

Top Losers, Top Winners and Price Reversals in the French CAC 40 Index

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Abstract

In this paper, the short term behavior of particular stocks has been analyzed on the French stock market: Top Losers and Top Winners, which are respectively defined as the worst (best) performing stocks which are part of the CAC 40 index over a short period of time (up to 5 days). The analysis of short term returns of Top Winners show that they tend to slightly underperform the CAC 40 index over the next days. On the contrary, Top Losers outperform significantly the CAC 40 index in the next 1, 2, 3, 4 and 5 days, no matter what was the period during which these stocks were defined as Top Losers (from 1 to 5 days). After using the MV framework to optimize the strategy, it appears that it is optimal to hold Top Losers for 2 days following their decline. When discriminating Top Loser using the magnitude of their decrease, it appears that the worst 20% Top Losers (over the past 100 trailing trading days) significantly outperform other stocks and other Top Losers. Nevertheless, over the past 20 years, these abnormal returns have declined steadily and seem to be disappearing. Therefore, making money using these abnormal returns seems to be difficult and most of the time, trading costs eat up all the extra returns generated by a strategy based on buying short term Top Losers and holding them for a couple of days.

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I. Introduction

Efficient market theory tells us that prices are supposed to reflect all available information on the market and that these prices are supposed to include all public information almost instantly. But there are particular stocks that are interesting to observe: those that have experienced the highest changes on a given short period of time, i.e. stocks that are the best or worst performers over the past J days and that are part of a given index. These stocks have shown extraordinary volatility in the past J days and it is interesting to wonder whether their short term past performance is a good predictor of their short term future performance over the next K days: is there a short term momentum (price continue to change in the same direction) or a price reversal? What has to be tested is whether stock prices tend to overreact to good or bad news or not and whether good news and bad news are treated equally by investors in the days following their observed good/poor performance, i.e. with overreaction or underreaction in both situations. The issue here is to analyze whether important price drops convey as much information as price surges or if other factors interact with price changes and if these factors have an impact on stock prices in the days following the period during which the stock was a Top Loser or a Top Winner.

Moreover, these stocks - especially the daily Top Winners or Losers - are of particular interest because they are highlighted in most financial journals, financial databases and websites specialized in trading and business news. Most of the time, financial databases (and more recently websites) display in real-time time the three Top Winners and Losers of the trading day and therefore give them an extra publicity among individual investors as well as professional day traders.

Top Winners send the signal that there have been good news and that investors are bullish on the stock whereas Top Losers send the opposite signal, which may be likely to trigger buy orders as investors may see the stock as unfairly “punished” by the market or sell orders as investors may consider the stock as too risky and likely to keep falling.

If efficient markets theory held, then once the good or bad news on a company has been taken into account by the market during the trading day, the next trading days’ performance should not be significantly different than that of the reference index in absence of new information.

But in 1991, Bremer and Sweeney¹ highlighted the fact that large negative 10-day rates of return were on average followed by abnormal positive returns over the next 2 days. Such a finding tends to show that prices do not include so well all the available information on the market and that bad runs can be considered as predictors of future short term price reversals. In their study, they chose to use the -10% figure to define a “large decrease”. Such decreases are scarce over an even shorter period of time (inferior to 5 days), therefore it is necessary to find a way to discriminate between the level of decrease of stock prices to find a threshold below which returns are considered as a “large decreases”. There are two possible ways to do so: either by choosing an absolute threshold such as -X%, or by choosing a relative threshold, i.e. if the decrease is in the worst Y% of Top Losers in the past L trailing trading days. The later method is preferable as it enables to account for business cycles. Indeed a daily -5% decline can be a huge decrease in a bullish market but a relatively common maximum decrease in a bearish market or during an economic crisis. Therefore, the relative threshold method is more efficient as it enables to better identify abnormal extreme decreases among Top Losers.

In 2008, Whitelaw, Bali, and Cakici² have shown that investors are ready to pay more for stocks that have experienced extreme positive returns in the past month in the hope that these stocks will reiterate such positive returns in the short term. The researchers have highlighted the fact that even controlled for size, book-to-market, momentum, short-term reversals, liquidity, and skewness it was possible to draw a negative relation between extreme positive returns and expected stock returns, i.e. stocks that have experienced a very high positive return on a given trading day in the past previous month will perform worse than other stocks that have not experienced such extreme positive returns. The paper focuses on monthly horizons, but what happens the days next to extreme returns is not addressed and this study aims at discovering it.

Moreover, strategies that consist in selling past losers and buying past winners have been around for some time now. In 1993, Narasimhan Jegadeesh and Sheridan Titman³ have

¹ Bremer & Sweeney (1991), “The Reversal of Large Stock-Price Decreases”, *Journal of Finance*, June 1991.

² Whitelaw, Bali, & Cakici (2008). “Maxing Out: Stocks as Lotteries and the Cross-Section of Expected Returns,” *NBER Working Papers* #14804.

³ Jegadeesh & Titman (1993). “Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency,” *The Journal of Finance*, Vol. 48, No. 1. (Mar., 1993), pp. 65-91.

demonstrated that over 3, 6 and 12 months horizons, implementing such strategies enabled to yield significant positive returns and that these returns were not due neither to the systematic risks of the stocks nor to delayed stock price reactions to common factors. One of the interpretations they give to explain these abnormal returns is that the market overreacts to information impacting the long term profitability of the companies and underreacts to information impacting the short term profitability of the companies. Their other hypothesis is that investors tend to buy/sell more than they should the stocks that have performed well/badly in the past, therefore moving away their price from their long term value. Both hypotheses are supported by the fact that abnormal returns tend to disappear one year after the portfolios have been formed. Narasimhan Jegadeesh and Sheridan Titman updated their study in 1999⁴ and showed that momentum strategies remained profitable in the 1990's. They also confirmed that there existed a "momentum period" that could range from 12 to 60 months but not further.

⁴ Jegadeesh & Titman (1999). "Profitability of Momentum Strategies: An Evaluation of Alternative Explanations." *NBER Working paper #7159*.

II. Data used and methodology

The period chosen for the study ranges from December 31st 1987 to December 31st 2009. It was not possible to start the study at an anterior date as the CAC 40 index was created on December 31st 1987 and that the study required having the main French index as benchmark and as source of available stocks. To analyze short term returns of the stocks included in the CAC 40 index, it was necessary to rebuild the index from 1987 to 2009 so that at each point in time it only included the 40 stocks that were included in the index at the time. In order to know the historical composition of the CAC 40 index, the Bnains website⁵ was used, then it was necessary to get the stock prices of the companies that were part of the CAC 40 index. To do so, the main database used was the Eurofidai one since it gathered the stock prices of French companies over the past 30 years and even those that have disappeared, have been acquired or have merged during this period. This methodology enables to avoid the “survivorship bias” which consists in analyzing only returns of companies that are now part of the CAC 40 index and therefore that have necessarily performed better than the companies that used to be part of the index since they are still among the French biggest market capitalizations.

Since all companies in the CAC 40 index are among the biggest market capitalizations on the French market, all the stocks analyzed in this study are highly liquid and enjoy an extensive coverage by financial analysts. Therefore, if abnormal returns are highlighted, they cannot be due to the lack of liquidity or to price pressure given the size of these companies and the volumes that are traded every day.

Over the past 22 years, 87 companies have been part of the CAC 40 index at least 10 days and on average each company has been part of the index 2,527 days. The number of trading days chosen for this study (5,500) enables to get relevant results on enough different periods that are not affected by particular events or cycles. Not all stock prices were available over the studied period, on average 39.32 stock prices were available for each trading day and 90% of the time more than 38 stock prices were available.

For each point in time from December 31st 1987 to December 31st 2009, the returns of the best/worst performing stocks over the past J days have been studied over the next K days (J-day/K-day strategy) so that it could be possible to detect any abnormal returns and/or

⁵ www.bnains.org, the website contains a full history of the CAC 40 index since its inception.

spikes in volatility that cannot be explained neither by market conditions nor companies' specifics.

III. Identification of abnormal returns

Graph A.1 shows a significant rebound in the stock prices of 1-day to 5-day Top Losers over the next 5 days. All results are significant at the 99% level and except the 1-day Top Losers, other Top Losers rebound in the same proportion. Therefore, there seem to be abnormal returns that cannot be explained by market conditions or CAPM theory. Following strong decreases, stock prices tend to recover part of their losses in the following days. Nevertheless, this recovery is limited as the average loss is 7.9% for 5-day Top Losers and their average gain following this decrease is 0.9%. One of the possible explanations for this recovery is that some of the sales that occurred during the declining period were due either to liquidity issues, i.e. investors oversold Top Losers because they needed cash and were ready to sell them at a price abnormally low, or because of irrational behavior (investors that are afraid of the fall of the stock for example). Block trades can be responsible for that kind of behavior as large investors may be willing to close positions no matter what the price of the stocks were, if that is the case, then it is logical to expect stock prices to converge towards their *true* value a couple of days later when the market has been able to absorb these large trades.

Another possible explanation for this abnormal recovery is that it is more difficult to take into account bad news than good news. This would imply that at first, investors react to bad news by massively selling the stocks, thus overestimating the impact on the companies' value, then investors revise their estimates on the firms' value and start buying back the stocks. Such an explanation would mean that investors are not rational and that all information is not included as well as market theory tells us and that it takes time to be fully included in the stock price. Indeed, even if analysts at Investments Banks are generally very reactive, it takes time to calculate the impact of a given event on the value of a company, without their advice, investors trust their feelings and may be afraid of the fall of the stock price and decide to close their positions even if there is no rationale behind that decision.

Graph A.2 is very different from graph A.1 as it shows that following the strong increase experienced by 1-day to 5-day Top Winners, their stock prices remain relatively flat or experience a limited decrease over the next 5 days. That means that following their strong increase (as they are the best performers of the CAC 40 index), these stocks do not continue their upward trend and experience smaller returns than the other stocks from the same index.

The difference of performance of Top Losers and Top Winners is clearly visible on tables B, these tables show a very simple version of the Sharpe Ratio (SR): the annualized returns divided by the annualized volatility.

In this study, Sharpe Ratios are computed as follows:

$$SR = \frac{R_{annualized}}{\sigma_{annualized}}$$

with:

$$R_{annualized} = (1 + R_L)^{\frac{250}{L}}$$

$$\sigma_{annualized} = \sigma_L \sqrt{\frac{250}{L}}$$

where L is the number of days stocks are held.

What appears immediately is that Top Winners have a negative Sharpe ratio no matter what past performance period is chosen or what future period is chosen (excluding two values: 1-day/1-day and 1-day/2-day). Therefore, it seems that Top Winners are stocks that should not be bought following their strong increase for short term traders as they do not yield positive returns and are very volatile. Things are very different for Top Losers, their Sharpe Ratios are indeed always positive for every combination of past observation period and the number of days stocks are held. Even more, excluding 1-day Top Losers, all the Sharpe ratios are very high, 19 out of 20 are superior to 1. These high values show that there are indeed abnormal returns that cannot be explained by a high market exposure or a high volatility, tables C.1 to C.6 show that the CAC 40 1-day and 2-day returns are very close to 0 (inferior to 0.1) and that Top Losers seem to beat the CAC 40 in short term returns.

What is interesting to note in Table B is that on average the most optimal strategy in terms of Sharpe ratios is to keep the stocks following their strong decline for 2 days no matter what was the period in which the stock was a Top Loser (from 1 day to 5 days). This 2-day period had already been identified by Bremer and Sweeney⁶ in 1991, what they showed was that prices adjustments lasted on average 2 days following large negative 10-day returns. Here

⁶ Bremer & Sweeney (1991), "The Reversal of Large Stock-Price Decreases", *Journal of Finance*, June 1991.

the situation is quite different as prices adjustments for Top Losers last longer than 2 days and continue up to 5 days even if positive abnormal tend to fade away as time goes by. What may explain this difference is the way Bremer and Sweeney chose their stocks: they decided to analyze the returns of stocks that had previously lost more than 10% of their value in the previous 10 days. In this study the focus is put on Top Losers (and Top Winners but as we have seen, results are less interesting than those of Top Losers), which means that there is no minimum loss required, instead, the only criteria to meet is that on a given trading day, the selected stock has to be the worst performer of the CAC 40 index for a short period of time. Therefore, on average, negative returns are lower than those observed in the study by Bremer and Sweeney - where it was -13% - versus -8% to -4% here depending on the observation period chosen (from 1 day to 5 days). The fact that the observed rebound is lower in this study than in that of Bremer and Sweeney is consistent with their results, indeed they showed that by lowering the trigger threshold (in absolute terms) from -10% to -7,5%, rebounds were lower, while changing the trigger from -10% to -15% made the rebounds higher. In this study there is no threshold, therefore it is consistent to find lower rebounds than those found in the study by Bremer and Sweeney.

The analysis of tables C.2 to C.6 shows that over the 1987 - 2009 period, returns of strategies consisting in buying 1-day to 5-day Top Losers and holding them for the next 2 days (X-day/2-day strategies) are all positively skewed and have a high kurtosis. The fat tail phenomenon is logical as Top Losers are stocks that have experienced a significant surge in their volatility and therefore remain very volatile for the next days. All the X-day/2-day returns are on average superior to 0 with a confidence interval level of 100,00%. This very high level shows the resilience of the strategy over the period. The very high volatility of Top Losers following their decrease (all strategies have an annualized volatility superior to 45% versus 22% for the CAC 40) illustrates the uncertainty of the *true* value of the stocks and whether the large decrease in their price was legitimate or not. Nevertheless, this surge in volatility is largely compensated by much higher returns than those of the CAC 40 index as highlighted by the very high Sharpe Ratios of these strategies (Table B on Top Losers).

Another interesting point to note is that Top Loser did not perform the same way depending on the period of study. Graph A.3.a and Table A.3.b show that Top Losers have experienced very different returns following their decline over time. The example taken here is the 3-day Top Loser strategy, it has been chosen because it is the strategy with the highest Sharpe ratio as shown in Table B. By modifying the horizon of the study, we observe that the

strategy has been less and less effective over time. Tables A.3.b shows that since 1996, returns of 3-day Top Losers have been lower and lower as reflected by both their average returns and their Sharpe ratios, which both decline in more recent periods. One interpretation could be that this strategy is heavily impacted by market performance: 1996 - 1999 was a period of rally on the stock markets, then 2000 - 2003 a period of decline of the CAC 40 index, but it is not consistent with the 2004 - 2009 period which was a period of increase of the stock market (excluding 2008) while the average return of Top Losers decreased. Another possible explanation is that information travels faster and better as technology improves and that news affecting firms' valuations are reflected more effectively and more quickly in stock prices, thus explaining the lower rebound in the following days.

What is also interesting to remark is that not all Top Losers react the same way following their decline. To discriminate them, two options were available: defining a threshold below which we take into account a stock as a Top Loser in addition to the fact that the stock is the worst performer of the CAC 40 index, say -10%, as Bremer and Sweeney did in their paper in 1991⁷, or choosing a relative threshold such that the negative return is qualified as extreme and thus taken into account. The second option has been chosen as it enables to adjust stock declines for market conditions. Indeed, what has been chosen is to separate Top Losers into categories: returns of Top Losers belonging to the Worst x percentile have been analyzed. The methodology used to select these stocks has been as follow: if a stock was both a Top Loser and among the worst x% of the past 100 Top Losers' returns (i.e. over the past 100 trading days), then its return was analyzed over the next couple of days.

Let S_i be the stock price of a stock belonging to the CAC 40 index, this stock is both a Top Loser and belongs to the Worst x percentile of the past 100 L-day Top Losers at time t if the two following conditions are met:

$$R_{i;t} = \frac{S_{i;t} - S_{i;t-L}}{S_{i;t-L}} = \text{Min}\left(\frac{S_{k;t} - S_{k;t-L}}{S_{k;t-L}}\right)_{k \in [1;40]} \text{ and,}$$

$$R_{i;t} \leq \text{Max}\left(\text{Min}\left(\frac{S_{j;(t-j)} - S_{j;(t-j)-L}}{S_{j;(t-j)-L}}\right)_{j \in [1;x]}\right)_{x \in [1;100]}$$

⁷ Bremer & Sweeney (1991), "The Reversal of Large Stock-Price Decreases", *Journal of Finance*, June 1991.

where $S_{jt} \in [1; x]$ is a Top Loser belonging to the Worst x percentile of the past 100 L-day Top Losers.

What is visible at first when looking at graph A.4.a is that without the remarkable exception of the Worst 20% Top Losers, the other results are very close and do not show significant differences. For all the thresholds considered, it seems that price reversals stop after 3 days as most returns stop growing positively after the first 3 days (see Table A.4.b). These results do not come as a surprise as Bremer and Sweeney had already found that by lowering the threshold for large decreases, price reversals were bigger. The magnitude of price reversals for the Worst 20% Top Losers (+1.34% over the next 3 days for 3-day Top Losers) forces us to consider that maybe these large declines were not only due to bad news but also to liquidity issues, such as block trades, that take days to be absorbed by the market. If that is the case, then liquidity is on average responsible for 1.3% out of the 3-day 11.8% decline in the Worst 20% Top Losers, i.e. more than 10% of the level of the decrease. This unjustified additional negative return is compensated at more than 90% in the next 3 days on average no matter what was the observation period for the fall of the stock price was (from 1 to 5 days).

Abnormal positive returns seem to exist for Top Losers in the days following their decline whereas the picture is not as clear for Top Winners. What this could mean is that Top Winners' stocks convey more information than Top Losers. Top Winners tend indeed to keep their past increase on the following days whereas Top Losers tend to recover part of the value they have lost. Liquidity issues may be responsible for this difference as investors may be forced to sell stocks for liquidity reasons, which is less likely to be the case for Top Winners (which have been massively bought) as buy orders are not affected by liquidity issues (with the particular exception of Hedge Funds that have to close short positions and therefore buyback stocks) and thus convey more information. Since all sell orders may not reflect a decrease in firms' values but also liquidity needs, it's not surprising that Top Losers experience a price reversal following their poor performance.

It also seems that positive returns have been declining over time and that in more recent periods, the strategy consisting in buying Top Losers and holding them for a couple of days do not work as well as in the past. But what has to be tested is whether it would have actually been possible to make money by implementing a Top Loser strategy when the CAC 40 index was created in 1987 up to 2009.

IV. Implementation of an investment strategy

After having identified abnormal returns among Top Losers and Top Winners over a short period of time, it is interesting to test whether it would have been possible to actually make money with a strategy based on buying Top Losers or Top Winners over the periods of time identified in the previous part. The main difference between assessing the performance of the stocks and assessing the profitability of an investment strategy is essentially to account for trading costs.

What is much harder to assess is the implementation shortfall and the price drifts that would have been implied had the strategy been implemented on a large scale. For the sake of the exercise it is considered that stocks are bought and sold at the end of each trading day at the closing price⁸.

To build a strategy based on Top Losers it has been decided to start with a fund of a value of 1,000 on December 31st, 1987, i.e. the same value as that of the CAC 40 Index at the date of its inception. To compute the amount that could be invested every day on the K-day Top Loser for the next L days, the following formula has been used:

$$I_t = \frac{\min(C_t + I_t * (1 + R_{t;t-L}); \frac{\sum_{i=1}^t I_i}{L})}{1 + TC} \quad (1)$$

I_t = amount invested in Top Loser at time t

C_t = Cash available at the start of trading day t (or end of trading day $t-1$)

$R_{t;t-L}$ = Return of stocks bought at time $t - L$

TC = Trading costs in percentage

⁸ In reality it would be impossible to do so especially if the strategy was run on a large scale and if it had an important impact on market prices. One way to avoid this could be to use black pools where prices are matched using the midquote from another stock exchange (Euronext for example) and have no impact on market prices, but as their existence is quite recent it could not have been possible to use them a few years back.

This formula's objective is to maximize the amount of money that could be invested every day on the Top Loser with the following constraints:

- The fund can only invest money it has, i.e. it cannot have a negative cash balance;
- No more than $\frac{1}{L}$ of the total value of the fund can be invested in a particular Top Loser in order to make sure that investments in Top Losers are equally distributed as much as possible.

At the end of every trading day, the value of the fund F_t is computed as follow:

$$F_t = I_{t-L} * (1 + R_{t;t-L}) * (1 - TC) - I_t * (1 + TC) + C_{t+1} + \sum_{t-L+1}^t I_i \quad (2)$$

The choice of the historical cost method⁹ to calculate the daily value of the fund has been made in order to limit the risk taking that would be implied by choosing the fair value of the stocks bought (i.e. by using the closing price every trading day for every stock held). Indeed, the price change of stocks bought in the previous days could enable to buy more stocks on day t as showed by the formula (1): if stocks bought at time $t-x$ increased strongly, it would enable to invest more money on stocks at time t as the maximum amount that can be invested depends on the value of the portfolio at time t (and on the cash available), which would give more weight on stocks at time t while the profits from previous stocks have not been taken since the stocks are still held. Since stocks are not held more than a couple of days, the historical cost method is not a problem and does not create an important delay in the *true* value of the fund. Therefore, the formula (2) has been used to estimate the value of the fund at each point in time.

Tables D.1 and D.2 show the Sharpe Ratios of Top Loser strategies by changing the number of days of the past period (in which stocks are Top Losers) in column and the number of days stocks are held in line. To compute these Sharpe Ratios, the chosen average return is the average annual return from 1988 to 2009 and the measure of volatility used is the standard

⁹ The value of the fund is calculated using I_t as value for the stocks bought, i.e. the price at which they were bought (excluding their change in price until their sale).

deviation of annual returns over the same period. When comparing table D.1 to table B, i.e. when comparing Sharpe Ratios of Top Losers and Sharpe Ratios of the actual investment strategy consisting in buying Top Losers, the first thing to notice is that in the case of the investment strategy and without accounting for trading costs, Sharpe Ratios are much lower than in the case of Top Loser stocks. These results do not come as a surprise since the fat tail phenomenon has already been identified and is likely to have large impacts on the value of the funds, especially when large negative returns are experienced. Indeed, when a large negative return occurs on a particular stock, it has an impact on the stocks that are bought following this decrease as it is not possible to invest as much money on them as it was possible before the large negative returns. On the contrary, large positive returns in the previous days enable to put more weight on new stocks bought as more money is available. Therefore, the weights of the stocks held are not equally distributed over time as they are dependent on the performance of the stocks that have been bought previously. Thus, large returns experienced impact the overall performance of the fund and make it less profitable than theory had predicted.

Moreover, when accounting for trading costs, Sharpe Ratios plummet as shown on table D.2. Even when choosing trading costs as low as 0.15% over the 1987 - 2009 period, Sharpe Ratios decline strongly. Table D.3 shows the decrease in Sharpe Ratios when trading costs are taken into account. Declines are stronger when stocks are held less time, which is logical because when stocks are held for a shorter period of time, the churn rate of the portfolio increases and therefore trading costs increase sharply too, eating up all the performance of the fund.

Trading costs paid every day are reflected by the following formula:

$$V_{TC} = TC * I_t * (2 + R_{t;t-L}) = I_t * R_{t;t-L} + C_{t+1} + \sum_{t-L+1}^t I_i - F_t$$

This formula is derived from formula (2).

I_t = amount invested in Top Loser at time t

C_t = Cash available at the start of trading day t (or end of trading day $t-1$)

$R_{t;t-L}$ = Return of stocks bought at time $t - L$

$TC = \text{Trading costs in percentage}$

$V_{TC} = \text{Trading costs amount paid every day (in absolute value)}$

$F_t = \text{Fund value}$

To understand why trading costs are higher when stocks are held fewer days, let's consider two funds F_y and F_z of equal value and that have the same level of cash:

- F_y holds stocks for y days and F_z holds stocks for z days
- $(y; z) \in [1; 5]^2$
- $y < z$
- The last investments had a return of 0.00%

Thus we have:

$$I_{y; t-y} \cong I_{y; t} \cong \frac{F_{y; t}}{y} \quad \text{and} \quad I_{z; t-z} \cong I_{z; t} \cong \frac{F_{z; t}}{z}$$

And as we have $F_{z; t} = F_{y; t}$, we have:

$$I_{y; t} \cong \frac{F_{y; t}}{y} > I_{z; t} \cong \frac{F_{z; t}}{z}$$

$$\Leftrightarrow TC * (I_{y; t-y} + I_{y; t}) > TC * (I_{z; t-z} + I_{z; t})$$

$$\Leftrightarrow TC * \frac{2}{y} * F_t > TC * \frac{2}{z} * F_t$$

$$\Leftrightarrow V_{TC; y; t} > V_{TC; z; t}$$

What this inequality shows is that the shorter the period of time stocks are held, the higher their returns have to be in order to compensate for the higher trading costs. But graph A.1 shows that it is not the case, returns over shorter periods are lower than on longer periods. This explains the plunge of Sharpe ratios for very short term periods (1 or 2 days) when trading costs are taken into account.

To compare the actual performance of a Top Loser Fund to its theoretical performance, the 3-day/2-day fund has been chosen as it was the fund with the higher Sharpe Ratio (see Table B). When dismissing trading costs, table D.4.a shows that the fund has always outperformed the CAC 40 index with the exception of 2007 (slight underperformance of -1,7%), and even more interesting, it has fewer annual negative returns: 3 (2002, 2007, 2008) which were all small (-7,2% in 2002) versus 7 for the CAC 40 index which experienced several violent decreases (-34% in 2002 or -43% in 2008 for example). What is possible to observe though is that in more recent periods, the fund tends to outperform the CAC 40 index with a smaller and smaller margin (with the exception of year 2009 which was very volatile and experienced a 7-months rally that lifted the value of the CAC 40 index by more than 65%). A regression ran on the 22 annual returns of the fund over the returns of the CAC 40 index shows that the fund's performance has little to do with market exposure even if its beta is 2.24. Indeed, it only explains 17.8% out of 90% of the fund's performance; the R^2 is equal to 0.61, which makes this regression statistically significant. In absence of trading costs, launching a 3-day/2-day fund at the same time as the CAC 40 index would have been very profitable as it would have yielded a stunning average 90% in annual returns!

The study of the same fund but including trading costs is much more interesting. 0.15% has been chosen as a reference figure for trading costs over the 22-year period, this figure is not perfect as trading costs have experienced a steep decline since the 80's with the rise of electronic trading platforms and the decline in telecommunication prices. Table D.4.b summarizes the performance of a 3-day/2-day fund that would have been created at the same time as the CAC 40 index and that would have incurred trading costs of 0.15%. What strikes first is the huge impact of these trading costs when the fund is compared to the previous one (without trading costs, see table D.4.a): the Sharpe Ratio is down to 0.53 from 1.17, the average annual return is down to 31% from 90% and the Alpha plummets from 72% to 19%. Nevertheless, the fund is still profitable - on average - over the period and would have yielded a very good performance up to 2001. What is very interesting in this fund is that it would have stopped outperforming the CAC 40 index in 2001 and would have since underperformed it - sometimes heavily (-37% in 2006 and -33% in 2007 when comparing its performance to that of the CAC 40 index) - with the exception of 2009 when volatility peaked and the market experienced a stunning 7-month rally that lifted the value of the index by more than 65%.

It is also interesting to look at the fund based on the Worst 20% Top Losers as they were defined in part III. Indeed, this fund is theoretically supposed to be very profitable as the

analysis of Table A.4.c shows, the 3-day/2-day strategy for example is supposed to have a Sharpe Ratio of 4.21. But when implementing an investment strategy we find that the actual performance of the fund (with or without trading costs) is well below what was predicted (see Tables D.5.a and D.5.b). Whether trading costs are taken into account or not, market exposure is very low (beta inferior to 0.2), volatility is low too (especially compared to traditional Top Loser Funds, see tables D.4.a and D.4.b) and performance is poor in the years 2000's (with the exception of 2008). Trading costs have a much lower impact on this fund compared to traditional Top Loser Funds as described above because fewer trades are made over the period since only the Worst 20% Top Losers are bought and then kept for a couple of days. Most of the time, the fund has cash and waits for Top Losers to fall below the threshold of the Worst 20% Top Losers to buy them. When looking at the annual returns of the Worst 20% Top Loser Fund (by taking into account trading costs of 0.15%), what strikes is that the fund has had very irregular returns over the 1988 - 2009 period and that it has experienced very poor returns in the years 2000's. The fund has almost no market exposure, its beta is 0.17, but with a R^2 of 0.01 we cannot say anything about its correlation with the CAC 40 index. The fund's golden age was from 1994 to 2002 when it has always beaten the CAC 40 index year after year. Since then, its performance has been very erratic, it underperformed the CAC 40 index most of the time when the latter was on a positive trend but experienced a whopping 110.4% return when the market collapsed in 2008 due to the financial crisis. Therefore, in more recent years this fund could have been used to hedge long positions on the CAC 40 index and its returns can be associated to those of buying out of the money puts on the CAC 40 index: negative returns most of the time but huge returns when the market collapses.

Several explanations are possible for what has happened since 2001: either markets are more efficient since 2001 and are able to estimate more accurately the impact of news and events on stock prices, or the decline in trading cost has made possible for short term traders to run "Top Loser" strategies, which made them disappear as they were heavily played. The first hypothesis can be supported by the fact that at the end of the 90's, the rise of new information technologies made it possible for many more market participants to have access to information in real time and to compete with traditional traders and brokers. The increase in both the amount of information and the speed at which it spreads would have made possible for many more market participants to make their own assumptions on the *true* value of a stock following a steep decline and therefore adjusting their beliefs more quickly: what took days in the 90's took only 1 or 2 days in the years 2000 as the graph 3.a shows: it is not

profitable on average to hold Top Losers more than 2 days as the increase following the first 2 days is very low (but volatility still very high!). Moreover, in the years 2000's, a lot of new players entered the trading market with the rise of Internet, these electronic platforms offered much lower trading costs than traditional brokers, enabling more and more investors to run the Top Loser strategy, therefore reducing the extra returns generated by the price reversals.

Therefore, the decline in trading costs may have made possible short term strategies that were not possible in the past as trading costs were eating up all the generated performance. In the case of the fund we took as an example (see Table D.4.b), this would mean that in reality, the strategy is likely to have never been profitable because trading costs were higher in the 90's and would have prevented the fund from making any net positive performance: abnormal returns existed but investors could not make money by using them on the short term since trading cost were too high to generate a net positive return.

V. Conclusion

The study of both Top Winners and Top Losers has shown that these stocks have a specific behavior in the days that follow their performance in the CAC 40 index (best or worst performers). Top Winners experience negative returns in the following days but the small magnitude of these returns prevent us from calling them price reversals, whereas Top Losers experience large price reversals that can be superior to 1%. Therefore, it seems that Top Losers are stocks that have been oversold for reasons that have little to do with their core value (liquidity for example). To adjust for these additional sales, the market needs around 2 or 3 days. Next to these 3 days, price reversals stop and stocks do not behave differently than the CAC 40 index. Among Top Losers, it has been shown that the Worst 20% Top Losers (calculated using the past 100 trailing trading days) experience more important price reversals than the others. And the more the Worst x% Top Losers are among worst performing Top Losers, the higher their returns in the following days.

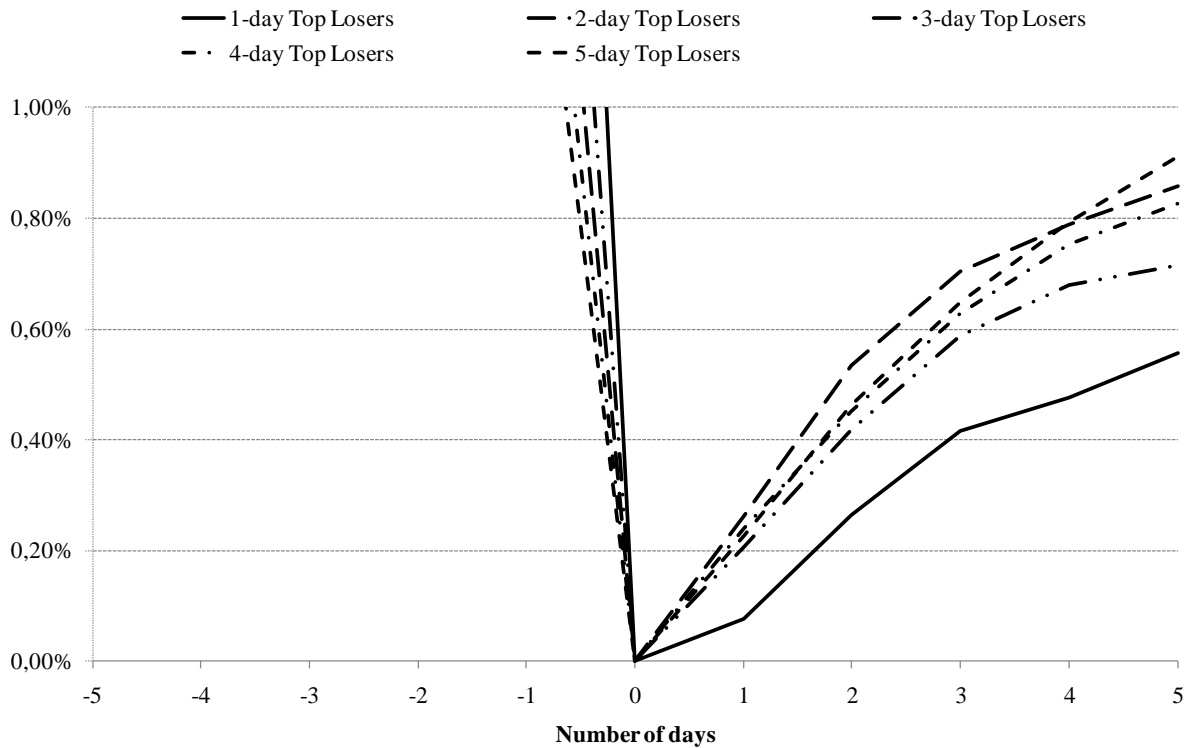
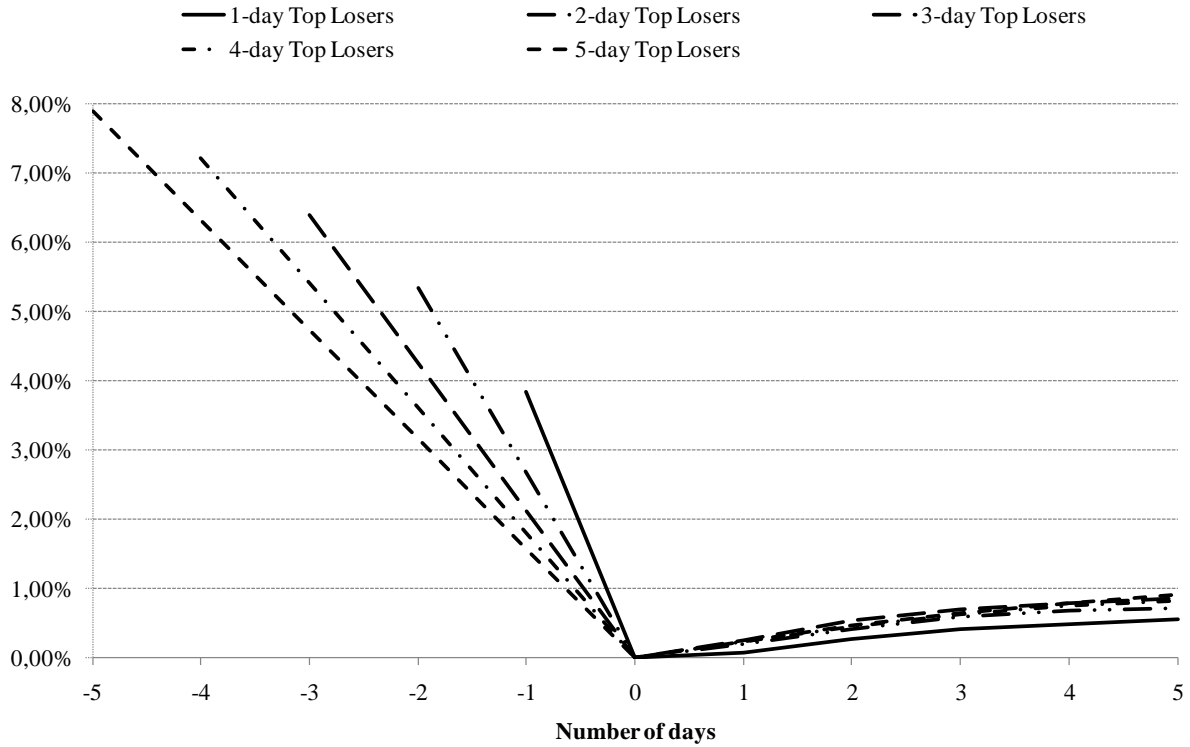
But despite these price reversals, Top Losers cannot be used to actually make money, especially since 2001, as the strategy has yielded lower and lower returns year after year. After accounting for trading costs, strategies based on Top Losers have yielded negative returns most of the time over the past decade. Possible explanations are that in recent years information has traveled faster and faster, trading costs have declined strongly and algorithmic trading has emerged, therefore limiting the range for price reversals as liquidity increased (and thus was less and less likely to be responsible for price drops) and market participants were able to adjust their belief about the value of stocks faster.

The relative disappearing of price reversals in recent years for Top Losers may mean that large sell orders are less and less due to other reasons than changes in the beliefs of stocks' values. Liquidity has increased and is therefore less and less likely to account for a large share of the decrease experienced by Top Losers. In recent years, short term Top Losers tend to convey almost as much information as Top Winners. The decrease Top Losers experienced is less and less likely to have been due to other reasons than changes in investors' beliefs about their value, meaning that markets are becoming more efficient when pricing the impact of bad news affecting companies' valuations.

VI. Appendices

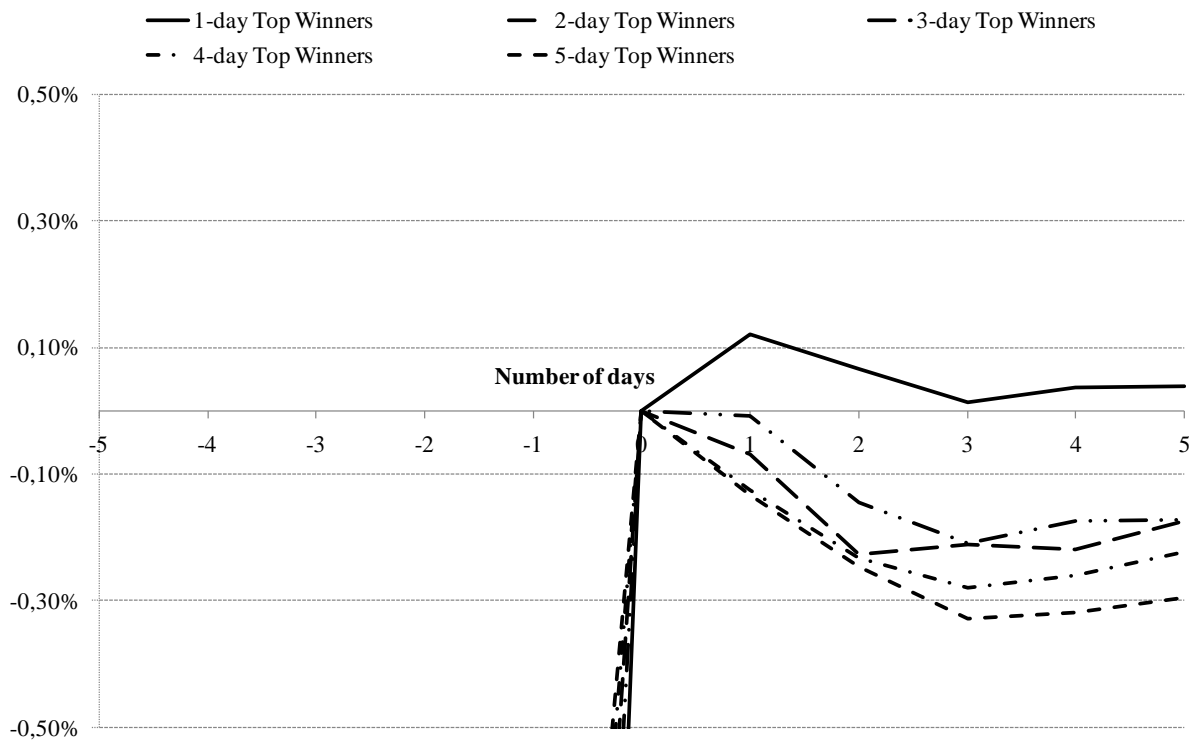
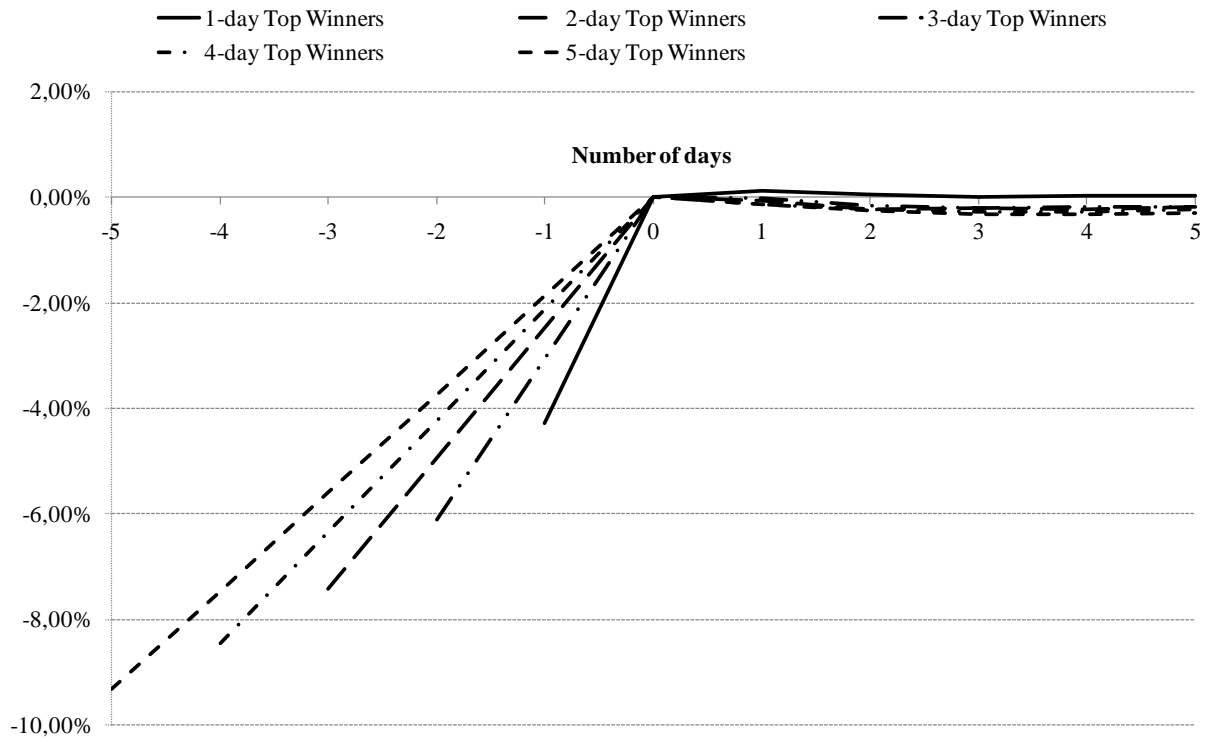
A. Graph of past performance of Top Losers & Winners

1. Performance of Top Losers



All results are statistically significant at the 99% confidence interval.

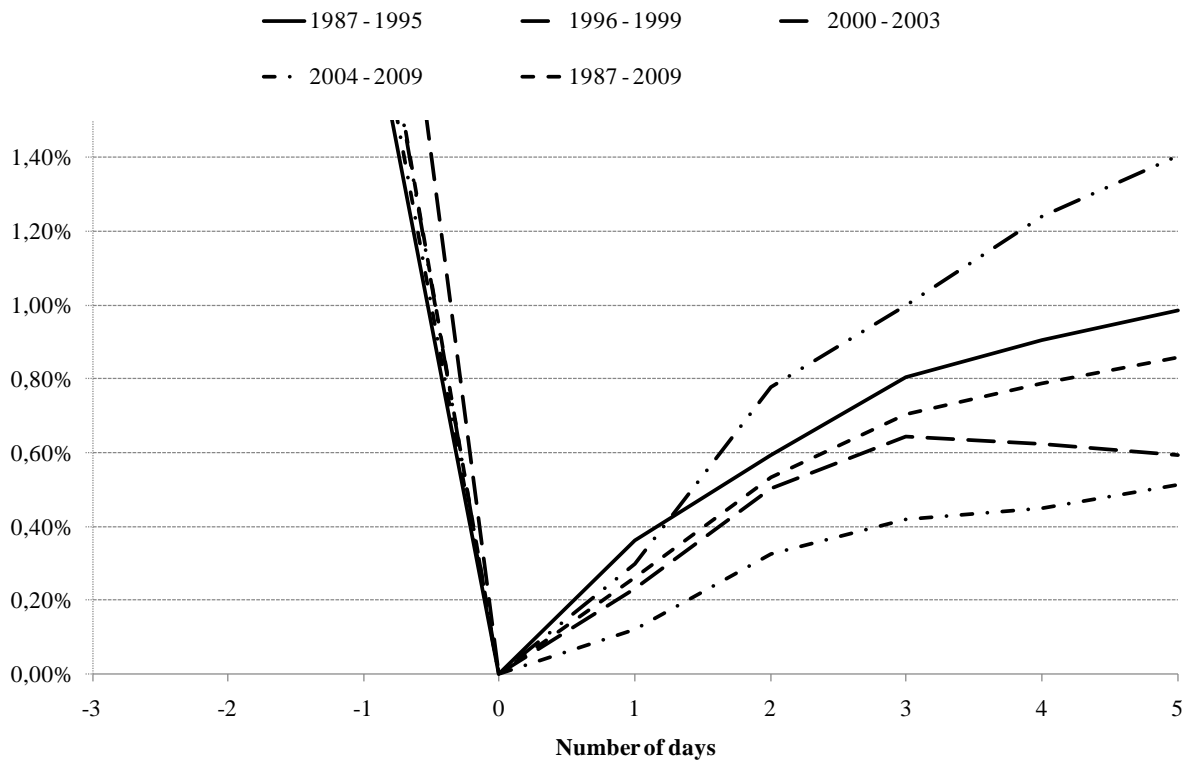
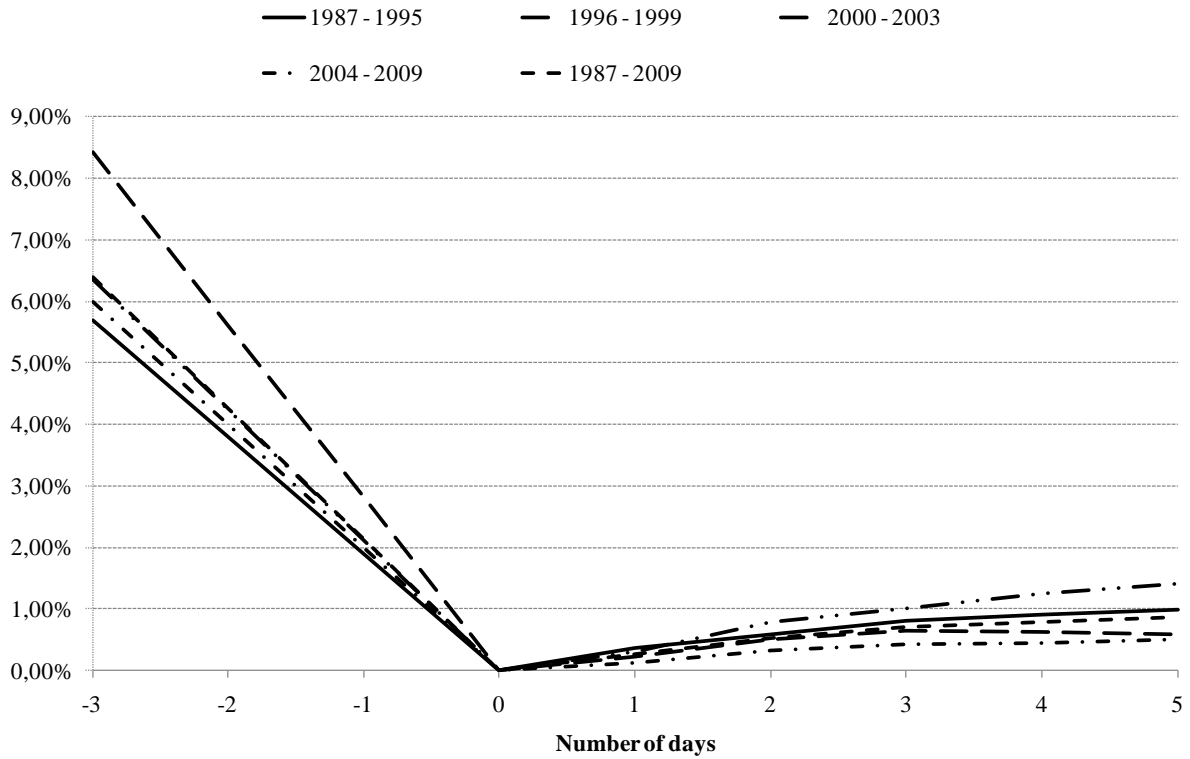
2. Performance of Top Winners



All results (excluding 1-day Top Winners) are statistically significant at the 99% confidence interval.

3. Performance of 3-day Top Losers over time

a) Graphs



All results are statistically significant at the 99% confidence interval.

b) Tables

Performance of 3-day Top Losers over time

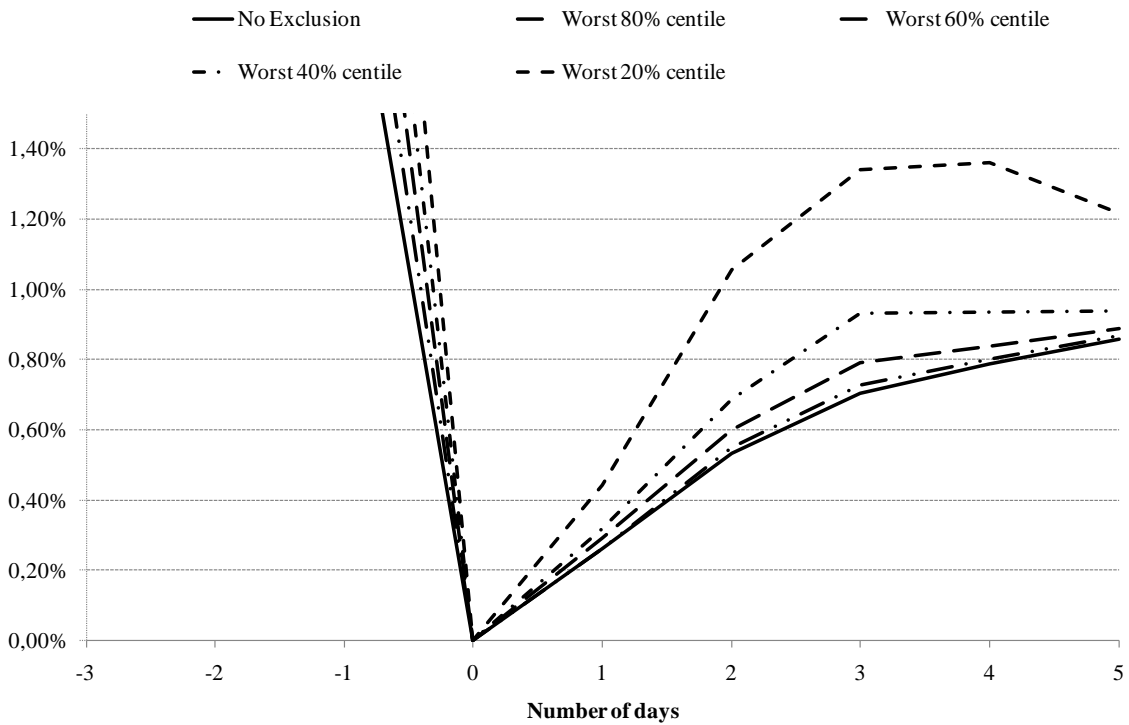
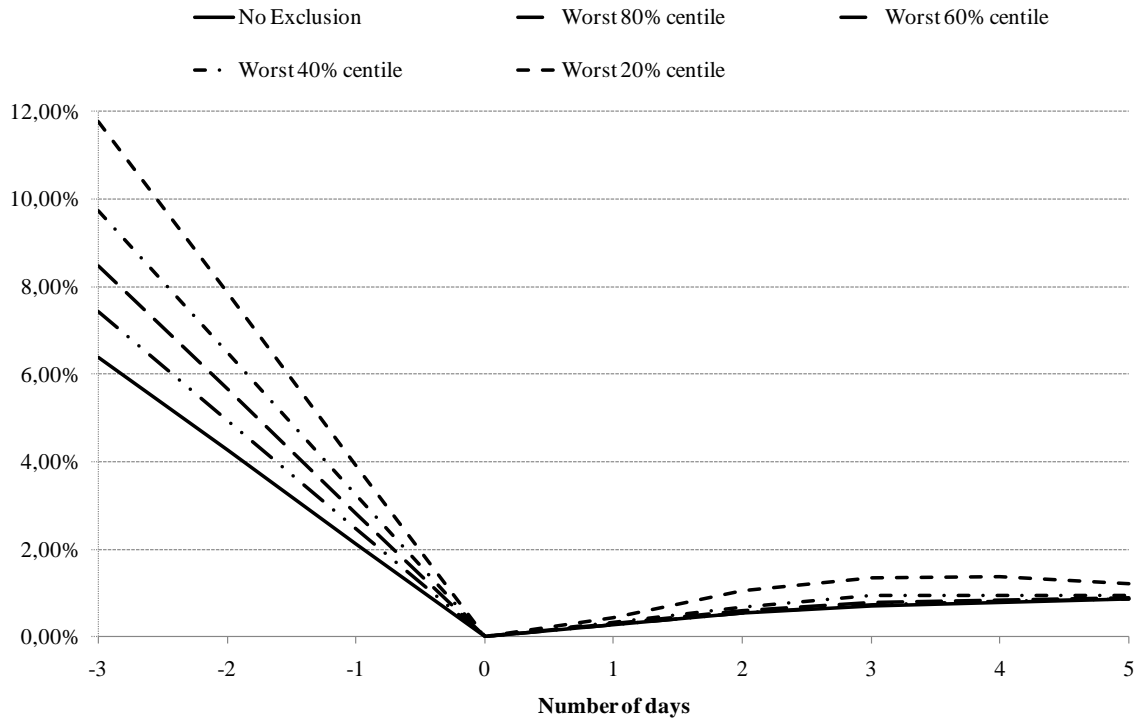
	Number of days following the 3-day decrease				
	1	2	3	4	5
1987 - 1995	0,36%	0,59%	0,80%	0,90%	0,98%
1996 - 1999	0,30%	0,78%	1,00%	1,24%	1,40%
2000 - 2003	0,23%	0,50%	0,64%	0,63%	0,59%
2004 - 2009	0,12%	0,32%	0,42%	0,45%	0,51%
1987 - 2009	0,26%	0,53%	0,70%	0,79%	0,86%

Sharpe Ratios of 3-day Top Losers over time

	Number of days following the 3-day decrease				
	1	2	3	4	5
1987 - 1995	3,67	2,86	2,48	2,06	1,75
1996 - 1999	2,34	3,79	3,11	2,92	2,56
2000 - 2003	1,26	1,33	1,10	0,74	0,56
2004 - 2009	0,80	1,06	0,82	0,64	0,58
1987 - 2009	1,85	1,91	1,57	1,26	1,07

4. Returns of 3-day Top Losers depending on the magnitude of their decrease

a) Graphs



All results are statistically significant at the 99% confidence interval.

b) Table

Returns of 3-day Top Losers depending on the magnitude of their decrease

	3-day decrease	Number of days following the decrease				
		1	2	3	4	5
No Exclusion	-6,40%	0,26%	0,53%	0,70%	0,79%	0,86%
Worst 80% centile	-7,42%	0,26%	0,55%	0,73%	0,80%	0,87%
Worst 60% centile	-8,47%	0,29%	0,60%	0,79%	0,84%	0,89%
Worst 40% centile	-9,74%	0,32%	0,69%	0,93%	0,93%	0,94%
Worst 20% centile	-11,78%	0,44%	1,06%	1,34%	1,36%	1,22%

A stock is defined as in the Worst x% centile if its decrease (as a Top Loser) is amongst the worst x returns of Top Losers in the past 100 days.

c) Sharpe Ratios

Sharpe Ratios of 3-day Top Losers depending on the magnitude of their decrease

	Number of days following the decrease				
	1	2	3	4	5
No Exclusion	1,85	1,91	1,56	1,26	1,07
Worst 80% centile	1,84	1,95	1,62	1,29	1,11
Worst 60% centile	2,01	2,08	1,72	1,30	1,09
Worst 40% centile	2,15	2,37	2,02	1,40	1,09
Worst 20% centile	3,16	4,21	3,05	2,08	1,35

A stock is defined as in the Worst x% centile if its decrease (as a Top Loser) is amongst the worst x returns of Top Losers in the past 100 days.

B. Analysis of the Sharpe Ratios

Sharpe Ratio Sensitivity for Long Top Loser strategy

		Performance n days later				
		1	2	3	4	5
Past observation period (days)	1	0,36	0,75	0,83	0,69	0,63
	2	1,35	1,41	1,29	1,07	0,87
	3	1,85	1,91	1,57	1,26	1,07
	4	1,65	1,48	1,35	1,19	1,02
	5	1,52	1,53	1,40	1,26	1,13

Sharpe Ratio Sensitivity for Long Top Winner strategy

		Performance n days later				
		1	2	3	4	5
Past observation period (days)	1	0,70	0,11	-0,07	-0,04	-0,05
	2	-0,13	-0,47	-0,47	-0,35	-0,30
	3	-0,45	-0,67	-0,48	-0,42	-0,31
	4	-0,70	-0,68	-0,59	-0,47	-0,37
	5	-0,74	-0,71	-0,68	-0,56	-0,46

Columns represent the period of observation for past maximum/minimum returns and lines the performance of the stocks n days later.

C. Detailed Performance of Top Winners & Losers

1. Performance of the 1-day/1-day strategy

Returns over the past 1 day(s)

	Top Winners	Top Losers
Average change	4,27%	-3,85%
Std Deviation	3,05%	2,73%

This table shows the average 1-day change and volatility of the best and worst performers of the CAC40 index from December 31st 1987 to December 31st 2009.

Returns over the next 1 day(s)

	Top Winners	Top Losers	CAC 40
Average change	0,12%	0,08%	0,03%
Annualized Change	35,38%	21,15%	8,81%
Std Deviation	2,84%	3,02%	1,38%
Annualized Volatility	44,91%	47,77%	21,88%
Sharpe Ratio	0,70	0,36	0,22
% of positive performances	49%	50%	52%
Skewness	0,79	-0,03	0,08
Kurtosis	7,69	13,50	5,07
Confidence interval	99,85%	94,17%	93,10%

This table shows the performance of the best or worst performers over the last 1 day(s) in the next 1 days compared to that of the CAC40 index from December 31st 1987 to December 31st 2009.

2. Performance of the 1-day/2-day strategy

Returns over the past 1 day(s)

	Top Winners	Top Losers
Average change	4,27%	-3,85%
Std Deviation	3,05%	2,73%

This table shows the average 1-day change and volatility of the best and worst performers of the CAC40 index from December 31st 1987 to December 31st 2009.

Returns over the next 2 day(s)

	Top Winners	Top Losers	CAC 40
Average change	0,07%	0,26%	0,07%
Annualized Change	8,63%	38,94%	8,82%
Std Deviation	3,88%	4,14%	1,95%
Annualized Volatility	43,33%	46,29%	21,81%
Sharpe Ratio	0,11	0,75	0,22
% of positive performances	48%	52%	53%
Skewness	0,63	0,37	0,01
Kurtosis	7,43	8,24	3,75
Confidence interval	79,67%	100,00%	99,02%

This table shows the performance of the best or worst performers over the last 1 day(s) in the next 2 days compared to that of the CAC40 index from December 31st 1987 to December 31st 2009.

3. Performance of the 2-day/2-day strategy

Returns over the past 2 day(s)

	Top Winners	Top Losers
Average change	6,11%	-5,35%
Std Deviation	4,34%	3,79%

This table shows the average 2-day change and volatility of the best and worst performers of the CAC40 index from December 31st 1987 to December 31st 2009.

Returns over the next 2 day(s)

	Top Winners	Top Losers	CAC 40
Average change	-0,14%	0,42%	0,07%
Annualized Change	-16,57%	68,61%	8,82%
Std Deviation	3,87%	4,10%	1,95%
Annualized Volatility	43,31%	45,87%	21,81%
Sharpe Ratio	-0,47	1,41	0,22
% of positive performances	45%	53%	53%
Skewness	0,46	0,24	0,01
Kurtosis	6,58	6,97	3,75
Confidence interval	99,46%	100,00%	99,02%

This table shows the performance of the best or worst performers over the last 2 day(s) in the next 2 days compared to that of the CAC40 index from December 31st 1987 to December 31st 2009.

4. Performance of the 3-day/2-day strategy

Returns over the past 3 day(s)

	Top Winners	Top Losers
Average change	7,41%	-6,40%
Std Deviation	5,26%	4,50%

This table shows the average 3-day change and volatility of the best and worst performers of the CAC40 index from December 31st 1987 to December 31st 2009.

Returns over the next 2 day(s)

	Top Winners	Top Losers	CAC 40
Average change	-0,23%	0,53%	0,07%
Annualized Change	-24,72%	94,81%	8,82%
Std Deviation	3,85%	4,26%	1,95%
Annualized Volatility	43,01%	47,58%	21,81%
Sharpe Ratio	-0,67	1,91	0,22
% of positive performances	44%	55%	53%
Skewness	0,41	0,38	0,01
Kurtosis	7,58	10,58	3,75
Confidence interval	100,00%	100,00%	99,02%

This table shows the performance of the best or worst performers over the last 3 day(s) in the next 2 days compared to that of the CAC40 index from December 31st 1987 to December 31st 2009.

5. Performance of the 4-day/2-day strategy

Returns over the past 4 day(s)

	Top Winners	Top Losers
Average change	8,45%	-7,21%
Std Deviation	5,97%	4,99%

This table shows the average 4-day change and volatility of the best and worst performers of the CAC40 index from December 31st 1987 to December 31st 2009.

Returns over the next 2 day(s)

	Top Winners	Top Losers	CAC 40
Average change	-0,23%	0,45%	0,07%
Annualized Change	-25,19%	75,78%	8,82%
Std Deviation	3,86%	4,34%	1,95%
Annualized Volatility	43,10%	48,47%	21,81%
Sharpe Ratio	-0,68	1,48	0,22
% of positive performances	45%	54%	53%
Skewness	-0,06	1,40	0,01
Kurtosis	9,84	22,39	3,75
Confidence interval	100,00%	100,00%	99,02%

This table shows the performance of the best or worst performers over the last 4 day(s) in the next 2 days compared to that of the CAC40 index from December 31st 1987 to December 31st 2009.

6. Performance of the 5-day/2-day strategy

Returns over the past 5 day(s)

	Top Winners	Top Losers
Average change	9,33%	-7,91%
Std Deviation	6,63%	5,41%

This table shows the average 5-day change and volatility of the best and worst performers of the CAC40 index from December 31st 1987 to December 31st 2009.

Returns over the next 2 day(s)

	Top Winners	Top Losers	CAC 40
Average change	-0,25%	0,46%	0,07%
Annualized Change	-26,50%	78,14%	8,82%
Std Deviation	3,83%	4,34%	1,95%
Annualized Volatility	42,85%	48,48%	21,81%
Sharpe Ratio	-0,71	1,53	0,22
% of positive performances	45%	54%	53%
Skewness	0,07	1,38	0,01
Kurtosis	9,11	22,24	3,75
Confidence interval	100,00%	100,00%	99,02%

This table shows the performance of the best or worst performers over the last 5 day(s) in the next 2 days compared to that of the CAC40 index from December 31st 1987 to December 31st 2009.

D. Implementation of an investment strategy based on Top Losers

1. Sharpe Ratios of investment strategies without trading costs

Sharpe Ratios of the Top Loser Funds

		Number of days following the decrease				
		1	2	3	4	5
Past observation period (days)	1	0,28	0,56	0,67	0,67	0,65
	2	0,54	0,81	0,97	0,86	0,76
	3	0,72	1,17	1,08	0,94	0,82
	4	0,79	0,82	0,85	0,73	0,72
	5	0,67	0,87	0,91	0,91	0,88

2. Sharpe Ratios of investment strategies with trading costs of 0.15%

Sharpe Ratios of the Top Loser Funds

		Number of days following the decrease				
		1	2	3	4	5
Past observation period (days)	1	-0,37	-0,08	0,17	0,22	0,29
	2	-0,13	0,26	0,48	0,50	0,46
	3	-0,18	0,53	0,64	0,60	0,55
	4	-0,35	0,30	0,48	0,47	0,48
	5	-0,26	0,34	0,52	0,58	0,60

3. Change in Sharpe Ratios when accounting for trading costs

Change in Sharpe Ratios of the Top Loser Funds when accounting for trading costs of 0.15%

		Number of days following the decrease				
		1	2	3	4	5
Past observation period (days)	1	-229%	-115%	-75%	-67%	-56%
	2	-124%	-67%	-50%	-41%	-40%
	3	-125%	-55%	-40%	-36%	-33%
	4	-144%	-64%	-44%	-35%	-33%
	5	-140%	-61%	-43%	-36%	-32%

4. Implementation of a 3-day/2-day strategy

a) Without trading costs

Time period of the extreme change: 3 day(s)

Holding period following extreme change: 2 day(s)

	CAC 40	Top Gainer Fund	Top Loser Fund
Average annual Return	7,9%	-20,8%	90,0%
Annual standard deviation	23,6%	38,8%	73,8%
Beta		0,39	2,24
R ²		0,07	0,61
Sharpe Ratio	0,17	-0,64	1,17
Information Ratio		-0,74	1,11
Average spread vs CAC 40		-27%	76%
Perf. explained by market exposure		3,13%	17,83%
Remaining performance (alpha)		-23,92%	72,21%

Years	CAC 40		Top Loser Fund		Sprd vs CAC
	Value	Performance	Value	Performance	
2009	3 936	22,3%	286 971 187	130,3%	108,0%
2008	3 218	-42,7%	124 599 697	-6,8%	35,9%
2007	5 614	1,3%	133 637 005	-0,4%	-1,7%
2006	5 542	17,5%	134 174 096	18,1%	0,6%
2005	4 715	23,4%	113 607 238	69,5%	46,1%
2004	3 821	7,4%	67 037 801	56,3%	48,9%
2003	3 558	16,1%	42 890 527	56,6%	40,5%
2002	3 064	-33,7%	27 382 727	-7,2%	26,5%
2001	4 625	-22,0%	29 519 509	85,9%	107,9%
2000	5 926	-0,5%	15 876 199	98,2%	98,7%
1999	5 958	51,1%	8 011 002	272,1%	221,0%
1998	3 943	31,5%	2 152 927	113,1%	81,6%
1997	2 999	29,5%	1 010 497	167,3%	137,8%
1996	2 316	23,7%	378 046	88,8%	65,1%
1995	1 872	-0,5%	200 278	29,2%	29,7%
1994	1 881	-17,1%	154 994	99,8%	116,9%
1993	2 268	22,1%	77 565	150,9%	128,8%
1992	1 858	5,2%	30 912	79,5%	74,2%
1991	1 766	16,3%	17 225	96,6%	80,3%
1990	1 518	-24,1%	8 762	11,2%	35,4%
1989	2 001	27,1%	7 879	131,3%	104,1%
1988	1 574	57,4%	3 407	240,7%	183,3%
1987	1 000	na	1 000	na	na

b) With trading costs of 0.15%

Time period of the extreme change: 3 day(s)

Holding period following extreme change: 2 day(s)

	CAC 40	Top Gainer Fund	Top Loser Fund
Average annual Return	7,9%	-45,9%	30,9%
Annual standard deviation	23,6%	26,4%	51,2%
Beta		0,27	1,55
R²		0,07	0,61
Sharpe Ratio	0,17	-1,89	0,53
Information Ratio		-2,04	0,45
Average spread vs CAC 40		-53%	19%
Perf. explained by market exposure		2,17%	12,36%
Remaining performance (alpha)		-48,03%	18,59%

Years	CAC 40		Top Loser Fund		Sprd vs CAC
	Value	Performance	Value	Performance	
2009	3 936	22,3%	77 595	57,8%	35,5%
2008	3 218	-42,7%	49 159	-36,1%	6,6%
2007	5 614	1,3%	76 883	-31,9%	-33,2%
2006	5 542	17,5%	112 919	-19,2%	-36,7%
2005	4 715	23,4%	139 758	15,6%	-7,8%
2004	3 821	7,4%	120 927	6,3%	-1,1%
2003	3 558	16,1%	113 785	7,2%	-8,9%
2002	3 064	-33,7%	106 147	-36,4%	-2,6%
2001	4 625	-22,0%	166 834	27,9%	49,8%
2000	5 926	-0,5%	130 464	36,4%	37,0%
1999	5 958	51,1%	95 616	155,7%	104,6%
1998	3 943	31,5%	37 392	47,6%	16,1%
1997	2 999	29,5%	25 337	84,5%	55,0%
1996	2 316	23,7%	13 730	30,2%	6,4%
1995	1 872	-0,5%	10 549	-10,3%	-9,8%
1994	1 881	-17,1%	11 762	38,1%	55,2%
1993	2 268	22,1%	8 517	72,9%	50,9%
1992	1 858	5,2%	4 925	24,2%	19,0%
1991	1 766	16,3%	3 965	35,8%	19,5%
1990	1 518	-24,1%	2 920	-23,2%	0,9%
1989	2 001	27,1%	3 802	60,1%	32,9%
1988	1 574	57,4%	2 375	137,5%	80,1%
1987	1 000	na	1 000	na	na

5. Implementation of a 3-day/2-day strategy on the Worst 20% Top Loser percentile

a) Without trading costs

	CAC 40	Top Loser Fund
Average annual Return	7,9%	30,1%
Annual standard deviation	23,6%	26,9%
Beta		0,13
R ²		0,01
Sharpe Ratio	0,17	0,97
Information Ratio		0,82
Average spread vs CAC 40		22%
Perf. explained by market exposure		1,01%
Remaining performance (alpha)		29,04%

Years	CAC 40		Top Loser Fund		Sprd vs CAC
	Value	Performance	Value	Performance	
2009	3 936	22,3%	207 640	20,7%	-1,6%
2008	3 218	-42,7%	172 019	89,9%	132,6%
2007	5 614	1,3%	90 592	-17,3%	-18,6%
2006	5 542	17,5%	109 541	6,1%	-11,4%
2005	4 715	23,4%	103 253	17,0%	-6,4%
2004	3 821	7,4%	88 231	52,0%	44,6%
2003	3 558	16,1%	58 049	4,4%	-11,8%
2002	3 064	-33,7%	55 627	26,1%	59,9%
2001	4 625	-22,0%	44 104	-2,1%	19,9%
2000	5 926	-0,5%	45 029	57,6%	58,1%
1999	5 958	51,1%	28 580	74,2%	23,0%
1998	3 943	31,5%	16 410	47,1%	15,6%
1997	2 999	29,5%	11 159	67,4%	37,9%
1996	2 316	23,7%	6 667	45,7%	22,0%
1995	1 872	-0,5%	4 577	23,0%	23,5%
1994	1 881	-17,1%	3 722	15,5%	32,6%
1993	2 268	22,1%	3 223	30,5%	8,4%
1992	1 858	5,2%	2 469	2,5%	-2,7%
1991	1 766	16,3%	2 409	7,2%	-9,2%
1990	1 518	-24,1%	2 248	25,8%	50,0%
1989	2 001	27,1%	1 787	24,5%	-2,6%
1988	1 574	57,4%	1 435	43,5%	-13,9%
1987	1 000	na	1 000	na	na

b) With trading costs of 0.15%

	CAC 40	Top Loser Fund
Average annual Return	7,9%	20,0%
Annual standard deviation	23,6%	23,9%
Beta		0,17
R²		0,03
Sharpe Ratio	0,17	0,67
Information Ratio		0,50
Average spread vs CAC 40		12%
Perf. explained by market exposure		1,39%
Remaining performance (alpha)		18,65%

Years	CAC 40		Top Loser Fund		Sprd vs CAC
	Value	Performance	Value	Performance	
2009	3 936	22,3%	36 473	16,4%	-5,9%
2008	3 218	-42,7%	31 333	67,7%	110,4%
2007	5 614	1,3%	18 683	-25,3%	-26,6%
2006	5 542	17,5%	25 008	-1,4%	-18,9%
2005	4 715	23,4%	25 364	9,1%	-14,3%
2004	3 821	7,4%	23 257	39,8%	32,4%
2003	3 558	16,1%	16 638	-0,4%	-16,5%
2002	3 064	-33,7%	16 704	16,4%	50,1%
2001	4 625	-22,0%	14 354	-9,7%	12,3%
2000	5 926	-0,5%	15 891	41,1%	41,6%
1999	5 958	51,1%	11 263	63,8%	12,7%
1998	3 943	31,5%	6 877	33,8%	2,4%
1997	2 999	29,5%	5 139	51,1%	21,6%
1996	2 316	23,7%	3 400	38,0%	14,3%
1995	1 872	-0,5%	2 464	13,8%	14,3%
1994	1 881	-17,1%	2 165	8,9%	26,0%
1993	2 268	22,1%	1 987	20,6%	-1,5%
1992	1 858	5,2%	1 648	-7,0%	-12,2%
1991	1 766	16,3%	1 772	0,0%	-16,3%
1990	1 518	-24,1%	1 772	13,7%	37,8%
1989	2 001	27,1%	1 559	15,5%	-11,6%
1988	1 574	57,4%	1 349	34,9%	-22,5%
1987	1 000	na	1 000	na	na

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