Japan is not Different: Evidence on Conditional Momentum

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Keywords: Japan, Momentum, Momentum Crashes, Behavioral Finance, Market Dynamics
JEL Classifications: G11, G12, G15

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I Introduction

Past return-based investment strategies, such as the medium-term momentum strategy by Jegadeesh and Titman (1993), have been studied intensively by financial economists over the last two decades. Their success has been documented for different countries (Rouwenhorst (1998); Rouwenhorst (1999)), time periods (Jegadeesh and Titman (2001)) and asset classes (Asness et al. (2013)). Thus, momentum is one of the "big three" anomalies beside size (Banz (1981)) and value (Rosenberg et al. (1985); Fama and French (1992); Lakonishok et al. (1994)).

There are three main stories that can explain such profitable investment strategies.[1] First, the factors the strategy is based on are proxies for risk not captured by the suggested underlying asset pricing model.[2] Second, the market is not efficient and the profits are the result of systematic mispricing. Or third, the empirical evidence is spurious because of survival ship bias or simply data mining.

In contrast to the size effect[3], value and momentum have survived most out-of-sample tests. Whereas the debate on the value effect focuses on whether risk (e.g. Petkova and Zhang (2005); Zhang (2005)) or mispricing (Lakonishok et al. (1994)) is the main driver, we take the third argument as an occasion for this article.

Despite the broad evidence of momentum profits around the world, there is one remarkable exception. Several studies argue that medium-term momentum strategies fail in Japan as they do not find any significant mean return (e.g. Griffin et al. (2003), Chou et al. (2007), Fama and French (2012), Asness et al. (2013)). While these results could be rejected as bad luck, there are also other explanations why momentum returns are smaller in Japan or why momentum should not be considered stand alone. Chui et al. (2010) argue that momentum returns are weaker in countries with less individualism like Japan or other parts of Asia. Some researchers, like Fama and French (2012), are skeptical as "it seems [that] the argument could go the other way" (p. 461) and see the evidence as a chance result. Asness (2011) though argues that momentum should be studied in a system with value because they are negatively correlated. A combined 50/50 strategy also works in Japan and therefore he argues that "momentum in Japan [...is] the exception that proves the rule" (p. 67). However, the author gives no theoretical explanation why value and momentum should be negatively correlated.

[1] Fama and French (1996) identify these three arguments for the explanatory power of their SMB and HML factors.

[2] E.g. the CAPM or the Fama-French three-factor model.

[3] See Van Dijk (2011) for an comprehensive review of the size effect.

In the present article, we aim to investigate why momentum strategies do not deliver any significant premium in Japan. In contrast to the majority of studies on momentum, we focus on momentum profits in different market dynamics. According to the behavioral model of Daniel et al. (1998) investors' overconfidence is expected to be higher when the market remains in the same state than when it reverses. Therefore, momentum returns should be higher in market continuations than in market transitions. Asem and Tian (2010) provide mixed evidence as they can present this pattern for the U.S but not for Japan.

We instead show that market-dynamics conditional momentum is also present in the Japanese stock market by examining a comprehensive and carefully screened data set. We observe that momentum returns are significant higher when the market stays in the same condition than when it transitions to the other state. Furthermore, this pattern is more pronounced after periods of poor market performance. A potential explanation of this pattern might be the result of the option-like payoff of the loser portfolio after market declines. Finally, our results are robust to various specifications and also hold for other countries with low average momentum returns.

Our study contributes to the existing literature in at least two ways. To the best of our knowledge, we are the first to provide evidence outside the U.S. that momentum returns are conditional on market dynamics. This finding is consistent with the behavioral model of Daniel et al. (1998). Moreover, our results indicate that momentum strategies, when studied depending on different market dynamics, cannot be seen as a failure in Japan unlike previous studies.

The remainder of the paper is organized as follows. Section II introduces an overview of potential sources of momentum profits while Section III provides details about the data and the calculation of momentum returns and the other risk factors. Section IV presents descriptive statistics about our risk factors, while Section V shows our main empirical results. Section VI applies robustness tests and Section VII concludes.

II Sources of Momentum Profits

There is an ongoing debate among researchers about the sources of momentum profits.[4] Models trying to explain momentum profits with market risk (Jegadeesh and Titman (1993); Jegadeesh and Titman (2001)) or the Fama-French factors (Jegadeesh and Titman (2001); Fama and French (1996); Grundy and Martin (2001)) fail.

Beside these standard risk models, some other rational models exist.[5] While

[4]See e.g. Jegadeesh and Titman (2011) for an overview.
[5]See e.g. Johnson (2002) or Sagi and Seasholes (2007).

these models provide an explanation why momentum profits could exist, the magnitude of momentum returns observed (e.g. about one percent per month in Jegadeesh and Titman (1993) would require extreme levels of risk aversion for these models (see Chui et al. (2010)).

As a consequence, most of the academic research focuses on behavioral explanations. Barberis et al. (1998) discuss that conservatism bias might lead to an initial underreaction to new information followed by momentum profits. Underreaction is also caused by the disposition effect, which leads investors to stick on their past losers and sell their past winners too early according to Grinblatt and Han (2005). George and Hwang (2004) also provide evidence that anchoring on past prices might cause momentum.

Daniel et al. (1998) suggest a model in which traders receive public signals after trading a stock based on a private signal. If the public signal confirms their private signal the investors attribute the success to their skills, non-confirming signals to bad luck due to a self-attribution bias. Because of this cognitive bias the traders become overconfident about their stock selection skills and this overconfidence drives momentum.

Hong and Stein (1999) model two groups of investors, newswatcher observing some private information and momentum traders only acting on past prices. The private information diffuses slowly over time causing some initial underreaction and attracting the attendance of the momentum traders. This leads to momentum and an eventual overreaction.

Based on the evidence in Cooper et al. (2004) that momentum profits exist only after periods with a positive market performance, Asem and Tian (2010) develop hypotheses about the magnitude of momentum profits in different market dynamics according to the models of Sagi and Seasholes (2007), Hong and Stein (1999) and Daniel et al. (1998). The empirical evidence that momentum profits are higher when the market continues to stay in the same condition than when the market reverses, is only consistent with the behavioral model of Daniel et al. (1998).

In the model of Daniel et al. (1998) a public signal confirming a trade based on a private signal increases overconfidence, while a disconfirming signal decreases overconfidence only by little or remains constant due to self-attribution. Thus, positive public signals following a "buy" or negative public signals following a "sell" increase overconfidence. Asem and Tian (2010) assume that investors on average traded more based on positive private signals when the past market was positive. Consequently, subsequent positive months should drive overconfidence more than subsequent negative months. Analogously, the investors should have traded more based on negative private signals in a period of bad market performance. Subsequent negative months should then drive

overconfidence more than subsequent positive months. As a result, we expect higher overconfidence and thus also higher momentum profits when the market continues to stay in the same state than when it reverses.

III Data and construction of momentum returns

A Data

Our sample of Japanese stocks is derived from Thomson Reuters Datastream. As Ince and Porter (2006) describe, raw return data from Datastream can contain errors. Following Ince and Porter (2006), Griffin et al. (2010) and Schmidt et al. (2011) we apply several screens to ensure our data quality. The static screens ensure that the sample contains only Japanese common equity stocks, as described in detail in Appendix A.1.

This screening process leaves 5,043 unique securities. For these securities, we obtain return data from Datastream and accounting data from Worldscope. All items are measured in USD. To assure data quality, we have to limit our analysis to the period from October 1986 to September 2012.[6] Following Ince and Porter (2006) and Schmidt et al. (2011), we apply several dynamic screens to the monthly return data, as described in Appendix A.2.[7]

To be in our sample from October of year y to September of year $y+1$, we need the market capitalization for the security on March 31 and September 30 of year y, a positive book value at the fiscal year end that falls between April of year $y-1$ and March of year y and valid stock returns for the last 12 months. We define book value as common equity plus deferred taxes, if available.[8]

As a proxy for the risk free rate, we choose the one month T-bill rate, downloaded from Kenneth French's website.

[Table 1 about here.]

Table 1 shows the number of stocks in our sample as of end of September of each year. From the 5,043 unique securities remain 4782 unique securities with sufficient data to be in our sample at least for one year. The sample consists of a minimum of 803 stocks in 1986 and a maximum of 3813 stocks in 2008.

[6] "The base year for the Worldscope Database is 1980, although statistically significant company and data item representation is best represented from January 1985 forward." Thomson Financial (2007), p.4.

[7] Ince and Porter (2006) point out that raw return data from Datastream could especially affect momentum returns. E.g. Datastream repeats the last valid data point for a desisted stock. This fact could, for example, lead that this stock wrongly appears in the winner portfolio when the overall market is down as it seems to outperform the market.

[8] This definition is standard in the Fama-French factor literature, see e.g. Fama and French (1993) or Fama and French (1996).

B Construction of Risk Factors

We construct the risk factors RMRF, SMB, HML, WML and MOM following the standard procedures of Fama and French (2012) and Jegadeesh and Titman (2001).

RMRF is the excess return of the market return (RM), a value-weighted return of all sample stocks, over the risk free rate (RF).

For the construction of the risk factors SMB ("Small minus Big") and HML ("High minus Low"), we follow the procedure of Fama and French (2012) with the exception of the portfolio construction date. The majority of the companies listed in Japan have March 31 as their financial year end.[9] As we wish to ensure that all accounting information is publicly available at the time of portfolio construction we choose end of September instead of end of June as construction date for our book-to-market (B/M) and size portfolios. At the end of September of each year y, all stocks are sorted independently into two size groups, Big (B) and Small (S), and three B/M groups, High (H), Medium (M), and Low (L). According to Fama and French (2012), we choose the top 90% of the aggregate market capitalization at the end of September of year y as size breakpoint.[10] B/M is calculated as the book value at the fiscal year end, falling between April of year $y-1$ and March of year y, divided by the market capitalization at the end of March of year y. The breakpoints for the book-to-market ratio are the 30% and 70% quantiles of B/M for the biggest stocks (B).

At the intersection of the two size and three B/M groups, we construct six portfolios (S/H, S/M, S/L, B/H, B/M, and B/L). Monthly value-weighted returns are calculated for the next twelve months starting from October of year y until September of year $y+1$. The portfolios are reformed at the end of September of year $y+1$.

Based on theses portfolios, we construct the monthly time series of SMB and HML as follows:

$$SMB_t = \frac{(r_t^{S/L} + r_t^{S/M} + r_t^{S/H}) - (r_t^{B/L} + r_t^{B/M} + r_t^{B/H})}{3}. \tag{1}$$

$$HML_t = \frac{(r_t^{S/H} + r_t^{B/H}) - (r_t^{S/L} + r_t^{B/L})}{2}. \tag{2}$$

In words, SMB is the difference between the average of the three small stock portfolios and the average of the three big stock portfolios. HML is the difference

[9] See also Chan et al. (1991) or Daniel et al. (2001).

[10] Fama and French (1993) calculate the median for all NYSE stocks, but apply this breakpoint to all NYSE, AMEX, and NASDAQ stocks. They want to avoid a high weight of tiny stocks within the size dimension as NYSE stocks have on average a higher market capitalization. Fama and French (2012) mention that the NYSE median roughly corresponds to 90% of the aggregate market cap.

between the average of the two high B/M portfolios and the average of the two low B/M portfolios.

Following Carhart (1997) and Fama and French (2012), we also construct WML ("Winner minus Losers"). Each month t, we sort stocks by their cumulative performance from month $t-11$ to month $t-1$ (it is standard to skip the last month t). Again, the momentum breakpoints for all stocks are the 30% and 70% quantiles of lagged performance for the biggest stocks (B). Now, L denotes losers (bottom 30% of lagged return), N denotes neutral (middle 40%), and W denotes winners (top 30%). The intersection of the size and momentum groups results in the six portfolios S/L, S/N, S/W, B/L, B/N, and B/W. The calculation of the WML factor is similar to the calculation of the HML factor:

$$WML_t = \frac{(r_t^{S/W} + r_t^{B/W}) - (r_t^{S/L} + r_t^{B/L})}{2}. \tag{3}$$

Additionally, we construct the momentum factor MOM, according to Jegadeesh and Titman (2001). At the end of each month t we rank the stocks in our sample based on their cumulative return for month $t-5$ to month $t-1$ and assign the stocks into ten portfolios. Portfolio 10 contains the stocks with the highest lagged performance, portfolio 1 the stocks with the lowest lagged performance. Each portfolio is held for six months. As in Jegadeesh and Titman (2001), we construct overlapping portfolios, in other words, a momentum decile portfolio in any month holds stocks ranked in that decile from all the previous six ranking months. Each monthly cohort is assigned an equal weight in this portfolio. We calculate value weighted returns to reduce the effect of small stocks. MOM is the return difference of portfolio 10 and portfolio 1.

Beside the raw momentum return, we also calculate the Fama and French (1993) adjusted momentum α for each month t as

$$\alpha_t = WML_t - \hat{\beta} \cdot RMRF_t - \hat{s} \cdot SMB_t - \hat{h} \cdot HML_t, \tag{4}$$

where RMRF, SMB and HML are the common risk factors as described above. $\hat{\beta}$, $\hat{s}$ and $\hat{h}$ are the estimated loadings from a time series regression of the momentum variable on the common Fama and French (1993) risk factors plus a constant. As medium-term momentum usually cannot be explained by the Fama and French (1993) risk factors (see e.g. Fama and French (1996)), we do not expect that this alters our results.

IV Basic Evidence

This section reports the descriptive statistics of the standard risk factors from October 1986 to September 2012 for Japan. Table 2 shows the summary statistics and correlations. The average return of the market (RM) is only slightly higher than the average risk free rate (RF). This leads to an equity risk premium (RMRF) that is almost zero. Fama and French (2012) observe for a slightly earlier time frame even a negative equity risk premium.

[Table 2 about here.]

There is only a small size premium of 0.08% that is not significant ($t = 0.42$) different from zero. In contrast, we find the well-known value premium also in Japan. The average HML return is 0.68, and is 4.56 standard errors from zero.

Similar to Fama and French (2012) and Asness et al. (2013), we cannot find a premium for WML. Also the slightly different methodology for MOM does not change the result. As in Griffin et al. (2003), we find only a small premium of 0.19% that is not significant ($t = 0.5$) different from zero. This evidence leads to the common view that momentum strategies fail in Japan.

The second part of Table 2 shows the correlations of the risk factors. Beside the naturally high correlations of the two variables depending on the market (RM and RMRF) and the both momentum factors (WML and MOM), the correlations between the other factors are rather small. There is a small negative correlation between RMRF and HML of -0.26 and between RMRF and WML (MOM) of -0.18 (-0.13). We also see a negative correlation between HML and WML (MOM) of -0.1 (-0.09),but not as negative as in Asness (2011).[11]

[Figure 1 about here.]

Figure 1 visualizes the cumulative performance of our risk factors RMRF, SMB, HML, WML and MOM from October 1986 to September 2012. The chart illustrates our first results above. The equity risk premium is very volatile and especially in the nineties we see much more market transitions as we would see for the U.S. market. The overall cumulative performance is even negative. The different sign of the premium between Table 2 and Figure 1 is due to the difference in arithmetic and geometric averages. The size premium is positive for the beginning of our sample until the early nineties. This is consistent with the observation of a positive size premium in earlier studies of the Japanese market, like in Chan et al. (1991) or Daniel et al. (2001). After the early nineties, we find

[11] Changing the month of the market capitalization in the denominator of B/M from March to September would push the coefficient down to -0.47, which is a similar level as in Asness (2011) (-0.55). See also Asness and Frazzini (2011) for a detailed analysis of this alternative specification.

a negative performance for SMB. In contrast, we see a nearly stable value effect, only interrupted by a sharp decline in the cumulative value premium during the tech bubble around the year 2000.

WML and MOM both are highly volatile and correlated. There are time periods where momentum strategies are working well, like in the mid two thousands or late nineties, but also months with sharp momentum crashes. These crashes tend to occur when the market rebounds after some months of decline (growth) like in October 1990 or February 2009 (March 2000).

Analyzing this dependency of momentum returns on market dynamics, will be the topic of the following section.

V Conditional Momentum Profits

A Market Dynamics

Following Asem and Tian (2010), we classify for each month t the past market either as a BULL Market or a BEAR Market, depending if the past cumulative twelfth-month return of the market (RM) is non-negative or negative. Furthermore, we classify month t as subsequent UP (DOWN) Market if the return of the market in t is non-negative (negative).

[Table 3 about here.]

This results in 75 (68) subsequent DOWN (UP) Market months following BEAR Markets and 69 (88) subsequent DOWN (UP) Market months following BULL Markets. Compared to the U.S. market in Asem and Tian (2010) we see a rather balanced proportion of the different market dynamics. For the U.S. past BULL Markets are dominating the sample with 453 following UP Markets and 246 following DOWN Markets. 135 (114) times the subsequent month is classified as UP (DOWN) Market after a past BEAR Market. This indicates why the average momentum profits could be lower in Japan than in the U.S.

Panel A of Table 3 shows the momentum profits following past BEAR Markets. The mean momentum return is 2.46% (t = 5.3) per month when the subsequent market is DOWN and -3.05% (t = -4.57) when the subsequent market is UP. We see a difference of 5.5% that is highly significant (t = 6.78). This indicates that momentum profits are higher when the market stays in the same condition. The high momentum profits when the market continues to be negative are remarkable as Cooper et al. (2004) argue that momentum profits do not exist after negative market returns. We also report average momentum profits of -0.16% after BEAR markets but our results demonstrate that these overall negative returns are only driven by the months when the market rebounds. The

Fama and French (1993) adjusted α's have the same signs and significance levels as the raw momentum profits.

The results following BULL Markets are shown in Panel B of Table 3. The mean momentum return is -0.76% (t = -1.74) when the market reverses and 1.26% (t = 3.25) when it continues to be in the same state. Again, the momentum profits depend on the subsequent market development, but not as strong as after a BEAR Market. The difference in momentum returns is -2.03% with -3.45 standard errors from zero. The Fama and French (1993) adjusted α's lead to the same result.

In Panel C we only distinguish between the subsequent month and see that momentum profits are higher for subsequent DOWN Market months. Potentially, this result indicates that the effect after past BEAR Markets is dominating the effect after past BULL Markets. Although, the momentum profits in subsequent DOWN Markets and the difference in momentum profits are significant, the effect is not as pronounced as for the both different past market regimes. Also, the Fama and French (1993) adjusted α's show only a small difference and are not significant.

On the bottom right corner of Table 3, the outcome of Section IV is shown again. Also, the Fama and French (1993) adjusted α demonstrate the lack of momentum profits for an unconditional model. The question is why we find this overall low momentum return for Japan although we see the same significant patterns in different market dynamics as in the U.S. where significant momentum returns are observed. We think that the different distribution of market transitions is the answer. As mentioned above, UP Markets following past BULL Markets are dominating in Asem and Tian (2010) for the U.S. For Japan this is only the case for 29% of the months compared to 48% for the U.S. Supposing the same distribution of market transitions for Japan as in the U.S. with constant premiums for the particular market dynamics would result in a mean momentum strategy return of 0.27% per month for WML and 0.44% for MOM compared to 0.01% and 0.19% as in Section IV. This corresponds to yearly premiums of more than 3% or 5% respectively. Thus, we conclude that momentum strategies, when studied depending on different market dynamics, cannot be seen as a failure in Japan anymore as previous studies argue.

B A Potential Explanation

In the last subsection we saw that momentum profits are higher when the market stays in the same condition as when it reverses. As described in Section II these patterns are consistent with the behavioral model of Daniel et al. (1998). But the model does not provide an explanation why the pattern is more pronounced

after BEAR Markets than after BULL Markets. Daniel and Moskowitz (2012) argue that this pattern could be the result of the option-like payoffs of the loser portfolio after a BEAR Market. They confirm that momentum portfolios have significant time-varying exposures to the market. By their nature, the market beta of a momentum portfolio should be higher after a past BULL Market than after a BEAR Market because it should be long in high beta stocks and short in low beta stocks. Daniel and Moskowitz (2012) demonstrate not only that the market betas of the momentum portfolio differ depending on the past market performance but also show that after BEAR Markets the beta of the momentum portfolios is significant lower when the subsequent market is UP. This so called optionality is only present after BEAR Markets but not after BULL Markets. They resume "that, in bear markets, the momentum portfolio is effectively short a call option on the market" (p. 19). Thereby, the loser portfolio is the predominant source of this optionality. This is consistent with the theory of Merton (1974) that a common stock can be seen as a call option on the value of the firm. Especially after a BEAR Market environment the stocks of the loser portfolio are likely not as deep in the money as the stocks in the winner portfolio and consequently have a stronger option-like behavior. In this subsection we want to replicate the main model of Daniel and Moskowitz (2012) for Japan.

For the ten momentum portfolios, described in Section III.B, and the difference of the two extreme decile returns (MOM) we estimate the following regressions:

$$R_t = \alpha + \alpha_B I_B + [\beta + I_B(\beta_B + I_U \beta_{B,U})] RMRF_t + \epsilon_t \tag{5}$$

$$R_t = \alpha + \alpha_L I_L + [\beta + I_L(\beta_L + I_D \beta_{L,D})] RMRF_t + \epsilon_t \tag{6}$$

Thereby, I_B and I_L are dummies indicating if the past cumulative twelfth-month return of the market (RM) is negative (I_B) or non-negative (I_L). I_U and I_D are dummies indicating if the subsequent month is non-negative (I_U) or negative (I_D). Table 4 shows the results of the both regressions.

[Table 4 about here.]

In Panel A we estimate a conditional CAPM with I_B as a past BEAR Market indicator and I_U as a subsequent UP Market indicator as instruments. The associated coefficients α_B and β_B indicate if the intercept and market-beta differ after past BEAR Markets while $\beta_{B,U}$ indicates to what extend the subsequent UP and DOWN Market beta differ after such a past BEAR Market.

Analyzing the results for the momentum portfolio MOM, we observe a positive α as well as a positive α_B but both not significant and hard to interpret as the market excess return RMRF is conditional. Consistent with Grundy and Martin (2001) and Daniel and Moskowitz (2012) we see significant differences in the market beta depending on the market conditions. While we see a slightly positive beta of 0.188 after BULL Markets, we observe a significant change of beta after BEAR Markets. If the subsequent market is DOWN the beta is -0.419 (t = -2.53) lower but if the subsequent market is UP the beta is additional -0.499 (t = -2.17) lower. This results in an overall market beta of $\beta + \beta_B + \beta_{B,U} = -0.73$ if the market reverses after past BEAR Markets but only $\beta + \beta_B = -0.231$ if the market declines further. When we analyze the results for each of the ten momentum portfolios we observe that the prevailing source of this optionality is the loser portfolio. While the UP Market beta of the winner portfolio is only -0.172 lower than in subsequent DOWN Markets, the loser portfolio beta is 0.327 higher with a point estimate of 1.539.

In Panel B we analyze the corresponding model after past BULL Markets. In accordance with Daniel and Moskowitz (2012), we do not observe the optionality as described above after BULL Markets. While we see a considerable change in the market beta of the momentum portfolio MOM between past BEAR Markets and past BULL Markets in general (0.629) the difference between subsequent UP and DOWN Markets is only small and not significant (0.106). The point estimate for the momentum portfolio is $\beta+\beta_L = 0.14$ for subsequent UP Markets and $\beta + \beta_L + \beta_{L,D} = 0.246$ for subsequent DOWN Markets. This lack of optionality may be the explanation why the pattern described in the previous subsection are more pronounced after BEAR Markets than after BULL Markets.

VI Robustness Checks

The results in the previous section demonstrated that momentum profits are sensible to current market dynamics. In this section we will address some alternative specifications and their impact on our results.

A Local Currency

While the choice of the currency should not affect significantly long-short difference returns like our momentum portfolios, the market (RM) or market excess return (RMRF) could differ significantly depending on the currency used to measure them. As the classification into past BEAR/BULL Markets and subsequent UP/DOWN Markets might differ when returns are measured in JPY, we show the analogous results for Table 3 in Table 5. In this specification we

use the Japanese one month interbank rates offered by the British Bankers' Association (BBA) as risk free rate. The numbers in Table 5 show that our results are not affected by the choice of the return currency.

[Table 5 about here.]

B Alternative Period

Asem and Tian (2010) cannot confirm their results for the U.S. also for Japan. We instead demonstrated in the previous section that market-dynamics conditional momentum is also present in the Japanese stock market. As Asem and Tian (2010) do not give details about their data process, we cannot explain this contrary finding. While we trust our comprehensive and carefully screened data set, also the different time periods covered in the papers could be an explanation. This might indicate that the results are not stable over time. Therefore, we replicate our analysis for the time period between October 1986 and December 2005 that is nearly identical to January 1985 to December 2005 as in Asem and Tian (2010). Table 6 demonstrate that our results are robust to this alternative time period.

[Table 6 about here.]

C Alternative Momentum Definition

[Table 7 about here.]

The Jegadeesh and Titman (1993) MOM and the Carhart (1997) WML momentum strategy definition are the most common momentum definitions in financial research. To check if the alternative definitions alters our results we use MOM instead of WML in Table 7. While the evidence after past BEAR Markets is almost unchanged, the differences after past BULL Markets are not as pronounced. The mean momentum profits of 1.22% in subsequent UP Markets are still positive, significant and higher than in subsequent DOWN Markets (0.05%) but the difference is not significant (t = -1.29) any more. We don't think that this finding questions our overall result, especially as the Fama and French (1993) adjusted α still shows a highly economically and statistically difference of (-2.52)% (t = -2.79).

D International Robustness

Chui et al. (2010) argue that cross-country differences in individualism are related to average momentum profits in these countries, while we argue that momentum profits are depending on market dynamics. We check if our results

also hold in countries with low individualism scores and low average momentum profits. Korea, Taiwan and Turkey are the only countries beside Japan with negative average momentum profits in Chui et al. (2010) and moreover are all in the lowest country individualism group. For all of the three countries we report significant and positive (negative) momentum premiums after DOWN (UP) markets following past BEAR Markets. Beside Turkey we also see significant and positive momentum profits in UP Markets following past BULL Markets and negative momentum returns in DOWN Markets. For Turkey the patters following BULL Markets are not as pronounced as for the other countries but we still see higher momentum profits if the market continues to rise.

[Table 8 about here.]

VII Summary

In this paper, we provide first evidence about the profitability of medium-term momentum strategies depending on market dynamics in Japan. While several studies point out that momentum strategies are an empirical failure in Japan, we argue that momentum must be studied conditional on different market dynamics.

First, we determine that momentum returns are significant higher when the market stays in the same condition than when it transitions to the other state. The mean momentum return following a BULL Market is -0.76% per month when the subsequent market is DOWN and 1.26% when the subsequent market is UP. Following BEAR markets the mean momentum return is 2.46% when the market continues to be in the same state and -3.05% when it reverses. These findings are consistent with the behavioral model of Daniel et al. (1998).

Second, we observe that this pattern is more pronounced after periods of poor market performance. We report a difference of 5.5% after BEAR Markets but only a difference of 2.03% after BULL Markets. A potential explanation of this asymmetry might be the result of the option-like payoff of the loser portfolio after BEAR Markets. We do not observe this optionality after BULL Markets.

Third, our results are robust to various specifications and also hold for other countries with low average momentum returns.

Our results should be of interest to researchers and practitioners alike. We enrich the ongoing debate about the source of momentum profits and show in which market dynamics momentum strategies would be profitable. Investors should be aware that momentum strategies might be exposed to sharp momentum crashes in BEAR Markets if the market rebounds. On the other side, this risk is rewarded by high momentum profits if the market stays in the same condi-

tion. For the Japanese market, our findings indicate that momentum strategies might be more profitable in the future if the overall market performance is more stable than in the past.

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Table 1: Number of Stocks
The table shows the number of stocks in our sample and the average market value (MV) in $ billion as of end of September of each year y. To be in our sample from October of year y to September of year $y+1$, we need the market capitalization for the security on March 31 and September 30 of year y, a positive book value at the fiscal year end that falls between April of year $y-1$ and March of year y and valid stock returns for the last 12 months.

	No. of Stocks	Avg. MV in $bn
1986	803	1190
1987	834	1971
1988	953	2530
1989	1136	2915
1990	1443	2832
1991	1826	2525
1992	1953	2032
1993	2018	3049
1994	2068	3585
1995	2132	3047
1996	2246	3490
1997	2300	2957
1998	2857	2002
1999	3048	2715
2000	3081	3518
2001	3198	2613
2002	3287	2294
2003	3381	2227
2004	3405	3325
2005	3522	3335
2006	3610	4316
2007	3750	4526
2008	3813	4120
2009	3717	3318
2010	3632	3380
2011	3551	3809

Table 2: Descriptive Statistic Risk Factors
The table reports summary statistics of the market return (RM), the risk free rate (RF), the excess return of the market over the risk free rate (RMRF=RM-RF), the size factor (SMB), the value factor (HML), the two momentum factors (WML and MOM). The statistics are computed over the period October 1986 to September 2012.

	RM	RF	RMRF	SMB	HML	WML	MOM
Mean	0.32	0.31	0.01	0.08	0.68	0.01	0.19
Std dev	6.23	0.20	6.24	3.58	2.63	4.84	6.68
t-Mean	0.90	28.00	0.02	0.42	4.56	0.05	0.50
				Correlations			
RM	1.00						
RF	-0.04	1.00					
RMRF	1.00	-0.08	1.00				
SMB	0.04	-0.07	0.04	1.00			
HML	-0.26	0.03	-0.26	0.01	1.00		
WML	-0.18	0.01	-0.18	-0.22	-0.10	1.00	
MOM	-0.13	0.03	-0.13	-0.18	-0.09	0.88	1.00

Table 3: Market Dynamics and Momentum Profits
The table reports the WML means and Fama and French (1993) (FF) α's for different market states. We classify for each month t the past market either as a BULL Market or a BEAR Market, depending if the past cumulative twelfth-month return of the market (RM) is non-negative or negative. Furthermore, we classify month t as subsequent UP (DOWN) Market if the return of the market in t is non-negative (negative). The statistics are computed over the period October 1986 to September 2012.

	Subsequent DOWN Markets	Subsequent UP Markets	DOWN - UP Markets	Both subsequent Months
Panel A: Past BEAR Market				
Mean	2.46	-3.05	5.5	-0.16
t-Mean	5.3	-4.57	6.78	-0.35
FF-α	1.83	-2.18	4.01	-0.07
t-FF-α	3.95	-3.52	5.19	-0.18
No. of months	75	68		
Panel B: Past BULL Market				
Mean	-0.76	1.26	-2.03	0.37
t-Mean	-1.74	3.25	-3.45	1.24
FF-α	-1.21	2.15	-3.36	0.67
t-FF-α	-2.66	5.81	-5.73	2.12
No. of months	69	88		
Panel C: Both past conditions				
Mean	0.65	-0.56	1.2	0.01
t-Mean	1.75	-1.4	2.22	0.05
FF-α	0.16	0.3	-0.14	0.24
t-FF-α	0.44	0.81	-0.28	0.91

Table 4: Momentum Portfolio Optionality
The table reports the results of a regression of the excess return of ten momentum portfolios and the difference of the two extreme decile returns (MOM) on the excess return of the market (RM) and various indicator varibales. In Panel A we estimate the following regressions for each of these portfolios:

$$R_t = \alpha + \alpha_B I_B + [\beta + I_B(\beta_B + I_U \beta_{B,U})]RMRF_t + \epsilon_t$$

In Panel B we estimate the following regressions for each of these portfolios:

$$R_t = \alpha + \alpha_L I_L + [\beta + I_L(\beta_L + I_D \beta_{L,D})]RMRF_t + \epsilon_t$$

Thereby, I_B and I_L are dummies indicating if the past cumulative twelfth-month return of the market (RM) is negative (I_B) or non-negative (I_L). I_U and I_D are dummies indicating if the subsequent month is non-negative (I_U) or negative (I_D). The statistics are computed over the period October 1986 to September 2012.

	1	2	3	4	5	6	7	8	9	10	MOM
Panel A: Past BEAR Market and Subsequent UP Market Indicator											
α	-0.355	-0.005	-0.02	0.127	0.053	0.099	0.21	0.267	0.278	0.29	0.645
	(-1.16)	(-0.03)	(-0.13)	(0.9)	(0.47)	(0.99)	(1.91)	(2.46)	(2.18)	(1.13)	(1.36)
α_B	-0.149	-0.423	-0.144	-0.366	-0.465	-0.301	-0.207	-0.274	-0.185	0.076	0.224
	(-0.25)	(-1)	(-0.46)	(-1.32)	(-2.07)	(-1.53)	(-0.96)	(-1.28)	(-0.74)	(0.15)	(0.24)
β	1.042	0.954	0.925	0.905	0.928	0.941	0.971	1.011	1.103	1.23	0.188
	(17.82)	(23.08)	(30.52)	(33.41)	(42.45)	(49.3)	(46.22)	(48.75)	(45.17)	(24.96)	(2.06)
β_B	0.17	0.136	0.156	0.107	0.05	0.025	-0.026	-0.065	-0.124	-0.249	-0.419
	(1.6)	(1.81)	(2.83)	(2.17)	(1.25)	(0.72)	(-0.68)	(-1.72)	(-2.8)	(-2.77)	(-2.53)
$\beta_{B,U}$	0.327	0.249	0.11	0.152	0.125	0.047	-0.032	-0.074	-0.12	-0.172	-0.499
	(2.22)	(2.39)	(1.43)	(2.23)	(2.26)	(0.98)	(-0.61)	(-1.41)	(-1.94)	(-1.38)	(-2.17)
Panel B: Past BULL Market and Subsequent DOWN Market Indicator											
α	0.397	0.256	0.138	0.18	-0.069	-0.071	-0.086	-0.21	-0.237	-0.106	-0.503
	(1.23)	(1.12)	(0.83)	(1.2)	(-0.57)	(-0.68)	(-0.75)	(-1.85)	(-1.76)	(-0.39)	(-1)
α_L	-0.985	-0.586	-0.355	-0.179	0.054	0.053	0.383	0.609	0.564	0.376	1.361
	(-1.68)	(-1.42)	(-1.17)	(-0.66)	(0.25)	(0.28)	(1.83)	(2.95)	(2.31)	(0.76)	(1.49)
β	1.382	1.218	1.138	1.091	1.043	0.991	0.928	0.908	0.917	0.892	-0.489
	(29.9)	(37.34)	(47.8)	(50.98)	(60.31)	(66.18)	(56.37)	(55.72)	(47.6)	(23.02)	(-6.81)
β_L	-0.287	-0.192	-0.169	-0.158	-0.099	-0.023	0.023	0.074	0.175	0.342	0.629
	(-2.54)	(-2.41)	(-2.9)	(-3.01)	(-2.35)	(-0.64)	(0.57)	(1.86)	(3.71)	(3.61)	(3.58)
$\beta_{L,D}$	-0.116	-0.162	-0.098	-0.063	-0.034	-0.058	0.043	0.066	0.025	-0.01	0.106
	(-0.61)	(-1.21)	(-1)	(-0.72)	(-0.48)	(-0.95)	(0.64)	(0.98)	(0.32)	(-0.06)	(0.36)

Table 5: Robustness - Market Dynamics and Momentum Profits in Local Currency

The table reports the WML means and Fama and French (1993) (FF) α's for different market states measured in JPY. We classify for each month t the past market either as a BULL Market or a BEAR Market, depending if the past cumulative twelfth-month return of the market (RM) is non-negative or negative. Furthermore, we classify month t as subsequent UP (DOWN) Market if the return of the market in t is non-negative (negative). The statistics are computed over the period October 1986 to September 2012.

	Subsequent DOWN Markets	Subsequent UP Markets	DOWN - UP Markets	Both subsequent Months
Panel A: Past BEAR Market				
Mean	2.46	-3.02	5.47	0
t-Mean	6.46	-4.55	7.16	-0.01
FF-α	1.64	-2.09	3.74	-0.04
t-FF-α	4.37	-3.47	5.25	-0.09
No. of months	87	71		
Panel B: Past BULL Market				
Mean	-1.33	1.38	-2.71	0.25
t-Mean	-2.83	3.5	-4.42	0.79
FF-α	-1.89	2.45	-4.34	0.65
t-FF-α	-3.87	6.47	-7.03	1.86
No. of months	59	83		
Panel C: Both past conditions				
Mean	0.66	-0.59	1.25	0.01
t-Mean	1.83	-1.46	2.31	0.03
FF-α	0.01	0.39	-0.37	0.21
t-FF-α	0.04	1.02	-0.73	0.81

Table 6: Robustness - Market Dynamics and Momentum Profits for an Alternative Period

The table reports the WML means and Fama and French (1993) (FF) α's for different market states. We classify for each month t the past market either as a BULL Market or a BEAR Market, depending if the past cumulative twelfth-month return of the market (RM) is non-negative or negative. Furthermore, we classify month t as subsequent UP (DOWN) Market if the return of the market in t is non-negative (negative). The statistics are computed over the period October 1986 to December 2005.

	Subsequent DOWN Markets	Subsequent UP Markets	DOWN - UP Markets	Both subsequent Months
Panel A: Past BEAR Market				
Mean	2.44	-3.43	5.87	-0.12
t-Mean	3.08	-3.19	4.4	-0.18
FF-α	2.14	-2.71	4.85	0.02
t-FF-α	2.63	-2.67	3.73	0.03
No. of months	62	48		
Panel B: Past BULL Market				
Mean	-0.82	1.66	-2.49	0.64
t-Mean	-1.02	2.14	-2.22	1.12
FF-α	-0.93	2.67	-3.6	1.19
t-FF-α	-1.13	3.68	-3.28	2.1
No. of months	46	66		
Panel C: Both past conditions				
Mean	0.54	-0.19	0.73	0.16
t-Mean	0.85	-0.29	0.79	0.34
FF-α	0.42	0.63	-0.21	0.53
t-FF-α	0.68	1.01	-0.24	1.21

Table 7: Robustness - Market Dynamics and Momentum Profits for an Alternative Momentum Variable

The table reports the MOM means and Fama and French (1993) (FF) α's for different market states. We classify for each month t the past market either as a BULL Market or a BEAR Market, depending if the past cumulative twelfth-month return of the market (RM) is non-negative or negative. Furthermore, we classify month t as subsequent UP (DOWN) Market if the return of the market in t is non-negative (negative). The statistics are computed over the period October 1986 to September 2012.

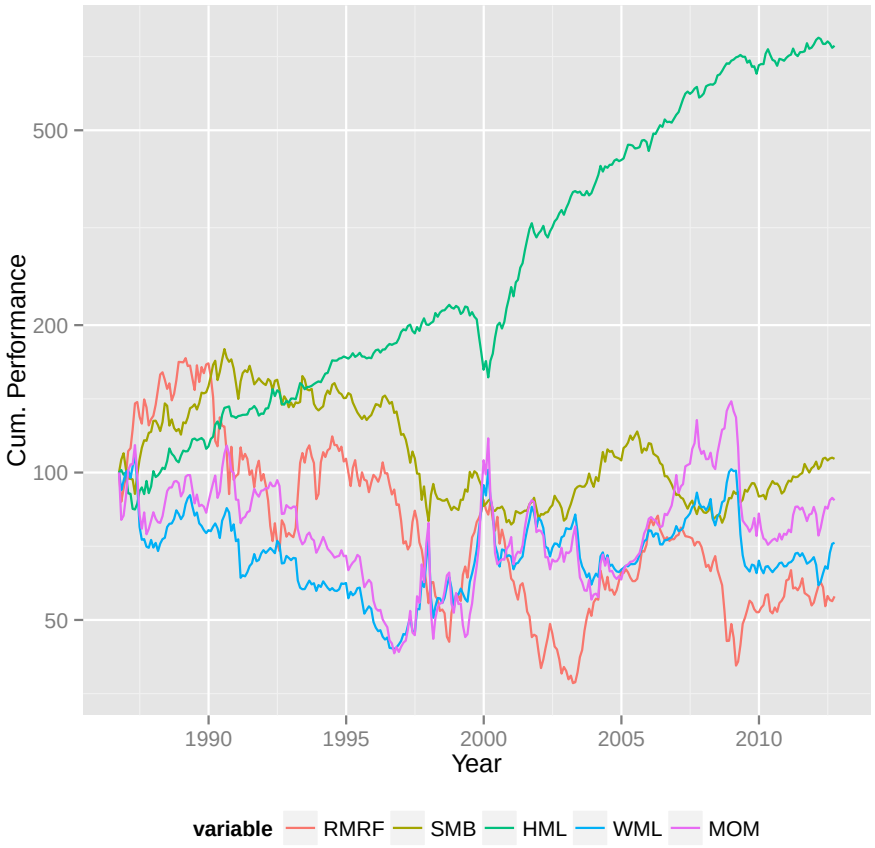
	Subsequent DOWN Markets	Subsequent UP Markets	DOWN - UP Markets	Both subsequent Months
Panel A: Past BEAR Market				
Mean	2.49	-3.2	5.7	-0.22
t-Mean	3.63	-3.69	5.14	-0.36
FF-α	1.91	-2.32	4.22	-0.1
t-FF-α	2.74	-2.78	3.89	-0.18
No. of months	75	68		
Panel B: Past BULL Market				
Mean	0.05	1.22	-1.17	0.71
t-Mean	0.08	1.88	-1.29	1.54
FF-α	-0.37	2.15	-2.52	1.05
t-FF-α	-0.56	3.45	-2.79	2.26
No. of months	69	88		
Panel C: Both past conditions				
Mean	0.93	-0.48	1.41	0.19
t-Mean	1.82	-0.87	1.88	0.5
FF-α	0.49	0.41	0.08	0.44
t-FF-α	0.96	0.78	0.11	1.22

Table 8: Robustness - Market Dynamics and Momentum Profits for other International Markets

The table reports the WML means and Fama and French (1993) (FF) α's for different market states in Korea, Taiwan and Turkey. We classify for each month t the past market either as a BULL Market or a BEAR Market, depending if the past cumulative twelfth-month return of the market (RM) is non-negative or negative. Furthermore, we classify month t as subsequent UP (DOWN) Market if the return of the market in t is non-negative (negative). The statistics are computed over the period July 1995 to June 2012.

Past Market	BEAR		BULL	
Subsequent Month	DOWN	UP	DOWN	UP
Panel A: Korea				
Mean	2.71	-5.95	-0.18	1.95
t-Mean	2.64	-3.05	-0.32	2.88
No. of months	46	31	51	64
Panel B: Taiwan				
Mean	1.62	-4.23	-0.55	2.68
t-Mean	2.07	-3.21	-0.73	3.32
No. of months	37	33	55	67
Panel C: Turkey				
Mean	2	-3.84	0.15	0.65
t-Mean	1.9	-3.69	0.21	0.97
No. of months	31	42	56	63

Figure 1: Cumulative Performace of the Risk Factors Premiums
The figure plots the cumulated performance of the monthly time-series of the market (RMRF), SMB, HML, WML and MOM factor. The time series are computed over the period October 1986 to September 2012.



A Appendix

A.1 Static screens

We use Thomson Reuters Datastream constituent lists to build our data set. To avoid a survivorship bias, we use the intersection of Datastream research lists, Worldscope lists, and dead lists.[12] We restrict our sample to stocks of type equity; companies and securities located and listed in Japan; the primary quotation of a security; and the (major) security with the biggest market capitalization and liquidity for companies with more than one equity security. Furthermore, we exclude securities with quoted currency other than the local JPY or ISIN country code other than "JP". To eliminate non-common equity stocks we search similar to Griffin et al. (2010) for suspicious words in the company name, indicating that the security is more likely a duplicate, preferred stock, dept, etc.[13]

A.2 Dynamic screens

We calculate returns from the total return index and delete all zero returns (in local currency) from the end of the time-series to the first non-zero return. In addition, we remove all observations for which returns are greater than 890%, for which the unadjusted price in local currency is greater than 1,000,000 or for which R_t or R_{t-1} is greater than 300% and $(1 + R_t)(1 + R_{t-1}) - 1$ is smaller than 50%.

[12] Research lists (FJAP, FTOKYO, FOSAKA, FJASDAQ), Worldscope list (WSCOPEJP), Dead list (DEADJP)

[13] See table A.1 for a list of all the used keywords.

Table A.1: Generic filter rules to exclude non-common equity securities, mostly recommended by Ince and Porter (2006) and Griffin et al. (2010)

The table lists keywords, which serve as indicators, that a Datastream security is, in contrast to its stock classification in Datastream, not common equity. If a part of the securities name is matched to one of the keywords from the second column, the security is most likely not a common stock but the type in the first column of the same row. The security is excluded from the sample.

Non-common equity	**Keywords**
Duplicates	”DUPLICATE” ” DUPL” ”DUP.” ”DUPE” ”DULP” ”DUPLI” ”1000DUPL” ”XSQ” ”XETa” ” DUP ” ”DUPL ”
Depository Receipts	” ADR” ”GDR”
Preferred Stock	”Stock” ”PREFERRED” ”PF.” ”PFD” ”PREF” ”’PF”’ ”PRF”
Warrants	”WARRANT” ”WARRANTS” ”WTS” ”WTS2” ”WARRT”
Debt	” DEB ” ” DB” ”DCB” ” DEBT ” ”DEBENTURES” ” DEBENTURE” ”BOND” ”%”
Unit Trusts (2 words)	”RLST IT” ”INVESTMENT TRUST” ”INV TST” ”UNIT TRUST” ”UNT TST” ”TRUST UNITS” ”TST UNITS” ”TRUST UNIT” ”TST UNIT”
Unit Trusts (1 word)	” UT ” ”.IT”
ETF	”ETF” ”ISHARES” ”INAV” ”X-TR” ”LYXOR” ”JUNGE” ”AMUNDI”
Ince and Porter (2006)	”500” ” BOND ” ”DEFER” ” DEP ” ”DEPY” ”ELKS” ” ETF” ”FUND” ”FD” ”IDX” ”INDEX” ” MIPS” ” MITS” ”MITS.” ” MITT ” ” MITT.” ”NIKKEI” ” NOTE.” ” NOTE ” ”PERQS” ” PINES ” ” PINES.” ”PRTF” ”PTNS” ”PTSHP” ”QUIBS” ” QUIDS” ” RATE” ”RCPTS” ”RECEIPTS” ”REIT” ”RETUR” ” SCORE” ”SPDR” ”STRYPES” ”TOPRS” ”WTS” ”XXXXX” ”YIELD” ”YLD” ” QUIDS”
Expired securities	”EXPIRED” ”EXPD” ”EXPIRY” ”EXPY”

Japan is not Different: Evidence on Conditional Momentum

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Motivation

Motivation

- Medium-term momentum (Jegadeesh and Titman (1993,2001)) is one of the big three anomalies besides „size and „value“.
- Rouwenhorst (1998, 1999), Griffin et al. (2003) or Asness et al. (2013) show that momentum profits also exist for other countries than the U.S. or other asset classes. Premium up to 1% per month.
- Despite the broad evidence of momentum profits around the world, there is one remarkable exception:
- Several studies argue that medium-term momentum strategies fail in Japan as they do not find any significant mean return (e.g. Griffin et al. (2003), Chou et al. (2007), Fama and French (2012), Asness et al. (2013)).
- Aim of this paper: Why?

Related Literature

- Chui et al. (2010) argue that momentum returns are weaker in countries with less individualism like Japan or other parts of Asia.

- Asness (2011) though argues that momentum should be studied in a system with value because they are negatively correlated. A combined 50/50 strategy also works in Japan and therefore he argues that "momentum in Japan [...is] the exception that proves the rule" (p. 67).

- According to the behavioral model of Daniel et al. (1998) investors' overconfidence is expected to be higher when the market remains in the same state than when it reverses.

- Therefore, momentum returns should be higher in market continuations than in market transitions.

- Asem and Tian (2010, JFQA) provide mixed evidence as they can present this pattern for the U.S but not for Japan.

Main Results

- We observe that momentum returns are significant higher when the market stays in the same condition than when it transitions to the other state.
- This pattern is more pronounced after periods of poor market performance.
- A potential explanation of this pattern might be the result of the option-like payoff of the loser portfolio after market declines.
- Our results are robust to various specifications and also hold for other countries with low average momentum returns.

Contribution to the Literature

- To the best of our knowledge, we are the first to provide evidence outside the U.S. that momentum returns are conditional on market dynamics. This finding is consistent with the behavioral model of Daniel et al. (1998).

- Our results indicate that momentum strategies, when studied depending on different market dynamics, cannot be seen as a failure in Japan unlike previous studies.

Theory

Behavioral Model of Daniel et al. (1998) and expected momentum profits

- In the model, a public signal confirming a trade based on a private signal increases overconfidence, while a disconfirming signal decreases overconfidence only by little or remains constant due to self-attribution.
- Thus, positive public signals following a "buy" or negative public signals following a "sell" increase overconfidence.
- We assume that investors on average traded more based on positive (negative) private signals when the past market was positive (negative).
- Consequently, subsequent positive months should drive overconfidence more than subsequent negative months. And vice versa.
- As a result, we expect higher overconfidence and thus also higher momentum profits when the market continues to stay in the same state than when it reverses.

Data Set

Data

- Our sample of Japanese stocks is derived from Thomson Reuters Datastream. Following Ince and Porter (2006), Griffin et al. (2010) and Schmidt et al. (2011) we apply several screens to ensure our data quality.

- Period of analysis: October 1986 to September 2012

- Sample consists out of 4782 unique securities with sufficient data to be in our sample at least for one year with of a minimum of 803 stocks in 1986 and a maximum of 3813 stocks in 2008.

- WML ("Winner minus Losers") is constructed following Carhart (1997) and Fama and French (2012), MOM (momentum factor) according to Jegadeesh and Titman (2001).

- Beside the raw momentum returns, we also calculate the Fama and French (1993) adjusted *α*'s for each month *t*

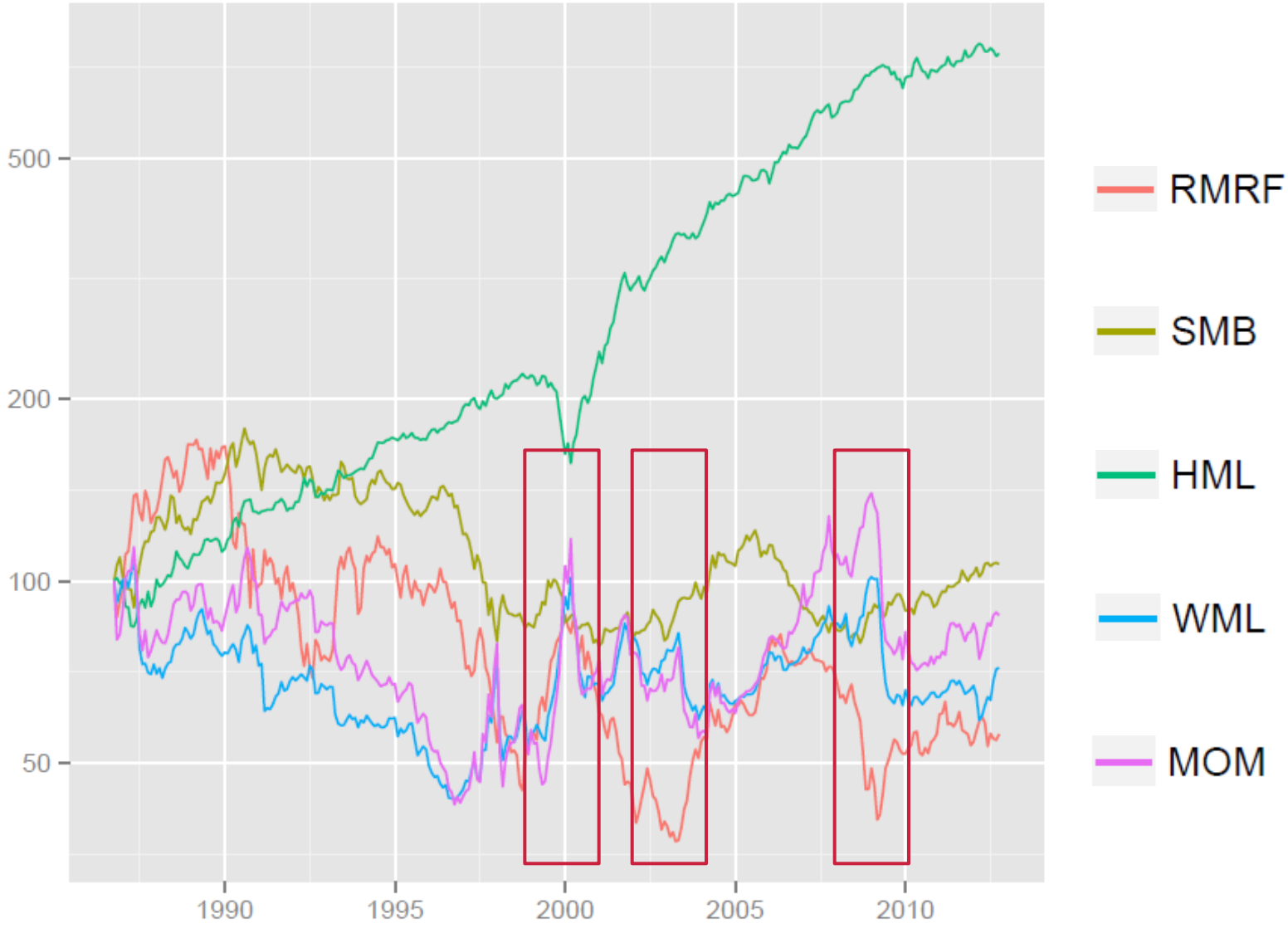
Basic Evidence

Table 2: Descriptive Statistic Risk Factors

The table reports summary statistics of the market return (RM), the risk free rate (RF), the excess return of the market over the risk free rate (RMRF=RM-RF), the size factor (SMB), the value factor (HML), the two momentum factors (WML and MOM). The statistics are computed over the period October 1986 to September 2012.

	RM	RF	RMRF	SMB	HML	WML	MOM
Mean	0.32	0.31	0.01	0.08	0.68	0.01	0.19
Std dev	6.23	0.20	6.24	3.58	2.63	4.84	6.68
t-Mean	0.90	28.00	0.02	0.42	4.56	0.05	0.50
				Correlations			
RM	1.00						
RF	-0.04	1.00					
RMRF	1.00	-0.08	1.00				
SMB	0.04	-0.07	0.04	1.00			
HML	-0.26	0.03	-0.26	0.01	1.00		
WML	-0.18	0.01	-0.18	-0.22	-0.10	1.00	
MOM	-0.13	0.03	-0.13	-0.18	-0.09	0.88	1.00

Cumulative Performance



Conditional Momentum Profits

Market Dynamics and Momentum Profits

	Subsequent DOWN Markets	Subsequent UP Markets	DOWN - UP Markets	Both subsequent Months
Panel A: Past BEAR Market				
Mean				
t-Mean				
FF-α				
t-FF-α				
No. of months	75	68		
Panel B: Past BULL Market				
Mean				
t-Mean				
FF-α				
t-FF-α				
No. of months	69	88		
Panel C: Both past conditions				
Mean				
t-Mean				
FF-α				
t-FF-α				

Momentum Portfolio Optionality (Past BEAR Markets)

$$R_t = \alpha + \alpha_B I_B + [\beta + I_B(\beta_B + I_U \beta_{B,U})] RMRF_t + \epsilon_t$$

	1	2	3	4	5	6	7	8	9	10	MOM
Panel A: Past BEAR Market and Subsequent UP Market Indicator											
α	-0.355	-0.005	-0.02	0.127	0.053	0.099	0.21	0.267	0.278	0.29	0.645
	(-1.16)	(-0.03)	(-0.13)	(0.9)	(0.47)	(0.99)	(1.91)	(2.46)	(2.18)	(1.13)	(1.36)
α_B	-0.149	-0.423	-0.144	-0.366	-0.465	-0.301	-0.207	-0.274	-0.185	0.076	0.224
	(-0.25)	(-1)	(-0.46)	(-1.32)	(-2.07)	(-1.53)	(-0.96)	(-1.28)	(-0.74)	(0.15)	(0.24)
β	1.042	0.954	0.925	0.905	0.928	0.941	0.971	1.011	1.103	1.23	0.188
	(17.82)	(23.08)	(30.52)	(33.41)	(42.45)	(49.3)	(46.22)	(48.75)	(45.17)	(24.96)	(2.06)
β_B	0.17	0.136	0.156	0.107	0.05	0.025	-0.026	-0.065	-0.124	-0.249	-0.419
	(1.6)	(1.81)	(2.83)	(2.17)	(1.25)	(0.72)	(-0.68)	(-1.72)	(-2.8)	(-2.77)	(-2.53)
$\beta_{B,U}$	0.327	0.249	0.11	0.152	0.125	0.047	-0.032	-0.074	-0.12	-0.172	-0.499
	(2.22)	(2.39)	(1.43)	(2.23)	(2.26)	(0.98)	(-0.61)	(-1.41)	(-1.94)	(-1.38)	(-2.17)

- I_B and I_U are dummies indicating if the past cumulative twelfth-month return of the market (RM) is negative (I_B) or if the subsequent month is non-negative (I_U).
- The overall market beta of the momentum portfolio is -0.73 if the market reverses after past BEAR Markets but only -0.231 if the market declines further.
- The prevailing source of the optionality is the loser portfolio.

Momentum Portfolio Optionality (Past BULL Markets)

$$R_t = \alpha + \alpha_L I_L + [\beta + I_L(\beta_L + I_D \beta_{L,D})] RMRF_t + \epsilon_t$$

	1	2	3	4	5	6	7	8	9	10	MOM
Panel B: Past BULL Market and Subsequent DOWN Market Indicator											
α	0.397	0.256	0.138	0.18	-0.069	-0.071	-0.086	-0.21	-0.237	-0.106	-0.503
	(1.23)	(1.12)	(0.83)	(1.2)	(-0.57)	(-0.68)	(-0.75)	(-1.85)	(-1.76)	(-0.39)	(-1)
α_L	-0.985	-0.586	-0.355	-0.179	0.054	0.053	0.383	0.609	0.564	0.376	1.361
	(-1.68)	(-1.42)	(-1.17)	(-0.66)	(0.25)	(0.28)	(1.83)	(2.95)	(2.31)	(0.76)	(1.49)
β	1.382	1.218	1.138	1.091	1.043	0.991	0.928	0.908	0.917	0.892	-0.489
	(29.9)	(37.34)	(47.8)	(50.98)	(60.31)	(66.18)	(56.37)	(55.72)	(47.6)	(23.02)	(-6.81)
β_L	-0.287	-0.192	-0.169	-0.158	-0.099	-0.023	0.023	0.074	0.175	0.342	0.629
	(-2.54)	(-2.41)	(-2.9)	(-3.01)	(-2.35)	(-0.64)	(0.57)	(1.86)	(3.71)	(3.61)	(3.58)
$\beta_{L,D}$	-0.116	-0.162	-0.098	-0.063	-0.034	-0.058	0.043	0.066	0.025	-0.01	0.106
	(-0.61)	(-1.21)	(-1)	(-0.72)	(-0.48)	(-0.95)	(0.64)	(0.98)	(0.32)	(-0.06)	(0.36)

- I_L and I_D are dummies indicating if the past cumulative twelfth-month return of the market (RM) is non-negative (I_L) or if the subsequent month is negative (I_D).
- Optionality not present after BULL markets.

International Evidence

Past Market	BEAR		BULL	
Subsequent Month	DOWN	UP	DOWN	UP
Panel A: Korea				
Mean	2.71	-5.95	-0.18	1.95
t-Mean	2.64	-3.05	-0.32	2.88
No. of months	46	31	51	64
Panel B: Taiwan				
Mean	1.62	-4.23	-0.55	2.68
t-Mean	2.07	-3.21	-0.73	3.32
No. of months	37	33	55	67
Panel C: Turkey				
Mean	2	-3.84	0.15	0.65
t-Mean	1.9	-3.69	0.21	0.97
No. of months	31	42	56	63

Summary

- We observe that momentum returns are significant higher when the market stays in the same condition than when it transitions to the other state.
- This pattern is more pronounced after periods of poor market performance.
- A potential explanation of this pattern might be the result of the option-like payoff of the loser portfolio after market declines.
- Our results are robust to various specifications and also hold for other countries with low average momentum returns.

Back-up

Market Dynamics and Momentum Profits (Local Currency)

	Subsequent DOWN Markets	Subsequent UP Markets	DOWN - UP Markets	Both subsequent Months
Panel A: Past BEAR Market				
Mean	2.46	-3.02	5.47	0
t-Mean	6.46	-4.55	7.16	-0.01
FF-α	1.64	-2.09	3.74	-0.04
t-FF-α	4.37	-3.47	5.25	-0.09
No. of months	87	71		
Panel B: Past BULL Market				
Mean	-1.33	1.38	-2.71	0.25
t-Mean	-2.83	3.5	-4.42	0.79
FF-α	-1.89	2.45	-4.34	0.65
t-FF-α	-3.87	6.47	-7.03	1.86
No. of months	59	83		
Panel C: Both past conditions				
Mean	0.66	-0.59	1.25	0.01
t-Mean	1.83	-1.46	2.31	0.03
FF-α	0.01	0.39	-0.37	0.21
t-FF-α	0.04	1.02	-0.73	0.81

Market Dynamics and Momentum Profits (Until 2005)

	Subsequent DOWN Markets	Subsequent UP Markets	DOWN - UP Markets	Both subsequent Months
Panel A: Past BEAR Market				
Mean	2.44	-3.43	5.87	-0.12
t-Mean	3.08	-3.19	4.4	-0.18
FF-α	2.14	-2.71	4.85	0.02
t-FF-α	2.63	-2.67	3.73	0.03
No. of months	62	48		
Panel B: Past BULL Market				
Mean	-0.82	1.66	-2.49	0.64
t-Mean	-1.02	2.14	-2.22	1.12
FF-α	-0.93	2.67	-3.6	1.19
t-FF-α	-1.13	3.68	-3.28	2.1
No. of months	46	66		
Panel C: Both past conditions				
Mean	0.54	-0.19	0.73	0.16
t-Mean	0.85	-0.29	0.79	0.34
FF-α	0.42	0.63	-0.21	0.53
t-FF-α	0.68	1.01	-0.24	1.21

Market Dynamics and Momentum Profits (MOM)

	Subsequent DOWN Markets	Subsequent UP Markets	DOWN - UP Markets	Both subsequent Months
Panel A: Past BEAR Market				
Mean	2.49	-3.2	5.7	-0.22
t-Mean	3.63	-3.69	5.14	-0.36
FF-α	1.91	-2.32	4.22	-0.1
t-FF-α	2.74	-2.78	3.89	-0.18
No. of months	75	68		
Panel B: Past BULL Market				
Mean	0.05	1.22	-1.17	0.71
t-Mean	0.08	1.88	-1.29	1.54
FF-α	-0.37	2.15	-2.52	1.05
t-FF-α	-0.56	3.45	-2.79	2.26
No. of months	69	88		
Panel C: Both past conditions				
Mean	0.93	-0.48	1.41	0.19
t-Mean	1.82	-0.87	1.88	0.5
FF-α	0.49	0.41	0.08	0.44
t-FF-α	0.96	0.78	0.11	1.22