

# The Impact of Corporate Geographic Decentralization on the Quality of Accounting Disclosure

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**Abstract.** The Quality of accounting information is of paramount importance in facilitating investment decision-making processes for investors and there is an observed trend towards geographic decentralization within large publicly listed corporations. Drawing on a trans-regional imitation perspective, the paper examined the impact of geographical decentralization on the quality of accounting information. We apply a novel approach to measure the geographical distance, two-stage least squares estimation and PSM were conducted to test the hypotheses. The findings show that geographic decentralization negatively relates to the quality of accounting disclosure. Moreover, this association is more pronounced for corporations with low-quality corporate government as well as in provinces where the traffic accessibility is poor. These results not only provide companies better strategic planning about regional expansion but also help investors to acknowledge potential risks about the accounting information quality of decentralized companies.

**Keywords:** Geographic decentralization, Quality of accounting information, Internal control, Traffic accessibility, Moderating effect.

## 1. Introduction

The three key characteristics of honesty, trustworthiness, accuracy, and completeness should be present in all accounting data for it to reflect the operating circumstances and asset level of businesses. High-quality accounting data supports the wholesome and orderly growth of the capital market in addition to assisting information users in making accurate judgments and decisions. The geographically diverse characteristics of enterprise group geographic dispersion are a result of the increasing marketization and growing size of enterprise groups, and Chinese listed businesses have largely adopted the off-site branch management model.

The following are the primary areas where this study makes theoretical research contributions. First, a great deal of research has been done both domestically and internationally on the variables influencing the caliber of accounting disclosure, but there are comparatively few studies that focus on the geographic distribution of enterprise groups. Second, studies conducted in the United States and abroad have examined the effects of corporate geographic distribution on corporate financial forecasting, surplus management, and investment returns with corporate geographic distribution as the independent variable. However, there is a paucity of literature examining the effects of corporate geographic distribution on the quality of accounting information for listed companies' parent companies and subsidiaries. Finally, there are many studies on the effectiveness of corporate internal control in foreign countries, but there is no linkage between this and the two major issues of the geographic diversity of parent and subsidiary companies and the quality of accounting information disclosure; there is a lack of domestic and international research on off-site independent directors, and although off-site independent directors have explored the governance and financial performance of corporations more, there is no research that incorporates them into the exploration of the geographic distribution of the accounting information disclosure.

## 2. Research Hypothesis

### 2.1. Geographical dispersion and quality of accounting information

Geographic separation within organisational groups initially hinders information integration, collaboration, and increases the chance of error. Rising management expenditures make it more difficult to coordinate R&D. As subsidiaries expand, different locations make it difficult to integrate resources, which causes sudden opacity escalation. According to Wu, regional diversity results in a variety of languages, clientele, and cultural norms, which increases accounting opacity [1]. Principal-agent problems are accentuated and management costs are increased by a wider geographic distribution. Accounting opacity is heightened by mistakes and dishonesty. According to Wan, parent-subsidiary enterprises often have contradictory aims, uneven resource distribution, and power imbalances that lead to self-serving behaviour that exacerbates conflicts [2].

Remote places reduce parent-subsidiary communication, restricts the public's access to true information, and increases opacity [3]. Communication between agents is hampered by geographic distance, which raises the cost of information gathering. Passing head office policies to subsidiaries becomes difficult as a result, leading to problems with content awareness.

**Hypothesis 1.** Geographic dispersion has a positive effect on accounting information opacity.

### 2.2. Internal control

Enterprise internal control is the process by which management or operators manage the quality of internal workers, governance structure, etc. to enhance the authenticity of financial reporting and business efficiency [4]. At start with, a scientific internal control system can improve the rationality and effectiveness of accounting information. Improvement of control norms can optimize the internal operation of enterprises, establish a safe and stable environment, enhance the reasonableness and effectiveness of accounting information [5]. Additionally, internal control improves management and governance, optimizes processes, prevents fraud, regulates internal control activities and enhances the quality of financial reporting [6]. In conclusion, scientific internal control system can improve the reasonableness of financial information, prevent fraud, optimize management, reduce agency costs and weaken the negative impact of geographical distance on the quality of accounting information.

**Hypothesis 2.** The negative impact of geographical dispersion on the quality of accounting information is reinforced when firms have poorer internal controls.

### 2.3. Traffic accessibility

The distance between the independent directors and the company, the long commuting time, and the time gap in obtaining information are not conducive to better supervision of the company. Even due to the distance from the location of the listed company, there is a big difference in the social scope and cultural environment with the internal directors and local independent directors, which tends to be classified as an "outside group" [7]. Group differentiation may lead to friction within the board of directors, differences in the choice of corporate governance options [5], inefficient internal communication, and weakening of the function of foreign independent directors [8]. Existing research suggests that the ability of actors to obtain information is weakened to a certain extent due to geographic distance, and the lack of information acquisition further affects the efficiency of decision-making [9].

**Hypothesis 3.** The traffic accessibility has negative effects between the geographic dispersion and the opacity of accounting information.

## 3. Variables and models

The empirical analysis was based on a sample of publicly listed firms at the Shanghai or Shenzhen stock exchanges in China, with a time range from 2011 to 2021. The data were collected from China Stock Market and Accounting Research (CSMAR), a widely used database for academic research. To

make the results more reliable and precise, we excluded companies in the financial industry, Special treatment (ST, ST\*), Particular Transfer (PT) companies, and companies with missing data. Finally, our sample contains a total of 26,181 observations and 3,462 listed companies with more than one subsidiary.

### 3.1. Dependent variable: Quality of accounting information

The dependent variable is accounting information quality measured by earnings opacity. Earnings opacity refers to the degree to which earnings are difficult to verify and understand. As information acquisition and processing costs increase, managers' earnings disclosure opacity may decrease, thereby reducing the quality of accounting information [10].

The modified Jones model was used to measure a company's earnings management level and demonstrate its accounting information quality, the model could be written as Eq. (1). Earnings management opacity is calculated as the sum of the absolute values of discretionary accruals (DA) over the past three years. A higher Opaque indicates lower information transparency and weaker accounting information quality.

$$DA = \frac{TA_{i,t}}{A_{i,t-1}} - \partial_1 \left[ \frac{1}{A_{i,t-1}} \right] - \partial_2 \left[ \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} \right] - \partial_3 \left[ \frac{PPE_{i,t}}{A_{i,t-1}} \right] \quad (1)$$

### 3.2. Independent variable: Geographic decentralization

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The independent variable is geographical dispersion. To enhance the discussion of geographic distance, this study uses the latitude and longitude coordinates of the parent company and its subsidiaries to calculate the geographic distance between each subsidiary and its parent company using the standard deviation and mean difference. Due to the large value of geographic distance, we divide the standard deviation and mean difference by 2,000 for equal scaling. The article draws on the parent-subsidiary geographic distance calculation models, equations (3) and (4):

$$D_{pcj} = \cos^{-1}(\Delta_{pcj}) \times \pi R \div 180 \quad (2)$$

$$\Delta_{pcj} = \cos(lat_p) \times \sin(lon_p) \times \cos(lat_{cj}) \times \sin(lon_{cj}) + \sin(lat_{cj}) \times \sin(lat_p) + \cos(lat_{cj}) \times \cos(lon_{cj}) \times \cos(lat_p) \times \cos(lon_p) \quad (3)$$

Second, the geographic distance between each of its subsidiaries and the parent company is calculated separately for each group of companies. Based on the results of Eq. (3) and (4), Eq. (5) and (6) were concatenated and added to the distances of multiple subsidiaries relative to the parent company using Chen et al. [3]. As seen from the formula, the larger the PCD, the larger the geographic distance.

$$PCD1_{it} = \frac{1}{2000} \times \sqrt{\sum_{j=1}^n (D_{pcj} - D')^2} \div n \quad (4)$$

$$PCD2_{it} = \frac{1}{2000} \times \left\{ \left[ \sum_{j=1}^n [D_{pcj} - D'] \right] \div n \right\} \quad (5)$$

### 3.3. Moderate variables

This paper uses two moderating variables, internal control and traffic accessibility. Internal control index is collected from the BID Internal Control and Risk Management Database from 2011 to 2021. Based on five indicators, including financial reporting reliability, internal control environment, risk assessment, information and communication, and internal control supervision, this index value could reflect the overall level of internal control of the company. Increasing the internal control index might exert a syngenetic effect on the quality of accounting information. The higher the company's internal control level, the higher the internal control index. The other moderating variable is traffic accessibility, which is collected from the "Traffic Chapter" of the China Statistical Yearbook for the years 2011-2021. The density of road networks along the route is generated using AEGIS based on the latitude and longitude of the two locations as a measure of traffic accessibility [11].

### 3.4. Control variables

Various control variables that may affect the quality of accounting information were control in our model. Firstly, we control for firm features, including group size, group age, group profitability, group Tobin's Q, group status, group growth, group cashflow and group leverage. Secondly, we control for group-board characteristic, including supplier independence, supplier dual, supplier board size. Finally, we include year and firm fixed effects and use the dummy variables in all regression models. Given that it takes little time for firms to change the level of earning opaqueness, we need a lag between the dependent variable and the covariates that is less than 1 year [12].

## 4. Empirical Analysis

The trend of mass data in power system provides a basis for load characteristic analysis and prediction model establishment, but the classical load forecasting method can not afford such a huge time and computing resource consumption. The problem of over fitting in large sample set will affect the prediction accuracy. In this paper, a power load forecasting model is built by using the BP neural network model, making full use of the powerful data processing function of Clementine and preventing the over fitting function. The experimental results show that the BP neural network model has good predictability and robustness, and has a certain practical application value.

### 4.1. Summary statistic

Descriptive statistic and correlations are provided in Figure 1. We report the mean, standard deviation and correlations with independent variable, geographic decentralization and dependent variable, quality of accounting information pertaining to moderating variables and control variables [13]. The mean of geographic distance was 0.59097 (SD=0.10973), with a range from 0.34207 to 1. Additionally, the mean of accounting information opaqueness, the dependent variable, was 0.16590 (SD=0.52109), with a range from 0 to 29.370. All the absolute values of correlation coefficients are below 0.5. It is notable that the correlation between firm size and in list age are relatively high, about 0.3838, which may raise collinearity concerns.

**Table 1.** Descriptive statistic and correlations analysis

| Variables                | Mean   | SD      | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10      | 11       | 12       | 13       | 14 |
|--------------------------|--------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|----------|----------|----------|----|
| 1 Opaque                 | 0.166  | 0.521   | 1        |          |          |          |          |          |          |          |          |         |          |          |          |    |
| 2 Decentralization       | 31.603 | 5.868   | 0.0286*  | 1        |          |          |          |          |          |          |          |         |          |          |          |    |
| 3 Internal control index | 35.9   | 6.53    | -0.0586* | -0.0355* | 1        |          |          |          |          |          |          |         |          |          |          |    |
| 4 Traffic accessibility  | 15.584 | 4.379   | -0.0325* | 0.0400*  | 0.0953*  | 1        |          |          |          |          |          |         |          |          |          |    |
| 5 Firm age               | 2.909  | 0.337   | 0.0561*  | -0.0016  | 0.1099*  | 0.1397*  | 1        |          |          |          |          |         |          |          |          |    |
| 6 Firm size              | 22.247 | 1.336   | 0.0193*  | 0.0962*  | 0.1607*  | 0.0496*  | 0.1562*  | 1        |          |          |          |         |          |          |          |    |
| 7 Leverage               | 0.436  | 0.295   | 0.0843*  | 0.0309*  | -0.0702* | -0.0033  | 0.1248*  | 0.2913*  | 1        |          |          |         |          |          |          |    |
| 8 ROA                    | 0.042  | 0.178   | -0.0047  | 0.0083   | 0.0131*  | -0.0056  | -0.0294* | -0.0261* | -0.1263* | 1        |          |         |          |          |          |    |
| 9 Cashflow               | 0.045  | 0.104   | -0.0452* | 0.0004   | 0.0566*  | 0.0390*  | 0.0151*  | 0.0802*  | -0.1147* | -0.0669* | 1        |         |          |          |          |    |
| 10 Growth                | 6.201  | 837.474 | -0.0001  | 0.0027   | -0.0186* | -0.0007  | 0.0032   | -0.0029  | 0.005    | 0.0002   | -0.0006  | 1       |          |          |          |    |
| 11 Board size            | 2.128  | 0.199   | -0.0204* | 0.0689*  | -0.0059  | -0.0255* | 0.0355*  | 0.2594*  | 0.1045*  | -0.0045  | 0.0348*  | 0.0026  | 1        |          |          |    |
| 12 CEO duality           | 0.276  | 0.447   | -0.0399* | -0.0617* | -0.0204* | -0.0037  | -0.0957* | -0.1693* | -0.0944* | 0.0260*  | -0.0165* | -0.0025 | -0.1768* | 1        |          |    |
| 13 List age              | 2.176  | 0.81    | 0.1490*  | 0.0736*  | -0.0152* | -0.0139* | 0.5140*  | 0.3838*  | 0.2736*  | -0.0658* | -0.0159* | 0.0056  | 0.1485*  | -0.2394* | 1        |    |
| 14 Board independence    | 0.376  | 0.056   | 0.0051   | -0.0289* | 0.0381*  | -0.0092  | -0.0130* | 0.0107   | -0.0036  | 0.0003   | -0.0160* | -0.0053 | -0.5299* | 0.0995*  | -0.0261* | 1  |

**Note.** N=26,181. SD means Standard Deviation. The asterisk \* demotes statistical significance at or below 5% level.

## 4.2. Multicollinearity

Regarding to the issue of multicollinearity, we test variance inflation factors (VIFs) in all our model. We compute variance inflation factors in four regression model respectively, which ranged from 1.00 to 1.56, well below the cutoff of 10. Thus, multicollinearity was not a concern.

## 4.3. Main effects

Table 1 shows the main effect and two moderating effects results, at slightly high significance levels. \*, \*\*, \*\*\* indicate significance levels (two-tailed) at 10%, 5% and 1%, respectively.

Model 1 shows the effect of geographical decentralization on accounting information opaque using ordinary least squares to test our predictions. The statistical significance (p-value) is well below 1% and effect size is 1.49 times increase of opaqueness as geographical decentralization rise from 2 S.D. below the mean to 1 S.D. below the mean. From the view of significance, when the independent variable, accounting information opaqueness, increases by one standard deviation, the dependent variable decreases by -3.11, which indicates that the effect of the independent variable has economic significance.

**Table 2.** Geographical decentralization and accounting information opaqueness

| Independent variables                         | Model 11                        | Model 2                                                                      | Model 3                              |
|-----------------------------------------------|---------------------------------|------------------------------------------------------------------------------|--------------------------------------|
| <b>Decentralization</b>                       | <b>0.002**</b><br><b>(3.56)</b> | 0.002***<br>(1.55)                                                           | 0.002***<br>(0.723)                  |
| <b>Decentralization×Internal control</b>      |                                 | <b>-0.029***</b><br><b>(-0.00563)</b><br><b>(0.00620)</b><br><b>(0.0199)</b> |                                      |
| <b>Decentralization×Traffic accessibility</b> |                                 |                                                                              | <b>-0.062***</b><br><b>(484.769)</b> |
| Firm age                                      | 0.107***<br>(9.59)              | 0.007***<br>(3.092)                                                          | 0.022***<br>(6.463)                  |
| Firm size                                     | -0.001<br>(-0.37)               | -0.005***<br>(-7.770)                                                        | -0.001***<br>(1.274)                 |
| Leverage                                      | 0.130***<br>(7.24)              | 0.017***<br>(4.171)                                                          | 0.002***<br>(-0.362)                 |
| ROA                                           | 0.037<br>(-1.18)                | 0.002<br>(-0.271)                                                            | 0.013<br>(-1.395)                    |
| Cashflow                                      | -0.149***<br>(-4.33)            | -0.006<br>(-0.874)                                                           | 0.027***<br>(-0.0341)                |
| Growth                                        | -0.000<br>(-0.34)               | -0.000<br>(-0.061)                                                           | -0.000584<br>(-0.0036)               |
| Board size                                    | -0.152***<br>(-0.)              | -0.007<br>(-1.632)                                                           | -0.026***<br>(-4.099)                |
| CEO duality                                   | -0.023**<br>(-2.85)             | -0.002<br>(1.034)                                                            | -0.000***<br>(-0.121)                |
| Tobin's Q                                     | 0.033<br>(-0.0801)              | -0.001*<br>(-0.0805)                                                         | -0.001<br>(-0.0812)                  |
| Board independence                            | -0.157<br>(-0.0801)             | -0.019<br>(-0.0805)                                                          | -0.023<br>(-0.0812)                  |
| _cons                                         | (-2.52)<br>0.184<br>(2.951)     | (-1.308)<br>0.149***<br>(-8.561)                                             | (-1.086)<br>0.008***<br>(-0.319)     |
| N                                             | 22353                           | 22336                                                                        | 22029                                |

*Note.* \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

#### 4.4. Moderating effects

Model 2 and model 3 in Table 2 shows the moderating effects of internal control index and traffic accessibility, respectively. The least square methods are used to demonstrate such effects.

Model 2 shows the result of the moderating effects of internal control and traffic accessibility. Figure 1 compares the slope between lower decentralization and higher decentralization. The interaction of geographical distance and internal control is positively correlated with that of accounting information opaque, indicating that the higher level of the internal control is, the lower level of accounting information opaque will be. This can also describe that the moderating variable, internal control, weaken the negative effect of geographic decentralization on the quality of accounting information [14].

Model 3 presents the moderating effect of traffic accessibility. Figure 2 suggests that the interaction between geographical distance and traffic accessibility has a positive correlation with accounting information opacity, indicating that the higher the traffic accessibility, the lower the level of accounting

information opacity will be. This can also be stated as the moderating variable, traffic accessibility, reducing the negative impact of geographic decentralization on the quality of accounting information [15-17].

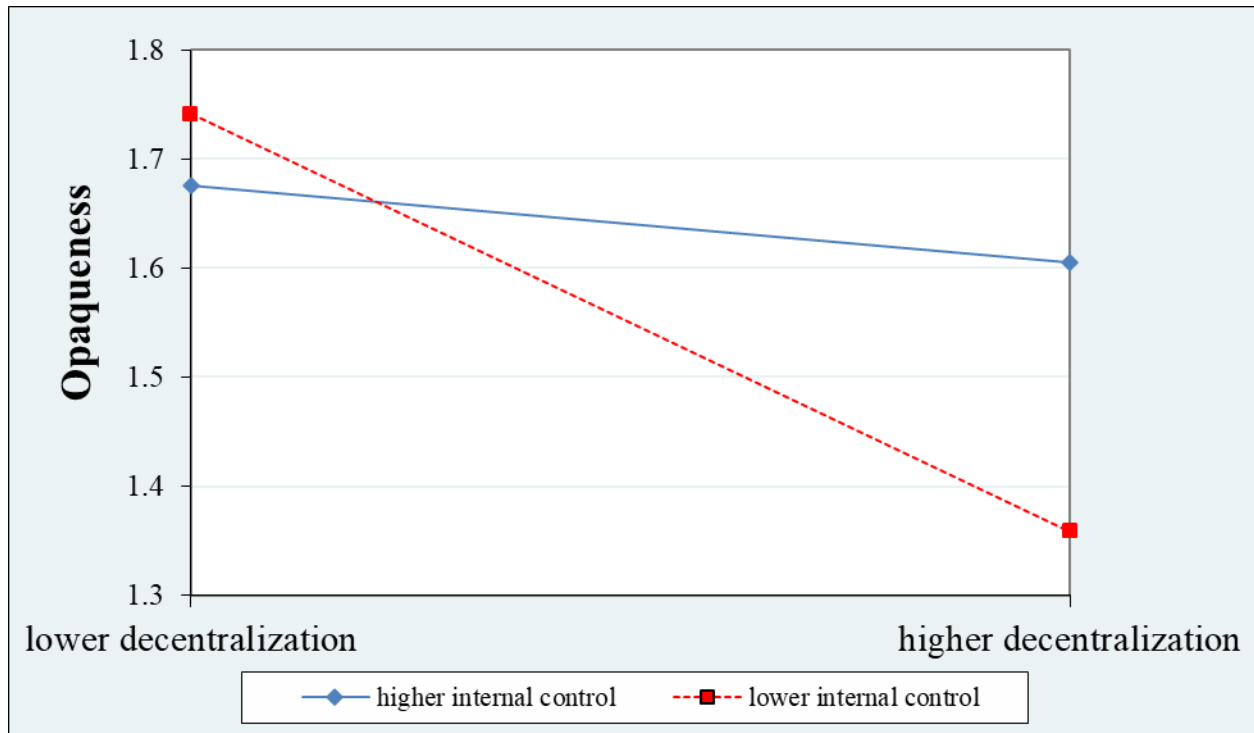


**Figure 1.** The moderating effect of internal control

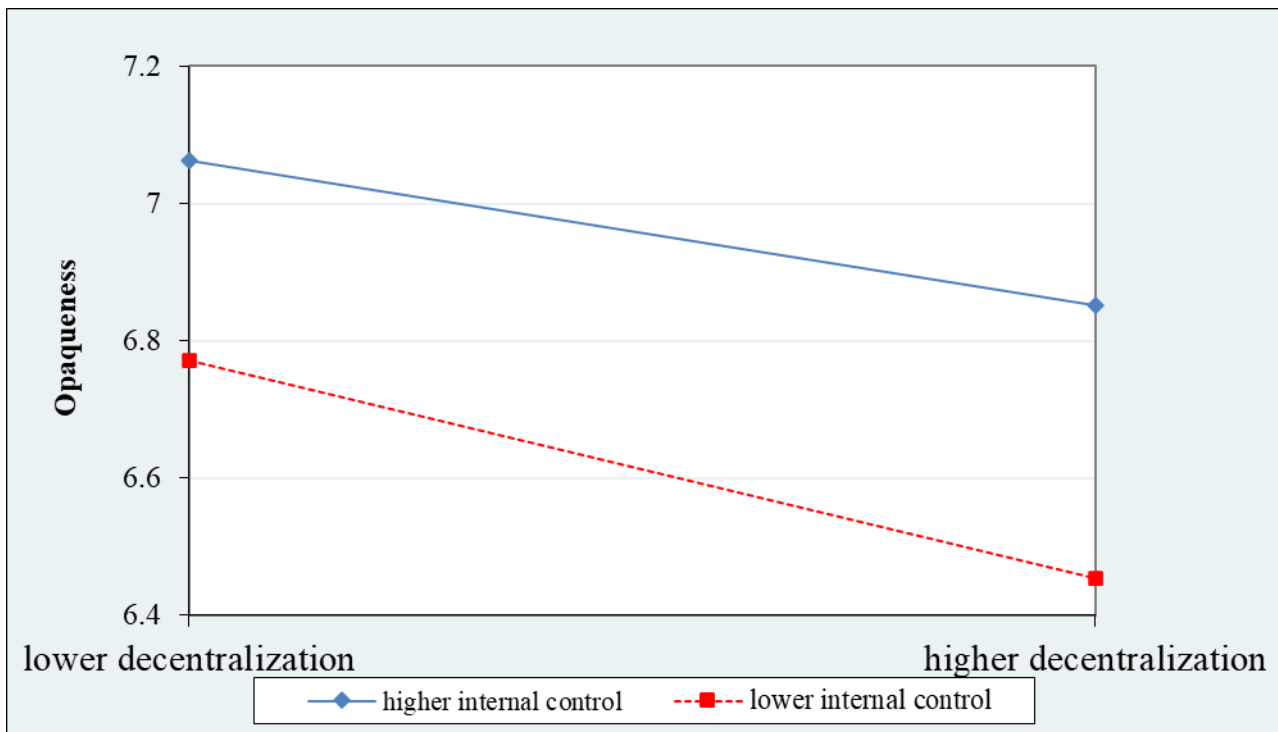


**Figure 2.** The moderating effect of traffic accessibility

#### 4.5. Endogeneity

We further tackle the endogeneity issue by using propensity score matching (PSM). Since the explanatory variables are continuous, we generate dummy variables using the median as the cut-off and classify the sample into two categories based on whether the decentralization exceeds the median.

Subsequently, we use a logit model to conduct a 1:1 nearest neighbor PSM with matching covariates including firm's assets, profitability, leverage, cashflow, status as a state-owned enterprise and firm's duality. After matching, the results of the covariate balance test showed that the absolute values of the standardized mean differences of all covariates were less than 10% before and after matching, and all covariates had non-significant p-values after matching, indicating that there is no systematic difference between the experimental and control groups and this paper still hold after excluding the omitted variables.

## 5. Conclusion

The study examines variables affecting financial reporting's opacity and quality, providing insights into intricate dynamics. It draws attention to issues with information integration, teamwork, and error risks brought on by regional subsidiary expansion. The opacity of reporting is made worse by the cultural and language disparities among subsidiaries. Effective internal controls reduce the negative consequences of regional dispersion, boosting authenticity and operational effectiveness. Control frameworks help to better the quality of accounting information by spotting flaws, controlling risks, and encouraging compliance. Traffic accessibility has a huge impact on oversight, with social and cultural differences causing board friction and communication breakdowns. Improved traffic accessibility lessens the detrimental effects of dispersion on accounting data. The study's conclusion highlights the importance of traffic accessibility, strong internal controls, and geographic diversity's issues in discussions of corporate governance and financial reporting for dispersed firms.

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