**Momentum Strategies on Global ETFs**

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Abstract

Domestic investors may use iShares MSCI Index ETFs to exploit the momentum profit across country portfolios. This paper examines the price momentum on 15 well-diversified iShares country ETFs from April 1996 to October 2015. We find statistically and economically significant profits for some momentum strategies: long past winners and short past losers. The results are robust to trading costs and excessive risks. Thus, investors may seek outperformance by implementing global momentum strategies on iShares MSCI country ETFs.

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**Momentum Strategies on Global ETFs**

Index Exchange Traded Funds (ETFs) are rapidly becoming a staple investment tool for a wide spectrum of investors, both individual and institutional. There are several reasons: Firstly, Index ETFs tend to have lower expense ratios than most actively managed funds. They do not incur the usual expensive operational and research costs found in actively managed funds. According to ETFZone, annual fees for ETFs are as low as .09% of assets, which is breathtakingly low compared to the average mutual fund fees of 1.4%.Secondly, Index ETFs tend to have lower portfolio turnover and therefore are less likely to realize capital gains than heavily traded active funds. Poterba and Shoven (2002) find that the tax liabilities are less for index ETFs than average mutual funds since they are not impacted by other shareholders' activities. In contrast, if a mutual fund realizes capital gains, it is obligated to distribute those gains to every shareholder. Essentially, shareholders remaining in the fund may receive capital gains for activities they may not have initiated. Thirdly, Index ETFs allow the investors to more extensively access the market across asset classes, sectors, styles, regions, or even nations.

In 1996, American Stock Exchange began to list iShares MSCI Index Funds for many different foreign countries. These ETFs represent the MSCI (Morgan Stanley Capital International) country equity indices. As of 2015, there are 15 iShares MSCI series for developed markets and 18 iShares MSCI series for emerging markets. Investors can buy and short sell these ETFs. To avoid sample selection bias, in this paper, all of the 15 iShares MSCI Index ETFs for the developed markets are used to test for momentum in the portfolio returns.

Momentum refers to the tendency of stock prices to continue moving in the same direction for several months after an initial impulse, which is simply a change in the price itself. The most basic form of momentum is price momentum, while earnings momentum is momentum following a revision in analysts’ earnings forecasts (Chan, Jegadeesh, and Lakonishok 1996). An extensive body of finance literature documents that past stock returns can predict the future stock returns. Price momentum was noted in aggregate US stock prices in the late 1980’s (Poterba and Summers (1988)), in individual US stock prices in the early 1990’s (Jegadeesh and Titman (1993)), and in international markets later in the 1990’s (Rouwenhorst (1998), (1999)).

The momentum anomaly documented by Jegadeesh and Titman (1993) remains one of the most intriguing puzzles in empirical asset pricing. It constitutes perhaps the toughest challenge for rational theories of the cross-section of stock returns. Stocks that have performed extraordinarily well over the last 6 to 12 months continue to perform well over the following 6 to 12 months. Stocks that have declined continue to do so. These findings appear to be very robust. Jegadeesh and Titman (2001) report that momentum strategies remained profitable even after the publication of their original study. Abnormal profits of momentum strategies are also documented in non-US equity markets. For example, Ahmet and Nusret (1999) find abnormal profits of long-term contrarian strategies in the stock markets of seven non-US industrialized countries. Chang, McLeavey, and Rhee (1995) document abnormal profits of short-term momentum strategies in the Japan stock market. Hameed and Ting (2000) notice the same in the Malaysia stock market. Rouwenhorst (1998, 1999) finds momentum profits in 12 European equity markets and in six (out of 20) emerging equity markets. Hameed and Yuanto (2000) report that momentum strategies generate small but statistically significant profits in six Asian stock markets. Schiereck, DeBondt, and Weber (1999) discover abnormal profits for intermediate-term momentum strategies in the Germany equity market.

Momentum is hardly explained by a traditional asset pricing model. Such a model requires that high average returns are simply compensation for some form of risk; but stocks that have risen recently typically seem to have lower risk, not higher risk as would be required for risk to explain momentum (Grundy and Martin (2001); Griffin, Ji, and Martin (2003)).

Fama (1991) notes that the predictability of stock returns over time is among the most controversial issues on stock market efficiency. Strict market efficiency requires that security prices fully reflect all available information. Evidence of momentum in stock returns certainly seems inconsistent with strict market efficiency since current prices do not reflect past prices. The controversy has led to various explanations on the possibility and the sources of abnormal profits of momentum strategies.

Based on behavioral irrationality of investors, researchers argue that momentum profits are due to market inefficiency and result from stock prices’ irrational reactions to information and investors’ herding behavior. For example, Barberis, Shleifer, and Vishny (1998), Daniel, Hirshleifer, and Subrahmanyam, (1998) and Hong and Stein (1999) develop models that are based on behavioral bias. In these models, the human cognitive bias leads investors either to underreact to information or to adopt positive feedback strategies that result in delayed overreaction to information. The tendency to herd among investors (for example, among fund managers) is a well-documented fact, which helps explain the profits of intermediate-term momentum strategies (see, e.g., Grinblatt, Titman, and Wermers (1995); Lakonishok, Shleifer, and Vishny (1994)).

The market-efficiency supporters, on the other hand, argue that time-varying common factors or data mining lead to the existence of intermediate-term momentum profits. According to this explanation, the abnormal returns of momentum strategies are attributable to common factors that are not accounted for in, for example, CAPM or a three-factor model. As Jegadeesh and Titman (1993) point out, to the extent that high past returns are partly due to high expected returns, winner portfolios will contain high-risk stocks that would also generate higher expected returns in the future. Conrad and Kaul(1998) examine this possibility and conclude that momentum profits can be explained by the cross-sectional difference in individual stocks’ expected returns. Chordia and Shivakumar (2000) also show that momentum profits can be driven by time-varying expected returns.

In this paper, we employ iShares ETF monthly data for 15 developed markets for the period April 1996 to October 2015 to test for the price momentum. The remainder of this paper is organized as follows. Section 2 describes the data and the methodology employed for portfolio formation and investment strategies. Section 3 documents the profitability of various momentum strategies. Section 4 conducts some robustness checks. Section 5 provides some possible behavioral explanations to the momentum profits. Section 6 concludes the study.

**I. Data and Methodology**

The data used in this study are the monthly prices of iShares ETF Morgan Stanley Capital International (MSCI) Index ETFs for 15 developed countries. These country index ETFs have been traded in AMEX since April 1996. The data are available from Bloomberg and Yahoo Finance, but Yahoo Finance provides dividend-adjusted prices which are used for this study. The iShares International Index ETFs have wide market coverage and are diversified. MSCI indices are computed consistently across markets, thereby allowing for a direct comparison across countries. The indices are calculated on the end-of-period value-weighted indices of a large sample of companies in each country. The countries examined in this paper include Australia (Symbol: EWA), Austria (EWO), Belgium (EWK), France (EWQ), Germany (EWG), Hong Kong (EWH), Italy (EWI), Japan (EWJ), Netherlands (EWN), Singapore (EWS), Spain (EWP), Sweden (EWD), Switzerland (EWL), the United Kingdom (EWU), and the United States (SPY). Because the focus of this paper is on intermediate-term returns, the complete history of monthly data from April 1, 1996 to October 1, 2015 is used.

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| **Exhibit 1: Summary Statistics for Average Monthly Returns on 15 iShares MSCI Index ETFs** |
|   |   |   |   |   |   |   |
| Country | ETF Symbol |  | Mean (%)  |  | Standard Deviation (%) |  | β with World Index |
| Austria | EWO |  0.64 |  | 7.26 |  | 1.20 |
| Australia | EWA | 0.80 |  | 6.63 |  | 1.19 |
| Belgium | EWK | 0.68 |  | 6.24 |  | 1.11 |
| France | EWQ | 0.73 |  | 6.23 |  | 1.24 |
| Germany | EWG | 0.75 |  | 7.07 |  | 1.38 |
| Hong Kong | EWH | 0.70 |  | 7.52 |  | 1.20 |
| Italy | EWI | 0.62 |  | 7.07 |  | 1.26 |
| Japan | EWJ | 0.12 |  | 5.59 |  | 0.86 |
| Netherlands | EWN | 0.62 |  | 6.13 |  | 1.22 |
| Singapore | EWS | 0.50 |  | 7.99 |  | 1.31 |
| Spain | EWP | 0.93 |  | 7.16 |  | 1.26 |
| Sweden | EWD | 0.98 |  | 7.57 |  | 1.45 |
| Switzerland | EWL | 0.72 |  | 5.08 |  | 0.93 |
| UK | EWU | 0.57 |  | 4.91 |  | 0.99 |
| US | SPY | 0.73 |  | 4.43 |  | 0.95 |
| World |   | 0.67 |   | 6.46 |   | 1.00 |
|  |  |  |  |  |  |  |
| This table reports the average monthly returns on iShares ETF Morgan Stanley Capital International (MSCI) Index ETFs for 15 developed countries from April 1, 1996 to October 1, 2015. These 15 ETFs have been traded on AMEX since April of 1996. World is MSCI world index. We use 1 month T-bill rate for risk-free rate to compute β with world index.  |
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The trading strategies examined in this paper are designed in a way similar to Jegadeesh and Titman (1993). Specifically, at the end of each month, the return of the past J months (J = 1, 3, 6, 9 or 12) for each of the 15 ETFs are calculated and ranked in descending order. We assign the top three ETFs (with the highest returns) to the ‘‘winner portfolio’’ and the bottom three ETFs (with the lowest returns) to the ‘‘loser portfolio’’. These portfolios are equally weighted at formation. I then buy the winner portfolio, simultaneously sell short the loser portfolio, and hold the position for K months (K = 1, 3, 6, 9 or 12). When the holding horizon K is longer than one period, this creates an overlap in the holding period return. We follow Jegadeesh and Titman (1993) to compute the period average return of K strategies, each starting one period apart. In other words, this return is equivalent to the return of a composite portfolio in which 1/K of the holdings is updated each period and the remaining from the previous period is carried over. For example, at the end of month t, the J = 6, K = 3 portfolio of winners consists of three parts: a position carried over from the investment at the end of month t-3 and two similar positions resulting from the portfolios at the end of months t-2 and t-1. At the end of month t, the first of these holdings will be liquidated and replaced with the ETFs with highest six-month performance as of time t.

**II. Profitability of Momentum Strategies**

Exhibit 2 reports equal-weighted average monthly returns of the winner and loser portfolios, as well as the difference between winner and loser portfolios, over various holding periods for the 25 strategies. Returns are annualized. There are 5 parts in Exhibit 2, which differ by formation periods, and each part has 5 strategies with different holding periods. The first row in each part refers to the specific strategy. For example, Strategy 6-6 (that is, Strategy with J = 6 and K= 6) represents the strategy that ETFs are ranked according to their previous 6 month returns and then held for the next 6 months. To examine whether momentum profits exist, we calculate the average monthly returns of winner and loser portfolios, and the difference between their returns. If the difference between the winner’s return and loser’s return is statistically significantly larger than zero, then there exists a momentum profit. Otherwise, no profit exists. Exhibit 2 shows that 24 of 25 momentum strategies have positive profits and some momentum profits are statistically significant. Statistically significant profits are available for 5 strategies whose formation periods are mostlyamong 3 and 6 months whereas the statistically weakest momentum profits are available for K = 12 strategies. For 1-K strategies (Panel A), no strategy has a significant profit. For 3-K strategies (Panel B), the profits for 1- and 6- month holding periods are statistically significant at 5% level. For 6-K strategies (Panel C), the profits for 3- and 6- month holding periods are statistically significant at 10% level. For 9-K strategies (Panel D), the strategy with 12 month holding periods generate statistically significant profit. For 12-K strategies (Panel E), all the strategies are insignificant. The result shows the strategies based on the previous 3 or 6 month returns are more profitable than any other momentum strategies, which is consistent with Jegadeesh and Titman’s (1993) finding.

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| **Exhibit 2: Monthly Returns of Momentum Strategies** |
| Panel A: Portfolios based on previous 1 month returns and held over 5 different horizons (1-K) |
| Portfolio | 1-1 | 1-3 | 1-6 |  1-9 | 1-12 |
| Winner | 0.66  | 0.78  | 0.82  | 0.86  | 0.83  |
|  | (5.89) | (3.57) | (2.74) | (2.34) | (1.98) |
| Loser | 0.62  | 0.54  | 0.70  | 0.70  | 0.73 |
|  | (6.16) | (3.94) | (2.85) | (2.29) | (1.99) |
| Winner - Loser | 0.04  | 0.24  | 0.13 | 0.15  | 0.10  |
|  | (3.90) | (2.32) | (1.70) | (1.53) | (1.37) |
| t-Stat | 0.16  | 1.60  | 1.13  | 1.51 | 1.08  |
|  |  |  |  |  |  |
| Panel B: Portfolios based on previous 3 month returns and held over 5 different horizons (3-K) |
| Portfolio | 3-1\*\* | 3-3 | 3-6\*\* | 3-9 | 3-12 |
| Winner | 0.88  | 0.79  | 0.89  | 0.83  | 0.78  |
|  | (5.77) | (3.63) | (2.82) | (2.24) | (1.96) |
| Loser | 0.33  | 0.60  | 0.58  | 0.63  | 0.67  |
|  | (6.60) | (4.16) | (2.94) | (2.43) | (2.03) |
| Winner - Loser | 0.55  | 0.19  | 0.31  | 0.20  | 0.11  |
|  | (4.26) | (2.99) | (2.22) | (1.84) | (1.54) |
| t-Stat | 1.96 | 0.96  | 2.10 | 1.63 | 1.09  |
|  |  |  |  |  |  |
| Panel C: Portfolios based on previous 6 month returns and held over 5 different horizons (6-K) |
| Portfolio | 6-1 | 6-3\* |  6-6\* | 6-9 | 6-12 |
| Winner | 0.76  | 0.88  | 0.85  | 0.80  | 0.77  |
|  | (5.82) | (3.67) | (2.62) | (2.17) | (1.92) |
| Loser | 0.42  | 0.52  | 0.58  | 0.64  | 0.65  |
|  | (6.87) | (4.24) | (2.98) | (2.58) | (2.19) |
| Winner - Loser | 0.34  | 0.36  | 0.27  | 0.16  | 0.12  |
|  | (4.83) | (3.18) | (2.21) | (1.97) | (1.68) |
| t-Stat | 1.05  | 1.71 | 1.82 | 1.23 | 1.05 |
|  |  |  |  |  |  |
| Panel D: Portfolios based on previous 9 month returns and held over 5 different horizons (9-K) |
| Portfolio | 9-1 | 9-3 |  9-6 | 9-9 | 9-12\* |
| Winner | 0.82  | 0.78  | 0.71  | 0.70  | 0.74  |
|  | (5.67) | (1.74) | (2.54) | (2.13) | (1.9) |
| Loser | 0.61  | 0.59 | 0.61  | 0.65  | 0.68  |
|  | (7.17) | (4.35) | (3.10) | (2.67) | (2.25) |
| Winner - Loser | 0.50  | 0.19  | 0.10  | 0.06  | 0.28  |
|  | (5.36) | (3.22) | (2.38) | (2.09) | (2.25) |
| t-Stat | 1.40  | 0.87  | 0.60 | 0.39  | 1.83  |
|  |  |  |  |  |  |
| Panel E: Portfolios based on previous 12 month returns and held over 5 different horizons (12-K) |
| Portfolio | 12-1 | 12-3 | 12-6 | 12-9 | 12-12 |
| Winner | 0.70  | 0.64  | 0.65  | 0.69  | 0.74  |
|  | (5.67) | (3.54) | (2.60) | (2.15) | (1.91) |
| Loser | 0.65  | 0.60  | 0.65  | 0.71  | 0.72  |
|  | (7.35) | (4.42) | (3.19) | (2.71) | (2.24) |
| Winner - Loser | 0.34  | 0.04  | 0.01  | -0.02 | 0.02  |
|  | (5.68) | (3.29) | (2.39) | (2.08) | (1.74) |
| t-Stat | 0.90  | 0.16  | 0.04  | -0.16  | 0.17  |

 At the end of each period, we calculate the return of the past J months (J = 1, 3, 6, 9 or 12) for each of the 15 ETFs and rank them in descending order. We assign the top three ETFs (with the highest returns) to the ‘‘winner portfolio’’ and the bottom three ETFs (with the lowest returns) to the ‘‘loser portfolio.’’ These portfolios are equally weighted at formation. We then buy the winner portfolio, simultaneously sell short the loser portfolio, and hold the position for K months (K = 1, 3, 6, 9 or 12). The monthly returns (%) for the 25 winner-loser portfolios are calculated with (standard deviation (%)) and t-values.

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| \*\* Statistical significance at 5% level |
| \* Statistical significance at 10% level |

**III. Robustness Checks**

While the profits on each momentum strategy shown above are quite strong, they should be interpreted with caution because they could be driven by potential biases associated with market risks, size and value factors, and transactions costs. In this subsection, some robustness checks are conducted.

**1. Robustness to Market Risk and Other Factors**

Since all of the 15 iShares International Index ETFs in this paper are selected from the developed markets, have wide market coverage, and are well diversified, a simple risk measure would be the standard deviation of returns. Exhibit 2 shows that the winner portfolios have a lower standard deviation than the loser portfolios at all the significantly profitable trading strategies. There is, therefore, no evidence that winner countries are riskier than loser countries.

Fama and French (1996) argue that the differences in returns between small and big firms (SMB) and between high and low book-to-market value ratios can be additional risk factors in explaining cross-sectional U.S stock returns. To further examine whether the excess returns from momentum strategies are compensation for systematic risks, we estimate a three-factor Fama-French model with the SMB and HML factor as additional sources of risk. SMB and HML factor are obtained from Kenneth French’s web site.

Rt = αt + *b1*(World - Rf)t + *b2*SMBt + *b3*HMLt + εt.

For the market return, the MSCI world index monthly data is used. The results are reported in Exhibit 3 for the 6-6 momentum strategy. It shows that SMB factor has insignificantly positive loading on winner and loser portfolios while HML factor and the market return have significantly positive loadings on both portfolios. For the winner-loser momentum portfolio, none of the three factors has positive loading. The above results demonstrate that exposure to the market risk, SMB or HML factor does not provide a simple explanation for the excess returns on momentum strategies.

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| **Exhibit 3: Risk-adjusted Excess Returns for the 6-6 Momentum Strategy** |
|   |   |   |   |   |   |   |   |   |
| Portfolio | α | t-stat |  β (world) |  t-stat | β (SMB) |  t-stat | β (HML) | t-stat |
|  |  |  |  |  |  |  |  |  |
| Winner  | 0.79 | 4.83 | 0.23 | 6.45 | 0.01 | 0.11 | 0.15 | 3.02 |
|  |  |  |  |  |  |  |  |  |
| Loser | 0.49 | 2.67 | 0.27 | 6.74 | 0.06 | 1.11 | 1.08 | 3.17 |
|  |  |  |  |  |  |  |  |  |
| Winner - Loser | 0.30 | 1.97 | -0.04 | -1.23 | -0.06 | -1.24 | -0.03 | -0.61 |
|  |  |  |  |  |  |  |  |  |
| SMB and HML factor data are from Kenneth French's website and the market return from the MSCI world index monthly data. Risk free rate is 1 Month T-bill rate. The 6-6 momentum strategy is to buy the past 6 month winner and hold the portfolio for the next 6 months.  |
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**2. Transaction Costs**

So far we do not consider any transaction cost involved in the momentum strategy. Total costs include not only the bid-ask spread but also applicable commissions. In this study, 15 well-diversified country index ETFs for the developed markets are used, so the investors can buy and sell these ETFs easily. Also, since these ETFs are well diversified, the spread between bid and ask is small relative to illiquid small stocks. Furthermore, the monthly momentum strategies provided in this paper have much lower costs than the daily momentum strategies. However, the momentum strategies in this study do require somewhat intensive trading, so the transaction costs can lower the actual returns.

To examine the effect of transactions costs, we consider the case with J = 6 and K = 6: each of the winner and loser portfolios consists of 3 ETFs, so the investor needs a maximum of 24 trades per year for the winner-loser momentum strategy. As of 2015, some discount online brokers charge $10 or less per trade, so the total trading cost is $240 per year. Assuming the total investment is $100,000 or more, the total trading cost should be below 0.24%. This produces an after-cost excess return of 3.24% - 0.24%= 3% per year, which remains an economically significant figure today.

In sum, the robustness checks presented in this subsection suggest that the global momentum strategies are robust to the market risk and size and value factors. Even after considering intensive transactions involved in the strategies, ETFs investors can still profit from global momentum.

**IV. Behavioral Explanations**

Hong and Stein (1999) argue that momentum profits result from stock prices’ irrational reactions to information and investors’ herding behavior. Underreaction theory stresses a process of gradual adjustment to news. Stock prices initially underreact to the news, and then adjust over time so that the long-term response is the appropriate rational one.

Underreaction is most likely to occur when fundamental news arrives that has important implications for the future cash flows of a stock. It is caused by the limited ability of most investors to access and process information, and by overconfidence that leads investors to cling to their original views even in the face of relevant new information (Daniel, Hirshleifer, and Subrahmanyam (1998)). Rational investors do respond to fundamental news, but they do not trade aggressively enough to drive prices all the way to the level that would be justified by fundamentals. Instead, on good news they drive the price up to a level at which it is still profitable to hold the stock, while on bad news they drive the price down to a level at which it is still profitable to short the stock. Over time, as all investors absorb fundamental news, the price adjusts fully to the news and this allows arbitrageurs to unwind their positions profitably. This story is consistent with the strong evidence for momentum in response to fundamental impulses such as earnings announcements or analysts’ forecast revisions.

Overreaction is more likely to be associated with “soft” or qualitative information (Daniel and Titman (2004)). For example, investors may place undue credence in stories about a website company as a new economic model. Irrationality of this sort generates mispricing that can be exploited by value investors. It may also generate momentum in the short run if irrational investors respond gradually to soft information, if they copy each others’ trades, or if they tend to buy stocks that have performed well recently. These behavior patterns are sometimes described as herding. Evidence on flows into mutual funds does suggest that individual investors are attracted to funds, fund categories, and fund families that have performed well recently, consistent with the herding hypothesis (Sirri and Tufano (1998)).

There is little evidence that herding generates short-run momentum that eventually reverses. One suggestive piece of evidence is provided by Brunnermeier and Nagel (2004), who show that hedge funds rode the technology bubble through the late 1990’s even after technology stocks became wildly overpriced on any conventional measure. These funds appeared to believe that positive short-term momentum would overcome poor long-term value, and their strategies were quite successful. Overall, however, the evidence for momentum generated by overreaction is weaker than the evidence for momentum generated by underreaction to fundamentals.

The studies by Brennan and Cao (1997), Choe, Kho, and Stulz (1999), and Clark and Berko (1996) suggest that one may think of investors as having an informational advantage in their home markets, explaining why investors might have a home bias. In this view, suppose that favorable news is released involving the home market. Foreign investors now raise their valuation by more than domestic investors. Thus, these foreign investors purchase domestic equity at higher prices. As a result, domestic investors, left holding less domestic equity, become better diversified and, for a given perceived distribution of future dividends, may accept lower expected returns. Domestic equity prices thus initially rise further, but then revert over the longer horizon as the broadening of the investors’ base lowers expected returns.

**V. Conclusion**

This paper examines the profitability of the momentum strategies on 15 iShares MSCI Index ETFs for the developed national markets from April 1996 to October 2015. Since these 15 ETFs have low management fees, tax efficiency and well diversified components, the investor may profit from the global momentum. Using monthly data, we find consistently positive returns from buying past winners and short selling past losers. Some of the portfolio profits are not only statistically but also economically significant after transaction costs.

We also investigate the effects of the market risk and the Fama-French size and value factors on the momentum portfolios. We find that the momentum profits are robust to these factors. Even after imposing reasonable transaction costs, the significant momentum profits still hold.

 The finance literature provides a behavioral explanation of momentum profit: stock prices initially underreact to the released news, and then adjust over time. However, further research on the source of the price momentum is needed.

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