Explaining Peer-firm Effect on Corporate Capital Structure: Predation Theory and Investment Imitation

Master's Thesis Financial Economics

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Date:	10 July, 2018

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Abstract

This study investigates how and why capital structure and financial decision of specific firm are affected by peer firms in the industry. Using idiosyncratic equity returns as the instrumental variable, the 2-stage least squares (2SLS) regression results show that industry followers (defined as small, less profitable firms) are more sensitive to the interaction of industry leaders (defined as big, profitable firms). And I show that peer-firm effect on capital structure is more pronounced in the industry with more munificence, lower level of dynamics and higher level of competition. Besides, firms do not only mimic the financial policies of peer firms, but also the investment projects and strategic planning (R&D). Generally, my study is consistent with the theory of predatory interaction and investment imitation, and helps to answer the question "why the firm imitates financial structure and policies of peer firms?"

Contents

1. Introduction

Explaining the capital structure variance among firms and industries is a key theoretical and empirical issue in the field of corporate finance. The previous research on capital structure determinants pays much attention to time and firm-level and country-level characteristics (Titman and Wessels (1988); Hovakimian et al. (2004)). Related empirical studies employ dummy variables, the dummy of bank-based financial system for example, to control the effect of country on capital structure and investment decisions (de Jong et al. (2008)). Although traditional determinants can explain more than two-thirds of the level and change of firm leverage (Kayo and Kimura, 2010), further reasearch explores remaining determinants by studying the impact of peer firms and enviroment (Leary and Roberts (2014); Yang et al. (2017); Rauh and Sufi (2011)).

This paper investigates peer-firm effect on capital structure and studies how and why industry level characteristics influence peer-firm effect. It is closely related to the study of Leary and Roberts (2014) and extend it by using additional industry factors of munificence, dynamics and competition (Boyd, 1995). Leary and Roberts (2014) use reduced-form estimate regressions and two-stage least square (2SLS) regressions and argue that individual small, unsuccessful firm responses to the financing policies as well as the characteristics of big, profitable peer firms. In other words, the channel of peer-firm effect is following and mimicking the actions of leaders. Other research on peer-firm effect focuses on investment mimicking hebavior and show similar economic implications (Yang et al. (2017); Bustamante and Fresard (2017)). However, these studies are restricted to analyzing how specific firm imitates peer firms without questioning why they do it. Potential explanations contains predation theory (Bolton and Scharfstein, 1990), information disadvantage (Benoit, 1984), investment imitation (Yang et al.,2017), rational herding (Devenow and Welch, 1996), etc. So, this paper aims at revealing the most relevant explanation.

Kayo and Kimura (2010) utilize three innovative industry-level characteristics (munificence, dynamics and competition) and test several hierarchical determinants of financial structure. And the results suggest that all of these determinants show strong explanatory power at the industry level, throwing more light on what is hard to be explained by traditional firm-level factors. In this context, study additional variables including industry characteristics would contribute to revealing the incentive of peer-firm effect. And to my best knowledge, there are no studies explore the peer-firm effect on capital structure that consider the moderating effect of three industry characteristics. Therefore, this paper distinguishes itself from other research studying peer effect by combining the existing firm-specific determinants of capital structure (such as firm size and M/B ratio) with other potential industry-level factors (munificence,

dynamics and competition). These innovative factors show different moderating effects and deliver significant economic and empirical implications. And therefore, it contributes to identifying which theoretical explanation is most relevant to peer-firm effect.

The remaining paper is organized as follows: The next section sets out related literature, theoretical determinants of capital structure and hypotheses of this paper. Following the discussion about methodology in section 3, the empirical results of peer-firm effect and leader-follower model are presented in section 4. Besides, this section also provides the 2SLS regression results regarding the mediating effect of industry characteristics on peer/leader effect. In section 5, I explore the connection between capital structure imitation and investment imitation and further discuss how financial constraint impacts firms' reaction. In section 6, I conclude this paper with main findings and important implications of the results.

2. Literature review and hypotheses

2.1 Traditional theories of capital structure

"There are still much we do not know about capital structure (Myers, 1984)". The initial ideas of corporate capital structure originate from static trade-off model. Modigliani and Miller (1958) pose that, under perfect markets assumptions, the company chooses optimal financial leverage by balancing the tax benefits of debt and the underlying bankruptcy costs. In any case, this hypothesis indicates extremely restrictive explanatory power on financial decisions conducted in the real field. And the empirical study is so scarce to test the optimal capital structure which firms aim to have. During the 1980s, some empirical studies demonstrate that the announcements of firms' financing events may trigger negative reactions in stock markets. And the negative impacts are larger when the company issues equity instead of debt. Myers and Majluf (1984) adjust the M-M assumption of symmetrical information and argue that companies prioritize internal slacks, and then debt, lastly raising equity when they need financing. And this pecking order theory helps to resolve capital structure puzzle and it pushes related study to a new and interesting direction. Then Baker and Wurgler (2002) observe that current capital structure and financial policies of firms are strongly related to the previous market value of stocks. Consequently, they argue that capital structures reflect managers' aggregate attempts to "time" the market by issuing overvalued equity, and this effect is persistent. "Market timing" reflects a phenomenon that firms would probably issue equity when it is overvalued compared with fundamental values and restrict the equity issuance or even repurchase the stocks when it is relatively undervalued.

Based on these theories, further research extends empirical study by analyzing different attributes that may influence corporate financial structure and decisions, such as growth opportunity (Welch, 2012), Tobin Q (Rajan and Zingales (1995)), financial situation, bankruptcy rate (Titman and Wessels (1988); Leland and Toft (1996)). Following research provides ample implications from their empirical results. Titman and Wessels (1988) employ several measures of long-term, short-term, and convertible debt, instead of using the single aggregate measure of total debt. So they succeed to match different theories with variable instruments. Their data of 469 U.S. firms suggest that corporate debt is negatively correlated with the "uniqueness" of firms' products and business. In other words, firms with such advantages could have more bargaining power towards their customers, suppliers and employees (Titman, 1982). Besides, even though transaction costs are relatively small compared with various leverage-related costs and benefits, it shows to be an important determinant regarding the level of short-term leverage. These theories are based on several theoretical assumptions and ignore the interactions in the environment.

2.2 Peer-firm effect and related explanations

2.2.1 Peer-firm effect on capital structure and investment

Peer-firm effect exists across individuals, firms and nations. Basically, the impact of peer firm is observed as an imitative behavior regarding strategic planning and financial decision making. In the context of economic and financial theory, peer firms shape the decisions of different firms from many perspectives, for instance, trough commodity valuation (Bertrand, 1883) and through promotion strategy (Stigler, 1968). Relevant research focuses on how capital structure and investment are impacted by peer firms. Leary and Roberts (2014) find convincing empirical results of peer-firm effect on corporate financial policies. They find evidence of peer-firm effects that are more important than most previously identified determinants (market-to-book ratio, asset intangibility, Tobin Q, etc.). Additional, weaker, less successful firms pay much attention to the financial actions of leaders in the industry and respond to the changes in the industry. But it is not the other way around. Consistent with previous findings, the research of Yang et al. (2017) confirms that peer group characteristics affect corporate investment decisions. Moreover, under the risk of exiting the market, financially constrained firms have more incentive to imitate the investment strategy of peer firms, and firms in mid-level competition markets are least likely to be impacted by their peers. Consistent with the conclusions of Yang et al. (2017), Foucault and Fresard (2014) pose that counterparties have a strong spillover effect which pushes firms to take less profitable investing choices. And moreover, using Chinese listed firms (1999 – 2012) as the sample, Chen and Ma (2016) show that the pressure from counterparties is more pronounced when firms 1) have more accurate and useful

information; 2) the accounting disclosure quality of peer firms is higher and 3) the competition in the industry is fierce. And these findings also inspire me to explore the relationship between investment and leverage since most of the investment projects need constant support of financing.

Moreover, other studies investigate the association of peer firms on corporate governance (John and Kadyrzhanova, 2008), M&A decisions (Bizjak et al., 2009) and tax avoidance (Li et al., 2014). John and Kadyrzhanova (2008) analyze the peer effect in the view of corporate governance, and they use novel triple-difference estimator to address endogeneity problem of causality by using peer firm adoption of antitakeover laws as a variable in the model. Their data of U.S. listed firms demonstrate that great condition of administration makes great administration over the long haul- i.e., firms are more likely to use antitakeover provisions when most of their peers adopt them. This research provides good resources to understand peer-firm effect and enrich the theoretical and empirical studies on this topic.

2.2.2 Related explanations and theories

Regarding the incentive of learning and mimicking the peer firms, there are a few theories such as rational herding (Devenow and Welch, 1996), predatory competition (Bolton and Scharfstein, 1990), information disadvantage (Welch, 1992), etc.

Devenow and Welch (1996) argue that herding is a coordination phenomenon among individuals who act similarly to the signal (e.g., announcement, stock price movement) or process their information based on the action of peers (e.g., investment decisions). Rational herding could arise from the principal-agent problem that relative performance is usually used to judge managerial achievement. The rational herding model (Devenow and Welch, 1996) suggests that such herding is motivated by informational learning or risk aversion in case of relatively poor performance. The psychology to avoid relative failure can be concluded as “it is better for reputation to fail conventionally than to succeed unconventionally (Keynes, 1936)”. As a result, better-than-average managers who “follow the crowd” make suboptimal decisions and worse managers “ride the herd” and benefit form herding.

Besides, rivals’ predation could be used to explain learning behavior among peer firms (Benoit, 1984; Lieberman and Asaba, 2006). Bolton and Scharfstein (1990) propose rational predation theory based on agency problems in financial contracting and this model suggests that optimal financial contract which reduces agency problems increase the rivals' incentives to prey less successful firm and push it to exit the market. Their argument is closest in spirit to the "deep-pockets" theory of predation, in which cash-rich firms drive their financially constrained competitors out of business by reducing their rivals' cash flow. In

addition, this theory implies that the financially constrained firms rely more on external resources, exposing the firm to predatory competitors. As a result, followers in the industry mimic the capital structure of their peers to avoid risk from bankruptcy and the risk of financing termination. This theory inspires me to explore the connection between investment imitation and capital structure mimicking behavior because investment projects need stable financing and the financing termination threaten the implementation of investment projects.

Another explanation is regarding information asymmetry and information disadvantage. Introduced by Welch (1992), the basic cascade model implies that agents gain useful information from observing peers' actions and thus ignore their own private information. And this tendency is especially strong when there is finite access to private information, and the disclosure quality of peers is high. Another example of information disadvantage concerns a situation when the firm enters a market. New arrivals have less information compared with existing firms, and thus they prefer to infer the unavailable information from the actions of peers and act alike (Bolton and Scharfstein, 1990).

These results together suggest that peer-firm effect matters. And in order to understand corporate capital structure and financial decisions better, further research should go beyond single-firm assumptions.

2.3 Industry level determinants of corporate capital structure

2.3.1 Munificence

This paper firstly analyzes the impact of industry munificence on capital structure and peer-firm effect. Industry munificence estimates the abundance of available resources in the environment (Boyd, 1995). And environment with abundant resources is expected to support a constant growth for its business (Dess and Beard, 1984). Industry of mining, for example, is a fairly resources scarce environment, while resources are greatly more munificent in technology and semiconductors industries. Munificence implies low threshold to resources; and consequently, it is positively related to the growth and development in the industry. Dess and Beard (1984) represent that industries with great munificence show a profile of low level of competition, and consequently high profitability and great developing opportunity. Kayo and Kimura (2010) show that munificence and corporate leverage are negatively correlated, and the effect is more pronounced in the developing countries. Given these background theories, it is reasonable to support that industries with munificence are less likely to issue debt. And therefore, leverage is expected to be negatively related to munificence. In this paper, we employ the concept of munificence and extend it to the effect of peer firm. In theory, if the abundance of resources creates a comfort environment for the firms to reap the benefit of mimic behavior, munificence would increase the effect of peer firms.

However, firms confronted with less predatory interaction in a high-munificence industry, would have less incentive to herd. So, the peer-firm effect is the aggerated effect of two competing power.

2.3.2 Dynamics

Another concept we employ from previous research is industry dynamics. Dynamism directly measures environmental volatility and reflects uncertainty in the industry (Boyd, 1995). Yang et al. (2017) study how counterparties in the industry shape firm's investment decisions and argue that a certain group of firms reduce long-term investment to protect themselves from the threat of uncertain in the industry. These short-term investment policies coupled with flexible assets would significantly enhance the efficiency of the mimicking behavior because learning is a dynamic process. Similarly, the study of Simerly and Li (2000) also implies that the firm survives in a more dynamic and unpredictable environment prefer to keep a low level of debt. Specifically, the interaction variable between the measure of dynamism and leverage show a significant negative influence on firm's ROA (return on assets). Combined with the effect of munificence, firms working in an environment with prominent generosity (i.e. more convenient access to resources) and more dynamism (i.e. higher level of instability or volatility) tend to use leverage with less intensity (Yang et al. (2017)). Therefore, it is reasonable to hypothesize that leverage mimic behavior is advantageous in low dynamic industries but less pronounced in industries with high dynamism.

2.3.3 Competition

The third dimension of industry-level characteristics is industry competition (industry complexity). Complexity is based on variables of environmental homogeneity and concentration (Aldrich (1979)), and it is a good measure of inequalities among competitors. Traditional economic theories use two relevant variables to measure competition (see, for example, Porter (1980)). One is the number of competitors in a given industry, and another is their relative market share. In this paper, we use Herfindahl-Hirschman index (Herfindahl, 1950; Kelly, 1981) which includes both components mentioned above. When the score of HHI is approaching 1, it would imply that the market is controlled by a few giant companies or the majority of the market is occupied by the minor companies (e.g., monopolistic or oligopolistic structures). The industry structure and participating interaction would be less complex for Industries with fewer competitors and higher market concentrations (i.e. higher HHI scores). The most related study of the topic of competition and capital structure is the study of Yang et al. (2017), who find that peer-firm effect firstly decreases and then increases with the competition in an industry aggravates. In other words, firms' investment decisions are less dependent on peer firms' action in medium-competition markets. This U-shaped curve of competition and peer group effect implies the risk-averse attitude in different markets and reflects the risk-taking attitude towards innovative investment than traditional investment (Yang et

al., 2017). However, as Bolton and Scharfstein (1990) suggest, competition strengthens the predatory actions of firms. If the predation theory holds, the peer-firm effect is expected to be strong in a highly competitive industry.

In conclusion, to my best knowledge, there are no studies study the peer-firm effect on capital structure that consider the moderating effect of three industry characteristics (munificence, dynamics and competition). And these innovative industry-level determinants of capital structures, I believe, deserve an in-depth analysis and tests.

2.4 Hypotheses

Based on these fundamental research and theories, I hypothesize that:

H1: The capital structure of the specific firm is correlated with peer firms' average capital structure.

H2: Small and less successful firms are more sensitive to the leverage and financial decisions of big and successful peer firms.

H3: Firms do not only imitate the financial structure of peer firms, but also imitate their strategic investing projects.

H4: Peer-firm effect on capital structure is more pronounced in the industry with more munificence, lower level of dynamics and high level of competition.

H5: Financially constrained firms are more likely to be impacted by the interaction of peer firms.

3. Methodology, data, and descriptive statistics

3.1 Methodology

Following the empirical model of corporate capital structure used in related research (e.g., Titman and Wessels (1988); Frank and Goyal (2009)), I specify the baseline empirical model as follows:

$$y_{ijt} = \alpha + \beta \bar{y}_{-ijt} + \gamma' \bar{X}_{-ijt-1} + \lambda' X_{ijt-1} + \delta' \mu_j + \phi' \nu_t + \varepsilon_{ijt} \quad (1)$$

Where the indicators i, j, and t correspond to firm, industry, and year, respectively. The dependent variable Y_{ijt} measures financial policies, market leverage for example, of firm i at time t in industry j. The explanatory variable of peer-firm effect is $\overline{Y}_{-ijt,}$ denoting average outcomes of peer firms (the counterparties of firm i in the industry j). To efficiently limit the time during which firms respond to each other, the baseline model uses contemporaneous variable $\overline{Y}_{-ijt}$. However, this choice makes it harder to

see the duration of peer-firm effect. So, lagged average outcome variable is used in section 5 for robustness. The vectors $\bar{X}_{-ijt-1}$ and X_{ijt-1} denote peer firm average variables and specific characteristics of firm i, respectively. Following Leary and Roberts (2014), this paper use 2SLS regression to test the relation between firms' financial decisions and peer firm/leader firms' average actions, controlling for firm size (log sales), asset intangibility (Net PPE/Assets), M/B ratio and profitability (EBITDA/Assets). The error components μ_j and v_t represent industry and year fixed effects, while ε_{ijt} indicates the error term assumed to be correlated within firms and heteroscedasticity. Under this specification, this paper mainly focusses on β and γ' which measure the peer-firm effect.

3.2 Endogeneity problem and construction of IV

The regression formula below is a basic model relating the dependent variable Y_i and regressors X_i:

$$y_i = \alpha + \beta x_i + u_i \tag{2}$$

Endogeneity occurs when one or more unobserved/observed variables which are not incorporated in the model, are correlated with one or more variables that are included in the model. In other words, if X_i and u_i are correlated, the OLS estimator is inconsistent. There are three main causes of endogeneity: 1) Omitted variable bias which cause endogeneity when correlated explanatory variables are excluded from the model under study; 2) Measurement error of explanatory variable; and 3) Simultaneity or reverse causality.

$$y_{ijt} = \alpha + \beta \bar{y}_{-ijt} + \gamma' \bar{X}_{-ijt-1} + \lambda' X_{ijt-1} + \delta' \mu_j + \phi' v_t + \varepsilon_{ijt} \tag{1}$$

In the model used, endogeneity problem arises from using $\bar{Y}_{-ijt}$ as the explanatory variable. Specifically, if the firm A's capital structure or financial decision is influenced by firm B's, it is reasonable to argue that the reverse is also true. In this context, the causality between the dependent variable and independent variables is not clear. So, it implies that $\bar{Y}_{-ijt}$ is an endogenous regressor and that the structural parameters are not identified. Following Leary and Roberts (2014), this paper use lagged stock shock of peer firms as the instrumental variable to deal with endogeneity problem mentioned above.

This paper extracts idiosyncratic returns by using two-factor asset pricing model (Leary and Roberts, 2014)

$$r_{ijt} = \alpha_{ijt} + \beta_{ijt}^{M}(rm_t - rf_t) + \beta_{ijt}^{IND}(\bar{r}_{-ijt} - rf_t) + \eta_{ijt} \tag{3}$$

Where r_{ijt} refers to the stock return for firm i in industry j over month t. $(rm_t - rf_t)$ denotes the excess market return, and $(\bar{r}_{-ijt} - rf_t)$ denotes the excess return on an equal-weighted industry portfolio excluding

firm i's return. For each firm, I estimate equation (3) on a rolling annual basis using the historical data of previous 5 years. It requires at least 24 months (40% of 60 months) of historical data and uses up to 60 months (100% of 60 months) of data in the estimation. For example, to calculate expected and idiosyncratic stock returns for 3M Company during the period between January 2000 and December 2000, I first estimate equation (3) using monthly stock returns from January 1995 to December 1999. Then, after getting the estimated coefficients and the factor returns from January 2000 through December 2000 (annual basis), I estimate equation (4) to compute the expected and idiosyncratic returns as follows:

$$\begin{aligned} \text{Expected Return}_{ijt} &\equiv \hat{r}_{ijt} = \hat{\alpha}_{ijt} + \hat{\beta}^{M}_{ijt}(rm_t - rf_t) + \hat{\beta}^{IND}_{ijt}(\bar{r}_{-ijt} - rf_t), \\ \text{Idiosyncratic Return}_{ijt} &\equiv \hat{\eta}_{ijt} = r_{ijt} - \hat{r}_{ijt}. \end{aligned} \tag{4}$$

Therefore, the instrumental variable of this model is the average peer-firm equity return shock lagged for one year, $\overline{\hat{\eta}}_{jt}$. There are two advantages to use it as the instrumental variable. First, the idiosyncratic return reflects the effect of many random events that influence firm's financial decisions. It includes the events like accounting scandals, accidental disaster, M&A, etc. Second, it is publicly available and relatively mitigates manipulation of the company.

3.3 Construction of industry characteristics (munificence, dynamics and competition)

In this paper, I follow the method of Boyd (1995) to construct industry characteristics of munificence and dynamics.

Munificence: Abundance of resource in the industry.

$$Sales_{j,t} = \beta\ Year_{j,t} + \varepsilon \tag{5}$$

$$Munificence_{j,t} = \frac{\beta}{\frac{\sum Sales}{5}} \tag{6}$$

Munificence is the slope coefficient of regression (5) using historical data of previous 5 years, divided by the mean value of sales over the same period. For example, to obtain the munificence of industry j in time t, I regress time against sales of this industry over the previous 5 years (from t-5 to t-1). And then I calculate the measure of munificence by dividing the estimated regression coefficient with the mean value of sales during the same period (from t-5 to t-1).

Dynamism: Market volatility in an industry.

$$Dynamics_{j,\,t} = \frac{\boldsymbol{SE(\beta)}}{\frac{\sum \boldsymbol{Sales}}{\mathbf{5}}} \quad (7)$$

Dynamics is the ratio of standard error of regression (5) relative to the average value of sales over this period.

Competition: Concentration of resources (market concentration), and heterogeneity in the environment (Industry complexity).

$$HHI = S_1^2 + S_2^2 + S_3^2 + \ldots + S_n^2 \quad (8)$$

$$\left(S_n = \frac{\boldsymbol{Sales\ (n)}}{\boldsymbol{Total\ sales\ in\ the\ industry}}\right) \quad (9)$$

Competition is measured by Herfindahl-Hirschman Index (HHI index). Under traditional definition, HH index is the sum of the squares of market shares of firms within a given industry (firms with same 3-digit SIC code). The market share of the specific firm is represented by the ratio of its sales relative to the total sales in the industry.

It is important to notice that all the calculations are based on the available data of U.S. listed firms that meet the requirements in Appendix A. Therefore, the measures of industry characteristics used in this paper do not fully represent all participants in a given industry. Nevertheless, the calculated indexes can be considered as a representative measure of characteristics in each unique industry of the sample.

3.4 Data and descriptive statistics

The financial data are obtained from The Center for Research in Security Prices (CRSP)-Compustat merged from 1976 to 2016. The dataset begins in 1976 as there is not sufficient data for constructing instrumental variable before 1976, and it ends in 2016. To keep comparison of previous research, I drop firms of utilities (SIC code 4900-4999), financial firms (SIC code 6000-6999) and government entities (SIC>=9000). And in order to avoid inconsistency through all the regression test, I require observations to have no missing data for main independent and dependent variables. The description of sample selection, variable construction and the detailed requirement of data are illustrated in Appendix A. The final sample contains 91244 firm-year observations of 9,690 firms and 229 industries. The median number of firms in an industry is 8.

Table I

Summary statistics of key variables (1976-2016)

Peer firm average				**Firm specific**			
Variable	Obs	Mean	Std.Dev.	Variable	Obs	Mean	Std.Dev.
Book leverage	91,244	0.228	0.100	Book leverage	91,244	0.224	0.197
Market leverage	91,244	0.248	0.137	Market leverage	91,244	0.243	0.237
Firm size	91,079	5.185	1.342	Firm size	91,079	5.249	2.246
M/B	91,244	1.473	0.678	M/B	91,244	1.475	1.367
Profitability	91,244	0.101	0.061	Profitability	91,244	0.107	0.126
Tnagibility	91,244	0.300	0.180	Tnagibility	91,244	0.301	0.226
R&D	54,311	0.070	0.067	R&D	54,311	0.070	0.142
Investment	90,423	0.043	0.071	Investment	0.066	0.066	0.071

Table II

Summary Statistics of Industry Characteristics (1976-2016)

		Munificence		**Dynamics**		**Competition**		**Firm-Year**
SIC_4	Industry category	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	**Observatio**
1000-1499	Mining	0.084	0.115	0.046	0.029	0.199	0.128	6,114
1500-1799	Construction	0.108	0.160	0.065	0.051	0.296	0.197	1,290
2000-3999	Manufacturing	0.076	0.111	0.040	0.036	0.251	0.173	51,716
4000-4999	Transportation, Communications, Electric, Gas and Sanitary service	0.101	0.137	0.049	0.047	0.236	0.163	5,815
5000-5199	Wholesale Trade	0.099	0.119	0.046	0.044	0.356	0.200	4,116
5200-5999	Retail Trade	0.107	0.137	0.045	0.046	0.288	0.191	6,806
7000-8999	Services	0.096	0.131	0.060	0.050	0.255	0.180	15,230

Table I shows the descriptive statistics of key independent variables (Firm size, M/B, Profitability, Tangibility) and dependent variables (Market leverage, Book leverage, R&D, Investment). It summarizes firm-specific and peer-firm average of mean value and standard deviation separately. To avoid the statistical effect of outliers, all the main ratios with no missing data are winsorized at the 1st and 99th percentiles.

Table II summarizes the munificence, dynamics, and competitions by general industry categories of firms having same 2-digit sic code. The resources in mining and manufacturing industry are relatively scarce compared with other industries in the sample. Construction and services industries are confronted with high dynamics in the market, and meanwhile, wholesale trade, retail trade and construction industry show strong competition in the market. It is interesting to notice that the observation of each industry is not equal. For example, 56.7 % of firm-year observations come from manufacture industries while 4.5% firm-year observations are represented in the construction industry. However, as the industry is categories by 3-digit in this research, the popularity of each industry is relatively small and will not significantly impact the result.

4. Empirical results of peer-firm effect

4.1 Do peer firm have an impact on firm's capital structure?

First, this paper examines whether particular firm responds to the average capital structure and financial policies of other firms in the same industry. Table III presents two-stage least square (2SLS) estimates of the basic regression model of peer-firm effect. The lagged peer firm average stock shock is used as the instrumental variable (IV) for all the 2SLS regressions. The dependent variable indicated at the top of the table can be classified into two categories. From column (1) to column (3), book leverage, market leverage, D/E ratio measure the level of debt relative to book value of asset, market value of asset and shareholders' equity, separately. Column (4) and column (5) show the results of corporate financial decisions regarding equity issuance and debt issuance. Moreover, the last two columns innovatively study how short-term and long-term debt are impacted by the debt change of peer firms. The first-stage instrumental coefficients for leverages are all negative and significant at 1% level. It suggests that the average equity shock is significantly and negatively correlated with the endogenous variable in the first row. However, column (6) and (7) show the results of changes in short-term debt and long-term debt separately. Both results are significant at 1% level, while the coefficients have no difference from zero.

The explanatory variable of peer-firm effect is denoted by the coefficients in the first row. Consistent with the first hypothesis, the positive coefficient implies that firms' leverage and financial policies are positively impacted by that of peers. My results are also consistent with the previous findings which study peer-firm effect and herding effect (e.g. Leary and Roberts (2014), Chen and Ma (2016)). But the degree of influence varies among different measures. For the measure of levels of capital structure, D/E ratio and market leverage, they show the most pronounced results. In column (2), a one standard deviation increase in the market leverage of peers is correlated with 13.9% (1.012*0.137) point increase in that of firm i. The result is close to the findings of Leary and Roberts (2014) because of our large overlap of dataset. The coefficient of D/E ratio in column (3) is 1.524, and it is significant at 1% level (t=3.40). However, the results of debt issuance and equity issuance exhibit different patterns. Equity (debt) issuance shown in the column (4)-(5) are dummy variables equivalent to one if the proportion of net stock (debt) issuances relative to the lagged book asset is greater than 1%, and otherwise equivalent to zero. For equity issuance, the peer firm average is a good indicator of the financial action of a specific firm. The significant positive coefficient in column (4) suggests that firm i is 8.4% more likely to issue equity if its peer did so. But the result for debt issuance is not significant which implies that firm i is not affected by the action of issuing debt in the

industry. Besides, compared to control variables of firm-specific characteristics, peer firm average determinants show opposite effect.

Table III
Peer Firm Effect and Capital Structure (2SLS)

	(1) Book leverage	(2) Market leverage	(3) D/E	(4) Equity issuance	(5) Debt issuance	(6) Δlong-term debt	(7) Δshort-term debt
Peer firm average							
Dependent varibale	0.728 ***	1.012 ***	1.524 ***	0.469 ***	3.776	1.625 **	1.452 ***
	(4.51)	(3.63)	(3.40)	(3.30)	(0.339)	(2.12)	(2.76)
Firm size (log sales)	-0.012 ***	-0.015 ***	-0.109 ***	-0.001	-0.056	0.002 *	0.000
	(-5.36)	(-6.07)	(-4.36)	(-0.31)	(-0.97)	(1.68)	(0.45)
M/B	0.032 ***	0.006 **	0.108 ***	-0.019	-0.076	0.001	0.000
	(3.63)	(2.1)	(2.96)	(-1.47)	(-0.76)	(0.79)	(-0.35)
Profitbility	0.340 ***	0.294 ***	1.823 ***	0.171 **	-0.770	-0.048 ***	0.002
	(5.09)	(5.29)	(4.78)	(2.52)	(-0.64)	(-2.70)	(0.10)
tangibility	-0.078 **	-0.148 ***	-0.473 *	0.013	-0.513	-0.003	0.007
	(-2.23)	(-2.83)	(-1.65)	(0.50)	(-0.94)	(-0.35)	(0.65)
Firm-specific							
Firm size	0.014 ***	0.013 ***	0.518 ***	-0.016 ***	0.018 ***	0.000	-0.001 ***
	(34.63)	(32.15)	(13.78)	(-20.60)	(7.18)	(0.18)	(-4.71)
M/B	-0.040 ***	-0.006 ***	-0.065 ***	0.073 ***	0.001	-0.002 ***	0.000
	(-71.66)	(-12.03)	(-13.18)	(69.63)	(0.15)	(-5.82)	(-0.61)
Profitbility	-0.387 ***	-0.282 ***	-1.036 ***	-0.449 ***	-0.161	0.033 ***	0.017 ***
	(-57.74)	(-42.32)	(-16.50)	(-36.98)	(-1.19)	(-5.82)	(3.47)
Tangibility	0.202 ***	0.205 ***	0.428 ***	0.046 ***	0.176 ***	-0.007 ***	-0.038 ***
	(42.30)	(46.15)	(8.83)	(5.28)	(10.11)	(-2.81)	(-11.09)
IV	-0.003 ***	-0.001 **	0.006	0.016 ***	0.005	0.000	-0.001
	(-5.14)	(-2.37)	(1.12)	(14.01)	(1.50)	(1.02)	(-2.12)
Lagged Peer firm avarge stock shock	-0.020 *** (-17.54)	-0.011 *** (-11.64)	-0.065 *** (-7.61)	0.043 *** (22.88)	-0.003 (-1.21)	-0.002 *** (-4.68)	-0.005 (-6.41)
Year fixed effect	YES	YES	YES	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES	YES	NO	NO
Observations	90,922	90,922	90,922	90,922	90,922	90,922	90,922

Table III: This table presents two-stage least square (2SLS) estimates of basic regression model of peer-firm effect. The dependent variables are the measures of corporate capital structure and financial policies, which are denoted on the top of each column. This table shows the estimated coefficients and the corresponding t-statistics in parentheses below. The endogenous problem comes from using the peer firm variable corresponding to the measure of dependent variable of each regression. For example, in column (1), the peer firm average of dependent variable is the mean value of firms' book leverage excluding firm i. Following Leary and Roberts (2014), the instrumental variable (IV) used to deal with endogeneity problem is the one-year lagged average peer-firm idiosyncratic stock of peer firms. And the row of lagged peer firm average stock shock at the bottom show the result of first-stage regressions. The control variables are the peer-firm average and firm-specific variable of firm size (log sales), M/B, profitability, Tangibility. The construction of these variables is described in Appendix A. For all independent variables, excluding the endogenous variable of peer firms, are lagged 1 year relative to the dependent variable unless specified exception. Equity (Debt) Issuance are dummy variables equal to one if net equity (debt) issuances relative to lagged book assets is greater than 1%. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

In summary, the firms engaging in the same industry have interactions with each other, and their corporate leverage and financial decisions are affected by one another. A one standard deviation increase in peer's leverage is associated with approximately 13.9% point increase in that of firm's leverage. And hereby, this finding provides a basis to argue that peer-firm average capital structure is one of the main determinants of firms' financial decisions as well as corporate leverage.

4.2 Who plays the role of imitator?

4.2.1 Relative performance and leadership

"Why do firms herd?" Herding is a typical phenomenon in financial markets among different groups such as fund managers, individual investors and firms. Rational herding theory argues that administrative performance judgment is basically based on relative but not absolute performance (Devenow & Welch, 1996)). And therefore, for instance, fund managers may mimic the strategy of other fund managers to safeguard their reputation and avoid relatively underperformance. Another possibility raises from informational cascades models (Bikhchandani et al., 1992), which proposes that market followers who have restricted information would rationally mimic the action of leaders to infer unavailable information. However, Rauh and Sufi (2011) pose that similitude of capital structure origins form asset similarity for firms produce similar products. Leary and Roberts (2014) question who is mimicking in the industry and find that small and less successful firms (followers) conduct similar strategies as a response to the behavior of big and successful firms (leader), but not vice versa. Moreover, their tests in a dynamics market suggest that peer-firm effect is a dynamic learning process. And it cannot be explained by the argument that asset similarity induces leverage consistency (Rauh and Sufi, 2011).

Thus, it is interesting to extend related theories and test the explanatory power of other financial decisions such as equity issuance. Besides, as the standard of leader diverges from one another, this paper compares the results of leader-firm effect with different definitions of the leader.

4.2.2 Empirical results

Table IV shows the results of 2SLS regression of leader/follower effect. For each table, the upper panel stands for leader-follower model, and the bottom panel switches the role of leader and followers (follower-leader model). Intuitionally, if firms are rational and only aimed at imitating leaders, their capital structure would be a function of that of their mimicking objects. For both Table IV and Table V, in column (1), leaders are defined as firms with above median market share (sales). But in column (2), leaders are defined as firms with above median profitability (EBIT/asset). But innovatively, in the third column, leader

firm is defined as the firm which has 1) sales above median and 2) profitability above median. Compared with previous single measure of leader firm, like market share or stock return, this method measures leader firm more accurately as it uses multi-standard classification. In this context, as the difficulty of being a leader in the industry increases, only 31.3% of the firms (24192 out of 77334) in all the industries are defined as leader firms. However, in the column (4), leader firm is defined as the firm which has either 1) sales above median or 2) profitability above median. This change allows almost two-thirds of firms play the role of leader.

Consistent with the second hypothesis, the financial policies (such as equity issuance) of big and profitable firms have significantly positive impact on relatively small and less profitable firms, but the opposite does not hold. Panel A and Panel B show the regression results of market leverage. As is shown in panel A, the coefficients of first two columns are 0.690 (t=3.86) and 1.107(t=3.22). Both of them are significant at 1% level. However, the insignificant coefficients in panel B below reveal that the market leverage of big or profitable firm is not a function of followers' market leverage. This finding is consistent with leader firm model (Leary and Roberts (2014)), and it can be explained by "learning is a process of following the leader or value line" (Stein (1990); Graham (1994)). The results in the third column exhibit a different pattern. As is shown in panel A, the coefficient of 2SLS regression is 1.097 and significant at 1% level (t=4.22). The coefficient in panel B is 0.382 with a low significant level (t=1.95), which is 65.2% lower than that in panel A. It suggests that leader firms are also affected by the interactions from follower firms, but to a much lower degree. In other words, big, successful firms are less subjected to the peer (follower) firm effect, but not vice versa. Another possibility is that followers learn from peer firms who are either big or profitable. In column (4), the coefficient at panel A is 0.856 (t=5.83), which is 22% lower than the coefficient in column (3). So, it is reasonable to believe that firms which are both big and profitable are more likely to play the role of leaders in the industry. Although the empirical result in column (3) conflicts with the result of Leary and Roberts (2014) that leaders in the industry do not respond to the financial behavior of followers, it may result from the different meaning of leaders. In addition, it is important to notice that the number of follower firms is much more than that of leader firms; so, in some industries with small number of firms, the effect of peer firms and followers are similar or even the same. Considering these alternative explanations, if further research can define the leader firms more accurately, this paper expects a more persuading economic implication of leader-follower model.

In Table V, Panel C and Panel D study the leader-firm effect of financial decisions of issuing equity. Equity issuance is an indicator variable equals to one if the ratio of net equity issuances relative to lagged book

Table IV

Panel A: Leader-Follower Model of Peer Effect on Capital Structure (Market Leverage)

	(1) Sales	(2) Profitability	(3) (1)and(2)	(4) (1)or(2)
Peer firm average				
Dependent varibale	0.690 ***	1.107 ***	1.097 ***	0.856 ***
	(3.86)	(3.22)	(4.22)	(5.83)
Industry average characterist	YES	YES	YES	YES
Firm-specific characteristics	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	41,462	41,372	53,142	25,687

Panel B: Follower-Leader Model of Peer Effect on Capital Structure (Market Leverage)

	(1) Sales	(2) Profitability	(3) (1)and(2)	(4) (1)or(2)
Peer firm average				
Dependent varibale	0.553	0.347	0.382 *	0.121
	(1.10)	(1.12)	(1.95)	(0.91)
Industry average characterist	YES	YES	YES	YES
Firm-specific characteristics	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	39,877	40,029	24,192	55,714

Table IV shows the results of 2SLS regression of leader/follower effect. The dependent variable is the measure of market leverage. For both table IV and table V, in column (1), leaders are defined as firms with above median market share (sales). But in column (2), leaders are defined as firms with above median profitability (EBIT/asset). But in column (3), leader firm is defined as the firm which has 1) sales above median and 2) profitability above median. In column (4), leader firm is defined as the firm which has either 1) sales above median or 2) profitability above median. Different definition of leader results in the number of leaders varies. The control variables are the peer-firm average and firm-specific variable of firm size (log sales), M/B, profitability, Tangibility. The construction of these variables is described in Appendix A. For all independent variables, excluding the endogenous variable of peer firms, are lagged 1 year relative to the dependent variable unless specified exception. Equity (Debt) Issuance are dummy variables equal to one if net equity (debt) issuances relative to lagged book assets is greater than 1%. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Table V

Panel C: Leader-Follower Model of Peer Effect on Capital Structure (Equity Issuance)

	(1) Sales	(2) Profitability	(3) (1)and(2)	(4) (1)or(2)
Peer firm average				
Dependent varibale	0.561 ***	0.433 **	0.548 ***	0.383 ***
	(2.77)	(2.26)	(2.57)	(3.07)
Industry average characteristics	YES	YES	YES	YES
Firm-specific characteristics	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	41,462	41,372	53,142	25,687

Panel D: Follower-Leader Model of Peer Effect on Capital Structure (Equity Issuance)

	(1) Sales	(2) Profitability	(3) (1)and(2)	(4) (1)or(2)
Peer firm average				
Dependent varibale	0.318	0.540	0.418	0.300
	(0.24)	(0.41)	(1.35)	(0.89)
Industry average characteristics	YES	YES	YES	YES
Firm-specific characteristics	YES	Yes	YES	YES
Year fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	39,877	40,029	24,192	55,714

Table V shows the results of 2SLS regression of leader/follower firm effect. The dependent variable is the indicator variable of equity issuance. For both table IV and table V, in column (1), leaders are defined as firms with above median market share (sales). But in column (2), leaders are defined as firms with above median profitability (EBIT/asset). But in column (3), leader firm is defined as the firm which has 1) sales above median and 2) profitability above median. In column (4), leader firm is defined as the firm which has either 1) sales above median or 2) profitability above median. Different definition of leader results in the number of leaders varies. The control variables are the peer-firm average and firm-specific variable of firm size (log sales), M/B, profitability, Tangibility. The construction of these variables is described in Appendix A. For all independent variables, excluding the endogenous variable of peer firms, are lagged 1 year relative to the dependent variable unless specified exception. Equity (Debt) Issuance are dummy variables equal to one if net equity (debt) issuances relative to lagged book assets is greater than 1%. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

assets is greater than 1%. Compared with the results of market leverage, it also presents leader effect and to a stronger degree. For all the 2SLS regression coefficients in panel C, they are significant at 1%-5% level.

While the coefficients of 2SLS regression are not significant. As debt/equity issuance is directly related to the change of leverage within one year, it supports the argument that imitative behavior is a dynamic process of learning from the leaders.

In sum, back to the basic question in this section, "who plays the role of imitator?" It is reasonable to argue that followers with smaller size and less profitable business performance mimic the capital structure and financial decisions from their leaders in the industry. Besides, the empirical results also the channel of peer-firm effect is mimicking the success of the leaders to gain higher market share and earn higher profitability.

4.3 Investment and mimicking behavior

Peer-firm effect impacts not only financial structure (Leary and Roberts, 2014) but also other decisions such as corporate cash holding (Chang and Chen, 2013), stock split (Kaustia and Rantala, 2015). In practice, corporate investment decision has a close connection with equity/debt issuance which funds investing projects. Many academic research (i.e., Akdog˘u and MacKay (2008), Yang et al. (2017)) analyzes how industry structure influence firm investment decisions. Similar to my study, they find that the predatory competition-based theories help to explain the risk aversion inherent in imitative investment behavior. Inspired by their study, I hypothesize that the aim of financial structure imitation is not only to reduce the risk of predatory exiting, but it is also an indirect result of investment imitation. As R&D expense and capital expenditure (CAPEX) are often used to undertake new projects or investments, they are good measures of investment decisions.

Firstly, I focus on research and development (R&D) which measures the investment decisions and estimate regression (1) by using R&D instead of capital structure measures. Considering investment imitation is a time-consuming and costly process, I also test how specific firm responds to the peers' previous R&D expense. Table VI shows the 2SLS regression results of peer-firm effect on investment decisions. For the top two rows in Table VI, the coefficient in column (1) is not significant (t=0.52), but the coefficient in column (2) is 0.683 and significant at 10% (t=1.84). Consistent with my assumption, the firm does not only imitate peer firm average structure but also the investment strategies (R&D). And it is important to notice that mimic behavior on R&D is weaker and costs more time to respond. Then, I use capital structure to measure investment and the results in column (3) and column (4) strengthen the argument of investment imitation. A one standard deviation increase in peers' one-year lagged capital expenditure is associated with 0.747 (t=2.62) basis point increase in firm i's capital expenditure.

Table VI

Peer Firm Effect and Investment (2SLS)

	(1) R&D	(2) R&D	(3) Investment	(4) Investment
Peer firm average				
Dependent variable	0.447		0.316	
	(0.52)		(0.98)	
Lagged dependent varibale		0.683 *		0.747 ***
		(1.84)		(2.62)
Lagged Peer firm avarge stock shock	-0.004 ***	-0.007 ***	0.003 ***	0.003 ***
	(-5.44)	(-7.48)	(6.87)	(10.14)
Firm specific and peer firm average characteristics	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Industry fixed effect	NO	NO	YES	YES
Observations	54,207	54,207	90,259	90,259

Table VI: This table presents two-stage least square (2SLS) regression results. The dependent variables are investment (measured by capital expenditure) and R&D, which are denoted on the top of each column. This table shows the estimated coefficients and the corresponding t-statistics in parentheses below. To extend the time that specific firm responds to peer firms, the dependent variable in column (2) and (4) is the lagged peer-firm average R&D/investment instead of the contemporaneous measure. To keep consistency to other variable, the measure investment decisions are the ratio of R&D and capital expenditure relative to total asset. The control variables are the peer-firm average and firm-specific variable of firm size (log sales), M/B, profitability, Tangibility. The construction of these variables is described in Appendix A. For all independent variables, excluding the endogenous variable of peer firms, are lagged 1 year relative to the dependent variable unless specified exception. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Although mimicking behavior on capital structure could result from investment imitation, there are some additional explanations regarding the incentive of this mimicking behavior, such as information disadvantage (Albino et al. (1998)), rational herding (Scharfstein and Stein (1990), Graham (1994) and Trueman (1994)) and predation theory. Bolton and Scharfstein (1990), argue that financial constraint firms are confronted with predatory threat of their strong competitors, inducing strategies like imitating the financial policies of their peer firms to protect themselves from exiting the market. So, it suggests that competition in the industry is a vital determinant of mimic behavior. Inspired by predation theory, the following section focuses on how competition, as well as other industry characteristics (dynamics and munificence), moderate peer-firm effect in the following section.

4.4 Empirical results of peer-firm effect and industry characteristics

The interactions in the industry come from peer firms and the environment. So, environmental peculiarity could not be ignored in studying peer-firm effect. Moreover, studying the mediate effect of industry variables help to examine whether predation theory and investment imitation are closely related to peer-firm effect. For instance, if the predation theory holds, the industry with intense competition would show stronger peer-firm effect, compared to the industry with less competition. And therefore, the following sections focus on how industry characteristics of competition, munificence and dynamics impact corporate capital structure and peer-firm effect.

4.4.1 Do industry characteristics influence corporate capital structure? (OLS)

Table VII presents how industry competition, dynamics and munificence is correlated with firm's capital structure.

Table VII

How Do Industry Characteristics Within The Industry Influence Corporate Capital Structure?

	(1) Market leverage	(2) Market leverage	(3) Market leverage	(4) Market leverage	(5) D/E	(6) Equity issuance	(7) Debt issuance
Munificence	-0.020 ***			-0.019 ***	-0.060	0.001	0.050 ***
	(-3.23)			(-3.14)	(-1.25)	(0.05)	(3.73)
Dynamics		-0.035 *		-0.020	-0.219	0.127 ***	0.008
		(-1.86)		(-1.09)	(-1.47)	(3.57)	(0.19)
Competition(HHI)			-0.043 ***	-0.042 ***	-0.090 *	-0.020 *	0.036 ***
			(-7.20)	(-6.92)	(1.86)	(-1.73)	(3.66)
Firm size	0.014 ***	0.014 ***	0.014 ***	0.014 ***	0.047 ***	-0.016 ***	0.016 ***
	(35.30)	(35.13)	(35.03)	(35.04)	(14.99)	(-21.71)	(17.68)
M/B	-0.041 ***	-0.041 ***	-0.041 ***	-0.041 ***	-0.063 ***	0.074 ***	0.005 ***
	(-74.23)	(-74.26)	(-74.31)	(-74.21)	(-14.43)	(71.77)	(4.07)
Profitbility	-0.381 ***	-0.381 ***	-0.381 ***	-0.380 ***	-0.945 ***	-0.438 ***	-0.050 **
	(-59.64)	(-59.61)	(-59.67)	(-59.55)	(-18.58)	(-36.18)	(-3.31)
Tangibility	0.206 ***	0.206 ***	0.207 ***	0.207 ***	0.515 ***	0.047 ***	0.180 ***
	(44.75)	(44.74)	(44.98)	(44.86)	(14.03)	(5.39)	(17.04)
Peer firm average characteristics	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES	YES	YES	YES
Observations	90,922	90,922	90,922	90,922	90,913	90,922	90,922
Adjusted R2	0.320	0.320	0.321	0.321	0.060	0.170	0.037

Table VII: This table presents ordinary least square (OLS) estimates of basic regression model of capital structure. The dependent variables are the measures of corporate capital structure and financial policies, which are denoted on the top of each column. This table shows the estimated coefficients and the corresponding t-statistics in parentheses below. The construction of variables of industry feature is described in Appendix A. The control variables are the pee- firm average and firm-specific variable of firm size (log sales), M/B, profitability, Tangibility. The construction of these variables is described in Appendix A. For all the specifications, year fixed effect and industry fixed effect are controlled. Equity (Debt) Issuance are dummy variables equal to one if net equity (debt) issuances relative to lagged book assets is greater than 1%. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

The dependent variables like D/E ratio are denoted on the top of the table. In column (4), the negative coefficient of munificence shows that abundant resources in the industry decrease the market leverage. It is consistent with pecking order theory that firms prefer internal funds to eternal finance such as debt. Moreover, firms with greater munificence would have higher growth opportunity, and thus are reluctant to issue debt. However, firms in highly competitive industry have higher market leverage. Firm's financial leverage is higher and relative less dispersed in competitive industries, where interactions are supposed to be strong, while the firm's natural hedge is not high (Mackay and Phillips (2005)). But the volatility in the industry does not show strong impact on the market leverage while it has a significant positive effect on equity issuance policy. These findings are consistent with previous studies (Boyd (1995); Kayo and Kimura (2010)) and provide an indicating overview for testing subsamples with different industry features in the following part of this section.

To understand how these unique industry features impact peer-firm effect on financial structure and policies, this paper uses subsamples of low/medium/high index percentile. Table VIII, IX, X display the 2SLS regression results of subsamples separately.

4.4.2 Industry competition and peer-firm effect

Table VIII presents the 2SLS regression results of equation (1) by separating industry subgroups of low, median, high market competition. Competition is measured by Herfindahl-Hirschman index (HHI), which presents the market concentration within the industry. As HHI index is the sum of squares of the firms' market share in the industry, a lower value of index means intense market segmentation and higher level of competition. The coefficients at the first row indicate the level of sensitivity to the interaction of capital structure of peer firms in the same industry. Column (1) and column (2) show the peer-firm effect upon firms in low and middle level of rivalry. The significant coefficients 0.716(t=2.81) and 0.707 (t=2.30) indicate that a one standard deviation increase in the peer firms' market leverage is correlated with approximately 10% (0.716*0.137) increase in the specific firm's market leverage. In column (3), however, I observe a significant rise from 10% to 12% (0.878*0.137). Because the difference is not very pronounced, I use interaction variable by interacting peer firm average with dummy variable of high competition. And at Table VIII-continued in Appendix B, the coefficient in column (3) is 0.072 and significant at 1% level (t=2.26), implying that firms in competitive industry show stronger peer-firm effect. Combining the results of two tests, they show that although firms who do not compete fiercely for market and resource are also influenced by peer firms, while competition in the industry aggravates imitative behavior on leverage.

Why does competition lead to financial structure imitation? The predation theory of Bolton Scharfstein (1990) implies that a key determinant of business success is whether firms have sustainable financing. When the firm performs poor, the sponsor may stop financing and subsequently pursue the firm into financial constraint. This termination threat (Bolton and Scharfstein (1990)) is costly and urgent in a

Table VIII

Competition and Peer Firm Effect

	(1) Low (hhi > 0.25)	(2) Medium (0.15<hhi<=0.25)	(3) High (hhi<=0.15)
Peer firm average			
Market leverage	0.716 ***	0.707 **	0.878 ***
	(2.81)	(2.30)	(3.34)
Firm size (log sales)	-0.011 ***	-0.012 *	-0.013 ***
	(-2.69)	(-2.33)	(-2.85)
M/B	0.036 ***	0.033 **	0.030 ***
	(3.26)	(1.75)	(2.74)
Profitbility	0.353 ***	0.351 ***	0.260 ***
	(2.67)	(2.54)	(3.92)
Tangibility	-0.068	-0.050	-0.151
	(0.124)	(-0.42)	(-1.57)
Lagged Peer firm avarge stock shock	-0.016 ***	-0.027 ***	-0.039 ***
	(-9.14)	(-12.20)	(-18.13)
Firm-specific characteristics	YES	YES	YES
Year fixed effect	YES	YES	YES
industry fixed effect	YES	YES	YES
Observations	35,415	27,016	28,648

Table VIII: This table presents two-stage least square (2SLS) estimates of three subsamples regarding competition. The whole sample is categorized into three subsamples with low, medium, high level of competition separately. The competition is measured by Herfindahl-Hirschman index (HHI). The dependent variable is market leverage of specific firm. The coefficients at the top row measure peer-firm effect. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

competitive industry. Thus, preys (followers) confronted with financing termination threat have more incentive to mimic the financial condition of predators (leaders) to avoid the risk of changing leverage inappropriately. By doing so, followers with competition disadvantage could guarantee their financing stability. Although our finding conflicts with the argument that capital structure, business risk and capital-labor ratios are more dispersed within competitive industries (Mackay and Phillips (2005)), it presents similar implication as competition within the industry drives firms to similar leverage and cost structures (Maksimovic and Zechner (1991), Fries et al. (1997)).

4.4.3 Industry munificence and peer-firm effect

The second industry characteristics that I examine is munificence. Munificence, in other words, is the capacity of resources in a certain environment to support a consistent growth. Table IX presents the 2SLS regression results of equation (1), using subsamples of industries with low, medium and high level of munificence. In Table IX, the instrumental variable is significantly negatively correlated with market leverage. In column (1), the coefficient 0.852(t=2.03) suggests that a one standard deviation increase of firm average market leverage is related to 0.852 basis point increase in specific firm's market leverage. While the t-statistics in column (3) is higher, the coefficient 0.676 is lower than that in column (1). Surprisingly, the regression result in medium level competition industry is not significant (t=1.46).

Table IX

Munificence and Peer Firm Effect

	(1) Low(0-30%)	(2) Medium (30%-70%)	(3) High(70%-100%)
Peer firm average			
Market leverage	0.852 **	0.538	0.676 ***
	(2.03)	(1.46)	(3.16)
Firm size (log sales)	-0.014 *	-0.010 ***	-0.009 **
	(-1.95)	(-3.49)	(-1.98)
M/B	0.036	0.021	0.032 ***
	(1.50)	(1.03)	(2.84)
Profitbility	0.412 ***	0.270 *	0.346 ***
	(2.68)	(1.92)	(3.39)
Tangibility	-0.079	-0.062	-0.066
	(-0.92)	(-0.82)	(-1.35)
Lagged Peer firm avarge stock shock	-0.014 ***	-0.017 ***	-0.028 ***
	(-6.59)	(-8.92)	(-13.68)
Firm-specific characteristics	YES	YES	YES
Year fixed effect	YES	YES	YES
industry fixed effect	YES	YES	YES
Observations	26,471	35,992	28,459

Table IX: This table presents two-stage least square (2SLS) estimates of three subsamples regarding munificence. The whole sample is categorized into three subsamples with relative low, medium, high level of munificence separately. Munificence measures the abundance of resource to support a constant growth in the industry (Boyd, 1995). The dependent variable is market leverage of specific firm. The coefficients at the top row measure peer-firm effect. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

According to Dess and Beard (1984), munificence measures the capacity to support sustainable growth of the environment, so it is positively correlated with growth opportunity. And munificence might also affect other variables in the model. Table X shows the correlation between munificence and other variables, where M/B ratio is a measure of growth opportunity (Tobin 1958 and Chen, 2006). The Pearson correlation coefficients indicate that competition is negatively correlated with munificence, while investment, profitability and growth opportunity are positively associated with munificence.

Table X

Correlation Between Munificence and Other Variables

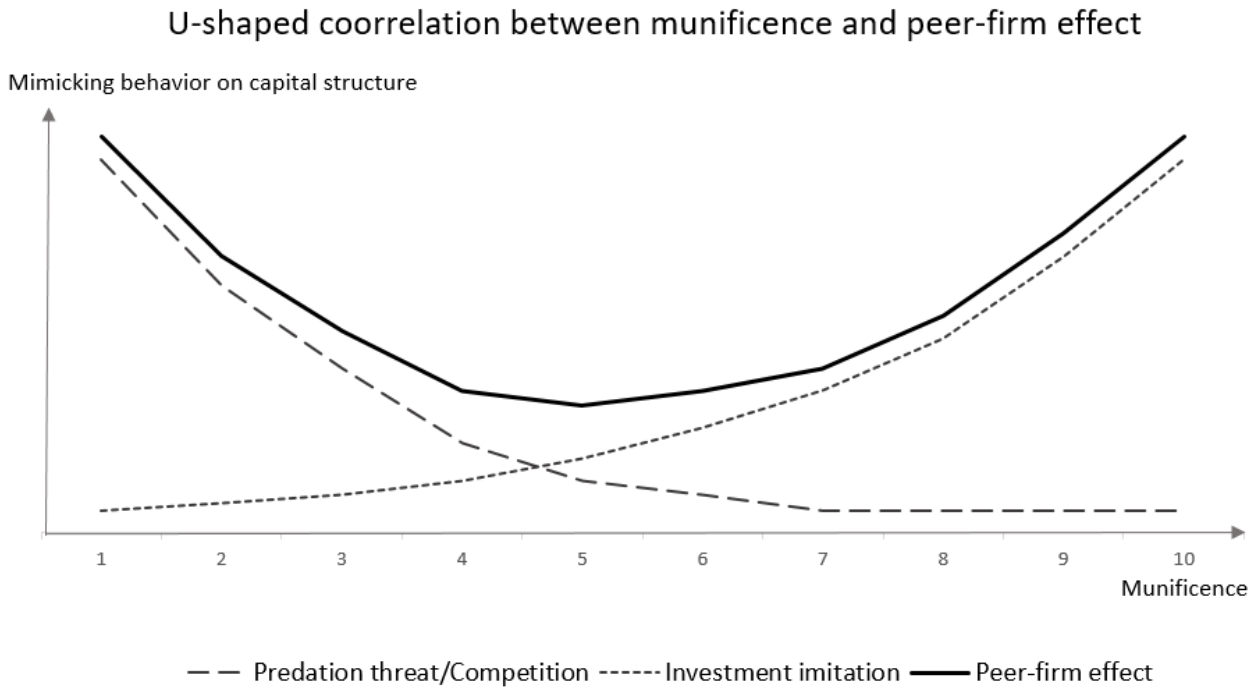
	(1) Munificence	(2) Dynamics	(3) Competition	(4) R&D	(5) Investment	(6) M/B	(7) Profitability
Munificence	1.000						
Dynamics	0.048***	1.000					
Competition	-0.033***	0.170***	1.000				
R&D	-0.012	-0.050***	0.037***	1.000			
Investment	0.031**	-0.029**	-0.058***	0.373***	1.000		
M/B	0.037***	0.018	-0.033***	-0.017	-0.007	1.000	
Profitability	0.067***	-0.100***	0.002	-0.070***	0.009	0.057***	1.000

Table X: This table presents Pearson correlation coefficients which measure the linear correlation between two variables X and Y. It has a value between +1 and −1, where 1 is total positive linear correlation, 0 is no linear correlation, and −1 is total negative linear correlation. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

And this inconsistent relationship provides a potential explanation for the decrease of peer-firm effect in mid-munificence industry. The peer-firm effect is observed as the aggerated effect of competing power between predatory threat and the ability to imitate. Based on the results of correlation test, when the munificence is low, the competition in the industry is fierce and the profitability is low. Firms show strong incentive to herd, otherwise investors may cut off financing when firms' relative performance is poor. And this financing termination directly leading to exiting and bankruptcy. With the increase in munificence, the predatory threat decreases while it creates a comfort environment for product and investment imitation. This assumption is consistent with the significantly positive coefficient between munificence and capital expenditure (investment). So, investment imitation plays the leading role in peer-firm effect when the munificence in the industry is very high. However, firms respond to peers passively in mid-munificence market because either of two powers play the leading role. Figure I shows a U-shaped correlation between munificence and peer-firm effect. This uniqueness is noticed by Akdogˇu and MacKay (2008) who cite 'strategic behavior' to address the particular pattern of investment in mid-competition

industries. They infer that firms passively respond to investment opportunities by herding in monopolistic or perfectly competitive markets, whereas firms react differently when investment opportunities are more accessible in mid-competition environment. So, either predatory threat or investment imitation show strong power in the mid-munificence environment, leading to insignificant peer-firm effect in this situation.

Figure I



4.4.4 Industry dynamics and peer-firm effect

The final industry characteristic that I investigate is industry dynamics, which measures the degree of volatility in the environment. Table XI displays the 2SLS regression results of equation (1). It shows how dynamics within the industry influence the peer-firm effect on capital structure. Comparing the coefficients at the first row, it is obvious that with the dynamics in the industry increases, the sensitivity to peer firms' market leverage fall significantly from 0.75 to 0.542 and the corresponding t-statistics fall from 2.21 to 1.79. This result is consistent with the third hypothesis that firms in a highly dynamic industry are less sensitive to peer firm impact on financial conditions.

Table XI

Dynamics and Peer Firm Effect

	(1) Low(0-30%)	(2) Medium (30%-70%)	(3) High(70%-100%)
Peer firm average			
Market leverage	0.750 **	0.739 ***	0.542 *
	(2.21)	(2.48)	(1.79)
Firm size (log sales)	-0.007 ***	-0.010 ***	-0.012 **
	(-1.43)	(-3.23)	(-2.47)
M/B	0.038 **	0.032 *	0.023
	(2.19)	(1.95)	(1.47)
Profitbility	0.317 **	0.363 ***	0.306 **
	(1.97)	(3.18)	(2.52)
Tangibility	-0.095	-1.200	-0.026
	(-1.58)	(-1.51)	(-0.34)
Lagged Peer firm avarge stock shock	-0.022 ***	-0.021 ***	-0.016 ***
	(-9.57)	(-10.57)	(-8.68)
Firm-specific characteristics	YES	YES	YES
Year fixed effect	YES	YES	YES
industry fixed effect	YES	YES	YES
Observations	26,107	36,648	28,167

Table XI: This table presents two-stage least square (2SLS) estimates of three subsamples regarding dynamics. The whole sample is categorized into three subsamples with relative low, medium, high level of dynamics separately. Dynamics measures market volatility in an industry (Boyd, 1995). The dependent variable is market leverage of specific firm. The coefficients at the top row measure peer-firm effect. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Based on previous literature, this result is not a surprise for my study, but it has important economic implications. In my model, I choose to use peer-firm average measure of capital leverage during the same period because it controls the time of responses to peer firms. If, as my study suggested in section 4.1 and 4.2, leverage similarity is the outcome of financial decision imitation, high dynamics in the environment could be a huge obstacle to learn from the other firms efficiently. There are a few explanations. One explanation is that speedy and dramatic changes in the industry, the quick improvement of technology in IT industry for example, surge the difficulties to mimic peer firm's financial decisions. In a dynamic environment, firms are reluctant to follow the herd because such herding is costly. But the positive and significant coefficient in column (3) implies that even in highly unpredictable environments, peer-firm effect is not eliminated. However, since whether firm's mimic action peer is rational and value-added strategy is not clear, it concerns the possibility that high dynamics in the industry helps to eliminate irrational herding. The most related research is Smith et al. (2015), which investigates the impact of

industry characteristics on capital structure adjustment and represent that firms in a high dynamic industry adjust their above optimal leverage to target leverage rapidly. These firms modify the D/E ratio by either issuing equity or reducing debt, and it helps to decrease the risk of facing financial distress. Then, in section 5, this paper allows a longer time for the firm to learn and get more information by using the lagged peer firm average dependent variable instead of the previous one. And it also shows explanatory power but to a lower degree.

In sum, the test on dynamics shows that the greater the dynamics in the industry is, the less mimicking behavior is observed in my sample of U.S. listed firms during the period of 1976-2016. Moreover, the tests regarding competition, munificence, dynamics are consistent with hypothesis 3 that peer-firm effect on capital structure is more pronounced in the industry with greater munificence, lower level of dynamics and high level of competition.

4.5 Industry characteristics and leader-follower model

In section 4.2, I have tested the leader-firm effect (leader-follower model) and industry impact on peer-firm effect. If the channel of peer-firm effect is by following the leader, I expect that industry characteristics under study would show similar and even stronger impact on leader-firm effect. And I stick to use the definition of leaders in section 4.2.2 column (3) that leaders are defined as the firms have 1) above median market share and 2) above median profitability, compared with the other firms in the same industry. This multi-standard definition restricts the number of firms defined as leaders. It also reduces the misclassification of big, successful firm because small firms tend to have relatively higher profitability and growth opportunity (see, for example, Marshall and Weiss, 1967). Thus, this choice guarantees good comparability to the results in section 4.2.2.

Table XII shows the 2SLS regression result of leader-firm effect interacted with the dummy of high industry features under study. The significant and positive coefficients in column (1) and column (2) suggest that firms in highly competitive and greater munificence environment are more sensitive to the capital structure of leader firms. However, although it seems that dynamics is negatively associated with peer-firm effect, I do not observe a strong impact on leader-firm effect in my sample. One possibility is that the impact of leader firms is not influenced by the volatility of growth in the environment. An alternative explanation may say that leader-firm effect could be impacted significantly only when the industry dynamics are extremely high. So, I employ the interaction variable of market leverage multiplied by the

indicator variable of extreme high dynamics (top 10 percentile) in column (4). This test confirms the latter possibility that leader-firm effect would decrease 28 basis point an industry with extreme high dynamics.

Comparing the results above with the findings of peer-firm effect, I would argue that leader-firm effect is more pronounced within competitive, developing and quickly changing industries. And although the impact of industry characteristics on peer-firm effect cannot be fully explained by that of leader-firm effect, it still shows strong indicating power in this context. So, the argument that leader-follower model could be the channel of peer-firm effect on capital structure and financial decisions is strongly favorable in my study.

Table XII

How Do Industry Characteristics Influence Leader Effect

	(1) Competition	(2) Munificence	(3) Dynamics	(4) Dynamics
Peer firm average				
Market leverage	0.936 ***	0.780 ***	1.035 ***	1.109 ***
	(3.96)	(3.34)	(4.06)	(-4.05)
Market leverage*High 50%	0.337 **	0.352 ***	0.086	
	(2.10)	(4.16)	(0.79)	
Market leverage*High 10%				-0.280 ***
				(3.31)
Industry average characteristics	YES	YES	YES	YES
Firm-specific characteristics	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	53,142	53,142	53,142	53,142

Table XII shows the results of 2SLS regression of leader-follower channel. The dependent variable is market leverage, and the estimated coefficients and the corresponding t-statistics are presented in parentheses below. Leaders are defined as the firm which has 1) sales above median and 2) profitability above median. The interaction variables are peer-firm average market leverage interacted with the dummy of high level of industry characteristics. The control variables are the peer-firm average and firm-specific variable of firm size (log sales), M/B, profitability, Tangibility. The construction of these variables is described in Appendix A. For all independent variables, excluding the endogenous variable of peer firms, are lagged 1 year relative to the dependent variable unless specified exception. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

So far, to a certain degree, predatory interaction theory and investment imitation answer the question "why the firm mimics the financial structure and policies of peer firms?". The former answer is in view of

market competition, and the latter answer is in view of strategic planning. Two theories show important implications, both economically and statistically.

5. Robustness and further discussion

Based on the tests above, predation theory and investment imitation together play the key roles in understanding why peer-firm effect exists. Table XIII is aimed at exploring the connection between capital structure imitation and investment imitation. If the actions of mimicking investment projects result in the change of capital structure in the following year, I expect that leverage of specific firms is significantly correlated with leverage of peer firms. So, back to the baseline regression function (1), I use lagged peer firm average dependent variable of $\overline{Y}$ –ijt-1 instead of $\overline{Y}$ –ijt for further discussion. This change allows the firm to have more time in responding to the interaction of peer firms and reveals a long-term peer-firm effect.

Table XIII

Do The Firm Responds To Its Peer Firms Immediately ?

	(1) Market leverage	(2) Market leverage	(3) Investment	(4) R&D
Peer firm average				
Dependent variable	1.012 ***			
	(3.63)			
Lagged dependent varibale		0.619 ***	0.913 **	1.289 *
		(2.71)	(2.12)	(1.81)
Lagged Peer firm avarge stock shock	-0.011 ***	-0.014 ***	9.711 ***	14.211 ***
	(-11.64)	(-13.37)	(4.45)	(4.2)
Firm specific and peer firm average characteristics	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	NO	NO
Observations	90,922	91,079	90,259	54,207

Table XIII: This table presents two-stage least square (2SLS) regression results. The dependent variables are market leverage, investment (measured by capital expenditure) and R&D, which are denoted on the top of each column. This table shows the estimated coefficients and the corresponding t-statistics in parentheses below. To extend the time that specific firm responds to peer firms, the dependent variable in column (2) - (4) is the lagged peer-firm average market leverage/R&D/investment instead of the contemporaneous measure. The control variables are the peer-firm average and firm-specific variable of firm size (log sales), M/B, profitability, Tangibility. The construction of these variables is described in Appendix A. For all independent variables, excluding the endogenous variable of peer firms, are lagged 1 year relative to the dependent variable unless specified exception. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

The coefficient in column (2) is 0.619 (t=2.71) and 38.8% lower than that in column (1). The decrease of peer-firm effect implies that the firm responds to the influence of peer firms quickly (within one year) but keep a longer period of over one year. It results in a paradox that the firm responds immediately to improve the efficiency of mimicking behavior but failed to react efficiently when they try to follow the investment projects of peer firms. And this inefficiency arises another question whether mimicking behavior is a value-added action? Chen and Ma (2017) show that investment imitation increases firm value and benefits corporate performance. And learning behavior in investment is especially beneficial under an uncertain environment.

Moreover, according to previous studies on each of two theories, financial constraint plays a key role in the plot of peer firm story. Leary and Robert (2014) pose that financially constrained firms face more threat of peer firms and show stronger peer-firm effect. In order to see whether it is true for my sample, I use two indexes, i.e. KZ index and Altman's (1968) Z-Score, to test this argument. The KZ-Index (Kaplan-Zingales Index) measures the dependence on external financing, and Altman's (1968) Z-Score indicates the possibility to go bankrupt. The lower the Z-score, the greater chance that a company is headed for bankruptcy. The results are presented at Table XIV.

Table XIV shows that firms who are financially constrained (top 30 percentile of KZ-index) and are heading to bankruptcy (bottom 30 percentile of Z-index) are significantly more sensitive to the financial interaction of their peer firms. The empirical result is consistent with previous finding that strategic imitation behavior is concentrated among financially constrained firms (Leary and Roberts (2014); Lyandres (2006)). And it strengthens the argument that financing predation from peer firms pushes individual firm to mimic and hind in the herd. But the empirical results of Chinese list firms (Chen and Ma, 2016) show a different pattern that financially constrained firms respond passively to the action of peer firms than relatively unconstrained firms. And they suggest that such mimicking behavior is less costly for unconstrained firms because they have lower cost of financing. This inconsistency between two datasets implies that country-level variants (economic status, policies, etc.) may result in different conclusions. Similar inconsistency can be observed between developed countries and developing countries that the effects of munificence in driving low firm leverage is more pronounced in emerging countries and markets (Kayo and Kimura (2010)).

Table XIV

Financial Constraint and Peer Firm Effect(2SLS)

	(1) Market leverage	(2) Market leverage	(3) Market leverage
Lagged Peer firm avarge stock shock	-0.017 ***	-0.018 ***	-0.016 ***
	(-11.99)	(-8.9)	(-7.01)
peer firm average			
Market leverage*unconstriand	0.752 ***		
	(3.03)		
Market leverage*constrained		0.902 **	
		(2.55)	0.957 **
Market leverage*bankruptcy			(2.23)
firm specific and peer firm average characteristics	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
industry fixed effect	Yes	Yes	Yes
Observations	91,079	27,175	26,546

Table XIV: This table presents two-stage least square (2SLS) regression results. The dependent variables are market leverage. This table shows the estimated coefficients and the corresponding t-statistics in parentheses below. Financial constraint is measure by KZ-index (top 30 percentile) , and bankruptcy is measured by Z-index (bottom 30 percentile). The control variables are the peer-firm average and firm-specific variable of firm size (log sales), M/B, profitability, Tangibility. The construction of these variables is described in Appendix A. For all independent variables, excluding the endogenous variable of peer firms, are lagged 1 year relative to the dependent variable unless specified exception. Symbols ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

6. Conclusion

As no firm can stand alone in an industry, it is common to influence and be influenced by peer firms, through interactions such as signing cooperating agreements and making strategic plans together. Recent research studies whether peer firms impact firm's capital structure (Leary and Roberts (2014)) and investment decisions (Yang et al. (2017); Chen and Ma (2016)). Although these studies show strong economic implication, they overlook the incentive of peer-firm effect. Therefore, this paper follows the study of Leary and Roberts (2014) and extend it by interacting peer-firm effect with industry characteristics of munificence, dynamics and competition.

Using a sample of U.S. listed firms during the period of 1976-2016, I find that the interaction of peer firms within the industry significantly influence the capital structure and financial policies of the specific firm. A one standard deviation increase in the peer firm average market leverage is associated with 13.8%

increase in the market leverage of specific firm. And the results in the leader-follower model suggests that small, less successful firms are sensitive to the financial actions of big, successful firms, but not vice versa. And industry characteristics play a key role in moderating the effect of peer-firm effect. My empirical results imply that peer-firm effect on capital structure is more pronounced in the industry with more munificence, lower level of dynamics and higher level of competition. Besides, abundant resources in the industry and fierce competition among market participates aggregate leader-firm effect on financial structure.

Moreover, financially constrained firms and firms facing high risk of bankruptcy are more sensitive to the interaction of peer firms. This finding reveals a predatory competition that induces exit when the prey company is financially constrained. The innovative examination on investment expenditure and R&D expenses show that firms do not only mimic the financial policies of peer firms, but also the investment projects and strategic planning. In conclusion, among all the theoretical explanations, the predation theory and investment imitation could be the most relevant explanations. The financial predation of peers and the competition in the market stimulate firms to imitate each other by constructing similar capital structure and making similar financial decisions.

This paper contributes to the study of corporate finance on capital structure and behavioral finance. And my study emphasizes that industry characteristics are playing important roles in the story of peer-firm effect on financial structure and decision-making. Moreover, this paper throws light on the mechanism of peer-firm effect and call for further study on the economic outcome of herding.

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Appendix A

The financial data are obtained from Center for Research in Security Prices (CRSP)-Compustat merged from 1976 to 2016. To keep comparison of previous research, I drop firms of utilities (SIC code 4900-4999), financial firms (SIC code 6000-6999) and government entities (SIC>=9000). And in order to avoid inconsistency through all the regression test, I require observations to have no missing data for main independent and dependent variable (book leverage, market leverage, sales, market-to-book ratio, profitability, tangibility, net equity issuances, net debt issuances, stock returns, IV). The final sample contains 91244 firm-year observations of 9,690 firms and 229 industries. Industry is defined by 3-digit SIC code. Monthly data of stock return are available at CRSP monthly stock price database. Variable definitions and the calculation of indexes are presented below. Time periods are indicated by (t) or (t − 1) suffixes. The construction of munificence, dynamics and competition (HHI index) are denoted at the table below.

Variable	Calculation
Total Book Assets	=at
Total Debt	= Short-Term Debt + Long-Term Debt = dltt + dlc
Book Leverage	= Total Debt/Total Book Assets.
Market Value of Assets (MVA)	= prcc_f * cshpri + dlc + dltt + pstkl −txditc
Market Leverage	= Total Debt/MVA
Net Debt Issuances	=[(dltt(t) + dlc(t)) − (dltt(t − 1) + dlc(t − 1))]/at(t − 1)
Debt Issuance Indicator	= 1 if Net Debt Issuances > 1%; 0 otherwise
Net Equity Issuances	= (sstk(t) − prstkc(t))/at(t − 1)
Equity Issuance Indicator	= 1 if Net Equity Issuances > 1%; 0 otherwise
Firm Size	= Log(sale)
Tangibility	= Net PPE/Assets = ppent/at
Profitability	= EBITDA/Assets = oibdp/at
Market-to-Book Ratio	= MVA/Total Book Assets
Common Dividends	= dvc
Common Dividend Indicator	= 1 if dvc > 0; 0 otherwise
Sales, General, and Administrative Expenses	= xsga/Firm Size
Research and Development Expenses	= xrd/Firm Size
Capital Expenditures	=capx
Capital Investment	= Capital Expenditures(t)/Net PPE(t − 1)
Altman's (1968) *Z*-Score	=(3.3 * pi + sale + 1.4 * re + 1.2 * (act − lct))/at
Kaplan-Zingales Index(2009)KZ-Index	= -1.001909 x Cash Flows / K + 0.2826389 x Q + 3.139193 x Debt / Total Capital + '-39.3678 x Dividends / K + -1.314759 x Cash / K Cash Flows = (Income Before Extraordinary Items$_t$ + Total Depreciation and Amortization$_t$) K = PP&E$_{t-1}$ Q = (Market Capitalization$_t$ + Total Shareholder's Equity$_t$ - Book Value of Common Equity$_t$ - Deferred Tax Assets$_t$) / Total Shareholder's Equity$_t$ Debt = Total Long Term Debt$_t$ + Notes Payable$_t$ + Current Portion of Long Term Debt$_t$ Dividends = Total Cash Dividends Paid$_t$ (common and preferred) Cash = Cash and Short-Term Investments$_t$
Munificence	**Abundance of resources in an industry** Measurement: Regression slope coefficient, divided by mean value. Coefficients are based on regression of time against value of shipments. Estimate for any given year is based on the five preceding years, i.e., munificence estimate for 1980 is based on data for 1976-1980. Industries are defined using 3-digit SIC codes.
Dynamism	**Instability or volatility in an industry** Standard error of regression slope coefficient divided by the mean value; using same regression model as for munificence
Competition	**Market concentration in an industry** Herfindahl-Hirschman index the sum of the squares of market shares of firms within a given industry (firms with same 3-digit SIC code). The market share of a firm is measured by the ratio of its sales relative to the total sales in the industry.

Appendix B

Table VIII-Continued

Competition and Peer Firm Effect -Continued

	(1) Low (hhi > 0.25)	(2) Medium (0.15<hhi<=0.25)	(3) High (hhi<=0.15)
Peer firm average			
Market leverage	0.712 ***	0.707 ***	0.716 ***
	(2.71)	(2.60)	(3.54)
Market leverage *competition dummy	-0.052	-0.002	0.072 ***
	(-0.66)	(-0.04)	(2.26)
Observations	90,922	90,922	90,922