SECTORAL ANALYSIS OF FIRM FUNDAMENTAL FACTORS AND STOCK RETURNS IN THE SOUTH AFRICAN EQUITY MARKET

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-Abstract-

In this paper, we attempt to verify the relationship of the firms fundamentals and its stock returns. Price-Earnings ratio (P/E ratio), dividend yield and market capitalization are used as proxies of a firms fundamental values. All series are in a monthly frequency for the period 1995-2011 and were obtained from Thomson Reuters Datastream. We have considered a sample of firms in some particular main sectors listed on the Johannesburg stock market. The sectors in this study are chosen based on the availability of firm-level data. The empirical results indicate that three fundamentals have significantly explained the differences in cross-sectional stock returns in each sector, and such cross-sectional differences also vary across sectors, both within static and dynamic panel data models.

Key Words: Firm fundamentals, Stock returns, South African**,** Equity Market

JEL Classification: G15, C33

1. INTRODUCTION

While the important role of firm-specific characteristics is generally accepted in influencing stock returns prospects, the study on firm-specific returns variation and the information content of stock prices is another important issue that has received much attention from researchers. Information about fundamentals is capitalized into stock prices in two ways. The first channel is through a general revaluation of stock values following the release of *public information*, and the second channel is through the trading activity of risk arbitrageurs who gather and

possesses *private information*. Firm-specific price fluctuations therefore signal if the stock price is tracking its fundamental closely (Durnev, R. Morck, B. Yeung, & P. Zarowin, 2003). These two points of view have raised the growing interest in a relationship between firm-specific return or price volatility and firm fundamental values in both developed stock markets as well as the emerging stock markets. The relationship between firm-specific returns variation and firm fundamentals is found in Durnev et al. (2003) who examined whether greater firm-specific returns variation mean more or less informed stock pricing in the U.S. They found that greater firm-specific stock returns variation, measured relative to total variation, is associated with more informative stock prices, where price informativeness is defined as how much information stock prices contain about future earnings. They concluded that the importance of firm-specific variation in U.S. stock returns most likely reflects the capitalization of firm-specific information about fundamentals into stock prices and thus reflects an efficient stock market rather than a noisy one (Durnev et al., 2003). Chang and Dong (2006) investigated the roles of investor behavior and stock fundamentals in explaining differences in firm-specific volatility across firms. They found that in the case of Japan both institutional herding and earning dispersion significantly and positively related to firm-specific variation in stock returns (E. C. Chang & S. Dong, 2006). This empirical works is similar to Wei and Zhang (2006) who investigated the individual U.S stocks over the period 1976 to 2000. They found a strong negative correlation between earnings (returns on equity) and idiosyncratic volatility, as well as a strong positive correlation between earnings volatility and idiosyncratic volatility. Another empirical study was also done in the case of the U.S. stock market (Wei & C. Zhang, 2006). Irvine and Pontiff (2009) examined the factors influencing the upward trend of idiosyncratic returns volatility. They found that the trends in alternative proxies of idiosyncratic cash flow volatility mirror the trend in idiosyncratic stock returns volatility in the U.S (Irvine & J. Pontiff, 2009).

Considering the cross-sectional dimension across countries studies, Li et al. (2004) investigated the firm-specific returns variation for a cross-section of emerging markets. They found that over the period from 1990 to 2001, idiosyncratic variation of stock returns in the majority of the emerging economies exhibits a rising pattern (Li, R. Morck, F. Yang, & B. Yeung, 2004) Morck et al. (2000) uncovered the cross-sectional difference between developed and emerging economies in terms of firm-specific stock returns variation. They found that firm-specific variation generally constitutes a greater part of total returns variation in most of developed countries and a lower part of total returns variation in most of

the emerging stock markets. However, their analysis cannot adequately account for the cross-sectional differences in firm-specific variation with variable like firm-specific variation in fundamentals (Morck, B. Yeung, & W. Yu, 2000). The subsequent study of Rahman and Hassan (2008) made the first attempt to analyze the direct relationship between firm-specific variations in returns and firm fundamentals in the context of a set of emerging Asian stock markets. They found that firm-specific variation of stock returns is highly correlated with, and is significantly explained by, alternative proxies of firm-specific variation of fundamentals in a majority of the emerging markets in Asia (Rahman & M.K. Hassan, 2008).

In our study, we aim to investigate the impacts of firm-specific fundamentals on its stock return volatility in the South African stock market, Johannesburg Stock Exchange (JSE). JSE is presently the largest stock exchange in Africa and the 16th largest exchange worldwide. On 31 December 2007, the JSE Securities Exchange had 411 listed companies with a combined market capital of US$828 billion. Figure-1 and Figure-2 show the FTSE/JSE All Share Index and the FTSE/JSE All Share Total Return Index in the South African equity market for the period 1995 to 2011. Although the JSE changed the methodology of index calculation on 24 June 2002 from the JSE Actuaries Index Series to the FTSE/JSE Index Series, it recalculated the new index dating back to July 1995 (Ferreira & J.D. Krige, 2011). The FTSE/JSE All Share index increased from 4899.04 in July 1995 to 32270.06 at the end of 2011. Over the same period, the All Share total return index delivered a total return of 368.03% in July 1995 to 3829.72% at the end of 2011. It is clearly that South African FTSE/JSE All Share Index and All Share Total Return Index continuously increased with the only breakdown of both indices in the underperforming years 1997 and 1998.

Our analytical approach accounts for both static and dynamic relationship within a panel data framework. We define dividend yield, price-earnings ratio, and market capitalization as alternative proxies of firm-specific fundamentals, while firm-specific return is defined as the total return index of individual firm. Firm-level monthly data on financial items as well as total return index of individual firms, industries, and the whole market covering the period 1995 to 2011 is obtained from Thomson Reuters Datastream 2011. The sectors included in our respective samples are banking, financial services, retails, industrial, mining, insurance, food producers, construction& materials, and electricity & electronics sectors. The rest of the paper is organized as follows. Section 2 presents the theoretical framework

and the research methodology. Section 3 describes empirical specifications. Section 4 reports the empirical results. Section 5 presents our conclusion.

Figure-1: The FTSE/JSE All Share Index

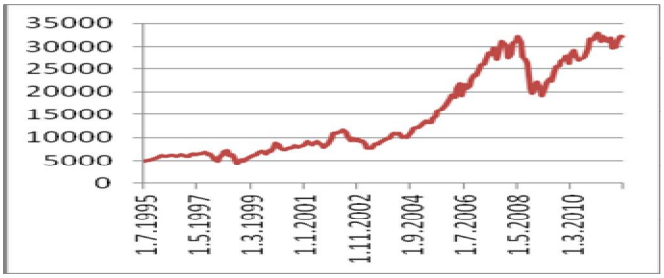
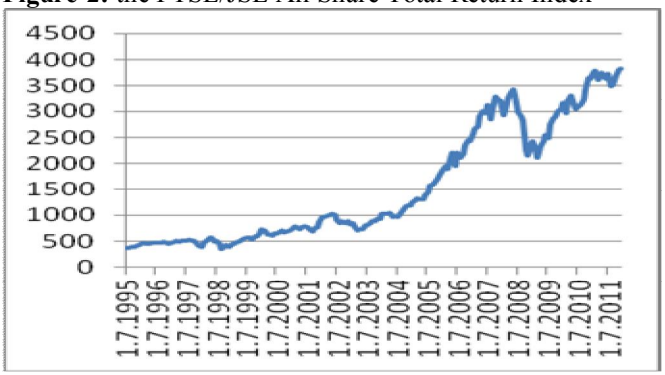


Figure-2: the FTSE/JSE All Share Total Return Index



2. EMPIRICAL SPECIFICATIONS AND RESERCH METHODOLOGY

The volatility of firm-specific returns index is obtained through the ARCH specification which a constant, an autoregressive (AR1) component as well as two regressors namely total market returns index ($r_{mk,t}$) and industry returns index ($r_{id,t}$) are included in the mean equation given in (1), and the variance equation is either specified as GARCH (1,1) or EGARCH(1,1). When the two sets of univariate models (GARCH (1,1) or EGARCH(1,1)) were estimated, the conditional variances (σ_t^2) of each firm-specific returns index in all sectors will be then generated from the model that most appropriately captures volatility, as evidently shown from the relatively lower information criteria (SIC, SIC, and HQ, for instance).

$$r_{i,t} = \alpha_{i,t} + \beta_{i,t} r_{mk,t} + \delta_{i,t} r_{id,t} + \varepsilon_{i,t} \qquad (1)$$

where $r_{i,t}$ is total returns index of firm *i* in month *t*, $r_{mk,t}$ is total market returns index of stocks traded in the Johannesburg Stock Exchange (FTSE/JSE All Share Total Returns Index) in month *t*, and $r_{id,t}$ is total returns index of a sector where individual firm *i* is categorized into in month *t*. As for the volatility of the firms fundamentals namely dividend yield, price-earnings ratio, and market capitalization, will be obtained in similar fashion except for there are only a constant and an autoregressive (AR1) component as regressors of a particular series in the mean equation.

The time-varying volatility of individual stock returns index is then regressed with the time-varying volatility of each of proxies of the firms fundamentals, and with the time-varying volatilities of all proxies in another separate model. This estimation will be separately done for all sectors under consideration. In this study, we consider the static and dynamic specifications of the effects of firm-specific fundamentals volatility on firm-specific returns index volatility within a panel data framework.

2.1 Static Linear Panel Data Models

Panel 2.1A:

$$LnVolRI_{i,t} = \alpha_1 + \beta_1 LnVolDy_{i,t} + \mu_i + \lambda_t + \upsilon_{it}$$

Panel 2.1B:

$$LnVolRI_{i,t} = \alpha_2 + \beta_2 LnVolPe_{i,t} + \mu_i + \lambda_t + \upsilon_{it}$$

Panel 2.1C:

$$LnVolRI_{i,t} = \alpha_3 + \beta_3 LnVolMc_{i,t} + \mu_i + \lambda_t + \upsilon_{it}$$

Panel 2.1D:

$$LnVolRI_{i,t} = \alpha_4 + \delta_1 LnVolDy_{i,t} + \delta_2 LnVolPe_{i,t} + \delta_3 LnVolMc_{i,t} + \mu_i + \lambda_t + v_{it}$$

where $\alpha_i + \mu_i$ is the total individual effects, and λ_t is the time effects. Panel A-D are estimated within a two-way error component regression model which the fixed effects and random effects model will be chosen to model the structure of the error component.

$LnVolRI_{i,t}$ is the logarithm of volatility of total returns index of firm *i* at time *t*.

$LnVolDy_{i,t}$ is the logarithm of volatility of dividend yield of firm *i* at time *t*.

$LnVolPe_{i,t}$ is the logarithm of volatility of price-earnings (P/E) ratio of firm *i* at time *t*.

$LnVolMc$ is the logarithm of volatility of market capitalization of firm *i* at time *t*. , Market capitalization, representing firm size, is another potential covariate with volatility of firm-specific returns index. (Wei & C. Zhang, 2006) and (Xu & B.G. Malkiel, 2003)document that the larger firms tend to have smaller firm-specific return volatility.

Empirical specifications specified in panel 2.1A-2.1D are estimated by WITHIN estimation with cross-section (fixed/random) and/or time (fixed/random) effects.

2.2 Dynamic Linear Panel Data Models

Panel 2.2A:

$$LnVolRI_{i,t} = \omega_1 + \alpha_1 LnVolRI_{i,t-1} + \beta_1 LnVolDy_{i,t} + \mu_i + \lambda_t + v_{it}$$

Panel 2.2B:

$$LnVolRI_{i,t} = \omega_2 + \alpha_2 LnVolRI_{i,t-1} + \beta_2 LnVolPe_{i,t} + \mu_i + \lambda_t + v_{it}$$

Panel 2.2C:

$$LnVolRI_{i,t} = \omega_3 + \alpha_3 LnVolRI_{i,t-1} + \beta_3 LnVolMc_{i,t} + \mu_i + \lambda_t + v_{it}$$

Panel 2.2D:

$$LnVolRI_{i,t} = \theta_0 + \theta_1 LnVolRI_{i,t-1} + \theta_2 LnVolDy + \ddot{o}\theta_3 LnVolPe + \theta_4 LnVolMc + \mu_i + \lambda_t + v_{it}$$

where

$LnVolRI_{i,t-1}$ allows for dynamic in the firm-specific volatility process and is included to control for persistence in firm-specific return volatility. Many previous research in finance found that firm-specific stock return volatility

displays considerable persistence (E. C. Chang & S. Dong, 2006; Hwang & S.E. Satchell, 2001; Jiang & B-S. Lee, 2006; Rahman & M.K. Hassan, 2008).

Empirical specifications specified in panel 2.2A-2.2D are estimated by the biased-corrected LSDV (LSDVC) and the two-step system GMM methods.

3. CONCLUSION

This study mainly aims to investigate the significant extent of the variation in firm's equity returns attributable to the variation in firm fundamentals. A number of research studies find the existence of the relationship between the witnessed changes as regards to firm size, structure, and turnover. More precisely stated, firm-specific variation in fundamentals generally constitutes a great part of total return variation in most of the emerging stock markets. This motivates us to empirically study the role of firm-specific variation on the variation in equity returns in the South Africa equity market for the period 1995 to 2011 through a panel data framework-both static and dynamic context. We considered three measures of firm fundamentals namely, dividend yield, price-earnings (P/E) ratio, and market capitalization. Thus, the data used in this analysis comprise total returns index, dividend yield, price-earnings (P/E) ratio and market capitalization for the representative firms in 9 sectors. The selection of representative firms listed in the Johannesburg Stock Exchange market (JSE) and sectors are mainly subject to the availability of data. The FTSE/JSE All Share Total Return Index as well as the sectoral total returns index are also obtained to construct the firm-specific volatility of total returns index. All series are in monthly frequency and were obtained from Thomson Online DataStream 2011.

The conclusion from a two-way error component regression models is that the impacts of firm-specific fundamentals volatility on returns index volatility across different measures and sectors are positive and highly significant. This indicates that an increase in firms' fundamentals contributes to an increase in the firm returns index volatility irrespective of the measure of fundamentals volatility. Also, when all firm fundamentals are incorporated into a model, the volatility of market capitalization represents most considerable impacts on the volatility of firm-specific returns in all sectors under consideration. When the dynamic nature of empirical relationship is taken into account, the biased-corrected LSDV (or LSDVC) together with the two-step system GMM are employed to deal with the unobserved firm-specific effects as well as the endogenity of all regressors. The empirical results from dynamic specifications show that the South African equity market encompasses volatility persistence. In other words, the one-period lagged of volatility of returns contributes to the volatility in the present time. The general

results of volatility persistence are not subjected to which proxies of fundamentals are used. Evidently, the banking sector is found to have the least evidence of volatility persistence, while the financial sector exhibits the most visible evidence.

In line with the hypothesis underlying the relationship between the volatility of returns and volatility of firm fundamentals, we found that the volatility of total returns is highly correlated with, and is significantly explained by firm-specific fundamentals volatility in the majority of sectors in the study although they are not capable of explaining all such volatility. This implies that the more volatile size, P/E and dividend yield leads to the more volatile total returns in the equity market. However, the magnitude of the coefficients on three firm fundamentals volatility tends to vary from one sector to another. In addition, we found that among these three firm fundamentals measures, the volatility of market capitalization significantly explains the variation in returns in all sectors in the South African market implying the presence of strong volatility of size effect. Consequently, the investment strategies could be primarily formulated based on firm size.

Table-1: Linear Panel Data Models

Dividend yield (DY) is a proxy of firms' fundamentals									
Panel A	**Banking**	**FinSvs**	**Retails**	**Industrial**	**Mining**	**Insurance**	**Food Producers**	**Construction &Material**	**Electricity& Electronics**
C	10.0136*** (0.0000)	8.7345*** (0.0000)	10.8112*** (0.0000)	11.3863*** (0.0000)	10.9177*** (0.0000)	9.4641*** (0.0000)	10.09466 (0.0000)	11.0192*** (0.0000)	9.6602*** (0.0000)
LnVolDy	-0.0849*** (0.0001)	0.1527*** (0.0000)	-0.15278*** (0.0000)	0.0366** (0.0287)	0.0211 (0.2383)	0.1352*** (0.0000)	-0.0553** (0.0151)	-0.0539*** (0.0046)	-0.1317*** (0.0000)
Cross-section and Time effects	Random, Random	Random, Fixed	Random, Random	Random, Fixed	Random, Fixed	Random, Fixed	Fixed, Fixed	Random, Fixed	Fixed, Fixed
Price-earnings ratio (P/E) is a proxy of firms' fundamentals									
Panel B	**Banking**	**FinSvs**	**Retails**	**Industrial**	**Mining**	**Insurance**	**Food Producers**	**Construction &Material**	**Electricity& Electronics**
C	9.9779*** (0.0000)	7.1281*** (0.0000)	11.4066*** (0.0000)	11.5097*** (0.0000)	11.4161*** (0.0000)	9.6583*** (0.0000)	9.8999*** (0.0000)	10.6669*** (0.0000)	9.6676*** (0.0000)
LnVolPE	0.081001*** (0.0000)	0.3302*** (0.0000)	-0.2094*** (0.0000)	-0.0647*** (0.0000)	-0.1004*** (0.0000)	-0.0756*** (0.0000)	0.0750*** (0.0095)	0.1328*** (0.0000)	-0.0129 (0.3918)
Cross-section and Time effects	Random, Random	Random, Random	Random, Random	Random, Random	Random, Fixed	Random, Fixed	Random, Fixed	Random, Random	Random, Fixed
Market capitalization (MC) is a proxy of firms' fundamentals									
Panel C	**Banking**	**FinSvs**	**Retails**	**Industrial**	**Mining**	**Insurance**	**Food Producers**	**Construction &Material**	**Electricity& Electronics**
C	7.8889*** (0.0000)	4.9884*** (0.0000)	4.3956*** (0.0000)	10.2181*** (0.0000)	7.2642*** (0.0000)	8.6735*** (0.0000)	7.1062*** (0.0000)	8.5861*** (0.0000)	5.9535*** (0.0000)
LnVolMV	0.1278***	0.3765***	0.4913***	0.0855***	0.2430***	0.0572	0.2238***	0.1835***	0.3599***

	(0.0000)	(0.0000)	(0.0000)	(0.0030)	(0.0000)	(0.1143)	(0.0000)	(0.0000)	(0.0000)
Cross-section and Time effects	Fixed, Fixed	Fixed, Fixed	Random, Random	Random, Random	Fixed, Fixed	Random, Fixed	Random, Fixed	Random, Fixed	Random, Fixed

All of firm fundamentals proxies are included									
Panel D	**Banking**	**FinSvs**	**Retails**	**Industrial**	**Mining**	**Insurance**	**Food Producers**	**Construction &Material**	**Electricity& Electronics**
C	6.5329*** (0.0000)	4.7760*** (0.0000)	4.3674*** (0.0000)	10.5355*** (0.0000)	7.7426*** (0.0000)	7.8087*** (0.0000)	6.7984*** (0.0000)	6.5518*** (0.0000)	6.3045*** (0.0000)
LnVolDY	-0.2547*** (0.0000)	0.0991*** (0.0000)	-0.1243*** (0.0000)	0.0091 (0.6758)	0.0079 (0.6529)	0.1275*** (0.0000)	0.0097 (0.6653)	-0.0907*** (0.0000)	-0.0409** (0.0253)
LnVolPE	0.0597*** (0.0000)	0.2571*** (0.0000)	0.0016 (0.9415)	-0.0624*** (0.0003)	-0.1112*** (0.0000)	-0.0738*** (0.0000)	0.0851*** (0.0034)	0.0899*** (0.0000)	0.0029 (0.8180)
LnVolMV	0.2606*** (0.0000)	0.2756*** (0.0000)	0.4951*** (0.0000)	0.0713** (0.0147)	0.2487*** (0.0000)	0.1481*** (0.0000)	0.2287*** (0.0000)	0.3265*** (0.0000)	0.3256*** (0.0000)
Cross-section and Time effects	Fixed, Fixed	Fixed, Fixed	Fixed, Fixed	Fixed, Fixed	Fixed, Fixed	Random, Fixed	Fixed, Fixed	Random, Random	Random, Random

Table-2: Dynamic Panel Data Models

Price-earnings ratio (P/E) is a proxy of fundamentals									
Dividend yield (DY) is a proxy of fundamentals									
Panel A	**Banking**	**Financial Services**	**Retails**	**Industrial**	**Mining**	**Insurance**	**Food Producers**	**Construction &Materials**	**Electricity & Electronics**
Biased-corrected LSDV estimation									
LnVolRi(-1)	0.6839*** (0.000)	0.9683*** (0.000)	0.9421*** (0.000)	0.9129*** (0.000)	0.9473*** (0.000)	0.9044*** (0.000)	0.9494*** (0.000)	0.8964*** (0.000)	0.9149*** (0.000)
LnVolDy	0.0244* (0.099)	0.0044** (0.041)	0.0151* (0.058)	0.0041 (0.595)	0.0073 (0.213)	-0.0035 (0.658)	-0.0081 (0.241)	0.0236** (0.011)	0.0181** (0.037)
2-step system GMM estimation									
C	0.8503*** (0.0000)	0.0831*** (0.0010)	0.2132*** (0.0000)	0.0729*** (0.0000)	0.0925*** (0.0000)	0.1239*** (0.0017)	0.6204*** (0.0000)	1.2587*** (0.0000)	0.8455*** (0.0000)
LnVolRi(-1)	0.9126*** (0.0000)	0.9919*** (0.0000)	0.9822*** (0.0000)	0.9932*** (0.0000)	0.9919*** (0.0000)	0.9872*** (0.0000)	0.9396*** (0.0000)	0.8872*** (0.0000)	0.9130*** (0.0000)
LnVolDy	0.0204** (0.0414)	0.0092** (0.0229)	0.0045* (0.0518)	0.0043 (0.9618)	0.0034 (0.3442)	-0.0003 (0.9707)	-0.00195 (0.8166)	0.0177* (0.0812)	0.0176 (0.1007)
AR(1)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AR(2)	0.3623	0.4621	0.1293	0.7831	0.1293	0.2974	0.9765	0.2496	0.1132
Panel B	**Banking**	**Financial Services**	**Retails**	**Industrial**	**Mining**	**Insurance**	**Food Producers**	**Construction &Materials**	**Electricity& Electronics**
Biased-corrected LSDV estimation									
LnVolRi(-1)	0.6770*** (0.000)	0.9637*** (0.000)	0.9427*** (0.000)	0.9129*** (0.000)	0.9475*** (0.000)	0.9034*** (0.000)	0.9492*** (0.000)	0.8878*** (0.000)	0.9159*** (0.000)
LnVolPe	0.0285*** (0.000)	0.0194*** (0.000)	0.0078 (0.351)	0.0022 (0.722)	0.0002 (0.967)	-0.0039 (0.430)	-0.0131 (0.101)	0.0321*** (0.000)	0.0035* (0.0536)
2-step system GMM estimation									
C	0.7319***	0.0611**	0.7515***	0.0835**	0.1261***	0.1108***	0.1404***	0.2111***	0.3197***

	(0.0000)	(0.0342)	(0.0000)	(0.0117)	(0.0008)	(0.0050)	(0.0013)	(0.0000)	(0.0000)
LnVolRi(-1)	0.9271*** (0.0000)	0.9922*** (0.0000)	0.9373*** (0.0000)	0.9926** (0.0189)	0.9914*** (0.0000)	0.9869*** (0.0000)	0.9897*** (0.0000)	0.9786*** (0.0000)	0.9667*** (0.0000)
LnVolPE	0.0226*** (0.0012)	0.0038 (0.1923)	0.0190** (0.0434)	0.0018 (0.7528)	0.0056 (0.1908)	-0.0047 (0.2790)	-0.0091 (0.2051)	0.0139** (0.0442)	0.0019 (0.7294)
AR(1)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0011	0.0000
AR(2)	0.1231	0.1435	0.6593	0.3338	0.3940	0.2918	0.2974	0.8112	0.2245

Market capitalization (MC) is a proxy of fundamentals									
Panel C	**Banking**	**Financial Services**	**Retails**	**Industrial**	**Mining**	**Insurance**	**Food Producers**	**Construction &Materials**	**Electricity& Electronics**
Biased-corrected LSDV estimation									
LnVolRi(-1)	0.6641*** (0.000)	0.9654*** (0.000)	0.9281*** (0.000)	0.9080*** (0.000)	0.9379*** (0.000)	0.9033*** (0.000)	0.9385*** (0.000)	0.8533*** (0.000)	0.8746*** (0.000)
LnVolMc	0.1063*** (0.000)	0.0182*** (0.002)	0.0403*** (0.000)	0.0244*** (0.000)	0.0266*** (0.000)	0.0131 (0.203)	0.0281*** (0.000)	0.0603*** (0.000)	0.0589*** (0.000)
2-step system GMM estimation									
C	3.7712*** (0.0000)	0.2010*** (0.0005)	0.4482*** (0.0000)	0.8291*** (0.0000)	0.5248*** (0.0000)	0.1189*** (0.0067)	0.0685 (0.2373)	0.1292** (0.0324)	0.7302*** (0.0000)
LnVolRi(-1)	0.9652*** (0.0000)	0.9684*** (0.0000)	0.9225*** (0.0000)	0.9108*** (0.0000)	0.9405*** (0.0000)	0.9869*** (0.0000)	0.9869*** (0.0000)	0.9764*** (0.0000)	0.8985*** (0.0000)
LnVolMc	0.0250* (0.0904)	0.0086* (0.0858)	0.0312** (0.0103)	0.0134* (0.0927)	0.0085 (0.2101)	0.00057 (0.8118)	0.0056 (0.2051)	0.0107** (0.0244)	0.0246*** (0.0040)
AR(1)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0004	0.0000
AR(2)	0.2673	0.2876	0.8792	0.2211	0.3475	0.2537	0.416	0.7381	0.6628
All of firm fundamentals proxies are included									
Panel D	**Banking**	**Financial Services**	**Retails**	**Industrial**	**Mining**	**Insurance**	**Food Producers**	**Construction &Materials**	**Electricity& Electronics**
Biased-corrected LSDV estimation									
LnVolRi(-1)	0.6424*** (0.000)	0.9617*** (0.000)	0.9268*** (0.000)	0.9079*** (0.000)	0.9374*** (0.000)	0.9003*** (0.000)	0.9383*** (0.000)	0.8455*** (0.000)	0.8738*** (0.000)
LnVolDy	0.1035*** (0.000)	0.0027* (0.062)	0.0154* (0.055)	0.0057 (0.488)	-0.0083 (0.160)	0.0059 (0.464)	0.00012 (0.987)	0.0281*** (0.002)	0.0186** (0.029)
LnVolPe	0.0101 (0.249)	0.0174*** (0.001)	0.0051* (0.055)	-0.0014 (0.828)	-0.0050 (0.303)	-0.0047 (0.357)	-0.0096 (0.244)	0.0250*** (0.001)	0.0079 (0.159)
LnVolMc	0.1408*** (0.000)	0.0139** (0.021)	0.0410*** (0.000)	0.0261*** (0.000)	0.0276*** (0.000)	0.0168** (0.012)	0.0271*** (0.000)	0.0564*** (0.000)	0.0609*** (0.000)
2-step system GMM estimation									
C	1.3742*** (0.0000)	-11.774*** (0.0000)	-24.3268*** (0.0000)	0.6696*** (0.0001)	0.4055*** (0.0000)	0.7749 (0.0000)	0.0402 (0.4845)	0.9234*** (0.0000)	0.61441*** (0.0000)
LnVolRi(-1)	0.6256*** (0.0000)	0.3345** (0.0327)	0.5149*** (0.0000)	0.9111*** (0.0000)	0.9358*** (0.0000)	0.9008 (0.0000)	0.9844*** (0.0000)	0.8455*** (0.0000)	0.8738*** (0.0000)
LnVolDy	0.1295***	0.8319***	0.8323***	0.0099	-0.0013	0.0102	-0.0009	0.0281***	0.0178*

	(0.0000)	(0.0000)	(0.0000)	(0.2514)	(0.8307)	(0.2384)	(0.8910)	(0.0022)	(0.0711)
LnVolPe	0.0119	0.0627*	0.0941**	-0.0009	0.0084*	-0.0034	-0.0047	0.0250***	0.0073
	(0.1840)	(0.0668)	(0.0214)	(0.8828)	(0.0966)	(0.5411)	(0.4728)	(0.0005)	(0.2204)
LnVolMc	0.1445***	1.7943***	2.1710***	0.0249**	0.0227***	0.0138**	0.0107**	0.0564***	0.0577***
	(0.0000)	(0.0000)	(0.0000)	(0.0120)	(0.0000)	(0.0273)	(0.0105)	(0.0000)	(0.0000)
AR(1)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0243	0.0127	0.0000
AR(2)	0.2311	0.3871	0.5238	0.4879	0.3212	0.4140	0.8650	0.1298	0.9798

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