Zeitschrift: Revue économique et sociale : bulletin de la Société d'Etudes Economiques et Sociales

Herausgeber: Société d’Etudes Economiques et Sociales

Band: 66 (2008)

Heft: 4: Activités sportives et actifs économiques ; Le salaire de la peur et de la cupidité

Artikel: Investor psychology and international equity markets

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DOI: https://doi.org/10.5169/seals-142150

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INVESTOR PSYCHOLOGY
AND INTERNATIONAL EQUITY MARKETS

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> Research in behavioral finance suggests that investor psychology is an important determinant of asset prices. This study examines the indexes of international equity markets since 1970. Each country index is treated as a separate asset. I form portfolios based on past performance. Depending on how far I look back, 6 months or 3 years, the subsequent returns of winner countries systematically exceed or fall below the returns earned by loser countries. These results echo prior research on the over- and underreaction of stock prices of individual companies within countries.

Over the last forty years, the world has witnessed extraordinary growth in international investment. Many strategists and money managers lose sleep worrying about a 3x3 matrix of economic forecasts: What is the market outlook for stocks, bonds, and currencies in the U.S., Europe, and Asia?

Alas, I cannot offer great wisdom on how to answer this vital question. However, in this article, I do throw new light on one aspect of the problem. By definition, a global equity portfolio includes stocks from different countries. Evidently, the talent to buy future winner countries and to sell (or sell short) future loser countries is what determines performance. (Indeed, it probably matters more than the ability to select individual stocks within countries.) Here, I study the stock index movements of 18 developed markets.[1] The data are provided by MSCI-BARRA and cover 38 years. The data start in January 1970 and end in December 2007. The analysis shows that a 3-year contrarian and a 6-month momentum investment strategy both earn unusual profits. I study arbitrage portfolios that are intended to be neutral relative to the movements of a world stock index. Hypothetically, no money is invested (since the portfolios are both long and short) and no risk is taken by the hedge funds that I simulate. Nonetheless, two years after the arbitrage portfolios are formed, past 3-year loser countries outperform past 3-year winner countries by as much as 11 percent. A contrarian arbitrage portfolio earns about 6 percent in the first year and about 5 percent in the second year. (The results vary slightly depending on the exact design of the tests.) Momentum strategies, long in 6-month past winners and short in 6-month past losers, succeed in the first year after portfolio formation. Therefore, "the trend is our friend," as some technical analysts claim. But the momentum profits do not last. A momentum arbitrage portfolio earns about 5 percent in the first year after portfolio formation, and zero in the second year.

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[1] This article is a non-technical summary of my own research as well as a study coauthored with Alex Fung and Kin Lam, both affiliated with Hong Kong Baptist University. See De Bondt et al. (2007).

The empirical analysis is inspired by prior studies suggesting that the stock prices of *individual companies* both overreact and underreact to news. Historically, in the U.S., portfolios of two- to five-year loser stocks have beaten the return performance of portfolios of prior winners by 8 percent per year. In other words, contrarian investment strategies appear to be profitable, and the exceptional performance sometimes lasts as long as five years.[2]

In earlier research co-authored with Richard Thaler (1985, 1987), I propose that security prices may diverge from intrinsic values because many amateur and professional traders suffer from psychological biases. Their expectations of the future are exaggerated. The forecasts are either too positive or too negative. On the upside, trading behavior motivated by unrealistic optimism and wishful thinking may instigate bubbles; on the downside, unreasonable fear may turn into panic. Even in normal times, however, many investors are seduced by popular investment themes, and they tend to extrapolate recent developments, most of all if a company or industry has been doing exceedingly well or poorly over several years. The bias is probably triggered by representativeness --a mental heuristic that leads people to judge probability by similarity. See, e.g., Daniel Kahneman et al. (1980). Representativeness contradicts rational learning, i.e., it challenges Bayes' theorem as a description of how people react to new information. As a result, traders are inclined to overpay for growth firms and they resist the purchase of value firms.[3] Ostensibly, a lot of investors do not mentally distinguish between good stocks and good companies or between bad stocks and bad companies.

Cognitive bias is one source of mispricing; other sources are herding behavior and emotion. There is wide agreement in finance that, on average, more risky assets command higher returns. According to Yoav Ganzach (2000), however, people judge unfamiliar assets unidimensionally on a continuum from good to bad. So, when information is scarce, some financial assets may be thought to guarantee both high return and low risk, or the reverse. That social influence tends to distort individual opinion and behavior has been understood since the days of Solomon Asch (1955). For instance, in the U.S., teenagers whose parents smoke cigarettes are twice as likely to become adult smokers than children of non-smokers. Recently, Matthew Salganik et al. (2006) have offered powerful new evidence with a creative study of an artificial music market. Social pressure, the authors show, magnifies both the unpredictability and the imbalance in the success of hit songs. For movies, Harry Potter books, modern art and growth stocks, success may also be self-reinforcing. What is most remarkable is that success is only moderately influenced by (objective measures of) quality. "The best songs rarely [do] poorly, and the worst rarely [do] well, but any other result [is] possible," Salganik et al. find (p. 854).

Two phenomena closely related to stock price reversals are the price-to-earnings (PE) and market-to-book effects in equity prices.[4] When the ratio of a firm's market value to its book value is "high" (or when the PE ratio is high), its stock tends to underperform relative to the return that is predicted by standard capital asset pricing models. It looks as if the market overprices the stock. The reverse is true for firms with low market-to-book and PE ratios. In this case, it looks as if the market underprices the stock.

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[2] The results apply to extreme past winners and losers, e.g., decile 1 vs. decile 10. The evidence requires careful interpretation. Some studies suggest that the profits earned by contrarian strategies are small compared to the bid-ask spread and that the returns are inflated because they are calculated from estimated closing prices. The overreaction effect may be partly a low-price effect. Other studies appeal to the slippery notion of time-varying risk. It is debatable whether risk and size adjustments moderate the overreaction effect. See De Bondt and Thaler (1987) for more discussion.

[3] Financial analysts appear to suffer from the same bias since trading profits may be earned by systematically betting against their forecasts of growth in earnings-per-share (De Bondt, 1992).

[4] For more discussion, see De Bondt (2005, 2008).

The empirical findings that suggest overreaction and misvaluation in the cross-section of U.S. share prices remain controversial but they have been replicated for various European and Asian markets.[5] In addition, Narasimhan Jegadeesh and Sheridan Titman (1993) and others have documented price momentum in the U.S. over 3- to 12-month horizons.[6] The price momentum may stem from *underreaction* to earnings news (Chordia and Shivakumar, 2006). For example, laboratory experiments reveal that people hesitate to accept information that contradicts cherished beliefs. The drift in prices may also be due to the slow dissemination of news, e.g., if corporate managers and analysts try to play down or conceal disappointing earnings. What is certain is that positive surprises in quarterly earnings are followed by positive abnormal returns, and negative surprises by negative abnormal returns (see, e.g., Jones and Litzenberger, 1970; Bernard and Thomas, 1989). A large fraction of the so-called post-earnings announcement drift in prices occurs around the time of later earnings releases. A likely explanation is that the forecasts of quarterly earnings that are implicit in stock prices are false.[7]

There are hardly any research papers, however, that examine over- and underreaction in the context of global asset allocation, i.e., with stock index data for multiple countries. Significant exceptions are the studies of Kalok Chan et al. (2000) and of Anthony Richards (1997). Kalok Chan et al. find evidence of profitable momentum in the stock indexes of 23 countries, including several emerging markets in Asia (1980-1995). Richards' study of overreaction covers 16 developed markets for the period 1970-1995. His empirical methods are similar but not identical to mine. Richards concludes that risk differentials cannot fully explain why past loser countries outperform past winner countries. Besides Richards (1997), a few more studies (Poterba and Summers, 1988; Cochran and DeFina, 1995; Vriezen, 1996; Balvers et al., 2000) examine related issues –e.g., whether international stock indexes contain predictable mean-reverting components.

One way to interpret the results reported below is to link them to macro strategies implemented by hedge funds. For many years, expert traders have relied on country forecasts of macroeconomic variables such as industrial production or inflation to formulate opinions about the outlook for stocks, bonds and currencies of these countries. Macro hedge fund managers like George Soros, Julian Robertson and Paul Tudor Jones are often in the public spotlight --either because of spectacular success or stunning failure. Although the macro strategies followed by these investors go in and out of fashion, they do have the potential to complement a globally diversified portfolio. According to Gabriel Burstein (1999), macro hedge funds commanded the largest percentage of assets invested in hedge funds of all types during the second half of the 1990s.

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[5] For surveys, see De Bondt (2000, 2005).

[6] Momentum is evident at the level of individual securities, industries, and investment styles (Chen and De Bondt, 2004) but most researchers study price momentum. Geert Rouwenhorst (1998) finds that price momentum strategies are profitable in 12 European markets.

[7] Investors may naively assume that, quarter-by-quarter, earnings this year tend to match earnings last year. The time-series properties of quarterly earnings, however, differ from a seasonal random walk. As a result, it is possible to predict three-day price reactions to future earnings announcements. The price reactions are connected to the autocorrelation structure of the errors produced by the naive forecast model.

The managers of macro hedge fund believe that market prices track the underlying macroeconomy in the medium to long run. Over the short to medium run, however, they perceive gaps between price and value. Financial markets and macroeconomic conditions temporarily disconnect. Macro arbitrage usually consists of global long/short strategies that attempt to exploit pricing errors.[8] A practical question is how one can detect pricing errors. Burstein says that global macro arbitrage relies on indicators such as the relative ratio of two stock market indexes to the corresponding ratio of pertinent country macro variables, e.g., relative growth in gross domestic product. The two ratios may track each other for some period of time before they diverge. This is what opens up the macro arbitrage opportunity.

A major cause of mispricing, Burstein believes, is investor psychology. It starts with "a shift of [the public's] attention to economic variables .. that are not immediately related to the performance of the assets under consideration" (1999, p. 68). Widely publicized events associated with market turmoil, however, tend to refocus investors on business fundamentals that truly matter. In this sense, financial turbulence is desirable. Paul Tudor Jones expressed similar sentiments in *The Financial Times* in December 2000. Commenting on the effects of a stalling U.S. economy on global financial markets, Jones said that "economic transition .. means greater volatility as people reassess and reprice a variety of risks and opportunities, which is clearly very good for macro investing."[9]

Even though my comments below are brief, I also find that the profitability of contrarian and momentum strategies in international equity markets is statistically linked to measures of world financial disorder. At the same time, I am unable to identify any macroeconomic variables that reliably explain the performance differentials between past winner and loser countries.

DATA AND METHODS

I use monthly return data (including dividends) for the stock indexes of 18 developed markets. The countries are Austria, Australia, Belgium, Canada, Denmark, France, Germany, Hong Kong, Italy, Japan, the Netherlands, Norway, Spain, Singapore, Sweden, Switzerland, the United Kingdom, and the United States. Every country index is value-weighted. In the analysis that follows, the world market return is defined by the equally weighted average return earned by the 18 stock indexes in the sample. I compute returns in U.S. dollars, i.e., from the perspective of an investor domiciled in the United States. The data are for the period between January 1970 and December 2007.

Table 1 lists the average monthly return for every stock index between January 1973 and December 2005. Hong Kong ranks first with 1.48% per month; Japan ranks last. Among the stock markets of the G7 countries (Canada, France, Germany, Italy, Japan, the U.K and the U.S.) the market of the United Kingdom is the best performer.

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[8] For details, see Burstein (1999). Money managers who follow directional strategies vary their holdings of an asset or an asset class because of changing macroeconomic indicators. In contrast, non-directional strategies lead traders to simultaneously buy one asset and sell another similar asset based on relative performance expectations driven by macroeconomic forecasts. Macro bets that are long/short usually have lower volatility than directional bets. Directional bets are perceived to be especially risky in volatile markets when there is no clear underlying bullish or bearish trend. Two-asset spreads, in contrast, may be market neutral.

[9] See Joshua Chaffin (2000).

CONTRARIAN INVESTING

To repeat, I form portfolios of equity markets based on past returns. The 3, 6, or 9 best past performers are assigned to the winner portfolio (W); the 3, 6, or 9 worst performers are assigned to the loser portfolio (L). I compute past returns over the previous 3 years ("the rank period"). If contrarian investing works, past losers should earn higher returns than past winners over later months. The "test period" that I choose is 24 months in length.

Valid statistical tests either require 3-year rank periods that are non-overlapping or appropriate adjustments for overlapping data. Since this article is meant to be non-technical, I skip the details of the tests and I lay emphasis on the main findings. The results are for overlapping 3-year rank periods. Since I rank the 18 national markets every month between (end) December 1972 and (end) December 2005, I simulate the contrarian strategy 33 (years) x 12 (months) = 396 times.[10] The cumulative buy-and-hold return for the index of country j over a period of T months (CR_{jT}) is defined as $\{[(1+r_{j1})(1+r_{j2}) \ldots (1+r_{jT})] -1.0\}$ where r_{jt} is the monthly index return of country j in month t. The corresponding cumulative buy-and-hold excess return, over-and-above the return earned by the world market index, is $CER_{jT}= [CR_{jT}-CR_{mT}]$. For every replication of the contrarian strategy, 396 in total, the winner and loser portfolio rank- and test-period cumulative excess returns are defined as equally-weighted averages of the CER_{jT} of the countries in the portfolio. Finally, I find the averages of the portfolio cumulative excess returns across 396 replications.

Whether contrarian investing is worthwhile is assessed by the average divergence in cumulative excess returns between the winner and loser portfolios during the test periods, i.e., by $[CER_{Lt} - CER_{Wt}]$. Let GAP_t denote this gap by month t of the test period (t=1, .., 24). It captures the average return earned by an imaginary hedge fund that finances its purchases of prior losers by selling winners short. If the expected index returns of the 18 markets in the sample are the same, if the risks of W and L are identical, and if all 18 markets are efficient, then H_0: $GAP_t = 0$ for all t. On the other hand, if there are 3-year reversals in national equity indexes, H_1: $GAP_t > 0$; if there are trends, H_1: $GAP_t < 0$.

MOMENTUM INVESTING

The procedures used to test for the profitability of momentum investing are similar to the methods used to study contrarian investing. However, I make two adjustments. First, the rank period is only 6 months. Second, since the objective is to gain from trends in prices, a momentum strategy is long in past winners and short in past losers. Thus, the performance gap is now defined as $GAP_t = [CER_{Wt} - CER_{Lt}]$. If the expected returns are equal across markets, if the risks of W and L are identical, and if all markets are efficient, then H_0: $GAP_t = 0$ for all t. On the other hand, if there are 6-month trends in national equity indexes, H_1: $GAP_t > 0$; if there are reversals, H_1: $GAP_t < 0$.

The analyis that follows is not corrected for trading costs. Obviously, comparative assessments of contrarian and momentum investing have to consider that as a rule a momentum strategy requires much more trading than a contrarian strategy.

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[10] I start with data for 38 years (1970-2007). However, since the rank period lasts 36 months, I lose the first three years of data (1970, 1971 and 1972). I also lose the last two years (2006 and 2007) as the test period lasts 24 months. Hence, 33 years of data are left.

ANALYSIS AND RESULTS

Tables 1 and 2 present selected descriptive statistics for the stock index returns of the 18 markets between 1970 and 2007. My aim is to illustrate the level of past market volatility. Volatility matters because, by construction, portfolios of past winner and loser countries select market indexes that make big moves over intervals of 6 months or 3 years.

BULLS AND BEARS

Table 1 lists the relative frequency by country, over any 6-month or 3-year period, of a bull market with a return greater than +25% or a bear market with a return less than -25%.[11] Norway, Singapore and Hong Kong look to be the most volatile indexes, but Italy and Spain show unusual downside volatility over 3-year periods. Sweden shows atypical upside volatility. In addition, the right-hand side of table 1 lists the relative frequency with which a market index turns up in a 6-country past winner, loser, or other portfolio. If all market indexes are equally volatile, the expected frequency is 33% for every type of portfolio. Remarkably, Italy appears in the contrarian loser portfolio in 52% of all replications. Sweden and Norway are among the 3-year winners 47% of the time. Hong Kong is the most frequent 6-month winner (45% of all replications); Italy is the most common 6-month loser (45%).

Table 2 indicates the maximum and minimum returns for the market index of each country over a 6-month or 3-year interval. The table also lists the date of the last month of the period for which it happened. So, the greatest 3-year bull market in the United States – a climb of 139% – occurred between April 1995 and March 1998. The most severe 3-year bear market – a plunge of 43% – was between April 2000 and March 2003. Equity market fluctuations can be truly dazzling. For instance, Hong Kong stock prices rose just about 1,100% from 1970 to 1973. Yet, over the next three years, the Hong Kong market lost 68% of its value. As shown at the bottom of table 2, extreme 6-month bull markets on average double prices. Extreme 6-month bear markets slash the indexes near 40 percent.

It is also evident from table 2 that there is a good deal of comovement between international stock indexes. Arbitrage strategies, like the ones I study here, are intended to be neutral with respect to return variation in the world index. The right-hand side of table 2 lists the maximum and minimum excess returns (and matching period ending months) for each country index. Note that a national market may earn an excess return of less than -100 percent if it goes down at the same time as other world markets go up. An example is Singapore. Its equity market underperformed the world index by -188% between May 1983 and April 1986.

TRENDS AND REVERSALS

Table 3 ranks the 18 countries by their past 6-month or 3-year returns and finds cumulative excess returns (CER) for the countries ranked first, second, .., and eighteenth. The CER's are averaged over 396 replications and are reported 6, 12, 18 and 24 months into the test period. At the bottom of table 3, I show similar statistics for equally-weighted portfolios of 6 countries.

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[11] Between January 1970 and December 2005, there are 396 partially overlapping 3-year periods. Similarly, between July 1972 and December 2005, there are 396 partially overlapping 6-month periods.

Figures 1 and 2 plot the numbers in table 3 that pertain to individual winner and loser countries (ranked 1st, 2nd, .., 18th). Figure 3 plots cumulative excess returns over 1 to 24 months for contrarian winner and loser portfolios of 3, 6, or 9 countries. Figure 4 does the same for momentum portfolios.

The analysis leaves no doubt whatsoever that there are predictable patterns in national stock indexes. The two null hypotheses of "no 6-month trends" and "no 3-year reversals" are rejected. Figures 1 and 3 show a negative relationship between the rank and test period returns of 3-year winner and loser countries. One year into the test period, a portfolio of three 3-year past losers beats a similar portfolio of winners by about 6%. Two years into the test period, the return differential is about 11%. Interestingly, the extent of the test period price correction depends on how far prices moved during the initial rank period. For example, the country index with the best performance during the rank period performs, on average, the worst afterward (10% below the world index, two years into the test period).

Figures 2 and 4 show a positive relationship between the rank and test period returns of 6-month winner and loser countries. Nine months into the test period, a portfolio of three 6-month past winners beats a similar portfolio of losers by about 6%. One year into the test period, the return differential is near 5%. Two years into the test period, it is 4%. Portfolios of 6 or 9 countries exhibit the same pattern. Consistent with prior research (e.g., figure 2 in De Bondt and Thaler, 1985), I conclude that momentum investing may be lucrative but that the profits do not last unless one regularly updates the portfolios.

ROBUSTNESS TESTS

It is essential to assess whether the main findings of this article are robust to minor changes in empirical methods, and whether they can be understood without reference to investor irrationality. For example, it is instructive to examine subperiods in order to test whether the effectiveness of momentum and contrarian investing changes over time. (In the modern era of globalization, so many technological and institutional changes have occurred that history may be obsolete.) Additional tests and variants of the empirical design include: (i) changing the length of the rank (2, 3, 4 or 5 years) and test periods (1, 2, or 3 years); (ii) adjusting the returns for currency movements relative to the U.S. dollar; (iii) checking whether excess returns are earned by the stock indexes of large countries (e.g., the G7) as well as small countries, and whether the results apply to emerging markets; (iv) checking the seasonality of excess returns; (v) adjusting the estimates of excess return for differences in systematic and unsystematic risk between winner and loser portfolios; (vi) checking whether the success of contrarian and momentum investing depends on the phase of the business cycle as suggested by the work of Jimmy Liew and Maria Vassalou (2000), Jesper Rangvid (2006) and others.[12] On the whole, the robustness tests are reassuring. Even though the tests add much interesting detail, they do not alter the central finding of trends and reversals in stock market indexes predicted by past price movements.

Two supplementary results that I do want to call attention to are as follows. First, the contrarian and momentum strategies are profitable *in combination*. Each month between

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[12] To this purpose, I match the MSCI-BARRA return data with monthly data for industrial production, inflation, and interest rates published by the Organization for Economic Cooperation and Development. Economic growth is usually lower for 3-year loser than for 3-year winner countries; inflation and interest rates, higher.

December 1972 and December 2005, I assign every national market index to one of four portfolios. The 1st group (named "expensive winners") includes markets that are both 6-month and 3-year winners.[13] The 2nd group ("expensive losers") includes markets that are 6-month losers but 3-year winners. The 3rd group ("cheap winners") includes markets that are 6-month winners but 3-year losers. Lastly, the 4th group ("cheap losers") includes markets that are both 6-month and 3-year losers. As before, the portfolio cumulative excess returns are equally-weighted across countries and averaged across 396 replications. Figure 5 shows the CER's 24 months into the test period. As before, cheap markets (groups #3 and #4) beat expensive markets (groups #1 and #2), and winners (groups #1 and #3) beat losers (groups #2 and #4). What is significant and new, however, is that an "enhanced momentum" strategy beats a "deep contrarian" strategy. More precisely, a hedge fund that is long in cheap winners and short in expensive losers earns much larger returns (3.6% + 4.5% = 8.1%) than a hedge fund that is long in cheap losers and short in expensive winners (1.1% + .6% = 1.7%). In the first case, the contrarian investing enhances momentum investing; in the second case, the two strategies work against one another.

Second, the main findings are influenced by global financial disorder. One measure of turmoil is a (normalized) cross-sectional standard deviation of monthly stock index returns. (Note that financial disorder is not the same as time-series volatility. The dispersion in market returns may be stable at the same time as the world stock index experiences severe macro-economic shocks.) In general, I find that disorder helps the performance of contrarian strategies and hurts the performance of momentum strategies. These results, I repeat, agree with the public statements of Paul Tudor Jones and other macro hedge-fund managers.

CONCLUSION

About 20 years ago, research in behavioral finance led to the discovery of predictable 6-month trends and 3-year reversals in the stock prices of individual companies. This article finds that the insights gained from earlier work may also have validity for global equity asset allocation. Counter to conventional wisdom, whether a national market does comparatively well or poorly in the cross-section of world equity markets is a reliable predictor of its future performance. Contrarian and momentum investing both succeed. They succeed all the more in combination.

Aspects of investor psychology likely explain the results. Still, the dark art of data mining may end in chance observations that no theory can rationalize. Also, there may be an economic logic to the findings that I am unable to discern. The statistical links between stock market trends, reversals, standard risk measures, and the macro-economy are weak, however. Even so, in times of global financial disorder, price momentum is disrupted and contrarian price corrections get larger.

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[13] Specifically, the first group includes markets with rank 1, 2, .., or 9 in past 6-month returns *and* rank 1, 2, .., or 9 in past 3-year returns. The two rankings are independent. Similar methods are used for the remaining three groups.

ANNEXES

	average monthly return	Relative frequency of 3-year return			Relative frequency of 6-month return			Relative frequency that country is in contrarian			Relative frequency that country is in momentum		
		below -25%	other	above 25%	below -25%	other	above 25%	loser portf.	other portf.	winner portf.	loser portf.	other portf.	winner portf.
AU	1.11	1	47	52	4	85	11	43	31	26	35	30	35
AT	1.08	9	42	49	1	86	13	49	16	35	40	28	32
BE	1.23	8	27	65	1	86	13	18	47	35	26	39	35
CA	0.95	2	43	55	2	90	8	38	40	22	34	37	29
DK	1.14	1	32	67	1	87	12	26	35	39	27	38	35
FR	1.18	7	29	64	3	85	12	34	40	26	33	37	31
DE	1.10	5	25	70	2	86	12	29	51	20	33	39	28
HK	1.48	10	26	64	8	68	24	32	28	40	34	21	45
IT	0.98	15	41	44	4	83	13	52	23	25	45	25	30
JP	0.92	12	34	54	2	84	14	38	28	34	39	26	35
NL	1.27	4	26	72	1	90	9	17	41	42	17	56	27
NO	1.24	10	21	59	4	78	18	40	14	47	38	22	40
SG	0.94	13	30	57	7	73	20	35	22	43	41	21	38
ES	0.98	15	37	48	2	87	11	42	25	33	39	31	30
SE	1.45	4	22	74	3	81	16	25	28	47	30	28	42
CH	1.14	2	31	67	1	88	11	21	45	34	27	40	32
UK	1.13	8	23	69	3	88	9	24	57	19	32	41	27
US	0.95	5	26	69	1	94	5	38	30	33	31	42	27

Table 1

Descriptive statistics for stock index returnsof 18 developed markets

I study stock market indexes for Australia (AU), Austria (AT), Belgium (BE), Canada (CA), Denmark (DK), France (FR), Germany (DE), Hong Kong (HK), Italy (IT), Japan (JP), the Netherlands (NL), Norway (NO), Singapore (SG), Spain (ES), Sweden (SE), Switzerland (CH), the United Kingdom (UK), and the United States (US). The results listed above are for 396 replications of monthly returns, past 6-month or past 3-year returns between end December 1972 and end December 2005. To calculate relative frequencies, I assume that the winner, loser, and other portfolios each contain 6 market indexes.

	Stock index returns								Stock index excess returns							
	Past 3 years				Past 6 months				Past 3 years				Past 6 months			
	Max.	date	Min.	date	Max.	date	Min.	date	Max.	date	Min.	date	Max.	date	Min.	date
AU	201	9/80	-31	9/74	58	3/87	-54	9/74	106	9/80	-146	2/73	41	8/88	-40	7/86
AT	307	9/87	-44	11/82	100	6/85	-34	9/90	178	3/90	-90	2/81	78	6/85	-36	5/87
BE	370	2/88	-43	9/02	84	2/86	-30	7/81	202	2/88	-94	4/81	43	2/86	-35	2/00
CA	160	9/05	-33	3/03	53	12/82	-33	2/01	65	2/80	-152	9/87	41	12/82	-42	2/86
DK	263	7/73	-30	2/03	71	2/73	-31	1/74	124	7/73	-185	7/87	43	1/73	-32	8/86
FR	288	7/87	-49	3/03	103	4/86	-40	6/81	125	7/86	-107	2/73	56	4/86	-37	6/81
DE	251	7/87	-63	3/03	74	10/85	-41	9/02	88	1/86	-111	2/73	44	10/85	-32	5/87
HK	1097	2/73	-68	2/76	316	2/73	-62	8/73	948	2/73	-94	7/98	276	2/73	-63	8/73
IT	439	10/86	-65	10/76	126	4/86	-41	9/74	283	10/86	-165	2/73	80	4/86	-36	4/76
JP	381	5/87	-58	3/03	75	7/86	-31	3/90	221	4/88	-116	3/98	48	7/86	-39	3/90
NL	261	7/87	-47	3/03	50	4/75	-33	9/02	85	9/84	-104	2/73	23	3/76	-26	2/73
NO	278	6/73	-54	11/82	130	6/73	-40	9/74	130	6/73	-114	5/87	106	6/73	-49	4/86
SG	489	1/73	-61	8/98	126	1/73	-47	8/98	373	1/73	-188	4/86	102	1/73	-75	4/86
ES	428	8/87	-66	7/77	117	4/86	-37	9/77	247	1/87	-114	9/77	70	4/86	-43	5/75
SE	242	5/88	-68	2/03	97	4/84	-39	3/01	200	8/83	-92	2/73	67	2/00	-31	3/73
CH	222	9/87	-35	9/82	66	12/85	-26	9/74	64	11/95	-90	2/81	32	11/85	-27	3/73
UK	238	7/87	-62	12/74	124	5/75	-43	11/74	147	12/77	-105	2/73	88	5/75	-50	2/73
US	139	3/98	-43	3/03	41	6/75	-32	9/74	70	11/97	-120	2/73	31	11/82	-39	2/73
Av.	336		-51		101		-39		203		-122		71		-41	

Table 2

Maximum and minimum 6-month and 3-year stock index returns for 18 developed markets, 1970-2005

I study stock market indexes for Australia (AU), Austria (AT), Belgium (BE), Canada (CA), Denmark (DK), France (FR), Germany (DE), Hong Kong (HK), Italy (IT), Japan (JP), the Netherlands (NL), Norway (NO), Singapore (SG), Spain (ES), Sweden (SE), Switzerland (CH), the United Kingdom (UK), and the United States (US). The results are for 396 replications of past 6-month or past 3-year returns between December 1972 and December 2005. I report maximum and minimum (excess) returns as well as the date of the last month of the period over which the return was realized.

	rank by return for past 3 years				rank by return for past 6 months			
	+6 months	+12 months	+18 months	+24 months	+6 months	+12 months	+18 months	+24 months
extreme winner	-3.6	-6.6	-8.8	-10.0	2.6	0.9	-0.2	-0.6
2	-1.0	-3.7	-6.1	-6.4	2.6	2.3	1.1	0.5
3	0.3	0.3	0.2	-1.3	2.8	3.3	2.6	2.8
4	-0.3	0.7	0.3	0.5	1.5	2.7	3.5	3.9
5	0.6	-0.4	-2.4	-4.5	1.2	1.4	0.4	0.4
6	0.6	-0.1	-1.9	-2.9	-0.2	1.1	1.0	2.1
7	0.4	-1.0	-1.4	-3.6	0.5	2.1	1.5	-0.9
8	0.3	1.1	0.1	-0.9	0.8	2.4	2.8	2.6
9	0.6	2.4	3.0	2.2	-0.1	0.0	0.3	1.2
10	0.9	1.6	1.5	2.2	0.2	0.6	1.7	1.6
11	0.7	2.5	4.1	5.2	-0.5	0.9	1.0	0.7
12	0.9	0.6	1.2	0.8	-0.5	-0.6	-1.2	-1.2
13	-1.2	-1.6	-1.9	-1.0	-1.5	-1.7	0.0	1.9
14	-0.9	-1.7	-1.2	0.0	-1.1	-1.8	-1.0	-0.1
15	1.2	2.0	3.3	6.3	-2.9	-3.7	-4.2	-5.2
16	-0.2	2.2	7.2	9.5	-1.3	-1.9	-1.8	-1.9
17	-0.6	0.5	2.7	5.0	-2.9	-5.9	-7.3	-7.6
extreme loser	1.0	1.2	0.2	-1.0	-1.2	-2.2	-0.1	0.1
6 winners	-0.5	-1.6	-3.1	-4.1	1.8	2.0	1.4	1.5
6 other	0.6	1.2	1.4	1.0	0.1	0.9	1.0	0.7
6 losers	-0.1	0.4	1.7	3.1	-1.8	-2.9	-2.4	-2.2
losers-winners	0.4	2.0	4.8	7.2	-3.6	-4.9	-3.8	-3.7

Table 3

The link between the past and future stock index returns of 18 developed markets

As in tables 1 and 2, I study stock market indexes for 18 industrialized countries. The data start in January 1970 and end in December 2007. Every month between December 1972 and December 2005, I sort the 18 indexes by their returns over the past 3 years or over the last 6 months. In total, there are 2 (3-year and 6-month sort) x 33 (years) x 12 (months) = 792 sorts. Next, I calculate for every index in each sort (ranked 1st, 2nd, .., or 18th) the cumulative returns for the next 6, 12, 18 or 24 months, and I deduct the average cumulative return for all 18 markets over the corresponding time period. I report cumulative excess returns for individual indexes and for portfolios of 6 extreme winners, 6 extreme losers, and the remaining indexes. The cumulative excess returns are averaged across 2 x 396 replications.

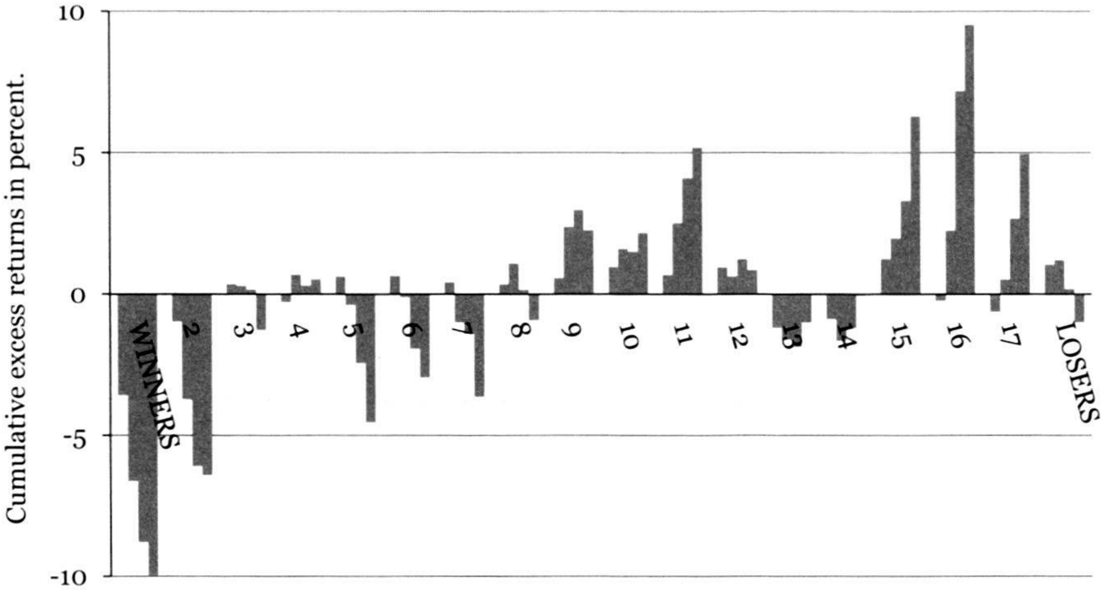

Figure 1

How profitable are contrarian portfolios? Cumulative excess returns after 6, 12, 18 and 24 months.

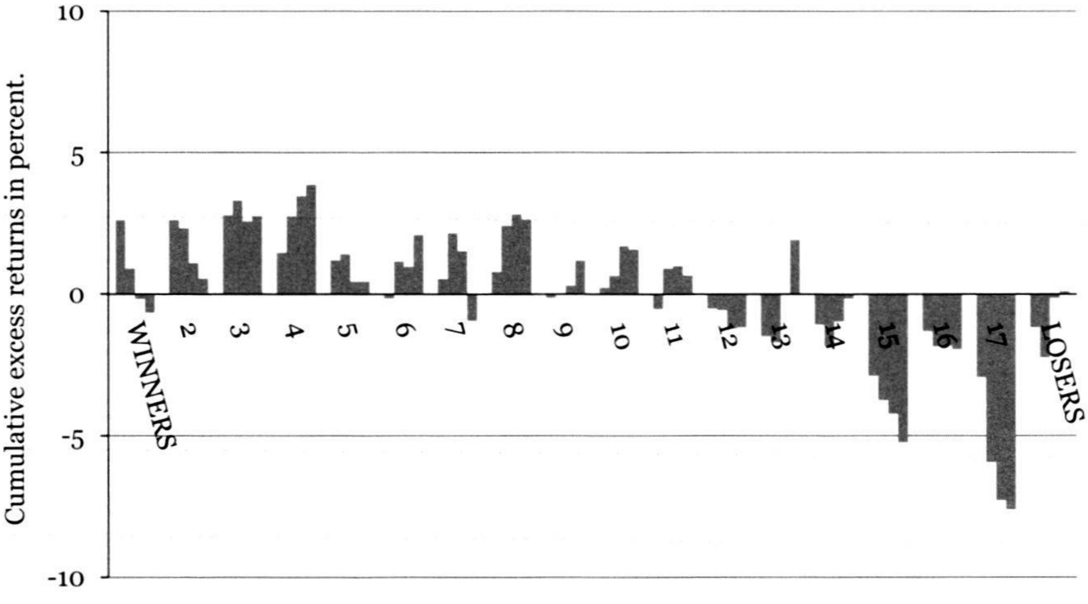

Figure 2

How profitable are momentum portfolios? Cumulative excess returns after 6, 12, 18 and 24 months.

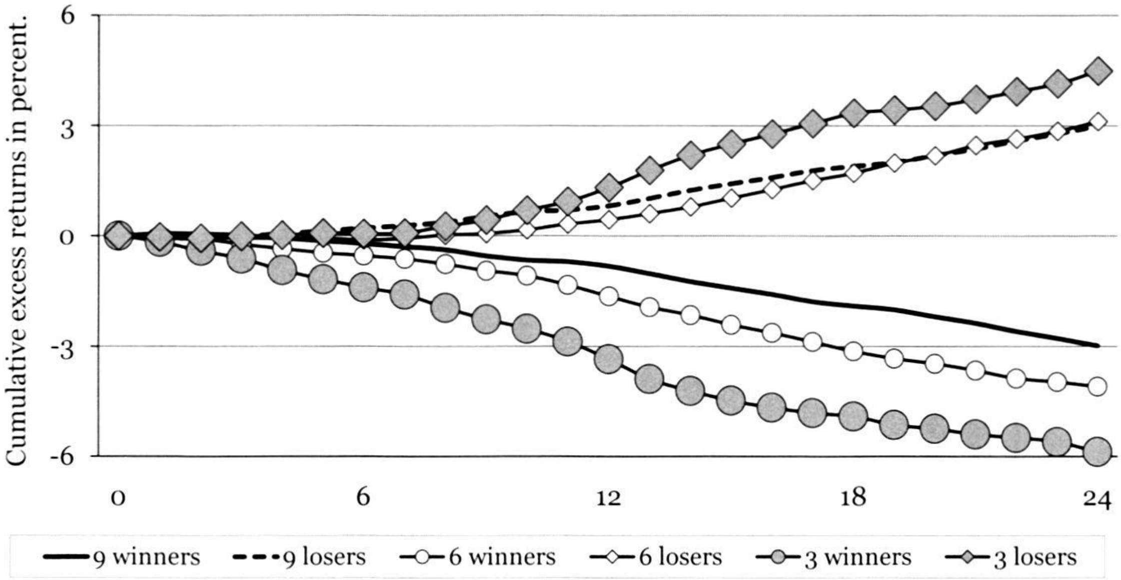

Figure 3

How profitable are contrarian portfolios? (18 developed markets; 1973-2007; markets are ranked by past 3-year returns)

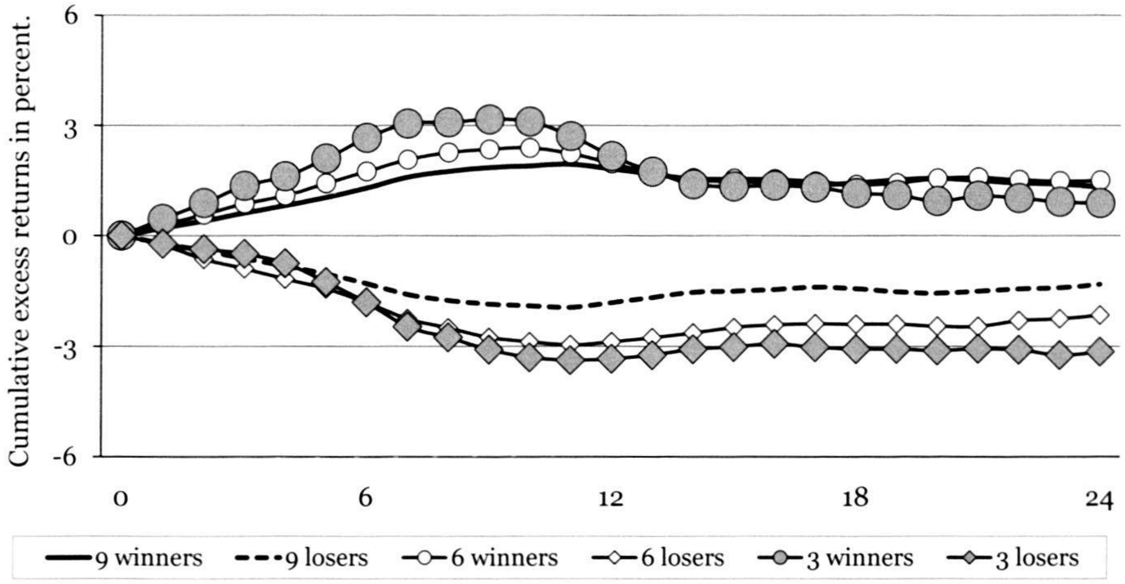

Figure 4

How profitable are momentum portfolios? (18 developed markets; 1973-2007; markets are ranked by past 6-year returns)

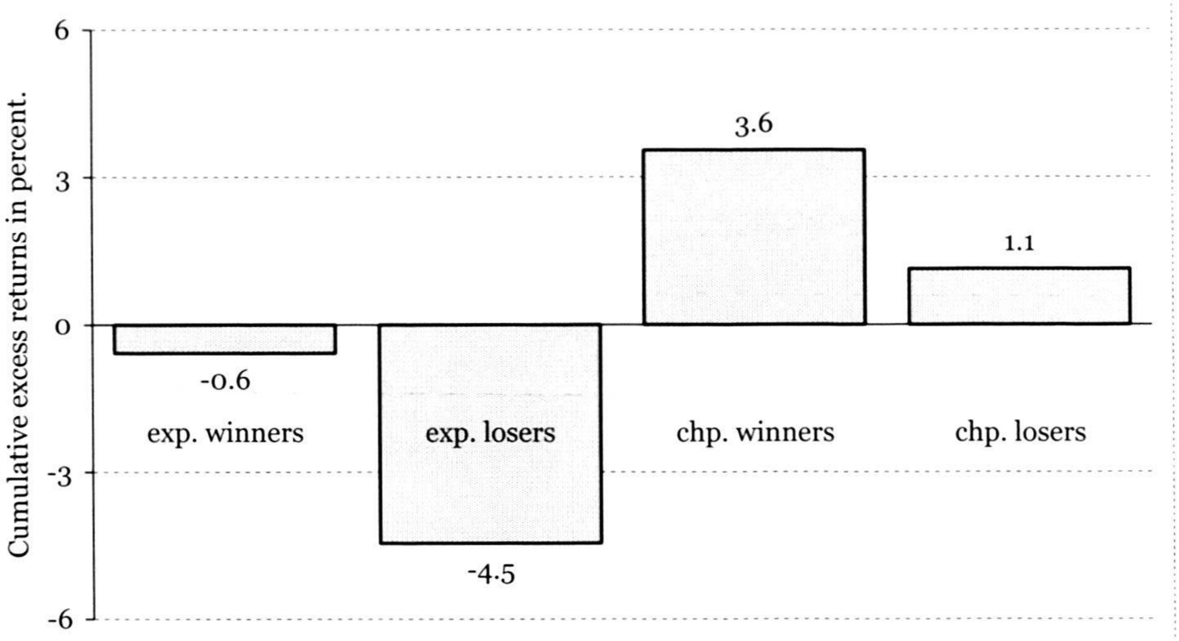

Figure 5

Cumulative excess returns after 24 months for expensive winners and losers, and cheap winners and losers

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Questions - Recommendations

Key recommendations for investors

- Plan your financial future.
- Assess your financial plan once a year, and make adjustments if necessary. Do not adjust your investment portfolio more than once a year. Try to keep trading costs low.
- Diversify your investments.
- Prepare recurring forecasts of key macro-economic and financial variables, and write down the reasons why you believe what you believe, but do not rely on these forecasts to make investment decisions. Study the forecasts in retrospect: Why did the predictions turn out to be true or false?
- Try to learn from past mistakes, but let bygones be bygones. Always look to the future.
- Practice the art of contrarian investing.