

Firm-specific Variations in Returns and Fundamentals in Emerging Asian Stock Markets*

M. Arifur Rahman
School of Economics and Finance
University of Western Sydney
Locked Bag 1797, Penrith South DC
NSW 1797, Australia
Email: marahman@ru.ac.bd

M. Kabir Hassan, Ph.D.
Department of Economics and Finance
University of New Orleans
New Orleans, LA 70148, USA
Phone: 504-280-6163
Email: mhassan@uno.edu

January 2008

* We would like to thank Dr. Craig Ellis and Dr. Girijasankar Mallik of University of Western Sydney and Ludwig F. M. Reinhard and other session participants at the International Colloquium on Business & Management (ICBM), Bangkok, 2007 for their useful comments on an earlier drafts of the paper. The usual disclaimer applies.

Firm-specific Variations in Returns and Fundamentals in Emerging Asian Stock Markets

Abstract

This paper makes the first attempt to understand the direct relationship between firm-specific variations in returns and firm fundamentals by analyzing firm-level micro panel data in the context of each of a set of emerging Asian stock markets. After properly accounting for unobserved firm-specific effects, volatility persistence and potential endogeneity bias, we find 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. Further analysis reveals that the observed effect of firm-specific fundamentals variation on returns variation is not indirectly driven by some other factors known to affect stock return volatility, *viz.*, firm size, stock turnover, and leverage. Consistent with the rational approach, these results suggest that stock prices in majority of the Asian emerging markets are not devoid of fundamentals.

LEL classification: G14, G20, G30

Keywords: Emerging Stock Markets, Firm-specific variation in returns,
Firm-specific variation in fundamentals

Firm-specific Variations in Returns and Fundamentals in Emerging Asian Stock Markets

1 Introduction

Emerging stock markets have always attracted special attention from both academics and practitioners. Equities in these markets have been found to possess very different characteristics compared to those of the developed stock markets such as higher sample average returns, lower correlation with developed market returns, higher serial correlation in returns, and higher volatility (see for example, Harvey, 1995; Bekaert and Harvey, 1997). Recently, Morck, Yeung and Yu (2000) have uncovered another characteristic difference between the cross-sections of developed and emerging economies in terms of firm-specific stock return variation. They find that firm-specific variation generally constitutes a greater part of total return variation in most of the developed countries and a lower part of total return variation in most of the emerging stock markets. Based on stock returns data through the first 26 weeks of 1995, they show that over 80% of stocks often move in the same direction in a given week in emerging markets like Poland and China. On the other hand, in developed markets like the US, Denmark and Ireland, they do not find any instance in which more than 57% of the stocks move the same direction during any week. Their subsequent analysis cannot adequately account for the cross-sectional differences in firm-specific variation with variables like country size, market size, macroeconomic stability, economic structure, or firm-specific variation in fundamentals (return on asset). Rather, the cross-country institutional development measures such as good governance and stronger private property rights are found to be strongly associated with higher firm-specific stock return variation. Morck, Yeung and Yu offer several

potential explanations for their results – for example, intercorporate income and wealth transfers (which Johnson, La Porta, Lopez-de-Silanes and Shleifer (2000) dub *tunneling*) by many group affiliated or family owned firms in emerging markets might harmonize stock returns; economies with sound institutions are more capable of protecting investors' property rights; better institutions might render firm-specific risk-arbitrage more attractive; or simply noise trader risk might be greater in countries with poor institutions. Regardless of the underlying mechanism, the bottom line of their suggestions is that the low firm-specific variation in emerging economies might be a sign of a murky stock market where stock prices contain little firm-specific information.

In addition to its cross-sectional dimension across countries however, the extent to which stock prices move in an idiosyncratic manner also has a country-specific time-series dimension. To our knowledge, Li, Morck, Yang and Yeung (2004) is the only study so far that sheds some light on the time series behavior of firm-specific returns variation for a cross-section of emerging markets. The authors show that, over the period from 1990 to 2001, idiosyncratic variation of stock returns in the majority of the emerging economies exhibits a rising pattern which is at least weakly similar to the one documented by Campbell, Lettau, Malkiel and Xu (2001) for the US.¹ They argue that increasing economic openness, especially to capital flows, and associated market reforms over the said period are the most likely factors contributing this phenomenon. They note that capital market openness and institutional reform measures are expected to discourage intercorporate *tunneling*, encourage investment in new and innovative firms, create pressure on regulators to

¹ Campbell, Lettau, Malkiel and Xu (2001) show that the firm-level (idiosyncratic) volatility in the US has increased noticeably relative to aggregate market volatility over the period from 1962 to 1997.

adopt international best practices in disclosure, governance, and regulation, and induce demand for information professionals like accountants and security analysts. All these changes, in turn, may help magnify the firm-specific differences in stock returns. Consistent with the argument, their regression analysis shows that higher firm-specific variation is significantly correlated with greater openness in capital markets, and this correlation is higher for countries with sound institutions characterized by strong property and investor rights, and good governance. They tentatively propose that increasing firm-specific variation might be regarded as a gauge of the extent of real institutional reform (p. 667).

Despite these apparently encouraging outcomes, whether the increased firm-specific stock return variation in the wake of institutional reforms in emerging markets reflects more informed stock prices remains an empirical question. This may be because a section of studies on volatility suggests that phenomena like limits to arbitrage, pricing errors, and noise are likely to show up in stock return volatility as well. According to Roll (1988), individual stocks in the US exhibit generally low R^2 statistics, and thus high firm-specific return variations. Failing to justify low R^2 s by identifiable firm-specific news releases, Roll suggests either that the financial press misses a great deal of relevant information that is generated privately or that stock price fluctuations are purely due to noise trading. Therefore, if his former view is correct, then firm-specific variation reflects trading by rational risk arbitrageurs on the basis of private firm-specific information with valuation implications. Conversely, if his latter view is correct, then such variation would indicate that stock prices are going astray from the fundamental value, which is symptomatic of market inefficiencies. So long as a substantial body of literature on “excess stock volatility”

(pioneered by Shiller, 1981; LeRoy and Porter, 1981) and behavioral finance (see for example, Hirshleifer, 2001) is concerned, Roll's alternative interpretation about firm-specific returns volatility cannot be undermined.

Research in this paper contributes to the literature on the information content of changes in emerging market stock prices by exploring the link between firm-specific volatility of returns and fundamentals in the context of a set of emerging Asian stock markets – India, Indonesia, Malaysia, Korea, Thailand, Taiwan, Philippines, Pakistan, and China. More specifically, from the perspective of the rational approach that equates stock prices to the present value of expected future cash flows, we examine whether firm-specific variation in stock returns in each of the sample markets is associated with firm-specific variation in cash-flows. Emerging economies of Asia, like many others across the globe, have been engaged in an intense process of financial liberalization and capital market reforms since the late 1980s and early 1990s. A key purpose of these reform initiatives is to achieve a functionally efficient stock market, which Tobin (1984) defines as the one in which stock prices direct capital to its most productive uses. To achieve a functionally efficient stock market, it is a necessary condition that stock prices track firm fundamentals closely (Durnev, Morck, Yeung and Zarowin, 2003).

Although the general focus of study in this paper is a set of emerging stock markets, our analytical approach is microeconomic in the sense that we study the firm-level relationship between variations in stock returns and fundamentals in the context of each of the markets separately. By emphasizing individual market experiences, a microeconomic approach is expected to yield more concrete and robust

evidence on the informativeness of stock prices than a cross-market macroeconomic study that would necessarily assume stock prices are equally informative across markets. Indeed, Asia houses a diverse, and hence a representative, set of emerging market economies. It includes not only the ‘tigers’ like South Korea, Malaysia and Taiwan, but also very fast-growing late comers like China and India. Not unexpectedly therefore, there is considerable heterogeneity among the stock markets in these economies in terms of sizes, trading activities, timing and intensity of liberalization and reform initiatives, and regulatory regimes. Table 1 highlights some of the potentially important differences among the markets in the region and their institutional environments.

The remainder of the paper is arranged as follows. Section 2 reviews related literature on the information content of firm-specific volatility of stock returns and provides a background to the study. Section 3 of the paper describes the framework we use to analyze the potential relationship between firm-specific volatility of returns and fundamentals. Section 4 describes data and sample, and presents details about estimation of firm-specific volatility of stock returns and fundamentals. Section 5 details the empirical specifications and their estimation methods. Section 6 presents the main results of the estimations. In Section 7, we test whether our main results are driven by the omission of some other firm characteristics that could potentially affect firm-specific returns variation. Section 8 summarizes and concludes the study presented in the paper.

Table 1 General characteristics of emerging Asian stock markets

Asian Emerging Stock Markets	Market Capitalization (USD mil.)	Weight of 10 most Capitalized Firms	Market Capital to GDP Ratio	Official Liberalization Dates	Stock Market Openness (0 to 1)	Insider Trading Law (Exist/Enforce)	Short Selling	Zero Returns	LOT	Anti-Self-Dealing Index (0 to 1)	Good Governance Index (0 to 30)	Business Competitiveness Ranking 2005	Government Effectiveness Index (-2.5 to 2.5)
India	553073.7	34.00%	69%	Nov-1992	0.199	1992/1998	n.a	23.53%	5.34%	0.58	18.44	31	-0.135
Indonesia	81428.1	53.20%	28%	Sep-1989	0.632	1991/1996	No	47.58%	10.15%	0.65	15.40	59	-0.415
Malaysia	180517.5	36.80%	139%	Dec-1988	0.742	1973/1996	Yes	20.69%	3.35%	0.95	22.76	23	0.849
Pakistan	45770.4	21.27%	41%	Feb-1991	0.613	1995/None	No	35.85%	7.10%	0.41	13.47	67	-0.548
Philippines	39817.8	60.80%	41%	Jun-1991	0.474	1982/None	No	43.08%	8.81%	0.22	12.94	66	0.001
Korea	718010.7	40.20%	91%	Jan-1992	0.353	1976/1988	No	11.67%	3.08%	0.47	22.20	24	0.798
Taiwan	476018.0	34.90%	140%	Jan-1991	0.231	1988/1989	No	9.68%	2.11%	0.56	25.13	15	1.224
Thailand	123885.0	47.10%	70%	Sep-1987	0.366	1984/1993	Yes	29.03%	5.19%	0.81	20.17	35	0.304
China	286190.3	32.60%	35%	n.a.	0.149	1993/None	No	4.69%	1.54%	0.76	n.a.	54	0.090

Notes:

- a) "Market Capitalization" and "Weight of 10 most Capitalized Firms" are as of the end of 2005. Source: World Federation of Exchanges (2005).
- b) "Market Capitalization to GDP Ratio" is as of the end of 2005. Source: World Bank (2006).
- c) "Official Liberalization Dates" of stock markets are from Bekaert and Harvey (2000).
- d) "Stock Market Openness" measure is based on Edison and Warnock (2003) and reflects the proportion of the domestic stock market capitalization available for investment to the foreign investors. This measure is closer to 1 if a market is more open, and closer to 0 if it is more closed.
- e) "Insider Trading Law" refers to the years in which insider trading law was enacted (Exist) and enforced (Enforce). The source is Table 1 of Bhattacharya and Daouk (2002).
- f) "Short Selling" identifies whether short-selling is permitted and practiced in the stock market as documented by Bris, Goetzmann and Zhu (2007).
- g) "Zero Returns" is the median number of zero returns over one quarter period for equities in the market scaled by the total number of market trading days. "LOT" is the median Lesmond–Ogden–Trzcinka estimate of how far the local market index must move to motivate firm-specific stock trading, which is a proxy for illiquidity of equities in the market. These measures are calculated (for different markets using data mostly over the 1990s) and reported in Table 1 of Lesmond (2005).
- h) "Anti-Self-Dealing Index" is a measure of legal protection of minority shareholders against expropriation by corporate insiders. Source: Table III of Djankov, La Porta, Lopez de Silanes and Shleifer (2006).
- i) "Good Governance Index" is constructed by following Morck, Yeung and Yu (2000) and is the sum of three indexes from La Porta, Lopez de Silanes, Shleifer and Vishny (1998), each ranging from 0 to 10. These indexes measure (1) government corruption, (2) the risk of appropriation of private property, and (3) the risk of repudiation of contracts by the government. The averages of monthly indexes for April and October for 1982 and 1995 are reported. Low values of the good governance index indicate poorer governance.
- j) "Business Competitiveness Ranking" is based on an assessment of the competitive business conditions of economies as determined by the level of productivity achievable at the firm-level. The 2005 ranking is reported, which is based on a set of 113 countries. Source: World Economic Forum (2005).
- k) "Government Effectiveness Index" is the measure of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. The main focus of this index is on basic inputs required for the government to be able to produce and implement good policies and deliver public goods. This index ranges from -2.5 to 2.5 where higher values equal higher government effectiveness. The average of the indexes from 1996 through 2005 is reported. Source: Kaufmann, Kraay and Mastruzzi (2006).

2 Related Literature and Background of the Study

Lately, a number of empirical studies relate firm-specific variation of stock returns to other variables that, on the surface at least, are plausible proxies for the information content of stock prices.² Some studies relate firm-specific variation in stock returns to the information environment of the stock market. We have already reviewed the studies by Morck, Yeung and Yu (2000) and Li, Morck, Yang and Yeung (2004) in the previous section of the paper that tread this line of research. In addition, Fernandes and Ferreira (2007) use firm-specific returns variation as the measure of stock price informativeness and find that enforcement of insider trading laws is associated with improvement in price informativeness in developed market countries, which are usually equipped with strong legal institutions. In the case of the emerging market countries, they find that price informativeness changes insignificantly (or even negatively) after the enforcement. They also note that the enforcement of insider trading laws *per se* does not achieve the goal of improving the information environment in emerging economies with poor legal institutions; rather it deters the contribution of insiders in impounding information into stock prices. Chan and Hameed (2006) find that, contrary to the conventional wisdom that security analysts specialize in the production of firm-specific information, emerging market securities which are covered by more analysts show lower firm-specific variation and therefore incorporate lesser firm-specific information. They speculate that weak property rights in these markets may discourage production of, and arbitrage on, firm-specific information, and consequently the information that security analysts collect may have more macroeconomic content than firm-specific details. Jin and Myers (2006) demonstrate that cross-country differences in the levels of firm-specific returns

² A summary of major empirical papers relating firm-specific stock returns variation to the information content of stock prices is provided in the Appendix to this paper.

variation can be explained by minimal shareholder protection and different measures of corporate opaqueness. They define opaqueness as the lack of information that would enable investors to observe operating cash-flow and income and determine the firm value. Other studies in this area have found that greater firm-specific variation is evident in countries with tougher protection against insider trading (Beny, 2000), more developed financial analysis industries and a freer press (Bushman, Piotroski and Smith, 2004), and fewer restrictions on short selling (Bris, Goetzmann and Zhu, 2007). In addition, this line of research in the context of the US market also suggests that higher firm-specific variation in returns is related to more stringent disclosure requirements (Fox, Morck, Yeung and Durnev, 2003) and a better quality of financial reporting (Rajgopal and Venkatachalam, 2007).

A few studies have recently explored the direct link between firm-specific variation in returns and profitability. In a firm-level study, Durnev, Morck, Yeung and Zarowin (2003) find that US firms with higher firm-specific returns variation observe higher association between current returns and future earnings. They regard this as evidence that firm-specific variation in US stock returns most likely reflects the capitalization of firm-specific information about fundamentals into stock prices, which essentially implies an efficient stock market rather than a noisy one. Chang and Dong (2006) also report that there is a strong cross-sectional relationship between firm-specific variation (idiosyncratic volatility) and earnings dispersion of Japanese firms. Recent research has also focused on the time-series relationship between variations in firm-specific returns and fundamentals. Wei and Zhang (2006) find a strong negative correlation between earnings (return on equity) and idiosyncratic volatility, as well as a strong positive correlation between earnings volatility and

idiosyncratic volatility. They suggest that “changes in fundamentals variables” are behind the upward trend in idiosyncratic stock market volatility in the US over the period from 1976 to 2000. Later, Irvine and Pontiff (2007) propose theoretically sounder alternative proxies of cash-flow volatility based on the simple present value framework. They demonstrate that, consistent with an efficient market, idiosyncratic stock market volatility in the US over the period from 1964 to 2003 shares a low frequency common trend with alternative measures of market wide idiosyncratic cash-flow volatility.

Some other work links increased firm-specific variation of stock returns to better capital allocation and aggregate productivity. Using firm-specific return variation as a proxy of stock price informativeness and the deviation in Tobin’s marginal q from its optimum level as the measure of investment efficiency, Durnev, Morck and Yeung (2004) show that US industries in which stock prices are more informative exhibit fewer signs of both overinvestment and underinvestment. They consider this finding as suggestive that more firm-specific variation in US stock prices facilitates more efficient corporate investment. Wurgler (2000) finds that there is higher elasticity of capital expenditure with respect to value added in countries where stock returns move more in an idiosyncratic manner. That is, more capital resources flow to activities with higher payoff prospects in countries where firm-specific variation is higher. More recently, Durnev, Li, Morck and Yeung (2004) using cross-country data over the period 1990 to 2002, find that higher real per capita GDP growth or total factor productivity growth is significantly associated with greater market-level stock return asynchronicity. Lacking sufficient data on only transition economies, they try to infer the nature of the relationship in transition economies

using a group of low-income countries including those in transition and find that their earlier results persist in the low-income country sample as well.

Clearly, most of the studies exploring the information content of firm-specific returns variation focuses either on well developed stock markets like that of US and Japan, or on a group of markets across developed and emerging economies. Especially in relation to the US market, much of the evidence cited above also undermines Roll's (1988) alternative view that higher firm-specific variation of stock returns reflects noisier stock prices. But on the other hand, however little evidence we have so far in relation to emerging stock markets is based only on cross-country studies, and more importantly, the findings of different studies seem difficult to reconcile. While Li, Morck, Yang and Yeung (2004) and Durnev, Li, Morck and Yeung (2004) suggest a positive association between firm-specific returns variation and plausible proxies for the information content of stock prices in emerging markets, Fernandes and Ferreira (2007) and Chan and Hameed (2006) suggest either no association, or a negative association. Possibly being constrained by the limited availability of accounting data, none of these studies relates firm-specific returns variation in emerging markets with the most obvious information content of stock prices – the rational assessment of expected cash-flows or firm fundamentals. We attempt to contribute to this apparent gap in the emerging market research. In this study, we try to overcome the insufficiency of the spans of time series data and consequent loss of testing power on account of insufficient degrees of freedom by using firm-level micro panel data from individual markets.

3 The Framework of Analysis

The link between firm-specific stock return variation and stock fundamentals can be studied in the context of simple present value framework. In a rational market, a change in stock price of a firm signals a change in one or both of the following fundamentals: (1) the expected future cash flows, and (2) the risk-adjusted discount rate (*i.e.*, the firm's cost of capital). This formulation suggests that firm-specific stock return variation should be the outcome of shocks to expected future cash flow stream and/or shocks to discount rate. However, from a purely theoretical point of view, it is questionable whether discount rate shocks can cause variation in firm-specific returns. Irvine and Pontiff (2007) note that discount rate shocks are supposed to be determined by the true asset pricing model and that modern risk-based asset pricing theories maintain that idiosyncratic risk is not priced, and therefore the source of firm-specific return variation is not a factor risk. In addition, empirical evidence supporting the discount rate explanation is also weaker. Vuolteenaho (2002) has demonstrated that, unlike the case with aggregate market return variation, only a third of the variation of individual stock returns is attributable to discount rate shocks and that cash flow shocks are less correlated across firms than discount rate shocks. Campbell and Vuolteenaho (2004) decompose CAPM beta into cash flow beta and discount rate beta and find that small or value stocks have considerably higher cash flow betas than large or growth stocks. Their two-beta model suggests that the most important determinant of the cost of capital is not the discount rate beta, but its cash flow beta. These findings imply that the cash flow information is largely firm-specific and firm-specific returns are mainly driven by cash-flow news.

Since the rational approach emphasizes the direct link between cash flow shock and stock return volatility, following Irvine and Pontiff (2007), we first outline the relationship between these two variables using a simple model of stock returns. Assuming rational expectations the generalized present value relation is given by

$$P_0 = \sum_{t=1}^{\infty} \frac{E_0(CF_t)}{(1+k)^t} \quad (1)$$

where, P_0 is the current stock price, CF_t is the cash flow at time t , k is the risk-adjusted discount rate, and $E_0(\cdot)$ is the expectations operator as of time 0.

Assume that cash flows follow a random walk, therefore,

$$E_0(CF_t) = CF_0, \quad \forall t \geq 0. \quad (2)$$

Now, equations (1) and (2) imply,

$$P_0 = \frac{CF_0}{k} \quad (3.a)$$

and similarly,

$$\tilde{P}_1 = \frac{CF_1}{k} = \frac{CF_0 + \tilde{\epsilon}_1}{k} \quad (3.b)$$

where, $\tilde{\epsilon}_1$ is the random unexpected cash flow shock at time 1.

The stock return at time 1 is therefore a random variable given by

$$\tilde{r}_1 = \frac{\tilde{P}_1 - P_0}{P_0} = \frac{\tilde{e}_1}{kP_0}, \quad (4)$$

and variance of stock return is given by

$$\sigma^2(\tilde{r}_1) = \frac{\sigma^2(\tilde{e}_1)}{k^2 P_0^2}. \quad (5)$$

In this framework, k and P_0 being predetermined at time 0, the variance of stock return process is directly caused by the variance of unexpected cash flows. This exposition underscores the point that while relating the variability of cash flow shocks to the variability of stock returns it is important that we scale cash flow shock by the product of current price and the discount rate.

Some of the recent studies cited in the previous sections, for example Morck, Yeung and Yu (2000), Chang and Dong (2006) and Wei and Zhang (2006), relate idiosyncratic volatility of stock returns to the volatility of the level of earnings divided by the book value of assets or shareholders' equity. However, as Irvine and Pontiff (2007) note, such comparison does not directly address the source of cash flow volatility, because return volatility is a function of the unexpected shocks to the cash flow stream and not the cash flow stream itself. Further, scaling by the book value of assets or equity instead of stock price adds noise to the estimated variance of fundamentals, the impact or bias on account of which is not clear.

4 Description of Data and Sample, and Estimation of Volatility

4.1 Data and sample

We analyze unbalanced panels of yearly data covering the period 1991–2005 from nine Asian emerging stock markets – Korea, Malaysia, Indonesia, Thailand, Taiwan, Philippines, India, Pakistan, and China. The empirical investigation presented depends on constructing variables from firm-level data on financial statement items as well as stock returns. We retrieve national currency denominated yearly accounting data for only non-financial firms listed on the major stock exchanges of the sample markets from Worldscope, which is accessible through Datastream[®]. Although a few countries (such as Malaysia, Indonesia and Thailand) in the sample opened up their capital markets even before the 1990s³, due to either outright unavailability or sheer scarcity of accounting data from Worldscope, we can only go back as far as the early 1990s in choosing the start of sample periods for markets under consideration. While our market-specific sample periods often start in different years depending on the availability of data on a reasonable number of firms per market, they extend up to 2005 in all cases. Specifically, our sampling starts in 1991 for Indonesia, Malaysia, Thailand, Taiwan, Philippines and Korea, in 1992 for India and Pakistan, and in 1996 for China. In order to estimate firm-specific variation in stock fundamentals discussed in Section 4.2, we require at least eight years of consecutive financial statement data up to 2005 be available for each firm to be included in the market-specific panel of firms. However, since Worldscope accounting data for most of the Chinese firms are available only since 1999, we require at least seven years of consecutive financial

³ Please refer to Table 1 for market-specific liberalization dates.

statement data for Chinese firms to obtain a reasonable sample.⁴ In some instances, a few firms in different markets have been found to have changed their fiscal years at least once over the sample period. We have dropped them from respective samples in order to simplify fundamentals volatility estimation. We summarize sample periods and sample sizes for the markets under study in Table 2.

In our analysis involving firm-specific variation in stock fundamentals, we focus on three separate cash flow measures for each firm in each sample market: (i) sales per share (data item number 1505), (ii) earnings per share (data item number 254), and (iii) cash earnings per share, which is earnings per share adjusted for non-cash items like depreciation and amortization, (data item number 792). We expect that these three measures together should sufficiently reflect any fundamental cash flow shocks affecting firms in different markets.⁵

⁴ As is discussed in Section 4.2, we lose the first annual observation for each firm in estimating firm-specific variation in fundamentals and therefore use at least seven years (six years for China) of accounting data in estimation. While we acknowledge that using more years of data arguably adds to the precision of estimates, given the scarcity of accounting data for emerging market firms, it worsens the problem of obtaining data for a statistically meaningful number of firms for each market-specific sample. Due to similar reasons, Morck, Yeung and Yu (2000) and Durnev, Morck and Yeung (2004) use, respectively, at least five and six years of accounting data in estimating their firm-specific fundamentals variation.

⁵ A common concern with accounting internationally, especially in environments where regulation is relatively weak, is a tendency for managers to smooth earnings by adopting various operating strategies and accounting policies (Leuz, Nanda and Wysocki, 2003). Even if we cannot reject this possibility *a priori* in relation to our earnings data, cash earnings and sales are unlikely to be affected by this practice.

Table 2 Summary of market-specific samples

Country	Major Stock Exchange	Sample Period	Sample Firms	Sample Observations
China	Shanghai Stock Exchange	1996–2005	296	1915
India	Bombay Stock Exchange	1992–2005	165	1748
Indonesia	Jakarta Stock Exchange	1991–2005	120	1387
Korea	Korea Stock Exchange	1991–2005	248	2315
Malaysia	Kuala Lumpur Stock Exchange	1991–2005	127	1354
Pakistan	Karachi Stock Exchange	1992–2005	44	465
Philippines	Philippines Stock Exchange	1991–2005	66	717
Taiwan	Taiwan Stock Exchange	1991–2005	160	1688
Thailand	Stock Exchange of Thailand	1991–2005	146	1710

We use weekly excess returns (Wednesday to Wednesday) to construct an annual measure of firm-specific returns volatility. This choice is driven by the competing needs for relatively higher frequency data to obtain a better estimate of annual firm-specific returns volatility and, at the same time, avoiding the microstructure noise (on account of, for example, non-synchronous trading, bid-ask bounces, price discreteness and stale prices) which is very likely to be present in daily emerging market stock returns data. We collect weekly total return indices of individual stocks and proxy risk-free interest rates from Datastream[®]. The risk-free rate proxies for different markets are as follows: 91-day T-bill Rate for India, Interbank Call Rate for Indonesia, 91-day Negotiable Certificate of Deposit Rate for Korea, 3-month Interbank Rate for Malaysia, Karachi Interbank Offered Rate for Pakistan, 91-day T-bill Rate for the Philippines, Interbank Swap Overnight Rate for Taiwan, Interbank Overnight Rate for Thailand.⁶ We do not find any suitable proxy

⁶ Risk-free rates used for India and Malaysia are not available for a brief period towards the beginning of respective sample periods. Over such periods, we use comparable money market rates available from Datastream[®] as substitutes.

for risk-free rate for China over the study period and consequently estimate firm-specific return variation based on total returns.

In addition to yearly accounting data, weekly returns and risk-free rates, our overall analysis also requires data on market capitalization of individual stocks at weekly and annual frequencies and annual trading volume of individual stocks. As before, we source these additional data requirements from Datastream[®].

4.2 Estimating firm-specific fundamentals volatility

Firm-level accounting data may often be infested with outliers. While using data from Datastream[®], Morck, Yeung and Yu (2000) also report similar irregularities with respect to earnings numbers. We are concerned that the effect of such potentially misleading accounting numbers on our results can be substantial particularly when constructing firm-specific fundamentals volatility based on a relatively fewer observations. To mitigate this concern, we winsorize our accounting variables, *viz.*, sales per share, earnings per share, and cash earnings per share. As the first step of the process, we transform each of the accounting variables by dividing their values by corresponding year-end stock prices. Then, if original value of the variable under consideration is greater (less) than the top 5th (bottom 95th) percentile, we replace it by a value equal to the value of the observation at the top 5th (bottom 95th) percentile. Finally, we re-transform the variable by multiplying by year-end stock prices.

Also, there is a vast literature in accounting suggesting that the levels of earnings and cash flows exhibit strong persistence and seasonality (see for example, Brown (1993) and references therein). Although the latter problem is not a big

concern in the case of annual data, we need to control for documented persistence in cash flow measures. The persistence in cash flow measures prevents us from interpreting the levels of these variables as incremental information. Therefore, as in Irvine and Pontiff (2007), we use the first-differences of our cash flow variables as the correct measure of shocks in each series. In addition, to be consistent with the framework presented in Section 3, we divide firm-level cash flow shock of year t by the year-end stock price of year $t-1$. Ideally, we should also scale yearly cash flow shocks by the discount rate. However, since this requires estimation of firm-level discount rates, scaling by discount rates may render our measure of cash flow shocks noisy.

In the step next to computing firm-level cash flow shocks, we create an index of market-level cash flow shocks, which is simply a market capitalization weighted average of cash flow shocks across firms. Denoting the market cash flow shock index in year t as $e_{m,t}$ and the cash flow shock of firm i in year t as $e_{i,t}$, we then construct a time series of firm-specific variation in fundamentals based on the residuals from the following market-model type regression

$$e_{i,t} = a + b.e_{m,t} + u_{i,t}. \quad (6)$$

Specifically, as suggested by Schwert and Seguin (1990), we estimate firm-specific fundamentals volatility as

$$CFIV_{i,t} = |\hat{u}_{i,t}| \sqrt{\pi/2} \quad (7)$$

where $\hat{u}_{i,t}$ is the estimated residual from equation (6).⁷ This definition of volatility is based on the result that $E(|x|) = \sigma\sqrt{2/\pi}$ if $x \rightarrow N(0, \sigma^2)$.

It should be noted that the implementation of the above mentioned procedure of estimating firm-specific fundamentals volatility may become quite problematic when fiscal years of firms vary *widely* in a market. Because of this, different subsets of firms in a market report their financial statements in different months over the calendar year. Fortunately however, the fiscal years of the *majority* of our sample firms end in a particular month in every market other than Malaysia. Fiscal year ends for majority of sample firms in different markets are as follows: China – 31 December for 100% of firms; Indonesia – 31 December for 100% of firms; Taiwan – 31 December for about 99% of firms; Korea – 31 December for about 95% of firms; Thailand – 31 December for about 95% of firms; Philippines – 31 December for about 89% of firms; India – 31 March for about 88% of firms; Pakistan – 30 June for about 70% of firms; and Malaysia – 31 December for about 50% of firms.

We address the issue of misalignment of accounting data across firms by following an approach suggested by Chang and Dong (2006). Specifically, we assign an accounting observation of firm i in its fiscal year p to the group of observations of fiscal year q (*i.e.*, the cross-section of fiscal year q) if the fiscal year p of firm i has a overlap of more than six months into the fiscal year q . As part of an early exercise, when we focus only on the majority of firms in each market having the same fiscal year, we get qualitatively the same results for all markets except Malaysia. The

⁷ Recently, Chang and Dong (2006) and Irvine and Pontiff (2007) have also used analogous measure of idiosyncratic fundamentals volatility in their analyses.

apparent failure of the alignment procedure for Malaysia is understandable considering the fact that only about 50% of firms having a year-end on 31 December are making up the majority in the Malaysian sample.⁸ Consequently, we decide to work with only a restricted Malaysian sample of firms with the same fiscal year for our subsequent analysis.

4.3 Estimating firm-specific volatility of returns

In constructing our measure of firm-specific returns volatility, we use the Capital Asset Pricing Model (CAPM) to control for systematic risk of individual stock returns. Since we intend to relate firm-specific volatility of stock returns to firm-specific fundamentals volatility, we estimate the former for each firm in a way that makes it synchronous with corresponding financial statement data. Hence, we run the following regression for each firm over each of its fiscal years using weekly excess returns

$$r_{i,j} = \alpha + \beta \cdot r_{m,j} + \varepsilon_{i,j} \quad (8)$$

where $r_{i,j}$ and $r_{m,j}$ are excess returns of firm i and the market in week j , and $\varepsilon_{i,j}$ is firm-specific excess stock returns of firm i in week j .

Then we obtain an annual measure of firm-specific returns volatility for firm i during fiscal year t , $IV_{i,t}$, as follows

⁸ Unlike any other market in our sample, the end of every month over the calendar year is the end of the fiscal year for at least a few firms listed on the Kuala Lumpur Stock Exchange.

$$IV_{i,t} = \sum_{j=1}^J \varepsilon_{i,j}^2 \quad (9)$$

where J is the number of weekly observations in a particular fiscal year t .

5 Model Specification and Estimation

We consider the following dynamic specification to estimate the effect of firm-specific fundamentals volatility on firm-specific returns volatility:

$$\ln IV_{i,t} = \alpha_1 \ln IV_{i,t-1} + \alpha_2 \ln CFIV_{i,t} + \delta_t + \eta_i + \varepsilon_{i,t} \quad (10)$$

where i is a firm, t is a fiscal year, δ_t is a set of time-specific effects, η_i is the full set of firm-specific effects which is time invariant within firms, and $\varepsilon_{i,t}$ is the random disturbance term. The coefficient of interest is α_2 , which reflects whether firm-specific volatility of cash flow ($\ln CFIV$) has any effect on firm-specific volatility of stock returns ($\ln IV$).

Since listed firms in stock markets are usually heterogenous in terms of their industry belongings, business-group affiliations, management skills and corporate culture, we consider that the inclusion of firm-specific effects in the regression model is essential to reduce the extent of omitted variable bias. We also include time dummies, δ_t , in our specification in order to remove possible common time-related shocks (*e.g.*, the Asian crisis of 1997) which may cause errors across firms in a market to become correlated. Absence of such cross-firm contemporaneous correlation is one of the most critical assumptions of the estimation procedure we

follow. The lagged dependent variable, $\ln IV_{i,t-1}$, in equation (10) controls for persistence in firm-specific returns volatility. Previous research has shown that firm-specific stock return volatility displays considerable persistence (see for example, Jiang and Lee, 2006; Chang and Dong, 2006; Hwang and Satchell, 2001). Even though the coefficient on $\ln IV_{i,t-1}$, α_1 , is not of direct interest for the purpose of our study, allowing for dynamics in the firm-specific volatility process ensures consistent estimates of other parameters (Bond, 2002).

Given the panel structure of our data, the proposed specification of equation (10) poses two basic problems for estimation. The first is the presence of unobserved firm-specific effects. With dynamic models, cross-sectional estimators, such as ordinary least squares (OLS), lose the desirable properties of unbiasedness and consistency because at least one of the explanatory variables will be correlated with the disturbance term unless firm-specific effects are adequately accounted for (see for example, Wawro, 2002).⁹ Even the common methods to deal with firm-specific effects (such as least squares dummy variables, fixed effects, or difference estimators) produce biased and inconsistent estimates given the dynamic nature of the regression (see Nickel, 1981; Judson and Owen, 1999). Secondly, $\ln CFIV$ may be endogenous in the sense that it is not unlikely to be associated with firm-specific characteristics. Alternatively, there may exist a common cause for firm-specific returns and

⁹ Chang and Dong (2006) use the Fama-MacBeth procedure (Fama and MacBeth, 1973) to estimate a dynamic specification (similar to equation 10) of the relationship between Japanese firm-specific volatility and fundamentals (return on equity) volatility. While their procedure duly addresses the time-specific effects, it fails to recognize the unobserved firm-specific effects, and therefore is unlikely to provide unbiased and consistent estimates in the dynamic context. Petersen (2007) provides a nice exposition of relative strengths and weaknesses of alternative approaches, including the Fama-MacBeth approach, for estimating coefficients and associated standard errors using panel data in the presence of different forms of dependence (time-effect and firm-effect) in regression residuals.

fundamentals volatility. In addition, measurement errors in $\ln CFIV$ may also serve as a source of endogeneity.¹⁰

In order to address these problems Arellano and Bond (1991) suggest a generalized method of moment (GMM) estimator known as the difference-GMM estimator. As the name implies, it requires first differencing of equation (10) that yields the following specification:

$$\Delta \ln IV_{i,t} = \alpha_1 \Delta \ln IV_{i,t-1} + \alpha_2 \Delta \ln CFIV_{i,t} + \Delta \delta_t + \Delta \varepsilon_{i,t} \quad (11)$$

Clearly, the first differencing kills off the firm-specific effects successfully. However, the problem with this transformation is that the lagged dependent variable remains endogenous, since the $\ln IV_{i,t-1}$ term in $\Delta \ln IV_{i,t-1}$ correlates with the $\varepsilon_{i,t-1}$ term in $\Delta \varepsilon_{i,t}$. This problem along with the likely endogeneity of $\ln CFIV$ necessitates the use of instrumental variables in estimation. Assuming that the disturbances in equation (10) are serially uncorrelated and that the explanatory variables are uncorrelated with future realization of the disturbance term¹¹, lags of $\ln CFIV$ and $\ln IV$ dated $t-2$ and earlier are valid instruments to identify the effect of exogenous variation in $\ln CFIV$ on $\ln IV$. Therefore, the difference-GMM estimator for equation (11) uses the following moment conditions:

$$E(\ln IV_{i,t-s} \Delta \varepsilon_{i,t}) = 0, \quad \text{for } s \geq 2 \quad (12.a)$$

$$E(\ln CFIV_{i,t-s} \Delta \varepsilon_{i,t}) = 0, \quad \text{for } s \geq 2 \quad (12.b)$$

¹⁰ Pagan (1984) and Pagan and Ullah (1988) also suggest using instrumental variables to reduce measurement errors associated with constructed measures of volatility.

¹¹ Endogeneity of explanatory variables implies that the variables are correlated with current values of the disturbances.

However, a problem with this estimator is that the lagged levels of the variables are often rather poor instruments for the first differences. Blundell and Bond (1998) show how, in the presence of high time series persistence and short panels, lagged levels of the regressors are only weakly correlated with the differences of the regressors.¹² In addition, first-differencing may exacerbate the bias due to measurement error by increasing the variance of this error relative to the variance of the true signal (Griliches and Hausman, 1986). Given the nature of constructed volatility series discussed above, to alleviate potential imprecision and biases associated with the usual difference-GMM estimator, we use an alternative and more efficient estimator suggested by Blundell and Bond (1998).

Arellano and Bover (1995) and Blundell and Bond (1998) note that, assuming lagged differences are uncorrelated with the fixed effects, one may explore additional moment conditions by estimating level equations using lagged differences as instruments. The new estimator based on this intuition has come to be known as the system-GMM estimator. This augmented estimator basically stacks difference and level equations together in a system of equations and uses lagged levels to instrument differences and lagged differences to instrument levels of the regressors. Therefore, in the context our study, the additional moment conditions for the level equations are

$$E(\Delta \ln IV_{i,t-s}(\eta_i + \varepsilon_{i,t})) = 0, \quad \text{for } s \geq 1 \quad (13.a)$$

$$E(\Delta \ln CFIV_{i,t-s}(\eta_i + \varepsilon_{i,t})) = 0, \quad \text{for } s \geq 1. \quad (13.b)$$

¹² A simple transformation of an AR(1) process to $\Delta y_{i,t} = (\beta - 1)y_{i,t-1} + \varepsilon_{i,t}$ helps us visualize the weak instrument argument. Here, the higher the persistence, β , the lower the $E(y_{i,t-1}\Delta y_{i,t})$.

Thus, under the system-GMM procedure, we use the full set of moment conditions presented in equations (12.a and 12.b) and (13.a and 13.b) to generate consistent estimates of the parameters of interest and their asymptotic variance-covariance. The general formulas for which are given by:

$$\hat{\boldsymbol{\theta}} = (\mathbf{X}'\mathbf{Z}\hat{\boldsymbol{\Omega}}^{-1}\mathbf{Z}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{Z}\hat{\boldsymbol{\Omega}}^{-1}\mathbf{Z}'\mathbf{y}, \text{ and} \quad (14)$$

$$\hat{\boldsymbol{\Sigma}} = (\mathbf{X}'\mathbf{Z}\hat{\boldsymbol{\Omega}}^{-1}\mathbf{Z}'\mathbf{X})^{-1} \quad (15)$$

where $\hat{\boldsymbol{\theta}}$ is a vector of estimated parameters of interest, \mathbf{X} is the matrix of regressors including the lagged dependent variable stacked first in differences and then in levels, \mathbf{y} is the vector of observations on dependent variable stacked first in differences and then in levels, \mathbf{Z} is the matrix of instruments based on the moment conditions, and $\hat{\boldsymbol{\Omega}}$ is the consistent estimate of the variance-covariance matrix of the moment conditions.

As in Arellano and Bond (1991), we follow a two-step procedure in order to obtain consistent and efficient GMM estimates. In the first step, assuming that the random disturbances, $\varepsilon_{i,t}$, are independent and homoskedastic both across firms and over time, a specific weighting matrix is used to produce parameter estimates (the one-step estimates). Then in the second step, parameters of interest are re-estimated (the two-step estimates) using a consistent estimate of the variance-covariance matrix of moment conditions, $\hat{\boldsymbol{\Omega}}$, which is constructed with the residuals obtained in the first step. Asymptotically, the two-step estimates are superior to the one-step ones in so far as efficiency is concerned. We make the Windmeijer (2005) finite-sample correction

to the standard errors of the efficient two-step GMM estimator, without which they are likely to be severely downward biased in small samples.

We conduct a number of post-estimation specification tests to assess the reliability of the results. First, the consistency of the system-GMM estimator depends crucially on the validity of the instrumental variables. We test joint validity of the instruments by applying the conventional test of overidentifying restrictions proposed by Sargan (1958) and Hansen (1982). Under the null hypothesis of orthogonality of the instruments, the test statistic is asymptotically distributed as a χ^2 with as many degrees of freedom as overidentifying restrictions. We report the probability of incorrectly rejecting the null. In addition, another critical assumption for the consistency of the system-GMM estimator is that there is no serial correlation in the disturbances in levels. If this assumption is correct, we would expect that the first-differenced disturbances of equation (11) to be significantly negatively autocorrelated at the first lag but uncorrelated at the second lag. Therefore, we present tests for first-order and second-order serial correlation in the first-differenced disturbances. The test statistics are asymptotically distributed as the standard normal variables under the null of no serial correlation.

We also test the validity of the additional instruments in the level equations. Since the set of instruments used in the difference-GMM estimator is a subset of that used in the system-GMM estimator, the validity of these additional overidentifying restrictions can be tested by comparing the Sargan/Hansen statistic for the system-GMM estimator with that of the difference-GMM estimator. Under the null hypothesis of orthogonality of the additional instruments, this “difference-in-Sargan”

statistic is distributed as χ^2 with as many degrees of freedom as the additional overidentifying restrictions. We report the probability of incorrectly rejecting the null hypothesis.

It is important to note that the use of too many instruments relative to the number of cross-sectional observations can overfit endogenous variables. Judson and Owen (1999) also show that a ‘restricted GMM’ estimator that uses a subset of the available lagged values as instruments increases computational efficiency without significantly detracting from its effectiveness. Hence, rather than using all available lags to instrument each variable, our main results are derived by using a restricted set of instruments – usually the first to sixth lags of the regressors. Specifically, the instruments for the first-differenced equations are chosen based on the principle that the information on the regressors is tapped as much as possible until the valid lowest value of the Sargan statistic is obtained. On the other hand, the instruments for the level equations are chosen to be the lag-one first-differences of the regressors. Considering relatively fewer sample firms for Pakistan and the Philippines (Table 2), we follow the strategy of Calderón, Chong and Loayza (2002) and Roodman (2004) who further reduce the size of instrument matrix by summing up individual moment conditions.¹³

¹³ This implies that, for example, the two moment conditions $E(X_{i,t-2}\Delta\varepsilon_{i,t})=0$ and $E(X_{i,t-3}\Delta\varepsilon_{i,t})=0$ are collapsed into $E(X_{i,t-2}\Delta\varepsilon_{i,t} + X_{i,t-3}\Delta\varepsilon_{i,t})=0$. This strategy of reducing potential bias due to too many overidentifying restrictions is implemented using the “collapse” option available as part of the *xtabond2* routine of *Stata 9.2*, which is written by David Roodman of the Center for Global Development, Washington DC, USA.

6 Empirical Results

We begin by providing summary statistics of our firm-level panel data for each market in Table 3. Panel A and B of the table respectively report descriptive statistics of and correlations between our main variables – firm-specific returns volatility and firm-specific fundamentals volatility measured in terms of sales per share (SPS), earnings per share (EPS), and cash earnings per share (CEPS). From Panel A, it turns out that the averages of firm-specific returns and fundamentals volatility vary considerably across markets. The cross-sectional averages of firm-specific returns volatility in China (about 0.08) and Taiwan (about 0.16) are relatively lower compared to those of the other sample markets. On the contrary, Indonesian firms show highest firm-specific returns volatility on average (about 0.47) over the sample period. Similar to stock returns, fundamentals of Chinese and Taiwanese firms also show lower average firm-specific variation than the firms in other markets. Among the alternative measures of firm-specific fundamentals volatility, the one based on SPS (which is the most primitive component of firm earnings) is generally higher on average compared to ones based on EPS and CEPS. More importantly, it is evident from Panel B of the table that there is a fairly high degree of correlation between log transformed firm-specific returns volatility and fundamentals volatility in all markets except China. In addition, even though there is close similarity in the pattern of correlation across alternative proxies of fundamentals, correlation coefficients for all markets (including China) are found to be higher when fundamentals volatility is measured in terms of EPS.

Table 3 Summary statistics of firm-specific variations in returns and fundamentals

Panel A of the table presents the descriptive statistics of the variables for each of Asian emerging stock markets – Indonesia (ID), Korea (KO), Malaysia (MY), Thailand (TH), Philippines (PH), Taiwan (TA), India (IN), Pakistan (PK), and China (CN). IV denotes firm-specific variation of stock returns. $CFIV_{SPS}$, $CFIV_{EPS}$, and $CFIV_{CEPS}$ denote measures of firm-specific variation of cash flows using sales per share (SPS), earnings per share (EPS) and cash earnings per share (CEPS), respectively. Panel B of the table reports correlation coefficients between log transformed firm-specific variation of returns and each of the proxies of firm-specific variation of cash flows.

Panel A: Summary Statistics of IV , $CFIV_{SPS}$, $CFIV_{EPS}$, and $CFIV_{CEPS}$									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
<i>IV</i>									
Mean	0.4729	0.3496	0.2068	0.3352	0.4075	0.1596	0.2453	0.2338	0.0831
Median	0.2367	0.2267	0.1177	0.1756	0.2011	0.1199	0.1807	0.1284	0.0659
25 th Percentile	0.1076	0.1190	0.0570	0.0884	0.0891	0.0659	0.1042	0.0776	0.0409
75 th Percentile	0.5531	0.4415	0.2298	0.3657	0.4870	0.1999	0.3127	0.2286	0.1060
Coef. of Variation	1.4125	1.1171	1.9793	1.5085	3.2750	1.2413	0.9707	3.2378	0.7747
Firm-year Observations	1267	2103	1227	1564	651	1528	1583	421	1619
<i>CFIV_{SPS}</i>									
Mean	1.6245	2.6073	0.5750	0.9218	0.8609	0.3279	0.8650	0.9127	0.1213
Median	0.5011	0.8661	0.1487	0.2695	0.1705	0.1180	0.2536	0.3805	0.0518
25 th Percentile	0.1612	0.3070	0.0554	0.0918	0.0568	0.0440	0.0845	0.1335	0.0202
75 th Percentile	1.5501	2.3742	0.3795	0.8525	0.5096	0.2873	0.7229	1.0741	0.1168
Coef. of Variation	3.1333	2.2900	6.7311	3.1726	5.0531	2.7617	3.1409	1.5082	1.9585
Firm-year Observations	1267	2103	1227	1564	651	1528	1583	421	1619
<i>CFIV_{EPS}</i>									
Mean	0.8273	0.6852	0.4547	0.4116	0.3704	0.1059	0.1635	0.1683	0.0266
Median	0.1786	0.1145	0.0392	0.0998	0.0672	0.0348	0.0439	0.0601	0.0103
25 th Percentile	0.0534	0.0413	0.0140	0.0353	0.0201	0.0145	0.0161	0.0231	0.0042
75 th Percentile	0.5988	0.3834	0.1155	0.3029	0.2291	0.0778	0.1223	0.1647	0.0252
Coef. of Variation	2.5924	3.9751	12.8995	4.0386	3.2630	2.9019	2.7546	2.0650	2.1707
Firm-year Observations	1267	2103	1227	1564	651	1528	1583	421	1619
<i>CFIV_{CEPS}</i>									
Mean	0.5038	0.4984	0.1190	0.3138	0.2009	0.0711	0.2054	0.2308	0.0218
Median	0.1801	0.1783	0.0499	0.0857	0.0690	0.0319	0.0611	0.1063	0.0119
25 th Percentile	0.0618	0.0663	0.0194	0.0311	0.0219	0.0135	0.0207	0.0393	0.0050
75 th Percentile	0.4961	0.4440	0.1157	0.2472	0.2022	0.0687	0.1707	0.2302	0.0253
Coef. of Variation	2.8682	2.6354	3.5032	3.2007	2.0246	2.5966	2.5015	1.9107	1.5717
Firm-year Observations	1267	2103	1227	1564	651	1528	1583	421	1619
Panel B: Correlation of $\ln IV$ with $\ln CFIV_{SPS}$, $\ln CFIV_{EPS}$, and $\ln CFIV_{CEPS}$									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
$\ln CFIV_{SPS}$	0.2400	0.2220	0.2813	0.2936	0.2284	0.2448	0.3755	0.2471	0.0351
$\ln CFIV_{EPS}$	0.2617	0.2993	0.3775	0.3512	0.3773	0.3980	0.3705	0.2789	0.1740
$\ln CFIV_{CEPS}$	0.2585	0.2474	0.2152	0.3169	0.3118	0.2838	0.3855	0.2414	0.0990

Now we turn to our main results presented in Table 4 – the two-step finite sample corrected system-GMM estimates of equation (10) for each market-specific panel of firms. The response of firm-specific returns volatility to changes in three separate measures of firm-specific fundamentals volatility in terms of SPS, EPS, and CEPS is reported in Panel A, B, and C of the table, respectively. An initial look through the table reveals that, consistent with our hypothesis underlying the framework presented in Section 3, the coefficient (α_2) of firm-specific fundamentals volatility ($\ln CFIV_{i,t}$) across different measures and markets are generally positive. The positive coefficients on $\ln CFIV_{i,t}$ for Korea, Malaysia, Thailand, Taiwan, and India are statistically highly significant irrespective of the measure of fundamentals volatility we use. Regarding other markets, while there is some strong evidence of positive and significant effect of $\ln CFIV_{i,t}$ on firm-specific volatility ($\ln IV_{i,t}$) for Philippines, Indonesia and China, we have found no significant effect in case of Pakistan at all. For Philippines, the effect of $\ln CFIV_{i,t}$ on $\ln IV_{i,t}$ is significantly positive at 1% level when the former is measured in terms of EPS and CEPS. Similarly, for Indonesia, $\ln CFIV_{i,t}$ measured in terms of either SPS or EPS has a positive and significant effect on $\ln IV_{i,t}$ at 10% level of significance. But for the Chinese market, $\ln CFIV_{i,t}$ measured only in terms of CEPS has a significant effect on $\ln IV_{i,t}$ at 5% level. Looking at the magnitude and significance of the coefficients on different proxies of $\ln CFIV_{i,t}$ across stock markets, two additional aspects of our results stand out. First, though there are some differences in the size of the coefficients on alternative measures of $\ln CFIV_{i,t}$, it seems difficult to suggest that a particular measure of $\ln CFIV_{i,t}$ has higher association with $\ln IV_{i,t}$ than others.

Second, the sensitivity of firm-specific volatility to changing fundamentals volatility tends to vary from one market to another, which underscores the importance of a market-specific cross-firm analysis as opposed to a cross-country macro analysis.

Table 4 Relationship between firm-specific variations in returns and fundamentals

This table reports the results of the two-step System-GMM estimation of the relationship between firm-specific variations in returns (IV) and cash flows ($CFIV$) for each of the market-specific panel of firms for Indonesia (ID), Korea (KO), Malaysia (MY), Thailand (TH), Philippines (PH), Taiwan (TA), India (IN), Pakistan (PK), and China (CN). The specification is as follows:

$$\ln IV_{i,t} = \alpha_1 \ln IV_{i,t-1} + \alpha_2 \ln CFIV_{i,t} + \delta_t + \eta_i + \varepsilon_{i,t}$$

where i is a firm, t is a fiscal year, δ_t denotes the time-specific effects, η_i denotes the firm-specific effects, and $\varepsilon_{i,t}$ is the random disturbance term. For MY only, the specification also includes $\ln IV_{i,t-2}$ to take care of significant first-order serial correlation found in $\varepsilon_{i,t}$. In Panel A, B, and C of the table, $CFIV$ is measured in terms of sales per share (SPS), earnings per share (EPS), and cash earnings per share (CEPS), respectively. Figures in brackets are p -values based on Windmeijer (2005) corrected standard errors. Statistical significance of the coefficients at 1%, 5%, and 10% is indicated by *, **, and ***, respectively. The values reported for the Sargan test are the p -values for the null hypothesis of instrument validity. The Diff-Sargan reports the p -values for the validity of the additional moment restrictions required by the System-GMM. The values reported for $AR(k)$ are the p -values for the test of k -th order autocorrelation in the first-differenced residuals.

Panel A: $CFIV$ measured in terms of sales per share (SPS)

	ID	KO	MY	TH	PH	TA	IN	PK	CN
$\ln IV_{i,t-1}$	0.3998*	0.3773*	0.4433*	0.3092*	0.2397**	0.4640*	0.1841***	0.1734	0.2419*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.020]	[0.000]	[0.084]	[0.113]	[0.000]
$\ln IV_{i,t-2}$			0.1652*						
			[0.003]						
$\ln CFIV_{i,t}$	0.1654***	0.0925*	0.1883*	0.1262*	0.3147	0.0819***	0.2146*	-0.0470	-0.0731
	[0.099]	[0.009]	[0.001]	[0.001]	[0.110]	[0.063]	[0.002]	[0.883]	[0.178]
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.029	0.000
AR(2)	0.302	0.746	0.814	0.400	0.738	0.271	0.811	0.201	0.416
Sargan	0.264	0.133	0.303	0.402	0.855	0.402	0.477	0.740	0.283
Diff-Sargan	0.342	0.592	0.581	0.284	0.403	0.779	0.799	0.306	0.628
Instruments	102	144	105	144	23	129	102	28	69
Firms	120	248	127	146	66	160	165	44	296
Firm-years	1267	2103	1227	1564	651	1528	1583	421	1619

Table 4 (Continued)

Panel B: <i>CFIV</i> measured in terms of earnings per share (EPS)									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
$\ln IV_{i,t-1}$	0.3848*	0.3358*	0.3846*	0.2922*	0.2330*	0.4195*	0.1748**	0.1872**	0.2082*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.041]	[0.043]	[0.000]
$\ln IV_{i,t-2}$			0.1454*						
			[0.004]						
$\ln CFIV_{i,t}$	0.1604***	0.1701*	0.2734*	0.2054*	0.3142*	0.1198*	0.2786*	0.2537	0.0741
	[0.089]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.123]	[0.130]
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.019	0.000
AR(2)	0.246	0.875	0.789	0.655	0.577	0.662	0.972	0.159	0.558
Sargan	0.258	0.226	0.348	0.597	0.829	0.425	0.167	0.281	0.197
Diff-Sargan	0.508	0.897	0.512	0.935	0.807	0.940	0.587	0.168	0.174
Instruments	112	144	105	144	39	129	102	36	69
Firms	120	248	127	146	66	160	165	44	296
Firm-years	1267	2103	1227	1564	651	1528	1583	421	1619
Panel C: <i>CFIV</i> measured in terms of cash earnings per share (CEPS)									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
$\ln IV_{i,t-1}$	0.4077*	0.3645*	0.6037*	0.3082*	0.2323*	0.4318*	0.2213*	0.1578	0.2282*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]	[0.000]	[0.013]	[0.205]	[0.000]
$\ln IV_{i,t-2}$			0.1000**						
			[0.068]						
$\ln CFIV_{i,t}$	-0.0332	0.1803*	0.1399*	0.1322*	0.3175*	0.1948*	0.2525*	0.1024	0.0924**
	[0.767]	[0.000]	[0.008]	[0.001]	[0.000]	[0.000]	[0.000]	[0.296]	[0.021]
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.022	0.000
AR(2)	0.271	0.876	0.147	0.932	0.737	0.465	0.737	0.194	0.239
Sargan	0.220	0.198	0.184	0.575	0.770	0.619	0.174	0.232	0.283
Diff-Sargan	0.887	0.336	0.959	0.585	0.152	0.713	0.448	0.515	0.998
Instruments	103	144	105	144	33	129	102	36	69
Firms	120	248	127	146	66	160	165	44	296
Firm-years	1267	2103	1227	1564	651	1528	1583	421	1619

Turning to other coefficients of the estimated model, we find that the lagged level of firm-specific volatility, $\ln IV_{i,t-1}$, has expected positive coefficients (α_1) ranging from 0.16 to 0.60 across markets. The overwhelming significance of these coefficients in general justifies the use of the system-GMM instead of the difference-GMM in estimation. Though we do not report individual coefficients of time dummies, we have found evidence of significant time-specific effects in various years

affecting the cross-section of firm-specific returns volatility in each of the markets under study.

As the reliability of our findings critically depends on the validity of the specifications used in the analysis, we append some important diagnostic test results towards the end of each panel of Table 4. AR(1) and AR(2) are the application of the autocorrelation tests developed in Arellano and Bond (1991) to check for first and second order autocorrelation in the residuals of the differenced equations. The p -values of the tests indicate that there is evidence of first order but not second order autocorrelation, which confirms that the model is well specified in levels. The χ^2 statistics of the Sargan/Hansen test of overidentifying restrictions are not significant in any of the specifications, which imply that there is no evidence that the instruments used are invalid. To address the validity of additional moment conditions of the system-GMM (equations 13.a and 13.b) we run the difference-in-Sargan tests. Since the corresponding χ^2 statistics are not significant, they do not reject the null of validity of the additional moment conditions.

In sum, the results of simple correlation analysis and subsequent regression estimates are broadly consistent and generally supportive of the close correspondence between firm-specific returns volatility and fundamentals volatility across majority of the emerging Asian stock markets under study.

7 Robustness Checks

This section checks the robustness of our main results to the effects of different control variables. This exercise is important because if other variables that affect firm-

specific returns volatility, and are related to firm-specific fundamentals volatility, are omitted from the analysis, the estimated coefficient on the latter variable could be biased. Our additional controls include trading volume, firm size, and leverage. The cross-sectional effects of these variables are often reported in the existing literature to be significant on firm-specific returns volatility.

We use turnover ratio, $TR_{i,t}$, as the measure of trading volume, which is defined as the aggregate number of traded shares divided by the total number of outstanding shares of firm i in fiscal year t . The mixture of distributions hypothesis (MDH) (Clark, 1973; Epps and Epps, 1976; Tauchen and Pitts, 1983) suggests that stock price changes and trading volume are driven by the same underlying news arrival process. While the arrival of ‘good news’ causes the stock price to increase, the arrival of ‘bad news’ depresses the stock price. Both of these events however stimulate above-average trading activity in the market as it adjusts to a new equilibrium. Volatility of stock returns and trading volume should therefore be positively correlated. Since firm-specific volatility defined as the volatility of the residual component of asset returns, formed by removing the common component(s), is thought to be driven by the firm-specific news events, it is also likely to be positively correlated with trading volume of stocks. Indeed, the evidence of this positive relationship has been found to be significant both at the market level (for example, Bessembinder, Chan and Seguin, 1996) and at the firm level (for example, Lo and Wang, 2000). In addition to trading volume, firm size is another potential covariate with firm-specific returns volatility. Studies such as Wei and Zhang (2006) and Xu and Malkiel (2003) document that the larger firms tend to have smaller firm-specific returns volatility. Therefore, we use market capitalization of firms at the

beginning of each fiscal year, $SIZE_{i,t-1}$, to control for potential size effect on firm-specific volatility of returns. Finally, following Chang and Dong (2006), we also include the lagged return, $RTN_{i,t-1}$, as an additional control variable to account for the ‘leverage effect’ – the commonly observed negative relationship between stock returns and volatility (Black, 1976; Christie, 1982). Campbell, Lettau, Malkiel and Xu (2001) also point out that leverage effect may have an effect on firm-specific returns volatility. We extend our basic model presented in equation (10) therefore by estimating the following specification:

$$\begin{aligned} \ln IV_{i,t} = & \alpha_1 \ln IV_{i,t-1} + \alpha_2 \ln CFIV_{i,t} + \alpha_3 \ln TR_{i,t} \\ & + \alpha_4 \ln SIZE_{i,t-1} + \alpha_5 RTN_{i,t-1} + \delta_t + \eta_i + \varepsilon_{i,t} \end{aligned} \quad (16)$$

Before estimating the above specification, it may be instructive to look at the general statistical properties of the control variables and their correlations with firm-specific returns volatility which we present in Table 5. Panel A of the table reports summary statistics of $\ln TR_{i,t}$, $\ln SIZE_{i,t-1}$, and $RTN_{i,t-1}$ of country-specific panels of firms. Correlations of $\ln IV_{i,t}$ with $\ln TR_{i,t}$, $\ln SIZE_{i,t-1}$, and $RTN_{i,t-1}$ are reported in Panel B. Results of the correlation analysis is particularly noteworthy. Although some of the correlation coefficients look weaker, they generally have the expected signs. Specifically, correlation of $\ln IV_{i,t}$ is generally positive with $\ln TR_{i,t}$ and negative with $\ln SIZE_{i,t-1}$ and $RTN_{i,t-1}$ (except China). Among the control variables, $\ln SIZE_{i,t-1}$ has the highest correlation with $\ln IV_{i,t}$ across markets.

Table 5 Summary statistics of the control variables

Panel A of the table presents the descriptive statistics of the control variables for each of Asian emerging stock markets – Indonesia (ID), Korea (KO), Malaysia (MY), Thailand (TH), Philippines (PH), Taiwan (TA), India (IN), Pakistan (PK), and China (CN). TR , $\ln SIZE$, and RTN denote respectively turnover ratio, log of firm size, and lagged returns. Panel B of the table reports correlation of log of firm-specific variation of returns ($\ln IV$) with $\ln TR$, $\ln SIZE$, and RTN .

Panel A: Summary Statistics of TR , $\ln SIZE$, and RTN									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
<i>TR</i>									
Mean	1.3631	5.3993	0.7609	2.4849	0.3201	3.8545	1.9322	1.8263	1.3044
Median	0.2300	2.0883	0.2252	0.4646	0.0873	1.9348	0.2284	0.1209	0.9176
25 th Percentile	0.0386	0.9042	0.0908	0.0987	0.0224	0.9450	0.0640	0.0244	0.5634
75 th Percentile	0.8566	4.6226	0.5757	1.6966	0.2346	4.0579	0.7940	0.7346	1.5435
Coef. of Variation	4.1747	4.4586	3.1789	3.0324	3.9346	1.7492	7.5348	2.8263	1.2455
Firm-year Observations	1267	2103	1227	1564	651	1528	1506	421	1619
<i>ln SIZE</i>									
Mean	12.3526	11.4142	5.8944	7.3879	7.9658	9.3100	8.3198	7.4471	7.7479
Median	12.2796	11.1977	5.8025	7.2342	7.9010	9.2048	8.2568	7.4825	7.6996
25 th Percentile	11.0410	10.2175	4.8271	6.0871	6.6220	8.4536	7.0603	6.4202	7.2647
75 th Percentile	13.5110	12.3625	6.9210	8.5593	9.1442	10.0642	9.5025	8.7593	8.1654
Coef. of Variation	0.1495	0.1432	0.2471	0.2416	0.2261	0.1432	0.2170	0.2394	0.0957
Firm-year Observations	1267	2103	1227	1564	651	1528	1583	421	1619
<i>RTN</i>									
Mean	-0.0012	-0.0274	-0.0247	-0.0140	-0.0469	-0.0028	0.0742	0.1237	-0.0256
Median	-0.0237	0.0028	0.0332	0.0072	-0.0087	0.0092	0.0186	0.1243	-0.0962
25 th Percentile	-0.4479	-0.3609	-0.2489	-0.3568	-0.3726	-0.2762	-0.3235	-0.1986	-0.2810
75 th Percentile	0.3871	0.3231	0.2915	0.3472	0.2841	0.2815	0.4228	0.4962	0.2002
Coef. of Variation	-639.841	-23.037	-23.433	-49.568	-14.887	-170.999	8.670	4.365	-14.650
Firm-year Observations	1267	2103	1227	1564	651	1528	1583	421	1619
Panel B: Correlation of $\ln IV$ with $\ln TR$, $\ln SIZE$, and RTN									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
$\ln TR$	0.3802	0.3244	0.3794	0.1554	0.1138	0.2206	0.1079	0.0114	0.3407
$\ln SIZE$	-0.2045	-0.3198	-0.4337	-0.3701	-0.4797	-0.3597	-0.4845	-0.3650	-0.2630
RTN	-0.1989	-0.1597	-0.2779	-0.2866	-0.2059	-0.1781	-0.0916	-0.1432	0.0428

Now we present the results of GMM estimation of equation (16) in Table 6. Panel A, B, and C of this table, in conformity with Table 4, report results using sales per share (SPS), earnings per share (EPS), and cash earnings per share (CEPS) as alternative cash flow proxies, respectively. Since previous studies have shown that trading volume and volatility are simultaneously determined in the trading process

(see for example, Tauchen and Pitts, 1983; Lamoureux and Lastrapes, 1994), we treat

$\ln TR_{i,t}$ as an endogenous variable and instrument it accordingly under the system-GMM framework.

Table 6 Relationship between firm-specific variations in returns and fundamentals with additional controls

This table reports the results of the two-step System-GMM estimation of the relationship between firm-specific variations in returns (IV) and cash flows ($CFIV$), with additional controls, for each of the market-specific panel of firms for Indonesia (ID), Korea (KO), Malaysia (MY), Thailand (TH), Philippines (PH), Taiwan (TA), India (IN), Pakistan (PK), and China (CN). The specification is

$$\ln IV_{i,t} = \alpha_1 \ln IV_{i,t-1} + \alpha_2 \ln CFIV_{i,t} + \alpha_3 \ln TR_{i,t} + \alpha_4 \ln SIZE_{i,t-1} + \alpha_5 RTN_{i,t-1} + \delta_t + \eta_i + \varepsilon_{i,t}$$

where i is a firm, t is a fiscal year, δ_t denotes the time-specific effects, η_i denotes the firm-specific effects, and $\varepsilon_{i,t}$ is the random disturbance term. For MY only, the specification also includes $\ln IV_{i,t-2}$ to take care of significant first-order serial correlation found in $\varepsilon_{i,t}$. $TR_{i,t}$, $SIZE_{i,t-1}$, and $RTN_{i,t-1}$ control for the effects of turnover ratio, firm size, and leverage effect, respectively. In Panel A, B, and C of the table, $CFIV$ is measured in terms of sales per share (SPS), earnings per share (EPS), and cash earnings per share (CEPS), respectively. Figures in brackets are p -values based on Windmeijer (2005) corrected standard errors. Statistical significance of the coefficients at 1%, 5%, and 10% is indicated by *, **, and ***, respectively. The values reported for the Sargan test are the p -values for the null hypothesis of instrument validity. The Diff-Sargan reports the p -values for the validity of the additional moment restrictions required by the System-GMM. The values reported for AR(k) are the p -values for the test of k -th order autocorrelation in the first-differenced residuals.

Panel A: $CFIV$ measured in terms of sales per share (SPS)									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
$\ln IV_{i,t-1}$	0.2993*	0.4426*	0.2787*	0.2693*	0.2336*	0.3721*	0.1450	0.1393	0.2653*
	[0.000]	[0.000]	[0.001]	[0.000]	[0.009]	[0.000]	[0.159]	[0.249]	[0.000]
$\ln IV_{i,t-2}$			0.1463*						
			[0.002]						
$\ln CFIV_{i,t}$	-0.1169	0.1165*	0.1766*	0.0374	0.2117	0.1216*	0.1153*	-0.0145	-0.0611
	[0.232]	[0.000]	[0.011]	[0.586]	[0.184]	[0.003]	[0.018]	[0.898]	[0.220]
$\ln TR_{i,t}$	0.2461*	0.0595**	0.0372	0.0152	0.0447	0.1526*	0.0511**	0.0861	-0.0292
	[0.001]	[0.018]	[0.500]	[0.755]	[0.593]	[0.000]	[0.054]	[0.144]	[0.622]
$\ln SIZE_{i,t-1}$	-0.2279*	-0.0734*	-0.1516*	-0.1149*	-0.2154*	-0.1071*	-0.1532*	-0.2422*	-0.1117*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.004]	[0.005]
$RTN_{i,t-1}$	-0.1709**	-0.1115*	-0.1436	-0.0080	-0.1078	-0.1795*	0.0152	-0.2283***	0.2290*
	[0.037]	[0.001]	[0.117]	[0.840]	[0.177]	[0.000]	[0.812]	[0.070]	[0.000]
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.001	0.000	0.000	0.077	0.043	0.000
AR(2)	0.170	0.551	0.844	0.441	0.732	0.528	0.684	0.272	0.431
Sargan	0.309	0.311	0.362	0.210	0.377	0.239	0.308	0.514	0.350
Diff-Sargan	0.499	0.497	0.630	0.302	0.139	0.499	0.995	0.200	0.927
Instruments	109	185	123	139	36	139	137	47	100
Firms	120	248	127	146	66	160	165	44	296
Firm-years	1267	2103	1227	1564	651	1528	1506	421	1619

Table 6 (Continued)

Panel B: <i>CFIV</i> measured in terms of earnings per share (EPS)									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
$\ln IV_{i,t-1}$	0.2683*	0.3707*	0.2271*	0.2406*	0.2315*	0.3342*	0.1348***	0.1523	0.2216*
	[0.000]	[0.000]	[0.002]	[0.000]	[0.002]	[0.000]	[0.081]	[0.130]	[0.000]
$\ln IV_{i,t-2}$			0.1552*						
			[0.000]						
$\ln CFIV_{i,t}$	0.1441**	0.1862*	0.1963*	0.1360*	0.1805***	0.1238*	0.1655*	0.1582	0.0768**
	[0.049]	[0.000]	[0.000]	[0.000]	[0.095]	[0.000]	[0.000]	[0.429]	[0.025]
$\ln TR_{i,t}$	0.2866*	0.0896*	0.0123	0.0750***	0.0443	0.1594*	0.0685*	0.0782	-0.0350
	[0.001]	[0.001]	[0.783]	[0.094]	[0.494]	[0.000]	[0.003]	[0.447]	[0.588]
$\ln SIZE_{i,t-1}$	-0.1555*	-0.0448*	-0.1639*	-0.1120*	-0.1850*	-0.0955*	-0.1291*	-0.2322**	-0.1267*
	[0.004]	[0.003]	[0.000]	[0.000]	[0.004]	[0.000]	[0.000]	[0.049]	[0.002]
$RTN_{i,t-1}$	-0.1512***	-0.0445	-0.1121	0.0150	-0.1608***	-0.1791*	0.0257	-0.1266	0.2245*
	[0.060]	[0.205]	[0.170]	[0.644]	[0.055]	[0.000]	[0.676]	[0.276]	[0.001]
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.001	0.000	0.000	0.000	0.000	0.000	0.056	0.031	0.000
AR(2)	0.160	0.938	0.667	0.461	0.629	0.925	0.925	0.216	0.657
Sargan	0.308	0.589	0.436	0.336	0.891	0.427	0.438	0.441	0.213
Diff-Sargan	0.799	0.751	0.532	0.823	0.113	0.836	0.667	0.783	0.674
Instruments	109	185	123	139	42	139	137	50	100
Firms	120	248	127	146	66	160	165	44	296
Firm-years	1267	2103	1227	1564	651	1528	1506	421	1619
Panel C: <i>CFIV</i> measured in terms of cash earnings per share (CEPS)									
	ID	KO	MY	TH	PH	TA	IN	PK	CN
$\ln IV_{i,t-1}$	0.2757*	0.4193*	0.3357*	0.2465*	0.2402*	0.3429*	0.1722**	0.1126	0.2320*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.030]	[0.239]	[0.000]
$\ln IV_{i,t-2}$			0.1406*						
			[0.002]						
$\ln CFIV_{i,t}$	-0.0781	0.1798*	0.1626*	0.0983**	0.3106*	0.1662*	0.1250*	0.0243	0.0908**
	[0.494]	[0.000]	[0.006]	[0.028]	[0.000]	[0.000]	[0.000]	[0.908]	[0.017]
$\ln TR_{i,t}$	0.3073*	0.0770*	-0.0141	0.0497	-0.0032	0.1276*	0.0544*	0.1274***	-0.0248
	[0.000]	[0.003]	[0.804]	[0.270]	[0.968]	[0.000]	[0.009]	[0.080]	[0.676]
$\ln SIZE_{i,t-1}$	-0.2254*	-0.0507*	-0.1576*	-0.1148*	-0.1599*	-0.1013*	-0.1341*	-0.2525**	-0.1287*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.004]	[0.000]	[0.000]	[0.038]	[0.001]
$RTN_{i,t-1}$	-0.1771**	-0.0804**	-0.2133**	0.0017	-0.1168	-0.1522*	0.0137	-0.1179	0.2277*
	[0.032]	[0.021]	[0.018]	[0.968]	[0.202]	[0.002]	[0.835]	[0.506]	[0.000]
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.076	0.028	0.000
AR(2)	0.159	0.923	0.806	0.643	0.672	0.878	0.739	0.264	0.346
Sargan	0.113	0.440	0.269	0.291	0.895	0.452	0.400	0.695	0.228
Diff-Sargan	0.751	0.475	0.337	0.961	0.171	0.612	0.874	0.184	0.961
Instruments	109	185	123	139	45	139	137	29	100
Firms	120	248	127	146	66	160	165	44	296
Firm-years	1267	2103	1227	1564	651	1528	1506	421	1619

Compared to the results presented in Table 4, there are only two instances from twenty-seven market-specific specifications of Table 6 (3 specifications for each of the 9 markets) where the coefficients on $\ln CFIV_{i,t}$ (α_2) have lost their significance as a result of the simultaneous effect of control variables – one for Indonesia and another for Thailand, both using SPS as the cash flow proxy (Panel A). We have also found a contrasting case with regard to China, where the previously observed insignificant effect of EPS based $\ln CFIV_{i,t}$ (with p -value of 0.13) on $\ln IV_{i,t}$ has turned out to be significant at 5% level after allowing for the effect of control variables (Panel B). In all other cases however, the simultaneous effect of control variables, if any, seems to be only on the magnitude of the point estimates of the effect of $\ln CFIV_{i,t}$ on $\ln IV_{i,t}$, and not on their statistical significance. India is the only sample market for which such effect is found to be most visible irrespective of the measure of $\ln CFIV_{i,t}$ used. After accounting for the joint impact of control variables, the point estimates of α_2 for India have plummeted to 0.12, 0.17, and 0.13 from the baseline estimates of 0.21, 0.28, and 0.22 of Table 4, respectively. Some deterioration only in the size of α_2 is also observed for Philippines and Thailand. On the other hand, the changes in the magnitude of α_2 for Korea, Taiwan, and Malaysia have been mixed with cases of both slight deteriorations and marginal improvements depending on the particular measure of $\ln CFIV_{i,t}$ used in estimation. Overall, the results reported in Table 6 suggest that controlling for the joint effect of major firm-specific characteristics known to affect firm-specific volatility of returns does not alter our main findings presented in the previous section. $\ln CFIV_{i,t}$ across measures continues to be a significant and positive determinant of $\ln IV_{i,t}$ in Korea, Malaysia, Taiwan and India. In other markets excepting Pakistan, the positive relationship

between $\ln CFIV_{i,t}$ and $\ln IV_{i,t}$ also remains significant when the former is measured using either or both of our earnings based cash flow proxies (EPS and CEPS).

In addition to the above mentioned simultaneous effect of our control variables, it is also worth noting their individual significance in explaining the cross-sectional differences of firm-specific returns volatility in emerging markets. Consistent with the finding of Lo and Wang (2000), the coefficients on $\ln TR_{i,t}$ (α_3) are generally significantly positive for Indonesia, Korea, Taiwan and India across alternative specifications. Although there is some evidence of similar positive effect for Thailand and Pakistan, $\ln TR_{i,t}$ does not seem to affect $\ln IV_{i,t}$ of Malaysia, Philippines and China. Among the control variables, $\ln SIZE_{i,t-1}$ is found to have the most noticeable impact on $\ln IV_{i,t}$ of the Asian emerging markets. An across the board statistically significant negative coefficient on this variable (α_4) confirms the earlier findings in relation to US market (Wei and Zhang, 2006; Xu and Malkiel, 2003) that larger firms tend to have lower firm-specific volatility. In addition, we have found stronger evidence for Indonesia and Taiwan that $RTN_{i,t-1}$ has a significant negative effect on $\ln IV_{i,t}$. Similar expected evidence, albeit weaker, has also been found with respect to other markets except China. Contradicting the well-known leverage effect, coefficients on $RTN_{i,t-1}$ (α_5) across specifications for China are positive and significant at 1% level, which suggests that firm-specific returns volatility of Chinese firms tend to be higher (lower) following positive (negative) returns. Li (2003) also reports similar abnormal leverage effect for Shanghai Stock Exchange index returns and attributes the finding to strict prohibition against short-selling activities in that market.

Diagnostic test results suggest that the extended model of firm-specific returns volatility is well specified for each of the markets under study. As desired, AR(1) and AR(2) tests performed on the differenced residuals indicate the presence of first-order serial correlation but the absence of second-order serial correlation. Furthermore, the general insignificance of the χ^2 statistics of the Sargan/Hansen test and the difference-in-Sargan test of overidentifying restrictions provides evidence for the validity of the full set of instruments and the subset of additional instruments for the system-GMM estimators, respectively.

8 Summary and Conclusion

Emerging literature in finance relates firm-specific volatility of stock returns to variables that, in one way or another, are proxies for the information content of stock prices. Morck, Yeung and Yu (2000) interpret firm-specific stock return variation as a gauge of the extent of informed trading in the stock market. In a comprehensive cross-country analysis, they find that the emerging stock markets, *vis-à-vis* well developed ones, tend to have low firm-specific stock return variation. They suggest that weak institutions (such as poor corporate governance and weak property rights) in the emerging markets prevent firm-specific information from being incorporated into stock prices, which ultimately translates into low firm-specific variation in returns. More recently however, Li, Morck, Yang and Yeung (2004) find that greater capital market openness and associated market reforms over the years of the 1990s have induced higher firm-specific stock return variation in most of the emerging stock markets. These recent findings motivate us to investigate whether the changes in stock prices in emerging markets reflect any information about the changes in firm fundamentals, which obviously is the most direct measure of the information content

of stock prices. To the extent that the greater openness and institutional reforms help disseminate firm-specific information more accurately and encourage more informed stock trading, we would expect the changes in stock prices to reflect rational expectations about the present value of expected future cash-flows of the firms. Accordingly, based on a framework dictated by the simple present value relation, we examine the relationship between firm-specific variations in returns and fundamentals in the context of a set of emerging stock markets of Asia – India, Indonesia, Malaysia, Korea, Thailand, Taiwan, Philippines, Pakistan, and China. Unlike previous studies that use country level cross-sectional or panel data, we use firm-level micro panel data for each of the markets separately. Our approach therefore recognizes potential heterogeneity of the information environment across markets, and includes time-varying observations of firm-specific returns and fundamentals volatility such that the dynamic effects of market reforms in each of these markets may be taken into consideration.

In line with the hypothesis underlying the present value framework, we find that firm-specific volatility of returns is highly correlated with, and is significantly explained by, firm-specific fundamentals volatility in the majority of the emerging Asian stock markets. Specifically, firm-specific fundamentals volatility measured using all three cash-flow variables used in the analysis is found to be significantly positively associated with firm-specific volatility of stock returns in five out of nine markets, *viz.*, Korea, Malaysia, Taiwan, India and Thailand. Similar evidence, depending on the particular measure(s) of fundamentals volatility, also emerges for Philippines, Indonesia and China. For Pakistan however, even though a simple correlation analysis suggests a close correspondence between firm-specific variations

in stock returns and fundamentals, that relationship does not hold in subsequent regression analysis. Judging by the magnitude of the coefficients on fundamentals volatility, the sensitivity of firm-specific volatility to changing fundamentals volatility tends to vary from one market to another. Our further analysis reveals that the observed effect of fundamentals volatility on firm-specific returns volatility is not driven indirectly by some other firm-specific factors known to affect firm-specific volatility, *viz.*, firm size, stock turnover and leverage. Although these firm-specific factors are often found to have independent effects on firm-specific returns volatility in different markets, their simultaneous effect, if any, is largely only on the magnitude of the point estimate of the coefficient of fundamentals volatility and not on their statistical significance. This result can be interpreted as evidence of the primacy of the direct effect of fundamentals volatility on firm-specific returns variation.

Overall, we view our results as suggestive that firm-specific changes in fundamentals in the majority of the Asian emerging markets help explain, possibly at differing degrees, changes in individual stock prices in the post liberalization period. Although we do not directly model the effect of institutional reforms in this study, our results lend support to the position of Li, Morck, Yang and Yeung (2004) that the increasing pattern of emerging market firm-specific returns variation observed during the 1990s may potentially serve as the measure of the effectiveness of reforms in different countries. Our findings may also have important economic implications. To the extent that the responses of firm's stock prices track news about the present value of expected cash flows, those price responses should have some predictive power for the changes in investment and consequent growth of output. Consistent with this view, at the aggregate level, Durnev, Li, Morck and Yeung (2004) find that higher

real per capita GDP growth or total factor productivity growth is significantly associated with greater market-level stock return asynchronicity in a cross-section of low income economies, including the ones in transition.

Even though research in this paper documents a statistically significant firm-level relationship between variations in stock returns and fundamentals in majority of the Asian emerging markets, based on the analysis conducted here, we cannot judge the extent to which firm-specific returns volatility in those markets is explained by fundamentals volatility. We do not therefore interpret the evidence presented in this paper as contradictory to the observation of Morck, Yeung and Yu (2000) that the changes in emerging stock market prices in general convey little firm-specific information. In addition to fundamentals volatility, we have found that there are other firm-specific characteristics such as firm size and turnover that also have strong cross-sectional relationships with firm-specific returns variation. However, especially in the context of emerging markets, it is difficult to argue that these relationships are only driven by fundamental factors. Further, the literature on behavioral finance emphasizes the importance of investors' irrational behavior as an additional factor explaining stock return volatility that is unrelated to fundamentals.

References:

- Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies* 58(2), 277–297.
- Arellano, M., Bover, O., 1995. Another look at the instrumental variable estimation of error-component models, *Journal of Econometrics* 68, 29–51.
- Bekaert, G., Harvey, C.R., 1997. Emerging equity market volatility. *Journal of Financial Economics* 43, 29–78.
- Bekaert, G., Harvey, C., 2000. Foreign speculators and emerging equity markets. *Journal of Finance* 55, 565–614.
- Beny, L., 2000. A comparative empirical investigation of agency and market theories of insider trading. Harvard Law School doctoral dissertation.
- Bessembinder, H., Chan, K., Seguin, P.J., 1996. An empirical examination of information, differences of opinion, and trading activity. *Journal of Financial Economics* 40, 105–134.
- Bhattacharya, U., Daouk, H., 2002. The world price of insider trading. *Journal of Finance* 57, 75–108.
- Black, F., 1976. Studies of stock price volatility changes. *Proceedings of the 1976 Meetings of the Business and Economic Statistics Section. American Statistical Association*, 177–181.
- Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics* 87, 115–143.
- Bond, S., 2002. Dynamic panel data models: A guide to micro data methods and practice. *Portuguese Economic Journal* 1, 141–162.
- Bris, A., Goetzmann, W.N., Zhu, N., 2007. Efficiency and the bear: Short sales and markets around the world. *Journal of Finance* 62(3), 1029–1079.
- Brown, L., 1993. Earnings forecasting research: Its implications for capital markets research. *International Journal of Forecasting* 9(3), 295–320.
- Bushman, R., Piotroski, J., Smith, A., 2004. What determines corporate transparency?. *Journal of Accounting Research* 42, 207–252.
- Calderón, C.A., Chong, A., Loayza, N.V., 2002. Determinants of current account deficits in developing countries. *Contributions to Macroeconomics* 2(1), Article 2.

- Campbell, J.Y., Lettau, M., Malkiel, B.G., Xu, Y., 2001. Have individual stocks become more volatile? An empirical exploration of idiosyncratic risk. *Journal of Finance* 56, 1–43.
- Campbell, J.Y., Vuolteenaho, T., 2004. Bad beta, good beta. *American Economic Review* 94, 1249-1275.
- Chan, K., Hameed, A., 2006. Stock price synchronicity and analyst coverage in emerging markets. *Journal of Financial Economics* 80, 115–147.
- Chang, E.C., Dong, S., 2006. Idiosyncratic volatility, fundamentals, and institutional herding: Evidence from the Japanese stock market. *Pacific-Basin Finance Journal* 14, 135–154.
- Christie, A., 1982. The stochastic behavior of common stock variances: Value, leverage, and interest rate effects. *Journal of Financial Economics* 10, 407–432.
- Clark, P.K., 1973. A subordinated stochastic process model with finite variance for speculative prices. *Econometrica* 41, 135–155.
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2006. The law and economics of self-dealing. Working Paper. National Bureau of Economic Research.
- Durnev, A., Morck, R., Yeung, B., Zarowin, P., 2003. Does greater firm-specific return variation mean more or less informed stock pricing?. *Journal of Accounting Research* 41, 797–836.
- Durnev, A., Morck, R., Yeung, B., 2004. Value-enhancing capital budgeting and firm-specific stock return variation. *Journal of Finance* 59, 65–105.
- Durnev, A., Li, K., Morck, R., Yeung, B., 2004. Capital markets and capital allocation: Implications for economies in transition. *Economics of Transition* 12(4), 593–634.
- Edison, H. Warnock, F., 2003. A simple measure of the intensity of capital controls. *Journal of Empirical Finance* 10, 83–105.
- Epps, T.W., Epps, M.L., 1976. The stochastic dependence of security price changes and transaction volumes: Implications for the mixture-of-distributions hypothesis. *Econometrica* 44(2), 305–321.
- Fama, E.F., MacBeth, J.D., 1973. Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy* 81, 607–636.
- Fernandes, N., Ferreira, M.A., 2007. Insider trading laws and stock price informativeness. *Review of Financial Studies*, Forthcoming.

- Fox, M.B., Morck, R., Yeung, B., Durnev, A., 2003. Law, share price accuracy, and economic performance: The new evidence. *Michigan Law Review* 102(3), 331–386.
- Griliches, Z., Hausman, J., 1986. Errors in variables in panel data. *Journal of Econometrics* 31(1), 93–118.
- Hansen, L., 1982. Large sample properties of generalized method of moments estimators. *Econometrica* 50, 1029–1054.
- Harvey, C.R., 1995. Predictable risk and returns in emerging markets. *Review of Financial Studies* 8, 773–816.
- Hirshleifer, D., 2001. Investor psychology and asset pricing. *Journal of Finance* 56, 1533–1597.
- Hwang, S., Satchell, S.E., 2001. Properties of cross-sectional volatility. *Financial Econometrics Research Centre Working Paper WP00-4*. City University Business School.
- Irvine, P.J., Pontiff, J., 2007. Idiosyncratic return volatility, cash flows, and product market competition. *Review of Financial Studies*, Forthcoming.
- Jiang, X., Lee, B-S., 2006. The dynamic relation between returns and idiosyncratic volatility. *Financial Management* 35, 43–65.
- Jin, L., Myers, S., 2006. R^2 around the world: New theory and new tests. *Journal of Financial Economics* 79, 257–292.
- Johnson, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2000. Tunneling. *American Economic Review* 90(2), 22–27.
- Judson, R.A., Owen, A.L., 1999. Estimating dynamic panel data models a guide for macroeconomists. *Economics Letters* 65(1), 9–15.
- Kaufmann, D., Kraay, A., Mastruzzi, M., 2006. *Governance Matters: Governance Indicators for 1996-2005*. World Bank Policy Research September 2006. World Bank, Washington DC, USA.
- Lamoureux, C.G., Lastrapes, W.D., 1990. Heteroskedasticity in stock returns data: Volume versus GARCH effects. *Journal of Finance* 45, 221–229.
- La Porta, R., Lopez de Silanes, F., Shleifer, A., Vishny, R.W., 1998. Law and Finance. *Journal of Political Economy* 106, 1113–1155.
- LeRoy, S., Porter, R., 1981. The present value relation: Tests based on variance bounds. *Econometrica* 49, 555–574.
- Lesmond, D.A., 2005. Liquidity of emerging markets. *Journal of Financial Economics* 77(2), 411–452.

- Leuz, C., Nanda, D., Wysocki, P., 2003. Earnings management and investor protection: An international comparison. *Journal of Financial Economics* 69, 505–527.
- Li, K., Morck, R., Yang, F., Yeung, B., 2004. Firm-specific variation and openness in emerging markets. *Review of Economics and Statistics* 86(3), 658–669.
- Li, X-M., 2003. China: Further evidence on the evolution of stock markets in transition economies. *Scottish Journal of Political Economy* 50(3), 217–358.
- Lo, A., Wang, J., 2000. Trading volume: Definition, data analysis and implication of portfolio theory. *Review of Financial Studies* 13, 257–300.
- Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: Why do emerging markets have synchronous price movements?. *Journal of Financial Economics* 58, 215–260.
- Nickel, S.J., 1981. Biases in dynamic models with fixed effects. *Econometrica* 49, 1417–1426.
- Pagan, A.R., 1984. Econometric issues in the analysis of regressions with generated regressors. *International Economic Review* 25, 221–247.
- Pagan, A.R., Ullah, A., 1988. The econometric analysis of models with risk terms. *Journal of Applied Econometrics* 3, 87–105.
- Petersen, M., 2007. Estimating standard errors in finance panel data sets: Comparing approaches. Working Paper. Northwestern University.
- Rajgopal, S., Venkatachalam, M., 2007. Financial reporting quality and idiosyncratic return volatility over the last four decades. Working Paper. Duke University.
- Roll, R., 1988. R^2 . *Journal of Finance* 43, 541–566.
- Roodman, D., 2004. The anarchy of numbers: Aid, development, and cross-country empirics. Working Paper 32. Center for Global Development, Washington DC.
- Sargan, J., 1958. The estimation of economic relationships using instrumental variables. *Econometrica* 26(3), 393–415.
- Schwert, G.W., Seguin, P.J., 1990. Heteroskedasticity in stock returns. *Journal of Finance* 45, 1129–1156.
- Shiller, R.J., 1981. Do stock price move too much to be justified by subsequent dividends?. *American Economic Review* 71, 421–436.
- Tauchen, G.E., Pitts, M., 1983. The price variability–volume relationship on speculative markets. *Econometrica* 51, 485–505.

- Tobin, J., 1984. On the efficiency of the financial system. Fred Hirsch Memorial Lecture, New York, Lloyds Bank Review 153, 1–15.
- Vuolteenaho, T., 2002. What drives firm-level stock returns?. *Journal of Finance* 57, 233–264.
- Wawro, G., 2002. Estimating dynamic panel data models in political science. *Political Analysis* 10(1), 25–48.
- Wei, S.X., Zhang, C., 2006. Why did individual stocks become more volatile?. *Journal of Business* 79(1), 259–292.
- Windmeijer, F., 2005. A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics* 126, 25–51.
- World Bank, 2006. *World Development Indicators 2006*. [online]. World Bank, Washington DC, USA.
- World Economic Forum, 2005. *The Global Competitiveness Report 2005-2006*. Geneva, Switzerland.
- World Federation of Exchanges, 2005. *Annual Report and Statistics 2005*. Paris, France.
- Wurgler, J., 2000. Financial markets and the allocation of capital. *Journal of Financial Economics* 58, 187–214.
- Xu, Y., Malkiel, B.G., 2003. Investigating the behavior of idiosyncratic volatility. *Journal of Business* 76, 613–644.

Appendix:

Previous studies on firm-specific returns variation and the information content of stock prices

Study	Sample	Main Objectives	Major Findings
Firm-specific returns variation and aspects of the information environment of the stock market:			
R. Morck, B. Yeung and W. Yu (2000)	1995 stock returns and other data for a representative set of developed and emerging stock markets.	Examining and explaining firm-specific variation in stock returns in a set of developed (high per capita income) and emerging (low per capita income) economies.	Firm-specific variation constitutes a greater part of total return variation in most of the developed countries and a lower part of total return variation in most of the emerging stock markets and that the cross-sectional differences country size, market size, macroeconomic stability, economic structure, and firm fundamentals cannot account for the differences in firm-specific returns variation. Rather, the cross-country institutional development measures such as good governance and stronger private property rights are found to be strongly associated with higher firm-specific stock return variation.
K. Li, R. Morck, F. Yang and B. Yeung (2004)	Stock returns of 17 emerging stock markets over the 1990–2001 sample period.	Examining and explaining the time series behavior of firm-specific returns variation for a cross-section of emerging stock markets.	Firm-specific stock return variation in the majority of the sample markets exhibits a rising trend over the sample period and that trend is significantly associated with that of capital market openness and market reforms in those markets.
N. Fernandes and M. A. Ferreira (2007)	Data from 48 developed and emerging market countries over the 1980–2003 sample period.	Investigating the relation between a country's first-time enforcement of insider trading laws and stock price informativeness as measured by firm-specific stock returns variation.	Enforcement of insider trading laws improves price informativeness in developed markets. In emerging market countries, price informativeness changes insignificantly after the enforcement.

Previous studies on firm-specific returns variation and the information content of stock prices

(Continued)

Study	Sample	Main Objectives	Major Findings
Firm-specific returns variation and aspects of the information environment of the stock market:			
K. Chan and A. Hameed (2006)	The sample includes firms from 25 emerging market countries with the sample years starting from 1993 and ending in 1999.	Examining the relationship between the firm-specific stock returns variation and analysts' activity in emerging stock markets.	Emerging market securities which are covered by greater number of analysts show lower firm-specific returns variation and therefore incorporate lesser firm-specific information.
L. Jin and S. C. Myers (2006)	Stock returns from 40 stock markets from 1990 to 2001.	Examining the impact of corporate opaqueness (lack of information that enables investors to assess cash-flows and the firm value) on firm-specific returns variation.	Cross-country differences in the levels of firm-specific returns variation can be explained by minimal shareholder protection and different measures of corporate opaqueness.
R. Bushman, J. Piotroski and A. Smith (2004)	A varying sample size covering 41 to 46 countries.	Identifying the determinants of corporate transparency, defined as the availability of firm-specific information to those outside publicly traded firms.	Countries with more developed financial analysis industries and freer press tend to have improved firm-specific information environments.
A. Bris, W.N. Goetzmann and N. Zhu (2007)	Sample period of January 1990 to December 2001 across 46 stock markets.	Examining whether short sales restrictions affect the efficiency of the market.	Greater firm-specific returns variation is evident in countries that impose fewer restrictions on short selling.

Previous studies on firm-specific returns variation and the information content of stock prices

(Continued)

Study	Sample	Main Objectives	Major Findings
Firm-specific returns variation and aspects of the information environment of the stock market:			
M. B. Fox, R. Morck, B. Yeung and A. Durnev (2003)	US companies listed in the CRSP and COMPUSTAT tapes in 1980 and 1982.	Examining the effect of a December 1980 change in SEC's disclosure requirements (MD&A Rule) on share price accuracy as measured by firm-specific returns variation.	Higher firm-specific stock returns variation is significantly positively related to more stringent disclosure requirements.
S. Rajgopal and M. Venkatachalam (2007)	US stock returns and accounting data from 1962 to 2001.	Exploring whether deteriorating financial reporting quality can explain the increase in idiosyncratic volatility in the US.	Deterioration in financial reporting quality as proxied by earnings quality and dispersion in analyst forecasts of future earnings is related to rising idiosyncratic volatility over the last four decades.
Firm-specific returns variation and firm fundamentals:			
A. Durnev, R. Morck, B. Yeung and P. Zarowin (2003)	US companies listed in the WRDS CRSP/COMPUSTAT Merged Database for each year from 1983 to 1995.	Examining whether greater firm-specific returns variation mean more or less informed stock pricing in the US.	US firms with higher firm-specific returns variation observe higher association between current returns and future earnings, reflecting increased capitalization of firm-specific information about fundamentals into stock prices.
E. C. Chang and S. Dong (2006)	Japanese stock returns and accounting data from 1975 to 2003.	Examining the roles of investor (institutional) behavior and stock fundamentals in explaining differences in firm-specific volatility across firms.	Both institutional herding and earnings dispersion of Japanese firms are significantly positively related to firm-specific variation in Japanese stock returns.

Previous studies on firm-specific returns variation and the information content of stock prices

(Continued)

Study	Sample	Main Objectives	Major Findings
Firm-specific returns variation and firm fundamentals:			
S. X. Wei and C. Zhang (2006)	US stock returns and accounting data from 1976 to 2000.	Investigating why individual US stocks have become more volatile over the sample period.	They report a strong negative correlation between earnings (return on equity) and idiosyncratic volatility, as well as a strong positive correlation between earnings volatility and idiosyncratic volatility.
P. J. Irvine and J. Pontiff (2007)	Data from the US stock market over the period from 1964 to 2003.	Examining why idiosyncratic volatility in the US has increased over time.	The trends in alternative proxies of idiosyncratic cash flow volatility mirror the trend in idiosyncratic stock return volatility in the US, which is consistent with stock market efficiency.
Firm-specific returns variation and allocational efficiency of the stock market:			
A. Durnev, R. Morck and B. Yeung (2004)	Daily US stock returns data over 1990–1992 and annual firm-level accounting data over 1993–1997.	Examining the relationship between economic efficiency of corporate investment and the magnitude of firm-specific variation in stock returns across US industries.	US industries in which firm-specific stock returns variation is higher exhibit fewer signs of both overinvestment and underinvestment.
J. Wurgler (2000)	Dataset spanning 28 manufacturing industries across 65 countries over 33 years (1963–1995).	Examining whether financial markets improve the allocation of capital and identifying the underlying mechanism at work.	Financial markets appear to improve the allocation of capital. The efficiency of capital allocation across countries is negatively correlated with the extent of state ownership in the economy, and positively correlated with the degree of firm-specific movement in domestic stock returns and the legal protection of investors.
A. Durnev, K. Li, R. Morck and B. Yeung (2004)	Data from a number of developed and transition economies over the period 1990 to 2002.	Examining the relationship between stock return asynchronicity and economic growth across countries.	Higher real per capita GDP growth or total factor productivity growth is significantly associated with greater market-level stock return variation (asynchronicity).