Analysis of the Peer Effects in Trading with Connected Parties

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Abstract: Most of Chinese listed companies have controlling shareholders. As a result, the conflict between these controlling owners and the minority or non-controlling owners becomes more pronounced. Controlling shareholders can harm the interests of minority shareholders through various means, and related-party transactions are an important way for controlling shareholders to exploit listed company assets (Yu and Xia, 2004)[1]. This article uses data from listed companies in the Shanghai and Shenzhen stock exchanges to examine the influence and economic consequences of peer companies' related-party transactions from the perspective of peer effects. The empirical results show that related-party transactions by peer companies in the same industry significantly affect the related-party transaction decisions of listed companies. Moreover, this peer effect has a significant negative impact on a company's innovation input and output.

1. Introduction

Related-party transactions can be used to allocate resources within a group, allowing various business units to share resources, technology, or expertise and engage in specialized division of labor, which can help reduce transaction costs, control risks, and ultimately enhance overall efficiency. However, in the context of highly concentrated equity ownership in listed companies and inadequate investor protection laws, related-party transactions often become a means for insiders to transfer company resources and seize control for their own personal gains(Cheung et al.,2006)[2]. Understanding the underlying causes of related-party transactions in listed companies is crucial for governance, preventing the abuse of power by major shareholders, and protecting investor interests.

The reasons for related-party transactions in listed companies are diverse. Cheung et al. (2006) classified the connected transactions into three categories: transactions that are prone to result in expropriation, transactions that are likely to benefit the listed firm and transactions that may have been driven by strategic reasons. This article focuses on the first type of related-party transactions that are prone to exploitation by major shareholders, specifically involving transactions related to assets, services, and goods.

Recent researches have focused more on the impact of corporate governance structures and financial factors on related-party transactions. Wei et al.(2013) [3]found that the higher the shareholding and board representation of family-related major shareholders, the more severe the related-party transactions. It is often implicitly assumed that listed companies make independent

decisions, while social interaction theory suggests that the average behavior of a group can influence the behavior of individual group members (Manski, 1993)[4]. Empirical research and anecdotal evidence also indicate that companies often refer to the behavior of other companies in the same industry before making decisions. Companies within the same industry are not independent of each other, and there is a phenomenon of mutual imitation and learning among decision-makers. The peer effect is commonly observed in various corporate decisions, such as capital structure (Leary and Roberts, 2014)[5], IPOs(Aghamolla and Thakor, 2022)[6], dividend payouts (Grennan, 2019)[7], CSR (Li and Wang, 2022)[8], and misconduct (Lu Rong and Chang Wei, 2018)[9]. Lieberman and Asaba (2006)[10] pointed out that mutual imitation among companies in an uncertain environment implies that they are making the same bets on the future. This can greatly amplify the positive or negative social consequences of their actions. Therefore, self-dealing may not only be related to the financial and governance aspects of the listed company itself, but it can also be influenced by other companies.

On the other hand, insiders of listed companies may exploit the company's assets through related-party transactions, then hinder the operations and profitability of the company (Jiang et al., 2010)[11].While innovation activities require significant financial and resource investments, related-party transactions can result in a lack of necessary innovation resources, thereby suppressing innovation activities. Additionally, unfair or opaque related-party transactions can lead to conflicts of interest, especially if the related parties gain undue benefits at the expense of other shareholders, potentially weakening internal innovation drive. So, does the peer effect of related-party transactions inhibit corporate innovation?

This article takes the related-party transactions of goods, services, and assets in domestic A-share listed companies as samples. Based on the perspective of peer effects, it examines the influence of related-party transactions among peer companies on a company's own related-party transactions and their market effects from an industry dimension. The empirical results show that related-party transactions by peer companies in the same industry significantly affect the related-party transaction decisions of listed companies. Moreover, this peer effect has a significant negative impact on a company's innovation input and output.

The structure of this article is as follows: section 2 discusses the impact mechanism of peer company related-party transactions on listed companies. Section 3 presents sources of data and defines the variables used in the empirical analysis. Section 4 report empirical results and other robustness tests. Section 5 concludes.

2. Literature review and hypothesis formulation

2.1 Peer effects in corporate finance

Peer effects refers to the influence of reference groups on individual decision-making, leading to a tendency to exhibit behavior consistent with other members of the same group (Manski, 1993). Just like individuals, companies also exist within a social environment and are often influenced by the behavior of other organizations or groups in society, thereby displaying significant peer effects (Manski, 2013). Emerging literature emphasizes the role of peer effects in corporate finance. Leary and Roberts (2014) found that a company's capital structure is influenced by peer companies, and the effect of in-group bias exceeds the influence of its own characteristics on the capital structure. Lu Rong and Chang Wei (2018) found that the probability of misconduct in a company in a specific region significantly increases due to the misconduct of other listed companies in the same region. Grennan (2019) showed that firms accelerate the time taken to make a dividend change by about 1.5 quarters and increase payments by 16% in response to peer changes. Furthermore, companies exhibit pronounced peer effects in decisions related to managers' stock selling (Yi et al.,2 019)[12], corporate governance(Foroughi et al., 2021)[13], corporate social responsibility (CSR)and information

disclosure(Seo,2021)[14].

2.2 Peer effects in trading with connected parties

Controlling shareholders have strong incentives to expropriate the assets of listed companies through means such as fund misappropriation, related-party transactions, cash dividend distribution, and even direct theft (Jiang et al., 2010). While concentrated ownership structures enhance the motivation and ability of controlling shareholders to supervise managers, to some extent, addressing agency costs between external shareholders and managers, the interests of controlling shareholders and external shareholders are not entirely aligned. Deng et al. (2005) found that due to inadequate property rights protection in China, parent companies have enough motivation and ability to expropriate the resources of listed companies.

When the benefits of expropriation outweigh the costs, insiders tend to exploit the controlling company. However, due to the illegality of expropriation and the issue of selective enforcement by regulatory authorities (Dai Zhiyong and Yang Xiaowei, 2006)[15], the consequences of related-party transactions are uncertain. The "information learning theory" suggests that when environmental uncertainty makes it difficult for managers to predict actions and outcomes, they tend to imitate other companies to reduce the uncertainty of outcomes (Lieberman and Asaba, 2006). If insiders seek expropriation strategies on their own, simple strategies may lead to exposure and punishment, while complex strategies can incur high planning costs. Strategies practiced by peer companies are more likely to be tolerated by regulatory authorities, helping to reduce search costs and the uncertainty of outcomes. Therefore, the expropriation behavior of insiders in focal companies may be influenced by the expropriation strategies of large shareholders in their peer companies within the same industry. Thus, we expect the existence of industry peer effects in related-party transactions.

Controlling shareholders transfer resources to related-party companies through related-party transactions, thereby reducing the funds and resources available for innovation in the company. This resource loss may limit the company's ability to engage in research and development activities, introduce new technologies, and innovate products. Additionally, frequent related-party transactions indicate that controlling shareholders may prioritize short-term economic benefits over long-term returns on innovation investments. This conflict of interest can lead to improper allocation of resources and decision-making in innovation, thereby affecting the progress of innovation. Furthermore, we will examine the economic consequences of in-group bias-induced asset stripping by controlling shareholders and investigate whether in-group bias amplifies the impact of related-party transactions on corporate innovation. We expect that imitating asset stripping will exacerbate the decline in innovation activities.

3. Research design

3.1 Data source and sample processing

The sample consists of A-share listed companies from 2003 to 2018. The initial data is processed as follows: (1) Excluding listed companies in the financial industry,(2) Excluding companies with missing data, and (3) Winsorizing all continuous variables by truncating the top and bottom 1% of the data to avoid the impact of extreme values. The data for this study is sourced from CSMAR and CNRDS.

3.2 Model setting and variable description

3.2.1 Model setting

To test whether there is a peer effect in related-party transactions, we adopt the methods used by Leary and Roberts (2014) and Grennan (2018) and construct the following OLS model:

$$rpt_{ijt+1} = \beta_0 + \beta_1 peer\_rpt_{ijt} + \gamma X_{ijt} + \delta \overline{X}_{ijt} + \theta v_j + \sigma y_t + \varepsilon_{ijt} \qquad (1)$$

Among them, rpt_{ijt} is representing the related-party transactions of company i in industry j in year t. $peer\_rpt_{ijt}$ represents the related-party transactions of peer companies, specifically, the average of related-party transactions of other companies in the same industry excluding company i. ε_{ijt} represents the random error term. X_{ijt} represents the control variables that represent company characteristics,,$\overline{X}$ represents the control variables for peer company characteristics, v and y represent industry and time fixed effects, respectively. Industry j is defined based on firm's one-digit code according to Chinese Standard Industrial Classification. Dependent variable is leading by one period to reduce the influence of reverse causality.

To examine the spillover effects of peer effect on corporate innovation, this study draws on the methods used by Yi et al. (2019)[12] and constructs the following OLS model:

$$innovation_{ijt+1} = \beta_0 + \beta_1 peer\_rpt_{ijt} + \gamma X_{ijt} + \delta \overline{X}_{ijt} + \theta v_j + \sigma y_t + \varepsilon_{ijt} \qquad (2)$$

$Innovation_{ijt}$ is the proxy for corporate innovation. This article references the method used by He and Tian(2013) [16]and utilizes research and development (R&D) investment and patent applications as measurement indicators for corporate innovation.

3.2.2 Variable description

This article refers to Cheung et al. (2006) and defines related-party transactions as commodity, labor, and asset transactions between listed companies and related parties. The larger the transaction amount of the related party of the listed company is, the more serious the collection problem of the controlling shareholder is.

The key explanatory variable in this study is peer influence in related-party transactions. I use the one-digit code from Chinese Standard Industrial Classification to define peer groups based on industry. The firms in the same industry face the same legal environment. Peer firms compete for the same customers, capital and human resource, thus creating economic links (Grennan, 2018). As peer comparison is widely utilized by the investment community as a prominent method in equity analysis, and executives frequently engage with investors, the outcomes of peer firms are likely to be highly noticeable, even if peer interaction is not frequent.

It's hard to distinguish whether the results are influenced by peer effects or driven by reflection problems. This study refers to Grennan (2018) and uses peer idiosyncratic risk as an instrumental variable to mitigate endogeneity issues related to peer effects. The instrumental variable primarily reflects the idiosyncratic risk of peer companies, excluding market and industry factors, and does not have an impact on the related-party transactions of other companies, thus satisfying the exogeneity requirement. Additionally, there is a close relationship between peer firm's specific risk and its related-party transactions, fulfilling the relevance requirement. Definitions and description statistics of other variables are provided in Table 1 and Table 2.

Table 1: Variable Definitions

Variable	definition
agl_asset	Amount of related-party transactions in asset, services and goods/ total assets
ind_agl	Average agl_asset among peer companies
Lev	Leverage ratio=debt/ total assets
SIZE	logarithm of total market capitalization
ROA	Return on Assets
MtoB	Market to book ratio
AGE	logarithm of firm age
DOMINST1	institutional ownership ratio
ind_Lev	Average Leverage ratio among peer companies
ind_SIZE	Average SIZE among peer companies
ind_ROA	Average ROA among peer companies
ind_MtoB	Average MtoB among peer companies
ind_AGE	Average AGE among peer companies
ind_DOMI	Average DOMINST1 among peer companies

Table 2: Descriptive Statistics of Main Variables

Variable	N	Mean	Min	p50	Max	SD
agl_asset	30,866	0.0404	0	0	0.7024	0.1155
ind_agl	30,866	0.0567	0	0.0384	0.5348	0.0856
ind_Lev	30,866	0.4412	0.3037	0.4113	0.6191	0.0727
ind_SIZE	30,866	21.7648	19.4170	21.8256	23.1596	0.6805
ind_ROA	30,866	0.0320	-0.0197	0.0351	0.0653	0.0146
ind_MtoB	30,866	1.8609	1.0486	1.7762	3.5259	0.5536
ind_AGE	30,866	2.4409	1.4669	2.4814	2.8699	0.2761
ind_DOMINST1	30,866	0.0429	0.0218	0.0420	0.0762	0.0096
Lev	30,866	0.4670	0.0523	0.4634	1.2692	0.2238
SIZE	30,866	22.2285	18.6739	22.1782	25.0246	1.0644
ROA	30,866	0.0300	-0.3420	0.0325	0.2014	0.0707
MtoB	30,866	2.0001	0.8446	1.5340	9.0930	1.3829
AGE	30,866	2.5901	0	2.6391	3.3322	0.4509
DOMINST1	30,866	0.0469	0	0.0255	0.3365	0.0611

4. Empirical results and analysis

Model (1) is utilized to test the existence of peer effects in related-party transactions, and the regression results are shown in Table 3. The coefficient of industry peer firms' related-party transactions is significantly positive. Additionally, to mitigate the endogeneity of peer effects, this study employs peer firms idiosyncratic risk as an instrumental variable in a two-stage regression. The coefficient of ind_agl_asset remains significantly positive. Therefore, the related-party transaction behavior of listed companies exhibits peer effects, which are influenced not only by endogenous factors such as ownership structure but also by the related-party transactions of peer companies in the same industry.

Table 3: Peer effects in related parties transactions

VARIABLES	(1) OLS F.agl_asset	(2) OLS F.agl_asset	(3) OLS F.agl_asset	(4) 2SLS F.agl_asset
ind_agl_asset	0.2352***	0.0687***	0.0257*	0.0392**
	(0.0079)	(0.0146)	(0.0132)	(0.0156)
ind_Lev			0.2455***	0.2387***
			(0.0427)	(0.0549)
ind_SIZE11			0.0005	0.0003
			(0.0024)	(0.0031)
ind_ROA			0.5483***	0.5363**
			(0.1371)	(0.2032)
ind_MtoB			0.0053	0.0053
			(0.0047)	(0.0052)
ind_AGE			-0.1170***	-0.1142***
			(0.0285)	(0.0305)
ind_DOMINST1			-0.0951	-0.0981
			(0.1355)	(0.1548)
Lev			0.0223**	0.0222*
			(0.0087)	(0.0105)
SIZE11			0.0158***	0.0158***
			(0.0025)	(0.0052)
ROA			-0.0369	-0.0369
			(0.0234)	(0.0241)
MtoB			-0.0013	-0.0013
			(0.0010)	(0.0019)
AGE			0.0119***	0.0119***
			(0.0041)	(0.0038)
DOMINST1			-0.0491**	-0.0491***
			(0.0195)	(0.0114)
Observations	27,179	27,179	27,179	27,179
R-squared	0.0317	0.0725	0.0928	0.0232
Controls	NO	YES	YES	YES
Year FE	NO	YES	YES	YES
Industry FE	NO	YES	YES	YES
Chi-sq(1) P-val				0.0461
Wald F statistic				68.157

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Model (2) examines the spillover effect of peer effects in related-party transactions on corporate innovation, and the results are presented in Table 4. The regression coefficients of ind_agl_asset on research and development (R&D) expenditure (column 1), the log of invention patent applications (column 2), and the total number of patent applications (column 3) are all significantly negative. This indicates that related-party transactions among peer companies in the same industry have a significant negative impact on corporate innovation.

Table 4: The spillover effect of peer effects in related-party transactions

VARIABLES	(1) F.RD_asset	(2) F.lnpatent1_app	(3) F.lnpatent_app
ind_agl_asset	-0.0086***	-0.3829***	-0.3422***
	(0.0012)	(0.0829)	(0.1013)
ind_Lev	-0.0707***	-4.0759***	-4.6754***
	(0.0042)	(0.3062)	(0.3821)
ind_SIZE11	-0.0002	-0.0959***	-0.0940***
	(0.0003)	(0.0227)	(0.0272)
ind_ROA	-0.0672***	-6.1138***	-8.2745***
	(0.0104)	(0.9577)	(1.1462)
ind_MtoB	0.0017***	0.0356	-0.0859
	(0.0004)	(0.0456)	(0.0541)
ind_AGE	0.0079***	1.0828***	0.8205***
	(0.0029)	(0.2285)	(0.2638)
ind_DOMINST1	0.0460***	4.9940***	8.0512***
	(0.0130)	(1.1585)	(1.3768)
Lev	-0.0066***	0.1692**	0.0831
	(0.0009)	(0.0733)	(0.0932)
SIZE11	-0.0002	0.3719***	0.3859***
	(0.0003)	(0.0328)	(0.0367)
ROA	0.0215***	0.5715***	0.9809***
	(0.0028)	(0.2030)	(0.2408)
MtoB	0.0007***	-0.0973***	-0.1386***
	(0.0002)	(0.0105)	(0.0122)
AGE	-0.0054***	-0.2799***	-0.4388***
	(0.0005)	(0.0426)	(0.0529)
DOMINST1	0.0069***	0.4594**	0.5449**
	(0.0022)	(0.2266)	(0.2757)
Observations	19,346	23,816	23,816
R-squared	0.3602	0.3835	0.4275
Controls	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion

This study is based on A-share data of Chinese listed companies and investigates the phenomenon and consequences of peer effects in related-party transactions. Empirical results demonstrate the existence of peer effects in related-party transactions, where an increase in related-party transactions by peer companies reduces the focus company's research and development (R&D) expenditure and diminishes innovation output, thereby impacting the long-term development of listed companies. In the regulatory process, relevant authorities need to consider the "contagiousness" of insider-related transactions and further enforce strict regulations on related-party transactions of listed companies to

protect the interests of small and medium-sized investors.

Acknowledgements

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