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ABSTRACT

Tunneling is a type of expropriation of resources from the minority shareholders of a company by its largest shareholder. Previous research has found mixed results on the relationship between board independence and tunneling, and on the relationship between minority shareholder concentration and tunneling. We examine whether more independent boards may be better at limiting tunneling when there is greater minority shareholder concentration. Using a sample of 3,084 firm-years of Chinese companies, we find a significant interaction between board independence and minority shareholder concentration in a model of tunneling. These results suggest that more independent boards are more likely to inhibit tunneling when minority shareholdings have greater voting influence over board elections through concentration of shareholding.

Keywords: tunneling, board independence, minority shareholders, ownership concentration.

1. INTRODUCTION

Traditional agency theory envisions a conflict between shareholders (the principal) and managers (the agent) in which management may engage in self-serving behavior to the detriment of the shareholders (e.g., Jensen and Meckling 1976). This traditional view is premised on a dispersed ownership structure. A somewhat different picture emerges when ownership is more concentrated, especially when there is a large shareholder who owns a material portion of the company's shares. This concentrated ownership structure is common around the world, with La Porta et al. (1999) finding that over 63% of companies have a dominant shareholder. With a more concentrated ownership structure, management may serve the interests of the largest shareholder, even if the interests of the largest shareholder conflict with those of minority shareholders (e.g., Lei et al. 2013; Shan 2013; Du et al. 2013). The potential for large shareholders to harm the interests of minority shareholders is sometimes called "expropriation" of minority shareholders (e.g., Berkman et al. 2009).

One type of expropriation of minority shareholders is when the largest shareholder extracts resources from the company on terms that are favorable for the largest investor, but potentially harmful for the minority shareholders. Management would be unlikely to prevent this expropriation because the largest shareholder (through their voting control of the board) can control management. The extraction of resources from companies by the largest shareholder is called "tunneling" (e.g., Cheung et al. 2006).

Research has examined various means of limiting expropriation of minority shareholders. For example, research has examined the potential for tunneling to be reduced by board independence (e.g., Gao and Kling 2008; Qian and Zhou 2012; Shan 2013), and the

concentration of shareholdings among non-controlling shareholders (e.g., Gao and Kling 2008; Huyghebaert and Wang 2012), and these studies have produced mixed results. In our study, we combine the insights from the board independence/tunneling and minority shareholder concentration/tunneling literature to examine the potential interactive effects of board independence and minority shareholder concentration on tunneling.

Greater board independence and a more concentrated ownership structure among the minority shareholders may help to limit tunneling. We also expect that these two factors may interact to make the potential effect of board independence on tunneling stronger when minority shareholders have a more concentrated ownership structure. A more concentrated minority ownership structure could enhance the voting power of the minority shareholders on the board, and thereby make the independence directors more likely to protect the interests of the minority shareholders. One of the ways in which independent directors can protect minority shareholders is by preventing or limiting tunneling by the largest shareholders.

We gathered a sample of 3,084 firm-years among Chinese companies from 2008 to 2009. We find that more concentrated ownership among minority shareholders (measured as the percentage of shares owned by the second to tenth largest shareholders relative to the largest shareholder's ownership stake) is negatively related to tunneling, suggesting that minority shareholders with more concentrated ownership can constrain the largest shareholder from engaging in tunneling. We also find that the percentage of independent directors is positively related to tunneling.

The interaction between minority shareholder concentration and board independence indicates that the board independence/tunneling relationship becomes negative when minority

shareholdings are more concentrated. An analysis of the coefficients on the board independence and board independence*minority ownership concentration variables indicates that more independent boards become effective at preventing or limiting tunneling when the second to tenth largest shareholders own at least 43% of the number of shares held by the largest shareholder.

We contribute the literature in two important ways. First, we extend the literature on the relationships between minority shareholder concentration and tunneling (e.g., Berkman et al. 2009; Huyghebaert and Wang, 2012) and the relationships between board independence and tunneling (e.g., Gao and Kling, 2008; Shan 2013) by examining the potential interactive effects between board independence and minority shareholder concentration on tunneling. Second, most previous research on governance and tunneling draws upon data from before 2008, at which time the China Securities Regulatory Commission (CSRC) changed its voting regulations to enhance the potential voting power of minority shareholders (through cumulative voting) when there is a dominant shareholder. This regulatory change could have changed the potential relationship between minority shareholder concentration and tunneling.

2. BACKGROUND LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1 Tunneling

Johnson et al. (2000) define “tunneling” as the transfer of assets and profits out of firms for the controlling shareholder’s benefit. Tunneling is a type of agency cost in which the largest shareholder and management collude to the detriment of the minority shareholders. Tunneling is more likely when there is a large shareholder with a dominant ownership stake in the company who can exert strong influence on the company. Research indicates that large

controlling shareholders exist in many companies around the world (e.g., La Porta et al. 1999; Faccio and Lang 2002; Franks and Mayer 2001; Claessens et al. 1999). These controlling shareholders could have the power to expropriate resources from the minority shareholders through tunneling (Pagano and Roell, 1998; Johnson et al., 2000).

La Porta et al. (2002) show that firms in civil law countries (which generally have weaker legal protection of minority shareholders) have lower Tobin's Q than companies in common law countries. Tunneling is more prevalent in developing countries due to the weaker legal protection of minority shareholder and/or weaker corporate governance in emerging markets (e.g., Shleifer and Vishny 1997; Liu and Lu 2007; Li, 2010). Atanasov et al. (2010) and Berkman et al. (2009) found that legal/regulatory changes can help to better protect minority shareholders in emerging markets from adverse outcomes such as tunneling.

Faccio et al. (2001) found that companies in Western Europe tend to pay more cash dividends than those in East Asia, which reduced the resources available for expropriation, and thereby constrains the ability of the controlling shareholders of these Western European companies to engage in tunneling. Faccio et al. (2010) point out that controlling shareholders may prefer more debt in the capital structure (i.e., higher leverage) because debt (in contrast to equity which has voting rights) will not dilute their control ability. Liu and Tian (2012) further find that the company may incur excess debt to generate resources that can then be tunneled to the largest shareholder.

Tunneling has also been found to be more common when the company has political connections. For example, Pan and Yu (2010) find that expropriation of resources from minority shareholders is more likely among politically connected companies, particularly

those in emerging markets. In the Chinese markets, Peng, Wei and Yang (2011) and Luo and Jackson (2012) find that the controlling shareholders are more likely to expropriate resources from minority shareholders. Fan and Wong (2001) find that controlling shareholders from seven East Asian markets increase their control of listed companies through pyramid ownership structure and cross-holding, which can enhance their control of the company.

Various measures of tunneling have been used in the literature. For example, Cheung et al. (2006) Cheung et al. (2009) and Huyghebaert and Wang (2012) consider related-party transactions, such as having the company sell goods or assets at a reduced price to the controlling shareholder or companies affiliated with the controlling shareholder. Wang and Xiao (2011) and Liu and He (2004) also note that controlling shareholders could tunnel resources from the company through self-dealing transactions. Liu and He (2004) and Xu'nan (2011) also note the potential for tunneling through non-arms-length equity transactions, and Liu and He (2004) note that this is especially prevalent when the largest shareholder's ownership is somewhat less dominant.

One of the more common measures of tunneling is based on loans made to the largest shareholder and/or other companies controlled by the largest shareholder (e.g., Jiang 2010; Qiu 2003; Liu and Tian 2012), or through guarantees of loans made to the largest shareholder (e.g., Berkman et al., 2009). In China, the *Other Receivables* account is often used to measure tunneling by the controlling shareholder since the account is used to record related-party loans (Qiu, 2003).

Companies engaged in tunneling may attempt to ameliorate the adverse effects of tunneling through strategic use of accounting and earnings management. Liu and Lu (2007)

point out that the controlling shareholders might manage the earnings to mask the true firm performance. Fan and Wong (2001) also note that accounting policies can be adjusted to benefit the controlling shareholder, and Cullinan et al. (2012) found that companies with controlling shareholders may use less conservative accounting to mask potential expropriation of resources from minority shareholders.

2.2 Minority shareholder concentration and tunneling

The presence of large shareholders (other than the largest shareholder) may inhibit the ability of the largest shareholder to expropriate resources from minority shareholders (e.g., Huyghebaert and Wang 2012). More concentrated ownership among the non-largest shareholders may give them greater incentive and ability to influence the company's actions, and thereby protect the interests of themselves and those of other minority shareholders (e.g., Cullinan, et al. 2013). One of the ways in which they could protect their interests is through reduced tunneling.

Empirical evidence on this issue is mixed. Gao and Kling (2008) found no relationship between whether the second through fifth largest shareholders own more than the largest shareholder and the likelihood of tunneling. However, Berkman et al. (2009) did find some limited evidence that larger shareholdings among the second to tenth shareholders¹ was associated with a reduced likelihood of loan-guarantee type tunneling.² Huyghebaert and Wang (2012) found more consistent evidence that the relative size of shareholdings of the second to tenth shareholders was negatively associated with tunneling, measured based on a

¹ The names and shareholdings of the ten largest shareholders are disclosed in China.

² Note that Berkman's sample period was from 1999 and 2000. In June 2000, the CSRC issued regulations prohibiting any new loan guarantees for the benefit of the parent company (Huyghebaert and Wang 2012).

related party buying from or selling to the company.

Theory would suggest that minority shareholder concentration may enhance minority shareholder influence on the company and thereby help to reduce tunneling, and there is some empirical support for this position. We therefore propose that minority shareholder concentration may be negatively associated with tunneling, and hypothesize as follows:

H1: Minority shareholder concentration is negatively related to tunneling.

2.3 Board independence and tunneling

Independent directors are not employees or officers of the organization; they are typically officers from other companies. Because they do not work for the management of the company, independent directors are not beholden to management and can therefore provide more effective oversight of management and, in so doing, promote the interest of shareholders (e.g., Fama and Jensen 1983; Bhagat, et al. 1987). These independent directors may also have a stronger focus on maintaining their business reputation, which can create incentives for them to show greater diligence in their role as directors (Fama and Jensen 1983).

Board independence has been found to be associated with board decision making (Weisbach, 1988; Peasnell, Pope and Young, 2005). For example, Weisbach (1988) found that more independent boards are more likely to replace a poorly performing CEO and Peasnell et al. (2005) note that board independence is associated with higher quality financial reporting. Booth et al. (2002) note that decisions making may be enhanced by more independent boards because the independent directors bring complementary knowledge from outside the company.

One of the duties of the independent directors is to protect minority shareholders.

Consistent with the notion that independent directors can enhance minority shareholder protection, Anderson and Reeb (2004) found that controlling shareholders (who may wish to protect the interests of minority shareholders) seek to limit the presence of independent directors, especially in family-controlled firms. One of the ways in which independent directors may protect minority shareholders is through prevention or limiting tunneling (e.g., Shan, 2013).

Previous research has found mixed results regarding the relationship between board independence and tunneling. Huyghebaert and Wang (2012) found no relationship between board independence and tunneling, except among state-controlled firms, where board independence is *positively* related to tunneling. Other research, however, has found that tunneling is *negatively* related to the percentage of independent directors (e.g., Gao and Kling 2008; Qian and Zhou 2012) and to the number of independent directors (Shan 2013).

We also seek to examine the relationship between board independence and tunneling. As previous research has found the board independence is either positively related to tunneling, negatively related to tunneling, or not related to tunneling, we propose a non-directional (null) hypotheses as follows:

H2: There is no relationship between board independence and tunneling.

2.4 Interaction between independent directors and minority shareholder concentration

As mentioned previously, research has found mixed results on the relationship between board independence and tunneling. These mixed results suggest that the board independence/tunneling relationship may be contingent on some other factors related to tunneling, perhaps including minority shareholder concentration.

Independent directors are elected by the shareholders and are supposed to help ensure

that management acts in the shareholders' interests (e.g., Bhagat et al. 1987). All shareholders, however, may not have the same interests, especially when there is a large shareholder who may be able to expropriate resources from the minority shareholders. If there is a conflict between the interests of the largest shareholder and the other shareholders, the independent directors may have to decide whose interests to support.

If there is a large shareholder, management may take actions such as tunneling that are beneficial for the largest shareholder (who has a strong influence on the compensation and future employment of the executive), but which harm the interests of the minority shareholders. Independent directors who are subject to the voting power of the largest shareholder may not object to such tunneling, as their position on the board could be vulnerable if they do not support the interests of the largest shareholder.

However, if the minority shareholders have a more concentrated ownership position, this ownership concentration may enhance the voting power of the minority shareholders and thus enhance their influence on the independent directors (e.g., Cullinan et al. 2013). If the independent directors are more vulnerable to the voting power of minority shareholders, these independent directors may be more likely to restrict tunneling to protect the interest of these minority shareholders. We therefore expect that independent directors may be more effective at inhibiting tunneling when minority shareholders have more influence on the independent directors through concentrated ownership.

We propose a potential interactive relationship between independent directors and minority shareholding concentration that could be related to tunneling as follows:

H3: Independent directors are more effective at preventing tunneling when minority shareholding is more concentrated (relative to the largest shareholder).

3 RESEARCH METHODS

3.1 Sample

We gathered data from Chinese companies listed on the Shenzhen and Shanghai Stock Exchanges for 2008 and 2009. Data were obtained from the CSMAR and the Juchao databases. We supplemented ownership data based on cross and common ownership among the various owners to ensure that we measured the ultimate owner of the shares. Our sample includes 3,084 firm-years for Chinese companies in 2008 and 2009.

3.2 Variable measurements

3.2.1 *Dependent variable*

Consistent with Jiang et al. (2010) we measure tunneling based on intercompany loans, as disclosed in other receivables (OTRE). We scale this dependent variable by dividing the other receivables by the company's size (measured as total assets).

3.2.2 *Hypothesized independent variables*

We measure minority shareholder concentration (used to test H1) based on the holdings of the second to tenth largest shareholders relative to the holdings of the largest shareholder (CSTR). At higher levels of the CSTR, the minority shareholders have greater potential to influence the actions of the company. To ensure clean measurements of shareholding levels, we combined share ownership among different shareholders when there is cross/common ownership of shares among the largest and/or other disclosed shareholders. This procedure sometimes resulted in the largest *disclosed* shareholder not being the largest *actual* shareholder because two (or more) of the other disclosed shareholders were under common

control.³ In all cases, we based our measure of the largest shareholder based on the actual largest shareholder, which may differ from the disclosed largest shareholder.

To test H2, we measure the percentage of independent directors (INDP) on the board of directors. This was calculated as the number of independent directors on the board divided by the total number of directors on the board. To test H3, we interacted the minority shareholder concentration variable (CSTR) with the percentage of independent directors variable (INDP).

3.2.3 Control variables

We include the cash-flow rights of the largest shareholder (CASH) as a control variable. Tunneling behavior can adversely affect firm value (e.g., Cheung et al. 2006; Jiang et al. 2010; Du et al. 2013) harming the minority shareholders. However, as fellow shareholders of the business, the largest shareholder engaging in tunneling would also be adversely affected by the decline in firm value brought about by tunneling. The largest shareholder will therefore be balancing the direct benefit they obtain through tunneling with the indirect cost they may incur through decreased share value. We therefore expect that largest shareholders with higher cash-flow rights will be less likely to engage in tunneling, which may not be cost/beneficial to the largest shareholder if they must absorb more of the cost of the tunneling.

Board size may also be related to tunneling. Larger boards may be more likely to limit tunneling due to more independent directors being on a larger board, greater representativeness of the larger board, and the association of larger board with less extreme decisions (e.g., Cheng, 2008). Empirically, Shan (2013) found that a larger number of

³ This procedure also resulted in some cases in which there were less than 9 other shareholders included in the minority shareholder concentration calculation due to the cross/common ownership.

independent directors (implying a larger board) to be negatively related to tunneling, and research has also found that minority shareholder concentration is associated with larger boards, which contain more independent directors (e.g., Cullinan et al. 2013). Because we already include the percentage of independent directors and minority shareholder concentration, we include the total number of directors on the board (BOARD) as a control variable.

We also include a variable measuring whether the largest shareholder has a more dominant position over the company due to control of at least 30% of the company's shares. We base the 30% cut-off on regulations of the China Securities Regulatory Commission (CSRC), which consider shareholders owning at least 30% of the company's shares to be in a dominant position through which they might harm the interests of the minority shareholders. For this measure, we consider control rights, rather than cash-flow rights, which may differ due to cross/common ownership.⁴ The variable (DOMIN) is coded 1 if the largest shareholder's control rights are 30% or more, and 0 otherwise.

Consistent with most other research on tunneling, we include size of the firm as a control variable. Due to the skewed distribution of firm size, we utilized the inverse: $1/\text{total assets}$. We also include the ratio of debt to assets (LEV) as a control variable. Faccio et al (2010) suggest that higher leverage can increase the power of the largest shareholder because debtors (as opposed to investors) generally do not have voting rights. Because State-related firms

⁴ Consider, for example, a situation in which Company B owns 51% of the shares of Company C. Company B therefore exercises effective control over Company C. If Company A owns 51% of Company B, Company A controls Company B, which controls company C. Effectively, A has 51% control of C. However, if Company C paid dividends, Company A's would receive only 26% of the dividends (i.e., 51% A's ownership in B * 51% B's ownership in C), making the cash flow rights 26%.

may have different incentives than other firms, we include a dummy variable (STATE) measuring whether the largest owner⁵ is state-related (coded as 1) or not (coded as 0). Finally, we include two year dummy variables and 12 industry dummy variables. To control for potential outliers, all of the variables are winsorized at 1% and 99.⁶ A summary of all of these variables and their measurements are presented in Table 1.

<Table 1>

3.3 Testing techniques

To test H1, we estimated an OLS regression model with tunneling as the dependent variable and minority shareholder concentration (CSTR) and the control variables as the independent variables. To test H2, we regressed tunneling on the percentage of independence directors (INDP) and the control variables. Finally, we tested H3 by running an OLS regression model with tunneling as the dependent variable, and including minority shareholder concentration (CSTR), the percentage of independent directors (INDP), the interaction between minority shareholder concentration and the percentage of independent directors (CSTR*INDP), and the control variables.

4. RESULTS

4.1 Descriptive statistics

Table 2 presents the descriptive statistics for the firms in our sample. For the mean company, tunneling (OTRE/ASSETS) represents 4.43% of assets, with a maximum of 69.36% of assets, and a minimum of no tunneling. CSTR averages 0.5151, indicating that the

⁵ As with the ownership variables, the determination of the largest owner for coding the STATE variable is based on the actual largest shareholder, which may differ from the disclosed largest shareholder due to cross/common ownership.

⁶ All main results are robust to cross-sectional winsorization each year and no winsorization.

second to tenth largest shareholders together hold an average of 51.5% of the number of shares held by the largest shareholder. Independent directors comprise 36.33% of the directors at the average company (INDP), which has a board consisting of 9.19 directors (BOARD). Cash-flow rights (CASH) held by the largest shareholder are a mean of 33.83%. The largest shareholder owns at least 30% control rights (DOMIN) at 67.7% of the companies in our sample. The mean company size (in millions) is about RMB 33,000, but the median is much lower (RMB 2,061) due to the skewed distribution of the size variable.⁷ Debt averages 53.12% of assets among the firms in our sample (LEV), and state-controlled firms (STATE) comprise 61.25% of the companies in our sample.

<Table 2>

4.2 Regression results

Table 3 presents the results of our OLS regression models. The F statistics range from 90.376 to 102.247, and all of the model are significant overall at < 0.01 . The adjusted R-squares are in low 0.40s, which are comparable to many of the other tunneling models in the literature.⁸

Model 1 tests H1, which posited that minority shareholder concentration would be negatively associated with tunneling. The results for the CSTR⁹ variable are consistent with our expectations in H1: minority shareholder concentration is negatively related to tunneling.

⁷ The largest firm in our sample, with assets (in millions) of RMB 11,785,053 is the Industrial and Business Bank of China

⁸ For example, Gao and Kling 2008 report r-squares ranging from 0.11 to 0.60, Huyghebaert and Wang 2012 have r-squares from 0.03 to 0.19, and Shan 2013 report r-squares between 0.08 and 0.24.

⁹ Results when using a dummy variable to measure whether the second to tenth largest shareholders own at least as many shares as the largest shareholder (untabulated) were materially consistent with the results presented for the CSTR variables for all of our analyses.

These results suggest that when the minority shareholders have more concentrated ownership (relative to the ownership of the largest shareholder) tunneling is less likely to occur.

<Table 3>

Model 2 on Table 3 present the results of our testing of H2, which sought to examine the relationship between board independence and tunneling. We find a positive relationship between board independence and tunneling. Our results are contrary to the negative board independence/tunneling relationship found by Gao and Kling (2008) and Qian and Zhou (2012), but consistent with the results of Huyghebaert and Wang (2012) in their state-controlled company sample. This result may reflect that fact that independent directors may be independent of management, but neither management nor the independent directors may be independent of the largest shareholder, and thus may do the bidding of the largest shareholder.

Model 3 presents the regression model of tunneling incorporating the CSTR, INDP and the CSTR*INDP interaction variables. The CSTR*INDP interaction variable is negatively associated with tunneling. These results are consistent with H3, and suggest that independent directors may be more effective at limiting tunneling when the minority shareholders have more concentrated ownership, because the independent directors may pay greater attention to the interests of minority shareholders when these shareholders have greater voting power. When comparing the coefficients on the INDP and CSTR*INDP variables, it appears that independent directors become effective at inhibiting tunneling (i.e., the sign flips from positive to negative) when the number of shares owned by second to tenth largest

shareholders are at least 43%¹⁰ of the number of shares owned by the largest shareholder.

With regard to the control variables, we find that CASH is negatively related to tunneling. This result is in accord with the notion that if the largest shareholder will incur more of the costs of tunneling (through decreased share value, etc.) tunneling may be less likely. BOARD is also negatively related to tunneling, possibly because larger boards may be more likely to have a member who will raise concerns about tunneling (e.g., Cullinan et al. 2013). DOMIN is negatively related to tunneling, suggesting that when the minority shareholders have more voting power through cumulative voting, tunneling may be limited. The 1/ASSET variable is positively associated with tunneling, suggesting that smaller firms are more likely to experience tunneling. Consistent with Faccio et al.'s (2010) theory that higher leverage gives the largest shareholder more power, LEV is positively associated with tunneling. We find no evidence that STATE ownership is related to tunneling.

4.3 Robustness analysis

To control for possible endogeneity of board independence, we used a two-stage model in which we create a model in which the percentage of independent directors (INDP) is the dependent variable and the other independent variables in our tunneling model are also the independent variables in the model of INDP. We then used the residuals (RESI) from this model of INDP in place of the INDP variable and RESI*INDP in place of the CSTR*INDP interaction variable. The results of this analysis are presented in Table 4. The findings from Table 4 indicate that our main findings are robust when using the 2-stage regression approach.

¹⁰ Coefficient on the INDP variable (0.069)/coefficient on the CSTR * INDP variable (-0.160).

<Table 4>

4.4 Limitations

Our study is subject to a number of limitations. First, our measure of OTRE/ASSETS may not capture all types of tunneling. Second, we do not have measures of the detailed backgrounds of the independent directors, which may have revealed relationships with the largest shareholder or with the minority shareholders that may have influenced our results. Finally, while we attempted to control for other variables that may influence tunneling, and our R-squared compared favorably to other studies, there may be other variables associated with tunneling that we have not captured that could have influenced our results.

5. SUMMARY AND CONCLUSIONS

A very limited body of research has examined the relationship between the share ownership of minority shareholders and the likelihood that the largest shareholder may expropriate resources from the minority shareholders through tunneling. We propose that if the ownership interests of the minority shareholders are more concentrated, they will in a better position to defend their interests than if the minority ownership was more dispersed. The more concentrated ownership position can give the minority shareholder more influence over the company's affairs which allow the minority shareholders to limit tunneling. We thus expected that minority shareholder concentration is negatively related to tunneling.

Research has found inconsistent results when examining the relationship between board independence and through tunneling. We propose that, while independent directors are on the board to protect shareholders' interests, these interests may not be the same among all shareholders. The interests of different types of shareholder may be more likely to diverge

when there is a large shareholder who may be in a position to harm the interests of the other (minority) shareholders. These differing interests may help to explain the inconsistent results found in previous literature. Board independence may influence the extent of tunneling experienced by an organization. However, given the potential conflict between the interests of different types of shareholders, the direction of this relationship is not clear. The board independence/tunneling relationship may be positive (if the independent directors are serving the interests of the largest shareholder) or negative (if the independent directors are serving the interests of the minority shareholders).

Combining these perspectives on board independence and minority ownership concentration, we also propose that there may be an interactive effect of board independence and minority shareholder concentration on tunneling. Independent directors of companies with concentrated minority ownership may be more vulnerable to the influence of these minority shareholders, and thus may be more likely to protect the minority shareholders by limiting the extent of tunneling by the firm.

We use a sample of 3,084 firm-years of Chinese firms from 2008 and 2009 to test these ideas. Our sample begins in 2008 because Chinese securities regulations were implemented that year to empower minority shareholders to protect their interests through cumulative voting when there is a large, dominant shareholder. Consistent with the greater influence of minority shareholder when ownership is more concentrated, we found a negative relationship between minority shareholder concentration and tunneling. We found a positive relationship between board independence and tunneling, suggesting that independent directors may be protecting the interest of the largest shareholder, even when these interests may harm the

interests of minority shareholders. We also found that the interaction between board independence and minority shareholder concentration was negatively related to tunneling. This finding suggests that independent directors may be more likely to protect the minority shareholders' interests when the directors are more vulnerable to the concentrated voting power of the minority shareholders.

Overall, our results suggest that the role of independent directors is more complex when there is a large shareholder who may dominate the company (as is common in China and other Asian countries), rather than when ownership is widely dispersed (as is more common in the US). When there is a large shareholder, the bigger threat to the shareholders may not come from self-serving behavior by management (as in traditional agency theory), but from a divergence of interests between the largest shareholder (who may control management) and the interests of minority shareholders. In such a context, the independent directors may not effectively serve the interests of the minority shareholders, particularly if the minority shareholders are widely dispersed.

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Table 1 Variable Definitions

Variable Code	Descriptions	Data Source
<i>Dependent variable</i>		
<i>OTRE</i>	Other receivables at the end of fiscal year.	Databases and <i>Juchao</i> website
<i>Independent variables</i>		
<i>CSTR</i>	The ratio of non-controlling shareholding within the top 10 big shareholders to ultimate control shareholding, calculated as: The aggregate percentages of shares held by the other large shareholders The percentage of shares held by the largest shareholder ⁴	Manually coded
<i>INDP</i>	Percentage of independent directors served on the board.	Databases and <i>Juchao</i> website
<i>Control variables</i>		
<i>CASH</i>	The cash rights of ultimate control shareholding.	Manually coded
<i>BOARD</i>	Board Size	Databases and <i>Juchao</i> website*
<i>DOMIN</i>	Dummy variable, coded 1 if the voting rights of ultimate control shareholder are no less than 30%, 0 otherwise.	Manually coded
<i>ASSETS</i>	Total assets at the end of fiscal year.	Databases and <i>Juchao</i> website
<i>LEV</i>	Debt divided by total assets.	Databases and <i>Juchao</i> website
<i>STATE</i>	Dummy variable, equal to 1 if the ultimate owner is the government, otherwise 0.	Manually coded
<i>YEAR</i>	Dummy variable, coded 1 if the observation is in year 2008, and 0 if the observation is in year 2009.	Databases and <i>Juchao</i> website
<i>INDU_i</i>	Dummy variables ($i=1\sim 12$). Choosing the manufacture industry as the base group, coded 1 if the company is the industry i , and 0, otherwise.	Databases and <i>Juchao</i> website

Notes: Databases include the *CSMAR* database. The website of *Juchao Securities Information Net* (<http://www.cninfo.com.cn>) is the authorized website by *China Securities Regulatory Commission*.

Table 2 Descriptive Statistics

	Minimum	Maximum	Mean	Median	Std. Deviation	Skewness	Kurtosis
<i>OTRE/ASSET</i>	0.0001	0.6936	0.0443	0.0149	0.0939	4.8259	26.9469
<i>CSTR</i>	0.0230	2.4814	0.5151	0.3328	0.5075	1.6049	2.5632
<i>INDP</i>	0.2500	0.5556	0.3633	0.3333	0.0501	1.4987	2.8014
<i>CASH</i>	0.0376	0.7461	0.3383	0.3153	0.1740	0.3644	-0.6636
<i>BOARD</i>	5.0000	15.0000	9.1978	9.0000	1.9168	0.7818	1.6453
<i>DOMIN</i>	0.0000	1.0000	0.6770	1.0000	0.4677	-0.7576	-1.4270
<i>ASSET (RMB 000,000)</i>	3.3979	11,785,053	33,261	2,061	423,317	21.1174	482.4919
<i>LEV</i>	0.0707	1.8430	0.5312	0.5175	0.2621	1.6855	6.6405
<i>STATE</i>	0.0000	1.0000	0.6125	1.0000	0.4873	-0.4621	-1.7876

Table 3

Regression results examining the relationship between minority ownership concentration, board independence and the interaction and tunneling

Dependent Variable: OTRE/ASSETS

	Model 1			Model 2			Model 3		
	Coefficient	Sig.	VIF	Coefficient	Sig.	VIF	Coefficient	Sig.	VIF
(Constant)	0.045	0.000		0.011	0.478		0.016	0.307	
<i>CSTR</i>	-0.010**	0.020	2.997				-0.011**	0.017	3.005
<i>INDP</i>				0.062**	0.026	1.128	0.069**	0.013	1.140
<i>CSTR</i> × <i>INDP</i>							-0.160***	0.007	1.418
<i>CASH</i>	-0.036***	0.002	2.564	-0.019*	0.053	1.778	-0.037***	0.002	2.594
<i>BOARD</i>	-0.003***	0.001	1.207	-0.002***	0.003	1.288	-0.002***	0.007	1.313
<i>DOMIN</i>	-0.013***	0.001	2.059	-0.013***	0.000	1.729	-0.013***	0.001	2.061
<i>1/ASSET</i>	0.039***	0.000	1.244	0.038***	0.000	1.239	0.039***	0.000	1.249
<i>LEV</i>	0.133***	0.000	1.113	0.133***	0.000	1.110	0.133***	0.000	1.117
<i>STATE</i>	0.000	0.990	1.227	0.000	0.936	1.221	0.000	0.917	1.228
<i>YEAR</i>	<i>CONTROLLED</i>			<i>CONTROLLED</i>			<i>CONTROLLED</i>		
<i>INDU</i>	<i>CONTROLLED</i>			<i>CONTROLLED</i>			<i>CONTROLLED</i>		
<i>Adj.R</i> ²	0.408			0.408			0.4103		
<i>F</i>	102.179***			102.247***			90.376***		
<i>Sample Size</i>	3084			3084			3084		

Notes:

(1) Models are as follows:

Model 1:
$$\frac{OTRE}{ASSET} = \beta_0 + \beta_1 CSTR + \beta_2 CASH + \beta_3 BOARD + \beta_4 DOMIN + \beta_5 \frac{1}{ASSET} + \beta_6 LEV + \beta_7 STATE + \beta_8 YEAR + \sum_{i=1}^{12} \beta_{i+8} INDU_i + \varepsilon$$

Model 2:
$$\frac{OTRE}{ASSET} = \beta_0 + \beta_1 INDP + \beta_2 CASH + \beta_3 BOARD + \beta_4 DOMIN + \beta_5 \frac{1}{ASSET} + \beta_6 LEV + \beta_7 STATE + \beta_8 YEAR + \sum_{i=1}^{12} \beta_{i+8} INDU_i + \varepsilon$$

Model 3:
$$\frac{OTRE}{ASSET} = \beta_0 + \beta_1 CSTR + \beta_2 INDP + \beta_3 CSTR \times INDP + \beta_4 CASH + \beta_5 BOARD + \beta_6 DOMIN + \beta_7 \frac{1}{ASSET} + \beta_8 LEV + \beta_9 STATE + \beta_{10} YEAR + \sum_{i=1}^{12} \beta_{i+10} INDU_i + \varepsilon$$

(2) *, **, and *** denote statistically significant at 0.10, 0.05 and 0.01 levels respectively, in a two-tailed test.

Table 4

Second Stage of 2-stage regression results in which potential determinants of board independence are controlled in first-stage regression

Dependent Variable: OTRE/ASSETS

	Coefficient	Sig.
(Constant)	0.0442***	0.0000
CSTR	-0.0101**	0.0226
RESI	0.0136***	0.0012
CSTR*RESI	-0.0086***	0.0045
CASH	-0.0355***	0.0031
1/ASSET	0.0387***	0.0000
LEV	0.1337***	0.0000
DOMIN	-0.0134***	0.0008
BOARD	-0.0026***	0.0005
STATE	0.0003	0.9199
YEAR	CONTROLLED	
INDU	CONTROLLED	
Adj-R ²	0.4099	
F	90.2471***	
Sample Size	3084	

Notes:

(1) Models are as follows:

Stage1

$$INDP = \beta_0 + \beta_1 CSTR + \beta_2 CASH + \beta_3 \frac{1}{ASSET} + \beta_4 DOMIN + \beta_5 BOARD + \beta_6 LEV + \beta_7 STATE + \beta_8 YEAR + \sum_{i=1}^{12} \beta_{i+8} INDU_i + \varepsilon$$

Stage2

$$\frac{OTRE}{ASSET} = \beta_0 + \beta_1 CSTR + \beta_2 RESI + \beta_3 CSTR \times RESI + \beta_4 CASH + \beta_5 \frac{1}{ASSET} + \beta_6 LEV + \beta_7 DOMIN + \beta_8 BOARD + \beta_9 STATE + \beta_{10} YEAR + \sum_{i=1}^{12} \beta_{i+10} INDU_i + \varepsilon$$

(2) *, **, and *** denote statistically significant at 0.10, 0.05 and 0.01 levels respectively, in a two-tailed test.

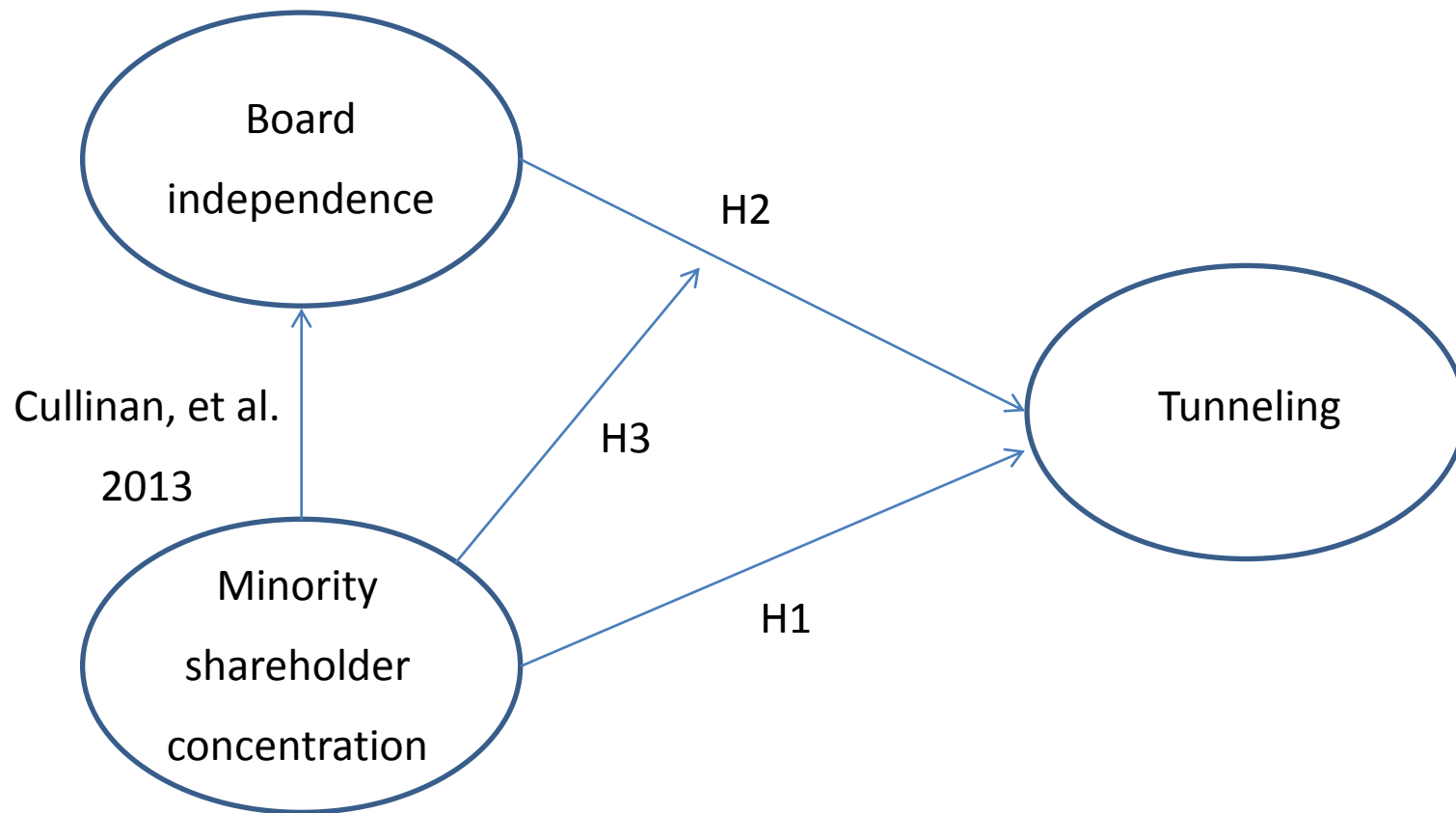


Figure 1: Summary of Hypotheses