Global Momentum Strategies

A portfolio perspective.

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The simple investing strategy of buying stocks that have won in the past and selling short stocks that have lost appears significantly profitable in the U.S. both statistically and economically. Since the Jegadeesh and Titman [1993] study of U.S. stock returns, substantial out-of-sample evidence of price momentum has mounted. Price momentum is economically high in many European markets, low but positive in many emerging markets, and also present in some Asian markets (see Rouwenhorst [1998, 1999], and Chui, Titman, and Wei [2000]).

Vandell and Parrino [1986] demonstrate that a model with earnings momentum as the major component substantially outperforms the U.S. market. Chan, Jegadeesh, and Lakonishok [1996] show that a similar momentum strategy based not on returns but on past earnings is a separate and distinct source of profitability in the U.S. Scott, Stumpp, and Xu [2003] document earnings momentum in all major markets they examine, but Hong, Lee, and Swaminathan [2003] find positive and significant earnings momentum profits in only 6 of 11 international markets.

Our analysis extends this evidence in 40 markets for price momentum and in 34 for earnings momentum by analyzing several key issues: separation of long-side positions from short-side positions; interaction between price and earnings momentum; the relation between momentum strategies across markets; and the sensitivity of the momentum to global market conditions, extreme events, and seasonality.

Attempts to explain momentum profits with increasingly complex risk factor models have largely failed.[1] Few researchers have looked at the practical risk faced by an investment practitioner implementing momentum. Recent exceptions are two studies of the implementability of momentum in the face of bid-ask spread and price impact costs: Chen, Stanzl, and Watanabe [2002] and Korajczyk and Sadka [2004]. We examine some of the practical implementation risks and challenges that managers might face when they use momentum strategies in a global setting. The approach we take may also be useful in examining properties of other more complicated investment strategies.

We find momentum is potentially useful even for investors who are able to take only long positions. Ignoring transaction costs, an investor investing $1 in European securities in 1975 would have earned $15.06 in former six-month low-return securities, $66.01 in market indexes, and $192.66 in former high-return securities.

Price and earnings momentum profits are large and positive on a global basis. Former short-term increases in earnings and prices are both important in generating excess returns. A strategy going long stocks in the top 20% of both past return and earnings growth and short stocks with the lowest returns and earnings growth produces positive returns in 29 of 32 markets: 13.45% per year in the U.S., and 10.41% in the rest of the world.

We compare from the perspective of a U.S. money manager the correlation between U.S. momentum strategies and those in other countries to correlations between market indexes. The result indicates that international momentum investors reap greater benefits of diversification than international index investors. Correlations of both price and earnings momentum strategies are much lower than market correlations. When the U.S. market experiences negative returns, market correlations dramatically increase, but momentum correlations are not higher. In addition, momentum strategies pay off when markets are up and down and when the economy is contracting and expanding.

While momentum strategies are not superficially risky in terms of time series average exposure to traditional risk factors, they are far from pure arbitrage. Time series of momentum profits in geographic regions and in the U.S. reveal that momentum strategies have occasionally dropped to as low as −20% per month. In a few months, these returns are also accompanied by negative returns in preceding months and even negative returns in other regions at the same time. While these occurrences are rare, they are worth noting, especially for leveraged investors.

We find that for some countries these negative returns cluster in January.

Cumulative returns of momentum strategies indicate that at times momentum does not work for extended periods. After 1975, in a 33-month period in the U.S. and a 60-month period in Asia, momentum strategies generally lost money. Overall, our results highlight the usefulness of momentum but also some areas of caution in implementation.

DATA AND METHODOLOGY

U.S. monthly stock return data include common shares of all New York Stock Exchange- and American Stock Exchange-listed firms available from the Center for Research in Security Prices. For non-U.S. data, we identify 39 countries from Datastream International that have at least 50 non-financial stocks (from both defunct and active firm lists). We begin coverage in 11 markets in 1975, but by February 1995 all countries except Egypt have coverage for price momentum strategies. Earnings momentum strategies begin in February 1976 for the U.S. and in February 1987 for many other countries.

To attenuate effects of possible errors in the Datastream information, we follow Griffin, Ji, and Martin [2003] and screen the data. We exclude preferred shares (except where preferred shares are the main share class, such as in Brazil), convertible shares, warrants, investment certificates, participation certificates, units, mutual funds, and foreign-listed shares. In countries with multiple share classes, we try to select the most representative share class by using widely traded shares with ordinary voting rights and accessible to foreign investment. We use industry classification codes to exclude non-common securities.

Whenever the return index of a stock is the same at least four times consecutively, we keep the first value and code the rest of the repeated values as missing. If any monthly return is over 1000%, we code it as missing. Detail regarding the methodology for the trading strategies is provided in Griffin, Ji, and Martin [2003].[2]

For price momentum strategies, we follow the most widely reported results, focusing on a six-month ranking period when winners and losers are determined and a six-month investment period when winners are held and losers are sold short. To avoid microstructure distortions in price momentum strategies, we skip one month between the portfolio ranking and investment periods. We follow these strategies every month so that strategies of six varying vintages are in effect simultaneously at all times.

For earnings momentum over a six-month period, we take the change in the consensus one-year earnings forecast and scale it by the price at the end of the period (much like Chan, Jegadeesh, and Lakonishok [1996]). Stocks are ranked according to this measure and held for the next six months.

For both price and earnings momentum strategies, we use strategies that examine the top 20% of stock returns (winner) and bottom 20% (loser) because in some countries there are simply not enough stocks for the common decile designations. We report annualized profits, monthly profits multiplied by 12.

RETURNS BY COUNTRY AND REGION

We examine price and earnings momentum according to viability of the strategy and profits.

Viability

The short sales constraint makes it crucial to identify the source of momentum profitability before the strategy can become useful to institutional investors. To ascertain this, we denominate each stock return in dollars and investigate the growth path of investing $1 in various portfolios beginning in August 1975. Subsequent analysis, however, simply uses local currency returns.

Exhibit 1 demonstrates that winner stocks outperform their respective market indexes in all regions, and return differentials are quite significant. Ignoring transaction costs, investing constantly in the U.S. would have generated $142.29 from the winner stocks and $33.87 from the value-weighted market index (compared to $7.27 from loser stocks).

Interestingly, stocks that were past losers outperform the market in the Americas (ex-U.S.) and Asia, possibly because the momentum stocks are typically of much smaller capitalization and may have earned a premium over large-caps in these regions. In Europe and the U.S., loser stocks underperform corresponding market indexes.

The fact that much of the returns come simply from investing long in winner stocks suggests that (ignoring transaction costs) momentum strategies are potentially profitable even for short-constrained institutional capital.

Returns

Exhibit 2 displays average winner-minus-loser profits for both price and earnings momentum strategies for each country in local currency. Countries with statistically significant momentum profits are indicated by the striped bars.

Winner-minus-loser portfolios are largely profitable around the world. Asian countries display the weakest momentum profits. Outside the U.S., African countries, all six American countries, 10 of 14 Asian countries, and 14 of 17 European countries display positive price momentum profits over the period. Earnings momentum strategies produce positive returns in 27 of 34 markets and are significantly negative in no markets.

To allow for noisiness of individual country data, we also report regional averages, forming the time series for each region as the equally weighted average of all countries in the region. Average annual price momentum profits are 19.62% in Africa; 9.41% in the Americas (ex-U.S.); 3.83% in Asia; and 9.21% in Europe. It is interesting to see that the price momentum profits for Asia are decidedly weaker than those around the world. Earnings momentum profits are 10.87% per year in the Americas (excluding the U.S.), 4.45% in Asia, and 4.16% in Europe.

Across all countries, the average momentum profit is 7.98% per year for price strategies and 5.10% for those based on earnings. Overall, both price and earnings strategy returns are large and pervasive across most countries and regions.

Are Price and Earnings Momentum Distinct?

A natural question is the importance of using distinct price and earnings momentum strategies. If such strategies are merely profiting from the same securities, they are redundant. To examine this issue, we sort securities independently according to both their past earnings and returns, and then examine price momentum profits within past earnings groups (and vice versa). Because our data outside the U.S. begin in 1987 or later, and the bivariate strategies require allocating the stocks into more portfolios than the univariate strategies, profits to these strategies are quite volatile. Hence, statistical significance may be hard to detect.

Within earnings momentum groups, Exhibit 3 shows that the average price momentum strategy earns positive profits in all American markets and all but one European market. It earns positive profits in 5 of 13 Asian markets and insignificantly negative profits in the other Asian markets. In Europe and in the U.S., price momentum strategies are profitable within low, medium, and high past earnings growth groups. Aggregating across all mar-

E XHIBIT 1

One Dollar Investment in Price Winner, Loser, and Market 1975-2000
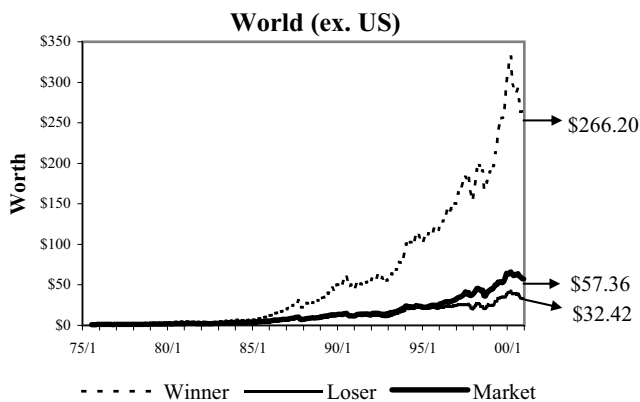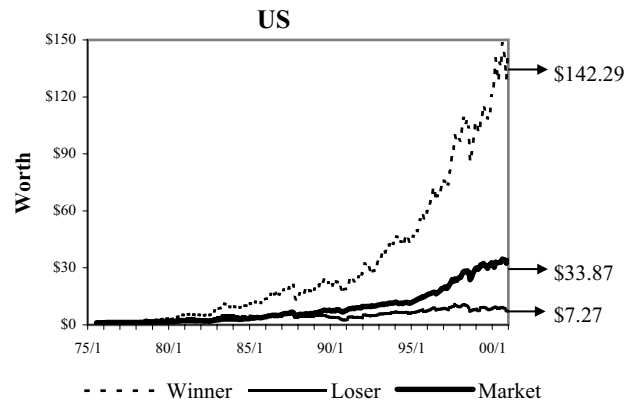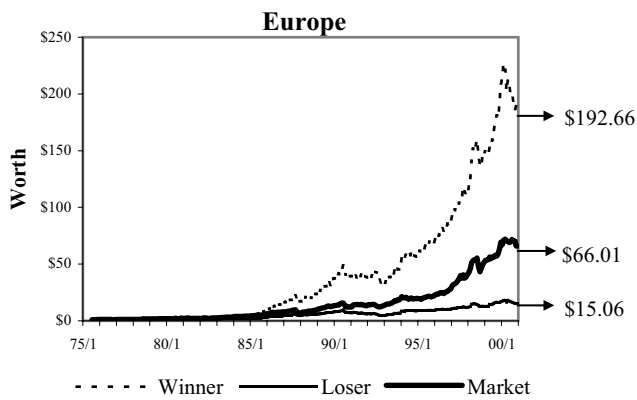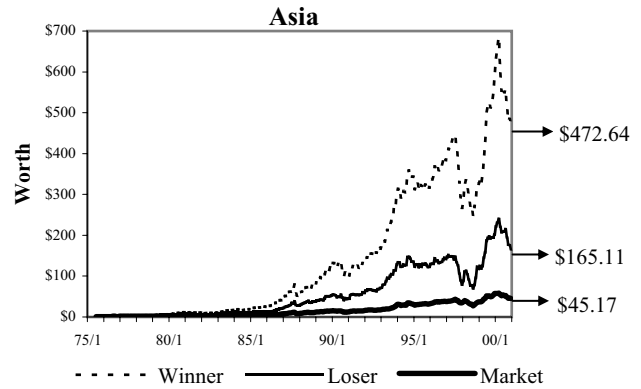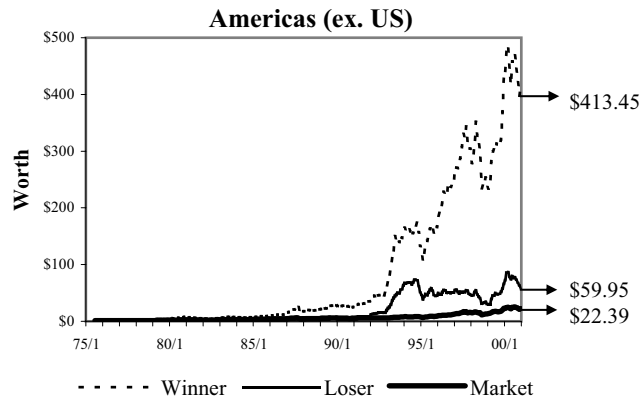
kets, price momentum profits are 4.89%, 6.13%, and 7.90% per year in stocks in low, medium, and high earnings momentum groups.

In past return groups, earnings momentum strategies are on average profitable in all but one American market, one Asian market, and one European market. Earnings momentum strategies are positive and significant in low, medium, and high past return momentum groups in both

Asia and Europe. Interestingly, though, earnings momentum is least profitable in the medium–price groups in both Asia and Europe. Across all markets, earning momentum profits are 4.59%, 3.10%, and 7.50% per year in low, medium, and high return groups.

These findings show that after conditioning on the same sets of stocks and the same time period, earnings momentum strategies are much more profitable than

E X H I B I T   2
Momentum Profits by Country and Region
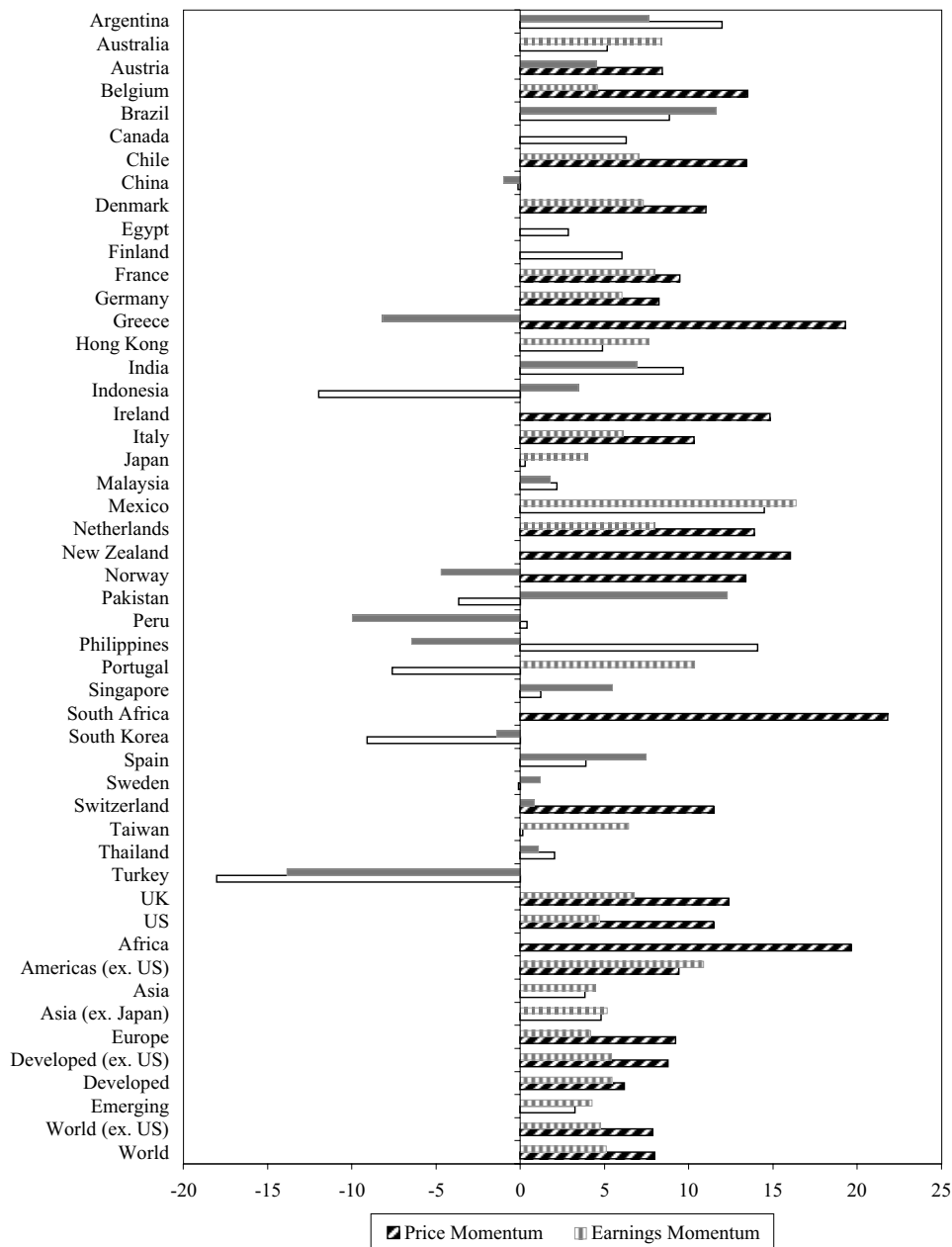
Striped bars: Statistically significant at the 5% level. Open bars: Statistically insignificant price momentum. Grey bars: Insignificant earnings momentum.

price momentum in Asia; outside Asia, price momentum is in general slightly more profitable. While earnings momentum strategies are more profitable in stocks that also exhibit price momentum, these strategies are not driven by price momentum. Additionally, price and earnings momentum are separate and profitable phenomena.

Quantitative investment houses are likely to use both price and earnings momentum for stock selection. We examine the returns to a joint strategy of buying stocks that are in the top 20% of price and earnings momentum and shorting stocks that are in the bottom 20% of both categories. The last column in Exhibit 3 shows that these strategies are substantially more profitable than the univariate results presented in Exhibit 2.

Exhibit 3
Interaction of Price and Earnings Momentum

	Price Momentum Sort Power of $(P_{hi} - P_{lo})$ within Earnings Momentum Groups				Earnings Momentum Sort Power of $(E_{hi} - E_{lo})$ within Price Momentum Groups				Combined Strategy
	$P_{hi} - P_{lo}$				$E_{hi} - E_{lo}$				$P_{hi}, E_{hi} -$
Region/Country	E_{lo}	E_{md}	E_{hi}	Avg	P_{lo}	P_{md}	P_{hi}	Avg	P_{lo}, E_{lo}
Argentina	20.97	5.42	14.35	13.58	5.96	14.26	-0.66	6.52	20.31
Brazil	24.28	24.38	-3.14	15.17	14.25	7.62	-13.16	2.9	11.11
Chile	30.11*	10.79*	6.48	15.79*	8.01	5.25	-15.61	-0.79	14.49
Mexico	19.91	-20.53	1.02	0.13	17.15	7.55	-1.74	7.65	18.17
Americas (ex. US)	24.49*	12.79	-2.32	11.66*	15.3	7.43	-11.51	3.74	12.98
Australia	13.93	1.07	6.34	7.11	17.42	6.10*	9.83*	11.11*	23.76*
China	11.92	-0.09	-5.86	1.99	8.84	7.75	-8.94	2.55	2.98
Hong Kong	-0.78	-6.06	5.26	-0.53	7.47	6.55*	13.51*	9.18*	12.74
India	16.59	10.72	25.44*	17.58*	1.29	3.48	10.14	4.97	26.73*
Indonesia	1.64	-20.15	-13.53	-10.68	14.06	-5.91	-1.11	2.35	0.53
Japan	-7.07	-3.88	-0.25	-3.74	2.75	5.00*	9.57*	5.77*	2.50
Malaysia	-2.93	-4.18	-2.17	-3.1	2.78	0.9	3.54	2.41	0.61
Pakistan	-16.43	-6.7	-22.2	-15.11	23.31	3.74	17.53	14.86	1.10
Philippines	-17.45	-35.91	-14.68	-22.68	2.73	-20.63	5.49	-4.14	-11.96
Singapore	-1.48	0.31	3.43	0.75	2.34	3.34	7.25	4.31	5.77
South Korea	-11.45	-13.38	-6.19	-10.34	-1.02	1.5	4.24	1.57	-7.21
Taiwan	-8.71	-2.99	0.04	-3.89	5.7	2.02	14.46*	7.39*	5.74
Thailand	0	2.93	-1.59	0.45	4.8	-2.3	3.21	1.9	3.21
Asia	-3.06	-4.65	-1.02	-2.91	6.81*	2.97*	8.85*	6.21*	5.79
Asia (ex. Japan)	-3.02	-4.13	-1.34	-2.83	8.60*	3.57*	10.28*	7.49*	7.26
Austria	4.09	2.37	-2.11	1.45	18.13	6.13	11.92	12.06*	16.01
Belgium	0.94	8.95	16.27	8.72	-1.32	1.96	14.01*	4.88	14.96
Denmark	18.06*	6.07	15.65*	13.26*	1.35	1.93	-1.06	0.74	17.00*
France	11.81*	1.43	12.05	8.43*	7.57	6.17*	7.81*	7.18*	19.62*
Germany	7.81	6.23*	7.82	7.29*	3.86	5.92*	3.87	4.55*	11.68*
Greece	3.9	14.1	15.81	11.27	-13.18	-10.77	-1.27	-8.4	2.63
Italy	0.86	4.44	13.06*	6.12	1.28	3.26	13.4*	6.01*	14.34*
Netherlands	5	17.78*	-5.63	5.72	25.43	7.97*	14.80*	16.07*	19.80*
Norway	-12.48	16.78	7.44	3.91	-0.54	-2.92	19.38	5.31	6.89
Portugal	15.13	-13.27	14.82	5.56	15.45	9.38	15.14	13.32*	30.27*
Spain	9.13	0.53	-8.5	0.39	10.25	4.13	-7.38	2.33	1.76
Sweden	-11.16	3.22	-8.31	-5.42	4.22	2.12	7.08	4.47	-4.08
Switzerland	18.22*	14.35*	11.53*	14.70*	4.75	-0.68	-1.94	0.71	16.28*
UK	6	15.97*	8.36*	10.11*	4.81	4.89*	7.17*	5.62*	13.17*
Europe	6.26*	7.76*	7.67*	7.23*	5.67*	3.53*	7.08*	5.43*	13.34*
US	7.44*	9.38*	11.06*	9.29*	2.38	2.13*	6.01*	3.51*	13.45*
Developed (ex. US)	4.46	5.14*	6.06*	5.22*	6.85*	4.46*	8.45*	6.59*	12.91*
Developed	5.69*	7.65*	9.11*	7.48*	4.59*	3.55*	8.01*	5.38*	13.70*
Emerging	-1.84	-4.15	-4.91	-3.64	7.66*	2.37	4.59	4.87*	2.75
World (ex. US)	3.01	2.36	3.66	3.01	6.76*	3.55*	7.40*	5.90*	10.41*
World	4.89*	6.13*	7.90*	6.27*	4.59*	3.10*	7.50*	5.06*	12.39*

Profits significant at the 5% level.

Trading on both price and earnings momentum yields an annual return of 5.79% in Asia, 13.34% in Europe, and 13.45% in the U.S. While the profits are lower in emerging markets (where there are typically fewer securities to choose from), the average annual return is 13.70% in developed markets.

We should emphasize that these are just simple strategies, and that more complex trading strategies using other stock characteristics could likely generate even higher returns. Overall, these results show that price and earnings momentum strategies, while related, reveal independent variations that are economically and statistically important.

Next, we examine the time series relation between price and earnings momentum strategies. To ensure that the earnings momentum strategy is not drawn from the same set of securities as price momentum strategies, we examine earnings momentum strategies using only stocks with moderate past returns. That is, we exclude stocks whose recent prior returns rank in the top or bottom 20% in each country. We call this strategy *constrained earnings momentum*.[3]

Exhibit 4 shows that the time series of price and constrained earnings momentum profits generally have positive correlations below 0.40. Interestingly, Indonesia has

E X H I B I T   4

Correlation Between Price and Earnings Momentum
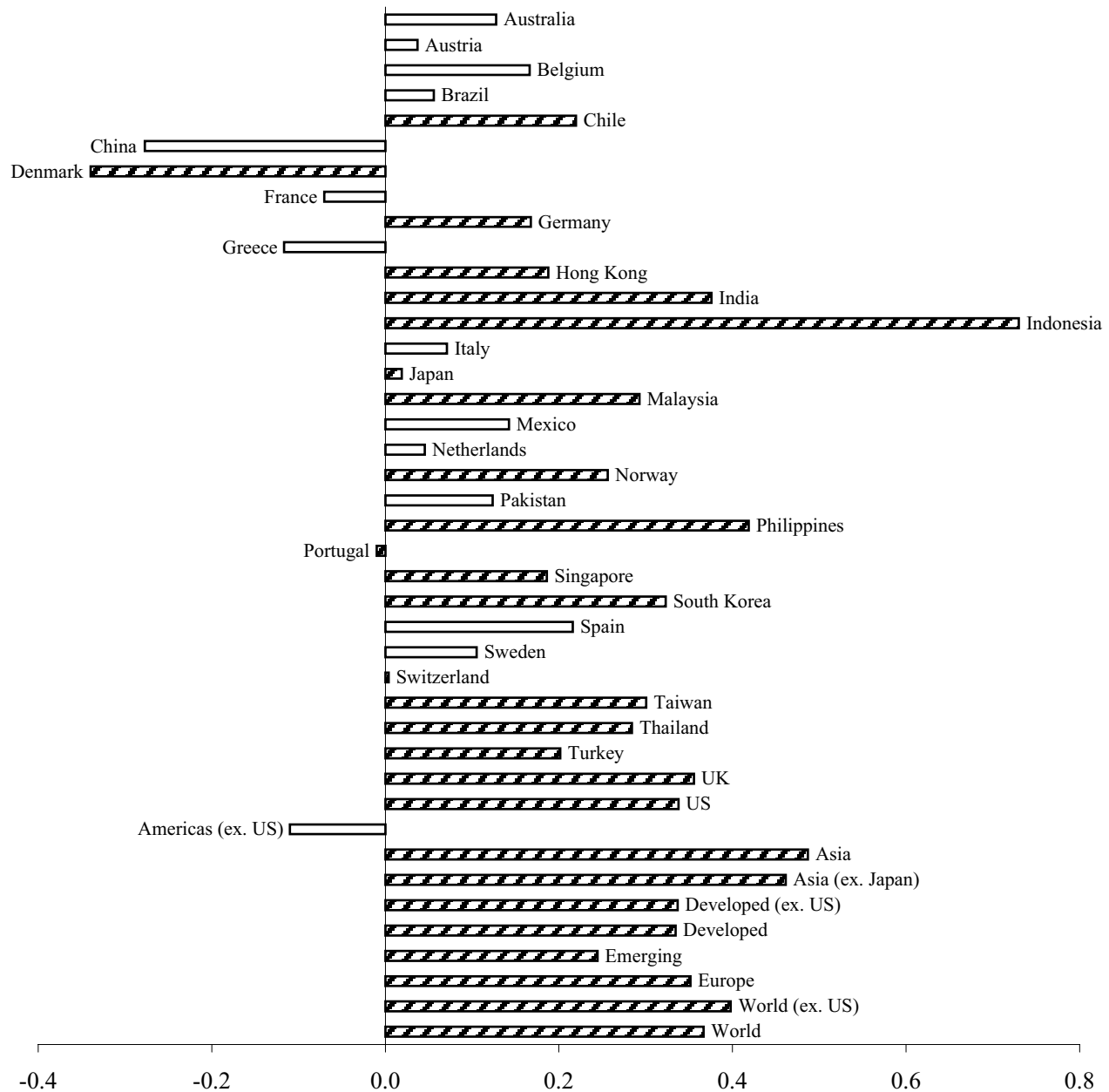
Striped bars: Statistically significant at the 5% level.

the highest positive correlation, while China, Denmark, France, Greece, and Portugal have negative correlations. In the U.S. and the world excluding the U.S., correlations are 0.338 and 0.398, respectively.

Hence, the results in Exhibits 3 and 4 demonstrate that, while the price and earnings momentum profits are related, there is clearly useful information in each.

INTERNATIONAL DIVERSIFICATION AND TIMING OF MOMENTUM STRATEGIES

To analyze the relation between country strategies across markets, we first examine raw correlations and then these correlations in up and down markets.

E X H I B I T   5
Momentum Correlation versus Market Return Correlation

Panel A: Price Momentum Correlation versus Market Return Correlation
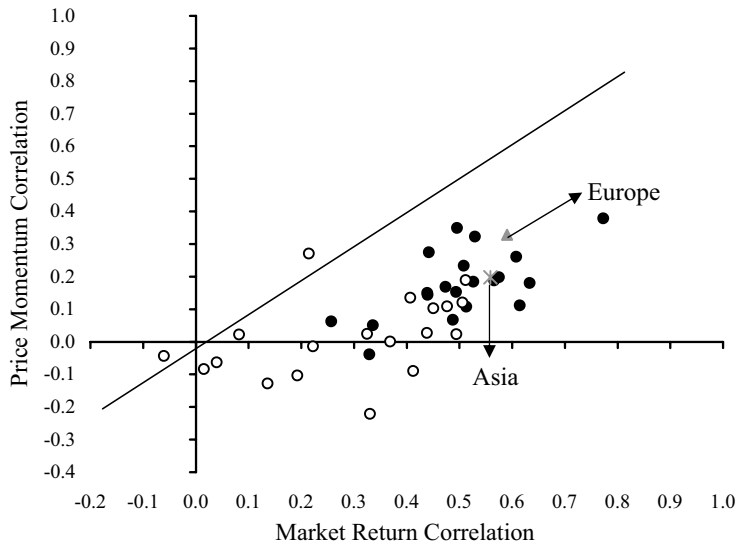
Panel B: Earnings Momentum Correlation versus Market Return Correlation
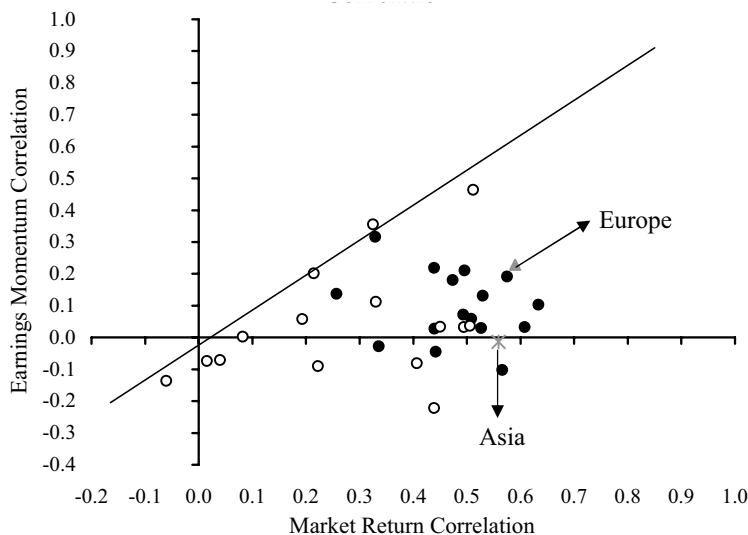
• *Developed countries.*

∘ *Emerging market countries.*

45-degree line demonstrates momentum correlations and market index correlations of equal magnitude.

Correlations

For a global portfolio manager, the correlation of momentum strategies across countries is crucial. If momentum strategies exhibit a higher degree of comove-

ment than pure passive diversification strategies, momentum may be costly to implement as a strategy component.

We calculate the correlation between U.S. momentum strategies and momentum strategies abroad and also the correlation between market indexes. In Exhibit 5, the correlation of each country's market index with the U.S. index appears on the *x* axis, and the correlation of each country's price momentum strategy with the U.S. price momentum appears on the *y* axis. Developed markets are the solid circles, and emerging markets the hollow circles.

The benchmark line of 45 degrees in Panel A shows that in only two emerging markets is the correlation between U.S. and international price momentum profits higher than the market correlation. Emerging market strategies generally exhibit lower momentum correlations than those in developed markets. These lower correlations could be attributable to noisier profits (fewer securities in each portfolio in emerging markets), or mean simply that emerging market momentum is more distinct from that in the U.S.

The average correlation between European price momentum profits and those in the U.S. is 0.328 as compared to the 0.590 correlation between the European market and the U.S. Similarly, the correlation between the Asian momentum strategies and that in the U.S. is 0.198 as compared to 0.559 between an equally weighted Asian market index and the U.S. market. The developed market average correlation is 0.177.

For a sample of firms that (among other differences) excludes international companies with market caps below the NYSE 25th percentile, Naranjo and Porter [2004] find a slightly higher developed market average of 0.31 for the U.S., leading us to conjecture that momentum strategies using larger-cap stocks (where institutions have a higher propensity to invest) will likely have somewhat higher correlations. Our results are similar in spirit to the finding of Asness, Liew, and Stevens [1997] that momentum strategies from international indexes have a low correlation of 0.13 with U.S. momentum strategy profits. Griffin, Ji, and Martin [2003] show that the U.S. correlations are generally above those for other countries.

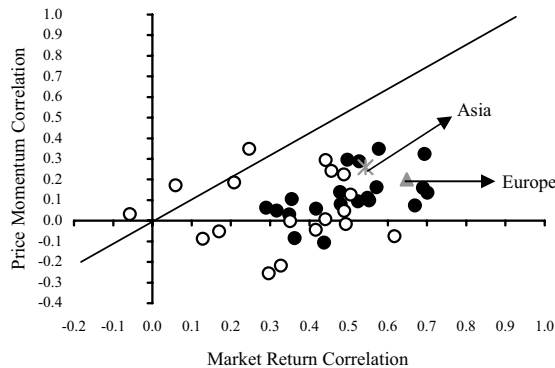We also calculate market-neutralized momentum

E X H I B I T 6
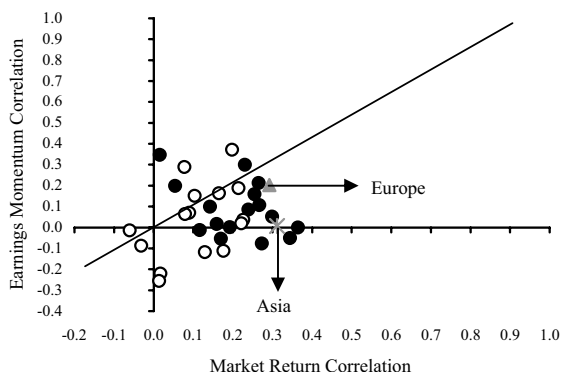## Correlations in Up and Down Markets

Panel A: U.S. Up Market: Price Momentum Correlation versus Market Return Correlation
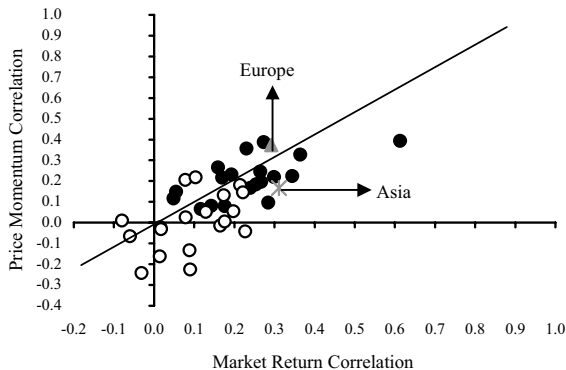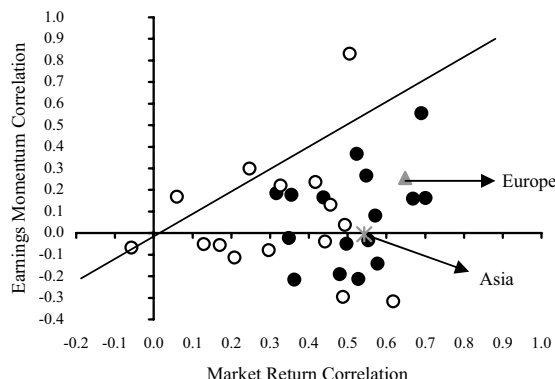

Panel B: U.S. Down Market: Price Momentum Correlation versus Market Return Correlation

Panel C: U.S. Up Market: Earnings Momentum Correlation versus Market Return Correlation

Panel D: U.S. Down Market: Earnings Momentum Correlation versus Market Return Correlation

• *Developed countries.*

∘ *Emerging market countries.*

45-degree line demonstrates momentum correlations and market index correlations of equal magnitude.

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profits that extract market exposure. The residual is computed with respect to the foreign market, so in effect the reported correlation is between the U.S. market and a delta-hedged foreign country momentum strategy as shown by Grundy and Martin [2001]. These correlations show a similar if weaker relation between momentum strategies across countries.

Panel B of Exhibit 5 shows correlations between constrained earnings momentum strategies with the U.S. as compared to market correlations. Earnings momentum strategies generally produce even lower correlations than price momentum strategies. Overall, Asian earnings momentum strategies have a correlation near zero, and European momentum strategies have a correlation of 0.229 with U.S. earnings momentum strategies.

Both price and earnings momentum strategies have much lower correlations than investing purely in market indexes. Momentum strategies appear to achieve substantial international diversification benefits.

Correlations and Market Conditions

Diversification matters more when investments go bad. There is evidence that international markets provide fewer diversification benefits in down markets than in up markets. If international momentum strategies are more highly correlated in down markets, then such a strategy entails additional risks.

Exhibit 6 plots the relation between market and either price or earnings momentum when the U.S. market return is above or below zero. Panel A shows that when the U.S. market is up, market correlations (between the U.S.

and other countries) are quite low, and price momentum correlations are similarly low. The average correlation between Asian price momentum profits and those in the U.S. is 0.167, compared to a correlation between the markets and the U.S. of 0.311. The average correlation between European and U.S. price momentum profits is 0.373, compared to 0.292 between the markets and the U.S.

Panel B shows that when the U.S. market is down, market correlations are quite high, but price momentum correlations are similar to those in Panel A. The correlation between the Asian (European) momentum strategies and that in the U.S. is 0.259 (0.200) as compared to 0.543 (0.648) for an equally weighted Asian (European) market index and the U.S. market.

Panels C and D report the correlations for earnings momentum strategies in up and down markets. They show that earnings momentum strategies are generally not more highly correlated in months the U.S. market is down. These results show that marketwide diversification benefits are lower when the market goes down, but momentum strategies remain effective diversification mechanisms.

When Do Momentum Strategies Pay Off?

Our analysis so far examines diversification and market conditions, but not payoffs. Investors tend to focus on portfolio performance more in down markets. If momentum strategies lose money in these periods, then they are clearly less useful to active portfolio management. In the meantime, if the average premium on momentum is due to economic risk related to market movements, momentum should earn negative returns during periods of negative market returns and positive returns in periods of positive market movements.

Exhibit 7 shows average price momentum profit during periods of positive market movements (solid bars) and negative market movements (open bars). During periods of negative marketwide returns price momentum earns positive returns in 35 of 40 markets; during periods of positive market movement, it earns positive returns in only 26 markets. In Asia, momentum profits are slightly negative during up market months, but 6.60% per year in down market months. For all markets, the average momentum return is 8.45% per year in down markets and 5.72% in up markets. Price momentum profits are, if anything, slightly higher when market returns are negative.

Tests not graphed examine the performance of constrained earnings momentum strategies under different market conditions. Earnings momentum strategies are positive

in 24 of 32 countries in up markets and in 21 of 32 in down markets. Because the earnings momentum strategies are constrained to the middle price group, the profits are low. Profits are nevertheless overall positive in both down and up markets, and greater in down markets than in up markets.

If momentum were related to economic distress risk, one might expect to see negative momentum profits when that risk is realized—i.e., in periods of low or negative GDP growth. We examine momentum profits in 22 markets for which the Organization for Economic Cooperation and Development provides GDP data.

Exhibit 8 displays regional average price momentum profit in quarters of positive and negative GDP growth. The average price momentum profit for developed countries is 9.15% per year for down GDP periods and 3.69% for up GDP periods. Momentum profits are high in periods of positive GDP growth but positive and even higher in periods of negative GDP growth.

Constrained earnings momentum strategies (not graphed) are positive in both up and down markets in Asia and the U.S., but slightly negative in down markets in Europe and highly negative in down markets in the Americas, which may be due to the limited observations (Mexico only).

Overall, price and constrained earnings momentum strategies are profitable in periods of high and low market and GDP growth, but price momentum strategies are slightly more profitable in periods of negative market returns and GDP growth. Earnings momentum strategies are positive in periods of negative market growth and near zero in periods of negative GDP growth. These results provide strong evidence that momentum can be a valuable investment strategy for portfolio managers who are particularly sensitive to market conditions.

MOMENTUM RETURNS OVER TIME

We examine the simple time series of momentum returns in all the major regions to see if they exhibit any unique features. We also plot corresponding market returns for comparison.

The returns in Exhibit 9 are not annualized but monthly raw returns. We see here several interesting cautions as to momentum. First, regional price momentum strategies are less volatile than market returns. The monthly standard deviation of momentum strategies is 3.40 in Asia and 1.65 in Europe as compared to 4.95 and 4.21 for the Asian and European equally weighted market return over the same period. This volatility for momentum

E X H I B I T   7
Momentum Investing and Market States

Price Momentum
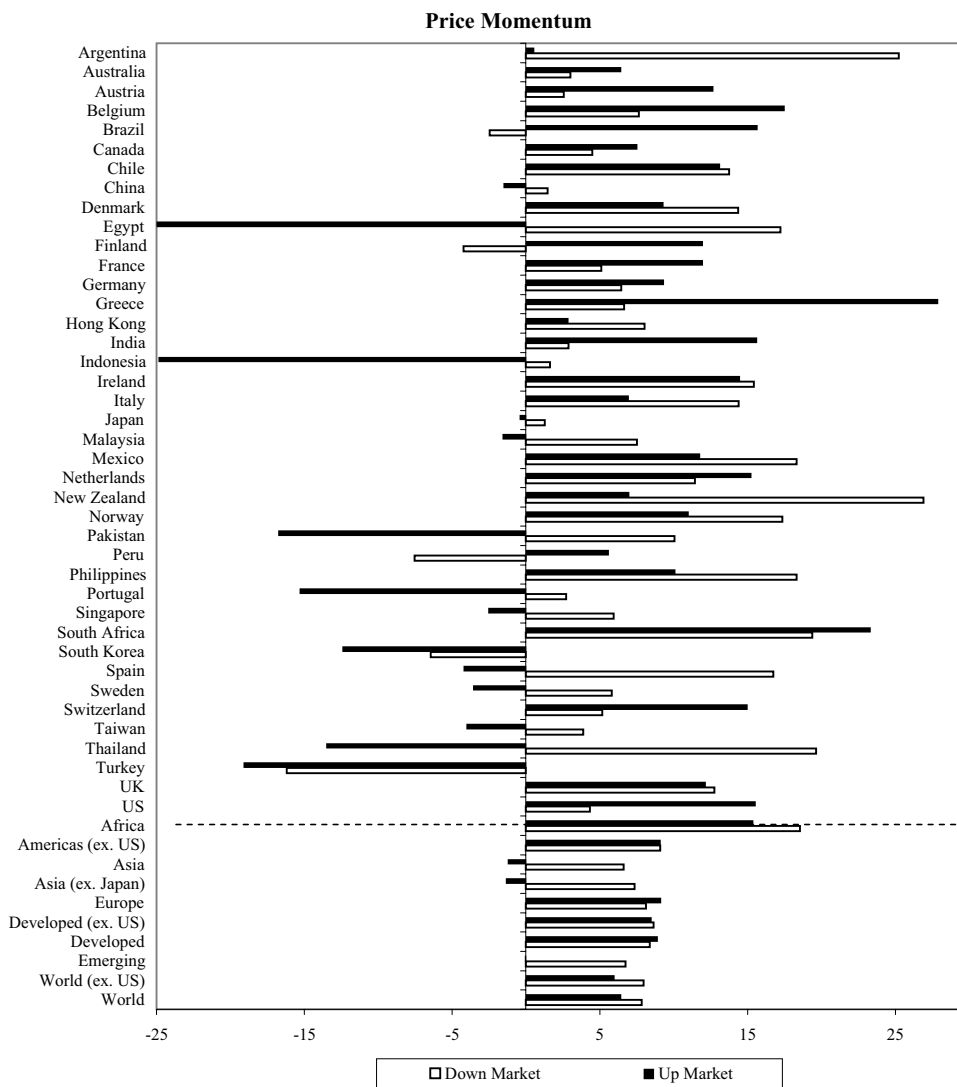
Open bars are down markets. Solid bars are up markets.
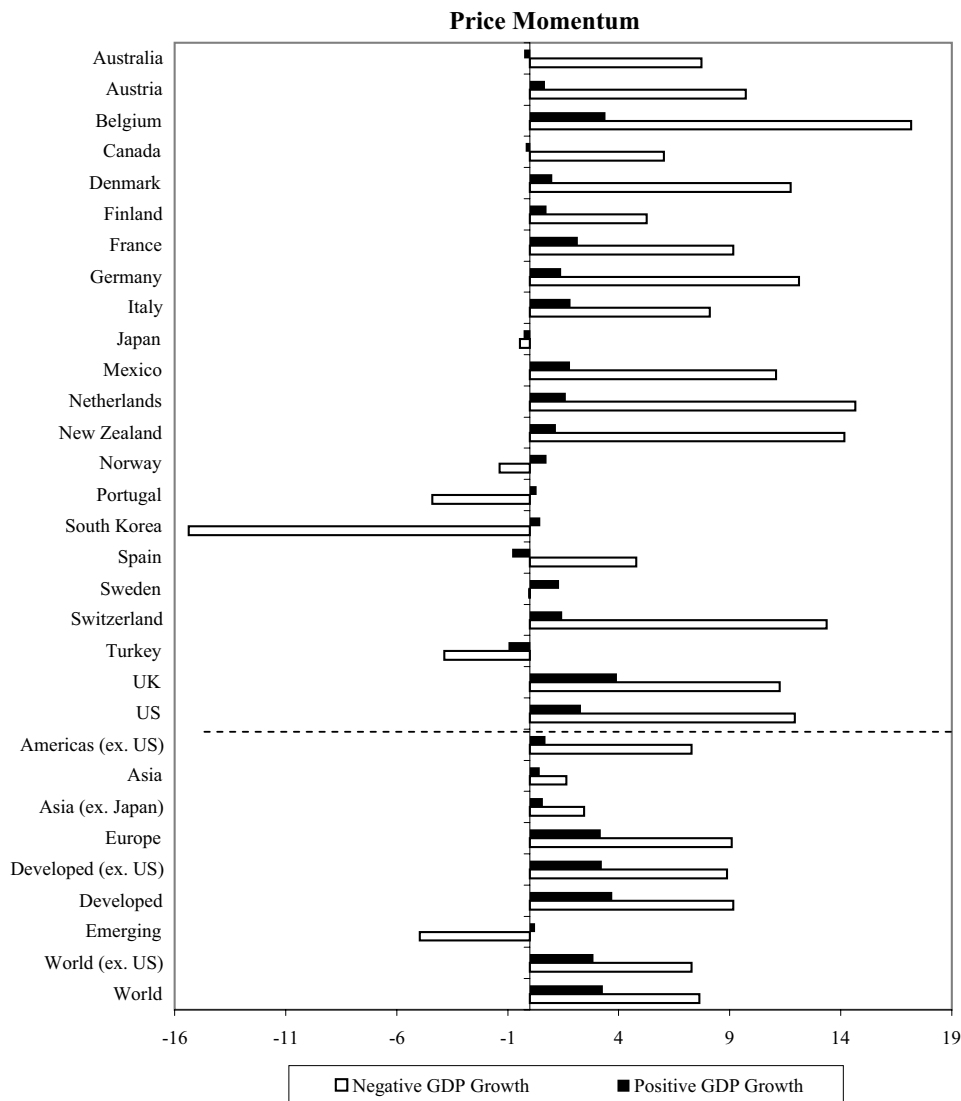
strategies translates into high returns in some months.

Second, momentum strategies are risky in the sense that they are sometimes autocorrelated near some extremely negative returns. For example, the most negative return of −18.31% for Asian momentum strategies is in November 1998. Before that month momentum earned −12.71% in October and −5.34% in September, but 1.3% in August and then 5.11% in December 1998. The momentum returns around other negative months are not nearly so bad. The second most negative momentum return of −13.64% is in February of 1998, and the returns are −2.68% and −3.29% in the months before and after that

month. Yet the returns are 3.76%, 4.36%, and 6.14%% in April, May, and June 1998.

For Europe, the most negative return of −8.05% is in February 1991, when it is preceded by a 1.01% monthly return and followed by a −2.41% return. For the U.S., the most negative return of −20.44% is in February 1991, and the monthly return in January is −14.92%, but in December of 1991 the return is 9.60%. The second greatest loss for momentum strategies is −20.24% in January 1992. In this case, the February return is near zero, and the previous December realized a 9.24% return.

E X H I B I T 8
Momentum Investing and Macroeconomic States

Price Momentum

Chart categories (top to bottom): Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, South Korea, Spain, Sweden, Switzerland, Turkey, UK, US, Americas (ex. US), Asia, Asia (ex. Japan), Europe, Developed (ex. US), Developed, Emerging, World (ex. US), World

X-axis: -16, -11, -6, -1, 4, 9, 14, 19

Legend: □ Negative GDP Growth ■ Positive GDP Growth

Third, momentum strategies occasionally earn large negative returns in the U.S. and other regions at the same time. For a momentum investor, the fact that both U.S. and European momentum strategies had their worst realization in February 1991 is troubling. This month in 1991 was also somewhat bad for Asian strategies (−5.52% return).

This clustering of large negative momentum profits is generally not the case in other months, however. For example, the large negative return for U.S. momentum strategies in January 1992 and October 1978 saw returns close to zero in Europe and Asia. Additionally, the large negative returns to Asian momentum strategies in late

November 1998 were accompanied by positive returns of 3.50% and 3.35% in Europe and the U.S., respectively.

These findings highlight the potential for momentum to sometimes earn large negative returns in consecutive months within a region and to earn negative returns in the same months across regions. When we look at the total returns of a global momentum strategy that takes equal positions in each market with at least 100 securities, the monthly standard deviation of the world strategy is 1.65 as compared to 4.05 for a similarly constructed world index. The most negative returns to this equally weighted global strategy are only −6.10% in February
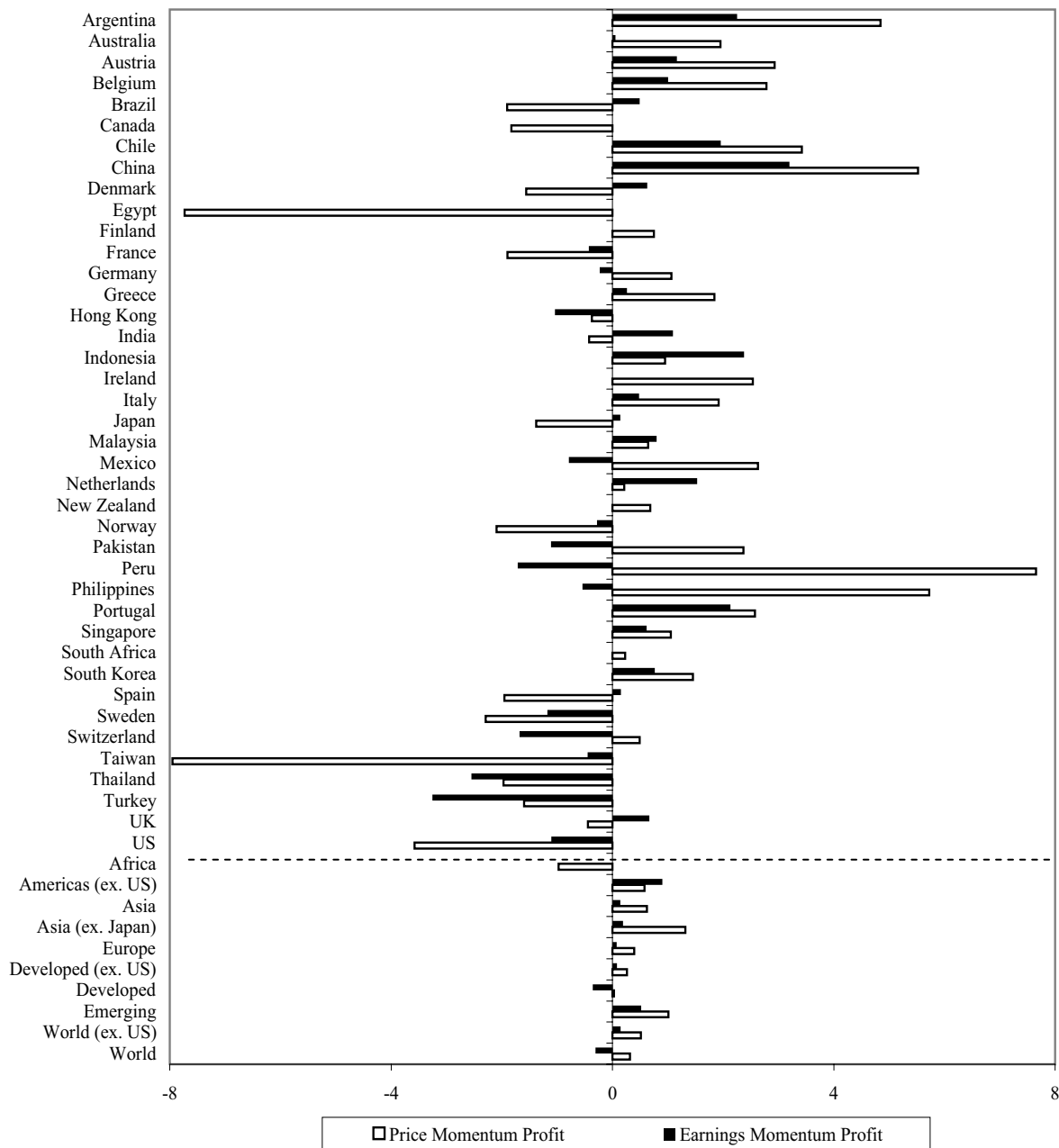
E X H I B I T   9
Price Momentum Profits and Market Returns

Americas (ex. US)

Asia

Europe

US

World (ex. US)
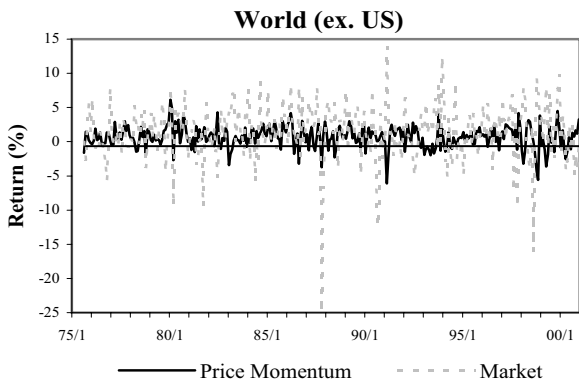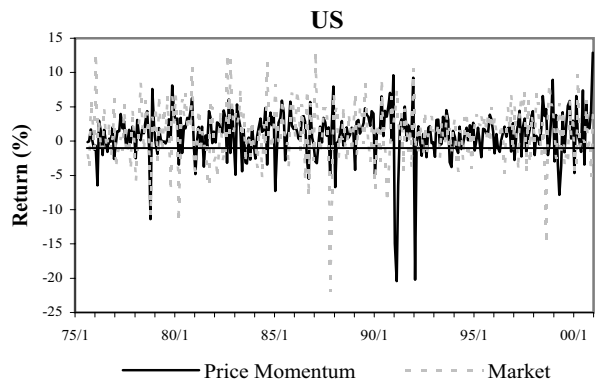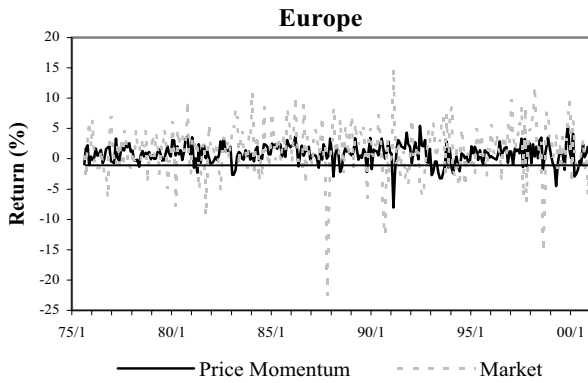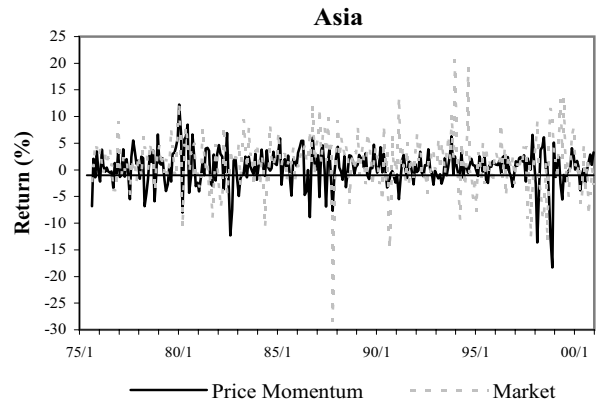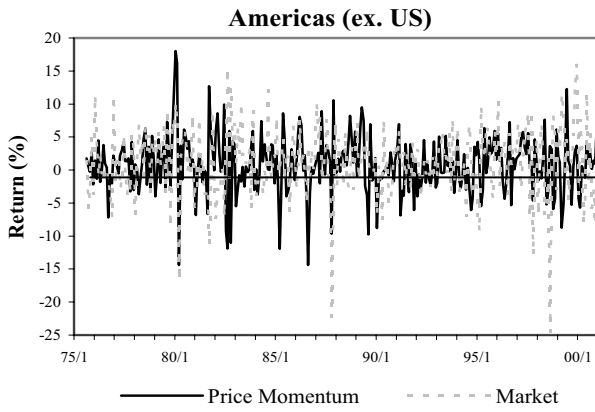
Sample period runs from the first available date for each country through December 2000, except through June 1999 for Peru and August 2000 for Argentina.

EXHIBIT 10
Momentum Profits in January by Country and Region

□ Price Momentum Profit   ■ Earnings Momentum Profit

1991 and −5.57% in November 1998. This demonstrates that, on average, a global momentum strategy is much less volatile than a U.S.- or regional-only strategy.

January Returns

The large negative returns in January highlight the importance of examining the effect of January returns across

countries. Because tax and reporting year-ends do not occur in December in all countries, reversals due to window-dressing or tax-loss selling may not all occur simultaneously in January.

The returns to price and earnings momentum strategies in Exhibit 10 show that some markets such as Egypt, Taiwan, and the U.S. exhibit rather large negative January returns to price momentum strategies. Overall returns are

E X H I B I T 1 1
Cumulative Price Momentum Returns
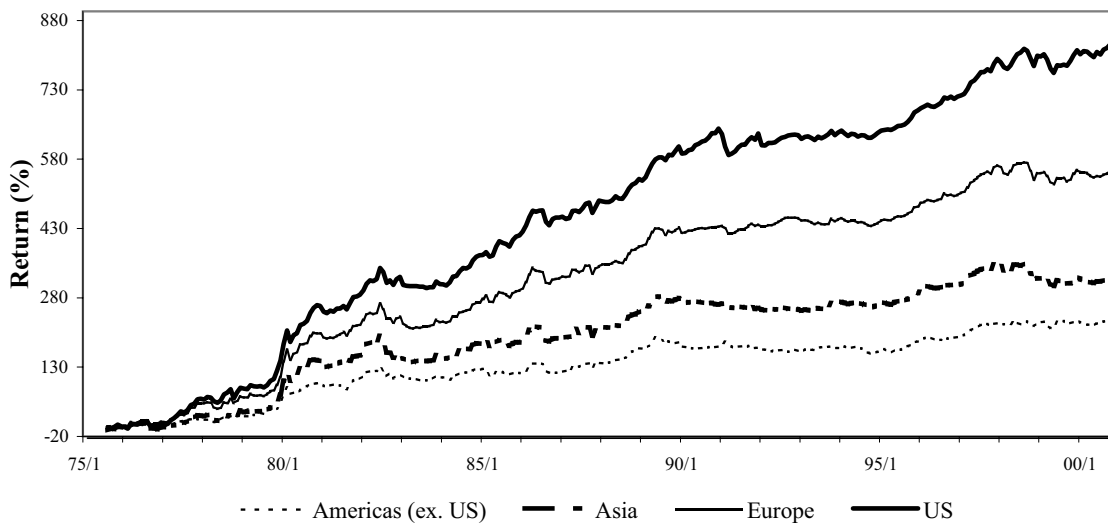
negative in January for 16 of 40 markets. Earnings momentum strategies are also negative in many markets in January.

Before they implement momentum strategies, managers may want to consider possible tax loss and portfolio rebalancing effects.[4]

Long-Run Returns

To examine momentum from a longer-term perspective, we plot the cumulative returns to price momentum strategies around the world in Exhibit 11. Three interesting patterns emerge. First, momentum strategies generally experience an upward trend that is the strongest in the U.S. followed by Europe.

Second, the positive correlations between momentum strategies in the U.S. and other regions show up clearly over longer horizons, as momentum profits across regions generally seem to move in the same direction over the long term. One extreme example is November 1979–February 1980, when momentum strategies in all regions experienced phenomenal returns.

Finally, momentum strategies can be unprofitable over periods longer than a year. In the U.S., momentum strategies lost money from December 1990 until November 1993. In Asia, there was a five-year period from July 1989 to November 1995 when momentum strategies performed poorly.

CONCLUSION

We have investigated practical issues regarding both price and earnings momentum in an international setting. First, we find momentum profits are not driven just by short positions; taking long positions in stocks with high past returns would have generated long-run buy-and-hold returns to outpace market indexes. Second, both price and earnings momentum strategies yield economically high profits in a variety of markets. Third, while price and earnings momentum profits are correlated, there is incremental information in both; strategies using both past returns and earnings earn higher profits than a strategy using each one alone.

Fourth, foreign momentum strategies are generally much less correlated with U.S. momentum strategies than the corresponding stock market index is correlated with the U.S. market index; momentum strategies benefit more from diversification than market index strategies. Unlike market indexes, momentum profits are not more highly correlated across countries in down markets.

One interesting observation is that momentum is present when markets go up and down, and even when the economy is expanding and contracting. Finally, momentum strategies are volatile. While momentum profits are less volatile than their market or regional indexes, they are occasionally associated with quite negative returns. In some markets, these negative returns cluster in January. Even regional momentum strategies can

sometimes earn negative returns for three to five years.

Our findings suggest that momentum is worth the serious consideration of active portfolio managers. Note, however, that both execution and price impact costs may vary substantially across markets and are not considered here. Our findings indicate that future work should focus on understanding predictors that may influence the time series variation in momentum profits.

Additionally, our positions are simple univariate strategies that do not consider traditional tilts such as growth and value. Asness [1997] and Daniel and Titman [1999] show that U.S. momentum profits are greater in growth stocks. Patterns such as market capitalization, turnover, and analyst coverage, which have been found to be related to price momentum in the U.S., may also be related abroad (see Hong, Lim, and Stein [2000] and Lee and Swaminathan [2000]). Indeed, we find in other research that international momentum profits are related to many firm characteristics. While more complicated strategies have the potential to boost momentum profits, they might also eliminate these profits if applied incorrectly.

Additional research may uncover more complete explanations for momentum. We have to consider, though, given the wide attention that momentum has received, how increasing amounts of capital seeking to exploit this phenomenon might affect its profitability.

ENDNOTES

The authors thank William Goetzmann, Kent Hargis, and seminar participants at Bernstein Investment Research and Management, Baruch College, and the University of Connecticut for comments.

[1]Jegadeesh and Titman [1993], Grundy and Martin [2001], Naranjo and Porter [2004], and Griffin, Ji, and Martin [2003], respectively, show that the CAPM, time-varying extensions of the CAPM, three-factor, and popular macroeconomic models cannot explain the source of momentum profits.

[2]Further details of the screening process are available at www.jgriffin.info/research/papers.htm. Our approach is generally consistent with the main steps outlined in Ince and Porter [2004].

[3]The returns to these constrained earnings momentum strategies are shown in the medium past return group in Exhibit 3.

[4]See Grinblatt and Moskowitz [2004] for a more detailed discussion of the seasonal patterns of momentum and explanations for these patterns in the U.S.

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