On the efficiency of benchmarks composition:

A behavioral perspective

by

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ABSTRACT

Acknowledging the richness of literature which aims to understand portfolio managers' biases evinced in active investment strategies, we attempt to translate some of the same results to index portfolios. As a consequence of disappointing performances achieved an old dilemma re-emerged: is benchmarking a more efficient investment strategy? This article intends to highlight how the indices' composition criteria can implicitly create important behavioural distortions in portfolio asset allocation. Our analysis, focused on the corporate bonds market, offers some evidence of investment decisions made during market overreaction phases, disrupting the main purpose of value creation.

Keywords:

Benchmark; asset management; overreaction; herding; corporate bonds.

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"Gains and losses that come with holding the benchmark portfolio are an 'act of God'. Gains and losses that come with deviation from the benchmark portfolio are an 'act of man'."

(Clarke, Krase and Statman, 1994, p.19)

Many papers have been written about the performances shown by portfolio managers (PMs) which implement an active investment style with respect to the underlying market index: the benchmark portfolio. Most of these studies points out the poor results achieved by actively managed portfolios with respect to both market indices (Elton et al., 1996; Gruber, 1996; Carhart, 1997; Davis 2001) and index tracker portfolios, which mirror the benchmark's composition (Frino and Gallagher, 2001).

One possible explanation of the general underperformance shown by mutual funds can be attributed to the investment style adopted by the PM (*'act of man'*) together with the identification of some heuristics he/she is subjected to. For example, the well known disposition to sell winners too early and to ride losers too long (Shefrin and Statman, 1985) together with the excessive portfolio turnover registered by mutual funds (Trueman, 1988). Another investor attitude that emerges from the financial literature is the tendency to purchase stocks based on their past returns (Grinblatt and Titman, 1989; Jengadeesh and Titman, 1993; Grinblatt et al., 1995), showing that investors behave, in the long term, as positive-feedback traders (De Long at al., 1990). Mutual funds managers also reveal a herding attitude (Scharfstein and Stein, 1990), buying and selling the same stocks at the same time. Overconfidence (Odean, 1999) and conservatism (Edwards, 1968) are other well-known heuristics that can affect the PM in investment choices.

One consequence of having emotion in the financial markets is the overreaction toward new events (Khaneman and Twersky, 1982; De Bondt and Thaler, 1987; Chopra et al., 1992). The underlying cause behind this market anomaly is based on investor tendencies to overweight recent information with respect to the asset's fundamental value. As a consequence, investors recognize a higher implicit credit risk that adds a higher risk premium asked in order to hold the asset in the

portfolio. In this framework, risk-adverse investors switch to assets characterized by a lower risk (flight to quality phenomenon).

It can be surprising that investors who try to take advantage of financial market inefficiencies, adopting a behavioral approach, are uncommon (Fuller, 1995). For example, many investors describe themselves as contrarians, even when their stock selections reveal them as conventional (Solt and Statman, 1989).

Many PMs are encouraged to pay no attention to the absolute result of the managed portfolio because they are often judged on a relative benchmark's performance base: for this reason PMs respond to this method of evaluation by optimizing portfolios with respect to portfolio tracking errors rather than portfolio return (Clarke et al., 1994). This established practice can lead to sub-optimal portfolios when the benchmark doesn't lie on the efficient market frontier (Roll, 1992). For these reasons, the benchmark portfolio fulfils a critical function in monitoring a portfolio's performance because it's the reference point for measuring the portfolio's risk. In this framework, the tendency of the PM to anchor the benchmark portfolio is a natural consequence.

The aim of this paper is to shed further light in the debate on the suitability of the benchmark, revealing how some of the implicit PM's heuristics can also have a negative influence on the growing index portfolios asset class. The motivation behind this paper is the analysis of some distinctive tangible problems of the Asset Management (AM) Industry with the aim of providing some useful inputs for AM companies, for professionals and for those who would expect a greater use of behavioral finance in portfolio management activity. Furthermore, our analysis, focused on the corporate bonds market, suggests useful operational inputs for the sector's specialists.

The paper is structured as follows: first, we briefly describe benchmark composition criteria in the light of a behavioural perspective, then we introduce the data and methodology leading our quantitative analysis. Results, conclusions and implications for the AM industry then follow.

1. Benchmarks' Appropriateness and Heuristics

One of the key issues for a mutual fund in embracing a market index as benchmark is its appropriateness. Generally, a market index requires the submission of several guidelines such as: 1) being objective and transparent, meaning that the benchmark should be clearly defined and easily understood; 2) being representative of the asset class, meaning that it should define the range of eligible instruments specified in the investment mandate; 3) being replicable and investible, meaning that all assets represented in the benchmark should be eligible instruments and readily tradable; 4) being computable and developed from publicly available information, in the sense that investors should be able to review the benchmark portfolios and assess their relative exposures on a continuous basis.

The trade-off between representativity and replicability is straightforward: the greater the representativity of the basket, due to a wider number of assets included, the less achievable is the basket replicability, due to the greater number of tradable assets and a feasible illiquidity risk. Similarly, the greater the number of index components, the higher the transaction costs supported by the financial portfolio. An example is the Morgan Stanley Capital International World, one of the most chosen benchmarks by international equity mutual funds: the index being composed of approximately 2.000 stocks. The complexity of investing and monitoring such a large number of assets is assured.

Another important issue is the direct relationship between the benchmark's characteristic of market representativity and the indices' constituent weights. For example, if we consider indices representative of bond markets, we can observe that they are often based on the total amount issued by countries, in the case of Government Bonds, or companies, in the case of Corporate Bonds. This proportionality has important implications on the implicit risk of the benchmark portfolio. For that reason, a mutual fund that invests in Emerging Markets Bond is largely composed by the issues of the countries that hold more debt because they are most representative of the underlying asset class.

An example of the market distortions following this composition rule can be seen observing the Merrill Lynch (ML) USD Emerging Market Sovereigns & Credit Index composition. If we focus on the weight dynamics of the Argentinean Bonds on this market index it can be surprising to realize that it was 14.50% on December 2000, 2.14% on December 2005 and 4.59% on December 2007[1]. Due to the huge debt of the Republic of Argentina it was observed that just before its default there was a proportional weight into the ML index due to the market index representativity. Implications in terms of a portfolio's overall risk are then straightforward. If we consider the performance of that asset class, we realize that the ML USD Emerging Market Sovereigns Argentina has registered a -61.9% in 2001, in correlation with the higher presence of these bonds in the ML index, and than +52.8% after the Argentine debt swap, in correspondence with a 2.14% market weight. The results of a market neutral investment strategy are then easily understandable.

Similar considerations can be applied for most of the equity market indices' underlying managed portfolios. Equity benchmarks show a composition that is proportional to the market capitalization of their constituents, in order to guarantee the representativity of the asset class. Once more, it's interesting to consider some biases that affect an index composition based on the market capitalization criteria. For example, it is well known from the literature that glamour stocks are the ones that have registered a good past performance and consequently the ones with the higher multiples with respect to the historic average. Chan et al. (2002) argue that PMs tend to cluster around a broad index, like S&P500, avoiding extreme positions relative to the index: when they choose to stray from the benchmark they are more prone to favour growth stocks with good past performances. Herding pressures arising, for example, from the practice of relative performance evaluation, and would also motivate PMs to select stocks that have done well in the past.

The homogeneity in investors' preferences causes alterations in the widespread optimism/pessimism in the financial markets, due to the concentration of investment strategies on

the same stocks. Sharma et al. (2006) examine the trading behaviour of institutional investors during the crash of 1998-2001. This study shows that during that period PMs herded into internet stocks with relatively high and increasing intensity.

Investors' preference for a particular investment idea provokes a lower risk premium required by investors to hold the asset in a portfolio. As a consequence, higher asset class valuations sour as do their weights inside the market indices. This phenomenon is observable for example in the S&P500 industry weights evolution: Table 1 reports the market capitalization of the Information Technology (IT) Industry in different time periods. To an IT sector weight of 34.81% in March 2000, the peak of the *"irrational exuberance"* corresponds with an approximately halved sector index weight on December 2007 (16.87%). One feasible paradoxical consequence is the situation in which an active PM, bullish on the IT sector on December 2007, could have shown a sector market weight in the portfolio lower than the one exhibited in March 2000, even when a sector underweight derived from a bearish idea was decided.

<< INSERT TABLE 1 ABOUT HERE >>

Once more, the heuristics that derive from the investors' anchoring to a well-defined level, considered "optimal" overall by the market, have substantial implications in the asset allocation choices implemented by the PM. When forming judgments, people have a tendency to become anchored on numbers in their heads and do not make sufficient adjustments relative to the anchor (Edwards, 1964). Anchoring is also a source of the conservatism shown by economic agents. For example, analysts who suffer from conservatism due to anchoring-and-adjustment do not adjust their earning predictions sufficiently in response to the new information contained in earnings announcements (Shefrin, 2000).

2. Data and methodology

In order to investigate the real effects of benchmarks' composition criteria, we apply an analysis focused on non financial corporate bonds. We have chosen the corporate bond asset class because of one of its peculiarities: this being that the issue's credit default rate risk is constantly monitored by rating agencies. In particular, we concentrate our analysis on investment grade bonds, rather than high yields, because they are the ones favoured by mutual funds. The reason comes down to the higher number and amount of investment grade issues in the corporate bond market. Credit rating is the globally recognized default risk assessment of a bond issuer and for that reason, allows us to implement our analysis based on non arbitrary rules. We associate the downgrade to a speculative grade level with a sell recommendation decided by a potential team of analysts, which is widely followed by investors. Operationally, for a PM a bond exclusion from the investment grade universe means the bond's exit from the benchmark and then inexorably from the managed portfolio, if we assume that a passive investment style is adopted.

This analysis is focused on the ML Emu Non Financial Corporate Index, in the period 01/01/01[2] - 31/12/07 and it is based on data sets from Bloomberg. The index chosen is representative of issues denominated in Euro currency and its components' number range from 336 to 579 issues during the period. The index's composition is based on a set of rules that aim to guarantee both the index replicability (in order to avoid illiquid securities) and a bounded portfolio risk to investment grade. The credit ratings used by ML are based on a composite of Moody's and S&P. The calculation of a composite rating is undertaken by an averaging algorithm that is biased to the lower of the two ratings[3]. The index is re-balanced on the last calendar day of the month based on information available in the marketplace up to and including the third business day prior to the last business day of the month. Rating changes that take place after the third business day prior to the last business day of the month are not taken into consideration until the following re-balancing. Four criteria can initiate a bond's exit from the ML index: 1) maturity lower than one

year; 2) illiquidity; 3) bond's rating unavailability; 4) downgrade to a speculative grade credit rating.

Our analysis is based on these index rebalancing criteria[4]. In particular, we follow an investment strategy that adopts a rule diametrically opposite to the ones defined by the ML index, concerning the bounded risk to investment grade. We are supposed to buy the downgraded bond on the same trading day of its exit from the benchmark. We name the list of these issues CONTRARIAN BONDS because they are selected through a Contrarian Investment Strategy (CIS) with respect to the benchmark's rules. We than observe the selected bonds' performance on different time horizons: 1, 2, 3, 4, 5, 6, 12, 18 and 24 months from the buying date.

The bond's daily performance[5] is defined as follows:

$$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} + C_i \cdot \frac{dd}{365} \qquad (1)$$

where:

$R_{i,t}$ = performance of the *i*-bond in correspondence of the date *t*;

$P_{i,t}$ = *i*-bond close price at the date *t*;

C_i = *i*-bond's annual coupon rate[6];

dd = difference between day *t* and day *t-1*[7].

For each time period we calculate the bond's compounded daily performance.

The bond's prices $P_{i,t}$, in some cases, aren't able to capture the wide bid-ask spread caused by the high volatility that follows a bond's downgrade. On the other hand, the liquidity risk (Driessen, 2005) symmetrically affects also a trackers PM strictly aligned to the benchmark's composition. In the case of default by the issuer[8] we consider as a selling price the market price registered in correspondence of the company's default announcement date. We than compare each bond's performance with the benchmark: this first comparison aims to verify the results of an investment strategy that exactly mirrors the benchmark.

A second analysis is required in order to take into account the different risk-return profile of the CONTRARIAN BONDS with respect to the investment grade benchmark. Aiming to compare

each selected bond with its homogeneous high yield category, we distinguish the high yields into three classes: BB, B e CCC & lower rated. For each selected bond we follow the credit rating evolution during the observed period: afterwards we calculate a synthetic index, able to reflect the daily performance of the overall bond's rating category. We name the group of these indices HIGH YIELDS whose daily returns are expressed as:

$$R_{HYi,t} = \begin{cases} R_{CCC\&lower,t} & \text{if the bond is rated CCC or lower at date } t; \\ R_{B,t} & \text{if the } i\text{-bond is rated B at date } t; \\ R_{BB,t} & \text{if the } i\text{-bond is rated BB at date } t; \\ R_{bmk,t} & \text{if the } i\text{-bond is rated investment grade at date } t\,. \end{cases} \quad (2)$$

where:

$R_{HYi,t}$ = performance of the synthetic index HY associated with the *i*-bond at date *t*;

$R_{CCC\&lower,t}$ = performance at date *t* of the rating classes described by ML Euro CCC&lower rated Index;

$R_{B,t}$ = performance at date *t* of the rating classes described by ML Euro B rated Index;

$R_{BB,t}$ = performance at date *t* of the rating classes described by ML Euro BB rated Index;

$R_{bmk,t}$ = performance at date *t* of the rating classes described by ML Emu Non Financial Corporate Index[9].

Therefore, the synthetic indices HIGH YIELDS are calculated through the compounded daily performances of the speculative grade indices, homogenously associated with each bond.

This further comparison gives an evaluation of the difference between the CONTRARIAN BONDS performance with respect to the returns of an equivalent class of risk. What we aim to verify is whether the contingency of the bond's exit from the benchmark occurs during a phase of investors' overreaction to a new event, in our case the downgrade to junk bond. A market overreaction can be firstly caused by a heightened risk perception over the downgraded bond with respect to the implicit risk underlying assets characterized by the same risk profile. In the second place, this market anomaly can be ascribed to a typical mechanism of the AM industry: whenever a

constituent index security is removed out from the most followed benchmarks then PMs must concentrate selling orders on the same assets during a small time period. The obvious final effect is a stressed market price.

In aiming to better understand these two different explanations of the phenomenon we engage in a final analysis. We follow an investment strategy based on the methodology previously described but assuming to buy the selected issues on the date of their downgrade announcement[10] instead of in correspondence to the bonds' exit from the benchmark. We implement this analysis, that we name Downgrade Investment Strategy (DIS), in two different cases. The former intends to compare the results of the DIS and the CIS, in order to understand the index rebalancing criteria effect on a managed portfolio. The latter aims to focus especially on the overreaction phenomenon, exploiting the DIS on the CONTRARIAN BONDS sample about with the exclusion of the defaulted bonds.

These different analyses allow us to think over the portfolio management of this market segment by the side of a professional anchored to a target benchmark.

3. Results

First of all, we observe the composition of the ML Emu Non Financial Corporate Index in the period 01/01/01 – 31/12/07. Table 2 summarizes the average number of the index's components during the time-frame and its turnover rate. The data confirm a high turnover rate: this evidence leads to important consequences in terms of the index replicability. A higher constituent turnover, due to the index's representativity, corresponds with a higher tracking error (Frino et al., 2004) and a set of transaction costs, held by the portfolio, in terms of wider bid-ask spreads above other administrative expenses.

<< INSERT TABLE 2 ABOUT HERE >>

The basket of bonds selected through the contrarian investment strategy is composed by a total of 92 issues (corresponding to 50 issuers). To the end of 2007, two issuers have defaulted: namely those of Marconi (2001) and WorldCom (2002). It must be highlighted that two of the most famous defaults aren't included in the CONTRARIAN BONDS basket: Enron (2001) and Parmalat (2003). In reality, several issues of these companies belonged to the ML index but the suddenness of the downgrade, combined with the company default declared before the index rebalancing, didn't allow them to be included in the CONTRARIAN BONDS basket. In this case, it's evident that the index rules, established ex-ante and associated with a downgrade close to the companies default, fail in the main purpose of investors' protection. Moreover, in the case of downgrade before the index rebalancing, even for a short time period, the benchmark doesn't respect the established risk profile until the bond's exit from the index.

Table 3 gives the numerical value for the Abnormal Returns (ARs) obtained implementing the CIS on the different time horizons. Each CONTRARIAN BONDS' average performance is compared both with respect to the benchmark and with the homogeneous asset class return achieved through the HIGH YIELD indices. These results show positive ARs in every window examined, in both the two comparisons. The positive and significant ARs of the CONTRARIAN BONDS with respect to the benchmark illustrates the potential value loss supported by an investor that has passively followed the index rebalancing criteria selling the downgraded bonds in response to the bond's exit from the benchmark.

<< INSERT TABLE 3 ABOUT HERE >>

The positive excess returns of the CONTRARIAN BONDS with respect to the HIGH YIELDS suggests a disentanglement between the risk defined by the rating agencies and the one perceived by the financial markets. Looking at the two months time horizon result, we can identify the more extreme AR: in this case, the basket of CONTRARIAN BONDS outperforms its homogeneous rated category by +163bp (+10.19% yearly). The image in Table 3 shows how this

AR tends to diminish in the following months. On the other hand, a buy-and-hold investment strategy, with a time horizon greater than one year, offers a performance in line with the market segment, showing a outperformance narrowed to 2.46%.

<< INSERT TABLE 4 ABOUT HERE >>

Table 4 describes the results of the DIS. In this case, the positive ARs of the CONTRARIAN BONDS over the benchmark are lower than the ones achievable by the CIS. Observing the ARs over the HIGH YIELDS, we can confirm that on average, the selected bonds have experienced a market overreaction to the announcement of the downgrade to the speculative grade asset class. In this case, even if the announcement is public information, and therefore should only have a minor impact on the financial markets (Daniel et al., 1998), it must be considered a *"one time strong news event"* that can encourage an investors' overreaction (Barberis et al., 1998). Focusing on the performance of the CONTRARIAN BONDS in the period between the downgrade announcement and the security's exit from the benchmark it's important to underline that 54 out of 88 bonds experienced a negative performance in that length of time. This evidence proves a greater impact on prices of the bond's downgrade in correspondence of the exit from the benchmark rather than in correspondence of the announcement date.

<< INSERT TABLE 5 ABOUT HERE >>

Finally, Table 5 intends to show the effect of the investors' overreaction to the downgrade excluding defaulted bonds. The image confirms overreaction as a larger than appropriate effect on a security's price. Furthermore these results verify that this price anomaly is not a permanent trend, although the price change is usually sudden and sizable, because the distress erodes over time.

In sum, our results show that the outperformance of the securities selected through a CIS can be motivated by a bondholders' overreaction to the downgrade announcement and amplified by the rebalancing criteria effect of a market index, widely chosen in the AM industry as benchmark.

These insights offer some operational inputs. First of all, the positive ARs, observed on different time horizons, with respect to both the benchmark and the homogeneous risk category, show the loss of value for a portfolio anchored to the index composition rules submitted by the underlying benchmark. This value loss can be explained by disinvestments during market overreaction phases: this evidence suggests a careful market timing evaluation for the PM operativeness. More straightforward are the implications for a PM specialized in high yields: our results reveal the opportunity to overweight the downgraded issues at the time they exit from the investment grade benchmarks.

4. Conclusions and implications for the Asset Management Industry

Acknowledging the richness of previous literature, which aims to understand the PMs' biases exhibited in active investment strategies, we have attempted to translate some of the same results to index portfolios. As a consequence of disappointing performance of actively managed portfolios an old dilemma re-emerged: is benchmarking a more efficient investment strategy?

This article aimed to highlight how the index composition criteria can implicitly create important behavioural distortions in portfolio asset allocation, similar to the ones ascribable to an active investment strategy. Our analysis shows the constant positive excess returns of bonds selected through a contrarian investment strategy with respect to the rebalancing criteria of a corporate bond index bounded to the investment grade risk category. In particular, the market overreaction registered following the index constituents' downgrade is particularly intense in the two months time horizon from the bond's exit from the benchmark. Looking at our results, in most circumstances, investors are forced to sell an asset with bad market timing in order to constrain the risk of the investment but without protecting portfolios from the event of issuers' default.

The market representativity of the most embraced benchmarks in the AM industry is often based on the market capitalization criteria. Our evidence suggests the necessity to overcome the cap-weighted indices looking for baskets that show more efficient criteria and able to guarantee both investors' protection and a portfolio asset allocation not affected by the heuristics common to active investment strategies. For these reasons benchmarks' selection should then be one of the most important strategic-organizational choices for an AM company.

This paper aimed at nurturing future research with some fertile inputs. Benchmarks should overcome the index composition rules based exclusively on market representativity. In the case of equity mutual funds, the adoption of equally weighted market indices or baskets based on a mix of parameters such as corporate earnings, sales or cash flows should overwhelm the biases connected to the market-cap allocation. Focusing on the Government bonds market, we can suppose to replace the representativity concept, based on the amount of Countries debt, with macroeconomic parameters such as GDP. Finally, if we consider the corporate bonds asset class, our analysis suggests the idea of a gradual outflow of the downgraded bonds in order to avoid disinvestments with erroneous market timing. Future studies might then consider to identify market indices able to overcome the disentanglement between the static rules of benchmarks' composition and the financial markets dynamism.

Mutual funds that offer returns in line with their benchmarks are usually regarded as efficient portfolios because they offer the performance of the chosen market. Market return is also extremely important in investors' psychology, both in the case of professionals or savers, as Clarke, Krase and Statman, (1994), p.18, say: "*The benchmark portfolio exposes an investor to risk; returns will vary from period to period, and they might be negative in some periods. The benchmark portfolio, however, never exposes an investor to regret*".

We have highlighted a typical herding attitude that can be ascribed to PMs in their investment decision process. If we consider that AM companies follow the same benchmarks then these herding pressures amplify its consequences on financial markets and with greater impact.

The substantial benchmarks' homogeneity characterizing the industry can than be interpreted as the willingness of AM companies to avoid to bear the risk (or to have the regret) to show performances that move away from the overall average, a market return perceived by investors as a sort of *'act of God'*.

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Table 1

S&P500 Index Sector Weights

The table contains the sector weights dynamics of the S&P500 Index. To a weight of the Information Technology sector of 34.81% in March 2000, corresponds with an approximately halved sector index weight on December 2007 (16.87%). Estimates are obtained using Bloomberg data.

S&P500 INDUSTRY INDEXES	31/12/1999	10/03/2000	31/12/2006	31/12/2007
S&P 500 INFORMATION TECHNOLOGY INDEX	29,18%	34,81%	15,14%	16,87%
S&P 500 FINANCIALS INDEX	13,03%	11,40%	22,27%	17,58%
S&P 500 CONSUMER DISCRETIONARY IDX	12,70%	11,36%	10,62%	8,41%
S&P 500 INDUSTRIALS IDX	9,91%	9,08%	10,84%	11,49%
S&P 500 HEALTH CARE IDX	9,31%	9,41%	12,03%	11,98%
S&P 500 TELECOM SERV IDX	7,94%	8,15%	3,51%	3,63%
S&P 500 CONSUMER STAPLES IDX	7,17%	5,45%	9,25%	10,23%
S&P 500 ENERGY INDEX	5,55%	5,66%	9,82%	12,85%
S&P 500 MATERIALS INDEX	3,00%	2,40%	2,96%	3,37%
S&P 500 UTILITIES INDEX	2,21%	2,28%	3,55%	3,60%

Source: Bloomberg

Table 2

Corporate Bond Benchmark's Turnover

The table shows the average number of the index's components during the period 2001-2007 and its turnover rate. Estimates are obtained using Bloomberg data.

	2001		2002		2003		2004		2005		2006		2007	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
No. of benchmarks' components (Average)	336		484		528		579		552		509		550	
Bonds that exit from the benchmark :	35	**10,42%**	80	**16,53%**	90	**17,04%**	155	**26,78%**	109	**19,76%**	79	**15,52%**	65	**11,82%**
for the maturity < 1 year	*25*	*7,44%*	*39*	*8,06%*	*60*	*11,36%*	74	*12,78%*	81	*14,69%*	65	*12,77%*	58	*10,55%*
for other motivations	*10*	*2,98%*	*41*	*8,47%*	*30*	*5,68%*	81	*13,99%*	28	*5,08%*	14	*2,75%*	7	*1,27%*
Bonds that enter and than exit from the benchmark during the same year :	19	**5,65%**	15	**3,10%**	25	**4,73%**	12	**2,07%**	3	**0,54%**	6	**1,18%**	6	**1,09%**
for the maturity < 1 year	*2*	*0,60%*	*1*	*0,21%*	*9*	*1,70%*	0	*0,00%*	1	*0,18%*	0	*0,00%*	1	*0,18%*
for other motivations	*17*	*5,06%*	*14*	*2,89%*	*16*	*3,03%*	12	*2,07%*	2	*0,36%*	6	*1,18%*	5	*0,91%*
Bonds that enter the benchmark :	160	**47,62%**	117	**24,18%**	176	**33,33%**	94	**16,24%**	96	**17,41%**	111	**21,81%**	107	**19,45%**
Bonds that remain into the benchmark :	296	**88,10%**	370	**76,46%**	397	**75,18%**	420	**72,56%**	405	**73,44%**	422	**82,91%**	467	**84,91%**

Table 3

Contrarian Investment Strategy: Abnormal Returns

The table shows the ARs of the CONTRARIAN BONDS with respect both the investment grade benchmark and the homogeneous asset class determinated through the HIGH YIELDS indices. These results show, on average, a positive excess return in every time window examined, in both the two comparisons. The average CONTRARIAN BONDS outperformance with respect to the benchmark, illustrates the potential value loss supported by an investor that has passively followed the index rebalancing criteria selling the downgraded bonds in correspondence of bond's exit from the benchmark. The superior average performance of the CONTRARIAN BONDS with respect to the HIGH YIELDS indices can be explained by two different phenomenon: investors overreaction to the downgrade announcement and the rebalancing criteria of the benchmarks homogeneously embraced by asset managers.

Table 3 Contrarian Investment Strategy: Excess Returns

(t statistics in parentheses)

Measure	1-month Returns	2-month Returns	3-month Returns	4-month Returns	5-month Returns	6-month Returns	12-month Returns	18-month Returns	24-month Returns
Over the Benchmark AR	1,40% (1,868) *	3,41% (3,629) ***	4,35% (4,759) ***	5,73% (5,222) ***	7,75% (6,436) ***	7,57% (5,817) ***	14,75% (7,759) ***	20,25% (8,585) ***	26,87% (8,778) ***
Over the High Yields AR	0,56% (0,844)	1,63% (1,901) *	2,15% (2,363) **	1,68% (1,62)	2,92% (2,516) **	1,98% (1,631)	2,46% (1,565)	3,65% (1,82) *	5,06% (1,99) **
N. of observations	88	87	86	85	83	83	81	70	52

Note: CONTRARIAN BONDS are equally weighted. Analysis is of daily data.
* Statistically significant at the 10 percent level
** Statistically significant at the 5 percent level
*** Statistically significant at the 1 percent level

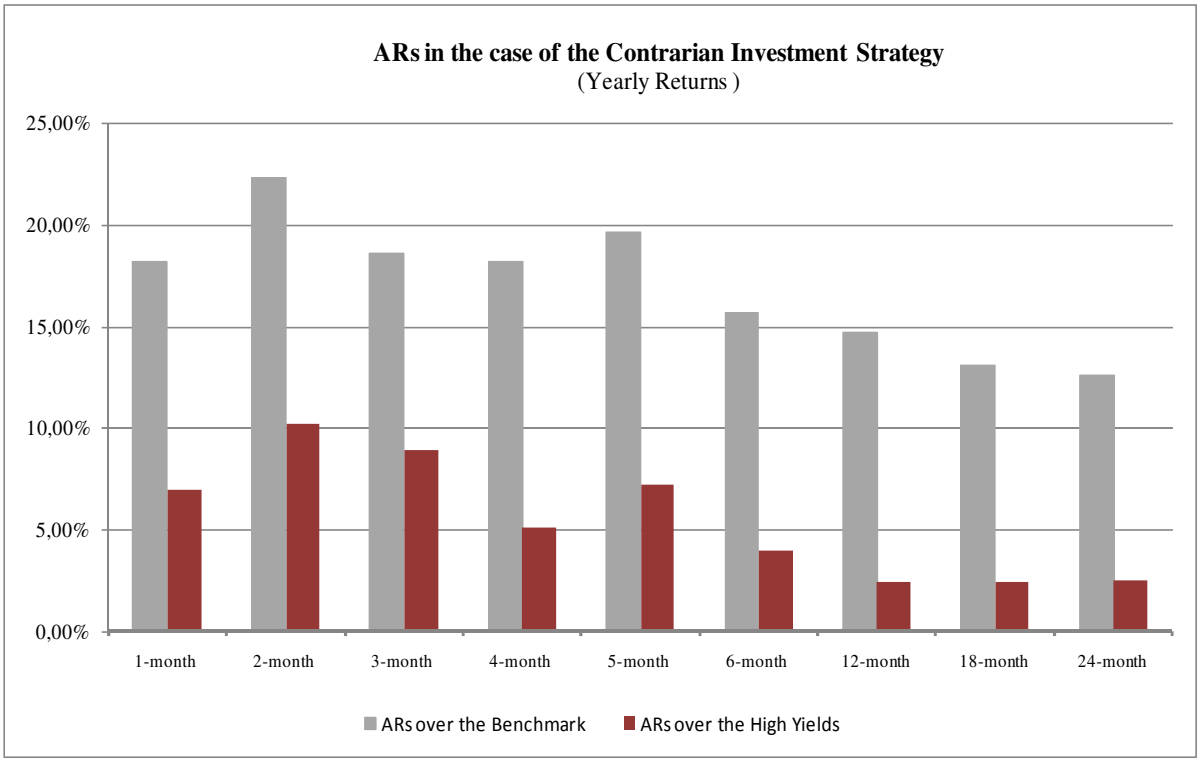


Table 4

Downgrade Investment Strategy: Abnormal Returns

The table shows the ARs of the CONTRARIAN BONDS when the Downgrade Investment Strategy is implemented. The results show, on average, a positive excess return of the strategy with respect to the benchmark but lower than in the case the Contrarian Investment Strategy is implemented. Observing the ARs over the HIGH YIELDS, we can confirm that on average, the selected bonds have experienced a market overreaction to the announcement of the downgrade to the speculative grade asset class.

Table 4 Downgrade Investment Strategy: Excess Returns

(t statistics in parentheses)

Measure	1-month Returns	2-month Returns	3-month Returns	4-month Returns	5-month Returns	6-month Returns	12-month Returns	18-month Returns	24-month Returns
Over the Benchmark AR	1,37% (1,22)	4,35% (1,687) *	3,06% (2,09) **	4,37% (2,697) ***	5,75% (3,41) ***	7,40% (3,927) ***	14,76% (5,377) ***	21,31% (6,35) ***	29,33% (6,47) ***
Over the High Yields AR	1,01% (0,919)	1,23% (1,024)	1,69% (1,184)	1,92% (1,156)	1,94% (1,172)	2,35% (1,307)	2,90% (1,158)	5,04% (1,684) *	7,95% (1,919) *
N. of observations	88	87	86	85	83	83	81	70	52

Note: CONTRARIAN BONDS are equally weighted. Analysis is of daily data.
* Statistically significant at the 10 percent level
** Statistically significant at the 5 percent level
*** Statistically significant at the 1 percent level

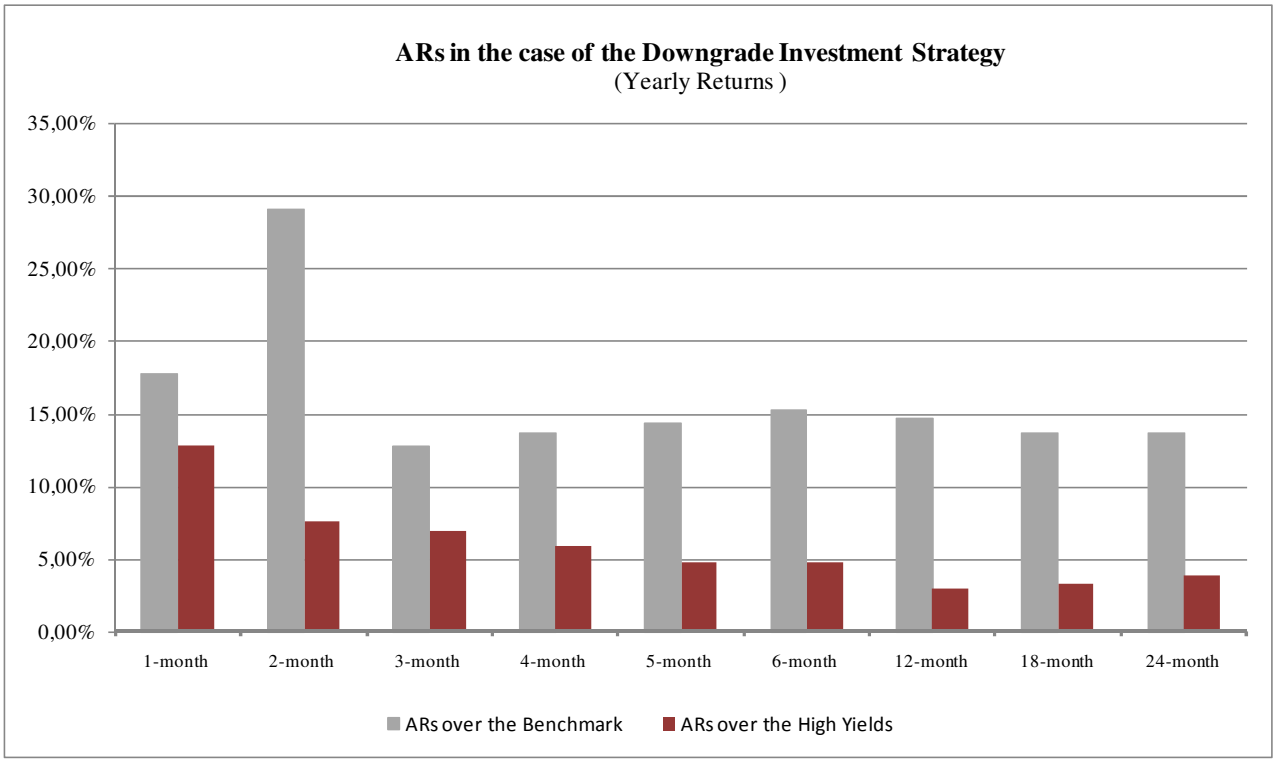


Table 5

Downgrade Investment Strategy: Abnormal Returns (excluding defaulted bonds)

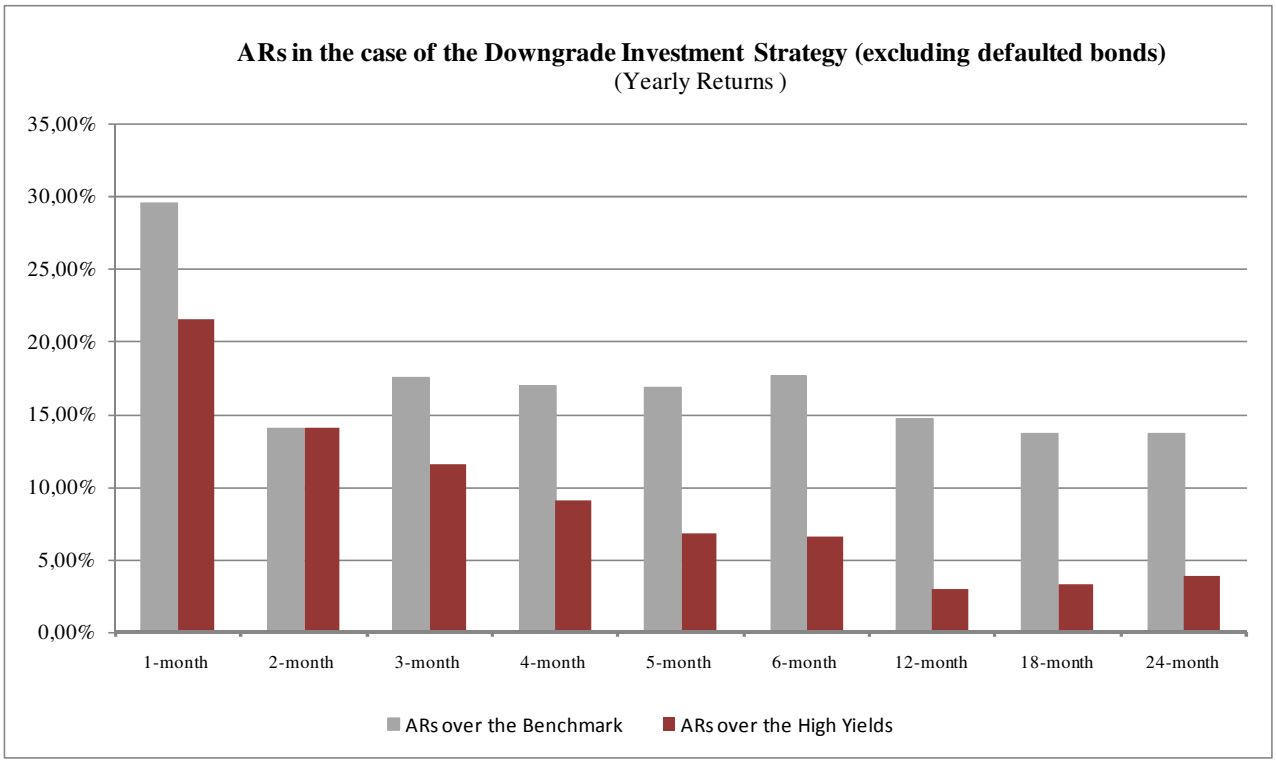
The table shows the effect of the investors' overreaction to the downgrade excluding defaulted bonds from the sample. The image confirms overreaction as a larger than appropriate effect on a security's price. Furthermore these results verify that this price anomaly is not a permanent trend, although the price change is usually sudden and sizable, because the securitys' distress erodes over time.

Table 5 Downgrade Investment Strategy: Excess Returns (excluding defaulted bonds)

(t statistics in parentheses)

Measure	1-month Returns	2-month Returns	3-month Returns	4-month Returns	5-month Returns	6-month Returns	12-month Returns	18-month Returns	24-month Returns
Over the Benchmark AR	2,18% (2,267) **	2,21% (3,25) ***	4,12% (3,223) ***	5,36% (3,624) ***	6,71% (4,322) ***	8,50% (4,822) ***	14,76% (5,377) ***	21,31% (6,35) ***	29,33% (6,47) ***
Over the High Yields AR	1,64% (1,628)	2,21% (2,181) **	2,76% (2,232) **	2,93% (1,926) *	2,78% (1,78) *	3,24% (1,871) *	2,90% (1,158)	5,04% (1,684) *	7,95% (1,919) *
N. of observations	85	85	84	83	81	81	81	70	52

Note: CONTRARIAN BONDS are equally weighted. Analysis is of daily data.
* Statistically significant at the 10 percent level
** Statistically significant at the 5 percent level
*** Statistically significant at the 1 percent level



Footnotes

[1] Source: Bloomberg.

[2] Before the initial date of the observation period, some of the index components weren't covered by rating.

[3] If a bond is rated by only one service, its composite rating is equal that individual rating.

[4] The index rebalancing criteria of the ML Emu Non Financial Corporate Index are common to the ones associated to other corporate bond indices, like the Iboxx EUR Bonds, the underlying benchmark of some Exchange Traded Funds.

[5] The ML index is an accumulation index. Coherently, we suppose to reinvest all the coupons in the same bond.

[6] The annual coupon is based on a 365 days.

[7] Business days are determined in accordance with a global holiday schedule. *dd* considers non trading days.

[8] In this case, the bonds' daily performance doesn't consider the coupon yield.

[9] This is the case in which a bond is upgraded to investment grade without re-entering as benchmarks' constituent.

[10] This date coincide with the first announcement of the bond's downgrade to the speculative grade level by one of the rating agencies.