segment firms. 20.3% and 28.7% of single- and multi-segment parent firms, respectively, diversify only geographically, with the remaining firms diversify either globally or both geographically and globally. On average, approximately 40% of both geographically and globally diversified firms' subsidiaries are located outside the United States and more than 30% are located within the United States but outside the region of their parent firm's headquarters location.

Table 1 also shows that, on average, firms with greater industrial diversification tend to be more geographically dispersed than pure-play firms. Note that the number of industrial segments and sales-Herfindahl index are two measures of the degree of

Table 1
Descriptive statistics

			Geographic dispersion		Industrial diversification and global diversification			
	Observations	Total subsidiaries	Regional subsidiaries	Different regions†	Industry segments	Sales Herfindal	Global subsidiaries	Different countries†
Single-segment firms								
No geographic dispersion	7945	0.8 [0.0]	0.0 [0.0]	0.0 [0.0]	1.0 [1.0]	1.00 [1.00]	0.0 [0.0]	0.0 [0.0]
Only geographic dispersion	3117	6.5 [3.0]	3.9 [2.0]	2.0 [1.0]	1.0 [1.0]	1.00 [1.00]	0.0 [0.0]	0.0 [0.0]
Only global diversification	1615	5.7 [3.0]	0.0 [0.0]	0.0 [0.0]	1.0 [1.0]	1.00 [1.00]	4.4 [2.0]	3.9 [2.0]
Both geographic dispersion and global diversification	2669	16.6 [10.0]	5.0 [2.0]	2.5 [2.0]	1.0 [1.0]	1.00 [1.00]	8.6 [3.0]	6.3 [3.0]
Total	15,346	5.2 [2.0]	1.6 [0.0]	0.8 [0.0]	1.0 [1.0]	1.00 [1.00]	2.0 [0.0]	1.5 [0.0]
Multi-segment firms								
No geographic dispersion	2377	1.3 [0.0]	0.0 [0.0]	0.0 [0.0]	2.6 [2.0]	0.61 [0.63]	0.0 [0.0]	0.0 [0.0]
Only geographic dispersion	2448	7.0 [5.0]	4.0 [2.0]	2.3 [2.0]	2.7 [2.0]	0.46 [0.37]	0.0 [0.0]	0.0 [0.0]
Only global diversification	692	8.5 [5.0]	0.0 [0.0]	0.0 [0.0]	2.8 [2.0]	0.50 [0.48]	6.1 [3.0]	4.7 [2.0]
Both geographic dispersion and global diversification	2981	25.5 [15.0]	7.9 [4.0]	3.2 [3.0]	3.0 [3.0]	0.34 [0.26]	11.9 [4.0]	7.5 [3.0]
Total	8498	12.0 [5.0]	3.9 [1.0]	1.8 [1.0]	2.8 [3.0]	0.46 [0.39]	4.7 [0.0]	3.0 [0.0]

The table shows average values of geographic dispersion, industrial, and global diversification measures for 23,844 firm-year observations during the period 1993–2003, with median values indicated in box parentheses. Information on industrial diversification is from the Compustat Business Information File, and on geographic dispersion and global diversification is from the DCA. Single-segment firms are firms with no industrial diversification, while multi-segment firms are those with and have at least two industry segments. 'No geographic dispersion' refers to firms with neither global subsidiary nor subsidiary outside the region of their headquarters location. 'Only geographic dispersion' refers to firms with only subsidiaries outside the region of their headquarters location. 'Only global diversification' refers to firms with only global subsidiaries. 'Both geographic dispersion and global diversification' refers to firms with both local and global subsidiaries. 'Segments' define the number of a firm's industry segments. 'Sales Herfindal' is measured using a firm's sales across all industry segments. 'Geographic (Global) subsidiaries' measures the number of regional (global) subsidiaries. 'No. of regions' or 'No. of countries' defines the number of different regions or countries where a firm's subsidiaries are located. † indicates that the measures exclude the region/country of the parent firm's headquarter location.

Table 2
Firm characteristics

	Observations	Total assets	Total sales	Debt to assets	Capital expenditure to sales	R&D to sales	EBIT to sales	Advertising to sales
Single-segment firms								
No geographic dispersion	7945	482 [147]	578 [157]	0.237 [0.173]	0.101 [0.040]	0.080 [0.000]	−0.019 [0.051]	0.013 [0]
Only geographic dispersion	3117	1273 [277]	1420 [327]	0.292 [0.265]	0.074 [0.034]	0.031 [0.000]	0.041 [0.060]	0.008 [0]
Only global diversification	1615	1148 [174]	1320 [190]	0.189 [0.140]	0.085 [0.040]	0.092 [0.036]	0.030 [0.064]	0.012 [0]
Both geographic dispersion and global diversification	2669	2119 [430]	2092 [466]	0.209 [0.184]	0.059 [0.040]	0.056 [0.019]	0.07 [0.082]	0.011 [0]
Total	15,346	997 [195]	1091 [221]	0.239 [0.190]	0.087 [0.038]	0.067 [0.000]	0.013 [0.060]	0.010 [0]
Multi-segment firms								
No geographic dispersion	2377	609 [170]	681 [188]	0.253 [0.211]	0.088 [0.039]	0.040 [0.000]	0.016 [0.047]	0.010 [0]
Only geographic dispersion	2448	1430 [376]	1539 [448]	0.281 [0.274]	0.057 [0.035]	0.015 [0.000]	0.061 [0.064]	0.006 [0]
Only global diversification	692	1447 [505]	1537 [476]	0.224 [0.208]	0.065 [0.036]	0.054 [0.015]	0.063 [0.076]	0.014 [0]
Both geographic dispersion and global diversification	2981	4118 [1102]	4374 [1261]	0.245 [0.236]	0.053 [0.039]	0.032 [0.013]	0.079 [0.083]	0.010 [0]
Total	8498	2144 [427]	2293 [480]	0.256 [0.238]	0.065 [0.038]	0.031 [0.001]	0.055 [0.068]	0.009 [0]

The table reports average values of firm characteristics with median values in box parentheses for the full sample of 23,844 firm-years over the period of 1993–2003. The subsample firm classification is defined in Table 1. Debt to assets ratio is the sum of long-term debt and short-term debt to the book value of assets. R&D and advertising expenditures are set to 0 if missing. Total assets, and total sales are in millions of dollars.

industrial diversification. For example, multi-segment firms have an average of 12 subsidiaries that report directly to them, compared to 5.2 in the case of single-segment firms. Furthermore, multi-segment firms' subsidiaries are more geographically dispersed than their single-segment counterparts. On average, the former are located in 1.8 different regions of the United States and 3 different countries worldwide, while the latter are in 0.8 different regions and 1.5 different countries.

Table 2 presents the summary statistics of firm characteristics. Within each firm category, it shows annual average values of a firm's debt–assets ratio (the sum of long-term debt and short-term debt to the book value of total assets), total assets, sales, capital expenditures to sales ratio, research and development (R&D) to sales ratio, earnings (EBIT) to sales ratio, and advertising to sales ratio. The firm characteristics show some systematic patterns across single- and multi-segment firms and across firms with varying degrees of geographic dispersion. For instance, firms with both global and local geographic dispersion are the largest in terms of total assets and total sales, whereas firms with no geographic dispersion are the smallest. Compared with other sub-groups, firms with only local geographic dispersion, both single-segment and multi-segment, are highly leveraged, but have both the lowest R&D expenditure to sales and advertising to sales ratios. In contrast, firms with only global diversification are the least leveraged, but tend to invest more in R&D and advertising relative to their total sales.

In our subsequent analysis, we employ the group of single-segment firms with no geographic dispersion as our benchmark portfolio of firms. As we discussed above, these benchmark firms are on average much smaller than other groups of single-segment firms. In addition, they are also much smaller than the industry segments of multi-segment firms with both local and global diversification. For example, the sales volume of benchmark firms (mean value of $578 million) is less than a third of the sales volume of their counterpart firms with both local and global diversification (mean value of $2092 million).[5] Previous studies in the industrial diversification literature suggest that the size differences can account for part of the differential market valuation across diversifying and pure-play firms.[6] In other words, industrially diversified firms might have a smaller value discount or even no value discount when compared with pure-play firms of similar size. We take this potential bias into account when measuring firm value.

3. Geographic dispersion and firm value

3.1. Main findings

In this section, we conduct both the univariate and multivariate analyses to investigate the valuation impact of geographic dispersion.

3.1.1. Univariate analysis

We begin by computing the excess value of geographically dispersed firms using the methodology developed by Berger and Ofek (1995) and modified by Bodnar et al. (1999, 2004), and Denis et al. (2002). One reason for such an approach is that a large proportion of our sample firms, particularly firms that are geographically dispersed, are industrially diversified. The methodology of Berger and Ofek can account for the impact of industrial diversification on firm value. We also employ various alternative measures of firm valuation, including Tobin's *Q*, in the robustness tests of our results.

The construction of firm excess value is as follows. For industrially diversified firms, we select two matching firms with the same 4-digit SIC code from the benchmark portfolio, one with sales right above the sales of the segment and one with sales right

[5] The characteristics of industry segments are available upon request.
[6] For example, see Santalò (2002), Maksimovic and Phillips (2002), and Gomes and Livdan (2004).

Table 3
Excess value measures

	Observations	Median	Mean	Q1	Q3	Standard deviation
Single-segment firms						
No geographic dispersion (base)	7868	0.000	−0.004	0.000	0.000	0.119
Only geographic dispersion	2761	−0.115 [a, b]	−0.100 [a, b]	−0.542	0.337	0.616
Only global diversification	1373	−0.118 [a, b]	−0.122 [a, b]	−0.604	0.334	0.64
Both geographic dispersion and global diversification	2382	−0.042 [a, b]	−0.047 [a, b]	−0.519	0.419	0.646
Total	14,384	0.000	−0.041	−0.036	0.000	0.437
Multi-segment firms						
No geographic dispersion (base)	1971	−0.184 [a]	−0.142 [a]	−0.602	0.28	0.629
Only geographic dispersion	2137	−0.196 [a]	−0.180 [a, b]	−0.623	0.232	0.597
Only global diversification	582	−0.177 [a]	−0.156 [a]	−0.588	0.261	0.603
Both geographic dispersion and global diversification	2593	−0.164 [a]	−0.167 [a]	−0.6	0.246	0.586
Total	7283	−0.178	−0.163	−0.607	0.254	0.603

The table shows the descriptive statistics of excess value measures for the sample firms during the period 1993 to 2003. Excess value is measured as the log of the ratio of a firm's total capital to the sum of imputed values of its industry segments. Imputed segment values are calculated by multiplying an industry segment's sales by either the average ratio of total capital to sales of two benchmark firms, or just the ratio of total capital to sales of the matching firm if there is only one matching firm. The subsample firm classification is defined in Table 1. Significance of means and medians is tested by a standard two-tailed *t*-test and a two-tailed signed-rank test.

[a] Denotes the mean or median excess value is different from 0 at the significance level of 5%.

[b] Denotes that, within single-segment firms and multi-segment firms, respectively, the difference between the base category and other categories in mean or median excess value is different from 0 at the significance level of 5%.

below. For single-segment firms, we adopt the same approach and select two matching firms with the same 4-digit SIC code from the benchmark portfolio. For both types of firms, we use the single-segment firms with no geographic dispersion as our benchmark portfolio. If we cannot find two matching firms meeting these requirements, then we use the matching firm with sales closest to that of the firm in question. This approach helps control for size when determining matching firms, in light of the large discrepancy in size between benchmark firms and single- and multi-segment firms from other categories. We also require the availability of at least three firms within the same industry (Villalonga, 2004). If there are fewer than three firms in the 4-digit SIC code, we use a 3-digit SIC code, and so forth. Using this algorithm, about 75% of all the segments associated with multi-segment firms and single-segment firms have two matching firms, and 25% of the sample has one matching firm.

We next calculate the imputed value of each segment of a firm by multiplying the segment's sales by either the average ratio of total capital (as defined earlier) to sales of two benchmark firms, or just the ratio of total capital to sales of the matching firm if there is only one matching firm. The sum of the imputed values of a company's segments provides the estimated value of a multi-segment firm, assuming all of its segments are operated as pure-play businesses. For a single-segment firm, its estimated value is derived from size-matched benchmark portfolio firms. A firm's excess value is then measured as the log ratio of the firm's actual total capital to its imputed value.[7]

Univariate results of excess value measures are reported in Table 3. We divide the sample firms into eight categories according to their geographic, global, and industrial diversification status, just as we do in Tables 1 and 2. Then we test the mean and median excess values of each category against 0 to see if there is any significant value discount. The results show that all the categories, except the benchmark or base category (i.e., firms without any form of diversification), exhibit a significant value discount. On average, firms that are both industrially and geographically diversified have the most value discount (mean=−0.180; median=−0.196), while firms that are both geographically and globally diversified have the least value discount (mean=−0.047; median=−0.042).

Further, to examine the marginal effect of geographic dispersion within industrially diversified and non-diversified firms, respectively, we test the difference between the base category and other categories in means and medians. It indicates that, within non-industrially diversified firms, all the three categories with geographic or global diversification exhibit more value discount compared with the base category. Interestingly, within industrially diversified firms, only the category with geographic dispersion exhibits, on average, more value discount relative to the base category. Overall, Table 3 suggests that all three types of diversification, as well as their interactions, have varying negative impacts on firm value.

3.1.2. Multivariate regression analysis

We now examine the relation between geographic dispersion and firm value in the regression analysis. We pool all firm-year observations together and use one-way fixed effect regression models that include eleven year dummy variables to control for time variation. We account for serial correlation by allowing for clustering of the error term at the firm level. Specifically, we report clustered standard errors or Rogers standard errors in all our regressions; such standard errors have been adjusted to correct for serial correlation in residuals within a cluster (e.g. within a firm or an industry).[8] Our regression models also control for both industrial diversification and global diversification to ensure that geographic dispersion is not merely a proxy for these two effects. Furthermore, we control for other possible determinants of firm valuation, and they include leverage, as a proxy for any financing

[7] Following prior studies, such as Berger and Ofek (1995), Denis et al. (2002) and Villalonga (2004), firm-years are considered outliers if their imputed value is higher than four times or lower than a fourth of their true value.

[8] See Petersen (in press) for a detailed discussion of this method.

Table 4
Impact of geographic dispersion on firm valuation

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	−0.088 (−6.76)	−0.084 (−6.55)	−0.069 (−5.30)	−0.073 (−5.73)	−0.086 (−6.44)
Geographic dispersion	−0.092 (−7.67)		−0.062 (−5.10)		
Number of different regions				−0.025 (−6.61)	
Industrial diversification	−0.211 (−15.72)	−0.219 (−16.53)	−0.207 (−15.48)	−0.204 (−15.33)	
Global diversification		−0.135 (−10.36)	−0.118 (−8.85)	−0.111 (−8.11)	
Only geographic dispersion					−0.036 (−2.08)
Only industrial diversification					−0.142 (−7.19)
Only global diversification					−0.104 (−4.59)
Both geographic and industrial diversification					−0.252 (−12.61)
Both geographic and global diversification					−0.121 (−5.81)
Both industrial and global diversification					−0.255 (−7.91)
Geographic, industrial, and global diversification					−0.423 (−20.27)
Log assets	0.29 (33.86)	0.297 (35.34)	0.303 (35.55)	0.308 (35.72)	0.305 (35.59)
Debt to assets	−0.378 (−9.95)	−0.385 (−10.09)	−0.383 (−10.02)	−0.386 (−10.02)	−0.386 (−10.08)
Capital expenditure to sales	0.67 (12.76)	0.674 (12.68)	0.664 (12.62)	0.660 (12.55)	0.662 (12.55)
EBIT to sales	0.265 (5.93)	0.263 (5.90)	0.262 (5.90)	0.262 (5.92)	0.261 (5.89)
R&D to sales	0.359 (2.16)	0.356 (2.16)	0.351 (2.15)	0.351 (2.15)	0.351 (2.15)
Advertising to sales	0.267 (1.91)	0.34 (2.41)	0.313 (2.23)	0.291 (2.08)	0.291 (2.28)
Adjusted R^2	0.276	0.281	0.283	0.285	0.286
Observations	20,481	20,481	20,481	20,481	20,481

The table shows regression estimates of the full sample over the period 1993 to 2003. The dependent variable is firm excess value. 'Geographic dispersion' equals 1 if a firm is geographically dispersed, and 0 if otherwise. 'Industrial diversification' equals to 1 if a firm is industrially diversified, and if 0 otherwise. 'Global diversification' equals 1 if a firm is internationally diversified, and 0 if otherwise. In Model 4, 'Number of different regions' is the number of different regions where a firm's subsidiaries are located. In Model 5, 'Only geographic dispersion' equals 1 if a firm is only geographically diversified, and 0 if otherwise; 'Only industrial diversification' equals 1 if a firm is only industrially diversified, and 0 if otherwise; 'Only global diversification' equals 1 if a firm is only internationally diversified, and 0 if otherwise; 'Both geographic and industrial diversification' equals 1 if a firm is both geographically and industrially diversified, and 0 if otherwise; 'Both geographic and global diversification' equals 1 if a firm is both geographically and internationally diversified, and 0 if otherwise; 'Both industrial and global diversification' equals 1 if both industrially and internationally diversified, and 0 if otherwise; 'Geographic, industrial, and global diversification' equals 1 if a firm is geographically, industrially, and internationally diversified, and 0 if otherwise. All control variables are measured relative to the sales-weighted average of the corresponding measure of the matching firms for each segment and include fixed-year effects. *t*-statistics are adjusted for clustering at the firm level and reported in parentheses.

benefits or costs of being geographically diversified, R&D and advertising expenditures for a firm's proprietary assets, the ratio of EBIT to sales for firm profitability, the ratio of capital expenditure to sales for growth opportunities, and the book value of assets for firm size. All these control variables are relative measures computed as the difference between the value of a firm and the weighted average of the mean value of each segment's matching firms.

Table 4 displays regression coefficients of different models that capture the impact of geographic dispersion on firm value. For brevity, the table does not report regression coefficients of the year dummies. Model 1 examines the impact of geographic dispersion on firm excess value, while controlling for industrial diversification. The geographic dispersion dummy equals one if a firm is geographically dispersed and 0 if otherwise, and the industrial diversification dummy equals one if a firm is industrially diversified and 0 if otherwise. The results demonstrate that geographic dispersion causes a negative and statistically significant valuation effect, even after controlling for industrial diversification. The evidence suggests that firms that are geographically dispersed tend to experience a valuation discount of 9.2% (*t*-statistic=−7.67). In comparison, the valuation discount associated with industrial diversification is 21.1% (*t*-statistic=−15.7). The coefficient estimates of all other control variables bear the same signs as those reported in prior studies. Firm size, investment opportunities, profitability, R&D and advertising expenditures are all positively related to firm excess value. Only leverage has a significantly negative relation to excess value. In fact, these coefficients together with that on the industrial diversification dummy remain fairly stable across the different models of this table as well as of subsequent tables.

Model 2 reports the results of only global diversification effects on firm value, controlling for industrial diversification and firm-specific variables. The global diversification dummy equals 1 if a firm is globally diversified, and 0 if otherwise. Estimating Model 2 facilitates the comparison of the results from our sample with those of prior research. The coefficient on the global diversification dummy is −0.135 (*t*-statistic=−10.36), implying a 13.5% valuation discount associated with globally diversified firms. This result is consistent with those documented in Denis et al. (2002) and Fauver et al. (2004). Both studies show that globally diversified firms are valued significantly less than their domestic counterparts. Denis, Denis, and Yost obtain a valuation discount of 18.2% over a sample period of 1984–1997, and Fauver, Houston, and Naranjo report a 6.3% global diversification discount during their sample period of 1991–1995.

Model 3 examines the impact of geographic dispersion, while controlling for both industrial and global diversifications. Results suggest that geographic dispersion discount persists even in the presence of global and industrial diversification. All the coefficients of geographic, industrial, and global diversification dummies are negative and statistically significant; they are −0.062 (*t*-statistic=−5.10), −0.207 (*t*-statistic=−15.48), and −0.118 (*t*-statistic=−8.85), respectively. In comparison with their counterpart coefficients in Models 1 and 2, the magnitude and level of statistical significance have reduced. However, the regression results of Model 3 suggest that neither industrial diversification nor global diversification is able to completely subsume the valuation effect

of geographic dispersion. Geographic dispersion contributes to a significant 6% decline in firm value. Regression estimates of Model 3 also provide robust evidence that firms that diversify along business lines are valued unfavorably relative to non-diversified firms. Given that many industrially diversified firms are also geographically dispersed, part of the discount for industrially diversified firms can be attributed to geographic dispersion.

Model 4 employs the number of regions in which a firm operates as a measure of geographic dispersion. In this regression, we examine whether the extent of a firm's geographic dispersion relates to the level of valuation discount we have found. Model 4 is similar to Model 3, except that we use the number of regions in place of the geographic dispersion dummy. From the results of Model 4, it is evident that the greater the degree of a firm's geographic dispersion, the greater is its value discount. The coefficient on the number of different regions is negative and statistically significant. For robustness checks, we also employ an alternative measure of geographic dispersion: the number of subsidiaries located outside the region of a parent firm's headquarters location rather than the number of regions in which the firm operates. The results are qualitatively similar. In unreported tests, we also use the number of different segments to measure the degree of industrial diversification and the number of foreign countries in which a firm operates to measure the degree of global diversification in Model 4; the negative impact of geographic dispersion on firm value still remains statistically significant.

Model 5 investigates the valuation effect of geographic dispersion, while controlling for the interaction of the three types of diversification. We take the benchmark firms (i.e., firms without any type of diversification) as the base case and construct seven dummy variables representing (1) firms that are only geographically diversified, (2) firms that are only industrially diversified, (3) firms that are only globally diversified, (4) firms that are both geographically and industrially diversified, (5) firms that are both geographically and globally diversified, (6) firms that are both industrially and globally diversified, and (7) firms that are geographically, industrially, and globally diversified. We find the coefficients of the dummy variables to be significantly negative, suggesting a value discount for each category of firms relative to the benchmark firms. Of particular interest is that the coefficient of the dummy variable associated with only geographic dispersed firms is significant, and its magnitude is −0.036. Thus, the evidence from this model corroborates the conclusion that geographic diversification is value decreasing.[9]

The results further show that the compounded effect of diversification is much stronger. Specifically, the value discount is smaller for firms with only one type of diversification than for firms with additional one or two types of diversification. For example, the value discount for industrially diversified firms is −0.142, which is significantly lower than the value discount for both geographically and industrially diversified firms (−0.252), for both globally and industrially diversified (−0.255), or for geographically, globally, and industrially diversified firms (−0.423). This finding is in sharp contrast to the univariate results of Table 3, where only geographic dispersion exhibits additional value discount in industrially diversified firms, while neither global diversification nor the combination of global and geographic diversifications exhibits any additional value discount in industrially diversified firms.

3.2. Changes of geographic dispersion and firm value

We have shown that geographically dispersed firms have a lower market valuation relative to their non-geographically dispersed counterparts after controlling for both industrial diversification and global diversification. Furthermore, the market valuation falls as the degree of geographic dispersion increases. In this subsection, we study a sample of firms that initiate geographic expansion of their businesses during the sample period and examine the impact of this geographic expansion on firm value.

Analyzing the effect of changes in firm geographic dispersion on changes in firm value offers important insights on the relation between geographic dispersion and firm value. Also, the analysis provides more robustness tests on our earlier cross-sectional results. More important, we use the change of geographic dispersion to address two issues associated with the causality of the value impact. As commonly argued in the industrial diversification literature (for example, Lang and Stulz, 1994; Hyland and Diltz, 2002; Campa and Kedia, 2002), the value discount associated with industrial diversification could result from the fact that industrially diversified firms have poor performance prior to conglomeration. Thus industrial diversification per se does not account for the entire valuation discount observed in conglomerates. One might similarly argue that the value discount associated with geographic dispersion is driven by poor market valuation before geographic expansion. That is, poorly performing firms choose to diversify geographically. In addition, Graham et al. (2002) provide evidence that part of the value discount associated with industrial diversification reflects acquisitions of firms that have low market valuation by conglomerates.

This subsection addresses the above two issues. We investigate the excess value of firms prior to and following their geographic expansion and how such changes in geographic dispersion status affect firm value. We also examine the specific activities behind geographic expansion, specifically whether firms expand to other regions through acquisitions or setting up new subsidiaries in other regions through internal growth, and how these two different forms of expansions influence firm valuation.

We identify firm-years that firms initiate geographic expansion from no geographic dispersion status and with no change in the number of industry segments. We denote the year when the change of diversification status occurs as $Year_0$, the year prior as $Year_{-1}$, and the year following as $Year_{+1}$. It is likely that some firms might change their geographic dispersion status more than once during the sample period. We require that the firms stay in the sample for at least three consecutive years, one year before and one year after the geographic expansion. We then examine firm excess values for these firm-years in $Year_{-1}$ to determine whether

[9] In the case of geographic dispersion, some firms may find that it is not necessary to set up a subsidiary in another region, even when they have expanded their businesses to that region. These firms are classified as non-geographically diversified and fall into our benchmark portfolio. This would lead to a non-result bias.

Table 5
Changes in geographic dispersion and excess value

	Observations	Mean	Median
Panel A: full sample			
$Year_{-1}$ excess value	248	−0.021	0.058
$Year_{+1}$ excess value	248	−0.054	−0.064
$Year_{+1}$ − $Year_{-1}$ excess value	248	−0.033	−0.023
Panel B: expand by M&A			
$Year_{-1}$ excess value	24	0.222*	0.327*
$Year_{+1}$ excess value	24	0.061	0.084
$Year_{+1}$ − $Year_{-1}$ excess value	24	−0.161	−0.218*
Panel C: expand by internal growth			
$Year_{-1}$ excess value	224	−0.046	−0.019
$Year_{+1}$ excess value	224	−0.060	−0.078†
$Year_{+1}$ − $Year_{-1}$ excess value	224	−0.014	−0.017
Panel D: difference between M&A and internal growth			
$Year_{-1}$ excess value		0.268*	0.336*
$Year_{+1}$ excess value		0.121	0.162
$Year_{+1}$ − $Year_{-1}$ excess value		−0.147	−0.201

The table reports mean and median excess values together with changes in geographic dispersion during the period 1993 to 2003. Excess value is calculated as the log of the ratio of a firm's total capital to the sum of imputed values of its industry segments. Imputed segment values are found by multiplying segment sales by the mean ratio of total capital to sales from two single-segment firms of the same industry with no geographic dispersion, one with sales right above the segment sales and the other with sales right below the segment sales, or by the ratio of total capital to sales of a firm with sales closest to the segment sales if no two firms satisfying the requirements are found. $Year_{-1}$ excess value and $Year_{+1}$ excess value are the excess values in the year prior to and in the year after the change in geographic dispersion status, respectively. 'Expand by M&A' refers to the category of firms that expand by acquiring existing firms located in other regions. 'Expand by internal growth' refers to the category of firms that expand by setting up new geographic divisions. Significance of means and medians is tested by a standard two-tailed *t*-test and a two-tailed signed-rank test. * denotes significance at the 5% level and † denotes significance at the 10% level.

firms choose to be geographically diversified because they have large valuation discounts. Furthermore, we investigate changes in firm valuations to determine whether a change in geographic dispersion status causes any valuation discount. The change in firm excess values is computed between $Year_{-1}$ and $Year_{+1}$. The results are offered in Table 5.

Panel A shows that, overall, geographic dispersion is not a strategy driven by poor performance. Firms have an average excess value of −0.021 and a median excess value of 0.058 in the year prior to their expansions to different regions nationwide. However, neither the mean nor the median is statistically significant, indicating no evidence that poor performance drives geographic dispersion strategies. Notwithstanding this, firms that initiate geographic dispersion tends to subsequently suffer a valuation loss. On average, firm excess value declines to −0.054 (median = −0.064) in the year after the expansion. Also, the change in excess value has a negative mean of −0.033 (median = −0.023). Though neither the mean nor the median is statistically significant, the results still show considerable reductions in firm value, compared to prior year's performance.

We then proceed to consider how firms expand geographically and how different means of expansions relate to firm value discount. First, we identify the specific activity behind firms' geographic dispersion by merging the sample of firm-years shown in Panel A with the SDC merger/acquisition database and find 31 matches. We exclude one match for which we cannot identify the target firm's location. We classify 24 matches for which the target firm and the acquiring firm are located in different regions as "Expand by M&A". We categorize the remaining six matches for which the target firm and the acquiring firm are located in the same region together with those observations that have no matches in the SDC database as "Expand by internal growth". It is evident that only a small fraction of geographic expansions are through M&A, which contrasts earlier findings that the majority of industrial diversification result from acquisitions (Graham et al., 2002; Hyland and Diltz, 2002).

Panels B, C, and D show valuation effects resulting from different means of expansions. During the year prior to geographic expansion, firms that expand by M&A maintain a statistically significant positive average excess value of 0.222 (median = 0.327). In contrast, firms that expand by internal growth experience some value loss, averaged at −0.046 (median = −0.019). The difference in excess value between the two groups of firms is averaged at 0.268 and is statistically significant at the 5% level. In the year following geographic dispersion, both categories of firms experience a reduction in excess value. The average excess value for firms that expand by M&A reduces to 0.061 and is no longer significantly above 0, while the average excess value for firms that expand by internal growth decreases to −0.06 (median = −0.078), and the median is significantly less than 0 at the 10% level. The change in firm excess value between the two years is negative for both forms of expansions. For example, firms that expand by M&A have an average change in excess value of −0.161 (median = −0.218), and the median value is marginally significant. Firms that expand by M&A also experience more value reduction than those that expand by internal growth. Because of the small sample of M&A firms, the difference of the two value reductions is not statistically significant. Overall, the evidence suggests that firms that expand geographically exhibit no low market valuation prior to expansion. This is especially true for firms that expand geographically through M&As as they even exhibit a valuation premium before expansion. The results are consistent with the notion that acquisition targets are firms with low market valuation. However, most firms expand geographically through internal growth and not through M&As, and these firms also experience value losses through geographic expansion.

Table 6
Sensitivity and robustness tests

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	−0.103 (−7.43)	−0.069 (−5.11)	−0.093 (−6.80)	−0.069 (−7.53)	−0.053 (−3.88)	−0.025 (−2.39)
Geographic dispersion	−0.051 (−3.66)	−0.047 (−3.58)	−0.064 (−5.18)	−0.039 (−3.79)	−0.056 (−4.49)	−0.087 (−8.27)
Industrial diversification	−0.079 (−5.74)	−0.278 (−17.33)	−0.195 (−14.38)	−0.095 (−8.39)	−0.195 (−14.45)	−0.246 (−20.25)
Global diversification	−0.084 (−5.33)	−0.11 (−7.73)	−0.112 (−8.16)	−0.033 (−2.81)	−0.121 (−8.90)	−0.159 (−13.52)
Size	0.099 (26.46)	0.314 (34.30)	0.28 (34.39)	0.046 (6.92)	0.295 (34.65)	0.414 (48.73)
Debt to assets	−0.069 (−3.33)	−0.373 (−8.92)	−0.059 (−2.78)	−0.53 (−8.96)	−0.366 (−8.90)	−0.169 (−7.20)
Capital expenditure to sales	0.600 (13.79)	0.672 (13.63)	0.597 (10.51)	0.139 (5.21)	0.73 (12.06)	0.54 (12.96)
EBIT to sales	0.091 (3.50)	0.259 (5.91)	0.284 (5.34)	0.194 (5.89)	0.478 (8.81)	0.129 (4.52)
R&D to sales	0.219 (4.92)	0.31 (2.07)	0.388 (2.03)	0.160 (3.01)	1.103 (8.97)	0.256 (2.23)
Advertising to sales	0.158 (1.06)	0.343 (2.37)	0.189 (1.39)	0.467 (3.06)	0.498 (3.04)	0.041 (0.36)
Adjusted R^2	0.134	0.289	0.227	0.151	0.313	0.505
Observations	21,608	18,058	20,314	20,713	18,643	20,481

The table shows fixed-effects regressions of firm excess value on the geographic dispersion, industrial, and global diversification dummies for the period 1993–2003. Models 1 to 5 use the book value of assets as a measure of firm size. Model 1 computes imputed segment values by multiplying the median ratio of total capital to sales for single-segment firms with no geographic dispersion in the same industry by segment sales. Model 2 employs the sample in which all firm-years with any industry segment sales less than $20 million are excluded. In Model 3, the geographic dispersion status is based on the state classification. Model 4 computes imputed segment values using assets multiple. Model 5 employs a sample in which any industry segment sales that are less than $40 million are allocated to larger segments. Model 6 uses total capital as a measure of firm size. All control variables are measured relative to the weighted average of the corresponding measure of the matching firms. *t*-statistics are adjusted for clustering at the firm level and reported in parentheses.

One concern about our finding is that the SDC database may not contain all M&A activities that are related to geographic expansion. While we may not have detected all the geographic expansions by M&As, the geographic divisions we examine are relatively large and the probability of these firms being listed in the SDC database should be very high if they were established by existing acquiring firms. So the impact of such an omission on the results should be small.

3.3. Robustness checks

In this section, we conduct a battery of robustness checks, including alternative computation methods for firm excess value, alternative sample selection criteria, alternative measures of geographic dispersion, and alternative size control variables. These various tests generate qualitatively similar results to those reported above, hence providing reinforcing evidence of the negative valuation effect associated with geographic dispersion.

3.3.1. Different benchmark portfolios

As discussed above, our benchmark portfolios contain single-segment, non-geographically dispersed firms. The firms in the benchmark portfolio generally are much smaller than some geographically dispersed single-segment firms, and even smaller than some industry segments in industrially diversified firms. In light of this, we have selected matching firms of the same industry and of similar sizes. This selection procedure contrasts with most of the prior studies that use industry medians to compute the imputed values of firms. To check the sensitivity of our results to various computation methods for firm excess value, we match segments with industry medians. Similar to our earlier matching firm method, we also require a minimum of three firms in the same industry. The imputed value for 41.5% of all observations at the segment level is based on four-digit SIC code industries, 20% on three-digit SIC code industries, 31.7% on two-digit SIC code industries, and 6.2% on one-digit industries, leaving 0.6% of the observations out.

We find that matching by firms with similar sizes differs substantially from matching by industry medians. Not surprisingly, the discrepancy in size between industry segments and benchmark firms is much smaller if we match firms of similar sizes. In addition, more segments are matched with smaller benchmark firms based on the industry median method. For example, based on this method, 18,891 out of 34,534 segment-level observations are matched with smaller benchmark firms. While under the matching by firms of similar sizes method, only 13,555 out of 34,534 observations are matched with smaller benchmark firms.[10] Despite the difference in the matching firms based on industry medians, our main findings are robust to this alternative computation method for excess value. Table 6 reports the robustness tests of our basic multivariate regression Model 3 of Table 4. Model l of Table 6 reports that, under this modified computation method, the value discount related to geographic dispersion is 5.1%. The magnitude of the value discount associated with geographic dispersion is comparable to the result in Table 4. However, the value discounts associated with industry and global diversifications are smaller than the results reported in Table 4.

3.3.2. Smaller sample

As noted earlier, to construct our sample, we do not simply delete firm-year observations in which some industrial segment has sales less than $20 million. Instead, we allocate sales from small segments to other segments in the firm. An alternative approach is to eliminate these firm-years. This criterion results in a sharp decrease in the number of multi-segment firms. Out of the resulting sample of 20,910 firm-year observations, only 5564 are multi-segment firms. We compute excess value measures based on this

[10] These unreported results are available upon request.

smaller sample and run multivariate regressions. The results, presented in Model 2, are qualitatively similar to the evidence based on our original sample, except for a slightly reduced valuation discount of 4.7% associated with geographic dispersion.

3.3.3. Geographic dispersion across states

An alternative means of defining a firm's geographic dispersion status is by state instead of by region. That is, we classify a firm to be diversified geographically if it expands its operations to other states beyond the state of its headquarters location. In this case, we define a firm as being geographically diversified if it has subsidiaries outside the state of its parent firm. Under this classification method, more firms become geographically dispersed. Model 3 shows that the value discount of −6.4% associated with geographic dispersion is robust to this alternative definition.

3.3.4. Alternative valuation measures

Other valuation measures in the diversification literature include assets multiples and EBIT multiples (Berger and Ofek, 1995) or Tobin's *Q* at the firm level (Lang and Stulz, 1994). Due to data constraint, using EBIT multiples would dramatically reduce our sample size. Thus we conduct a robustness check against assets multiples. Since it is more often for multi-segment firms not fully allocating firm assets to their reported segments than to their sales, we require the sum of segment assets to be within 25% of their consolidated total value. For those observations meeting this requirement, we explicitly allocate any unallocated assets to the segments. The sample is slightly smaller than that based on sales multiples. The regression results, shown in Model 4, are qualitatively the same as those based on sales multiples. Results based on Tobin's *Q*, not reported, show similar patterns of valuation discounts for geographically dispersed firms.

3.3.5. Alternative size control

Bodnar et al. (2004) argue that the value impact of global diversification is sensitive to firm size, both in terms of setting a minimum benchmark criterion for inclusion in the sample and in defining the size control variable. In this section, we set a minimum of $40 million for sales and get a sample of 21,503 firm-year observations, and out of which 7865 are multi-segment firms. Model 5 shows the regression results. In contrast to Bodnar, Tang, and Weintrop's arguments, the robustness of our earlier findings are maintained. Both geographic dispersion and global diversification have almost the same impact on excess value measures as the regression results from our original sample.

To check the sensitivity of size control variable, we use market value of assets as the alternative size variable and the results are shown in Model 6. It is evident that there is a significant increase in the explanatory power of the model from 28.3% (Model 3 of Table 4) to 50.5%. Nevertheless, our key results still hold. The only exception is that, when the market value of assets acts as a proxy for size, the valuation impact of geographic dispersion is greater—8.7% for geographic dispersion and 15.9% for global diversification.

4. Causes of the valuation discount

In this section, we explore the possible explanations of the value loss from geographic dispersion. Specifically, we ask whether and how a firm's anti-takeover index, a proxy for corporate governance, relates to our finding of value discount.

Corporate governance can contribute to the observed value discount in two ways. First, management of poorly governed firms could pursue corporate strategies that increase their own benefits, even though these strategies are not value maximizing to shareholders. For example, expanding business geographically increases firm size and consequently could provide both monetary and non-monetary gains to corporate executives. Second, geographic dispersion increases the difficulty of external monitoring by shareholders and of internal monitoring within a firm. If a firm becomes geographically dispersed, weaker external and internal control mechanisms might result in greater agency problems between management and shareholders and between divisional managers and firm management.

We employ corporate governance information from IRRC. Since IRRC does not update its publication yearly,[11] we follow Gompers et al. (2003) by using previously available data in between the updates. We merge the IRRC data set with our original sample and end up with 8618 firm-year observations for the period 1993 to 2003. We use the IRRC governance index that incorporates firm-specific anti-takeover provisions (ATPs) as a proxy for governance quality. The governance index takes into account 24 different provisions in five categories—tactics for delaying hostile bidders, voting rights, director/officer protection, other takeover defenses, and state laws. The governance index for each firm varies between 0 and 24, which is constructed by adding one point for every specific provision in place and zero otherwise. As a result, a higher governance index score implies more restricted shareholder power or more severe agency problems. We perform the following tests using this governance index.

First, we establish whether a firm's geographic dispersion state is related to its governance quality. Results are presented in Table 7. The dependent variable of Model 1 is equal to 1 if a firm is geographically dispersed, and 0 if otherwise. Model 2 uses a subsample of firm-year observations in which the sample firms are geographically dispersed, and the dependent variable is the number of different regions. The independent variables in both models include the governance index and firm-specific controls used in Table 4. Results show that both coefficients on the governance index are statistically significant at conventional levels. The coefficient estimate is 0.124 in Model 1, implying that for one unit increase in the governance score, the ratio of the probability of dispersion versus the probability of no dispersion will increase by $[e^{0.124}-1]*100\% = 13.2\%$, holding everything else constant. In

[11] The IRRC data are available only for the years 1990, 1993, 1995, 1998, 1999, 2002, and 2004.

Table 7
Geographic dispersion states and governance quality

Variables	Model 1	Model 2	Model 3	Model 4
Intercept	−0.882 (−5.19)	1.790 (9.59)	−0.072 (−0.99)	2.184 (21.39)
Governance index	0.124 (6.62)	0.068 (3.76)		
High governance score			0.535 (5.58)	0.392 (4.00)
Log assets	0.636 (12.43)	0.472 (10.02)	0.648 (12.61)	0.472 (10.11)
Debt to assets	0.171 (1.03)	−0.053 (−0.32)	0.177 (1.07)	−0.039 (−0.23)
Capital expenditure to sales	−0.851 (−2.26)	−0.785 (−3.70)	−0.909 (−2.46)	−0.817 (−3.81)
EBIT to sales	−0.329 (−1.67)	−0.052 (−0.23)	−0.334 (−1.69)	−0.051 (−0.23)
R&D to sales	−1.813 (−4.28)	−0.894 (−1.95)	−1.835 (−4.29)	−0.888 (−1.92)
Advertising to sales	−1.971 (−1.55)	−2.201 (−1.83)	−2.217 (−1.74)	−2.263 (−1.89)
Adjusted R^2	0.169	0.084	0.159	0.085
Observations	8,334	5,347	8,334	5,347

The table shows fixed-effects regressions of firms' geographic dispersion states against the governance quality over the period 1993 to 2003. Models 1 and 3 are logit regressions based on the full sample, i.e., all firm-year observations whose governance indexes are available. The dependent variable is 1 if a firm has subsidiaries outside the region of its headquarters location, and 0 if otherwise. Models 2 and 4 are based on a restricted sample, i.e., the firm-year observations that are geographically dispersed. The dependent variable is the number of different regions in which a firm's subsidiaries are located. The governance index indicates the number of anti-takeover provisions adopted by a firm. High governance score equals 1 if a firm's governance index is above the median governance index of all the sample firms within each year; 0 if otherwise. *t*-statistics are adjusted for clustering at the firm level and reported in parentheses. Pseudo R^2 is reported for Model 1.

Model 2, the governance index has a coefficient of 0.068, suggesting the number of different regions in which a firm's subsidiaries are located will increase by 0.068 for every unit increase in the governance score.

To highlight the difference in the likelihood and the degree of geographic dispersion between firms with more ATPs and with fewer ATPs, we further perform regressions of Models 3 and 4. These two models are the same as Models 1 and 2, respectively, with the only exception that the governance quality is indicated by a dummy variable, instead of the continuous governance index. High governance score equals 1 if a firm's governance index is above the median governance index of all sample firms within each year, and 0 if otherwise. The dummy has significant coefficients of 0.535 (Model 3) and 0.392 (Model 4). For firms with more ATPs, the ratio of the probability of dispersion versus the probability of no dispersion will increase by $[e^{0.535}-1]*100\%=70.7\%$ and the number of different regions will increase by 0.392, holding other variables constant. To sum, the results of Table 7 are consistent with the agency cost explanation that firms with more ATPs are more likely to be geographically diverse and to a greater extent than those with fewer ATPs.

Second, we investigate the relation between corporate governance quality and the observed valuation discount. To test the relation, we classify firms based on both corporate governance ranking and geographic dispersion. Firms with governance index greater than the median ranking are weak governance firms and those with equal or lower are strong governance firms. Each group is further divided into two sub-groups based on the geographic dispersion status. Table 8 reports the classification of firms and equal-weighted excess values of each sub-group. Two interesting results emerge.

One, we find that firms with high governance score have a greater incidence of geographic dispersion. 71.2% of firms with high governance score are geographically dispersed, while only 55.6% of firms with low governance score are geographically dispersed. The univariate evidence is consistent with our findings from the multivariate analysis shown in Model 3 of Table 7. Two, the results show that the value impact of geographic dispersion varies with corporate governance quality. Particularly, geographic dispersion has a significantly negative impact on the excess value of weak governance firms, but no effect on strong governance firms. Moreover, the difference in excess value for firms with high governance score is 0.037, and that for firms with low governance score is 0.019. This finding is further supported using a multivariate analysis, as shown in Table 9, where firm excess value is regressed on a governance quality indicator, a geographic dispersion variable, and their interactions, while controlling for firm-specific characteristics.

Results of Model 1 in Table 9 indicate that the excess value is increasing in the governance quality of a firm. One point increase in the governance index would lead to a 2.0% fall in firm excess value, implying that a firm with more ATPs would have a lower firm value. Model 2 addresses the possible endogeneity problem related to a firm's choice to become geographically dispersed. The

Table 8
Excess value and governance quality

	No geographic dispersion	Geographic dispersion	*t*-test for the difference in mean [Rank test for the difference in median]
Low governance score	−0.015 [0.000] $n=1679$	−0.034 [−0.042] $n=2102$	0.019 [0.042]
High governance score	−0.047 [−0.039] $n=1363$	−0.084 [−0.080] $n=3375$	0.037† [0.041*]
t-test for the difference in mean	−0.032	−0.050*	
[Rank test for the difference in median]	[−0.039†]	[−0.038*]	

The table presents mean and median excess values associated with four different groups of firms formed on the basis of governance quality and geographic dispersion status. Excess value is calculated as the log of the ratio of a firm's total capital to the sum of imputed values of its industry segments. Low governance score equals 1 if a firm's governance index is below or equal to the median governance index of all the sample firms within each year; 0 if otherwise. High governance score equals 1 if a firm's governance index is above the median governance index of all the sample firms within each year; 0 if otherwise. 'No geographic dispersion' refers to firms with no subsidiary outside the region of their headquarters location. 'Geographic dispersion' refers to firms with subsidiaries outside the region of their headquarters location. We use a standard two-tailed *t*-test for mean and Wilcoxon rank test for median. Medians and rank test results for median are shown in brackets. * Denotes significance at the 5% level and † denotes significance at the 10% level.

Table 9
Impact of governance quality on excess value

Variables	Model 1	Model 2	Model 3	Model 4
Intercept	−0.502 (−9.50)	0.241 (4.23)	−0.018 (−0.24)	−0.061 (−0.86)
Governance index	−0.020 (−6.18)			
Geographic dispersion		−0.046 (−2.37)		−0.011 (−0.07)
Industry diversification		−0.198 (−10.40)	−0.204 (−10.72)	−0.202 (−10.50)
Global diversification		−0.054 (−2.83)	−0.062 (−3.33)	−0.060 (−3.16)
High governance score				−0.029 (−0.87)
High governance score*Geographic dispersion			−0.095 (−4.54)	−0.057 (−1.66)
Log assets	0.176 (18.70)	0.326 (14.58)	0.211 (12.12)	0.216 (11.18)
Debt to assets	−0.398 (−10.66)	−0.369 (−10.23)	−0.401 (−10.96)	−0.401 (−10.93)
Capital expenditure to sales	0.928 (9.43)	0.740 (8.18)	0.876 (9.63)	0.874 (9.65)
EBIT to sales	0.796 (8.40)	0.736 (8.21)	0.777 (8.51)	0.777 (8.53)
R&D to sales	1.251 (5.95)	0.940 (4.85)	1.156 (5.82)	1.154 (5.80)
Advertising to sales	0.425 (1.88)	0.075 (0.33)	0.506 (2.21)	0.471 (2.07)
Adjusted R^2	0.281	0.319	0.312	0.313
Observations	8,334	8,334	8,334	8,334

The table reports fixed-effects regressions of excess value on governance quality for the period 1993 to 2003. The dependent variable is firm excess value, measured as the log of the ratio of a firm's total capital to the sum of imputed values of its industry segments. The governance index indicates the number of anti-takeover provisions adopted by a firm. High governance score equals 1 if a firm's governance index is above the median governance index of all the sample firms within each year; 0 if otherwise. Models 2, 3, and 4 are the second-stage regressions of the Heckman procedure. *t*-statistics are adjusted for clustering at the firm level and reported in parentheses.

Heckman (1979) two-stage estimation procedure has been employed. The first step uses a probit model that takes the governance index and other firm characteristics as the explanatory variables to determine the probability of a firm becoming geographically dispersed. Based on the parameter estimates of the first-stage regression, we construct an inverse Mill's ratio for both geographic dispersed and non-dispersed firms. This ratio captures the unobserved effects that influence a firm's decision about geographic dispersion. The second step involves an OLS regression that includes the inverse Mill's ratio as an additional independent variable. The first-stage regression shows that ATPs play an important role in a firm's decision about geographic dispersion, while the second-stage regression, presented in Model 2, suggests that, after controlling for the effect of ATPs in the first step, geographic dispersion still has a significantly negative impact on firm value. Note that the inverse Mill's ratio has a significantly negative coefficient of −0.388 (*t*-statistics=−5.56), indicating that the unobserved factors also have a negative impact on firm value. The same procedure is also applied to Models 3 and 4 of Table 9.

Models 3 and 4 introduce differential impacts of geographic dispersion with respect to corporate governance quality. Results show that, after controlling for the possible endogeneity problem, geographically dispersed firms with more ATPs exhibit a greater value discount than their counterparts with fewer ATPs. Particularly, in model 3, the interaction term between high governance score and geographic dispersion has a significantly negative coefficient of −0.095, which is much lower than the coefficient of the geographic dispersion dummy of −0.046 in model 2. This finding suggests that geographically dispersed firms with poor governance quality exhibit more value discount than an average dispersed firm. Model 4 combines models 2 and 3. The coefficient estimate of the interaction term increases to −0.057 and becomes only marginally significant. The average valuation effect of geographic dispersion for firms with high governance score is −0.030 (=−0.011*0.643−0.057*0.396),[12] albeit an insignificant coefficient of geographic dispersion. Hence the evidence from Model 4 confirms our univariate results that geographic dispersion leads to more value destruction for firms with more ATPs than for firms with fewer ATPs.

It is possible that corporate governance contributes to the valuation discount because of changes in the monitoring mechanism. The valuation difference between non-geographically dispersed firms with strong and weak governance is much smaller than that between their geographically dispersed counterparts. Such results are consistent with the interpretation that the adverse valuation impact of weak corporate governance is magnified in geographically dispersed firms, because distance and corporate structural complexity mitigate the effectiveness of external and internal monitoring mechanisms.

Thus far, we use the index of anti-takeover provisions as a proxy for corporate governance quality, and we assume that more anti-takeover provisions are an indicator of weak governance. Research papers subsequent to Gompers et al. (2003) also suggest that anti-takeover provisions are inefficient and tend to entrench firm management and destroy firm value. Recent studies such as Chemmanur et al. (2008), on the other hand, argue that anti-takeover provisions provide protection to firm managers, thereby allowing managers, especially high quality managers, to take risky projects with long-run payouts.[13] These studies find anti-takeover provisions to be value enhancing. Our findings, however, are more consistent with the value decreasing argument. On average, geographically dispersed firms have more anti-takeover provisions and do experience lower valuation, compared with their counterparts with fewer provisions.

In addition to the agency problem-based explanation, an alternative explanation to the value impact of geographic dispersion might be related to firm growth opportunities.[14] It is plausible that firms expand geographically, because they have already

[12] 0.643 is the sample average of the geographic dispersion variable and 0.396 is the sample average of the interaction between high governance score and geographic dispersion.

[13] Similarly, Chidambaran et al. (2007), Durnev and Kim (2005), and Lehn et al. (2007) argue that firm value and corporate governance mechanisms are simultaneously determined.

[14] We thank the referee for pointing out this explanation.

exhausted valuable local opportunities and hence are looking to opportunities beyond their home grounds. Typically, these non-local opportunities tend to be less valuable, but are still positive NPV projects. In this case, evidence of the lower excess value associated with geographically dispersed firms could possibly suggest that the imputed values over-estimate these firms' opportunities by using non-geographically diversified firms as benchmarks. It is therefore likely that geographic diversification is a result of fewer growth opportunities rather than of poor governance. This conjecture sheds some light on our finding that geographically dispersed firms tend to have more anti-takeover provisions compared with their geographically concentrated counterparts. It is plausible that firm management is insulated from short-term pressure from stronger anti-takeover provisions when they take less valuable, risky investments in other regions with longer time lines.

5. Conclusion

This study examines whether and how corporate expansion of operating and business activities across geographic regions affects firm value. We use a new database that covers U.S. public corporations between 1993 and 2003 to identify firms' geographic dispersion statuses and test their resulting valuation effects. Results show that geographic dispersion is associated with valuation discount, and the more geographically diversified a firm is, the lower is its valuation. On average, firms that initiate geographic dispersion tend to experience reductions in firm value.

Our study further explores plausible causes of the value discount associated with geographic dispersion. We find our evidence consistent with the agency cost-based explanation—geographically diversified firms with more anti-takeover provisions are more likely to be geographically diverse and tend to experience a larger value discount, but not their counterparts with fewer such provisions.

Overall, the results suggest that corporate geographic location decisions are an essential component of corporate policies and are closely related to agency problem considerations. Existing studies of corporate location decisions emphasize the benefits of geographic expansion, but we show that agency problems are an important determinant of geographic expansion decisions and that geographic dispersion has significantly negative value implications.

Appendix A. Regional classification

Atlantic Coast	Delaware	New England	Connecticut
	District of Columbia		Massachusetts
	Florida		Maine
	Georgia		New Hampshire
	Maryland		Rhode Island
	North Carolina		Vermont
	South Carolina	Plains	Iowa
	Virginia		Kansas
	West Virginia		Minnesota
Deep South	Alabama		Missouri
	Kentucky		North Dakota
	Mississippi		Nebraska
	Tennessee		South Dakota
Middle Atlantic	New Jersey	Southern Plains	Arkansas
	New York		Louisiana
	Pennsylvania		Oklahoma
Midwest	Illinois		Texas
	Indiana	West Coast	California
	Michigan		Oregon
	Ohio		Washington
	Wisconsin		Hawaii
Mountain	Arizona		Alaska
	Colorado	Other	Guam
	Idaho		Marshall Islands
	Montana		Northern Mariana Islands
	New Mexico		Puerto Rico
	Nevada		Virgin Islands
	Utah		
	Wyoming		

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