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**THE STUDY ON RELATIONSHIP AMONG LEVEL OF DISCLOSURE OF LAST INFORMATION AND FAMILY OWNERSHIP IN LISTED ENTERPRISES IN TEHRAN SECURITY AND EXCHANGE ORGANIZATION**

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**Abstract:** Given the family-owned companies have devoted noticeable percent of listed enterprises in Tehran Security and Exchange Organization (TSEO), it has been tried in this study to reveal nature of these commercial units for investors thereby they could make more rational decisions for their investments. The relationship among level disclosure of future information with family ownership has been examined in this investigation where 92 companies were selected as sample of study among the listed enterprises in Tehran Security and Exchange Organization using systematic deletion technique. The multivariate regression method has been adapted to test hypothesis. The time span of this study ranges from 2011 to 2015. The results of this study suggest that strongly-concentrated family ownership may reduce quality level (score) of future disclosure. Similarly, dispersed and relatively concentrated levels of family ownership did not significantly affect in quality of future disclosure.

**Keywords:** Family ownership, Disclosure score, Data panel model, Size of company

## 1. INTRODUCTION

Possession of an information system is one of the factors for economic development in the developing countries. Information gives awareness and alertness, creates surprise and motive and reduces uncertainty. Information reveals new alternatives or deletes poor alternatives and finally affects in individuals and motivates them to do an action. Before it is late, information should sent alarming signs and give new about future, especially in business and trade (John and Grad Nitsky, 1971).

Whereas investors and creditors are assumed as two main groups of extraorganizational users of accounting information thus one of the major missions of reporting of management and accounting system is to prepare and present the relevant information to prepare the basis for making logical decision for investors and creditors. Therefore, it is crucially important for information providers to pay special attention to secure information requirements for the individuals. Hence, high importance of information is subject to accurate and timely information by the companies. Thus all important information of economic units should be appropriately and perfectly disclosed and on the other hand the given information should not be quantitatively and qualitatively disclosed in such a way that leads to confusion of users of financial statements thereby they could make conscious decisions for the users (Sadidi et al. 2015).

The information disclosure is one of the accounting principles that affect in all aspects of financial reporting. The principle of disclosure requires all important related facts to the financial events and activities of trading unit to be reported aptly and perfectly. Based on this principle, the basic financial statements should include all important, relevant, and timely information and this type of information should be put at disposal of various groups in perceivable, perfect, and appropriate form (Sadidi et al. 2015).

Based on the conceptual framework of financial reporting, the financial information should comprise of both relevancy and reliability aspects. However the quality for transparency is appropriate and timely mainly from perspective of disclosure of information.

The published information in annual report can be classified into past and future information (Hosseini,

2004). Disclosure of the past information (history) refers to the financial results in the past time and last disclosure includes a class of information which comprises of current plans with future forecasting that enables investors and other users to evaluate financial performance in the future. Such disclosure includes financial prediction such as revenue of the next year, the expected return, and the predicted cash flow turnover. Last disclosure also includes non-financial information. In other words, the future information is a form of optional disclosure that means explanation of the information beyond the limits which have been in the existing financial system. Many theoretical topics try to describe motives of the trading units for voluntary disclosure of the additional information. Kiso and Wigand (1995) argue that the future information may have a lot of profitability for the users in process of decision-making and investment. They also believe that non- presentation of such information may lead the investors to found the bases of their predictions on other inaccurate sources. Finally, they declared that economic environment might be very dynamic and variable; consequently, no one can only rely on historic information. In addition to the above-said subjects, there is another point based on which publishing future information can be very helpful in annual reports to reduce rate of information symmetry between directors and investors. Therefore, disclosure of such information causes reduction in financing costs (Boojaki et al. 1999). Such an attitude is compliant with theory of investment market as motives for voluntary disclosure.

### 1.1 Theoretical bases and research literature

One of the objectives of financial reporting is preparation and presentation of information to provide a basis for logical decision making by investors and creditors. In this regard, the information should be useful and relevant and capable to affect in making economic decisions by individuals and led to the best decision- making. On the other hand, in order to make useful financial information in decision-making by the given groups, the accounting objectives and financial reporting require the relevant information to be disclosed appropriately and available for all (Sadidi et al. 2015).

The previous researches about economic consequences of disclosure have been generally focused on further disclosure of information in developed countries e.g. US that possesses stronger coercive mechanism. Inter alia, the enterprises are focused in execution of mandatory requirements and

disclosure of additional information to the public as one basis of disclosure. The empirical results of disclosure are generally compliant with financial theories in which the further general information increases corporate value by reducing capital cost or increase in cash flows belonged to shareholders or both of these processes. Moreover, they suggest that types of disclosure are vital for analysts as indifferent respondents to various types of disclosure (Butswan et al. 2002).

The last disclosure denotes a class of information that includes current plans and forecasting of future which enables the investors and other users to evaluate financial performance of the company in the future. Such disclosure comprises of financial prediction such as revenue of the next year, the expected return, and predicted turnover of cash flows. The last disclosure also comprises of non- financial information. Alternately, last disclosure is a form of optional disclosure that means describing information existed beyond it in financial reporting system. Simply disclosure is defined as transmission and presentation of economic information including financial and non-financial and or quantitative or other forms of information ordered based in financial status and performance of the company. Such disclosure is called compulsory disclosure if it is based on a regulatory and legislative source of rules and it is assumed as optional (arbitrary) disclosure if disclosure of information is not affected by any certain regulation. Similarly, the implicit disclosure denotes proposing the minimum information in corporative reports so that thereby to reasonably assess the risks and relative value of the company and to help the information users in this regard (Ansa Esau, 1998).

Family-owned companies were addressed in recent years and in financial and economic literature since the previous studies showed that family-owned companies have administered directly the most common commercial enterprises throughout the world (Bennedsen et al. 2007: 1). The family- owned companies possess systematically noticeable share in capital market in developed and developed countries. Several studies have been conducted in this field that identified differences in proprietorship of family-owned companies among developed and developing countries.

Although family-owned companies are present actively and noticeably among common joint stock enterprises, the family-owned companies differ from the other enterprises. With respect to theory of agency, owners and shareholders of family-owned

companies make more efforts to supervise over directors than other types shareholders in the other enterprises. As a result, compared to non- family owned companies it shows this point that the subject of owner director is less frequent in family-owned companies and this is due to lesser information asymmetry between shareholders and owners in this type of enterprises. However the subject that is assumed to be more aggravated in family-owned companies is that the owners in family-owned companies may prefer motive and potential of personal interests to cost of minor shareholders therefore this issue may be deemed as hazardous for values of the company (Chung et al. 2006).

Profit division policy can be originally assumed as a return to all shareholders toward the ownership they possess versus total stocks in companies. Payment of dividends reduces the existing cash sources in enterprises where this reduction in sources may occur by a method other than payment of dividend (Laporta et al. 2016). Payment of dividend is a regulatory mechanism which plays fundamental role in companies and causes deprivation of personal ownership in enterprises and in fact this payment causes waiving of personal ownership thereby the wealth is withdrawn from monopoly of individuals in great enterprises.

With respect to the mentioned issues and given the effect of policy of profit division has not been explored by focus in adjusting role of family ownership in Iran thus one can imply this question: Is there any relationship among level of disclosure of future information and family ownership?

In a survey, Mazzi (2011) examined relationship among family ownership/control/ administration with performance of payment institute and its focus in financial relations. In order to reconstruct the existing conceptual framework and to codify current level of awareness in this study, it has been tried necessarily to differentiate reliable findings from findings without scientific support. In this course, 23 studies were selected where they had been classified as systematic investigations in the most leading information database in the field of social sciences. Lack of coordination in previous studies caused complexity in relationship among family business and corporate performance and more likely to encounter ambiguity and uncertainty due to absence of some factors in these studies. According to his attitude, the major fields need to further investigation, are as follows: 1) Multidimensional concept of performance and change in approach of wealth creation toward value creation; 2) Precision and outlook of theoretical approaches of

the conducted studies regarding family-owned companies; 3) The problem in definition of family business and its concept; and 4) Growing interest in family-owned companies. These issues express strategic challenges and future research opportunities based on his opinion.

Black, Jas Kivich and Miller (2011) compare ownership effect of family (and founder) with administrative effects using theory of agency. Using Bayesian analysis, they found whereas family and founder's ownership led to premium performance thus results of family administration and even founder might be more ambiguous. The distinctive effects of family ownership and administration and founder on performance have been assessed for the first time and using Bayesian analysis in this study. According to S&P Companies (1994-2003), this study indicates that in over 90% of cases, higher level of family ownership or founder's proprietorship improves financial performance of the given institute.

Sajadi et al. (2009) concluded that variables of size of company, age of company, and type of industry had significant and positive relationship with quality of financial reporting and ownership structure had negative and significant relation with it. However the relation of type of auditor was not statistically significant with quality of financial reporting.

The research hypotheses have been formulated in line with achieving objective of study and with respect to theoretical bases and the given literature of research as follows:

**First hypothesis:** The family ownership will have significant relationship with the rate of disclosure of future information at dispersed level.

**Second hypothesis:** The family ownership will have significant relationship with rate of disclosure of future information at relatively concentrated level.

**Third hypothesis:** The family ownership will have significant relationship with rate of disclosure of future information at strongly concentrated level.

## 2. METHODOLOGY

After execution of librarian and field study phase, all the needed information from companies was collected via information banks of Tehran Security and Exchange Organization (TSEO) by Codal and Rahavard Novin and transactional website of TSEO. (To determine precision of data, data were adjusted from software and financial statements.) The collected data were prepared by means of Excel

software and then implemented using STATA software (final version 14).

### 2.1 Mathematical model and research variables

Model no 1 was adapted for testing of hypotheses in the current research.

Regression model (1)

$$LD_{j,t} = \beta_0 + \beta_1 PFO - Less5_{j,t} + \beta_2 PFO - To33_{j,t} + \beta_3 PFO - More33_{j,t} + \beta_4 RET_{j,t} + \beta_5 SIZE_{j,t} + \beta_6 MB_{j,t} + \beta_7 LEV_{j,t} + \beta_8 ROA_{j,t} + \varepsilon_{jt} \quad (1)$$

### 2.2 Dependent variable (parameter of last disclosure denotes by symbol LD)

Initially, parameter of last disclosure is defined and designed. This parameter is a scale for measurement of disclosure level of information that has been proposed by financial reports. Given there is no place for optional information in financial statements such information is often proposed by reports of board of directors, the current research only analyzes last information in report of board of directors. This parameter includes a list of elements which are disclosed in report of board of directors. The formulated parameter of Tousrab et al. (2001) has been adapted in codification of this list. Likewise, TSEO procedures and circulars and accounting guidelines are addressed in this process. After designing parameter, non-weight index is utilized to score dimension of information disclosure level. Consequently, the constituent elements of disclosure index are compared with the information listed in reports of board of directors. If the given element was disclosed in these reports, score 1 is devoted to it and this score is zero otherwise. This is done for each of the sample companies as well. Likewise, disclosure index is calculated as a ratio by direct dividing of the resultant scores to total possible scores. A model was proposed for measurement of variable of last information disclosure after conducted analyses and using comments from experts and practitioners in this field.

### 2.3 Independent variable (parameter of family ownership symbolized with PFO):

The level (percent) of family ownership will be assumed as independent variable in this study. After identifying family-owned companies, we will classified them into three categories of family-ownership at dispersed level, family-ownership at relatively concentrated level, and family-ownership at strongly concentrated level based study of Chen et al. (2005).

If the family-owned companies possess less than 5% of corporate stock, the family ownership will be at dispersed level. The family ownership will be at relatively concentrated level provided family-owned companies possess 5-23% of total stocks. And if the family-owned companies possess more than 33% of corporate stocks, the family ownership will be at strongly concentrated level.

## 2.4 Research control variables

$RET_{j,-1}$ : denotes mean monthly return of company.

$SIZE_{j,-1}$ : stands for size of company that is computed by natural logarithm of total assets.

$MB_{j,-1}$ : expresses ratio of market value to net book value if corporate assets.

$LEV_{j,-1}$ : denotes financial leverage through which ratio of liabilities to total assets is calculated.

$ROA_{j,-1}$ : refers to return of assets computed by ratio of profit or loss to total assets.

## 2.5 Statistical population and sample

The spatial domain of this study covers all pharmaceutical companies listed in Tehran Security and Exchange Organization (TSEO) in which they have been investigated with time interval (2011-2015). The sampling method of this study is based screening technique (deletion based on the given limits in study). As a result, the companies of statistical population with the following qualification were selected as statistical sample and the rest were excluded. The selected sample includes the listed companies in TESO Organization in Pharmaceutics industry have the following qualifications:

- 1- The companies in which fiscal year is ended to 21<sup>st</sup> March.
- 2- The companies in which the transactional process has not stopped for more than six months.
- 3- The enterprises for which transactions have been continued and not deleted in TSEO.
- 4- The date of admission of companies in TSEO should be prior to fiscal year 2011.
- 5- There was no change in fiscal year within interval (2011-15).
- 6- The full information needed for execution if this study has been perfectly examined.

## 2.6 Research findings

In this section, firstly descriptive findings and then inferential findings are presented.

## 2.7 Descriptive findings

Primarily, descriptive statistics of studied data are calculated for data analysis. Table (1) shows research variables noting values of descriptive parameters for any variable separately.

Table 1: Descriptive statistics of research variables

Name of variable	Mean	Standard deviation	Minimum	Maximum
Quality of disclosure	0.7253	0.1956	0.07	1
Dispersed family ownership	0.0326	0.1778	0	1
Relatively concentrated family ownership	0.0456	0.2089	0	1
Strongly concentrated family ownership	0.0565	0.2311	0	1
Return of stock	0.5327	1.03	-0.5829	8.10
Size of company	13.95	1.50	10.16	19.10
Market to book value	1.25	1.06	0.0344	7.23
Leverage	0.6375	0.2289	0.0901	2.07
Return of assets	0.0998	0.1390	-0.4509	0.5371

In Table (1), mean is the most major central parameter that indicates balance point and centroid of distribution and serves as a good index to show centrality of data. For instance, mean value of variable of leverage is 0.6375 that indicates most of data have been focused around this point. Or in other words, the rate of leverage for many studied companies is 63%.

Likewise, the mean value of variable of family ownership at dispersed level is 3%. This denotes 3% of the studied companies possess family ownership at dispersed level. Similarly, the mean values of family ownership at relatively and strongly levels indicate respectively 4% of the studied companies have relatively concentrated family ownership and 5% of them have strongly concentrated family ownership. For example, the minimum and maximum values of variable of return of assets (ROA) are -0.450 and 0.5371 respectively. Overall, dispersion factors are considered as criteria for determination of dispersion rate from each other or the rate of their dispersion from the mean. Standard deviation is one of the paramount dispersion parameters. The value of this parameter is 1.50 for variable of size of company and it is 0.13 for variable of return of assets which show these two variables have the maximum and minimum rates of standard deviation. It should be noted that the maximum leverage (2.07) belongs to Combine Manufacturing Company in 2012 that shows this company possessed negative capital in 2012 and this problem has been resolved in this company during years 2013-14 therefore it has not been deleted from statistical sample.

### 2.8 Bera- Jarque normality test

Normality of variables (particularly dependent variable in regressive models) is the primary condition for execution of parametric tests. In order to determine normality of research variables, Bera-Jarque normality test was utilized. In this test, if significance level is lower than 5% ( $\text{Sig} < 5\%$ ), the null hypothesis is rejected at confidence level 95%.

Test assumptions are as follows:

$H_0$ : Data distribution is normal.

$H_1$ : Data distribution is not normal.

Table 2: Results of Bera- Jarque normality test

Name of variable	Bera-Jarque significance	Result
Quality of disclosure	0.000	Without normal distribution
Dispersed family ownership	0.000	Without normal distribution
Relatively concentrated	0.000	Without normal

family ownership		distribution
Strongly concentrated family ownership	0.000	Without normal distribution
Return of stock	0.000	Without normal distribution
Size of company	0.000	Without normal distribution
Market to book value	0.000	Without normal distribution
Leverage	0.000	Without normal distribution
Return of assets	0.000	Without normal distribution

The significance level is smaller than 5% in Bera-Jarque normality test for all variables and this indicates they lack normal distribution. Whereas normality of dependent variable leads to normality of the residuals in this model thus Johnson transforms have been utilized for normalization of distribution for the dependent variable.

Table 3: The results of Johnson transforms for normalization of dependent variable

Name of variable	Significance level before normalization	Significance level after normalization	Result
Score of disclosure	0.005	0.163	Normal

Before operation of normalization, dependent variable is significant at level ( $p > 0.5$ ) while after normalization significance level has become higher than 5% and this expresses normality of dependent variables after Johnson transforms.

## Stationary test

According to literature of econometrics, it necessitates testing stationary of variables before estimation of model. It is not recommended to use some tests e.g. Dickey-Fuller test and Philips-Pron test for panel data since they are less capable in determination of stationary. In order to ensure from stronger stationary tests in panel models, it is suggested to pool data and then test their stationary level (Andreas, 2007). Leven, Lin and Cho, and Harris tests etc. can be used to determine presence of unit root in panel data.

Table 4: Stationary test (Harris) for all research variables

Name of variable	Test statistic	Significance level	Result
Quality of disclosure	-8.21	0.000	Stationary
Dispersed family ownership	-12.12	0.000	Stationary
Relatively concentrated family ownership	-15.52	0.000	Stationary
Strongly concentrated family ownership	-15.20	0.000	Stationary
Return of stock	16.95	0.000	Stationary
Size of company	-8.21	0.000	Stationary
Market to book value	-12.37	0.000	Stationary
Leverage	-8.21	0.000	Stationary
Return of assets	-8.56	0.000	Stationary

The significance level is less than 5% for stationary testing of all variables therefore it can be implied the research variables are stationary at confidence level 95%.

Table 5: Final approximation of research mathematical model after solving problem of inequality of variance and serial autocorrelation

Variables	Coefficients	Standard deviation	z-statistic	Significance level	Collinearity
Dispersed family ownership	0.0054	0.262	0.21	0.835	1.01
Relatively concentrated family ownership	0.210	0.0316	0.66	0.507	1.02
Strongly concentrated family ownership	-1.085	0.0420	-2.58	0.10	1.06
Return of stock	-0.448	0.0073	-6.13	0.000	1.06
Size of company	-0.0067	0.0046	-1.47	0.142	1.15
Market to book value	0.0250	0.0064	-3.89	0.000	1.15
Leverage	-0.497	0.0322	-1.54	0.123	1.75
Return of assets	0.6143	0.519	11.83	0.000	2.08
Intercept	0.8515	0.689	12.35	0.000	
Determination coefficient	80%				

Wald statistic	273.10				
Wald significance level	0.000				
Limer F-statistic	Value of statistic	4.30	Significance level	0.000	
Hausman	Value of statistic	34.08	Significance level	0.000	
Inequality of variance	Value of statistic	131.09	Significance level	0.000	
Serial autocorrelation	Value of statistic	28.412	Significance level	0.000	
Errors normality tests	Value of statistic	0.549	Significance level	0.157	

The variables of family ownership at dispersed level and relatively concentrated level are at significance level higher than 5% therefore the first and second hypotheses are not accepted at confidence level 95%. The variable of family ownership at strongly concentrated level is significant at level less than 5% with negative coefficient; namely, as variable of family ownership at strongly concentrated level increases, quality of disclosure will also decrease and third hypothesis is approved. Among the controlling variables, variables of return of stock and ratio of market value to book value have inverse effect and the variable of return of assets has direct and significant effect on quality level of disclosure in companies.

The Limer F-test is significant at level ( $p < 0.05$ ) which shows panel data have been accepted and whereas Hausmann test is significant at level ( $p < 0.05$ ) therefore the fixed effects have been accepted. After primary fitting of the model, it has been identified according to test of inequality of variance and serial autocorrelation tests that there is the problem of inequality and autocorrelation in primary approximation and both of problems were solved in final approximation. The values of variance

inflation factor (collinearity) are smaller than 5 and this indicates that there is no collinearity between independent variables. The adjusted determination coefficient (80%) also indicates that the independent variables could explain 80% of variance of the dependent variable. The Wald-statistic is also significant at level ( $p < 0.05$ ). Thus it can be mentioned at confidence level (95%) that the fitted model has adequate validity. The significance level is also greater than 5% in testing for determination of normal distribution for the residuals therefore it can be implied that the given sentences are normally distributed at confidence level (95%).

### 3. CONCLUSION

The present research sought for analysis of effect of family ownership on quality of disclosure. The given results imply that the family ownership at relatively concentrated level causes reduction in quality of disclosure. In an investigation, Chen, Chen and Cheng (2008) evaluated voluntary disclosure in family-owned companies. They expressed the family-owned companies had lesser value of voluntary disclosure in parameter of S&P500 than in the enterprises otherwise. This point can be justified with longer investment horizon and more suitable monitoring by management and better access to information of family owners. The same result has been also derived in this study that the family-owned companies possessed lower score in the last disclosure. Abdolmohammadi and kvall (2010) examined the preferences of profit management in Norwegian family-owned companies and other enterprises between years (2000-2007). The results indicated that the family-owned companies versus other enterprises smoothed profit further. Similarly, the family-owned companies with higher leverage might be more inclined in profit management than other enterprises with higher leverage.

It is suggested to the analysts and investors to involve factor of family ownership in their analyses of quality of disclosure as well. Likewise, it is suggested to the researchers to study hypotheses of this study separately in Bourse related industries to identify finding of research at level of any industry. Finally, it is suggested to students and researchers to examine the reasons for lack of effect of family ownership at dispersed and relatively concentrated levels on quality of last disclosure.



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## APPENDICES

### Descriptive statistics of research variables

summarize LD LESS TO MORE RET SIZE MB LEV ROA

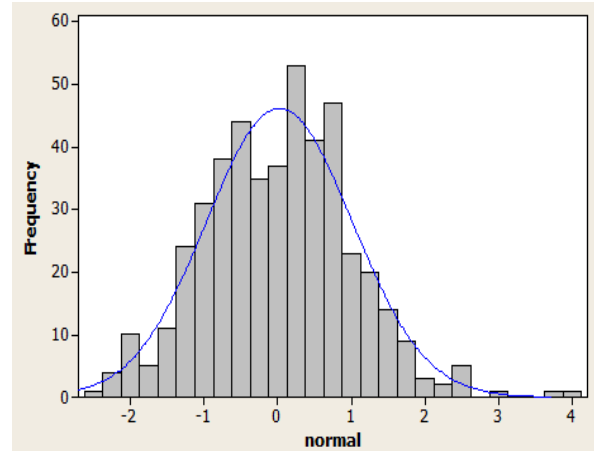
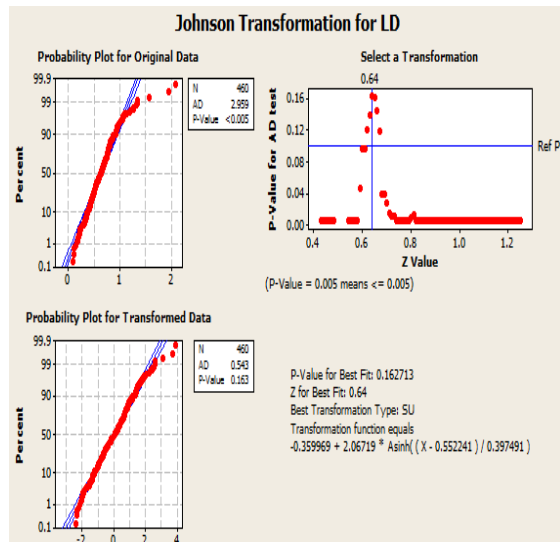
Variable	Obs	Mean	Std. Dev.	Min	Max
LD	460	.7253913	.1956233	.07	1
LESS	460	.0326087	.1778035	0	1
TO	460	.0456522	.2089569	0	1
MORE	460	.0565217	.2311779	0	1
RET	460	.5327202	1.038265	-.5829212	8.103448
SIZE	460	13.95527	1.507487	10.16654	19.1062
MB	460	1.259047	1.062398	.0344832	7.235875
LEV	460	.6375228	.2289517	.0901644	2.077506
ROA	460	.0998764	.1390407	-.4509258	.5371711

### Bera-Jarque normality test

sktest LD LESS TO MORE RET SIZE MB LEV ROA

Variable	Obs	Skewness/Kurtosis tests for Normality			
		Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
LD	460	0.0000	0.5089	32.98	0.0000
LESS	460	0.0000	0.0000	.	0.0000
TO	460	0.0000	0.0000	.	0.0000
MORE	460	0.0000	0.0000	.	0.0000
RET	460	0.0000	0.0000	.	0.0000
SIZE	460	0.0000	0.0001	52.33	0.0000
MB	460	0.0000	0.0000	.	0.0000
LEV	460	0.0000	0.0000	.	0.0000
ROA	460	0.4087	0.0004	11.85	0.0027

### Johnson transformations



### Stationary test

. xtunitroot ht LD

Harris-Tzavalis unit-root test for LD

Ho: Panels contain unit roots      Number of panels = 92  
 Ha: Panels are stationary      Number of periods = 5

AR parameter: Common      Asymptotics: N -> Infinity  
 Panel means: Included      T Fixed  
 Time trend: Not included

	Statistic	z	p-value
rho	0.0828	-8.2103	0.0000

. xtunitroot ht LESS

Harris-Tzavalis unit-root test for LESS

Ho: Panels contain unit roots      Number of panels = 92  
 Ha: Panels are stationary      Number of periods = 5

AR parameter: Common      Asymptotics: N -> Infinity  
 Panel means: Included      T Fixed  
 Time trend: Not included

	Statistic	z	p-value
rho	-0.1667	-13.1211	0.0000

. xtunitroot ht TO

Harris-Tzavalis unit-root test for TO

Ho: Panels contain unit roots      Number of panels = 92  
 Ha: Panels are stationary      Number of periods = 5

AR parameter: Common      Asymptotics: N -> Infinity  
 Panel means: Included      T Fixed  
 Time trend: Not included

	Statistic	z	p-value
rho	-0.2889	-15.5267	0.0000

```
. xtunitroot ht MORE
-----
Harris-Tzavalis unit-root test for MORE
-----
Ho: Panels contain unit roots      Number of panels = 92
Ha: Panels are stationary          Number of periods = 5

AR parameter: Common              Asymptotics: N -> Infinity
Panel means: Included              T Fixed
Time trend: Not included

-----
Statistic      z      p-value
-----
rho            -0.2727   -15.2086   0.0000
-----
```

```
. xtunitroot ht RET
-----
Harris-Tzavalis unit-root test for RET
-----
Ho: Panels contain unit roots      Number of panels = 92
Ha: Panels are stationary          Number of periods = 5

AR parameter: Common              Asymptotics: N -> Infinity
Panel means: Included              T Fixed
Time trend: Not included

-----
Statistic      z      p-value
-----
rho            -0.3615   -16.9561   0.0000
-----
```

```
. xtunitroot ht Size
-----
Harris-Tzavalis unit-root test for Size
-----
Ho: Panels contain unit roots      Number of panels = 92
Ha: Panels are stationary          Number of periods = 5

AR parameter: Common              Asymptotics: N -> Infinity
Panel means: Included              T Fixed
Time trend: Not included

-----
Statistic      z      p-value
-----
rho            0.0828    -8.2111   0.0000
-----
```

```
. xtunitroot ht MB
-----
Harris-Tzavalis unit-root test for MB
-----
Ho: Panels contain unit roots      Number of panels = 92
Ha: Panels are stationary          Number of periods = 5

AR parameter: Common              Asymptotics: N -> Infinity
Panel means: Included              T Fixed
Time trend: Not included

-----
Statistic      z      p-value
-----
rho            -0.1289   -12.3785   0.0000
-----
```

```
. xtunitroot ht Lev
-----
Harris-Tzavalis unit-root test for Lev
-----
Ho: Panels contain unit roots      Number of panels = 92
Ha: Panels are stationary          Number of periods = 5

AR parameter: Common              Asymptotics: N -> Infinity
Panel means: Included              T Fixed
Time trend: Not included

-----
Statistic      z      p-value
-----
rho            0.0828    -8.2121   0.0000
-----
```

```
. xtunitroot ht ROA
-----
Harris-Tzavalis unit-root test for ROA
-----
Ho: Panels contain unit roots      Number of panels = 92
Ha: Panels are stationary          Number of periods = 5

AR parameter: Common              Asymptotics: N -> Infinity
Panel means: Included              T Fixed
Time trend: Not included

-----
Statistic      z      p-value
-----
rho            0.0649    -8.5639   0.0000
-----
```

### Limer F-test

F test that all  $u_i=0$ :  $F(91, 360) = 4.30$

### Hausmann test

```
hausman fe re
```

	Coefficients			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
LESS	-.0194134	-.0288618	.0094484	.0057826
TO	-.056968	-.018484	-.0384839	.0072447
MORE	-.0020115	.0025895	-.004601	.0015138
RET	-.0231824	-.0255292	.0023768	.
SIZE	.076678	.0002071	.0764709	.0222651
MB	-.009337	-.0151568	.0058197	.0044048
LEV	-.0302104	-.1148541	.0846437	.0381797
ROA	.1264645	.2786014	-.1521369	.043288

b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

```
chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        = 34.08
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)
```

### Analysis on inequality of variance and serial autocorrelation

```
. xttest3
-----
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

HO: sigma(i)^2 = sigma^2 for all i

chi2(92) = 13109.22
Prob>chi2 = 0.0000
```

```
. xtserial LD LESS TO MORE RET SIZE MB LEV ROA
-----
Wooldridge test for autocorrelation in panel data
HO: no first order autocorrelation
F( 1, 91) = 28.412
Prob > F = 0.0000
```

### Collinearity

. estat vif

Variable	VIF	1/VIF
ROA	2.08	0.480123
LEV	1.75	0.570882
MB	1.34	0.745175
SIZE	1.15	0.871206
RET	1.06	0.947116
TO	1.02	0.982682
MORE	1.01	0.987260
LESS	1.01	0.993086
Mean VIF	1.30	

### Final approximation of model

. xtglm LD LESS TO MORE RET SIZE MB LEV ROA, panels(heteroskedastic) corr(pearl) rhtype(nagar)

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares  
 Panels: heteroskedastic  
 Correlation: panel-specific AR(1)

Estimated covariances = 92 R-squared = 0.8083  
 Number of obs = 460  
 Estimated autocorrelations = 92 Number of groups = 92  
 Estimated coefficients = 9 Time periods = 5  
 Wald chi2(8) = 273.10  
 Prob > chi2 = 0.0000

LD	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
LESS	.0054689	.0262742	0.21	0.835	-.0460277 .0569654
TO	.021009	.0316364	0.66	0.507	-.0409972 .0830152
MORE	-.1085863	.0420672	-2.58	0.010	-.1910364 -.0261361
RET	-.0448071	.0073154	-6.13	0.000	-.059145 -.0304691
SIZE	-.0067976	.0046281	-1.47	0.142	-.0158688 .0022732
MB	-.0250339	.0064301	-3.89	0.000	-.0376166 -.0124111
LEV	-.0497031	.0322066	-1.54	0.123	-.1128268 .0134206
ROA	.6143969	.051921	11.83	0.000	.5126337 .7161601
_cons	.8515225	.0689276	12.35	0.000	.716427 .986618

### Test of normality of residuals

