Are Earnings and Cash Flows Dividends Smoothing Agent in The Listed Non-Financial Firms in Nigeria?

Maryam Ahmed Jibril
Department of Accounting
Kaduna State University
maryamjibril13@gmail.com

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Abstract

This paper ascertained how determinants (earnings and cash flows) effect dividends smoothing of listed non-financial firms in Nigeria. The paper examined how earnings and cash flows affect dividends policy through smoothing of dividends. Correlation research design was adopted using a cross-section of 10firms for a period of 7 years (2010-2016). Generalized Least Squares (GLS) technique of analysis was used and the study found a significant positive effects of cash flows, current earnings and previous year earnings on dividends smoothing. The study concludes that**,** listed Nigerian non-financial firms use more earnings and less of current cash flow in dividends smoothing and making changes in dividends policy. Thus, earnings, and cash flows are dividends smoothing agents, and the more they are considered in dividends payout decisions, the higher dividends smoothing. The study recommends that regulators and the board of directors of listed non-financial firms in Nigeria should establish regulations and guidelines on the level and rate of dividends for the listed companies.

Keywords: Earnings, Cash Flows, Dividends Smoothing Agent, Listed Non-Financial Firms in Nigeria

1. Introduction

Dividends decision is one of the most critical aspects of financial management because of its relationship with firm value, finance and investment. Although there are opposing propositions in theory regarding the relevance and irrelevance of dividends, rational investors as well as corporate managers consider dividends when making future decisions and policies about their entity. The classical work of Miller and Modigliani (M&M, 1961) indicates that under perfect markets and constant investment, dividend policy is irrelevant for firm value. Empirical evidences (eg Allen &Michaely2003) strongly suggest that dividend is irrelevant to managers and markets. Rather dividends are "smoothed," as dividends are rarely decreased, and investors react positively to dividend increases and negatively to dividend decreases (Michaely& Roberts, 2006).

Dividend behavior as well as the incentives for changing dividend policies usually arises from either information asymmetry or agency problems between managers and shareholders. For instance, under asymmetric information, dividends are used as a signal to convey information about future profitability, while from agency theories; dividends are a means to mitigate perquisite consumption, empire building, or other value-destroying activities. Therefore, information asymmetry between shareholders and managers induces dividend smoothing (Guttman et al., 2010); dividend smoothing can also arise as a means to limit the agency costs of free cash flow, and the existence of external finance costs also drives dividend smoothing (Aivazian et al., 2006; Philip 2016).However, Jeong (2013) found that in South Korea, it is not agency problems nor information asymmetries that cause firms to smooth dividends, but rather the institutional factors of the financial market, such as the interest rate level and tax rate.

Dividend smoothing connotes the variation in dividends that is different from the variation in earnings, that is, keeping the dividends per share constant or stability of dividends in other words.

Finance literature is of the view that managers smooth dividends if they follow a constant nominal dividend payment policy with a partial adjustment strategy. This was the premise upon the Lintner's model; in his seminal work on partial adjustment hypothesis held that firms realizing the transitory nature of current earnings adjust only partially to its desired level of dividend with a time lag. Lintner observed that the main firms' priority is the stability of dividends, and instead of setting dividends each quarter, firms first consider whether they need to make any changes from the existing rate (Apedzan, Normah &Norhayati, 2015). This was later supported by the M&M that changes in dividends depend largely on management's expectations of future earnings and cash flows. Lee (1983) also argued that dividend payment should be based on cash flows, not on earnings, because cash flows better reflect the position of the firm. Moreover, the empirical work of Healy (1985) argued consistent with Lintner's position that cash flows are more reliable in determining firm value than earnings because the latter can easily be manipulated by managers to maximise their own compensation.

However, there has been a renewed debate in modern finance and accounting literature concerning the key determinants of dividends payout policy decisions vis-a-vi dividend smoothing. For instance, in Germany Andres *et al.* (2009) found that German firms base their dividend decisions on cash flows rather than published earnings. In a sample of UK firms, Al-Najjar and Belghitar (2012) concluded that UK firms rely more on cash flows to pay dividends, butLintner's (1956) partial adjustment model seems not to work very well in the UK.

This study is motivated by the lack of coherent conclusion with regards dividend policy in relation to smoothing dividend through earnings and/or cash flows. Moreover, there is no empirical study in Nigeria that tested the Lintner'smodel constituting a gap in theory, which this study intends to fill. The apriori of this study is that earnings are the key determinants of changes in dividends decisions as well as dividend smoothing among listed non-financial firms in Nigeria. The main objective of the study is to examine how the cash flows and/or earnings determine dividends smoothing in the listed non-financial firms in Nigeria. The specific objectives of the study are:

i. To determine the impact of earnings on dividends smoothing of non-financial firms in Nigeria.
ii. To determine the impact of cash flows on dividends smoothing of non-financial firms in Nigeria.

Research Hypotheses

Consistent with both theoretical and empirical predictions and in line with the objectives of the study, the following hypotheses are formulated in null form;

H_{01}: Earnings have no significant effect on

dividends smoothing of listed non-financial firms i n Nigeria.

H_{02}: Cash flows have no significant effect on dividends smoothing of listed non-financial firms i n Nigeria.

2. Literature Review

Dividend Smoothing

According to Lintner (1956), dividends smoothing is the variation in dividends that is different from the variation in earnings. In the words of Guttman*et al.* (2001), the term refers to the keeping of dividends per share constant over two or more consecutive years, i.e. stability of dividends. It therefore involves setting a dividend payout policy that does not necessarily conform to earnings.

Alternatively, dividend smoothing can be described as a method managers use to avoid adverse stockholder reactions when setting the dividend level. Lintner's work of 1956is the pillar and the foundation of later research of dividend smoothing phenomenon. Lintner interviewed CEOs and other key managers of 28 American companies to draw conclusions on firms' dividend policy behavior and why firms smooth their dividends relative earnings. He found that managers target a long-term payout ratio when deciding upon dividend policy. Moreover, he found that firms do not decide what level dividends should be set at each new period but rather how much the dividends should change. Managers only raised their dividends partly of the amount that was actually supported by the financials after a strong financial result. If additional increases in dividends were still justified, the managers would continue to raise the dividends in the subsequent years. He referred to this as dividends being “conservative”, and argue that strong avoidance of “erratic changes” in dividend policy is very important to firms. This is due to management's strong belief in the market preferring stable dividends over more volatile payments. Lintner's (1956) study implied that management thought that in the eyes of investors a change in current net earnings was the solely valid factor in changing the dividend rate. That is why management targets net earnings in the payout ratio.

Theoretical Framework and Model Development

According to Miller and Modigliani (1961), under the conditions of a perfect capital market, a managed dividend policy does not affect the firm value and therefore it is irrelevant. However, many academics argue that real world capital markets are subject to various market imperfections (e.g. information asymmetries, differential taxes, transaction costs and agency problems) and suggest that dividends may be used as a very important mechanism to minimise such imperfections. Indeed, Lintner (1956) observe that US managers follow extremely deliberate (managed) dividend policies, contrary to M&M's prediction. In his pioneering study, Lintner finds that US managers tend to smooth dividends relative to earnings; they only increase their dividend payments when they believe that earnings can sustain higher dividend levels permanently, and are reluctant to cut dividends unless adverse circumstances are likely to persist, since dividend cuts are bad signals to the market.

On the other hand, the dividend signaling theory is based on the belief that investors prefer stable dividend over the years and firms are reluctant to cut dividends. John and Williams (1985) show that, in equilibrium, the optimal dividend policy is to pay smoothed dividends relative to stock prices. Their model implies that when dividends are used as a signalling mechanism firms are expected to smooth their dividends. Similarly, Guttman et al. (2008) show that dividend smoothing can arise from a coarse signalling equilibrium in a setting where managers have private information about firm value. Al-Yahyaee et al. (2011) find that Omani firms use dividends to signal their future prospects. Dividends are smoothed with respect to earnings to be a credible signal (Jeong, 2008). On the contrary, smoothing of dividends has been explained by agency issues or information asymmetry. That in order to reduce the agency-principal conflict, dividend stability is pursued so as not to cause unnecessary price volatility for publicly listed firms due to uncertainty. Therefore, reducing uncertainty stemming from unpredictable dividend payouts make managers opt to establish a stable growth path of dividend payments (Servaes &Tufano, 2006).

On this premise, Lintner (1956) develops a mathematical model based on his extensive in-depth interviews with US managers to test for the stability of cash dividend payments. His model reveals that firms set current dividend payments in line with their current earnings and previous year dividend payments, and they make partial adjustments to a target payout ratio and do not match immediately with the earnings changes. Fama and Babiak (1968) re-evaluate and extend the Lintner model, by adding supplementary variables or undertaking more comprehensive approaches, and they all confirm the

original findings of Lintner that US companies follow stable dividend policies. In contrast, Aivazian et al (2003a) find that the Lintner model does not work very well for the eight emerging market (Turkey, Thailand, India, Pakistan, Jordan, Malaysia, South Korea, Zimbabwe) firms.

Lintner (1956) contends that dividends are adjusted to changes in earnings but only with a lag. He argues that when earnings increase to a new level, a company increases dividends only when it feels it can maintain the increase in earnings. Stability of dividends has been explained by Lintner (1956), Fama and Babiak (1968) and Wolmoran (2003) using regression models they constructed to determine values of speed of adjustment and target payout ratio. Lintner's partial adjustment model estimates coefficients for adjustment speed and target payout to determine whether dividend policy is stable or not. The speed of adjustment is particularly important and is a common measure of dividend smoothing. The speed of adjustment estimates how fast the target payout ratio is adjusted in relation to changes in a firm's earnings. The slower the target payout ratio is adjusted, the higher the degree of smoothing. Lintner (1956) argues that the constant in this model will be positive for the most firms because of the reluctance of managers to cut dividends.Fama and Babiak (1968) explained dividend stability by determining coefficients for adjustment speed and target ratio using absolute values of dividend per share regressed against changes in earnings and absolute values of previous dividend.
This research is underpinned by the signaling theory and agency-cost theory to examine the Partial Adjustment Model of Dividend smoothing in the listed non-financial firms in Nigeria.

Review of Empirical Studies
The empirical work of Lintner (1956) on partial adjustment hypothesis held that firms realizing the transitory nature of current earnings adjust only partially to its desired level of dividend with a time lag. Lintner (1956) surveyed managers on their attitudes towards dividend policy and concluded that managers target a long-term payout ratio. He also found that dividends are sticky, tied to long-term sustainable earnings, paid by mature companies and is smoothed from year to year. Adaoglu (2000) investigated instability in the dividend policy of the Istanbul Stock Exchange (ISE) corporations and found that dividend policy behaviour of corporations operating in emerging markets is significantly different from the widely accepted dividend policy behaviour of corporations operating in developed markets. His empirical results show that the ISE corporations follow unstable cash dividend policies, and the main factor that determines the amount of cash dividends is the earnings of the corporation in that year. Brav*et al.* (2005) find that managers are willing to raise external capital or even forego positive net present value (NPV) investments to avoid cutting dividends.

Andres *et al.* (2009) conducted their research in Germany and found that German firms payout a lower proportion of their cash flows, but a higher proportion of their published profits than UK and US firms. They estimated partial adjustment models and report two major findings. First, German firms base their dividend decisions on cash flows rather than published earnings, as published earnings do not correctly reflect performance because German firms retain parts of their earnings to build up legal reserves, and as published earnings are subject to more smoothing than cash flows. Second, to the opposite of UK and US firms, German firms have more flexible dividend policies, as they are willing to cut the dividend when profitability is only temporarily down.

Al-Yahyae*et al.* (2011) conducted their research in Oman, a developing economy on "Dividend smoothing when firms distribute most of their earnings as dividends". The research found that Omani firms have unstable dividend policies and target payout ratios, and they adjust their dividend policies very quickly and are willing to cut their dividends. Appannan and Sim (2011) examines the leading determinants affecting the dividend payment decision by company management in Malaysia listed companies for food industries under the consumer products sector and concluded that debt equity ratio and past dividend per share were the important determinants of dividend payment.

Al-Najjar and Belghitar (2012) conducted their research on "The information content of cash flows in the context of dividend smoothing" using a modified dividend partial adjustment model. In their model, they replaced current year's earnings with FCF, as according to them, UK firms rely more on their cash flows to pay dividends and that Lintner's (1956) partial adjustment model seems not to work very well in the UK. That their results were consistent across the different models and show that cash flows are superior to earnings in dividend smoothing,

suggesting that cash flows are the key determinant of dividend payments. This is because their proposed dividend partial adjustment model has a lower adjustment coefficient than Lintner's model, suggesting that their estimates are much closer to reality. They concluded that the modified version of Lintner's model explains better the smoothing process of dividends for UK firms:

Andres *et al.* (2009) and Adelegan (2003) re-evaluate the incremental information content of cash flows in explaining dividend changes, given earnings in Nigeria and found a significant relationship between dividend changes and cash flow unlike previous studies. The empirical results reveal that the relationship between cash flows and dividend changes depends substantially on the level of growth, the capital structure choice, size of each firm and economic policy changes

Al-Najjar (2009) also reports that the Lintner model successfully explains Jordanian markets' dividend behaviour, and further suggests that Jordanian firms have target payout ratios and they partially adjust dividends to their target but relatively faster than those in US (developed) market. Chemmanur et al. (2010) compare dividend policies of Hong Kong firms and US firms. Their study indicates that dividend payments in Hong Kong are more closely related to current year earnings and thus the extent of dividend smoothing by Hong Kong firms is considerably less than those in the US.

Al-Ajmi and Abo Hussain (2011) show that current dividends are determined by lagged dividends and current earnings as proposed by Lintner in Saudi Arabia; however, Saudi firms have more flexible dividend policies since they act quickly to increase dividend payments and are willing to cut or skip dividends when earnings decline.Leary and Michaely (2011) highlight the relationship between the levels in dividend payout and the degree of smoothing. They find that firms that pay higher degrees of dividends also smooth their dividends more.Al-Malkawi et al. (2014) examine dividend smoothing in Oman, and find that Omani firms adjust their dividends toward their target payout ratio gradually, more interestingly with a relatively low speed of adjustment, as compared to other firms in developed and emerging economies.

Apedzan, Normah and Norhayati (2015) found that Malaysia non-financial firms consider current earnings more important than current cash flow while making dividends payout decisions, and prior year cash flows are considered more important in dividends decisions than prior year earnings. They conclude that Malaysian non-financial firms participate actively in dividends smoothing where cash flow and earnings are taking into consideration while deciding on dividend payout policy of these firms.

3. Research Methodology

Research Design

This study adopted correlation research design in assessing the effect of cash flows and earnings on dividends smoothing in the listed non-financial firms in Nigeria. The population of this study comprises of all the 64 listed non-financial firms on the floor of the Nigerian Stock Exchange (NSE) Market as at 31st December, 2016. However, all the firms that were not in the NSE listing for all the period (2010 through 2016) covered by the study were filtered out, because of the difficulties in accessing their data. Similarly, firms that were not consistently paying dividends were also removed. Based on this, the population was reduced to 10firms, and hence the sample of the study.

The study used secondary data from the annual reports and accounts of the sampled firms for the period of 7 years (2010-2016). Therefore, our database consists of 70 observations, that is, 10firms for 7 years. The study employed panel regression technique of data analysis using Generalized Least Squares (GLS) regression estimators. **The analysis is conducted using Statistics/Data Analysis Software (STATA 13.0).**

3.2 Variables Measurements and Model Specification

This study employed the modified empirical model of Fama and Babiak (1968) "Extended Partial Adjustment Model). The model is mathematically expressed as follows;

$$DIV_{it} = \gamma_0 + \gamma_1 DIV_{it-1} + \gamma_2 ERN_{it} + \gamma_3 ERN_{it-1} + \gamma_4 CFO_{it} + \gamma_5 FSZ_{it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots i$$

Where

DIV_{it} is dividend smoothing of firm I in year t, measured by the absolute annual dividends (Fama & Babiak 968), divided by annual earning; DIV_{it-1} previous year dividend of firm i; ERN_{it} current year earnings, measured as earnings divided by number of shares outstanding; ERN_{it-1} previous year earnings of

firm I; CFO_{it} cash flows of firm I in year t, measured by operating cash flows divided by shares outstanding; FSZ_{it} size of firm I in year t, measured as a log of total assets. And γ_0 is the intercept, while γ_1, to γ_5 are the coefficients/estimators. μ_{it} is the Residual.

The study expect significant +ve coefficients from ERN_{it} and CFO_{it}, and to find which better explains dividends smoothing, the study compares the significant coefficient of ERN_{it} with that of CFO_{it}.

4. Results and Discussions

Descriptive Statistics

This section chapter presents and discusses the descriptive statistics of the data collected, as presented in Table 1;

Table 1: Descriptive Statistics

Variables	Mean	SD	Min	Max	N
DIV	0.2831	0.0959	0.0946	0.4184	70
LgDIV	0.3612	0.0409	0.1718	0.4145	70
ERN	0.3493	0.1263	-0.1490	0.5526	70
LgERN	0.3539	0.1404	-0.3732	0.5526	70
CFO	0.2257	0.0607	-0.2518	0.2518	70
FSZ	7.6106	0.5507	5.8800	8.5400	70

Source: STATA OUTPUT (Appendix)

Table 1 indicates an average dividends payout (DIV) of 28.31% of earnings with standard deviation of 0.0959, and minimum and maximum values of 9.46% and 41.84% of earnings respectively. The standard deviation signifies that the data deviate from both sides of the mean value by 0.0946. The Table also shows that the sample firms have an average lag dividends payout ratio (lgDIV) of 36.12, with standard deviation of 0.0409, and the minimum and maximum values of 17.18% and 41.45% respectively. The standard deviation suggests that the data is dispersed from the mean value by 0.0409. The descriptive statistics indicates that the average earnings (ERN) during the period is 34.93K with standard deviation of 0.1263, and minimum and maximum values of -14.9k and 55.26k respectively. Table 1 also shows an average lag earnings of 35.39k, with standard deviation of 0.1404, and the minimum and maximum values of -37.32k and 55.26k respectively. The standard deviation suggests that the data is dispersed from the mean value by 0.1404. The results in Table 1 indicate that the average cash flows (CFO) of the sample firms is 22.57% with standard deviation of 0.0607, and minimum and maximum values of -25.18% and 25.18% respectively. Lastly, Table 1 indicates an average firm size (FSZ) of 7.61 with standard deviation of 0.5507, and minimum and maximum values of 5.88 and 8.54 respectively. The standard deviation signifies that the data deviate from both sides of the mean value by 0.5507.

In order to ensure the normal distribution of the data, the study employs Shapiro Wilk test for normal data to find statistical evidence. The results of the test are presented in table 2 as follows;

The correlation matrix from Table 3 shows a significant positive association between DIV and lgDIV of the sample firms, from the correlation coefficient of 0.2002 which is statistically significant at 10% level of significance. The results from Table 3 shows a statistical negative relationship between DIV and current earnings (ERN) of the sample firms, from the correlation coefficient of -0.0161 which is not statistically significant at all levels of significance. The table also indicates that there is a significant positive correlation between DIV and previous year's earnings (lgERN), from the correlation coefficient of 0.4974 which is statistically significant at 1% level of significance. Table 3 shows a significant positive association between DIV and cash flows (CFO) of the sample firms, from the correlation coefficient of

Table 3: Correlation Matrix

Var.	DIV	lgDIV	ERN	lgERN	CFO	FSZ
DIV	1.0000					
lgDIV	0.2002***	1.0000				
ERN	-0.0161	-0.6092*	1.0000			
lgERN	0.4974*	0.3831*	-0.2414*	1.0000		
CFO	0.3589*	0.1413	-0.2441*	0.2701**	1.0000	
FSZ	-0.6523*	-0.0103	-0.1676	-0.0728	-0.0909	1.0000

**significant at 1% level* ***significant at 5% level* ****significant at 10% level*

Source: STATA OUTPUT (Appendix)

0.3589 which is statistically significant at 1% level of significance. Moreover, Table 3 shows a significant negative association between DIV and size of the firm (FSZ), from the correlation coefficient of -0.6523 which is statistically significant at 1% level of significance.

Regression Results and Hypotheses Testing

This section presents and analyzes the regression results of the model of the study. The section used the results presented in table 4.Table 4 shows that the model is fit at 99% confidence level, from the

Table 4: Regression Model Summary and GLS Estimators

Variables	Coefficients	Z	P-Values
lgDIV	0.1151	2.67	0.008
ERN	0.1225	3.26	0.001
lgERN	0.1665	5.01	0.000
CFO	0.0493	1.82	0.069
FSZ	-0.1278	-3.39	0.001
CONST.	-0.4405	-9.47	0.000
HETTEST	0.31		0.5789
Mean VIF	1.29		
Overall R^2	0.6763		
Hausman Test	37.91		0.0000
WaldChi2	72.23		0.0000
LM Test	7.70		0.0028

Source: STATA OUTPUT (Appendix)

WaldChi2 of 72.23 and the P-value of 0.0000. However, the results **show an absence of Heteroskedasticity in the panel as indicated by the** Breuch Pagan/Cook-Weisberg test for Heteroskedasticity Chi2 of 0.31 with p-value of 0.5789. This proved that the assumption of constant variance of the error term (Homoscedasticity) is been met. The table on the other hand, indicated the absence of the perfect Multicolinearity among the explanatory variables, as shown by the mean VIF of 1.29. The decision criterion for the Variance Inflation Factor is that a value of 10 and above implies the presence of perfect Multicollinearity.

The results from table 4 show that the explanatory variables explained 67.63% of the total variations in the dependent variable (dividend smoothing), from the overall R square of 0.6763. The table shows that lagDIVhas a significant statistical positive effect on the dividend smoothing (DIV) during the period of the study, from the coefficient of 0.1151 with Z-value of 2.67 and p-value of 0.008, implying that the results is statistically significant at 1% level of significance. Table 4 indicates that current earnings (ERN) has a statistical significant positive effect on the dividend smoothing (DIV) of the sample firms during the period, from the coefficient of 0.1225 with z-value of 3.26 and p-value of 0.001, suggesting that the result is significant at 99% confidence level. Similarly, the results indicated that lag earnings has statistical significant positive effect on the dividend smoothing of the sample firms during the period, from the coefficient of 0.1665 with z-value of 5.01 and p-value of 0.000, suggesting that the result is significant at 991significance level. Moreover, cash flows (CFO) has a statistical significant positive effect on the dividend smoothing of the sample firms during the period, from the coefficient of 0.0493 with z-value of 1.82 and p-value of 0.069, suggesting that the result is significant at 10% level. Lastly, the results show that firm size (FSZ) has a statistical significant negative effect on the dividend smoothing during the period, from the coefficient of -0.1278 with z-value of -3.39 and p-value of 0.001, suggesting that the result is significant at 1% level.

The results show after controlling for firm size significant impact of current and prior year earnings on dividends at 99% confidence level. Based on this, the study rejects the null hypothesis one (H01), which states that earnings have no significant effect on dividends smoothing of listed non-financial firms in Nigeria. The impact is more from prior year earnings, followed by current earnings. This means that listed non-financial firms in Nigeria consider current and prior year earnings while taking dividends payout decisions. The results also show after controlling for firm size significant impact of cash flow on dividends at 99% confidence level. Based on this, the study reject the null hypothesis two (H02), which states that cash flows has no significant effect on dividends smoothing of listed non-financial firms in Nigeria. The study infers that listed non-financial firms in Nigeria consider cash flows while taking dividends payout decisions.

These findings support Jensen (1986) on agency theory, that managers of firms pay dividends from free cash flow to reduce agency conflicts. The findings are also consistent with those of Apedzan, Normah and Norhayati (2015).

5. Conclusion and Recommendations

Based on the analysis conducted on the data collected,

the study concludes that, listed Nigerian non-financial firms use more earnings and less of current cash flow in dividends smoothing and making changes in dividends policy. The findings imply that current earnings and cash flows are dividends smoothing agents, and the more they are considered in dividends payout decisions, the higher of dividends smoothing. The findings also implied that if dividends smoothing is encouraged, it could lead to dividends-based earnings management.

The study recommends that regulators and the board of directors of listed non-financial firms in Nigeria should establish regulations and guidelines on the level and rate of dividends for the listed companies.

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Appendices

```
. xtset id year, yearly
       panel variable:  id (strongly balanced)
        time variable:  year, 2010 to 2016
                delta:  1 year
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```
. xtsum div lgdiv ern lgern cfo fsz
```

Variable		Mean	Std. Dev.	Min	Max	Observations	
div	overall	.2830784	.0958706	.0945787	.4183578	N =	70
	between		.0827113	.1144421	.3789294	n =	10
	within		.0542669	.1712551	.4238459	T =	7
lgdiv	overall	.3612301	.0408903	.1718192	.4146023	N =	70
	between		.034315	.2704546	.3880988	n =	10
	within		.0244314	.2625947	.4655107	T =	7
ern	overall	.3493086	.1262586	-.1490184	.5525732	N =	70
	between		.0970844	.2512448	.5213108	n =	10
	within		.0856473	-.0539842	.5125661	T =	7
lgern	overall	.3638635	.1408691	-.3731699	.5525732	N =	70
	between		.102126	.1842425	.5213108	n =	10
	within		.1008994	-.2809894	.5131774	T =	7
cfo	overall	.2256714	.0606516	-.251844	.251844	N =	70
	between		.021686	.1693678	.2417203	n =	10
	within		.057002	-.1955404	.3081476	T =	7
fsz	overall	7.610571	.5506646	5.88	8.54	N =	70
	between		.4711477	6.754286	8.252857	n =	10
	within		.3171025	6.736286	8.463429	T =	7

```
. swilk div lgdiv ern lgern cfo fsz
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
div	70	0.94372	3.464	2.702	0.00345
lgdiv	70	0.97453	1.568	0.978	0.16410
ern	70	0.99014	0.607	-1.086	0.86129
lgern	70	0.52082	29.496	7.359	0.00000
cfo	70	0.69075	19.035	6.407	0.00000
fsz	70	0.96869	1.927	1.427	0.07683

```
. reg div lgdiv ern lgern cfo fsz
```

Source	SS	df	MS		
Model	.602487873	5	.120497575	Number of obs =	70
Residual	.275721396	64	.004308147	F(5, 64) =	27.97
				Prob > F =	0.0000
				R-squared =	0.6860
				Adj R-squared =	0.6615
Total	.878209269	69	.012727671	Root MSE =	.06564

div	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lgdiv	.1423823	.0425377	3.35	0.001	.0574035	.2273611
ern	.1500839	.0379366	3.95	0.000	.0742467	.225821
lgern	.1708995	.0339621	5.02	0.000	.1025524	.2392466
cfo	.0719065	.0263907	2.72	0.008	.0191841	.124627
fsz	-.1896328	.0319915	-5.92	0.000	-.2534432	-.1256223
_cons	-.437994	.0431129	-10.16	0.000	-.524122	-.351866

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of div

         chi2(1)      =     0.31
         Prob > chi2  =   0.5789
```

```
. vif
```

Variable	VIF	1/VIF
lgdiv	1.54	0.650012
ern	1.37	0.728578
lgern	1.35	0.739059
cfo	1.16	0.861449
fsz	1.04	0.959870
Mean VIF	1.29	

```
. xtreg div lgdiv ern lgern cfo fsz, fe

Fixed-effects (within) regression               Number of obs      =        70
Group variable: id                              Number of groups   =        10

R-sq:  within  = 0.3847                         Obs per group: min =         7
       between = 0.7079                                        avg =       7.0
       overall = 0.5817                                        max =         7

                                                F(5,55)            =      6.88
corr(u_i, Xb)  = 0.4507                         Prob > F           =    0.0000
```

div	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lgdiv	.1000879	.0447337	2.24	0.029	.0104397	.1897362
ern	.1077541	.0372687	2.89	0.005	.033066	.1824421
lgern	.1526412	.0333384	4.58	0.000	.0858295	.219453
cfo	.0221017	.027942	0.79	0.432	-.0338953	.0780987
fsz	-.0369865	.0440509	-0.84	0.405	-.1252665	.0512936
_cons	-.4706147	.049258	-9.55	0.000	-.56933	-.3718994
sigma_u	.06721574					
sigma_e	.05054239					
rho	.63880701	(fraction of variance due to u_i)				

F test that all u_i=0: F(9, 55) = 5.88 Prob > F = 0.0000

```
. est store fixed

. hausman fixed random
```

	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lgdiv	.1000879	.1151289	-.015041	.0117007
ern	.1077541	.1224902	-.0147361	.
lgern	.1526412	.1666426	-.0139014	.0027114
cfo	.0221017	.0498492	-.0277475	.0065629
fsz	-.0369865	-.1277524	.0907659	.0228266

```
                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(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =       37.91
            Prob>chi2 =      0.0000
            (V_b-V_B is not positive definite)

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        div[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
```

	Var	sd = sqrt(Var)
div	.0127277	.112817
e	.0025545	.0505424
u	.0008095	.0284522

```
        Test:   Var(u) = 0
                                chibar2(01) =     7.70
                            Prob > chibar2 =   0.0028
```