Foreword

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Mean reversion for an asset or portfolio of assets can be defined narrowly as the tendency of an asset's market value (or the market value of a portfolio of assets) to return to a fixed value or linear trend path over time. In this issue of *Managerial Finance,* focusing on mean reversion in financial markets, we employ a broader definition of mean reversion: a tendency of an asset's market value to return to a specific "fundamental" value over time. For empirical purposes, the fundamental value needs to be well specified and will typically be related to an asset's book value, earnings, or dividends. Since the fundamental value is unobservable and necessarily approximated imprecisely, one may be better off empirically taking it to follow a linear trend, in which case the narrow definition of mean reversion applies.

Existence of mean reversion is related to both "value" and "size" effects. A value effect occurs when high (low) dividend-price ratios, earnings-price ratios, or book-to-market ratios lead to subsequent high (low) returns. But this is equivalent to mean reversion in the broad sense. A size effect occurs when smaller (bigger) firms, as measured by market value, generate higher (lower) average returns. Since firms with lower market value tend to have a lower price relative to a constant "proxy" for fundamentals, this implies mean reversion in the narrow sense.

If mispricing occurs (market price deviates from the *true* fundamental value) then by the broad definition of mean reversion, mean reversion must exist, since no matter what pattern the mispricing follows the fundamentals determine real payouts and must at some point take over. The reverse implication does not hold, however: if mean reversion is detected in the data relative to some fundamentals specification, mispricing need not have occurred. For instance, suppose an asset's risk increases permanently. Then the asset's value drops immediately but future returns are expected to be higher to compensate for the increased risk. The asset's price drops below its trend and then recovers over time, implying mean reversion in the narrow sense, without ever being mispriced. Thus, any evidence in favor of mean reversion presented in this issue is not necessarily evidence in favor of mispricing.

The existence and nature of mean reversion in financial markets has far-reaching consequences for financial management. Under slow mean reversion, for instance, the portfolio management implications are pretty clear: persistent buy-and-hold strategies harbor relatively low risk as shocks are partly offset as time passes, but more active investment strategies tend to outperform such passive buy-and-hold strategies by targeting recent losers—a contrarian strategy. For portfolio management purposes, the extent to which the mean reversion is due to mispricing is not crucial as long as mean reversion indeed occurs and there is a reasonable possibility that mispricing may be responsible: under mispricing the contrarian strategy creates abnormal returns on average, leading to a first-order gain relative to a buy-and-hold strategy; in the absence of mispricing, the contrarian strategy generates higher expected returns than the buy-and-hold strategy but these present merely a reward for increased risk, leading to only a second-order loss as a result of risk exposure being higher than optimal. Accordingly, this issue of *Managerial Finance* focuses mostly on whether mean reversion occurs and how quickly it develops without dwelling much on whether it is due to mispricing or not.

Detecting mean reversion is fraught with difficulties. A first problem, as Campbell, Lo, and MacKinlay (1997, p.80) argue, is that short time series imply that we have to be agnostic about mean reversion. While mean reversion may appear to be present in a variety of markets and time periods, statistical tests lack the power to clearly reject the null hypothesis of a random walk against the alternative of slow mean reversion. Balvers, Wu, and Gilliland (2000) are able to detect mean reversion with relatively short time series by adding a cross-sectional element to improve power. A second difficulty is the choice of the proxy for the fundamental value, which is both important and troublesome. Many mean reversion studies avoid this problem by time-series differencing the data, as in Fama and French (1988), or by cross-sectional differencing, as in Balvers, Wu, Gilliland (2000). As a result, the common component over time or across markets in the fundamental value can be ignored. A final problem is the interference of short run effects such as momentum. Mean reversion can look like momentum in a short time series: a large initial mispricing leads to subsequent recovery implying a series of positively autocorrelated returns. If the initial mispricing is not in the sample, one would mistake the recovery as a momentum process. Additionally, the presence of (short run) momentum in addition to (long run) mean reversion makes it more difficult to identify the mean reversion part. Balvers and Wu (2002), though, show that separating the momentum and mean reversion components is feasible and makes it easier to identify either.

Clearly, whether mean reversion truly exists is not fully settled. The articles in this issue contribute substantially to the literature by helping establish existence of mean reversion in a variety of different environments. The papers use an assortment of different sources of information that help establish the case for mean reversion. The findings of mean reversion in a variety of different markets, each displaying similar half lives, reveal robustness and suggest that data snooping is not responsible for earlier findings.

In the first article, Jeffrey Gropp revisits the issue of mean reversion across size-sorted portfolios. While Fama and French (1988) originally detected substantial mean reversion in ten portfolios re-sorted in each period by size, others have criticized their findings and have concluded that little evidence of mean reversion exists, especially in the post-World War II period. Gropp argues that individual stocks move across size deciles in a systematic way: after suffering relatively low (high) returns stocks tend to move to a lower (higher) size class. As a result, information is lost since a lot of subsequent mean reversion is missed because the decile portfolio that initially includes the "mispriced" stock is likely to no longer contain this stock in subsequent periods. Gropp proposes to sort stocks in three other ways that prevent stocks from moving systematically across size classes. He finds that, while mean reversion cannot be detected under the original Fama-French sorting mechanism, that his alternative sorting methods each imply substantial mean reversion, finding, moreover, half lives of around three to three-and-a-half years which is consistent with other findings of mean reversion.

Kausik Chaudhuri and Yangru Wu in the second article examine whether mean reversion holds across emerging stock markets. Since these markets have been largely omitted in previous studies of mean reversion, the result for these markets is important as a check on the possibility of data snooping in previous studies. Employing a panel approach to compensate for the relative short time series (1985.1-2002.4), Chaudhuri and Wu find clear evidence for mean reversion with a speed of mean reversion implying a half life of around three years, again consistent with other studies.

The third paper, by Duo Zhang, supports the existence of mean reversion in the broad sense and does so using a wholly different approach. Recent work by Hall (2001) claims that in the absence of mispricing, the difference between a firm's market value and book value must equal the present value of its "intangibles." He shows that intangibles lead to higher future earnings, suggesting that stocks are priced correctly on average. Zhang reasons that if the "overreaction" hypothesis of DeBondt and Thaler (1985) were true, one would expect to see market value rise above book value following positive news about future earnings, implying typically higher future earnings (as Hall finds), but with the future earnings not enough higher to warrant the initial market value increase. In this mispricing scenario, future stock returns should on average be below its long run mean. This is exactly what she finds: by buying stocks with a low fraction of intangible to tangible assets and shortselling stocks with a high fraction of intangibles to tangibles, statistically and economically significant payoffs can be generated. Zhang finds that such a trading strategy is in fact even more successful than a related value strategy. This is all the more significant since, without mispricing, following Aboody and Lev (2000), one would expect firms with higher intangibles to face a higher adverse selection risk mandating higher average returns. Instead, average returns are lower for such firms.

Angela Black and Patricia Fraser compare the time paths of the value premium across Japan, the U.K. and the U.S. Mean reversion would imply positive value premiums (that is, lower priced stocks—relative to some fundamental—generate higher future returns). Using a Variance-Ratio test that adjusts for data snooping biases, Black and Fraser confirm that this is indeed the case for these three countries and is not a statistical illusion. But Fama and French (1996) argue that such value premia are compensation for risk due to financial distress. Black and Fraser reason that in this view one would expect to find that in times of financial distress, as measured by a preceding period of low growth in real GDP, the value premium should be larger. They find that this is indeed the case for the country with the largest average value premium, the U.S., but that such effect is not significant for the other two countries.

In the last paper, Richard Heaney considers the time series of an index of Australian stock prices (with dividends reinvested) from 1883-1999. He finds that the price index does not display simple mean reversion relative to real assets with nominal return equal to the inflation rate. (That is, there is no mean reversion in the narrow sense for the imaginary zero-net-investment portfolio of holding the Australian index and short-selling an asset with zero real return). However, he finds statistical evidence of reversion of stock prices to fundamental values as measured by a simple dividend model. Although the price index and dividends are cointegrated, the error correction specification suggests that dividends lead stock prices instead of the other way around. Further, the coefficient in the error-correction term of –0.18 implies a speed of reversion with a half-life of around three-and-a-half years, consistent with other studies in this issue and elsewhere.

All papers in this issue thus provide some support for mean reversion. This is significant since the support comes from a variety of different time periods and sources such as U.S. industries and size classes (Gropp and Zhang) , other developed economies, Japan and U.K. (Black and Fraser) and Australia (Heaney), and emerging economies (Chaudhuri and Wu). Three of the papers further provide estimates of the speed of reversion (Gropp, Chaudhuri and Wu, and Heaney), impressively yielding the same half-life of around three to three-and-a-half years. Finally, two of the articles provide indications of the causes: Financial distress (Black and Fraser) and overreaction to news about intangible assets (Zhang).

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