



2010-01: Enhancing Contrarian Strategies: Evidence from Developed Markets Indices (Working paper)

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Published

2010

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No. 2010-01

Series Editor: Dr. Alexandr Akimov

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Enhancing Contrarian Strategies: Evidence from Developed Markets Indices

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A problem for contrarian strategies is that short-term continuation can offset long-term return reversal. This paper introduces a method for enhancing contrarian strategies to avoid this problem and applies it to 18 developed markets equity indices. Using recent short-term performance to determine which contrarian indices appear ready to reverse and which do not, we define late stage and early stage contrarian strategies. Late stage strategies are consistently more profitable than both pure contrarian and early stage contrarian strategies. Our subsample results confirm a general weakening in contrarian strategy profitability post-December 1989.

Key Words: contrarian, index, developed markets, MSCI

JEL Classification: G14, G15

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1. Introduction

This paper introduces a new and effective way to enhance the profitability of contrarian strategies. Following the landmark paper by DeBondt and Thaler (1985), traditional pure contrarian strategies buy portfolios composed of securities with low long-term past returns (losers) and sell portfolios made up of securities with high long-term past returns (winners). DeBondt and Thaler (1985) show that when portfolios of US stocks are formed on past three-year to five-year returns, losers have high future returns whereas winners have low future returns. While they find that their results are consistent with investor overreaction, Fama and French (1996) report that this pattern of long-term return reversal in US stocks is predicted by the Fama-French three-factor model.¹

Chan and Kot (2006) enhanced momentum strategies by using the long-term past performance of stocks to create a strategy with increased profitability. With momentum strategies, the aim is to identify those portfolios that have strong continuing returns. In contrast, with contrarian strategies, the highest profitability is found in those portfolios that strongly reverse. In some ways, our approach mirrors Chan and Kot (2006) in the sense that we are enhancing contrarian strategies by using recent short-term performance.

This method recognizes that not all long-term losers and winners are equally ready to reverse their performances. The key insight is to utilize recent short-term performances to help identify which securities are more ready to reverse their long-term performances. For example, long-term losers whose recent short-term performances are also poor seem more likely to continue to do poorly in the immediate future rather than reverse. Such losers are giving no indication of a readiness to reverse even if they do eventually reverse. On the other hand, long-term losers with relatively good recent short-term performance seem better candidates for reversal of their long-term performance. A similar story applies to long-term winners. Long-term winners with relatively good recent short-term performances appear less likely to reverse soon when compared with long-term winners with relatively poor recent short-term performances.

Given these considerations, we propose two new contrarian strategies: late stage and early stage contrarian. The late stage contrarian strategy buys those long-term losers with relatively good recent short-term performances and shorts those long-term winners with relatively poor recent short-term performances. In contrast, the early stage contrarian strategy buys those long-term losers with relatively poor recent short-term performances and shorts those long-term winners with relatively good recent short-term performances. Our expectation is that the late stage contrarian strategy will be more profitable than both the early stage contrarian and the traditional pure contrarian strategies.

¹ Other studies investigating the contrarian effect include DeBondt and Thaler (1985, 1987) Chopra, Lakonishok and Ritter (1992), Richards (1997), and Balvers, Wu and Gilliland (2000).

The late stage/early stage terminology has been previously used in a different context for momentum strategies by Lee and Swaminathan (2000) and Chan and Kot (2006).

We examine the late/early stage and pure contrarian strategies at the country index level using a sample of 18 developed markets equity indices. Previous predictability studies using these indices include Balvers et al. (2000), Shen, Szakmary and Sharma (2005), and Balvers and Wu (2006). We find that the late stage strategy is consistently the most profitable, while the early stage strategy is typically unprofitable. In one case, the late stage strategy produces a significant annualized risk-adjusted return of 8.5%. The corresponding return for the pure contrarian strategy is 1.8%, while the early stage strategy's risk-adjusted return is an insignificant -4.9%.

Robustness checks show that the gap between the end of a strategy's formation period and the beginning of its holding period has a significant effect on its profitability. With small gaps of seven months or less, the late stage strategy is the most profitable. For longer gaps, the early stage strategy becomes most profitable strategy. These results reinforce our original expectation that late stage portfolios will contain those contrarian securities ready to reverse whereas the early stage portfolios will contain those contrarian securities not yet ready to reverse.

The remainder of the paper is organized as follows. Section 2 describes the sample and the methodology employed to construct and test the various contrarian strategies. Section 3 presents the main empirical results. Section 4 reports the robustness checks. These involve investigating the sensitivity of strategy profits to the gap between the end of the formation period and the beginning of the holding period, followed by a study of strategy profitability by subperiods. Section 5 contains some final comments.

2. Data and Methodology

Monthly total returns data are obtained from Datastream for the 18 Morgan Stanley Capital International (MSCI) developed markets equity indices: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Italy, Japan, Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. Returns are calculated from prices with reinvested gross dividends (that is, excluding withholding taxes) converted to US dollar terms. Returns are measured in US dollar to facilitate the interpretation of results across markets, and because the various strategy profits reflect the results that would be available to a US dollar-based investor. This approach is consistent with related studies such as Balvers and Wu (2006). The time frame for the study extends from January 1970 to March 2009 with 471 observations for each country.

Table 1 presents summary statistics for the sample showing the monthly mean return, standard deviation, skewness and kurtosis for each index. The monthly mean returns vary from the highest 1.68% (Hong Kong) to the lowest 0.72% (Italy). Most countries exhibit negative skewness, and there is

a wide range of kurtosis values. This paper compares and contrasts enhanced contrarian strategies with the corresponding pure contrarian strategies. The formation methodology for these competing strategies is presented in the next sections.

Table 1. Summary Statistics of Stock Index Returns

Country	% Mean	% S.D.	Skewness	Kurtosis
Australia	0.90	7.01	-0.68	4.79
Austria	0.88	6.40	-0.26	5.24
Belgium	1.03	5.94	-0.62	5.76
Canada	0.91	5.67	-0.64	2.42
Denmark	1.14	5.58	-0.20	2.07
France	1.00	6.51	-0.13	1.57
Germany	0.95	6.27	-0.35	1.57
Hong Kong	1.68	10.47	0.92	11.09
Italy	0.72	7.27	0.18	1.00
Japan	0.96	6.35	0.24	0.62
Netherlands	1.09	5.47	-0.58	2.70
Norway	1.16	7.89	-0.43	1.72
Singapore	1.18	8.42	0.38	5.79
Spain	0.96	6.51	-0.20	1.91
Sweden	1.23	6.95	-0.25	0.95
Switzerland	1.02	5.32	-0.09	1.36
UK	0.97	6.49	1.26	11.86
USA	0.81	4.47	-0.41	1.96

This table provides descriptive statistics for the returns data of the 18 developed indices in the sample obtained from Datastream. Mean refers to the average monthly returns. S.D refers to the standard deviation of returns. Skewness and Kurtosis represent measures of distribution shape.

2.1 Pure Contrarian Strategy

At the beginning of each month the 18 indices are ranked based on their past J-month returns (J = 36, 48 or 60 months). Each month t, the strategy buys the long-term loser (LL) portfolio consisting of the 25% of indices that have the lowest past J-month returns, and sells the long-term winner (LW) portfolio comprised of the 25% of indices that have the highest past J-month returns. Thus each month the LL and LW portfolios each contain four MSCI indices. The pure contrarian arbitrage portfolio (LL-LW) is long the long-term losers and shorts the long-term winners. Portfolios are held for a K-month holding period, where K =1, 3, 6, 9 or 12 months. Consistent with return predictability studies, a gap of one month is employed between the end of the J-month formation period and the beginning of the K-month holding period.

2.2 Early Stage/Late Stage Contrarian Strategy

With a pure contrarian strategy, the investor is long a portfolio of long-term losers and shorts a portfolio of long-term winners. Although the profitability of such a strategy relies on these portfolios

reversing their recent performance in the future, the components of these portfolios may not be equally ready to reverse. The approach of Fama and French (1996) to this problem is to increase the gap between the end of the formation period and the beginning of the holding period from the usual one month to twelve months. Their approach does reduce continuation effects that would otherwise lead to lower contrarian profits. However, a problem with extending the gap to twelve months is that those components that were ready to reverse at the end of the formation period may no longer be reversing as strongly at the end of the twelve months wait. Rather than extend the gap to twelve months, our alternative approach retains the gap at one month and seeks out those long-term losers and winners that are most likely to reverse in the near future.

We can enhance the pure contrarian strategy if we can select a subset of the long-term losers (winners) that are more likely to reverse and do well (poorly) in the immediate future. This selection is done on the basis of the recent short-term performance of the long-term losers and winners. Intuitively, those long-term losers (winners) that have recently performed relatively better (worse) than other long-term losers (winners) seem the obvious candidates to select for an enhanced contrarian strategy. Call these late stage contrarian indices. Such indices appear to either have begun to reverse their long-term performance or seem more likely to begin reversing their long-term performance in the near future than are the indices not selected. Here, 'late stage' is being used in the sense that these indices may be near the end of an initial overreaction.

In contrast, early stage contrarian loser (winner) indices are those long-term losers (winners) that are not late stage contrarian loser (winner) indices. They are long-term losers with relatively poor recent short-term performances or long-term winners with relatively good recent short-term performances. Early stage contrarian indices are expected to be less likely to reverse their long-term recent performances in the near future than are late stage indices. They are considered 'early' in any initial overreaction because their recent short-term performance indicates that their long-term performances are not as ready to reverse. It is expected that strategies based on late stage contrarian indices will outperform the corresponding pure contrarian and early stage contrarian strategies because many indices that are not yet ready to reverse have been eliminated from the late stage contrarian strategies.

The late stage/early stage strategies and portfolios are constructed as double dependent sorts as follows. The first sort is described for the pure contrarian strategy. That is, at the beginning of each month the 18 indices are ranked based on their past $J1$ -month returns ($J1 = 36, 48$ or 60 months). At the beginning of each month the long-term loser (LL) portfolio consists of the four indices that have the lowest past $J1$ -month returns, and the long-term winner (LW) portfolio is comprised of the four indices that have the highest past $J1$ -month returns. These two portfolios are then each split in halves based on their component indices most-recent $J2$ -month returns, for $J2 = 3, 6, 9$, or 12 months. These $J2$ -month returns are calculated from the last $J2$ months of the $J1$ -month formation period. Thus the

long-term loser portfolio LL is split into two portfolios each containing two indices each month. Let LLSW denote the portfolio composed of the two long-term loser indices LL with the largest $J2$ -month returns (short-term winner SW), and let LLSL denote the portfolio with the remaining two indices from the long-term loser LL with relatively small past $J2$ -month returns (short-term loser SL). Similarly, let LWSL denote the portfolio with the two indices in long-term winner portfolio LW with the lowest past short-term $J2$ -month returns SL and let LWSW denote the portfolio with the remaining two indices of long-term winners LW with the largest short-term returns SW.

The late stage contrarian strategy buys the long-term losers with relatively good recent short-term returns (LLSW) and sells the long-term winners with relatively poor recent short-term returns (LWSL), and is denoted LLSW-LWSL. This is the enhanced contrarian strategy. By avoiding indices that are less likely to be ready to reverse, this strategy should be more profitable than the corresponding pure contrarian strategy. On the other hand, the early stage momentum strategy buys the long-term losers with relatively poor short-term returns (LLSL) and sells the long-term winners with relatively good short-term returns (LWSW), and is denoted LLSL-LWSW. The recent short-term performance of the components of these portfolios suggests that these indices are less ready to reverse in the near future than the components of the late stage portfolios.

As with the pure contrarian single sort strategy, portfolios are held for a K -month holding period, where $K = 1, 3, 6, 9$ or 12 months. There is a one month gap between the end of the formation period and the beginning of the holding period for both the late stage and early stage strategies. We adopt Jegadeesh and Titman's (1993) overlapping portfolio approach for all strategies. The reported average monthly return for the K -month holding period is an equal-weighted average of portfolio returns from the current month and the previous $K-1$ months². This approach has the advantage of reducing transaction costs, and it avoids overlapping returns. To facilitate comparisons between the single and double strategies, discussion will focus on strategies with six-month holding periods ($K = 6$) as the base case, with other results shown for robustness purposes.

3. Analysis of Results

In this section we discuss the empirical results of our study. In subsection 3.1 we confirm the contrarian effect for our sample of indices. Subsection 3.2 reports the raw results for the early stage and late stage contrarian strategies, while the risk-adjusted results can be found in subsection 3.3.

3.1 Pure Contrarian Results

The results presented in Table 2 show the returns of the short, long and the zero-cost portfolios for several pure contrarian strategies. The contrarian strategy buys the long-term loser (LL) portfolio and sells the long-term winner (LW) portfolio to form a neutral portfolio $LL - LW$. These portfolios are

² See Jegadeesh and Titman (1993) for a more detailed description of their approach.

based on past J month returns ($J = 36, 48$ or 60). Column 3 shows the average monthly return of long-term winners and losers over the formation period. Columns 4 through 8 report the equal-weighted average monthly returns over then next K months ($K = 1, 3, 6, 9, 12$).

Table 2. Profitability of the Pure Contrarian Strategy

J	Portfolio	Return	Monthly Returns					Annual Event Time Returns				
			K = 1	K = 3	K = 6	K = 9	K = 12	Year 1	Year 2	Year 3	Year 4	Year 5
36	LW	2.22	0.76 (2.75)	0.74 (2.75)	0.79 (3.02)	0.80 (3.07)	0.82 (3.16)	11.45 (4.00)	13.02 (3.86)	12.37 (4.23)	14.33 (4.28)	14.26 (4.42)
	LL	0.03	1.07 (4.13)	1.00 (3.93)	0.99 (3.94)	1.03 (4.11)	1.09 (4.35)	15.73 (4.68)	18.08 (5.02)	18.21 (5.10)	16.66 (4.18)	17.53 (4.36)
	LL - LW		0.31 (1.32)	0.26 (1.17)	0.20 (0.97)	0.23 (1.18)	0.28 (1.47)	4.28 (1.58)	5.06 (2.47)	5.84 (2.62)	2.33 (1.13)	3.27 (1.26)
48	LW	1.98	0.80 (2.94)	0.83 (3.07)	0.84 (3.09)	0.91 (3.41)	0.91 (3.37)	12.61 (3.69)	11.62 (3.66)	10.71 (3.69)	13.22 (4.14)	15.04 (4.59)
	LL	0.15	0.95 (3.61)	0.97 (3.72)	1.04 (4.12)	1.20 (4.84)	1.22 (4.96)	16.85 (5.05)	18.01 (5.21)	17.23 (4.24)	17.16 (4.22)	16.20 (4.19)
	LL - LW		0.15 (0.65)	0.14 (0.65)	0.21 (0.98)	0.28 (1.37)	0.31 (1.54)	4.24 (1.77)	6.38 (2.87)	6.52 (2.50)	3.93 (1.69)	1.16 (0.53)
60	LW	1.85	0.99 (3.62)	0.97 (3.53)	0.94 (3.42)	0.94 (3.38)	0.87 (3.13)	12.81 (3.90)	10.74 (3.42)	12.25 (3.94)	14.09 (4.33)	15.37 (4.52)
	LL	0.25	1.01 (4.18)	1.04 (4.28)	1.08 (4.47)	1.15 (4.77)	1.18 (4.89)	17.20 (4.97)	17.16 (4.71)	17.28 (4.27)	16.77 (3.98)	17.82 (4.24)
	LL - LW		0.02 (0.10)	0.07 (0.31)	0.14 (0.64)	0.22 (1.03)	0.32 (1.55)	4.39 (1.76)	6.42 (2.72)	5.04 (1.95)	2.69 (1.19)	2.45 (0.99)

This table presents the average monthly returns in percentages of the short, long and arbitrage portfolios of the pure contrarian strategy. Portfolios are constructed as follows: each month t , indices are ranked based on the compound return based on past $J=36, 48$ and 60 formation months. The top 25% of indices are those with the highest past return and grouped in the long-term winner LW portfolio and the bottom 25% are indices with the lowest past returns and grouped in the long-term loser LL portfolio. These portfolios are equally weighted. The strategy $LL-LW$ goes long the loser portfolio and short the winner portfolio to be held for $K=1, 3, 6, 9$ and 12 months. *Return* represents the average compound monthly return in percentages over the formation period J . The annual returns (*Year 1, Year 2, Year 3, Year 4* and *Year 5*) are computed as the average compounded returns in percentages for the first five years following the formation date. The t -statistics for the K monthly returns are simple t -statistics, whereas for the annual returns are calculated using Newey-West (1987) autocorrelation correction estimates up to 11 lags. The t -statistics are presented in parenthesis.

The findings presented in Table 2 indicate that the long-term loser portfolio (LL) outperforms the long-term winner portfolio (LW) for all holding periods although the contrarian strategy profits ($LL - LW$) are not significant. The contrarian base case ($J = 60, K = 6$) shows a return of 0.14% per month (t -statistic 0.64). Following Fama and French (1996) we have found in a separate analysis (not shown here) that the contrarian profit for the base case with a 12 month gap is a return of 0.53% (t -stat 2.54) which is significant at the 5% level. This shows that a gap of 12 months is sufficient time to allow for

any downward (upward) continuation effects in the long-term loser (winner) portfolios to be dissipated.

The last five columns in Table 2 present the average annual returns for each portfolio for the five 12-month periods following the formation date, together with the associated t-statistics based on the Newey and West (1997) autocorrelation correction with 11 lags. For the first three years following formation, the LL-LW average annual returns are positive and statistically significant for all formation periods and range from 4.28% to 6.52%. Average annual returns for the next two years post-formation are uniformly positive, although not significant. These positive returns indicate that prices continue to reverse throughout the first five years of the post-formation period. Overall, the results in Table 2 confirm the contrarian hypothesis presented first by DeBondt and Thaler (1985), and are consistent with other studies that have observed contrarian effects between international equity indices.

3.2 Early Stage/Late Stage Results

The aim of this paper is to investigate whether contrarian strategies can be enhanced by consideration of the recent short-term performance of long-term winners and losers. The late stage contrarian strategy is based on those long-term losers (winners) that have recently begun to perform relatively better (worse). Late stage contrarian strategies are expected to outperform pure contrarian and early stage contrarian strategies because many indices not yet ready to reverse have been eliminated from late stage contrarian strategies.

The results for the late stage contrarian strategies are presented in Table 3. Columns 4 through 8 show the monthly returns of the short, long and the zero investment portfolios. Columns 9 through 13 present the compound yearly returns for the portfolios for next five years following the formation date. To conserve space, only the combinations based on past $J1 = 60$ month long-term performance and $J2 = 3, 6, 9, 12$ month short-term performance are presented, with the base case ($J1/J2 = 60/6$ and $K = 6$) being highlighted.

Table 3. Strategy Profitability of the Late Stage Contrarian Strategy

J1	J2	Portfolio	Monthly Returns					Annual Event Time Returns				
			K = 1	K = 3	K = 6	K = 9	K = 12	Year 1	Year 2	Year 3	Year 4	Year 5
60	3	LWSL	0.91 (3.12)	1.00 (3.53)	0.86 (3.06)	0.80 (2.80)	0.78 (2.76)	11.63 (3.23)	10.97 (3.49)	11.54 (3.83)	14.36 (4.44)	15.03 (4.35)
		LLSW	1.09 (4.04)	1.15 (4.26)	1.24 (4.79)	1.30 (5.01)	1.28 (4.92)	18.33 (5.10)	16.99 (4.37)	17.30 (4.12)	16.67 (3.74)	18.41 (4.35)
		LLSW-LWSL	0.18 (0.66)	0.15 (0.57)	0.39 (1.64)	0.50 (2.21)	0.50 (2.24)	6.70 (2.66)	6.02 (2.42)	5.76 (1.80)	2.32 (0.75)	3.39 (1.15)
6	6	LWSL	0.85 (2.91)	0.83 (2.89)	0.68 (2.36)	0.70 (2.43)	0.73 (2.55)	11.12 (3.03)	10.89 (3.62)	11.12 (3.39)	15.64 (4.17)	14.73 (4.60)
		LLSW	1.21 (4.40)	1.29 (4.72)	1.37 (5.16)	1.40 (5.23)	1.36 (5.16)	19.75 (5.12)	17.04 (4.33)	17.39 (4.18)	16.27 (3.71)	18.08 (4.24)
		LLSW-LWSL	0.36	0.46	0.69	0.70	0.64	8.63	6.14	6.27	0.64	3.35

		(1.30)	(1.79)	(2.86)	(3.02)	(2.86)	(3.34)	(2.32)	(2.00)	(0.23)	(1.24)
9	LWSL	0.67	0.67	0.65	0.72	0.71	10.91	10.24	12.16	16.25	14.55
		(2.29)	(2.33)	(2.28)	(2.54)	(2.51)	(3.08)	(3.41)	(3.55)	(4.43)	(4.56)
	LLSW	1.37	1.43	1.43	1.42	1.39	19.77	17.80	17.98	16.45	17.95
		(4.99)	(5.14)	(5.18)	(5.16)	(5.11)	(5.30)	(4.43)	(4.29)	(3.95)	(4.06)
	LLSW-LWSL	0.70	0.76	0.78	0.70	0.68	8.86	7.56	5.82	0.20	3.40
		(2.50)	(2.94)	(3.17)	(3.00)	(3.01)	(3.79)	(2.45)	(1.97)	(0.07)	(1.19)
12	LWSL	0.83	0.82	0.80	0.81	0.77	11.58	10.33	11.75	16.73	14.42
		(2.86)	(2.88)	(2.81)	(2.85)	(2.72)	(3.38)	(3.39)	(3.39)	(4.39)	(4.49)
	LLSW	1.36	1.39	1.34	1.34	1.32	18.62	17.90	18.37	16.74	16.88
		(4.95)	(5.13)	(4.94)	(4.94)	(4.92)	(5.19)	(4.39)	(4.37)	(4.02)	(3.91)
	LLSW-LWSL	0.53	0.57	0.54	0.53	0.55	7.04	7.56	6.61	0.01	2.46
		(1.92)	(2.33)	(2.34)	(2.39)	(2.55)	(3.05)	(2.44)	(2.18)	(0.00)	(0.85)

This table presents the average monthly returns in percentages of the short, long and arbitrage portfolios of the *late* stage contrarian strategy. Portfolios are based on the 60 month formation period contrarian strategy $J1 = 60$. The formation of these portfolios is explained in Table 2. Within the long-term winner *LW* portfolio and the long-term loser *LL* portfolio, indices are further classified into two portfolios each where the top 50% of indices have best short-term performance *SW* and the bottom 50% of indices have the worst short-term performance *SL* over the past formation months $J2 = 3, 6, 9, 12$. The resulting four portfolios are: long-term losers that have worst short-term performance *LLSL* and best short-term performance *LLSW*, and long-term winners that have worst short-term performance *LWSL* and best short-term performance *LWSW*. The *late* stage contrarian strategy *LLSW-LWSL* is held for $K=1, 3, 6, 9$ and 12 months. The annual returns (*Year 1, Year 2, Year 3, Year 4* and *Year 5*) are computed as the average compounded returns in percentages for the first five years following the formation date. The *t*-statistics for the K monthly returns are simple *t*-statistics, whereas for the annual returns are calculated using Newey-West (1987) autocorrelation correction estimates up to 11 lags. The *t*-statistics are presented in parenthesis.

The average monthly returns of the late stage strategy (*LLSW-LWSL*) are positive for all formation and holding periods, with 17 out of 20 strategy combinations yielding statistically significant returns. The base case strategy ($J1/J2 = 60/6$ and $K = 6$) has an average monthly return of 0.69% per month, which is significant at the 1% level. This result is significantly larger³ than the corresponding pure contrarian strategy *LL-LW* return of 0.14% (*t*-statistic 0.64) reported in Table 2 (the $J = 60, K = 6$ case). More generally, the weakest late stage results are when three-month short-term performances ($J2 = 3$) are used in selecting late stage contrarian portfolios, while the best results arise for $J2 = 9$. The highest return for the arbitrage portfolio of 0.78% per month is given by the strategy with the formation period of $J1/J2 = 60/9$ and holding period $K = 6$ months, significant at 1% level (*t*-statistic 3.17).

The average annual returns for the first five years following formation are shown in the last five columns of Table 3. Since profitable contrarian strategies are based on prices reversing, positive

³ The paired two sample means *t*-statistic is -4.19

arbitrage portfolio returns for the yearly returns indicate that reversal continues for five years following the formation date. For all four strategies the post-formation returns are positive in the first five years, and significant in the first three years⁴.

For comparison purposes the early stage contrarian strategy results are presented in Table 4. The findings show that the arbitrage portfolios returns are negative for 18 out of 20 strategy combinations as the short LWSW portfolio outperforms the long LLSL portfolio in all cases except for the strategies with a formation period of $J1/J2 = 60/3$ and $J1/J2 = 60/10$ and a holding period of $K = 12$ months. The base case strategy with a formation period of $J1/J2 = 60/6$ and holding period of $K = 6$ months returns a loss of 0.42% per month (t -statistic -1.61).

This outcome is significantly inferior to the corresponding pure contrarian profit presented in Table 2 and also to the late stage contrarian profit shown in Table 3⁵. Thus, as expected, the early stage strategy underperforms both the late stage and pure contrarian strategies.

The post-formation average annual returns are presented in the last five columns of Table 4. The Year 1 returns are weakly positive in three cases and negative in one case. All Years 2 to 5 returns are positive, although only the Year 2 returns for $J2 = 3$ and $J2 = 6$ are significant at the 5% level. This pattern conforms to our expectation that the early stage portfolios will be mostly composed of indices not ready to reverse at the time of formation. The evidence of eventual reversal in Year 2 supports this view.

Table 4. Strategy Profitability of the Early Stage Contrarian Strategy

J1	J2	Portfolio	Monthly Returns					Annual Event Time Returns				
			K = 1	K = 3	K = 6	K = 9	K = 12	Year 1	Year 2	Year 3	Year 4	Year 5
60	3	LWSW	1.07 (3.61)	0.93 (3.25)	1.03 (3.59)	1.08 (3.84)	0.95 (3.40)	13.99 (4.51)	10.51 (3.25)	12.95 (3.79)	13.81 (3.99)	15.71 (4.54)
		LLSL	0.93 (3.31)	0.92 (3.55)	0.91 (3.66)	1.00 (4.12)	1.09 (4.53)	16.07 (4.58)	17.34 (4.80)	17.26 (4.28)	16.87 (4.08)	17.23 (3.95)
		LLSL-LWSW	-0.14 (-0.48)	-0.01 (-0.04)	-0.11 (-0.47)	-0.07 (-0.32)	0.14 (0.64)	2.08 (0.72)	6.83 (2.45)	4.31 (1.84)	3.06 (1.61)	1.52 (0.64)
6	6	LWSW	1.13 (3.78)	1.10 (3.76)	1.21 (4.17)	1.17 (4.12)	1.01 (3.54)	14.50 (4.54)	10.59 (3.07)	13.37 (4.13)	12.53 (4.04)	16.01 (4.23)
		LLSL	0.81 (2.92)	0.78 (2.92)	0.79 (3.07)	0.90 (3.68)	1.00 (4.11)	14.66 (4.34)	17.29 (4.75)	17.18 (4.17)	17.27 (4.02)	17.56 (4.03)
		LLSL-LWSW	-0.32 (-1.09)	-0.32 (-1.16)	-0.42 (-1.61)	-0.27 (-1.10)	-0.01 (-0.01)	0.16 (0.05)	6.70 (2.23)	3.81 (1.51)	4.74 (1.66)	1.55 (0.53)
9	9	LWSW	1.31 (4.39)	1.26 (4.32)	1.23 (4.22)	1.15 (3.96)	1.02 (3.53)	14.70 (4.40)	11.24 (3.14)	12.33 (3.92)	11.92 (3.61)	16.19 (4.25)
		LLSL	0.65	0.64	0.73	0.88	0.98	14.63	16.53	16.58	17.09	17.70

⁴ In a separate analysis not reported, the post-formation period analysis has been extended up to 10 years to reveal that reversal continues up to the 9th year after formation.

⁵ The paired two sample means t -statistics are -4.2 and 4.19, respectively.

		(2.30)	(2.41)	(2.86)	(3.56)	(3.96)	(3.98)	(4.47)	(4.00)	(3.79)	(4.07)
	LLSL-LWSW	-0.66	-0.62	-0.51	-0.26	-0.04	-0.07	5.28	4.25	5.18	1.50
		(-2.21)	(-2.20)	(-1.89)	(-1.02)	(-0.17)	(-0.02)	(1.74)	(1.53)	(1.82)	(0.51)
12	LWSW	1.15	1.12	1.09	1.06	0.96	14.03	11.15	12.74	11.44	16.32
		(3.80)	(3.76)	(3.67)	(3.62)	(3.30)	(4.07)	(3.14)	(4.16)	(3.55)	(4.24)
	LLSL	0.66	0.68	0.82	0.97	1.05	15.78	16.43	16.19	16.81	18.77
		(2.35)	(2.51)	(3.12)	(3.77)	(4.12)	(4.03)	(4.53)	(3.87)	(3.74)	(4.25)
	LLSL-LWSW	-0.49	-0.44	-0.27	-0.10	0.09	1.75	5.28	3.46	5.36	2.45
		(-1.59)	(-1.52)	(-0.96)	(-0.37)	(0.33)	(0.45)	(1.77)	(1.22)	(1.75)	(0.81)

This table presents the average monthly returns in percentages of the short, long and arbitrage portfolios of the *early* stage contrarian strategy. Portfolios are based on the 60 month formation period contrarian strategy $J1 = 60$. The formation of these portfolios is explained in Table 2. Within the long-term winner *LW* portfolio and the long-term loser *LL* portfolio, indices are further classified into two portfolios each where the top 50% of indices have best short-term performance *SW* and the bottom 50% of indices have the worst short-term performance *SL* over the past formation months $J2 = 3, 6, 9, 12$. The resulting four portfolios are: long-term losers that have worst short-term performance *LLSL* and best short-term performance *LLSW*, and long-term winners that have worst short-term performance *LWSL* and best short-term performance *LWSW*. The *early* stage contrarian strategy *LLSL-LWSW* is held for $K=1, 3, 6, 9$ and 12 months. The annual returns (*Year 1, Year 2, Year 3, Year 4* and *Year 5*) are computed as the average compounded returns in percentages for the first five years following the formation date. The *t*-statistics for the K monthly returns are simple *t*-statistics, whereas for the annual returns are calculated using Newey-West (1987) autocorrelation correction estimates up to 11 lags. The *t*-statistics are presented in parenthesis.

To better illustrate the post-formation behavior of the strategies' profits, Figure 1 charts the post-formation cumulative average monthly returns of the pure contrarian, early stage and late stage strategies when $J = 60, J1/J2 = 60/6$ and $K = 1$ month (the non-overlapping case).

The graph shows an upward trend of the late stage strategy that reaches 19.04% by the end of month 38 then follows a flat trend for the next 10 months, reaching 20.38% by the end of 60 month period. The pure contrarian strategy, as expected, is less than the early stage strategy but higher than the early stage strategy since it contains those indices that are both ready or not to reverse, reaching 17.33% by the end of the 60 month period.

The early stage strategy, negative for the first 11 months, recovers to reach 14.3% by the end of 60 month period. As Tables 3 and 4 indicate, the late stage strategy reverses for the first 60 months, while the early stage strategy does not reverse immediately. The early stage strategy loses money (as shown in Table 4) and the graph shows why. The early stage strategy is composed of indices not yet ready to reverse. Note that the graph begins rising by month nine. This means that this particular early stage strategy would have been profitable had the gap between the end of the formation period

and the beginning of the holding period been nine months rather than one month. The issue of sensitivity of results to the gap size is addressed later in this paper in the robustness section.

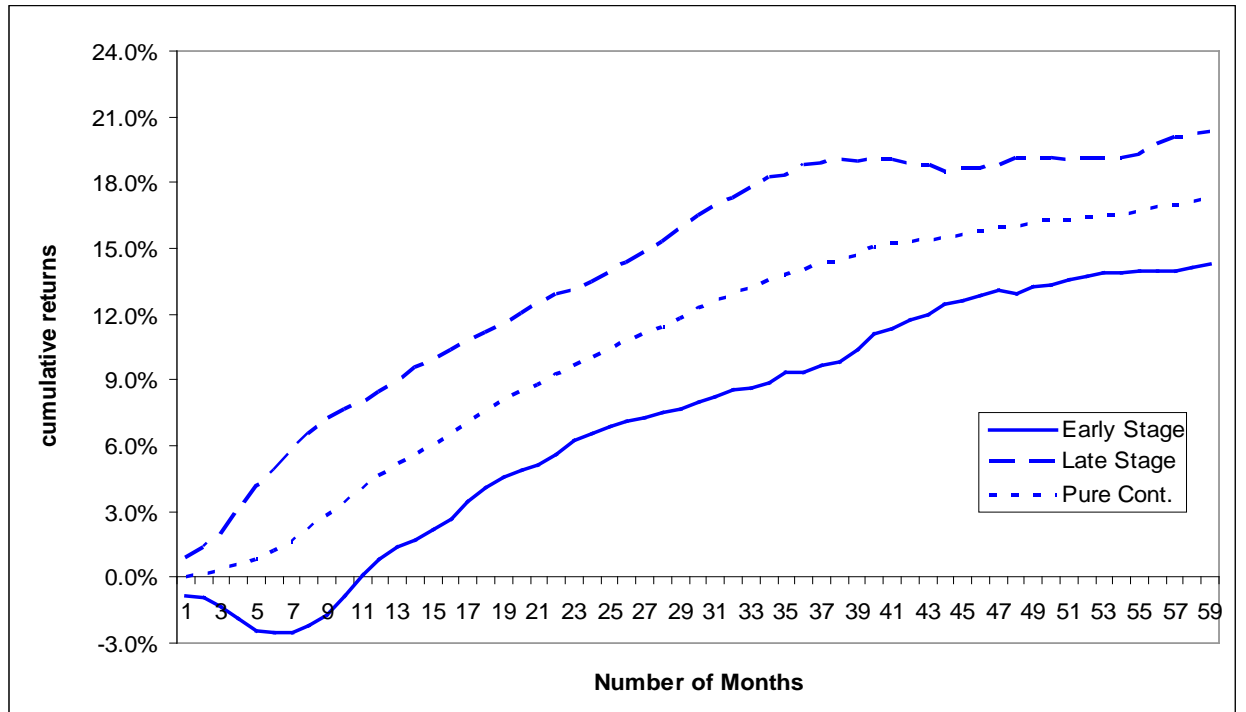


Figure 1 Cumulative Returns of Early/Late Stage and Contrarian Strategies.

The graph presents the cumulative raw profits of the Early Stage, Late Stage and Contrarian strategies for the formation period $J1/J2 = 60/6$ and $J = 60$ months and the non-overlapping holding period $K = 1$ month, for a period of 60 months following the beginning of holding period.

3.3 Risk Adjustments

To determine whether the profits of these strategies should be considered a reward for bearing risk, the profits of the early and late stage contrarian strategy have been risk-adjusted using the two-factor and three-factor time-series regression models employed by Balvers and Wu (2006). The two-factor model contains a market factor and a value minus growth factor (VMG) as follows:

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_{p,wld}(R_{wld,t} - R_{f,t}) + \beta_{p,vmg}VMG_t + \varepsilon_t \quad (1)$$

(A size factor is not included because MSCI country indices involve only large liquid stocks.) The second model used for risk adjustment is the international version of the Fama and French three-factor model:

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_{p,wld}(R_{wld,t} - R_{f,t}) + \beta_{p,smb}SMB_t + \beta_{p,hml}HML_t + \varepsilon_t \quad (2)$$

The dependent variable $R_{p,t} - R_{f,t}$ is the monthly excess return of an equally-weighted portfolio of interest, whether it's the long, short or arbitrage portfolio of a strategy, where $R_{p,t}$ represents the monthly US dollar return of portfolio p at time t and $R_{f,t}$ is the monthly risk-free rate at time t represented by the 1-month US T-bill return. The independent variables or factors for the two models are as follows: $R_{wld,t} - R_{f,t}$ corresponds to the excess return on the MSCI World market portfolio R_{wld} at time t ; SMB_t and HML_t are the monthly Fama-French size and book-to-market factors⁶ at time t ; VMG_t or Value minus Growth is the return on the MSCI World Value Index minus the return on the MSCI World Growth Index at time t .

The monthly values for the MSCI world market index as well as the world value and growth indices have been downloaded from the MSCI website⁷. The monthly return values for the Fama and French factors and the Ibbotson and Associates Inc. 1-month T-bill risk-free rate covering the full sample period from January 1970 to March 2009 have been downloaded from Kenneth French's website⁸. The three-factor model risk-adjustment covers the period from 1970 to March 2009 while the two-factor model covers the period from 1975 to March 2009 since the value and growth indices' price history starts in 1975. The coefficients $\beta_{p,wld}$, $\beta_{p,smb}$, $\beta_{p,hml}$, and $\beta_{p,vmg}$ are the regression loadings corresponding to the factors of the models while the intercept α_p (or simply alpha) represents the risk-adjusted abnormal returns of the portfolios over the estimation period. If alpha is statistically significantly different from zero, then this is evidence of abnormal profits. The t-values corresponding to the regression coefficients are corrected for heteroskedasticity using the White (1980) test.

Table 5 reports the regression coefficients of the two models and the corresponding White-corrected t-values for the long, short and zero-cost portfolios for the base case ($J = 6$, $J1/J2 = 60/6$ and $K = 6$) for the pure contrarian and the early and late stage profits. Column 2 of Table 5 contains the unadjusted annualized raw returns of the portfolios, while the annualized alphas of the two-factor and three-factor models are reported in columns 3 and 7, respectively.

The regression results for the pure contrarian profits presented in Panel A shows insignificant alphas for the two models. Considering the fact that the contrarian raw returns are not significant, it is expected that the risk-adjusted returns would also be insignificant. Interestingly, for both models, the risk-adjusted returns of the arbitrage LL-LW portfolio (1.8% and 2.6% per year) are slightly bigger than the unadjusted return of 1.7% per year.

Panel B reports the regression results for the late stage contrarian profits. Depending on the model employed, the regression alphas show either an 8.5% or a 9.3% annualized risk-adjusted return for

⁶ Downloaded from Kenneth French's website

⁷ <http://www.msibarracom/products/indices/stindex>

⁸ http://www.mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library

the arbitrage portfolio, LLSW – LWSL. Both alphas are significant at the 1% level (t-values 2.86 and 2.96), and both are marginally larger than the 8.3% unadjusted return. These results clearly indicate that the late stage contrarian profits are not simply a reward for bearing risk. Note also that it is the long portfolio LLSW with its significant alphas of 5.9% and 5.8% that provides much of the strategy's profitability. Also of interest is the significantly negative beta for the market factor in both models.

Table 5. Risk-adjusted Pure Contrarian and Early/Late Stage Contrarian Profits

Panel A: Pure Contrarian										
		Two-factor Model				Three-factor Model				
Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LW	0.113	0.009 (0.447)	1.092 (20.135)	0.001 (0.013)	67.9%	-0.003 (-0.144)	1.100 (19.746)	0.002 (3.074)	0.001 (1.973)	69.0%
LL	0.130	0.027 (1.403)	0.891 (16.922)	0.294 (3.308)	57.6%	0.024 (1.178)	0.873 (17.078)	0.002 (2.855)	0.001 (2.277)	57.6%
LL-LW	0.017	0.018 (0.694)	-0.201 (-2.738)	0.293 (2.206)	6.2%	0.026 (0.976)	-0.227 (-3.003)	0.000 (-0.055)	0.000 (0.096)	4.2%
Panel B: Late Stage										
		Two-factor Model				Three-factor Model				
Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LWSL	0.082	-0.026 (-1.226)	1.126 (18.914)	0.054 (0.599)	65.8%	-0.035 (-1.601)	1.135 (18.463)	0.001 (2.392)	0.001 (1.920)	66.3%
LLSW	0.164	0.059 (2.622)	0.934 (14.557)	0.332 (2.789)	51.9%	0.058 (2.447)	0.912 (14.828)	0.002 (2.240)	0.001 (1.795)	51.4%
LLSW-LWSL	0.083	0.085 (2.863)	-0.192 (-2.123)	0.278 (1.763)	4.2%	0.093 (2.958)	-0.222 (-2.425)	0.000 (0.335)	0.000 (-0.046)	2.8%
Panel C: Early Stage										
		Two-factor Model				Three-factor Model				
Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LWSW	0.134	0.043 (1.844)	1.059 (17.827)	-0.052 (-0.453)	58.6%	0.029 (1.221)	1.065 (17.689)	0.002 (3.199)	0.001 (1.640)	60.1%
LLSL	0.095	-0.006 (-0.287)	0.848 (15.131)	0.256 (2.995)	46.2%	-0.011 (-0.483)	0.834 (14.894)	0.002 (2.937)	0.001 (2.143)	46.7%
LLSL-LWSW	-0.050	-0.049 (-1.570)	-0.210 (-2.765)	0.308 (2.152)	4.4%	-0.040 (-1.231)	-0.231 (-2.977)	0.000 (-0.404)	0.000 (0.221)	3.0%

This table presents the two-factor and three-factor regression results for monthly returns on the contrarian portfolio of the $J = 60$ months formation and $K = 6$ months holding strategy, and the early and late stage portfolios for the $J1/J2 = 60/6$ months formation and $K = 6$ months holding base case strategies. For the pure contrarian strategy LW is the portfolio of long-term winners and LL is the portfolio of long-term losers. For the late stage strategy $LWSL$ is the portfolio of long-term winners that have worst short-term performance and $LLSW$ is the portfolio of long-term losers with the best short-term performance. For the early stage strategy $LLSL$ is the portfolio of long-term losers that have worst short-term performance and $LWSW$ is the portfolio of long-term winners with the best short-term performance. The two-factor regression is as follows:

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_{wld}(R_{wld,t} - R_{f,t}) + \beta_{vmg}VMG_t + \varepsilon_t$$

where $R_{wld,t} - R_{f,t}$ is the excess return on the MSCI World market portfolio, and VMG_t is the value-growth factor represented by the return on the MSCI World Value Index minus the return on the MSCI World Growth Index. The three-factor regression is as follows:

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_{wld}(R_{wld,t} - R_{f,t}) + \beta_{smb}SMB_t + \beta_{hml}HML_t + \varepsilon_t$$

where $R_{wld,t} - R_{f,t}$ is the excess return on the MSCI World market portfolio, SMB_t is the size factor and HML_t is the book-to-market factor. *Return* is the annualized unadjusted return for the respective portfolio. The *t*-statistics presented in parenthesis are corrected for heteroskedasticity using the White (1980) test.

Panel C of Table 5 presents the early stage contrarian strategy risk-adjusted profits. Since the unadjusted early stage strategy returns are negative and insignificant, it is not surprising that the two regression models have insignificant risk-adjusted alphas, similar to the unadjusted returns displayed in column 2. In summary, the results in Table 5 clearly indicate that the late stage contrarian strategy outperforms the pure contrarian and the early stage strategy in both raw and risk-adjusted terms.

4. Robustness Tests

4.1 Gap Sensitivity

The strategies' results have so far been based on a one month gap between the end of the formation period and the beginning of the holding period. Our expectation that the late stage strategies will be more profitable than the pure contrarian and the early stage strategies has been shown to be correct. The late stage indices are more ready to reverse in the immediate future than are the early stage indices. In this section we investigate to what extent the profits of these competing strategies depend on the gap between the end of the formation period and the beginning of the holding period. Figure 2 displays the average monthly returns for the late stage contrarian (with $J1/J2 = 60/6$ and $K = 6$), early stage contrarian (with $J1/J2 = 60/6$ and $K = 6$) and pure contrarian ($J = 60$, $K = 6$) strategies for gaps ranging from one month to 12 months. The thickened section of each graph denotes significance at the 5% level.

The graphs have a number of interesting features. Firstly, the pure contrarian strategy results are midway between the late stage and early stage results with the same gap because the late stage and early stage portfolios are each different halves of the corresponding pure contrarian portfolios. Secondly, the late stage strategy produces significant profits for all gaps from one month to 12 months. Thirdly, the late stage strategy is the most profitable strategy with a maximum return of 0.87% per month (*t*-statistic 3.66) based on a five month gap. In comparison, the best early stage result is an average return of 0.68% (*t*-statistic 2.71) based on an 11 month gap, while the best pure contrarian result is an average return of 0.59% (*t*-statistic 2.82) based on a nine month gap. Fourthly,

the early stage strategies do eventually become profitable if the gap is sufficiently large. For gaps greater than eight months, the early stage strategies are more profitable than the late stage and pure contrarian strategies with the same gap.

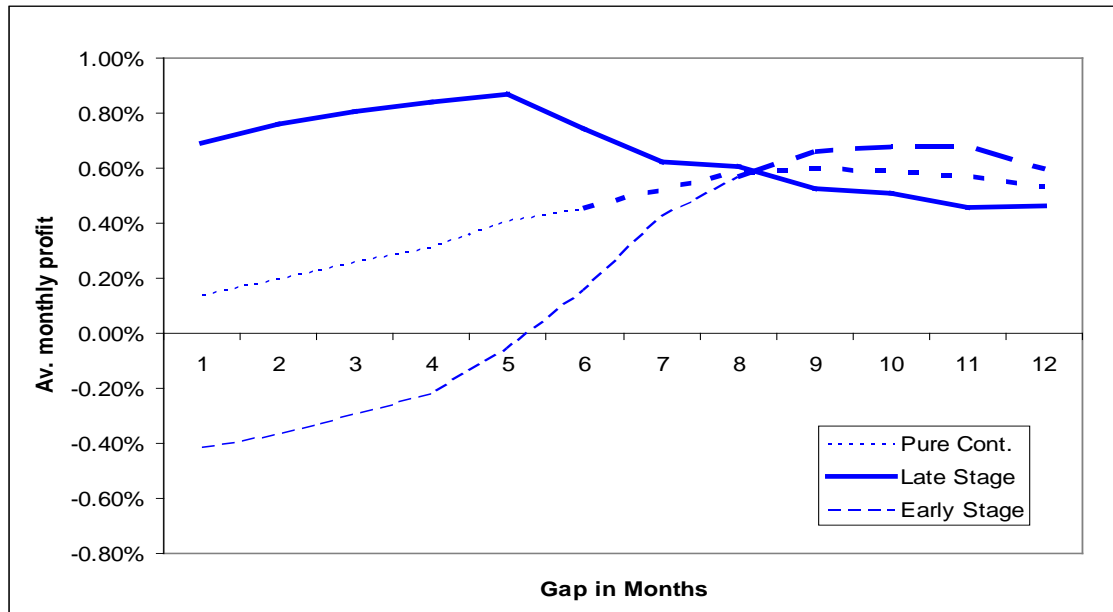


Figure 2 Strategy Profitability by Gap: January 1970 to March 2009.

The graph displays the average monthly profits of the pure contrarian (with $J = 60$, $K = 6$), late stage contrarian (with $J1/J2 = 60/6$, $K = 6$), and early stage contrarian (with $J1/J2 = 60/6$, $K = 6$) strategies for various values of Gap. Gap is the number of months between the end of the formation period and the beginning of the holding period. Thickened sections of the graphs denote significance at the 5% level.

That is, while the early stage indices are not ready to reverse near the end of the formation period, they do eventually reverse given sufficient time. On the other hand, late stage indices reverse more strongly near the end of the formation period, meaning that late stage strategies are more profitable if based on small gaps. Further tests using gaps up to 20 months and for $K = 1, 3, 9$, and 12 produced qualitatively similar results. Overall, late stage strategies are more profitable than both early stage contrarian and pure contrarian strategies.

4.2 Subperiod Analysis

As a further check, we examine the performance of the contrarian, late stage and early stage strategies in two subperiods. The first subperiod covers January 1970 to December 1989 (240 months) and the second subperiod extends from January 1990 to March 2009 (231 months). Table 6 presents the profitability of the three strategies in the two subperiods. To conserve space, only the base case of each strategy is presented ($J = 60$ months for the pure contrarian and $J1/J2 = 60/6$ months for the early/late stage strategies). Panel A of Table 6 confirms the profitability of the late stage contrarian strategy in the first subperiod, by showing significant returns in all holding periods. The pure

contrarian strategy displays positive but insignificant returns, while the early stage strategy shows both negative and positive insignificant monthly results.

The post-formation annual returns in the last five columns of Panel A indicate that the reversal continues for at least 3 years in the first subperiod for the pure contrarian and the late stage strategy, while the early stage strategy annual return is significant in the second year following formation.

Table 6. Profitability of the Contrarian, Late Stage and Early Stage Strategies in Subperiods

J1	J2	Portfolio	Monthly Returns					Annual Event Time Returns				
			K = 1	K = 3	K = 6	K = 9	K = 12	Year 1	Year 2	Year 3	Year 4	Year 5
Panel A: Subperiod Jan 1970 – Dec 1989												
Pure Contrarian												
60		LW	1.29 (3.38)	1.27 (3.36)	1.27 (3.32)	1.29 (3.40)	1.19 (3.13)	14.60 (2.81)	12.71 (2.51)	18.23 (3.89)	22.55 (4.47)	27.33 (4.96)
		LL	1.75 (5.26)	1.75 (5.11)	1.79 (5.12)	1.93 (5.34)	1.95 (5.24)	26.48 (4.40)	26.08 (3.81)	27.43 (3.40)	26.68 (2.90)	26.21 (2.83)
		LL - LW	0.47 (1.27)	0.48 (1.33)	0.52 (1.47)	0.64 (1.85)	0.76 (2.25)	11.89 (2.83)	13.38 (2.92)	9.20 (1.54)	4.12 (0.78)	-1.12 (-0.19)
Late Stage												
60	6	LWSL	1.06 (2.52)	1.26 (3.07)	1.06 (2.61)	1.09 (2.71)	1.09 (2.75)	13.87 (2.10)	13.20 (2.91)	17.36 (3.54)	24.65 (3.88)	24.96 (5.08)
		LLSW	2.10 (5.02)	2.21 (5.37)	2.21 (5.46)	2.29 (5.35)	2.18 (5.04)	29.96 (4.32)	23.75 (3.17)	28.17 (3.46)	25.43 (2.68)	26.47 (2.90)
		LLSW-LWSL	1.04 (2.27)	0.95 (2.19)	1.15 (2.76)	1.20 (2.99)	1.09 (2.82)	16.09 (3.52)	10.55 (1.98)	10.81 (1.48)	0.78 (0.14)	1.52 (0.24)
Early Stage												
60	6	LWSW	1.51 (3.57)	1.29 (3.13)	1.48 (3.67)	1.49 (3.80)	1.28 (3.28)	15.32 (3.55)	12.21 (2.12)	19.10 (3.85)	20.46 (4.84)	29.71 (4.48)
		LLSL	1.41 (3.69)	1.30 (3.37)	1.37 (3.68)	1.56 (4.34)	1.71 (4.72)	23.01 (4.12)	28.41 (4.28)	26.69 (3.19)	27.92 (3.02)	25.95 (2.69)
		LLSL-LWSW	-0.11 (-0.23)	0.01 (0.02)	-0.10 (-0.24)	0.07 (0.18)	0.43 (1.14)	7.69 (1.54)	16.20 (3.31)	7.59 (1.46)	7.46 (1.12)	-3.76 (-0.59)
Panel B: Subperiod Jan 1990 – Mar 2009												
Pure Contrarian												
60		LW	0.81 (1.76)	0.72 (1.53)	0.63 (1.31)	0.60 (1.23)	0.53 (1.06)	12.00 (2.06)	9.34 (1.61)	8.43 (1.34)	9.55 (1.39)	7.26 (1.07)
		LL	0.43 (1.06)	0.46 (1.14)	0.47 (1.18)	0.50 (1.27)	0.56 (1.42)	10.41 (2.22)	10.33 (2.03)	9.92 (1.68)	10.35 (1.64)	10.39 (1.40)
		LL - LW	-0.38 (-1.21)	-0.26 (-0.83)	-0.15 (-0.50)	-0.10 (-0.33)	0.03 (0.12)	-1.58 (-0.51)	0.99 (0.49)	1.49 (0.61)	0.80 (0.27)	3.13 (1.89)
Late Stage												
60	6	LWSL	0.90 (1.86)	0.57 (1.19)	0.40 (0.82)	0.44 (0.88)	0.40 (0.80)	10.29 (1.88)	9.89 (1.69)	5.42 (0.81)	12.25 (1.63)	7.09 (1.03)
		LLSW	0.67 (1.61)	0.70 (1.66)	0.69 (1.65)	0.67 (1.61)	0.74 (1.79)	12.59 (2.55)	10.96 (1.87)	11.11 (1.77)	11.06 (1.63)	8.95 (1.22)
		LLSW-LWSL	-0.23 (-0.58)	0.13 (0.38)	0.29 (0.89)	0.23 (0.75)	0.34 (1.12)	2.29 (0.93)	1.07 (0.36)	5.69 (1.85)	-1.19 (-0.22)	1.86 (0.89)
Early Stage												
60	6	LWSW	0.73 (1.51)	0.86 (1.78)	0.86 (1.74)	0.77 (1.55)	0.66 (1.30)	13.70 (2.18)	8.79 (1.45)	11.44 (1.75)	6.84 (1.00)	7.43 (1.10)
		LLSL	0.19 (0.39)	0.22 (0.49)	0.26 (0.60)	0.34 (0.82)	0.39 (0.94)	8.24 (1.62)	9.70 (2.01)	8.74 (1.54)	9.63 (1.54)	11.84 (1.51)
		LLSL-LWSW	-0.54 (-1.32)	-0.64 (-1.64)	-0.60 (-1.56)	-0.43 (-1.17)	-0.27 (-0.75)	-5.46 (-1.15)	0.91 (0.23)	-2.71 (-0.87)	2.78 (1.24)	4.40 (1.70)

This table presents the average monthly returns in percentages of the short, long and arbitrage portfolios of the pure contrarian, late and early stage contrarian strategies for the period January 1970 – December 1989 (Panel A) and January 1990 – March 2009 (Panel B). The way these portfolios are formed is described in Table 2 (for the contrarian strategy), Table 3 (for the late stage strategy) and Table 4 (for the early stage strategy).

Figure 3 presents the cumulative returns of the three strategies in the first subperiod. The graph shows that the trend of the strategies follows closely for the 60 months with the late stage strategy outperforming pure contrarian and early stage strategies.

Panel B of Table 6 presents the strategies' results for the period from 1990 to March 2009.

Profitability for the late stage strategy in this subperiod is much reduced. For example, the late stage strategy with $J1/J2 = 60/6$ and $K = 6$ has an average monthly return of 0.29% (t -statistic 0.89) in the second subperiod compared to 1.15% (t -statistic 2.76) in the first subperiod. None of the late stage strategy profits are significant in the second subperiod, although 4 out of the 5 combinations presented are at least positive. Since the late stage contrarian strategy shows only weak positive returns in the second subperiod, it is not surprising that the second subperiod returns of the early stage strategy are negative for all combinations. For example, the Panel B early stage return for the $K = 6$ case is -0.60% per month (t -statistic -1.56). This result is much worse than the corresponding late stage result of 0.29% per month (t -statistic 0.89).

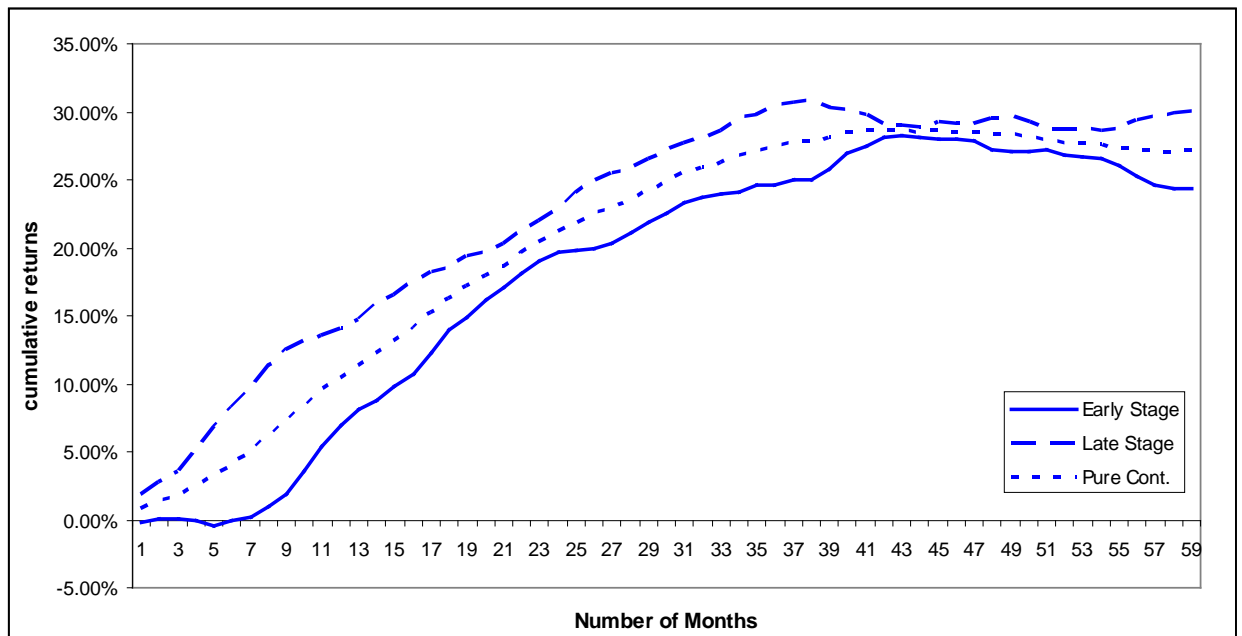


Figure 3 Cumulative Returns of Early/Late Stage and Contrarian Strategies in Subperiod 1 (January 1970 – December 1989).

The graph presents the cumulative raw profits of the Early Stage, Late Stage and Contrarian strategies for the formation period $J1/J2 = 60/6$ and $J = 60$ months and the non-overlapping holding period $K = 1$ month, for a period of 60 months following the beginning of holding period.

The reason for the reduced profitability of the late stage and early stage strategies in the second subperiod is due to an insignificant level of profitability in the underlying pure contrarian strategy. For example, analysis shown in Panel B reveals a return of -0.15% per month (t -statistic = -0.50) for the pure contrarian strategy with a $K = 6$ months holding period. In this context, the corresponding late stage result of 0.29% per month (t -statistic 0.89) amounts to a slight improvement over the pure contrarian strategy in the second subperiod. This is evident in Figure 4 which graphs the cumulative returns of the three strategies. Compared with Figure 3, the trends in Figure 4 are significantly lower, even for the late stage strategy, while the early stage strategy's returns become positive only after 46 months.

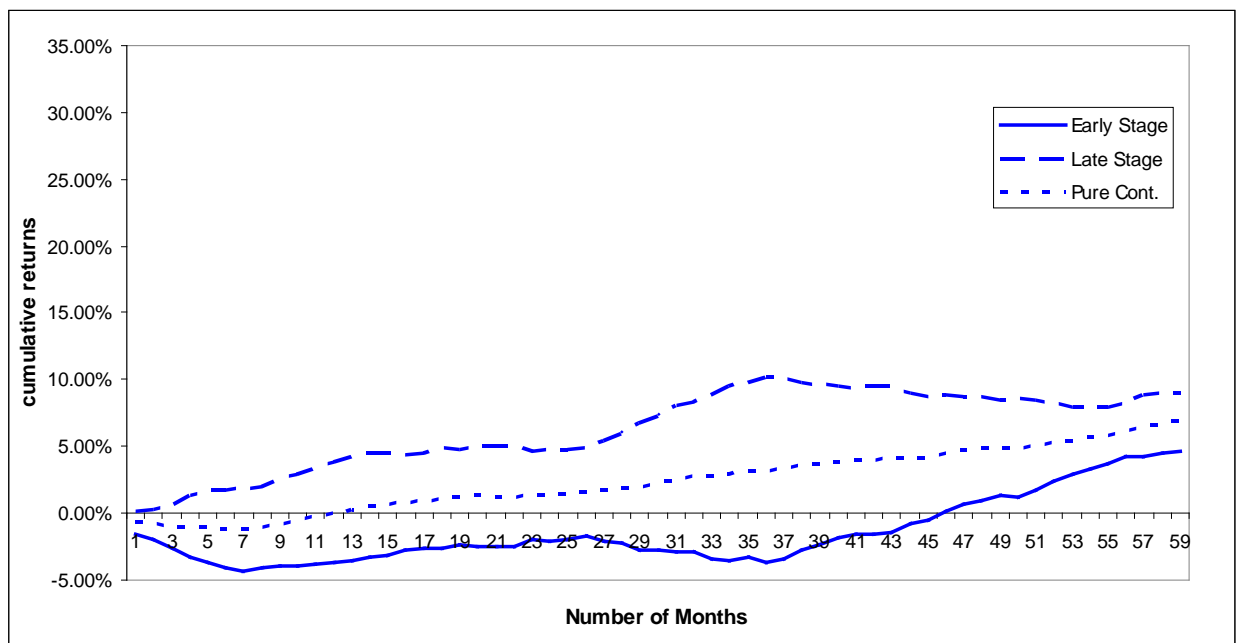


Figure 4 Cumulative Returns of Early/Late Stage and Contrarian Strategies in Subperiod 2 (January 1990 – March 2009).

The graph presents the cumulative raw profits of the Early Stage, Late Stage and Contrarian strategies for the formation period $J1/J2 = 60/6$ and $J = 60$ months and the non-overlapping holding period $K = 1$ month, for a period of 60 months following the beginning of holding period.

This comparison actually understates the improvement that the late stage strategy provides because the strategies have a one month gap between the end of the formation period and the beginning of the holding period. In order to show the extent to which profitability depends on various gap choices, Figure 5 displays the average monthly returns for the competing strategies for gaps ranging from one month to 12 months for the subperiod January 1990 to March 2009.

The graphs are lower than the corresponding graphs for the full sample presented in Figure 2. In particular, the pure contrarian strategy does not become profitable until the gap exceeds four months. Its maximum profitability of 0.21% (t -statistic = 0.71) from a gap of 12 months is considerably less than the maximum late stage strategy's profitability of 0.43% (t -statistic = 1.32) from a gap of 10 months. Although none of these results are significant at the 5% level, we can see that late stage approach is nevertheless effective in enhancing the profitability of contrarian strategies in this subperiod⁹.

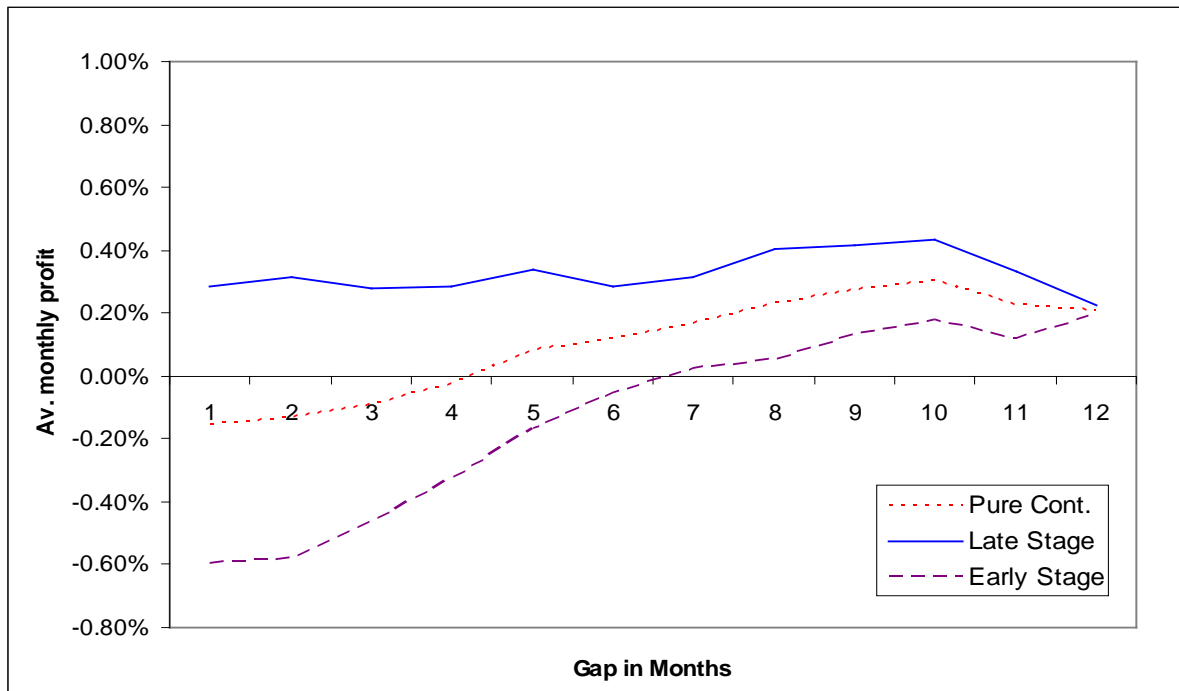


Figure 5 Strategy Profitability by Gap: January 1990 to March 2009.

The graph displays the average monthly profits of the pure contrarian (with $J = 60$, $K = 6$), late stage contrarian (with $J1/J2 = 60/6$, $K = 6$), and early stage contrarian (with $J1/J2 = 60/6$, $K = 6$) strategies for various values of Gap. Gap is the number of months between the end of the formation period and the beginning of the holding period.

For completeness, the subperiod returns of the base case for each strategy have been risk-adjusted using Fama and French three-factor model and Balvers and Wu (2006) two-factor model with the results presented in Table 7. Panel A shows the regression coefficients for the risk-adjusted returns in the first subperiod, from January 1970 to December 1989. The pure contrarian strategy's alphas are positive and statistically significant at the 10% level (9.2% and 9.6% per year with a t -statistic of 1.85 and 1.92 respectively) and higher than the unadjusted return of 6% per year shown in column two.

⁹ The only significant result observed in the second subperiod was an average monthly return of 0.75% (t -statistic 1.99) for the late stage strategy ($J1/J2 = 60/6$) with $K = 1$ and a gap of five months.

Similarly, the late stage strategy's risk-adjusted returns are positive and significant with a regression coefficient of 15.4% per year for the two-factor model (*t*-statistic 2.54) and 16.8% per year (*t*-statistic 2.75) for the three-factor model. As expected, the early stage strategy shows insignificant risk-adjusted returns in the first period due to insignificant and low unadjusted returns.

Table 7. Risk-adjusted Pure Contrarian and Early/Late Stage Contrarian Profits in Subperiods

Panel A: Subperiod Jan 1970 – Dec 1989										
Pure Contrarian										
		Two-factor Model				Three-factor Model				
Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LW	0.15	-0.025 (-0.819)	1.010 (12.870)	0.286 (1.629)	58.4%	-0.034 (-1.084)	0.995 (13.445)	0.002 (1.476)	0.002 (2.326)	59.3%
LL	0.21	0.066 (1.620)	0.730 (5.408)	0.167 (0.928)	36.6%	0.062 (1.450)	0.704 (6.151)	0.002 (1.383)	0.001 (0.471)	37.2%
LL-LW	0.06	0.092 (1.853)	-0.280 (-1.729)	-0.119 (-0.481)	4.1%	0.096 (1.915)	-0.292 (-2.053)	0.000 (0.032)	-0.001 (-1.039)	3.9%
Late Stage										
		Two-factor Model				Three-factor Model				
Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LWSL	0.13	-0.049 (-1.426)	1.019 (10.370)	0.246 (1.379)	52.6%	-0.056 (-1.577)	1.003 (10.634)	0.002 (1.232)	0.002 (1.580)	53.0%
LLSW	0.27	0.105 (2.051)	0.797 (4.591)	0.313 (1.358)	31.6%	0.112 (2.135)	0.739 (5.056)	0.002 (0.142)	0.000 (0.238)	31.3%
LLSW-LWSL	0.14	0.154 (2.537)	-0.222 (-1.083)	0.067 (0.226)	1.7%	0.168 (2.755)	-0.263 (-1.468)	0.000 (0.151)	-0.001 (-0.870)	1.6%
Early Stage										
		Two-factor Model				Three-factor Model				
Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LWSW	0.18	-0.001 (-0.036)	1.000 (12.673)	0.327 (1.552)	51.2%	-0.013 (-0.345)	0.988 (13.445)	0.002 (1.555)	0.003 (2.429)	52.3%
LLSL	0.16	0.028 (0.658)	0.662 (5.895)	0.022 (0.117)	27.4%	0.012 (0.268)	0.668 (6.507)	0.002 (1.407)	0.001 (1.056)	28.3%
LLSL-LWSW	0.01	0.029 (0.537)	-0.338 (-2.436)	-0.305 (-1.121)	4.1%	0.024 (0.443)	-0.320 (-2.543)	0.000 (-0.115)	-0.001 (-0.866)	3.1%
Panel B: Subperiod Jan 1990 – Mar 2009										
Pure Contrarian										
		Two-factor Model				Three-factor Model				
Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LW	0.08	-0.025 (-0.418)	0.017 (0.143)	0.472 (1.674)	0.34%	-0.001 (-0.011)	-0.073 (-0.560)	0.001 (0.531)	-0.001 (-0.293)	-1.45%
LL	0.06	-0.036 (-0.720)	-0.005 (-0.052)	0.341 (1.685)	0.02%	-0.013 (-0.241)	-0.048 (-0.466)	-0.001 (-0.297)	-0.000 (-0.194)	1.56%
LL-LW	-0.018	-0.011 (-0.281)	-0.022 (-0.335)	-0.132 (-0.846)	-0.95%	-0.012 (-0.306)	0.025 (0.367)	-0.002 (-1.346)	0.000 (0.292)	-0.15%
Late Stage										
		Two-factor Model				Three-factor Model				
Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LWSL	0.05	-0.056 (-0.936)	0.029 (0.234)	0.512 (1.709)	0.53%	-0.031 (-0.537)	-0.066 (-0.477)	0.001 (0.630)	0.000 (-0.188)	-1.41%
LLSW	0.08	-0.005 (-0.090)	-0.041 (-0.421)	0.262 (1.197)	-0.30%	0.012 (0.231)	-0.081 (-0.820)	0.000 (-0.025)	0.000 (-0.207)	-1.52%
LLSW-LWSL	0.03	0.051 (1.281)	-0.069 (-1.012)	-0.250 (-1.440)	-0.21%	0.043 (1.099)	-0.015 (-0.200)	-0.002 (-1.091)	0.000 (0.067)	-0.89%
Early Stage										
		Two-factor Model				Three-factor Model				

Portfolio	Return	α	β_{wld}	β_{vg}	Adj R ²	α	β_{wld}	β_{smb}	β_{hml}	Adj R ²
LWSW	0.10	0.005 (0.077)	0.005 (0.040)	0.433 (1.531)	0.04%	0.030 (0.475)	-0.081 (-0.622)	0.001 (0.420)	-0.001 (-0.370)	-1.49%
LLSL	0.03	-0.068 (-1.243)	0.030 (0.258)	0.420 (1.903)	0.22%	-0.037 (-0.630)	-0.015 (-0.127)	-0.001 (-0.480)	0.000 (-0.151)	-1.39%
LLSL-LWSW	-0.07	-0.073 (-1.476)	0.025 (0.276)	-0.013 (-0.060)	-1.18%	-0.067 (-1.332)	0.066 (0.710)	-0.002 (-1.262)	0.000 (0.365)	-0.10%

This table presents the two-factor and three-factor regression results for monthly returns on the relevant contrarian portfolios of the $J = 60$ months formation and $K = 6$ months holding strategy, and the early and late stage portfolios for the $J1/J2 = 60/6$ months formation and $K = 6$ months holding strategies for the period January 1970 – December 1989 (Panel A) and January 1990 – March 2009 (Panel B). The way these portfolios are formed and the regression models are described in Table 5.

Panel B of Table 7 presents the regression results for the second subperiod, from January 1990 to March 2009. For each strategy the results are insignificant consistent with the insignificant raw returns found in the second subperiod.

In summary, the subperiod analysis has identified that contrarian profitability is much weaker in the subperiod from January 1990 to March 2009. While the late stage strategy continues to enhance contrarian profits, this enhancement is insufficient to generate significant profits during the second period due to the weakness in the underlying contrarian effect. The early stage strategy fails to deliver significant profits on both the unadjusted or risk-adjusted basis.

5. Final Comments and Conclusion

DeBondt and Thaler (1985) suggest that investor overreaction is the cause of contrarian profitability. Our subperiod analysis indicates that contrarian profitability is weaker in the second half of our sample. This result suggests that if investor overreaction is indeed the cause of long-term return reversal then investors are no longer overreacting to the extent that had been observed in earlier periods.

The enhanced contrarian strategies introduced in this paper followed from the realization that traditional pure contrarian portfolios are composed of securities that are not all equally ready to reverse. The late stage strategy is designed to select those contrarian securities with long-term performances that are more ready to reverse than are the securities in the early stage strategy. We find that the late stage contrarian strategy is more profitable than both the pure contrarian strategy and the early stage contrarian strategy. Both the late stage contrarian and the pure contrarian strategies produce abnormal risk-adjusted returns when applied to the MSCI developed markets indices.

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