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Performance of High and Low Book-to-Market Stocks with Strong Financial Signals: Evidence in Asia Markets 1991-2002

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Key words: Asian stock markets; Firm-size effect; Book-to-market (BTM) effect; High BTM and low BTM portfolios; Glamour and value stocks; Fundamental analysis; Financial signals; F_SCORE; FG_SCORE.

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ABSTRACT

Motivated by striking findings in recent US studies on return enhancing role in financial signals, we examine in the context of Asian stock markets if we can improve one- and two-year returns of high and low book-to-market (BTM) portfolios by retaining in the portfolios only the stocks whose current accounting/financial information indicates strong financial performance in the prior year. We find that doing so can substantially improve the future returns of such portfolios in all markets except Malaysia. We also find that a zero-investment winner-loser strategy on high BTM stocks (a strategy of longing the value stocks with strong financial signals and simultaneously shorting the value stocks with weak financial signals) generates average returns ranging from 5% (Taiwan) to 20% (Korea) with 16% (Singapore) being the median, whereas the zero-investment strategy on low BTM stocks generates average returns ranging from 7% (Korea) to 25% (Taiwan) with 17% (Thailand) being the median. These findings suggest, among other things, that current (hence, outdated) accounting/financial information can contain substantial pricing information on the future returns of both value and glamour stocks also in Asian markets.

I. INTRODUCTION

Motivated by striking findings in recent US studies on return enhancing role in financial signals, we examine in the context of Asian stock markets if we can improve one- and two-year returns of high and low book-to-market (BTM) portfolios by retaining in the portfolios only the stocks whose current accounting/financial information indicates strong financial performance in the prior year.[1]

The high BTM (value) portfolio strategy, one of popular strategies, was motivated by an empirical regularity in developed international markets that medium-term returns of high BTM stocks tend to be larger than those of low BTM stocks.[2] Fama and French (1992) claim, in essence, that the positive medium-term relation between BTM ratio and stock return (that is, positive BTM effect) is not inconsistent with rational equity pricing as the higher average returns of value stocks are associated with their higher risk reflected in the higher BTM ratio.[3] Value portfolios became popular as they continued to beat on average other contrarian portfolios that were constructed by selecting stocks according to, for example, low price to earnings, high dividend yield, or relative lack of equity analysts following.[4]

The low BTM (glamour or growth) portfolio strategy, an equally popular strategy, was motivated by the possibility of professional investors' herding on glamour stocks. The herding would lead to return continuations in glamour stocks such that the glamour stocks with strong

[1] The recent studies are Piotroski (2000) and Mohanram (2003), whereas recent pricing studies utilizing a fundamental analysis of accounting/financial information include Nissim and Penman (2001), Beneish et al. (2001), Liu et al. (2002), and Lewellen (2002).

[2] For early evidence, see Fama and French (1992).

[3] Recent studies that attempt to provide risk-based explanations of the seeming medium-horizon anomaly include Petkova and Zhang (2002) who show an interesting possibility that value stocks are relatively more (less) risky than growth stocks in bad (good) times when expected risk premium is high (low). One well-known behavioral explanation of the anomaly is the mispricing story (or the extrapolation hypothesis) posited by Lakonishok et al. (1994) who claim that the positive BTM effect is a result of investors' irrational upward-biased (downward-biased) expectations on future performance of glamour (value) stocks, which are reversed only in intermediate horizons. Recent follow-up studies of this mispricing story include Nagel (2003) and Ali et al. (2003), which attempt to explain why the systematic errors in investors' expectations should persist. Interestingly, Fama (1998) raises another possibility that the positive BTM effect is a time-specific regularity with no systematic underlying explanations.

[4] For well-cited evidence, see Barber and Lyon (1997).

appreciation in the prior period will continue to outperform the value stocks with weak appreciation in the prior period. The implied negative relation between the BTM ratio and stock return (that is, negative BTM effect) is now an empirical regularity in less developed international markets and hence, the glamour strategy has become a popular momentum strategy especially in these markets.[5]

Recently, Piotroski (2000) documents that, in the period from 1976 to 1996, high BTM portfolios could have substantially enhanced their future returns by retaining only the value stocks whose current accounting information indicates strong financial performance in the prior year. To identify the value stocks with strong financial signals, Piotroski uses an aggregate index (F_SCORE) constructed from nine binary accounting proxies of profitability, liquidity and operating efficiency. He finds that the value stocks as a whole earned annual market-adjusted returns of 5.9% and 12.7% in the first and second year after portfolio formation, while the value stocks with strong (weak) financial signals earned 13.4% (-9.6%) and 28.7% (-14.5%) for the respective holding periods. His results indicate that even the outdated financial signals extracted from current accounting information can substantially affect the future returns of value stocks.[6] Piotroski argues, in essence, that the positive financial-signal effects are expected because value stocks are priced mainly on accounting/financial information as they are not favored and followed by many stock analysts, but their current prices do not fully reflect the pricing information contained in current accounting/financial information as they do not trade in rapid information dissemination environments due to lack of analysts following them.[7]

[5] For early evidence, see Fama and French (1998).

[6] He also finds that a zero-investment winner-loser strategy of longing the value stocks with strong signals and simultaneously shorting those with weak signals could have generated 23.0% (= 13.4% - (-9.6%)) and 43.2% in one- and two-year horizons, respectively.

[7] The Piotroski's argument implies that, since glamour stocks are traded in relatively rapid information dissemination environments, their prices may fully reflect the pricing information contained in current accounting/financial information and hence, the financial signals may not substantially affect their future returns.

More recently, Mohanram (2003) argues that unlike value stocks, glamour/growth stocks are valued also on non-accounting/non-financial information and tend to be over-valued relative to their accounting/financial fundamentals. Since the overvaluation tends to be reversed in intermediate horizons, the medium-term returns of low BTM stocks as a whole are expected to be negative.[8] Hence, Mohanram posits, in essence, that a test on the return enhancing role in financial signals of glamour stocks is a stronger test than that of value stocks because glamour (value) stocks as a whole tend to show negative (positive) future returns.[9] In his test on glamour stocks, Mohanram filters the glamour stocks according to their aggregate financial signals that are measured by both Piotroski's F_SCORE index and his own FG_SCORE index. Mohanram finds that, in the period from 1979 to 1999, the glamour stocks as a whole earned size-adjusted annual returns of -6.0% and -4.2% for the first and second year after portfolio formation, whereas the glamour stocks with strong (weak) financial signals based on the F_SCORE index earned 2.1% (-18.2%) and 0.9% (-12.3%) for the respective investment horizons.[10] These results indicate that even the outdated financial signals extracted from current accounting/financial information can also affect the future returns of low BTM stocks.[11]

Piotroski (2000) and Mohanram (2003) provide strong evidence on the positive financial-signal effects and hence the effectiveness of a simple accounting-based fundamental analysis in the US market. However, there are neither explicit explanations (in Mohanram)

[8] The implication of these negative medium-term expected returns of glamour stocks and the positive medium-term expected returns of value stocks is consistent with the positive BTM effect that the medium-term returns of value stocks tend to dominate those of glamour stocks.

[9] Guay (2000) also argues, in essence, that the test of positive financial-signal effects in glamour firms is a stronger test because the effects would be positive only when the return enhancing role in financial signals dominates the (negative) return-reversal effect on the returns of glamour stocks as a whole.

[10] He finds that larger return enhancements are obtained when the glamour stocks are filtered by the FG_SCORE index, which is constructed from both the nine proxies used for the F_SCORE index and such additional proxies as stability in earnings, sales and revenue growth and relative sizes in R&D, capital and advertising expenditures. For details, see Mohanram (2003).

nor implicit explanations (in Piotroski) on the positive financial-signal effects in glamour stocks.[12] This lack of explanations leads to a valid conjecture that the evidence on positive financial-signal effects in the US glamour stocks (and hence, value stocks) may have been a time-specific regularity.[13]

Given the possibility that the US evidence could have been a time-specific regularity, one may wonder if the positive financial-signal effect would be observed also in international markets. We reckon that in developed international markets, the positive financial-signal effects are likely to be observed because these and the US markets tend to share common empirical regularities as they are highly developed and integrated. In less-developed international markets, however, the positive financial-signal effects may not be observed for at least three reasons. First, since these and the US markets are not highly integrated, these markets may not share the empirical regularity in the US market. Second, since the quality of accounting/financial information in these markets is perceived to be relatively poor, the positive financial-signal effects, if any, may not be as substantial as in the US market. Third, while the Piotroski's argument for positive financial-signal effects in value stocks is based also on the positive BTM effects, these markets tend to show either negative or insignificant BTM effects[14] and hence, the positive financial-signal effects especially in value stocks may be negligible.

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[11] He also finds that a zero-investment winner-loser strategy of longing the glamour stocks with strong signals and simultaneously shorting those with weak signals could have generated 20.3% (= 2.1% - (-18.2%)) and 13.2% returns in the respective horizons.

[12] The lack of explicit explanations is expected, however, because the alternative hypothesis for the stronger test in Mohanram (that is, a presence of financial-signal effects in glamour stocks) should not be supported by Piotroski's argument for a presence of financial-signal effect in value stocks.

[13] This conjecture can be tested in the context of non-US international markets. This test is an indirect test when the sample does not include the US market from which the initial evidence is obtained. It is a meaningful test, however, not only because the likelihood of falsifying the financial-signal effect is high in non-US markets but also because a finding from international markets can be regarded as a more general finding to which the finding in the US market is compared.

[14] For example, a negative BTM effect is found in Argentina, Colombia and Mexico (Fama and French (1998)) and in Turkey (Gonenc and Karan (2003)), while an insignificant BTM effect is found in Taiwan and Thailand (Chui and Wei (1998)), New Zealand (Pinfold et al. (2001)), and Pakistan (Fama and French (1998)). In Korea, Singapore, Taiwan and Malaysia, Hong and Lee (2003) do not find earnings and price momentum, which

Motivated by the striking findings in Piotroski (2000) and Mohanram (2003) and our conjectures on the absence (presence) of positive financial-signal effects in less-developed (developed) international markets, this paper tests in the context of Asian stock markets whether future returns of high and low book-to-market (BTM) portfolios can be enhanced when they retain only the stocks whose current accounting information indicate strong financial performance in the prior year.[15] Our analysis is done in the context of six relatively liquid Asian markets (Hong Kong, Korea, Malaysia, Singapore, Taiwan, and Thailand) for the period from 1991 to 2002. We also investigate the BTM effects and the return performance of zero-investment strategies in the Asian markets.[16] We find that both the value and the glamour portfolios retaining stocks with strong financial signals can substantially improve their future returns in all markets except Malaysia. We also find that a zero-investment winner-loser strategy on high BTM stocks generates average returns ranging from 5% (Taiwan) to 20% (Korea) with 16% (Singapore) being the median, whereas the zero-investment strategy on low BTM stocks generates average returns ranging from 7% (Korea) to 25% (Taiwan) with 17% (Thailand) being the median.

Our findings suggest that even the current (hence, outdated) accounting/financial information can contain substantial pricing information on the future returns of both value and glamour stocks also in Asian markets. The median financial-signal effect in value (glamour)

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suggests either negative or insignificant BTM effects in these Asian markets. For similar findings on Korea, Taiwan and Malaysia, see Chui and Wei (1998).

[15] These conjectures imply that a test of the financial-signal effect in less-developed international markets would be an interesting investigation because the financial-signal effects in these markets may substantially differ from those in the US and other developed international markets. Such a test is also interesting because financial-signal effects in less-developed international markets may substantially differ among themselves as these markets are going through different development stages.

[16] Such analysis should be of interests also to financial market professionals for following reasons. First, such evidence on positive financial-signal effects in these markets would indicate the usefulness of a simple accounting-based fundamental analysis for portfolio investment, whereas a lack of evidence would be an indirect confirmation of conjectures on the absence of financial-signal effects. Second, the relative magnitude of financial-signal effects in value and glamour firms will shed some light on different information dissemination environments facing these firms in less-developed markets. Third, given the lack of both significant firm-size and positive BTM effects in less-developed markets, such evidence on positive financial-signal effects would

stocks in our sample is substantially (slightly) smaller than the average financial-signal effect in value (glamour) stocks documented in Piotroski (2000) (in Mohanram (2003)). This finding that the financial-signal effects in Asian markets are relatively small might be due to, perhaps, poor quality in accounting/financial information. Unlike the US finding, the financial-signal effects in glamour stocks are not smaller than those in value stocks. This is expected given the negative BTM effects that we find in all markets except Malaysia.

The next section describes the data and methodology. Section III discusses the main results. Section IV examines the relative strength among firm size, BTM ratio, and financial-signal effects. Section V concludes the paper.

II. DATA AND METHODOLOGY

1. Data

Our analysis covers six relatively liquid Asian stock markets for the period from January 1991 to December 2002: Hong Kong, Korea, Malaysia, Singapore, Taiwan, and Thailand.[17] Our sample consists of all non-financial stocks that are listed in their respective main boards and have sufficient financial data. The selection of the stocks listed on main boards is to avoid the "stale price" problem facing young, small, and illiquid stocks, which could impair the return measurement and hence the financial-signal effects. Data on month-end stock prices and annual financial statements are collected mainly from four databases: PACAP, BLOOMBERG, COMPUSTAT and COMPANY ANALYSIS. For the year of 1991, our sample contains 1534 firms that are positive in book value of equity. The corresponding

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suggest that the current accounting/financial information can be used to extract important pricing factors on future returns of value and glamour stocks in these markets.

[17] Together with Japan and Australia, the two well-developed markets in Asia, these markets are the major Asian markets that attract global investors' portfolio investments for at least three reasons. First, in comparison to China and other emerging Asian markets, they are relatively liquid markets as stock trading in these markets has been free from severe restrictions on foreign ownership and foreign exchange control since the early 1990s. Second, these were among the highest growing high-tech Asian countries in the past two decades. Third, as

number for the year of 2002 is 3167. The total number of firm-year observations for the six markets is 14,797, while the firm-year observations for value and glamour stocks are 7,264 and 7,534, respectively.[18]

Table 1 provides summary statistics on main financial characteristics of both the high and the low BTM portfolios. The average size of glamour firms is much larger than that of value firms in all markets, while the ratio between the two averages ranges from 2.27 (Thailand) to 31.71 (Taiwan). The value portfolios in our sample consist of relatively small firms (especially in Taiwan), a finding similar to that in US market (e.g., Fama and French (1995)). These mean sizes of value and glamour firms are, however, substantially smaller than the respective US counterparts reported in Piotroski (2000) and Mohanram (2003). The average BTM ratio of value firms ranges from 1.72 (Hong Kong) to 6.76 (Thailand), while the same of glamour firms ranges from 0.31 (Malaysia) to 1.45 (Korea). These BTM ratios are several times larger than the respective US counterparts reported in Piotroski (2000) and Mohanram (2003).[19]

[Insert Table 1 about here]

The summary statistics on accounting proxies for profitability of value firms are comparable to those reported in Piotroski (2000), whereas the same of glamour firms are not comparable to those reported in Mohanram (2003). These summary statistics indicate that value firms in Hong Kong, Korea, Singapore and Taiwan might have had slightly stronger financial signals on corporate profitability. The summary statistics on the proxies for financial risk and operating efficiency indicate that glamour firms in Hong Kong and Thailand might

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annual surveys of the Asian Corporate Governance Association (http://www.acga-asia.org) indicate, these markets score relatively high in terms of corporate governance quality.

[18] In Piotroski (2000), the total number of observations for value firms is 14,000 firm-years. The same for glamour firms is 20,866 firm-years in Mohanram (2003).

[19] The BTM ratios of glamour firms reported here are not much different from those reported in earlier studies, e.g., Chui and Wei (1998) and Barry, et al. (1999), whereas the BTM ratios of value firms reported here are

have had stronger financial signals, whereas value firms in Hong Kong and Singapore might have had stronger financial signals on operating efficiency. Altogether, these statistics suggest that, although their stock prices were temporarily distressed, the value firms in Asia were not financially weak.[20]

2. Methodology

To construct BTM portfolios for each fiscal year, each firm's BTM ratio is computed from dividing the book value of equity by the market value of equity at the beginning of its fiscal year. According to their BTM ratios, stocks are ranked and then grouped into a tercile portfolio. In our study, the stocks in the highest BTM tercile are labeled as high BTM stocks, whereas the stocks in the lowest tercile are labeled as low BTM stocks.

To measure the aggregate financial signal, we use the formulae for F_SCORE index in Piotroski (2000), which combines the nine binary signals on three aspects of corporate performance: namely, profitability, financial risk and operating efficiency. Specifically, the F_SCORE is computed as:

$$\begin{aligned} \text{F\_SCORE} = {} & \text{F\_ROA} + \text{F\_}\Delta\text{ROA} + \text{F\_CFO} + \text{F\_ACR} + \text{F\_}\Delta\text{LEV} + \text{F\_}\Delta\text{LIQ} + \text{F\_EQ} \\ & + \text{F\_}\Delta\Pi + \text{F\_}\Delta\text{TURN} \end{aligned} \quad (1)$$

Each binary proxy is numerically recorded as one (zero) if realization for the fiscal year is good (bad). In the case of binary proxies for profitability (F_ROA, F_ΔROA, F_CFO and F_ACR) and operating efficiency (F_ΔΠ and F_ΔTURN), each variable takes the value of one (zero) if its underlying variable is positive (non-positive).[21] Similarly, F_ΔLEV (F_ΔLIQ) takes the value of one if its underlying variable is negative (positive), whereas F_EQ takes the

much larger than those reported in the earlier studies. For example, Chui and Wei (1998) report that the BTM ratios of medium-size value portfolios range from 0.81 (Thailand) to 2.93 (Korea).

[20] This finding contrasts with implications of the corresponding summary statistics in Piotroski (2000).

value of one if there was no equity offering for the fiscal year. Hence, the composite F-SCORE can range from 0 (the worst) to 9 (the best).

The high BTM stocks are then ranked according to the composite F_SCORE and then grouped into a F_SCORE decile portfolio. Similarly, the low BTM stocks are grouped into a F_SCORE decile portfolio. Like the US stocks in Piotroski (2000) and Mohanram (2003), very few stocks in our sample had F_SCORE of 0 or 1 (especially in Taiwan), whereas very few stocks had F_SCORE of 9 (especially in Thailand). In our study, the high F_SCORE stocks (stocks with strong financial signals) are the stocks roughly in the top two F_SCORE deciles (stocks with F_SCORE of 8 or 9), whereas the low F_SCORE stocks are the stocks roughly in the bottom three deciles (stocks with F_SCORE of 0, 1, or 2).[22]

Future returns are measured in both one- and two-year market-adjusted returns, where market-adjusted returns are computed as unadjusted buy-and-hold returns minus the value-weighted market returns for a holding period.[23] Stocks that are delisted during a holding period are excluded.[24] For each stock, the holding period starts six months after the end of its fiscal year, which is the end of calendar year for majority stocks in our sample. As noted in

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[21] For example, in the case of F_ACR, it is recorded one (zero) if CFO ratio > ROA (if otherwise). For notations, see Table 1. For other details, see Piotroski (2000) and Mohanram (2003).

[22] In contrast, high F_SCORE firms in Piotroski (Mohanram) have 8 or 9 (7, 8, or 9) scores, whereas low F_SCORE firms in Piotroski (Mohanram) have 0 or 1 (0, 1, 2, or 3) scores. As in Piotroski (2000) and Mohanram (2003), our results are not sensitive to alternative criteria for strong and weak financial signals. To demonstrate the relative effectiveness of alternative financial signal measures for growth firms, Mohanram (2003) also considers the FG_SCORE index for financial signals and finds that the glamour portfolios filtered on FG_SCORE tend to perform better than those filtered on F_SCORE. We did not use the FG_SCORE index because our main purpose is documenting the presence or absence of positive financial-signal effects in value and glamour firms.

[23] The use of equal-weighted market returns gives more weights to the returns of value firms because these firms tend to be relatively small. As in Piotroski (2000) and Mohanram (2003), our qualitative results are not sensitive to these alternative methods of adjusting for market returns. In our analysis, results obtained using equal-weighted returns are quantitatively stronger than those results obtained using value-weighted returns. Since these quantitatively strong results are more susceptible to outliers, we report only the results obtained using value-weighted returns.

[24] Our results are robust to whether we exclude these firms or include them by assigning zero returns. Firms are delisted for many reasons including mergers, takeovers and bankruptcies. Hence, Guay (2000) cautions that these events have very different implications for the returns of delisted firms. Following Shumway (1997), Mohanram (2003) uses CRSP delisting returns if available. If the delisting returns are not available, he uses -30% if the delisting is for performance reasons and zero otherwise. As in Piotroski (2000), the results in Mohanram (2003)

Piotroski (2000) and Mohanram (2003), the parametric tests of the differences among returns of high and low F-score portfolios and value and glamour portfolios can be problematic due to low frequency data employed here. Hence, we provide both the t-statistics and the test statistics obtained from the bootstrapping technique similar to that in Piotroski (2000).[25]

III. Empirical Finding

Table 2 reports the distribution statistics for only one-year market-adjusted returns of value and glamour portfolios since the results of two-year returns are not materially different from those reported.

[Insert Table 2 about here]

The proportions of value stocks with positive returns range from 11% (Taiwan) to 32% (Thailand), which are smaller than the US equivalent (44%) in Piotroski (2000). The proportions of glamour stocks with positive returns range from 39% (Singapore and Thailand) to 51.1% (Korea), which are smaller than the US counterpart in Mohanram (2003). In all markets except Malaysia, value stocks underperformed glamour stocks in both median and mean returns. This negative BTM effect in Asian market contrasts with the positive BTM effect in the US market.[26] In the markets other than Singapore and Taiwan, the value stocks in the left 10th percentile of return distribution performed better than the glamour stocks in the corresponding percentile.[27] This finding that in most markets, the distributions of value (glamour) stock returns have a relatively short negative (long positive) tail is consistent with

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are not sensitive to these alternative adjustments for delisting returns. We do not analyze this issue as sufficient data for our sample markets are unavailable.

[25] For similar applications, see Kothari and Warner (1997), Barber and Lyon (1997), Piotroski (2000) and Mohanram (2003).

[26] The combined results in Piotroski (2000) and Mohanram (2003) imply the positive BTM effect documented in Fama and French (1992).

[27] The value firms in the left 25th percentile of return distribution did not perform worse than the glamour firms in the corresponding percentile.

earlier findings in Chui and Wei (1998) and Barry, et al. (1999) but not with US finding in Fama and French (1995), Piotroski (2003) and Mohanram (2003).

To investigate both the return enhancing role in financial signals and the zero-investment returns, we compute both one- and two-year market-adjusted returns of the portfolios constructed according to tercile BTM and decile F_SCORE partitions. One- and two-year returns are not, however, qualitatively different from each other. Hence, Table 3 reports only one-year returns of four portfolios: value portfolios with strong or weak financial signals and glamour portfolios with strong or weak financial signals.

[Insert Table 3 about here]

In all markets except Malaysia, the financial-signal effects in both value and glamour stocks are positive. In value stocks, the median return differences between strong and weak financial-signal stocks range from 5% (Taiwan) to 20% (Korea) with 16% (Singapore) being the median. In glamour stocks, the same range from 7% (Korea) to 25% (Taiwan) with 17% (Thailand) being the median.

Comparing the BTM effects, the return enhancements, and the financial-signal effects across our sample markets is complex as illustrated in Figure 1. In our analysis, the BTM effect is measured as the difference between the median returns of high and low BTM stocks. The net (or incremental) F_SCORE effect reflects the return-enhancing role in financial signals and measured as the difference between median returns of the value (glamour) stocks with strong financial signals and the value (glamour) stocks as a whole. The gross F_SCORE effect reflects the financial-signal effect and is measured as the difference between median returns of high and low F_SCORE stocks in the respective BTM partitions. Hence, this financial-signal effect is equivalent to the return of the zero-investment winner-loser strategy.

[Insert Figure 1 about Here]

The median negative BTM effects range from -9.0% (Thailand) to -25% (Korea) with -12% (Singapore) being the median of the median BTM effects. The median return enhancements (net F_SCORE effect) in value stocks range from 2% (Thailand) to 15% (Korea), whereas those in glamour stocks range from -5% (Thailand) to 7% (Korea, Singapore and Hong Kong). These financial-signal effects in value stocks are much smaller the US counterparts (23% for one-year and 43.2% for two-year horizon) reported in Piotroski (2000), whereas those in glamour stocks are only slightly smaller than the US counterparts (20.3% for one-year and 13.2% for two-year horizon) reported in Mohanram (2003).

The finding that the positive financial-signal effects in Asian stocks are smaller than those documented by Piotroski (2000) and Mohanram (2003) is surprising, given the relatively large volatility in Asia markets. The financial-signal effects in Asian markets are relatively small due to, perhaps, relatively poor quality of the accounting/financial information. Unlike the US finding, the financial-signal effects in glamour stocks are not smaller than those in value stocks. This result is consistent with the implication of negative BTM effects in Asian stock markets. Like the US finding, the respective zero-investment returns (that is, 16% for value and 17% for glamour stocks) are larger than the median return (roughly, 12%) of Asian hedge funds and the average return (11.3%) of Global emerging equity market funds, which may employ more sophisticated analyses and hence are expected to generate larger returns.[28]

Our finding indicates that in all markets except Malaysia, stocks with strong financial signals outperform stocks with weak financial signals regardless of their BTM partitions. This

[28] Koh et al. (2003) does not report mean and median statistics for the returns of Asian hedge funds. Our median return estimate (i.e., 12%) is computed as follows. First, the monthly excess return is computed as the simple average excess returns of the 5th and 6th performance deciles (i.e., 0.5*0.41% + 0.5*0.87% = 0.64%) using the information in their Table IV (Pre-fee Excess Monthly Returns). Second, the monthly gross return (1%) is computed by adding an assumed monthly risk-free rate (0.36%) to the excess monthly return (0.64%). Then, the median annualized return (12%) is obtained by simply annualizing the gross monthly return. For emerging equity

finding suggests that even in less-developed international markets, the financial signals imbedded in current (hence, outdated) accounting/financial information can contain substantial pricing information on the future returns of both value and glamour stocks.[29]

IV. Relative Strength among Firm-Size, BTM, and F_SCORE Effects

While both firm size and BTM ratio are broadly recognized as pricing factors, the financial signals are not. Here, we provide a simple analysis that attempts to ascertain the relative importance of financial signals as a pricing factor. Our analysis utilizes both the correlations of market-adjusted returns with these factors (reported in Table 4) and the results on pooled cross-sectional regressions of market-adjusted returns against various combinations of the three factors (reported in Table 5).[30]

The statistically significant correlations of market-adjusted returns with the BTM ratio are positive for value stocks in Korea and glamour stocks in Taiwan, but negative for value stocks in Singapore, Taiwan, and Thailand. This finding indicates that the lack of BTM effect in Korea is the weakest and suggests that the superior performance of value stocks in Korea is the strongest. The statistically significant correlations of the returns with the F_SCORE are positive for value stocks in Korea and Singapore and glamour stocks in Korea and Thailand. This finding indicates that the return-enhancing role in value stocks' financial signals is strong in Korea and Singapore. The correlations between F_SCORE and one-year (two-year) returns of high BTM stocks are 0.188 for Korea and 0.233 for Singapore (0.342 for Korea and 0.214

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market funds, Fung et al. (2002) report 11.3% as the average return for ten emerging market funds for the period from 1994 to 2000.

[29] Both the return-enhancing role in financial signals and the financial-signal effects may have been caused by other pricing factors (for example, firm size and financial distress) that were captured by accounting variables. The test of robustness to such factors can also indicate whether the F_SCORE effects are concentrated in certain types of firms. The F_SCORE effects can be also sensitive to alternative measures of financial signals. Although not reported here, our results are robust to all these factors. Details are available upon request.

[30] Table 5 reports only the results from regressions using one-year returns, which are not materially different from those using two-year returns.

for Thailand). These correlations are larger than those reported in Piotroski (i.e., 0.121 and 0.130 for the respective correlations with one- and two-year returns).[31]

[Insert Table 4 and Table 5 about here]

In the regression of Equation (1), the coefficient estimates for BTM ratios are statistically significant for value stocks in Korea, glamour stocks in Malaysia, and both the value and glamour stocks in Taiwan. The coefficient estimates for BTM ratio for these stocks are all negative, suggesting a negative BTM effect. When F_SCORE is added to the base equation (i.e., in the regression of Equation (2)), the F_SCORE coefficient becomes statistically significant for value stocks (but not for glamour stocks) in Korea, Singapore, and Taiwan. These results suggest that the positive financial signal effects in value stocks were stronger.

In the regression of Equation (3), the firm-size coefficient estimates are significant only for the value stocks in Korea, Malaysia, and Taiwan. This regression equation has a higher explanatory power than the base Equation (1) only for value stocks in Malaysia where the relation between return and firm size is negative. This result suggests that the financial-signal effect dominates the firm size effect in both Korea and Taiwan. When F_SCORE is added to equation (3) (i.e., in the regression of Equation (4)), the F_SCORE exerts a statistically significant positive (negative) effect on the returns of value stocks in Korea and Taiwan (glamour stocks in Hong Kong and Malaysia). These results suggest that the return-enhancing role in value stocks' financial signals was stronger in both Korea and Taiwan.

Relative to the regression of Equation (2), the regression of Equation (5) has a lower explanatory power for all portfolios except the value portfolios in Malaysia. This result suggests that the financial-signal effect dominates the firm size effect. Relative to the

[31] The statistically significant correlations with firm size are positive for value firms in Korea and Singapore. This result suggests that the performance of value firms in Korea and Singapore might have been affected by a firm-size effect.

regression of Equation (5), the regression of Equation (6) has a higher explanatory power for all portfolios. For value portfolios in Malaysia, however, the firm-size coefficient remains as the dominant explanatory variable. Altogether, these results suggest that the positive financial-signal effects are significant even after controlling for the firm size effect.

V. SUMMARY AND CONCLUSIONS

Motivated by striking findings in recent US studies on return enhancing role in financial signals, we examine in the context of Asian stock markets if we can improve one- and two-year returns of high and low book-to-market (BTM) portfolios by retaining in the portfolios only the stocks whose current accounting/financial information indicate strong financial performance in the prior year. We find that doing so can substantially improve the future returns of such portfolios in all markets except Malaysia. We also find that a zero-investment winner-loser strategy on high BTM stocks (a strategy of longing the value stocks with strong financial signals and simultaneously shorting the value stocks with weak financial signals) generates average returns ranging from 5% (Taiwan) to 20% (Korea) with 16% (Singapore) being the median, whereas the zero-investment strategy on low BTM stocks generates average returns ranging from 7% (Korea) to 25% (Taiwan) with 17% (Thailand) being the median.

Our evidence on large positive financial-signal effects (or substantial zero-investment returns) in Asian markets suggests that even in less-developed international markets, stock prices only partially reflect the pricing implications of current accounting/financial information. These financial-signal effects in Asian markets are relatively small due to, perhaps, relatively poor quality in accounting/financial information. Unlike the US finding, the financial-signal effects in glamour stocks are not smaller than those in value stocks. This result is consistent with the implication of the negative BTM effect that low BTM portfolios

tend to outperform high BTM portfolios in intermediate holding horizons, which we find in all markets except Malaysia.

The return enhancements (and the zero-investment returns) due to a simple accounting-based fundamental analysis are quite large also in our study. Like the results in the US, the enhanced returns exceed those of Asian hedge and emerging market equity funds, which may employ more sophisticated analyses and hence are expected to generate larger returns. The performance of portfolio strategies utilizing such fundamental analyses may not persist over time, however, and may vary across markets as the performance may be also sensitive to economic forces that are not considered here.

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Table 1
Financial Characteristics of High and Low BTM Firms by Markets: 1991-2002

		MVE	BTM	ROA	△ROA	CFO	ACR	△LEV	△LIQ	EQ%	△π	△TURN
Hong Kong												
High (n=1587)	AVG	3.4	1.7	6.9	0.0	4.7	-2.0	0.0	1.0	54.3	0.1	-0.1
	SD	(10.9)	(0.5)	(20.8)	(0.3)	(13.7)	(21.6)	(0.1)	(20.3)	13.4	(2.3)	(0.6)
	%+	n/a	n/a	88.5	41.2	77.4	49.0	32.1	42.8	n/a	48.1	37.0
Low (n=1675)	AVG	27.8	0.4	9.3	-0.1	10.1	1.0	0.0	-0.1	79.5	0.0	-0.2
	SD	(68.0)	(0.3)	(16.2)	(0.2)	(15.3)	(16.0)	(0.1)	(1.6)	19.5	(2.1)	(0.6)
	%+	n/a	n/a	82.8	33.5	81.6	56.0	27.6	50.6	n/a	40.6	33.5
Korea												
High (n=1379)	AVG	2.7	5.0	0.6	0.0	3.3	2.0	0.0	0.0	49.3	0.0	-0.1
	SD	(15.2)	(3.9)	(7.0)	(1.0)	(10.0)	(11.0)	(0.1)	(0.6)	17.5	(0.2)	(0.8)
	%+	n/a	n/a	69.2	40.7	67.1	69.0	48.5	58.4	n/a	42.5	33.2
Low (n=1424)	AVG	20.4	1.5	-8.2	0.0	4.9	13.0	0.0	0.2	71.8	-0.1	-0.1
	SD	(62.0)	(2.2)	(25.7)	(0.3)	(13.6)	(24.8)	(0.2)	(1.2)	21.7	(1.8)	(0.5)
	%+	n/a	n/a	54.1	45.9	68.0	82.0	41.6	58.0	n/a	46.3	41.1
Malaysia												
High (n=1199)	AVG	0.6	2.8	5.8	0.0	2.3	-4.0	0.0	-0.1	62.7	2.8	-0.1
	SD	(0.8)	(1.7)	(16.6)	(0.2)	(20.9)	(30.2)	(0.1)	(2.3)	17.7	(39.6)	(1.4)
	%+	n/a	n/a	90.3	37.2	64.8	50.0	47.9	52.0	n/a	44.4	39.8
Low (n=1216)	AVG	5.8	0.3	7.9	0.0	9.5	2.0	0.0	-0.1	73.5	-0.3	-0.1
	SD	(13.9)	(0.2)	(11.7)	(0.1)	(20.7)	(20.4)	(0.1)	(1.3)	19.9	(3.1)	(0.7)
	%+	n/a	n/a	86.1	42.2	78.9	66.0	28.3	49.4	n/a	44.6	41.6
Singapore												
High (n=1112)	AVG	0.9	2.6	4.0	0.0	2.8	-1.0	0.0	-0.1	59.9	0.0	-0.2
	SD	(1.7)	(2.0)	(6.6)	(0.1)	(14.5)	(14.4)	(0.1)	(1.6)	21.2	(0.1)	(0.9)
	%+	n/a	n/a	85.1	38.7	69.4	55.0	48.3	53.2	n/a	41.9	38.7
Low (n=1169)	AVG	9.0	0.4	2.6	-0.1	7.0	4.0	0.0	-0.5	76.7	-0.1	0.0
	SD	(28.9)	(0.2)	(41.8)	(0.4)	(26.4)	(24.0)	(0.1)	(5.5)	23.2	(0.3)	(0.6)
	%+	n/a	n/a	50.4	32.8	33.6	66.0	46.0	53.0	n/a	37.2	37.0
Taiwan												
High (n=1074)	AVG	0.6	4.3	0.6	0.0	0.8	-0.2	0.0	-0.1	36.7	-0.3	0.0
	SD	(0.5)	(3.9)	(8.2)	(0.1)	(11.1)	(13.5)	(0.1)	(1.6)	13.4	(4.2)	(0.2)
	%+	n/a	n/a	69.4	33.8	64.4	58.0	48.0	55.9	n/a	37.7	40.9
Low (n=1098)	AVG	18.9	1.2	24.4	-0.4	13.0	-11.0	0.0	-0.1	51.2	-0.1	-0.1
	SD	(1.3)	(0.6)	(267.7)	(6.5)	(121.6)	(147.7)	(0.1)	(1.2)	24.2	(0.7)	(20.5)
	%+	n/a	n/a	89.1	31.8	72.3	51.0	28.6	51.8	n/a	35.5	44.1
Thailand												
High (n=912)	AVG	1.5	6.8	3.4	0.0	1.4	-2.0	0.0	0.1	69.8	0.0	-0.1
	SD	(2.8)	(5.4)	(5.4)	(0.1)	(13.8)	(13.2)	(0.1)	(0.8)	20.6	(0.3)	(0.4)
	%+	n/a	n/a	86.1	27.5	58.6	49.6	49.7	52.0	n/a	32.8	38.5
Low (n=952)	AVG	3.4	0.5	40.0	0.0	-2.9	-43.0	0.0	0.0	82.7	0.0	0.1
	SD	(10.7)	(0.4)	(510.7)	(6.5)	(170.2)	(680.3)	(0.1)	(1.7)	14.8	(0.3)	(1.4)
	%+	n/a	n/a	84.8	35.2	75.2	67.0	25.7	56.1	n/a	42.2	37.4

Notations:

n	Firm-year observations.
n/a	Not applicable.
%+	The fraction of firm-year observations that are positive in the variable.
MVE	Market value of equity at the beginning of a fiscal year (in 10 US$ Million).
BTM	Book value of equity at the beginning of a fiscal year, scaled by MVE.
ROA	Net income at the beginning of fiscal year, scaled by total assets.
ΔROA	Change in ROA.
CFO	CFO ratio (the cash flow from operations, scaled by total assets).
ACR	Accrual (CFO ratio minus ROA).
ΔLEV	Change in the debt-to-total asset ratio.
ΔLIQ	Change in the current ratio (the ratio between current assets and current liabilities).
EQ%	The proportion of firms that make equity offerings.
Δπ	Change in the margin (the net sales minus the cost of goods sold, scaled by net sales).
ΔTURN	Change in the asset turnover ratio (the ratio between total asset and net sales).

Table 2

Distribution of One-year Market-adjusted Returns of High and Low BTM Firms: 1991-2002

	MEAN	High - Low (t stat)	10th Percentile	25th Percentile	Median	High - Low (p-value)	75th Percentile	90th Percentile	Percent Positive
Hong Kong									
High (1587)	-0.284	-0.141	-0.599	-0.417	-0.217	-0.093	0.051	0.535	0.282
Low (1675)	-0.143	(-2.155)*	-0.628	-0.403	-0.124	(-0.05)*	0.227	0.640	0.397
Korea									
High (1379)	-0.291	-0.351	-1.121	-0.538	-0.236	-0.242	0.001	0.318	0.251
Low (1424)	0.060	(-5.291)*	-1.231	-0.535	0.005	(-0.01)*	0.568	1.509	0.511
Malaysia									
High (1199)	-0.295	-0.434	-0.376	-0.306	-0.207	-0.157	0.019	0.345	0.260
Low (1216)	0.139	(-1.354)	-0.381	-0.275	-0.050	(-0.10)	0.350	0.889	0.452
Singapore									
High (1112)	-0.218	-0.123	-0.443	-0.327	-0.183	-0.123	-0.052	0.167	0.203
Low (1169)	-0.095	(-4.315)*	-0.383	-0.259	-0.060	(-0.01)*	0.141	0.433	0.387
Taiwan									
High (1074)	-0.382	-0.262	-0.705	-0.436	-0.285	-0.240	-0.143	0.007	0.107
Low (1098)	-0.120	(-7.558)*	-0.444	-0.280	-0.045	(-0.05)*	0.182	0.453	0.429
Thailand									
High (912)	-0.241	-0.087	-0.431	-0.324	-0.194	-0.090	0.073	0.330	0.316
Low (952)	-0.154	(-1.936)*	-0.488	-0.312	-0.104	(-0.05)*	0.139	0.403	0.387

* indicates a statistical significance at the 5% level.

Table 3

Distribution of One-year Market-adjusted Returns for Portfolios partitioned by BTM and F_SCORE

All sample firms are grouped into a tercile BTM portfolio. Both high and low BTM portfolios are further partitioned into a F_SCORE decile portfolio. Table 3 reports the results on the portfolios partitioned by both BTM ratio and F_SCORE. The high F_SCORE firms (firms with strong financial signals) are the firms with F_SCORE of 8 or 9, whereas low F_SCORE firms are the firms with F_SCORE of 0, 1 or 2. The p-value for return difference is based on the test statistics obtained from the bootstrapping technique and is provided in the parenthesis below the return difference. * denotes 5% statistical significance for mean return difference.

Hong Kong	**High BTM**								**Low BTM**							
	n	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*	*n*	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*
All	1587	-0.28	-0.60	-0.42	-0.22	0.05	0.53	0.28	1675	-0.14	-0.63	-0.40	-0.12	0.23	0.64	0.40
Low F	72	-0.31	-0.65	-0.43	-0.25	0.16	0.60	0.28	91	-0.17	-0.63	-0.43	-0.14	-0.05	0.51	0.25
High F	106	-0.23	-0.47	-0.33	-0.15	0.22	0.63	0.55	182	-0.07	-0.48	-0.29	-0.05	-0.01	0.67	0.23
High-Low	n/a	0.08*	0.18	0.10	0.10*	0.06	0.03	n/a	n/a	0.10*	0.15	0.14	0.09*	0.04	0.16	n/a
(*bootstrap*)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)
Korea	**High BTM**								**Low BTM**							
	n	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*	*n*	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*
All	1379	-0.29	-1.12	-0.54	-0.24	0.00	0.32	0.25	1424	0.06	-1.23	-0.54	0.01	0.57	1.51	0.51
Low F	45	-0.37	-0.87	-0.46	-0.29	-0.26	-0.05	0.09	73	0.02	-0.64	-0.39	0.01	0.48	1.45	0.57
High F	124	-0.21	-0.80	-0.38	-0.09	0.13	0.40	0.37	177	0.11	-0.59	-0.33	0.08	0.67	1.52	0.63
High-Low	n/a	0.16*	0.08	0.08	0.20*	0.39	0.44	n/a	n/a	0.09*	0.05	0.06	0.07*	0.19	0.07	n/a
(*bootstrap*)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)
Malaysia	**High BTM**								**Low BTM**							
	n	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*	*n*	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*
All	1199	-0.30	-0.38	-0.31	-0.21	0.02	0.35	0.26	1216	0.14	-0.38	-0.28	-0.05	0.35	0.89	0.45
Low F	61	-0.36	-0.37	-0.33	-0.31	-0.01	0.05	0.25	51	-0.19	-0.32	-0.27	-0.11	-0.09	0.00	0.10
High F	128	-0.35	-0.40	-0.35	-0.28	-0.02	0.05	0.19	190	-0.13	-0.31	-0.24	-0.12	0.13	0.41	0.27
High-Low	n/a	0.01	-0.03	-0.02	0.03	-0.01	0.00	n/a	n/a	0.07	0.00	0.03	-0.01	0.22	0.41	n/a
(*bootstrap*)	(n/a)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(n/a)	(n/a)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(n/a)

TABLE 3 (continued)
Distribution of One-year Market-adjusted Returns for Portfolios partitioned by BTM and F_SCORE

Singapore	**High BTM**								**Low BTM**							
	n	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*	*n*	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*
All	1112	-0.22	-0.44	-0.33	-0.18	-0.05	0.17	0.20	1169	-0.10	-0.38	-0.26	-0.06	0.14	0.43	0.39
Low F	70	-0.34	-0.45	-0.34	-0.24	-0.14	-0.04	0.98	60	-0.22	-0.39	-0.38	-0.23	0.13	0.39	0.25
High F	95	-0.15	-0.38	-0.26	-0.09	0.07	0.21	0.37	145	0.05	-0.31	-0.19	0.01	0.23	0.42	0.71
High-Low	n/a	0.19*	0.07	0.09	0.16*	0.21	0.25	n/a	n/a	0.27*	0.08	0.19	0.24*	0.10	0.03	n/a
(*bootstrap*)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)
Taiwan	**High BTM**								**Low BTM**							
	n	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*	*n*	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*
All	1074	-0.38	-0.70	-0.44	-0.29	-0.14	0.01	0.11	1098	-0.12	-0.44	-0.28	-0.05	0.18	0.45	0.43
Low F	46	-0.40	-0.85	-0.53	-0.30	-0.15	-0.01	0.08	49	-0.41	-0.95	-0.77	-0.34	-0.17	0.07	0.19
High F	73	-0.33	-0.59	-0.40	-0.25	-0.09	0.00	0.10	34	-0.10	-0.38	-0.23	-0.09	0.02	0.33	39.00
High - Low	n/a	0.07*	0.26	0.13	0.05*	0.06	0.01	n/a	n/a	0.31*	0.57	0.54	0.25*	0.19	0.26	n/a
(*bootstrap*)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)
Thailand	**High BTM**								**Low BTM**							
	n	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*	*n*	*Mean*	*0.10*	*0.25*	*Median*	*0.75*	*0.90*	*%posi*
All	912	-0.24	-0.43	-0.32	-0.19	0.07	0.33	0.32	952	-0.15	-0.49	-0.31	-0.10	0.14	0.40	0.39
Low F	49	-0.29	-0.40	-0.26	-0.24	0.07	0.13	0.33	41	-0.18	-0.49	-0.23	-0.15	-0.13	-0.12	0.00
High F	49	-0.20	-0.35	-0.21	-0.17	0.18	0.35	0.54	120	0.03	-0.47	-0.11	0.02	0.18	0.49	0.55
High - Low	n/a	0.09	0.05	0.05	0.07	0.11	0.22	n/a	n/a	0.21*	0.02	0.13	0.17*	0.31	0.61	n/a
(*bootstrap*)	(n/a)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(n/a)	(n/a)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(n/a)

TABLE 4

Correlations between Market-Adjusted Returns and the BTM Ratio, F_SCORE, and Firm Size: 1991-2002

	Hong Kong		Korea		Malaysia		Singapore		Taiwan		Thailand	
	H_BTM	*L_BTM*	*H_BTM*	*L_BTM*	*H_BTM*	*L_BTM*	*H_BTM*	*L_BTM*	*H_BTM*	*L_BTM*	*H_BTM*	*L_BTM*
Corr(R, BTM ratio)												
R_1	-0.005	-0.149*	0.211*	-0.400	-0.035	-0.129	-0.125*	-0.043	-0.196*	0.189*	-0.137*	0.076
(p-value)	(0.932)	(0.021)	(0.000)	(0.541)	(0.627)	(0.098)	(0.063)	(0.616)	(-0.001)	(0.005)	(0.032)	(0.249)
R_2	-0.114	-0.108	0.316*	-0.133	-0.214*	0.119	-0.151*	-0.176*	-0.142*	0.272*	-0.235*	0.012
(p-value)	(0.056)	(0.096)	(0.000)	(0.053)	(0.004)	(0.131)	(0.027)	(0.041)	(0.032)	(0.001)	(0.000)	(0.856)
Corr(R, F_SCORE)												
R_1	0.064	-0.053	0.188*	0.189*	-0.046	0.119	0.244*	0.198*	0.117*	-0.032	0.090	0.147*
(p-value)	(0.286)	(0.413)	(0.001)	(0.004)	(0.523)	(0.128)	(0.000)	(0.020)	(0.050)	(0.633)	(0.162)	(0.026)
R_2	0.095	-0.030	0.342*	0.212*	0.030	0.254*	0.235*	0.132	-0.025	0.014	0.214*	0.173*
(p-value)	(0.110)	(0.646)	(0.000)	(0.002)	(0.686)	(0.001)	(0.000)	(0.127)	(0.710)	(0.862)	(0.001)	(0.010)
Corr(R, ln(MVE))												
R_1	0.106	0.114	0.211*	0.089	-0.030	0.043	0.184*	0.122	0.158*	0.062	0.077	0.127
(p-value)	(0.075)	(0.079)	(0.000)	(0.179)	(0.677)	(0.586)	(0.006)	(0.154)	(0.008)	(0.353)	(0.234)	(0.054)
R_2	0.120*	0.181*	0.316*	0.007	0.224*	0.272*	0.142*	0.200*	0.105	0.183*	0.106	0.157*
(p-value)	(0.044)	(0.005)	(0.000)	(0.920)	(0.002)	(0.000)	(0.037)	(0.021)	(0.114)	(0.020)	(0.103)	(0.019)

* denotes a statistical significance at the 5% level.

Table 5
Regression Analysis of Market-Adjusted Returns of BTM Portfolios: 1991-2002

This table provides coefficient estimates from the following pooled cross-sectional regression equations:

(1) $R_i = \alpha_i + \beta_{1i} \ln(BTM_i)$
(2) $R_i = \alpha_i + \beta_{1i} \ln(BTM_i) + \beta_{2i} F'SCORE_i$
(3) $R_i = \alpha_i + \beta_{1i} \ln(MVE_i)$
(4) $R_i = \alpha_i + \beta_{1i} \ln(MVE_i) + \beta_{2i} F'SCORE_i$
(5) $R_i = \alpha_i + \beta_{1i} \ln(BTM_i) + \beta_{2i} \ln(MVE_i)$
(6) $R_i = \alpha_i + \beta_{1i} \ln(BTM_i) + \beta_{2i} \ln(MVE_i) + \beta_{3i} F'SCORE_i$

Eqs.		ln(BTM)	ln(MVE)	F-SCORE	Adj. R^2		ln(BTM)	ln(MVE)	F-SCORE	Adj. R^2
		(High BTM)			**Hong Kong**			**(Low BTM)**		
1	0.22	-0.02	n/a	n/a	0.00	0.02	-0.19	n/a	n/a	0.00
2	0.08	-0.01	n/a	0.02	-0.01	1.15*	-0.22	n/a	-0.22*	0.03
3	1.52	n/a	-0.07	n/a	0.00	1.19	n/a	-0.04	n/a	0.00
4	1.52	n/a	-0.08	0.04	-0.01	1.39	n/a	0.00	-0.22*	0.02
5	2.40	-0.12	-0.10	n/a	0.00	1.85	-0.29	-0.09	n/a	0.00
6	2.31	-0.11	-0.11	0.03	-0.01	2.00	-0.27	-0.04	-0.21*	0.02
		(High BTM)			**Korea**			**(Low BTM)**		
1	-0.13	-0.10*	n/a	n/a	0.02	0.35*	0.15	n/a	n/a	0.00
2	-0.34*	-0.10*	n/a	0.04*	0.03	0.08	0.17	n/a	0.06	0.00
3	-1.79*	n/a	0.06*	n/a	0.02	-0.26	n/a	0.02	n/a	0.00
4	-1.71*	n/a	0.05*	0.04*	0.03	-0.27	n/a	0.01	0.05	-0.01
5	-1.26	-0.06	0.04	n/a	0.02	-1.22	0.25	0.06	n/a	0.00
6	-1.13	-0.07	0.03	0.04*	0.03	-1.23	0.25	0.05	0.05	0.00
		(High BTM)			**Malaysia**			**(Low BTM)**		
1	-0.08	-0.01	n/a	n/a	0.00	-0.08	-0.17*	n/a	n/a	0.03
2	0.05	-0.03	n/a	-0.02	0.00	0.24	-0.17*	n/a	-0.06*	0.05
3	1.13*	n/a	-0.07*	n/a	0.03	1.05	n/a	-0.05	n/a	0.01
4	1.12*	n/a	-0.06*	-0.01	0.03	1.07	n/a	-0.03	-0.05	0.02
5	1.23*	-0.04	-0.07*	n/a	0.03	1.22*	-0.21*	-0.07*	n/a	0.05
6	1.24*	-0.05	-0.07*	-0.02	0.03	1.24*	-0.21*	-0.06	-0.04	0.06
		(High BTM)			**Singapore**			**(Low BTM)**		
1	-0.04	-0.10	n/a	n/a	0.01	-0.05	-0.04	n/a	n/a	0.00
2	-0.28*	-0.09	n/a	0.05*	0.03	-0.20	-0.05	n/a	0.03	0.00
3	-0.17	n/a	0.00	n/a	0.00	-0.19	n/a	0.01	n/a	-0.01
4	-0.33	n/a	0.00	0.05*	0.02	-0.25	n/a	0.01	0.03	0.00
5	0.13	-0.11	-0.01	n/a	0.00	-0.12	-0.04	0.00	n/a	-0.01
6	-0.05	-0.11	-0.01	0.05*	0.03	-0.18	-0.05	0.00	0.03	0.00
		(High BTM)			**Taiwan**			**(Low BTM)**		
1	-0.12*	-0.10*	n/a	n/a	0.04	-0.12*	-0.13*	n/a	n/a	0.04
2	-0.20*	-0.09*	n/a	0.02	0.04	-0.26*	-0.13*	n/a	0.03	0.04
3	-1.45*	n/a	0.06*	n/a	0.02	-0.73	n/a	0.03	n/a	0.00
4	-1.45*	n/a	0.05*	0.02	0.03	-0.89	n/a	0.03	0.03	0.01
5	-0.24	-0.09*	0.01	n/a	0.03	0.13	-0.14*	-0.01	n/a	0.03
6	-0.33	-0.09*	0.01	0.02	0.04	-0.04	-0.13*	-0.01	0.03	0.04
		(High BTM)			**Thailand**			**(Low BTM)**		
1	-0.04	-0.03	n/a	n/a	0.00	0.13	0.06	n/a	n/a	0.00
2	-0.07	-0.03	n/a	0.00	0.00	0.65	0.05	n/a	-0.09	0.00
3	-0.75*	n/a	0.03	n/a	0.01	0.16	n/a	0.00	n/a	0.00
4	-0.76*	n/a	0.03	0.01	0.01	0.57	n/a	0.00	-0.09	0.00
5	-0.74	0.00	0.03	n/a	0.00	-0.27	0.07	0.02	n/a	-0.01
6	-0.80	0.00	0.03	0.01	0.00	0.13	0.07	0.03	-0.09	-0.01

* denotes a statistical significance at a 5% level.

Figure 1. BTM and F-Score Effects

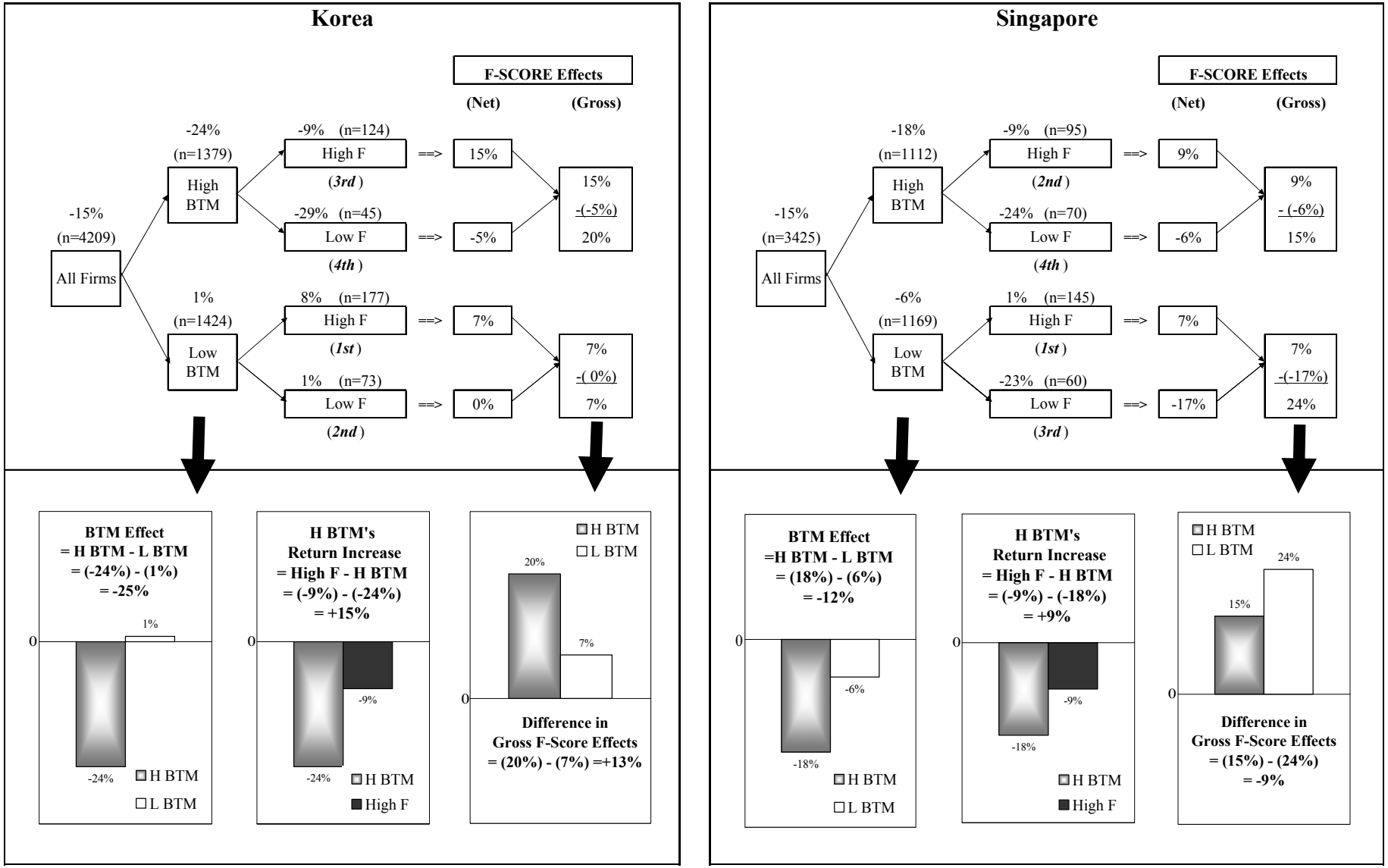

Figure 1. BTM and F-Score Effects (continued)

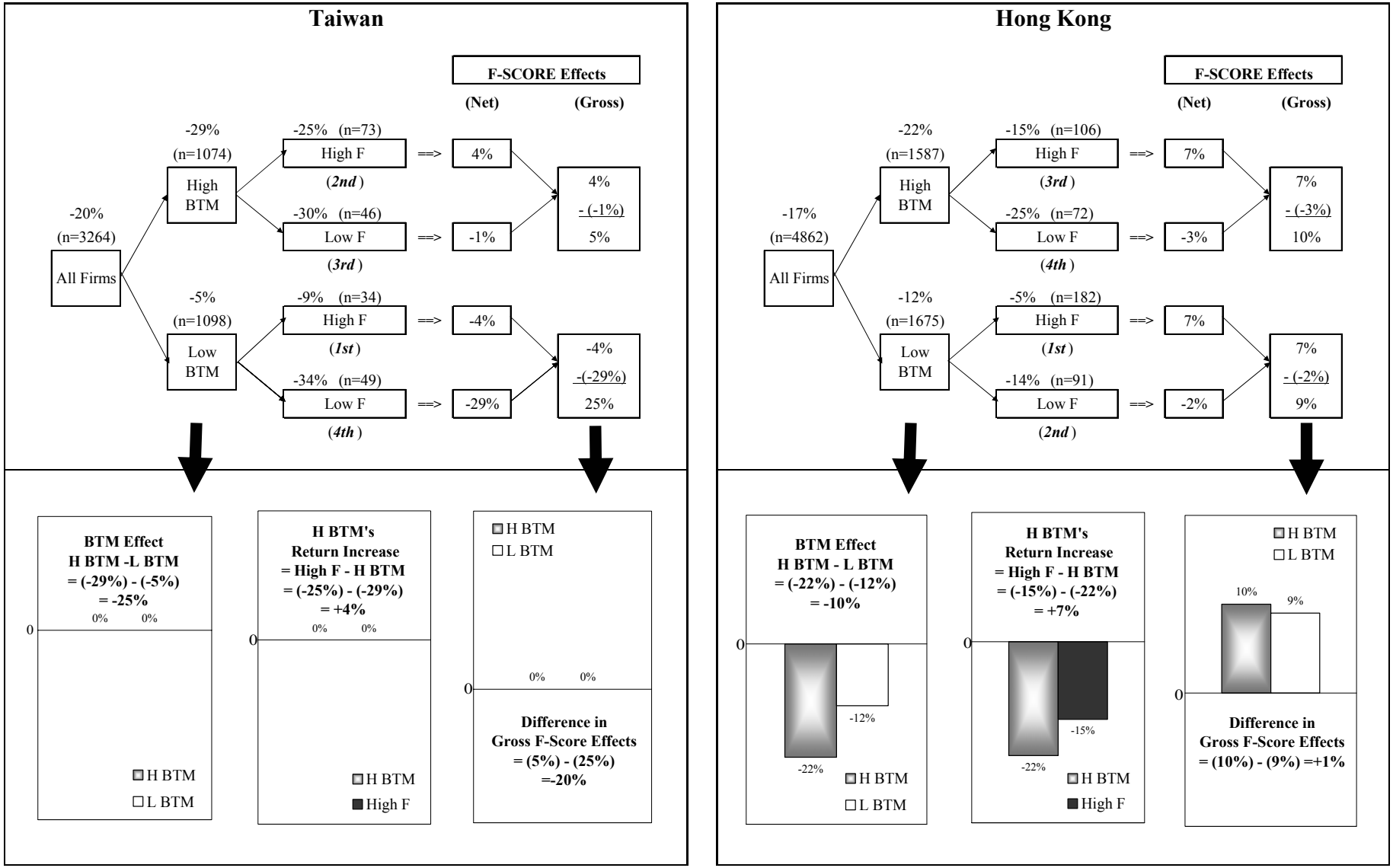

Figure 1. BTM and F-Score Effects (continued)