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Empirical Study of Dynamic Corporate Governance: New Evidence from Chinese-listed SMEs

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Abstract

Purpose – This study first explores the possible dynamic relationship between ownership structure and firm performance using a panel of 4,900 Chinese-listed small- and medium-sized enterprises (SMEs) from 1999 to 2012.

Research design, data, and methodology – We address this issue through a dynamic panel model using a method of moments (GMM) technique and dynamic simultaneous equations to alleviate the potential endogenous problem: unobserved heterogeneity, simultaneity, and dynamic endogeneity.

Results – Under the framework of dynamic endogeneity, firm performance has a significantly positive influence on ownership, but not vice versa. Ownership and performance can be explained by their owned lagged values, respectively. Moreover, intertemporal endogeneity exists among ownership, investment, and performance through the application of system dynamic equations, which implies that the relationship among ownership structure, investment, and firm performance is dynamic by nature.

Conclusions – This study also significantly contributes to a better understanding of dynamic corporate governance by providing further empirical evidence from the largest capital market in the Asian region.

Keywords: Ownership Structure, Investment, Firm Performance, Dynamic Endogeneity, Dynamic Simultaneous Equation.

JEL Classifications: L25, L50, M21.

1. Introduction

The most important and pervasive issue confronting studies in empirical corporate in empirical corporate finance are endogeneity, which can lead to biased and inconsistent parameter estimates that make reliable inference virtually impossible. Wintoki et al.(2007, 2012) summarized three main sources of endogenous problem in empirical corporate finance, including unobservable heterogeneity, simultaneity and intertemporal endogeneity (current values of governance variables are a function of past firm performance or current firm performance will impact on next ownership structure). A considerable amount of empirical researches have verified that dynamic endogeneity exists in the corporate governance. Davidson & Rowe (2004), Cheung and Wei (2006), Hu & Zhou (2008), Fahlenbrach &Stulz (2009), Zhou (2011), and Nguyen et al.(2014) also have explored the potential dynamic endogeneity between ownership structure (ownership concentration, managerial ownership and board ownership) and firm performance (Tobin"s Q and ROA). Prior relevant empirical researches by using traditional ordinary least squares (OLS) or fixed-effects estimations have shown that neglecting this endogenous problem can have serious consequences for inference.

This study responds to these endogeneity concerns in a specific sample, namely, Chinese listed firms based on these reasons. First, China is widely-known for its special corporate governance system which is totally different from US or Australia, which it is evident that China has a weak capital market which is typical for Asian markets. Second, the characteristic of ownership structure in Chinese listed firms is highly concentrated and the percentage of share owned by first shareholder is beyond the other shareholders excessively. Together, these unique institutional characteristics facilitate comparing our findings with those from mature markets and addressing the question regarding the ownership structure in determining performance in the Chinese context.

Zhou (2011) provided the only empirical study focusing on the dynamic endogeneity between ownership structure and corporate performance in China from 1999-2008. Unlike his method by using single equation model, this study applies a dynamic simultaneous equation to investigate the direction, as well as the nature of systematical and dynamic relationship between ownership structure, investment and firm performance. For the purpose of comparison, single equation model is also used to estimate the result of dynamic endogeniety. Dynamic simultaneous equation model is to also consider the intertemporal impacts be-

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tween ownership structure, investment and firm performance.

Interestingly, contrary to the findings of Zhou (2011), under the hypothesis of dynamic endogeneity, our study finds performance is significantly positive related to ownership, but not vice versa. We also find that there is intertemporal endogeneity both ownership-performance and investment-performance. This paper contributes to the literature in several ways: firstly, by using dynamic simultaneous equation with GMM method we are able to explore the dynamic relationship between ownership, investment and performance controlling the unobservable heterogeneity, simultaneity and dynamic endogeniety. Secondly, we can conclude that the relation among them is intertemporally endogenous. Finally, this study also significantly contributes to the extant non-US literature on corporate governance by providing further empirical evidence from an emerging market in Asian region and to an improved understanding of the international diversity on dynamic corporate governance.

The remainder of the paper is organized as follows: section 2 reviews relevant literatures related to GMM method and dynamic endogeneity. Section 3 introduces the development of corporate governance in China. Section 4 presents the methodology. Section 5 discusses the data and key variables. Section 6 presents the model tests. Section 7 reports the empirical results of dynamic endogeneity. Section 8 reports on robustness checks, and summary and conclusion are presented in section 9.

2. Literature Reviews and Hypothesis Development

This section reviews the theoretical and empirical literature of the ownership structure-firm performance nexus to develop appropriate research hypothesis for the current study.

Endogeneity issue: The idea between ownership and performance may be endogenously related is not new. However, when it comes to dynamic endogeneity, relevant empirical researches are not rich.

Wintoki et al.(2010, 2012) summarized the view of three potential sources of endogeneity in the empirical corporate finance: unobservable heterogeneity, simultaneity and possibility of current variables are a function of past variables (manifesto for effect on the former ownership structure to current performance, we call it as dynamic endogeneity). Wintoki et al.(2012) particularly elaborated the third endogeneity, namely, current values of governance variables are a function of past firm performance. The third possible endogeneity concerned the dynamic relationships inherent in the variables, which is the issue traditional fixed-effects model cannot fix it exactly. Ignoring the third possible endogeneity will lead to inappropriate inference. Actually, in the past corporate governance research, most empirical conclusion generally rely on panel data and fixed-effects estimates for inference.

Empirically, many studies have tested the existence of dynamic endogeneity. However, empirical researches of dynamic endogeniety are also divergent. Fahlenbrach & Stula (2009) confirmed that high past firm value will enhance the percentage of current managerial ownership. However, the empirical research from the results of Davidson and Rowe (2004) also presented the inverse evidence of this relationship, namely, past performance is negative relation with current board composition. Hu and Zhou (2008) provided the evidence that ownership structure affected the subsequent firm performance. Wintoki et al. (2012) supported the evidence that firm performance can be explained by lagged board structure. In this case, the results of prior research are still ambiguous and the exact sign of statistical significance is not distinct. According to the mentioned literature above, this study makes an attempt to exploit the possible dynamic endogeneity between ownership and performance, between dependent variable and other variable (explanatory variable and control variable). The following hypotheses under the framework of dynamic endogeneity are presented.

Hypothesis: dynamic endogeneity exists between ownership structure, investment and performance, however, the possible dynamic relationship among them is not distinct under the framework of dynamic endogeneity.

According to the aforementioned arguments, it is found that relevant literature of dynamic corporate governance are not rich, most of which are objects of American sample, few research focuses on the development of emerging market such as China. In regard to research methodology, GMM method is main solution to deal with the possible dynamic endogenous problem and no relevant literatures refer to utilization of dynamic simultaneous equation in this issue. Fixed effect model is used to eliminate the unobservable firm heterogeneity and simultaneous equation is utilized to alleviate the simultaneous endogeneity. Dynamic simultaneous equation with GMM method is able to address the endogenous problem by allowing the endogenous interaction between the variables in the system. In terms of ownership variable, like China and Japan, concentrated ownership is a main proxy for ownership structure, while managerial ownership/board ownership is used to measured ownership indictor in American sample. The conflicting results indicate that it is significant necessity that dynamic endogeneity between ownership structure and firm performance need to be further researched.

3. Methodology

One of significant objective of this study is to examine the dynamic relationship between ownership structure and firm performance. To this further impact of the correlation, a similar approach is followed by Hu & Zhou (2008), Zhou (2011), and Wintoki et al. (2012) using dynamic generalized method of moments (GMM) regression model. In addition, dynamic simultaneous equation model by applying GMM method is also utilized to explore the dynamic endogeneity. This method is able to simultaneously consider unobservable heterogeneity, simultaneity and dynamic endogeneity. The following special regression mod-

el is used to test our main hypothesis.

3.1. Dynamic Panel GMM Model

Dynamic panel GMM estimator is introduced by Holtz-Eakin, Newey, & Rosen (1988), Arellano &Bond (1991), and further developed by Arellano & Bover (1995), and Blundell &Bond(1998). This dynamic modeling approach widely has been used to exploit the dynamic correlation between dependent and independent variables (Wintoki et al., 2012). The dynamic panel data model is presented as following, in the sense that it contains (at least) a lagged dependent variables. For simplicity,

$$Y_{it} = \alpha_1 + \gamma Y_{i,t-1} + \beta X_{i,t} + \eta_i + c_t + \delta_{i,t} \quad (1)$$

For i=1,....,N; t=1,...,T. η_i and c_t are the (unobserved) individual and time-specific effect. $\delta_{i,t}$ is the error (idiosyncratic) term with $E(\delta_{i,t}) = 0$ and $E(\delta_{i,t}\delta_{j,s}) = \sigma_\delta^2$. If j=i, t=s, and $E(\delta_{i,t}\delta_{j,s}) = 0$ otherwise.

Dynamic panel GMM estimator presents an important solution to deal with dynamic endogeneity (Wintoki et al., 2012). Firstly, panel GMM method is able to explore the fix unobservable heterogeneity. Secondly, this estimator allows current governance to be influenced by previous realizations of, or shocks to, past performance. Thirdly, the dominant insight of the dynamic panel GMM estimator is that it can rely on its own internal instruments contained inside the panel itself (such as past firm performance can be used as instruments for current ownership structure). This implies that this estimator eliminates the external instruments.

In this paper, firstly, a dynamic panel GMM model is constructed and then we implement the dynamic panel GMM model to explore the possible dynamically endogenous problem between ownership structure and firm performance. We posit the dynamic model to explore the endogenous problem and wish that new findings are to be revealed.

3.2. Empirical Model Specification

According to aforementioned hypotheses and arguments, methodologically, referring to Wintoki et al., (2012)'s study, the following empirical model is constructed on the following equation.

Herein, Y_{it}, X_{it} and Z_{it} respectively present firm performance, ownership structure and investment. $control_{1,it}$ indicates control variables in ownership structure equation. $control_{2,it}$ is proxy for control variables of firm performance. $control_{3,it}$ represents the control variables of investment. $\delta_{i,t}, \xi_{i,t}$, $o_{i,t}$ represent the random error of three different dependent variable. c_i, μ_i and χ_i represent the unobservable heterogeneity of three different dependent variable. The dummy variable contains industry dummy variable and time dummy variable.

If testing the dynamic endogeneity between ownership structure, investment and firm performance, the system of simultaneous equations in Equation (2), (3) and (4) is used. Dynamic endogeneityimplies that the current observations of the explanatory variable (e.g., ownership structure) are not independent of past values of the dependent variable (e.g., performance). If the dynamic endogeneity exists, γ_s, λ_p and τ_e should be statistically significant.

$$Y_{it} = \alpha_1 + \sum_s \gamma_s Y_{i,t-s} + \beta_1 X_{i,t} + \beta_2 Z_{i,t} + \eta control_{1,it} + dummy + c_i + \delta_{i,t} \ldots\ldots s \geq 1 \ldots\ldots (2)$$

$$X_{it} = \alpha_2 + \sum_p \lambda_p X_{i,t-p} + \phi_1 Y_{i,t} + \phi_2 Z_{i,t} + \varphi control_{2,it} + dummy + \mu_i + \xi_{i,t} \ldots\ldots p \geq 1 \ldots\ldots (3)$$

$$Z_{it} = \alpha_3 + \sum_e \tau_e Z_{i,t-e} + \rho_1 X_{i,t} + \rho_2 Y_{i,t} + + \psi control_{3,it} + dummy + \chi_i + o_{i,t} \ldots\ldots e \geq 1 \ldots\ldots (4)$$

4.3 Lag Order Selection

Empirically, it is the important precursor to understand how many lags of dependent variable in the panel GMM model to capture all the information. Too-long lags will lead to a loss of degrees of freedom and over-parameterization, while too-short lags generally might create biased results caused by omitting important variables and failing to capture the variable's dynamics. According to previous researches (Glen et al., 2001; Gschwandtner, 2005; Zhou, 2011; Wintoki et al., 2012), two lags is sufficient to capture the persistence of profitability.

4. Data and key variable

4.1. Data

The data utilized in this study comprises balance panel data for 350 public companies listed on the Chinese Stock Exchange quoted on the Shanghai and Shenzhen in respect of the period 1999 to 2012. The panel data can alleviate the effect from unobservable heterogeneity that the different companies of our sample could present and simultaneity in a firm to both ownership structure and its performance; manifesto setting for Himmelberg et al. (1999).

Data are predominantly obtained from three databases. The first database is the Chinese Center for Economic Research (CCER); the second database is the China Stock Market and Accounting Research (CSMAR) database that is developed by the Shenzhen GTA Information Technology Company and University of HongKong. As indicated by previous studies, both the CCER and CSMAR are the most important databases on the Chinese capital market (Kato & Long 2005, Firth et al. 2006, 2007). The third database is Research and Set (RESSET) database, which is developed by the RESSET Information Technology Company in Beijing.

4.2. key variable

In our study, performance variable is proxies for two alternative variables: this paper utilizes commonly used accounting and market measures of the performance of firms. The accounting based measure of the performance of firms is return on assets (ROA) (Demsetz & Villalonga, 2001), and the market measure used is the Tobin"Q. ROA is used as the primary measure of firm performance in this study, we also report the results using Tobin"s Q variable totest the robustness of variable sensitivity.

We use ownership concentration as the proxy for the ownership structure. Due to the special characteristic of ownership structure in Chinese listed firms, Ownership concentration is measured by the fraction of share owned by the first largest shareholders (CR variable). CR5 variable (fraction of shares owned by the top 5 shareholders) (Demsetz & Villalonga, 2001) or CR10 variable (fraction of share held by the top 10 shareholders) (Hu and Zhou, 2008) is also used to the robustness test.

Regarding to the investment, it has been measured by two different variables: investment in Property, Plant and Equipment and investment in long-term intangible assets. Generally, the two variables are individually divided by the replacement cost of assets to control for firm size. Cho (1998) employed two measures of corporate investment, investment expenditures "iproperty, plant and equipment"j and R&D (research and development) expenditures coming from USA dataset. In his study investment variable is normalized by replace costs. Hu & Zhou "i2008" jmeasured the investment with the R&D expenses which is normalized by sales and operating revenue. Himmelberg et al. (1999) applied R&D expenditure which is normalized by investment expenditure. Iturriaga &Sanz (2001) utilized the percentage growth rate of property, plant and equipment divided by total assets and the percentage growth rate of intangible assets as the proxy variables for investment. In our study, we use analogous variables to substitute investment variable. The numerator of investment variable is cash outflow from tangible, intangible and other long-term assets subtract cash inflow from tangible, intangible and other long-term assets. The denominator of investment variable is book value of total assets.

Control variable is used to isolate the effects of other factors that have a predictable influence on firm performance. Following prior literatures, Control variables in our paper mainly contain, leverage, size, growth, state, legal, tsh, risk, liquidity, tangible and top1. The description of control variable is listed in Table1. Dummy variables are concerned to control the time effect and industry effect. Year dummy mainly reflect macroeconomic conditions, such as business cycleand market fluctuations. In our sample, we use the standard industry classification followed by the China Securities Regulatory Commission (CSRC) in 2012 and capture industry-specific characteristics and shocks. Table1 summarizes all the variables utilized in the study. Table2 reports the summary statistics for the firm-level variables including: mean, median, maximum, minimum and standard deviation (SD) for the key variables in the analysis.

<Table 1> The Summary of Description and Measurement of Variables

Variables	Description
CR	The fraction of shares owned by the first largest shareholders. It is defined as the shares owned by the first largest shareholders divided by the total shares with security i in period t.
TCR5	The fraction of shares owned by the five largest shareholders. It is defined as the shares owned by the five largest shareholders divided by the total shares with security i in period t.
TCR10	The fraction of shares owned by the ten largest shareholders. It is defined as the shares owned by the ten largest shareholders divided by the total shares with security i in period t.
CAPITAL	Investment expenditure. It is defined as the (cash outflow from tangible, intangible and other long-term assets subtract cash inflow from tangible, intangible and other long-term assets) divided by book value of total asset with security i in period t.
Q	Tobin'Q. It is defined as market value of equity plus market value of total liabilities divided by book value of total assets with security i in period t. Return on asset. It is defined as net earnings divided by the total asset with security i in period t.
ROA	
LEVERAGE	Debt ratio: It is defined as the total liabilities to total assets with security i in period t. The standard deviation of monthly stock return is with security i in period t.
RISK LIQUIDITY SIZE	Cash flow of security. It is defined as year-end net cash flow divided by the book value of total assets with security i in period t. Asset size of security. It is defined as the logarithm of assets book value with security i in period t.
GROWTH	The growth of security. It is defined as the percentage growth rate of total assets with security i in period t.
TANGIBLE	The structure of security i in period t. It is defined as the tangible asset plus inventory divided by the total assets State owned shareholdings with security i in period t. It is defined as the state-owned shares divided by total shares.
STATE	Legal person owned shareholdings. Legal person owned shareholdings with security i in period t. It is defined as the legal person owned shares divided by total shares. Tradable shareholdings with security i in period t. It is defined as the tradable shares divided by total shares.
LEGAL	

TSH	A dummy variable of equity ownership of security i in period t.It is set to be one for firms which the ultimate owner is state-owned share or state-owned legal person share and zero for those with non state owned share.
TOP	
INDUSTRY	An industry dummy variable. It is set to be one if industry is agriculture and zero for other industries.
YEAR	A year dummy variable. It is set to be one when year is 1999 and zero for other years.

4.3. Descriptive Statistics

Table 2 presents the descriptive summary statistics for variable in the study sample (1999-2012) and supports our argument that the Chinese listed firms have distinct firm characteristics in China.

<Table 2> Descriptive statistics for study variables

variable	N	Mean	SD	Min	Median	Max
Q	4900	2.080	1.310	0.590	1.690	14.98
ROA	4900	0.0400	0.0700	-0.970	0.0300	2.680
CR	4900	0.400	0.170	0.0400	0.380	0.890
CR2	4900	0.0700	0.0800	0.00052	0.0400	0.410
CR3	4900	0.0300	0.0300	0.00037	0.0200	0.250
CR4	4900	0.0100	0.0200	0.0002	0.0100	0.130
CR5	4900	0.0100	0.0100	0.0001	0.0100	0.0800
CR25	4900	0.120	0.100	0.0012	0.0900	0.590
IO	4900	0.0013	0.01	0	0.0003	0.22
TCR5	4900	0.520	0.150	0.0100	0.530	0.970
TCR10	4900	0.540	0.150	0.0100	0.550	0.970
CAPITAL	4900	0.0700	0.0900	-0.910	0.0400	1.480
LEGAL	4900	0.150	0.220	0	0.0200	0.850
STATE	4900	0.250	0.240	0	0.220	0.890
TSH	4900	0.710	0.310	0.0600	1	1
GROWTH	4900	0.170	0.520	-8.990	0.100	23.89
LEVERAGE	4900	0.480	0.200	0.0100	0.490	4.460
SIZE	4900	21.73	1.090	19.04	21.60	26.66
LIQUIDITY	4900	0.0200	0.0800	-0.520	0.0100	0.490
TANGIBLE	4900	0.290	0.180	0	0.270	0.970
TOP	4900	0.170	0.380	0	0	1
RISK	4900	0.120	0.0600	0.0200	0.110	1.120

Notes: CR2-CR5: the percentage of share held by the top2-5 largest shareholders. IO: the fraction of share owned by the managerial ownership

4.4. Correlation Analysis

Table3 shows the correlation matrix among the variables employed in our sample. When we look at the matrix of correlation coefficients between the dependent and other variables, we find that most cross-correlation terms are fairly small, thus giving no cause for concern about problem of multicollinearity among variables.

5. Model test

5.1. Panel unit root test

Panel unit root test must be implemented before using dynamic panel model. It is first necessary to test the stationarity properties of each of the variables and check whether each series is integrated and contains a unit root.

We implement four panel unit root tests (Levin-Lin-Chu: LLC, Im-Pesaran-Shin: IPS, and Fisher-types: ADF and PP tests) proposed by Levin et al. (2002), Im et al. (2003), Maddala &Wu (1999), and Choi (2001), respectively. The null hypothesis of the above unit root tests is that there exist unit root in the series, i.e., the variables are non-stationary. Rejecting the null hypothesis means the series is stationary. This series is non-stationary if we cannot reject the null hypothesis. Table4 shows the results of the panel unit root tests for each variable by applying different unit root"s test method. It can be seen that the level values of the series (ROA, Q, CAPITAL, CR, LEVERAGE, LIQUIDITY, TGROWTH, STATE, LEGAL, TSH, TANGIBLE and RISK) are stationary at the 1% level (for all tests listed p<.01) using LLC test, which means no unit root exist in the series. The results strongly reject the null hypothesis of unit root.

Finally, this study also winsorizes all the variables at the 1st and 99th percentiles to avoid the influence of extreme observations and the effect of outliers. Winsorization is commonly used in corporate governance literature, such as studies by Erkens et al. (2012) and Liu et al. (2012). Without these outliers, results are qualitatively not different from those reported above. We can therefore rule out that our results are driven by outlier values. Statistics tools: STATA 12 and EVIEWS7.0 are utilized to deal with data used in our study.

5.2. Auto Regression Test

One of essential steps using dynamic panel GMM is to use lagged values of the explanatory variables. That is, historical values of performance, ownership structure and other firm specific variables can be utilized as instruments for current changes in these variables. These historical or lagged values should support an exogenous source of variation for current value. This assumption indicates that lagged variables must be unrelated with the error in the performance equation (1). For the validity of exogeneity assumptions, the firm's historical performance and characteristics are exogenous with respect to current performance. Arellano and Bond (1991) provided two pivotal tests of this assumption.

<Table 3> correlations among study variables

	Q	ROA	CR	IO	CAPITAL	LEGAL	STATE	TSH	GROWTH	LEVERAGE	SIZE	LIQUIDITY	TANGIBLE	TOP	SD
Q	1														
ROA	0.26***	1													
CR	0.084***	0.104***	1												
IO	0.0004	0.024*	-0.06***	1											
CAPITAL	0.006	0.089***	0.071***	0.016	1										
LEGAL	0.151***	0.027*	0.051***	-0.007	0.059***	1									
STATE	0.032**	0.025*	0.465***	-0.062***	0.049***	-0.402***	1								
TSH	-0.128***	-0.029**	-0.421***	0.052***	-0.048***	-0.456***	-0.391***	1							
GROWTH	0.02	0.088***	0.064***	0.034**	0.333***	0.028*	0.034**	0.0210	1						
LEVERAGE	-0.272***	-0.223***	-0.153***	-0.005	0.013	-0.100***	-0.097***	0.214***	0.064***	1					
SIZE	-0.379***	0.030**	0.059***	0.0190	0.093***	-0.275***	-0.062***	0.381***	0.141***	0.310***	1				
LIQUIDITY	0.090***	0.121***	-0.003	0.00400	-0.0110	-0.001	0.00700	0.0130	0.216***	0.00600	0.035**	1			
TANGIBLE	-0.043***	-0.015	0.051***	-0.0230	0.253***	0.001	0.143***	-0.121***	-0.070***	-0.043***	-0.073***	-0.099***	1		
TOP	0.022	0.011	-0.299***	0.081***	-0.044***	0.223***	-0.352***	0.142***	0	0.048***	-0.044***	-0.00200	-0.123***	1	
RISK	0.209***	-0.003	-0.123***	-0.005	-0.052***	-0.078***	-0.039***	0.317***	0.052***	0.076***	0.0100	0.031**	-0.075***	0.056***	1

Notes: Number of observation is 4900. * correlation is significant at the 0.1 level. ** correlation is significant at the 0.05 level. *** correlation is significant at the 0.01 level

<Table 4> The unit root test

	Levin-Lin-Chu		Im-Pesaran-Shin		ADF Fisher		PP Fisher	
Satistics	Trend	No trend	trend	No trend	trend	No trend	trend	No trend
Variable	Adjustedt*Statisti	Adjusted t*Statistics	Z-t-tilde-bar Statistics	Z-t-tilde-bar Statistics	Chi-squared Statistics	Chi-squared Statistics	Chi-squared Statistics	Chi-squared Statistics
	cs							
ROA	-21.8887***	-18.7426***	-17.4877***	-13.7609***	15.3169***	23.2998***	28.0273***	38.2848***
Tobin'Q	-30.4156***	-44.1784***	-20.599***	-17.2299***	14.7692***	47.4623****	15.7435***	29.8900***
CR	-61.7386***	-25.3175***	-10.7812***	4.8266	4.8939***	1.9632**	2.2276**	-0.9726
CAPITAL	-28.7566***	-31.7121***	-23.5738***	-19.3354***	25.2695***	32.8876***	40.8872***	48.8233***
LIQUIDITY	-40.3201***	-43.5924***	-34.4396***	-33.7472***	67.6145***	84.2532***	128.2604***	157.5506***
TGROWTH	-33.9708***	-46.8571***	-28.9098***	-26.3601***	29.4848***	44.1519***	67.2376***	82.8813***
LEVERAGE	-21.6020***	-17.3907***	-12.2437***	-3.5574***	10.3946***	12.3230***	10.2755***	11.4977***
INCOME	-30.7415***	-34.2455***	-29.3959***	-27.4615***	43.8848***	56.7871***	77.3117***	97.9343***
RISK	-21.4022***	-16.2680***	-23.5729***	-16.4043***	16.5997***	18.4025***	34.7852***	36.6442***
SIZE	-22.6152***	-3.7585***	-8.5004***	15.4665	8.8310***	-1.2416	14.4425***	3.9275***
STATE	-38.7566***	-13.5160***			-1.5335	-5.3602	5.5310***	-1.8656
LEGAL	-12.8728***	-3.9853***			-1.1727	-6.3465	8.6892***	1.1621
TSH	-11.4917***	-10.5458***			-10.6256	-13.6198	-8.7387	-12.4610
TANGIBLE	-41.6507***	-32.2302***	-14.1429***	-4.4601***	21.1194***	15.2107***	10.2470***	12.0256***

Note: *** denotes rejection of the unit root hypothesis at 1% significance level and ** indicates rejection of the unit root hypothesis at 5%.other notatio

The test used in the study is a test of second-order serial correlation. If the assumptions of the specification are valid, by construction the residuals in first differences (AR(1)) should be correlated, but there should be no serial correlation in second differences(AR(2)).

5.3. Sargan or Hansen Test of Over-identification

The dynamic panel GMM estimator utilizes multiple lags as instruments, which implies that GMM system is over-identified. The Sargan test (Sargan, 1958) yielded a J-statistic which is distributed χ^2 under the null hypothesis of the validity of the instruments. It is sometimes called theHansen testorJ-test for over-identifying restrictions (Hansen, 1982).

The Sargan tested can be computed from residuals from instrumental variables regression by constructing a quadratic form based on the cross-product of the residuals and exogenous variables. Under the null hypothesis that the over-identifying restrictions are valid, the statistic is asymptotically distributed as a chi-square variable with (L − N) degrees of freedom (where L is the number of instruments and N is the number of endogenous variables)

5.4. Diff-in-Hansen Tests of Exogeneity

Testof strict exogeneity suggested by Wooldrdge (2002, p.285) is used to explore the potential variables whether or not are dynamic endogenous. The following fixed-effects model is presented to test the strict exogeneity.

$$y_{i,t} = \alpha + \beta X_{i,t} + \gamma Z_{i,t+1} + \eta_i + \varepsilon_{i,t} \quad (4)$$

Where $X_{i,t}$ contains the explanatory variables and control variables. $Z_{i,t+1}$ is a subset of future values of the explanatory variables and control variables. Under the null hypothesis of strict exogeneity, γ=0, i.e, future realizations of explanatory variables and control variables are unrelated to current performance.

6. Empirical Result

In this section, results from estimating the dynamic relation between ownership structure, investment and firm performance are provided.

Table5 reports the evidence of simulation from the performance equation regression when return on assets (ROA) is used to measure performance. Column 1-3 reports the results estimated by single equation model by GMM method. Column 4-6 presents the results caused by systems of equations by GMM

<Table 5> The Result of Dynamic Endogeneitybetween Ownership Structure, Investment and Firm Performance

METHOD	Single Equation Estimation by GMM			System Equation Estimation by GMM		
COLUMN	1	2	3	4	5	6
VARIABLES	ROA	CR	CAPITAL	ROA	CR	CAPITAL
CONSTANT	-0.086** (-1.996)	0.002 (0.0536)	0.056* (1.694)	-0.028*** (-2.506)	0.040*** (5.093)	0.009 (1.615)
L.CAPITAL			0.256* (1.797)			0.399*** (21.552)
L2.CAPITAL			0.012 (0.198)			0.019 (1.29)
L.ROA	1.090*** (3.370)			0.558*** (23.243)		
L2.ROA	-0.293 (-1.495)			0.075*** (3.385)		
CR	-0.016 (-0.771)		-0.040 (-0.971)	0.001 (0.292)		-0.006 (-1.026)
L.CR		0.935*** (30.65)			0.875*** (50.28)	
L2.CR		0.087*** (3.530)			0.054*** (3.126)	
ROA		-0.096 (-0.952)	0.329** (2.075)		0.058** (2.078)	0.174*** (5.477)
CAPITAL	-0.025 (-0.236)	-0.015 (-0.316)		-0.082*** (-5.987)	0.01 (0.613)	

STATE	-0.026**	0.012 (-2.031)	 (0.915)	0.002	0.021*** (0.502)	 (3.051)	
LEGAL		-0.024* (-1.650)	0.015 (0.985)		0.003 (0.945)	0.016** (2.177)	
TSH		-0.068*** (-3.154)	0.069** (2.502)		-0.004 (-0.804)	-0.067*** (-7.587)	
LEVERAGE		-0.039** (-2.520)			-0.042*** (-10.732)		
RISK+			-0.572** (-1.985)	-0.572* (-1.888)		0.01 (0.47)	-0.032 (-1.520)
SIZE		0.007*** (2.916)			0.002*** (4.019)		
GROWTH		0.015 (0.353)		0.132*** (3.031)	0.035*** (11.194)		0.118*** (17.297)
LIQUIDITY			0.009 (0.0976)	-0.378** (-2.547)		-0.036*** (-3.402)	-0.152*** (-10.308)
TANGIBLE				0.058* (1.758)			0.063*** (11.396)
TOP1				0.023*** (2.859)			0.003 (-2.07)
INDUSTRY		YES	YES	YES	YES	YES	YES
YEAR		YES	YES	YES	YES 0.521	YES 0.930	YES 0.493
Adjust R	2				0.518	0.929	0.489
J statistic					0.02	0.02	0.02
AR(1)(p-value)		0.003	0.000	0.000			
AR(2)(p-value)		0.058	0.478	0.278			
SarganTest of over-identification (p-value)		0.508	0.056	0.840			
Hansen Test of over-identification		0.768	0.059	0.914			
(p-value)							
Diff-in-Hansen Test of exogenity (p-value)		0.768	0.621	0.673			
Observations		4200	4200	4200	4200	4200	4200
Number of code		350	350	350	350	350	350

Notes: The method used in this estimation is GMM method. GMM refers to generalized method of moment. t-statisticsin parentheses. (***) denotes statistical significant at 99% confidence level. (**) denotes statistical significant at 95% confidence level. (*) denotes statistical significant at 90% confidence level. AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first-differenced residuals, under the null of no serial correlation. The Hansen test of over-identification is under the null that all instruments are valid. The Sargen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen tests of exogeneity is under the null that instruments used for the equations in levels are exogenous

model. According to the mentioned argument earlier and Wintoki et al.(2012)"s command specification of STATA, two lags of performance is included in the dynamic model. This makes past performance and past firm characteristics, lagged three periods or more, available for use as instruments. Lagged three and four periods as instruments for all the endogenous variables in the GMM estimates are used. Except industry influence and year dummies, our assumption in the GMM regression is that all the regressors are endogenous.

By utilizing single equation model, when controlling unobservable heterogeneity, simultaneity and dynamic endogeneity, there is no relationship between ownership and performance, meanwhile, we find that firm performance has positive effect to investment significantly, but not vice versa. However, the system of simultaneous equation supports the evidence that firm performance is positive relation with ownership structure when controlling the dynamic endogeneity, the result of which is not in line with the prior research (Cheung & Wei, 2006; Zhou, 2011; Wintoki et al., 2012). Furthermore, there is bidirectional relation between investment and performance by using dynamic simultaneous equations. It is worth noting that the real coefficient sign of current investment is negative and direction to current performance is opposite. The enlightenment is the risk aversion, which creates significantly negative impact on firm performance. This also implies that investment efficiency is lower (Wan, 2003).

It is found that when considering the main source of endogeneity, the ownership structure, investment and performance can be significantly explained by their owned lagged value, however, no statistical significance is between current investment and the second lagged investment. The two lag order is worth suspecting in our sample and this also implies that the appropriate lag order is vitally important for the estimated result.

The results of the specification tests including the result of the AR (2) second order serial correlation tests, the Hansen test of over identifying restriction, the test of the exogeneity of a subset of the instruments, which means that it is not possible to reject the hypothesis. J-statistic indicates that the instrumental variable used in systems of equations is valid.

Regarding to the difference of results estimated from single equation method and simultaneous equation method, one of the possible reasons might be related to the choice of econometric tools. STATA is used to estimate the conclusion by using single equation model. EVIEWS is utilized in the estimation of simultaneous equation model. Another possible cause is that simultaneous equation model can consider the endogenous interaction between variables in a system. However, the single equation model is unable to complete this.

The results of the specification tests including the result of the AR (2) second order serial correlation tests, the Hansen test of over identifying restriction, the test of the exogeneity of a subset of the instruments, which means that it is not possible to reject the hypothesis. J-statistic indicates that the instrumental variable used in systems of equations is valid.

7. Robustness Check

Several additional tests are used to investigate the sensitivity of the results and make sure of the strength of the results and avoid the suspicion of spurious correlation, which are not reported here in the interests of brevity.

In the robustness of dynamic endogeneity, Earle et al. (2005) contended that the pattern of concentration may impact on the estimate of effect of concentration on performance. We introduce the TCR5 variable (the percentage of share held by five largest shareholders) and TCR10 variable (the percentage of share held by tenth largest shareholders) to be proxy for the ownership concentration, the result is coherent and the main expected signs still exit and the basic relation is unchanged. Moreover, Tobin"s Q, as a method of estimating the firm performance based on the market value, appears in the dynamic model, the result shows that they maintain the expected signs.

Moreover, we re-estimate the result whether or not is robust to the choice of the lagged order, this check re-investigates the regressive results by using one period as the lagged order. The result show that lagged ownership concentration has significant positive relation with current performance, while inverse effect of lagged performance on current ownership concentration does not appear.

8. Conclusion

We add the new empirical study that the dynamic relation between ownership and performance is both endogenous and dynamic. This study firstly explores the dynamic relationship between ownership structure, investment and performance in Chinese listed SME considering the unobservable heterogeneity, simultaneity and dynamic endogeneity by using a sample of 350 listed firms from 1999-2012. It is found that the performance has positive and significant influence on ownership under the hypothesis of dynamic endogeneity, but not vice versa. Meanwhile, bidirectional relationship exists between investment and performance. This study is able to confirm and accept the hypothesis.

It is also interesting noted that there is a bidirectional and intertemporal effect between ownership structure and performance in which lagged ownership concentration has positive influence on the current performance, and lagged firm performance has significant effect on current ownership structure. In summary, reciprocal effect between ownership concentration and firm performance does emerge. This study also confirms and accepts our hypotheses hypothesis.

Another things should be noted in this study is that the appropriate lag order will impact on the result. The literature reviews provide the evidence suggesting that the proper lag order is two periods. However" C there is no criteria to explain how many length the lag order is the most appropriate. In this case, appropriate lag order plays a crucial influence on the estimated results.

Future research ought to be directed at other issues. That is, we can focus on the dynamic endogenous problem after financial crisis specially, which would add new findings in this issue. In addition, dynamic endogeneity may apply to other corporate governance issues as well. For instance, whether or not board structure and performance exists in Chinese listed firms if they conform to dynamic endogeneity.

The results of this paper suggest that the debate over the dynamic relationship between ownership, investment and performance under the framework of dynamic endogeneity is not over. The relation among them is still confusing, and need to be researched more in the future.

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