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# The performance of moving average rules in emerging stock markets

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indices. In addition, this profitability persisted for longer moving averages, suggesting that trends in share returns were larger and more persistent in emerging markets.

## Notes

<sup>1</sup> A number of heuristics are said to be employed by all decision-makers. For example, according to the representative heuristic, individuals generalize about an event by reference to how representative it is of similar events in their past experience. According to the anchoring heuristic, individuals arrive at estimates by starting from an initial value and then making adjustments upwards or downwards to yield a final answer. Individuals are also prone to the available heuristic whereby they assess the probability of an event by the ease with which instances or occurrences can be brought to mind (Kahneman and Tversky, [1982](#)).

<sup>2</sup> For a review of the developments in behavioural finance, the reader is referred to Van der Sar ([2004](#)).

<sup>3</sup> Given the focus of this study, only the literature pertaining to moving average rules is reviewed. A more detailed review of the different literatures can be found in Elton and Gruber (

<sup>4</sup> Van Ho and Ho (2004) provide a detailed version of this rule. Van Ho and Ho (2004) also discuss on more recent papers on moving average rules (e.g., [68](#)) and counterexamples to the moving average rule. The result employed in this paper is based on the result that the moving average rule is profitable in emerging markets (Van Ho and Ho, 2004).

<sup>5</sup> Brock et al. (1997) consider the moving average rule with parameters (1, 0), (1, 50), (1, 100), (1, 150), (1, 200), (1, 250), (1, 300), (1, 350), (1, 400), (1, 450), (1, 500), (1, 550), (1, 600), (1, 650), (1, 700), (1, 750), (1, 800), (1, 850), (1, 900), (1, 950), (2, 0), (2, 50), (2, 100), (2, 150), (2, 200), (2, 250), (2, 300), (2, 350), (2, 400), (2, 450), (2, 500), (2, 550), (2, 600), (2, 650), (2, 700), (2, 750), (2, 800), (2, 850), (2, 900), (2, 950).

<sup>6</sup> The moving average rule is also assessed by Brock et al. (1997) and Brock et al. (2002).



<sup>7</sup> The rules examined were (1, 50, 0), (1, 100, 0), (1, 150, 0), (1, 200, 0), (2, 100, 0), (2, 150, 0), (2, 200, 0), (5, 200, 0) and (1, 50, 1).

<sup>8</sup> In this study, the number of buy and sell signals was very similar for three of the four exchanges studied and, for the Variable Length Moving Average rules, the majority of both buy and sell returns were statistically significantly different from those earned by following a buy-and-hold strategy. These findings differ from the conclusions reached by other studies (Brock et al., [1992](#); Hudson et al., [1996](#); Coutts and Cheung, [2000](#)). In these studies, the number of buy signals was greater than the number of sell signals (suggesting a bullish market) and sell signals were the most powerful for prediction purposes.

<sup>9</sup> Specifically, the authors examined daily index prices for Argentina, Brazil, Chile, India, Korea, Malaysia, Mexico, Philippines, Taiwan and Thailand.

<sup>10</sup> In this study, Ratner and Leal examined the same 10 Variable Length Moving Average rules as Brock et al. ([1992](#)). A key difference between these studies is the interpretation of the band. While Brock et al. ([1992](#)) and indeed most studies which examine moving average rules, evaluated each rule with a trading band around the returns, Ratner and Leal employed a trading band around the Standard Deviation (SD). This resulted in more conservative findings. For example, without the band, 50 of the 60 trading strategies had buy signals greater than sell signals as compared to only 37 strategies.

<sup>11</sup> Indices use of data availability and quality could not be o condition, any individual analysis because ta employed in the the er investigate ns in terms of the ex his article may not ally encapsu country. In particula lex by the IFC; the rs. In



addition, the analysis should supply some insight into the theoretical levels of efficiency of the markets covered.

<sup>12</sup> In an analysis of trading strategies in 11 European stock markets, Fifield et al. (2005) concluded that no single trading rule could persistently exploit predictable behaviour in share prices, 'since the profitability of the different rules examined varied dramatically from market to market' (p. 17). Most practitioners would argue that a substantial amount of background knowledge is required before attempting to apply any moving average rule to a specific country index.

<sup>13</sup> The variations examined were (1, 50, 0), (1, 50, 1), (1, 150, 0), (1, 150, 1), (5, 150, 0), (5, 150, 1), (1, 200, 0), (1, 00, 1), (2, 200, 0) and (2, 200, 1).

<sup>14</sup> The cost per trade information for Argentina, Chile, India, Korea, Malaysia, Mexico, the Philippines, Taiwan, Thailand, Japan and the United States is taken from Ratner and Leal (1999). The estimates of transaction costs in the United Kingdom are from Hudson et al. (1996), and costs in Indonesia are from the Standard and Poors (2005). All remaining estimates come from information on the countries stock exchange website (Jakarta Stock Exchange, 2001). In particular, information on transaction costs for Hong Kong are from [www.hkex.com.hk](http://www.hkex.com.hk), for South Africa from [www.jse.co.za](http://www.jse.co.za), for Sri Lanka from [www.lanka.net](http://www.lanka.net), for Turkey from [www.ise.org](http://www.ise.org) and for Zimbabwe from [www.zse.co.zw](http://www.zse.co.zw).

<sup>15</sup> The a... terms. That is, the a... order to measure... by moving average... analysis was also und... st sterling. The resu... ose arising from... ar, both the sign a... Results based up... t.

<sup>16</sup> There... 50 days: (1, 50, 0), (1, 50, 1) and (10, 50, 1) examined, the total



<sup>17</sup> Closer investigation of the UK results shows that none of the 36 moving average rules outperformed the buy-and-hold strategy. The largest value for the rule profit (5, 50, 5) was only 63.84%, as compared to 210.62% following the buy-and-hold strategy. Similarly, for the United States, all 36 moving average rules failed to better the returns from following the buy-and-hold strategy. For example, the largest rule profit (5, 50, 1) was 182.02% as compared to 364.53% for the corresponding buy-and-hold strategy. Results for the individual rules are available from the authors on request.

<sup>18</sup> This finding holds for all 36 variations of moving average rule studied.

<sup>19</sup> There are several reasons which could explain the success of the moving average rule in Japan. For example, since the early 1990s, Japan's economy has faced its worst slump since World War II. Problems such as low demand, deflation, bankruptcies and bad debt burdens in the banking sector have plagued the economy that used to rank among the top three in the world. Given such difficulties in the macroeconomy, it is little wonder that the security market is suffering. Presumably, the long downward trend in Japanese security prices is being exploited by the moving average rule to yield profits. However, attempts are being made to reform the financial system in the hope that the economy can be reactivated through an increase in the efficiency of the market (Financial Times, [2003](#)). However, although the poor macroeconomic performance of Japan may be a plausible reason for the success of the moving average

strategies were successful from January suggests

<sup>20</sup> At 100 than the Philippine emergence hold pro Thailand

<sup>21</sup> Over than the Hong Ko countries



over two long-run periods, while South Africa and Turkey have successful mean moving average results over one long-run period, with the buy-and-hold profit exceeding the moving average profits for the other three long-run periods.

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