Do derivatives enhance or deter mutual fund risk-return profiles? Evidence from Italy

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ABSTRACT

We analyze the use of derivatives in Italian equity mutual funds from December 2002 to May 2007. We find that the average asset allocation in derivatives increased by around 50% during this time frame, roughly coinciding with the harmonization of Italian regulation of mutual funds to European standards. During the same period, users of derivatives significantly increased their risk-adjusted performance, increased their market risk exposures, reduced idiosyncratic and total risk, reduced skewness, and increased kurtosis. In contrast, non-users of derivatives increased their overall performance without either increasing their market exposures or changing the skewness of their returns. In spite of the increased exposure to derivatives, overall risk reduction was equal for both users and non-users of derivatives. These findings do not support the public perception about the use of derivatives as a means to increase risk through speculation.

JEL classification: G11, G21, G32.

Keywords : Mutual funds, derivatives

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1. INTRODUCTION

The last decades have witnessed an exponential growth in the number and the variety of derivative instruments available to investors. Such a wide range of derivative instruments allow investors in general, and investment managers in particular, to manipulate the performance of their portfolios in many different ways. For example, derivatives allow fund managers to reduce the exposures of their portfolios, to reduce transaction costs, and to use information better (Scholes (1981), Silber (1985), Stoll and Whaley (1985), Merton (1995), Koski and Pontiff (1999)). But derivatives can also be used to increase portfolio risk. Because there have been a few widely published cases of devastating results caused by the use of derivatives, the consensus among the general public is that the latter use of derivatives is most common.

In this paper, we study the use of derivatives in Italian equity mutual funds from December 2002 to May 2007. During this period, Italian authorities released a new regulation for mutual funds that incorporated EU guidelines to unify the European financial markets. Among other changes, the regulation allowed mutual funds to invest in a wider variety and quantity of derivative instruments.[1] The introduction of the new regulation allows us to test whether investment managers use derivatives to hedge, to speculate, or to reduce market frictions such as transaction costs, or information costs. In fact, an increased exposure to derivatives due to a more lax regulation could modify fund performance and risk in different ways, depending on the use of these instruments by Italian investment vehicles. Whether there was indeed such an increased exposure to derivative instruments following the regulatory change, and whether this increased exposure modified the funds' performance or risk profiles is the main objective of this study.

[1] *The appendix contains the details of the main changes brought by the new regulation of Italian mutual funds.*

We find that Italian mutual funds significantly increased their use of derivatives following the official announcement of the new set of rules. The average equity mutual fund increased its allocation of derivatives by a full percentage point, from 2.2% to 3.2% of total assets circa. Equity mutual funds that already used derivatives before the regulation increased allocations roughly from 4.1 to 5%. Changes on fund performance during the same period were surprisingly positive. In fact, the increase in allocation to derivatives coincided with an overall increase in market exposure and a decrease in idiosyncratic risk, translated in a net decrease of total risk. Risk-adjusted performance increased during this period, while the skewness of return distributions decreased and the kurtosis increased during the same period.

By further comparing the unconditional changes in risk-return profiles of the mutual funds among users and non-users of derivatives, we find that users of derivatives did not have a significantly different behavior regarding the change in total risk, although we do find that the increase in beta was higher for users of derivatives. Similarly, users of derivatives had a higher decrease in skewness and a higher increase in kurtosis than non-users. Mutual funds that started using derivatives with the new regulation also experienced a higher than average increase in risk-adjusted returns, and a stronger reduction in idiosyncratic risk.

We then perform two sets of multivariate analysis in order to further explore the relationships between the distribution of returns and derivative use. First, we condition the changes in fund performance to other fund characteristics, including the changes in portfolio allocations. Our primary results are not significantly changed. Finally, we perform an event study analysis where the control sample is composed of mutual funds that do not use derivatives, in order to explore whether the change in regulation can be attributed for the changes in portfolio risk-adjusted returns. We do find some evidence of a distinct performance between users and non-users of derivatives regading exposures to market risk, due to the change in regulation.

Overall, our evidence is not consistent with portfolio managers using derivatives to hedge; otherwise we would observe that users of derivatives both decrease total risk and decrease, rather than an increase, kurtosis. Likewise, we cannot assert unequivocally that

derivatives are in general used to speculate, otherwise we would observe a higher increase in standard deviation for users, relative to non-users, of derivatives. A more likely use of derivatives that is consistent with our results is to follow market indexes: starting with an average beta that is lower than one (as occurs in our sample), a fund that uses derivatives to track a market index is likely to increase beta more than with other diversification strategies that do not involve derivatives. Similarly, the larger decrease in skewness for users of derivatives – i.e., shifting the "bulk" of the distribution to the right – is consistent with using derivatives to track the market in the bull market under analysis.

Our results shed light on the use of derivatives by a particular type of investors, namely Italian equity mutual funds. We contribute to the literature on the use of derivatives by financial and non-financial firms (for example, see Booth, Smith and Stolz (1984), Eccher, Ramesh and Thiagarajan (1997), and Gorton and Rosen (1995) for evidence on the use of derivatives for financial firms, and Tufano (1996) and Hentschel and Kothari (2001) for non-financial firms).By focusing on mutual funds, our results are most closely related to the results of Koski and Pontiff (1999) for a sample of US equity mutual funds, Johnson and Yu (2004) for Canadian mutual funds and Marin and Rangel (2007) for Spanish mutual funds. The main difference with respect to these papers is the use of a change in regulation as a natural experiment to explore how derivatives are used. Nevertheless, the results are similar in that we do not find significant differences in the distributions of users vs. non-users of derivatives, nor clear-cut evidence for the use of derivatives as a means for speculation.

The rest of the paper is organized as follows. In Section 2 we describe the data used in the study. Section 3 presents the first univariate analysis on the relationship between the use of derivatives and fund performance. Section 4 presents the multivariate analyses of the paper, including the event study. Conclusions are left to Section 5. The Appendix contains further details about the regulatory change regarding Italian investment vehicles.

2. DATA DESCRIPTION

2.1 Sample description

The data consists of all Morningstar-classified equity open-end mutual funds marketed in Italy during December 2002 and May 2007 that were active during June 2007. The sample contains general characteristics of the fund (ISIN fund identification number, name, domicile, name of manager, Morningstar category, custodian, advisor, etc), the size of the fund (total assets), and historical information about returns and broad portfolio allocations (cash, equity, bonds, preferred stock, convertible bonds, and other (warrants, options, and derivatives), as percentage of the fund's assets).

As mentioned in the introduction, there were major changes in the regulatory framework for Italian mutual funds during the sample period. In particular, in April 14, 2005, a new document governing Italian investment vehicles, pronounced by the Governor of the Bank of Italy (henceforth the Pronouncement of the Bank of Italy, PBI) was made effective. Previous to the PBI, mutual funds were allowed to allocate a maximum exposure of 10% of the fund's net assets to derivative securities. Any fund exceeding such exposure was obliged to hold the assets generating the cash flows promised by the derivative instrument (or its cash equivalent). With the enactment of the PBI, these restrictions were lifted. The maximum exposure to derivatives can now be set up to a maximum of 100% of the fund's net asset value, instead of the previous limit of 10%. For the calculation of this exposure, a new measure of counterparty risk was also introduced.

The new PBI also summarized the simplified procedures for European investment companies to operate in Italy, as well as the procedures necessary for Italian mutual funds to operate throughout the EU. As a result of the PBI, virtually any investment company recognized by the local regulatory autority of other European country was permitted to

market its mutual funds in Italy. The Appendix contains more details about the major changes brought by the PBI and the timing of the enactment of these changes.

The original sample was collected after the PBI was made effective, i.e. during June 2007. This sample contained information on 5316 equity funds marketed in Italy at the time of the data collection. Clearly, by this date the new regulation was already in place, so some of these were domiciled outside of Italy, and could have not been available to Italian investors previous to the approval of the regulation. In our analysis we want to compare the changes in distributions of returns for the same sample of funds, i.e. only on those that were subject to the changes experienced within the Italian regulatory environment. Therefore, we restrict the analysis to the 415 funds that have their domicile in Italy, our target sample. These funds accounted for a total net asset value of 72.7 billion euro in 2005, i.e. 52% of the total market capitalization for Italian open-end equity mutual funds (Assogestioni 2008). The selected sample results in a quite balanced panel data set: We have complete monthly returns information for more than 75% of the funds, and only 5% of the sample funds have less than 25 (out of 54) monthly return data points.

On average, only 40 to 50% of the Italian funds in the sample report their portfolio allocations to Morningstar on a monthly basis. The majority of the funds report the portfolio allocations on a quarterly basis. As a result, on a monthly basis we have information about portfolio allocations for a minimum of 22%, and a maximum of 87% of the funds. Missing information about portfolio returns could be a problem for our analysis if funds that do not use derivatives are less likely to report their portfolio allocations. We analyze whether this occurs in our sample by calculating the correlations between not reporting portfolio allocations and fund size. To the extent that the use of derivatives is correlated with the fund size (Johnson and Yu 2004; Marin and Rangel 2007), high positive correlations between non-missing portfolio allocations and the size of the fund would indicate an underrepresentation of funds that do not use derivatives in our sample. We do not find evidence for such an underrepresentation: Regressions of different measures of size on a dummy variable for non-missing portfolio allocations (available upon request) do not consistently yield significant positive coefficients on a period-by-

period basis, nor for the sample as a whole. We conclude that our sample is representative of the universe of mutual funds.

2.2 Derivative allocations: The time trends

We use the asset allocation reported by Morningstar to identify the funds that used derivatives each period. Morningstar reports the percentage of the fund's assets that are allocated in cash (cash and money market instruments), equity (common stocks), bonds, preferred stock, convertible bonds, and other. The category observed as "other" contains information about warrants, options, futures, and other derivatives. Morningstar only considers long positions, so the asset allocation in each of the five identified groups adds up to 100%.[2] We use the category "other" to identify the funds that are exposed to derivatives, and by how much. It is important to note that according to Italian regulations, warrants and options linked to operations on the capital of the issuing companies have never been considered as derivatives. Any position on these instruments adds up to the fund's equity position and is not accounted for in the calculation of the limits to derivatives exposure. Our measure of use of derivatives by each fund therefore overestimates the amount of derivatives that is legally permitted by Italian regulation. Yet, the scope of this study is not to determine the exposure of Italian funds to derivatives, but to analyze the impact of the change in the law on the risk profile of the funds. If the changes in regulation increased the exposure of Italian funds to derivative instruments, on average the asset allocation of "other" instruments should increase for Italian funds. Any changes on the risk behavior of funds due to an increased use of derivatives will be reflected in an increased exposure to derivatives, and hence in an increased value for our variable.

[2] *Regulation in many European countries, including Italy, Luxembourg and Ireland, forbids funds to take up short positions in assets (European Commission 2008). Therefore, the asset allocations reported by Morningstar used in this study represent a good picture of the actual portfolio allocations of the funds.*

Using this variable as a proxy for the use of derivatives, we find that the proportion of Italian funds using derivatives increased by ten percentage points, going from an average of 53.2% to 63.2% after the reform was in place. Similarly, as can be appreciated from Figure 2 Panel A, the average allocation of assets on derivatives also increased significantly. For all Italian funds, derivatives allocation changed from 2.19 to 3.13% after the regulation was made effective. For the subsample of Italian funds that use derivatives, the allocation dedicated to this asset class also increased from 4.11 to 4.96% after the change (See Figure 2 Panel B). These differences are significant and contrast sharply with the allocation of derivatives for the average European fund (excluding Italy), which on average decreased their allocation on derivatives (from 3.09 to 2.63% for all funds, and from 6.02 to 4.84% for users of derivatives only).[3]

From Figure 2 we observe that the average allocation of derivatives for Italian mutual funds was quite low before the regulation change, at 4.11% for the funds that use derivatives, and 2.19% for the whole sample. This means that for the average user fund of derivatives, the previous regulation prohibiting a position larger than 10% of total assets on derivatives was *not* binding. In fact, a closer look at the distribution of the allocation on derivatives previous to the regulation indicates that the regulation was binding for less than 10% of the funds in the sample. Indeed, the top decile of funds sorted with respect to their allocation in derivatives corresponds to an average 5.5% of total assets previous to the regulation, and the average top 5% percentile of allocation in derivatives is 12.4%.

As a second observation, we note that Italian mutual funds started to increase their allocation on derivatives during the second quarter of 2004, much before the official regulation was enacted in April 2005. The increase in portfolio allocations on derivatives roughly coincided with the first official release of the draft of the regulation in June 2004. In fact, this increase on derivatives allocation before the regulation was made effective

[3] *Reported figures for average allocations on derivatives exclude the "transition period" that goes from May 2004 to April 2005, i.e. the period comprising the announcement of the first draft of the PBI and its official enactment. All reported differences are statistically significant at confidence levels of 99%, both for parametric and non-parametric tests. Including the transition period clearly narrows the differences in absolute terms, but does not alter the statistical significance of the differences.*

was actually possible due to the first finding, i.e. that regulation was not binding to start with.

Panel B of Figure 2 shows that the increase in derivatives allocation was made up to the point where it reached the average allocation of derivatives in other European countries. We conjecture that the increase in the use of derivatives in Italian mutual funds was an attempt to become more competitive in the light of the opening of European markets through the UCITS regulation, rather than a direct consequence of the less severe regulation on derivatives use for Italian mutual funds. We shall return to this point when we discuss the results of the event study.

3. DERIVATIVES AND MUTUAL FUND PERFORMANCE: UNCONDITIONAL ANALYSIS

3.1 Risk, performance, and the use of derivatives

We now analyze the risk and performance of the Italian mutual funds prior to and after the regulatory change. For this analysis we define three measures for risk: total risk, idiosyncratic risk, and market risk. To measure total risk we use the standard deviation of the funds´ monthly returns in each sub-period. The standard deviation of the residuals of a market model regression of fund excess returns on a constant and the market premium are used to calculate the idiosyncratic risk. Finally, we calculate market risk as the estimated beta on the same market model regression.[4] We complement the analysis by adding a risk-adjusted measure of performance: the estimated constant in the above market model regression.

Table 1 contains the average alpha, beta, idiosyncratic risk, total risk, as well as the skewness and kurtosis of the funds' returns, for all Italian funds before the regulation was

[4] *For the risk-free rate we use the one-month Euribor. As a market index, we use Morgan Stanley Euro-based indices of Italy, Europe, US, UK, Asia, Japan, or World indices depending on each fund's target investment zone, as classified by their Morningstar category.*

announced (December 2002 to April 2004) and after it was set in place (May 2005 to May 2007).[5] The objective is to analyze whether there was an effect on the funds' performance coinciding with the regulatory change. We calculate the risk and performance measures, skewness and kurtosis for the whole sample and for sub-samples of funds classified according to their use of derivatives (used derivatives before and after the regulation change, never used derivatives, used derivatives only after the regulation change). Any evidence of a change in the funds' distributions of returns, or performance, would signal a probable effect of the regulation, and hence a change in portfolio allocation of derivatives, on fund performance. For this purpose, we calculate (in the last two columns) the paired t-tests and Wilcoxon sign-ranked tests for equality of the means before and after the regulation change.

We use two measures for the use of derivatives. In Panel A, a fund is classified as a user of derivatives if the fund allocated any positive amount to derivatives at least once during each subperiod. Since this measure could suffer from measurement error due to the fact that portfolio allocations must add up to 100%, we use an alternative measure in Panel B. Here, a fund is classified as a user of derivatives if it allocated on average at least 0.1% to derivatives in each subperiod.

We observe from the first row of each of the data blocks that Italian funds significantly increased the performance and decreased overall risk during the observed period. Average alpha increased from -0.18 to -0.04 after the regulation was set into place; standard deviation dropped from an average of 4.48 to 2.88. However, the observed decrease in risk was due solely to a decrease in idiosyncratic risk. Italian mutual funds reduced their exposure to non-market risk, from an average 2.31 to 1.73. Beta, on the other hand, *increased* during this period from 0.65 to 0.71. On the other hand, Italian mutual funds experienced a negative shift of the skewness of the distribution of returns during the post-event period, and an increase in the kurtosis. All these differences are

[5] *We exclude the period between the announcement of the first draft and the release of the official regulation to avoid the transition period where mutual funds adjusted to the new changes. Including the transition period does not change the results significantly.*

significant at a 1% level, both using the standard paired t-test and the paired Wilcoxon sign-ranked tests.

Notice that the reported t- and sign-ranked tests correspond to the pre-announcement against the post-regulation periods, and we have omitted the transition period from the analysis. However, we repeated the analysis by adding the transition period to the pre-regulation and to the post-regulation subperiods, respectively, and the results do not change significantly (we do not report these tests). This means that the observed patterns are monotonic on time; i.e. there has been a consistent increase in alpha and beta, and a decrease in idiosyncratic and total risk, throughout the period under study.
In the next six rows of each of the data blocks, we divide the sample into users, non-users, and new users of derivatives to test whether the observed differences are statistically significant among these different types of funds. If non-users or new users of derivatives have a different pattern regarding the change in portfolio performance during the pre- and the post- regulation periods, that would signal a possible effect of change in performance due to the use of derivatives, hence a possible effect of the change in regulation.

The performance of users and non-users of derivatives is similar regarding alpha, idiosyncratic risk, total risk, and kurtosis, independently of the classification used to determine users of derivatives. However, we find that users and new users of derivatives significantly increased beta, while non-users of derivatives seem to have decreased beta, although this reduction is not statistically significant. Similarly, the decrease in skewness is only significant for users and new users of derivatives, but not for non-users.

So far we have observed an increase in alpha and kurtosis and a decrease in idiosyncratic and total risk both for users and non-users of derivatives. But Table 1 could hide true differences in the performance of users and new users of derivatives vs. non-users of derivatives. For example, it could be the case that while all funds decreased standard deviation of returns, users decreased it to a greater extent than non-users. In Table 2 we complement the analysis of Table 1 by comparing the differences in the measures of performance and moments of returns among users, new users, and non-users of derivatives. As with Table 1, we use the same two classifications of users of derivatives in Panel A and Panel B, respectively. The first two columns of Table 2 contain,

respectively, the number of observations and the difference between the performance measure after the regulation was in place and before it was announced, i.e. $x_{after} - x_{before}$, for users of derivatives. In the next four columns we include the number of users of derivatives, along with their corresponding average difference on the performance measure, and t-test and non-parametric Wilcoxon z-tests relative to the sample of user funds. The last four columns contain the number of new users of derivatives, the average difference on their performance measure, and the t-tests and Wilcoxon tests relative to non-users.

Table 2 confirms what we had observed in Table 1 that the changes in beta and skewness are different among users and non-users of derivatives. But Table 2 reveals that users and new users of derivatives increased kurtosis more than non-users of derivatives. Alpha, on the other hand, increased more for non-users of derivatives than for users and new users of derivatives, although these results are not significant using parametric tests of differences.

Overall, the results in this section are consistent with derivative users using their increased position on derivatives allocation for purposes other than hedging – otherwise we would have expected, together with the reduction in total risk, a decrease in kurtosis. Results in this section are similarly not consistent with a speculative use of derivative instruments, as we do not observe an increase in portfolio risk for users and new users of derivatives. One possibility is that users of derivatives used their increased allocation on derivatives to increase their market exposure, by using derivatives on market indexes, for example. Since the period under study is quite bullish, this is consistent with the "bulk" of the distribution of returns shifting towards the right, i.e. the decrease in skewness. However, from this analysis we cannot conclude whether these differences are due to the change in regulation regarding derivatives use, or to the overall larger exposures to derivatives. We need to control for other factors that could have affected the change in fund performance during these periods through multivariate analysis. This is what we do in the following sections.

4. DERIVATIVE USE AND THE PERFORMANCE OF MUTUAL FUNDS: CONDITIONAL ANALYSIS

4.1 Portfolio allocations and fund performance

The starting point in our multivariate analysis is to determine whether the variation in fund risk, performance, and return distributions after the regulation was set in place is related to the variations on the use of derivatives. To analyze this issue, we calculate the changes in the funds' risk and performance before the regulation was announced (December 2002 to April 2004) and after it was set in place (May 2005 to June 2007), and relate it to changes in the uses of derivatives and other observable fund characteristics.[6] In particular, we perform the following regressions:

$$\Delta MEASURE = \alpha + \beta_1 \Delta DER + \sum_{i=2}^{5} \beta_i \Delta ALLOC_i + \beta_6 PERF + \beta_7 LagMEAS + \sum \beta_j Controls \quad (1)$$

where $\Delta MEASURE$ is the difference in risk, performance, or distributional measure between the period before the regulation was announced and the period after it was set in place, ΔDER is the difference in the average derivative allocation between these same periods, $\Delta ALLOC_i$ is the change in equity, bond, preferred stock and convertible bond allocation during these periods, $PERF$ is the difference between the mean excess return on the fund and the mean excess return for funds with the same Morningstar category during the period previous to the announcement of the regulatory change, $LagMEAS$ is the value of the risk or performance measure before the announcement of the regulatory

[6] *We exclude the "transition period" (May 2005 to April 2005) in which, as we observed in the previous section, the funds adjusted their derivative allocations to the European averages. However, including these months in the post-regulation period does not change substantially the results.*

change. As control variables we include investment styles and size classification, as summarized by the Morningstar Equity Style Boxes.

The relationship between changes in portfolio allocations and fund performance and risk measures can be inferred from parameters β_1 to β_5. Observe that in order to avoid perfect multicollinearity we have omitted the portfolio allocation on cash from the regressions. Therefore, these coefficients should measure the relationship between changes in risk or performance and a substitution of cash for each of derivatives, equity, bonds, preferred stock or convertible bonds, respectively. We include past performance of the fund to control for possible changes in fund strategies due to past success or failure, such as gambling for resurrection or incentive gaming (Ippolito 1992, Koski and Pontiff 1999). Finally, we include the lag of the measure to account for mean reversion.

Panel A of Table 3 contains the results of these regressions where the dependent variable is the change in beta (Column 1), idiosyncratic risk (Column 2), total risk (Column 3), alpha (Column 4), skewness (Column 5), and kurtosis (Column 6). A number of funds have missing allocation information, so we lose some observations due to this lack of information. In order to avoid possible biases due to the lack of portfolio data, we impute a zero in the changes in allocation for all funds with missing portfolio data, and include a dummy for the funds for which we do not have allocation information. Reported results correspond to these imputed variables and do not change significantly if we rerun the regressions excluding the funds with missing allocations.

Let us start by analyzing the relationship between allocation on derivatives and beta by observing the first column of Table 3. Since equity, bonds, preferred stock and convertible bonds all have a higher market exposure than cash, then if there is any relationship between change in portfolio allocations and the change in fund market exposure we should expect coefficients β_2 to β_5 to be positive (otherwise they should be not significantly different from zero). However, the sign of β_1 could be either positive or negative, depending on whether derivatives are used to hedge risk, to speculate, to time the market, etc. Indeed, we find that this coefficient is positive and significant, confirming previous results and indicating a relationship between the observed increase in derivatives

allocation and an increase in beta, conditional on the rest of the portfolio allocations. Thus derivatives do seem to play a role in increasing the market exposure of Italian mutual funds.

Regarding the rest of the types of securities, we find that changes in beta are significantly related to changes in equity allocation. However, we do not find evidence of relationship between changes in the other types of securities allocations and changes in beta. Coefficients β_3 to β_5 are not significantly different from zero.

Finally, we find that past performance is positively related to changes in market risk, although the coefficient is not statistically significant. We do find, however, a strong evidence of mean reversion: the coefficient of the previous beta is positive and significant at a 1% level. This is consistent with previous results (Koski and Pontiff 1999) and is likely to be due to measurement errors.

Contrasting with the results for beta, and confirming the unconditional t-tests of the previous section, we do not find a significant relationship between the observed increase in portfolio allocation on derivatives and idiosyncratic risk. The coefficient β_1 is not significantly different from zero in the second column of Table 3. In fact, there does not seem to be a systematic relationship between portfolio allocations and idiosyncratic risk. We also find strong evidence of mean reversion, and that past performance is negatively related to change in idiosyncratic risk. In other words, funds that performed well in the first subperiod tend to reduce their idiosyncratic risk in the second subperiod. These results are in line with the literature on mutual fund tournaments (Brown et al 1996).

As a consequence of the results on beta and idiosyncratic risk, we observe that the change in total risk, in the third column, is positively affected by the change in derivative allocations in the same way as it was related to the change in beta. These results were not apparent from the unconditional univariate differences. As in the previous cases, we find strong evidence of mean reversion and a negative, but insignificant relationship between past performance and change in total risk, as in Brown et al (1996). Finally, we find that funds with missing portfolio allocations have a higher standard deviation of returns, all

else equal. From Column 2, we may conclude that this higher standard deviation comes mainly from an increased idiosyncratic risk.

Regarding alpha, as may be observed in the fourth column of Table 3, we find that the change in asset allocation has no significant impact on the change in performance, once we control for all other observables. In particular, there is no clear relationship between derivatives allocation and fund performance. As in the other cases, we also find strong evidence of mean reversion, and that past performance is negatively correlated to the change in performance. The best performers increase alpha much less than the worse performers. This is consistent with mutual funds becoming more competitive at the light of the opening of Italian mutual funds to more competition from European peers.

From the last two columns of Table 3 we cannot conclude that an increase in derivative allocation is systematically related to changes in the skewness or the kurtosis of the returns. There is similarly no apparent relationship between previous performance and the change in the distributions.

As further general observations for all the regressions in Tables 3, we may say first that increases in equity allocation increase market, and total risk significantly, but have no significant impact on performance. Finally, all the fitted models have satisfactory F-statistics and adjusted R-squared.

All the presented results are robust to excluding the funds that have missing values for the changes in their portfolio allocations and dropping the dummy for missing allocations. In the reported table we do find some evidence that non-reporting funds tend to underperform reporting funds (negative coefficient for the dummy for missing changes in portfolio allocations). Non-reporting funds tend to have a similar beta than reporting funds, but a larger idiosyncratic risk and thus a larger total risk. Apart from this, the inclusion or exclusion of these funds from the analysis does not change the basic results.

To complete our analysis on the relationship with the use of derivatives with the change in risk or performance of Italian mutual funds, we complement these regressions with another set of similar regressions in which we substitute the portfolio allocations with three out of four dummy variables that divide the sample into mutually exclusive groups, namely: (i) funds that used derivatives both before and after the regulatory change, (ii)

funds that only used derivatives after the change, (iii) funds that only used derivatives before the change, and (iv) funds that never used derivatives. To the extent that the regulation regarding the use of derivatives had any effect on the risk or performance of funds, we expect the change on risk and performance to be highest for funds that use derivatives with respect to those funds that do not use derivatives. This would be reflected in significantly different coefficients for groups (i) and (ii) relative to group (iv). These regressions are reported in Table 4. Panel A of Table 4 defines a user of derivatives as a fund that had a positive allocation on derivatives at least once during each subperiod, while in Panel B a fund is defined to be a derivative user if its average allocation was at least 0.1%.

From Table 4 we find, once again, that the increase in beta is higher for firms that started using derivatives after the regulatory change, and for funds that used derivatives consistently throughout the period, than for non-users of derivatives. However, these results lose statistical significance when we use the definition of user of derivatives of Panel B.

Table 4 also shows that, conditional on other fund characteristics, the change in idiosyncratic risk seems to be negatively related with the status of mutual funds as users of derivatives, although these results are statistically significant only at a 10% level and only for the classification of users of derivatives of Panel B. Once again, these results are consistent with users of derivatives using derivatives on market indexes. Italian mutual funds seem to use derivatives only to increase market risk, and idiosyncratic risk is higher for non-user funds, probably due to the use of derivatives on market indexes to increase beta and probably due to the use of derivatives specific on particular firms to reduce idiosyncratic risk.

Finally, Panel B of Table 4 confirms the univariate results found previously about the relationship between users of derivatives and changes in skewness and kurtosis.

We can conclude from this analysis that there is some evidence of the impact of derivative use on fund risk. The relationship seems to be persistent regarding market risk: users of derivatives, and funds allocating greater amounts of assets to derivatives, seem to have a higher exposure to market risk, all else equal. A likely use of derivatives that is

consistent with our results is to follow market indexes: starting with an average beta that is lower than one (as occurs in our sample), a fund that uses derivatives to track a market index is likely to increase beta more than with other diversification strategies that do not involve derivatives. Similarly, the larger decrease in skewness for users of derivatives – i.e., shifting the "bulk" of the distribution to the right – is consistent with using derivatives to track the market in the bull market under analysis.

However, from the analysis of this section we still cannot conclude whether these relationships are due to the regulatory change regarding the use of derivatives, or to other factors that could have caused investment managers to reshuffle their portfolios. In the next section, we tackle this problem by using an event study that enables us to rule out other contemporary confounding effects.

4.2 Event Study

The literature of event studies underlines three particular points to take into account when performing a regulatory event study (Binder 1985, Binder 1998, MacKinlay 1997, Grout and Zalewska 2006). The first point refers to the importance of knowing the exact moment when the market changes its expectations. It is quite usual that reforms are publicly discussed such that the final outcome is known well in advance of the enforcement of the regulation. The second point refers to the unknown effect of the regulations, which may affect some firms and benefit some others. Thus, these mixed effects may make it difficult to find clear cut results. The last point refers to the difficulty of distinguishing the regulatory effect from other contemporary industry specific effects, which may introduce some bias in the results.

In order to tackle the first point, we use three different dates as possible starting points for the regulation. In the most conservative date, we use a period of circa two months previous to the release of the first draft version of the new regulation, which took place in June 2004, as one of the possible starting points for the event period. An alternative less

conservative date that we use as a second possible starting date is a six months period before the official release of the new regulation, i.e. October 2004. This second date coincides with the date that the regulation of Bank of Italy was approved by CESR (see the Appendix). Finally, we use the date of the official release of the new regulation, April 2005, as a third starting point of the event period. Thus, with these three different starting points of the event period we try to capture any change in the expectation of the mutual fund managers in anticipation to the change in regulation.

With regard to the second difficulty of regulatory event studies, we do not expect the regulation to have a particular negative effect on any particular type of mutual fund. The more lax regulation allowing a generally more extensive use of derivatives should have positive effects on all mutual funds that use derivatives – especially if the previous regulation was binding. On the other hand, mutual funds that did not use derivatives before the regulation should not be affected by the changes, except perhaps by a positive effect driven by the option of becoming users of derivatives.

Finally, in order to control for industry specific effects apart from the regulatory change, we use the Italian mutual funds that do not use derivatives as the control sample. The control sample should allow us to isolate the specific effects of the regulatory change from other confounding changes that could affect the performance and risk of mutual funds, in order to eliminate or control for alternative effects that could introduce noise and hence loss of significance or bias in the results. The usual way of proceeding is to subtract from the return of the sample under study the return of the control sample.

We believe that the sample of Italian non users of derivatives funds is the correct control sample since these funds are in the same environment as the Italian mutual funds that use derivatives (Italy), with a similar type of shareholders, subject to the same regulation changes, with the single difference being the fund manager's decision to use derivatives or not. Hence, while the sample under study is clearly subject to the regulatory change regarding derivative use, the control sample is clearly not.

We propose for the event study analysis a CAPM and a CAPM type model with a dummy variable controlling for the event period, and the interaction of the event dummy and the market excess return. Thus the model specification is as follows:

$$r - r_f = \alpha + \beta\left(r_m - r_f\right) + \gamma D + \delta D\left(r_m - r_f\right) + \varepsilon$$

where *D* takes the value of one for each of the three dates chosen for the start of the event period as defined above and zero otherwise; r is the return of an equally weighted portfolio; r_f the risk free rate; and r_m the return of the market portfolio. We run the event study on three different equally weighted portfolios: one constructed from the returns of the sample of derivative users, one using the control sample (non derivative users), the third one being the difference between the returns of the first and the second portfolios.

Our approach uses the betas estimated using returns of equally weighted portfolios rather than averaging the betas estimated for each of the mutual funds. Both approaches are equivalent because the CAPM beta is additive. However, the portfolio estimate has the advantage of providing confidence intervals for the estimators. In what follows, we shall refer to the portfolio of users of derivatives as the regulated portfolio, and the portfolio of non-users of derivatives as the control portfolio.

According to the three different defined event periods, we have three slightly different specification equations. If the change in regulation has any effect on market risk and/or performance we would expect to find a significant γ and δ for the regulated portfolio and for the difference between both portfolios, while not necessarily so for the control sample. Moreover, if the change in regulation has a positive effect on performance we expect a positive γ, while δ could take any value depending on derivatives being used for hedging or speculation purposes.

We run the three specifications for each of the three different portfolios, in order to capture the potential effect of the regulation on the regulated sample, the control sample, and the difference of both. Notice that the difference of both samples should give us the effect of the regulation net of any other industry specific effects apart from the change in regulation. Finally, given that our sample of interest is the equity oriented funds, we would expect a positive beta. In fact, we find positive and significant betas for the regulated and the control samples.

Finally, we use the same two definitions for users of derivatives that we have used before. In Panel A of Table 5, a user of derivatives is defined as a fund that allocated a positive amount to derivatives in at least one period. In Panel B, a user of derivatives is a fund allocating on average at least 0.1% to derivatives.

In Table 5 we find the above proposed specifications for the three different portfolios of analysis: the regulated funds, the funds that do not use derivatives, and the difference in returns of both. The first four columns correspond to the regulated portfolio, the following four correspond to the control sample, and the last four to the difference in returns of both. We find a positive and large significant beta, as expected, both for the regulated and the control samples. We find a negative and significant performance for both samples and for almost all specifications. That is, we find that once returns are adjusted by risk, Italian equity oriented mutual funds do not perform particularly well. Finally, none of the dummy variables controlling for the event period show any effect on mutual fund performance and risk due to the change in regulation. This is true both for the regulated funds and for the control sample. Moreover, it seems that the control sample underperforms the regulated sample. In fact, once we analyze the difference of both portfolios, we find some weak evidence that the regulated sample does perform better than the control sample: two out of the four specifications show a significant positive difference in performance, while the other two show a positive difference but not significant.

When analyzing the difference in market risk exposure of both portfolios, in order to control for industry specific effects, we find some evidence that the change in regulation implied an increase in market risk for the regulated sample for two out of the three considered event periods compared to the control sample. We find significant evidence that the regulated sample tends to have a larger market risk than the control sample, and this happens only when the transition periods are included within the event period and not when the event period is defined from the change in regulation on. Thus, rather than the change in regulation by itself, it is during the transition period in which we observe a change in behavior of the Italian equity oriented mutual fund managers. We find that during the transition period funds had a significant larger market exposure, compared

to the non-user funds, with some additional evidence that they also over-performed non-user funds. Moreover, we find evidence that the over-performance remained after the introduction of the reform.

5. CONCLUSIONS

In this paper, we analyze the use of derivatives on a sample of Italian equity mutual funds when the regulatory environment relaxed the rules regarding the use of derivatives. We find that Italian mutual funds significantly increased the use of derivatives following the official announcement of the new regulation, and that mutual funds increased substantially their market exposures and increased their overall performance during the same period. We also find that the use of derivatives is related to a higher exposure to market risks, and to a reduction in the skewness of fund returns. However, we do not find evidence that overall fund risk is increased with the use of derivatives. Evidence is not consistent with the use of derivatives to hedge in the Italian mutual fund industries, nor with the use of derivatives as a means to speculate. Rather, it seems that Italian mutual funds used derivatives to track the market index and increase beta, while increasing diversification and thus decreasing idiosyncratic risk. It seems that the increases in exposure to market risk and in performance are a consequence of the opening of Italian financial market for mutual funds to European competitors. The expectation of Italian mutual fund managers to compete in a fiercer environment led them to become more aggressive and increase their average beta, and at the same time more efficient in managing risk, by increasing alpha.

REFERENCES

Assogestioni (2006), Factbook: Guida Italiana al Risparmio Gestito.

Assogestioni (2008), Nuova Mappa del Risparmio Gestito, Gestione collectiva e gestione di portafoglio, 1° Trimestre 2008.

Binder, J. J. (1985), "Measuring the effects of regulation with stock price data", RAND Journal of Economics 16, p. 167-183.

Binder, J. J. (1998), "The event study methodology since 1969", Review of Quantitative Finance and Accounting 11, p. 111-137.

Brown, Harlow, and Starks (1996), "On tournaments and temptations: An analysis of managerial incentives in the mutual fund industry", Journal of Finance

Directive 85/611/EEC of the European Council of 20 December 1985. Official Journal of the European Communities No. L375/3 of December 31, 1985.

Directive 2001/107/EC of the European Parliament and of the Council of 21 January 2002. Official Journal of the European Communities No. L41/20 of January 21, 2002.

Directive 2001/108/EC of the European Parliament and of the Council of 21 January 2002. Official Journal of the European Communities No. L41/35 of February 13, 2002.

European Commission (2008), "Investment funds in the European Union: Comparative analysis of investment powers, investment o utcomes, and related risk features in both UCITS and non-harmonized markets", project undertaken by PriceWaterhouseCoopers, February 2008.

Ippolito, R. A. (1992), "Consumer reaction to measures of poor quality: Evidence from the mutual fund industry", Journal of Law and Economics 35, p.45-70.

Johnson, L. D. and Yu, W. W. (2004), "An analysis of the use of derivatives by the Canadian mutual fund industry", Journal of International Money and Finance 23, p. 947-970.

Greenbaum, J. P. (2000), "Regulatory developments affecting the Italian investment fund market", Villanova Journal of Law and Investment Management Vol 2, number 1, p. 45-77.

Grout, P. A. and Zalewska, A. (2006), “The impact of a regulation on market risk”, Journal of Financial Economics 80, p. 149-184.

Koski, J. L. and Pontiff, J. (1999), “How are derivatives used? Evidence from the mutual fund industry”, The Journal of Finance 54, p. 791-816.

Legislative Decree of February 24, 1998, No. 58. Supp. Ord. 52/L to Gazzetta Ufficiale della Repubblica Italiana No. 71 of March 26, 1998.

Legislative Decree of August 1st, 2003, No. 274. Gazzetta Ufficiale n. 233 of October 7, 2003.

MacKinlay, A. C. (1997), “The event studies in economics and finance”, Journal of Economic Literature XXXV, p. 13-39.

Marin, J. M. and Rangel, T. A. (2007), “The use of derivatives in the Spanish mutual fund industry”, IMDEA Working Paper 2007/22, October 2007.

Merton, R. C. (1995), “Financial innovation and the management and regulation of financial institutions”, Journal of Banking and Finance 19, p. 461-481.

Ministerial Decree Number 47, January 31, 2003, Ministry of Economy and Finance. Gazzetta Ufficiale della Repubblica Italiana No. 70 of March 25, 2003.

Pronouncement of Bank of Italy of July 1st, 1998 (“Regolamento in materia di modalita’ di deposito e subdeposito degli strumenti finanziari”). Ordinary Supplement Number 120 to Gazzetta Ufficiale della Repubblica Italiana No. 160 of July 11, 1998.

Pronouncement of Bank of Italy of September 20, 1999 (“Regolamento recante disposizioni per le società di gestione del risparmio”). Gazzetta Ufficiale della Repubblica Italiana No. 230 of September 30, 1999.

Pronouncement of Bank of Italy of April 14, 2005 (“Regolamento sulla gestione collettiva del risparmio”). Ordinary Supplement Number 88 to Gazzetta Ufficiale della Repubblica Italiana No. 109 of May 12, 2005.

Scholes, M. S. (1981), “The economics of hedging and spreading in futures markets”, Journal of futures Markets 1, p- 265-286.

Silber, W. L. (1985), “The economic role of financial futures; in Anne E. Peck, ed: Futures Markets: Their Economic Role”, American Enterprise Institute for Public Policy Research, Washington, D.C.

Stoll, H. R. and Whaley, R. E. (1985), “The new option markets; in Anne E. Peck, ed: Futures Markets: Their Economic Role”, American Enterprise Institute for Public Policy Research, Washington, D.C.

ANNEX OF TABLES

Table 1

Unconditional change in risk and performance

This table contains the average alpha, beta, idiosyncratic risk, total risk, as well as the skewness and kurtosis of the funds' returns, for all Italian funds before the regulation was announced and after it was set in place. We calculate (in the last columns) the paired t-tests and Wilcoxon sign-ranked tests for equality of the means before and after the regulation change. To measure total risk we use the standard deviation of the funds´ monthly returns in each sub-period. The standard deviation of the residuals of a market model regression of fund excess returns on a constant and the market premium are used to calculate the idiosyncratic risk. Finally, we calculate market risk as the estimated beta in the same market model regression. As unique measure of performance, we use the estimated alpha in the market model explained above.

In Panel A, a user of derivatives is defined as a fund that had a positive allocation on derivatives at least once during each subperiod. In Panel B, a user of derivatives allocated an average of at least 0.1% to derivatives.

Panel A: Used derivatives at least during one period					
	N	**Before**	**After**	**t-stat**	**Wcx z**
Beta	385	0.654	0.714	-3.875 ***	-4.077 ***
Users	223	0.681	0.736	-3.127 ***	-3.157 ***
Non-Users	14	0.698	0.579	1.463	1.538 *
New Users	67	0.593	0.695	-2.766 ***	-2.724 ***
Idiosyncratic risk	383	2.306	1.735	11.987 ***	10.875 ***
Users	223	2.297	1.712	10.466 ***	9.063 ***
Non-Users	14	2.651	2.057	2.621 **	2.542 ***
New Users	67	2.553	1.782	6.052 ***	5.435 ***
Total risk	383	4.486	2.889	28.091 ***	15.601 ***
Users	223	4.628	2.920	27.364 ***	12.673 ***
Non-Users	14	4.649	2.791	8.725 ***	3.296 ***
New Users	67	4.512	2.899	11.978 ***	6.615 ***
Alpha	385	-0.187	-0.049	-4.319 ***	-5.180 ***
Users	223	-0.184	-0.035	-4.294 ***	-4.829 ***
Non-Users	14	-0.735	-0.249	-2.353 **	-2.166 **
New Users	67	0.037	0.101	-0.772	-1.362 *
Skewness	383	-0.280	-0.807	14.197 ***	11.550 ***
Users	223	-0.280	-0.853	12.023 ***	9.410 ***
Non-Users	14	-0.574	-0.587	0.057	0.031
New Users	67	-0.193	-0.840	7.144 ***	5.410 ***
Kurtosis	383	2.924	3.967	-16.779 ***	-12.978 ***
Users	223	2.937	4.049	-13.360 ***	-10.184 ***
Non-Users	14	3.450	3.740	-0.803	-0.722
New Users	67	3.011	3.990	-7.423 ***	-5.572 ***

Table 1 (continued)
Unconditional change in risk and performance

Panel B: Allocated on average at least 0.1% to derivatives

	N	Before	After	t-stat	Wcx z
Beta	385	0.654	0.714	-3.875 ***	-4.077 ***
Users	150	0.670	0.737	-3.173 ***	-3.211 ***
Non Users	38	0.703	0.681	0.398	0.631
New Users	94	0.611	0.678	-2.287 **	-2.506 ***
Idiosyncratic risk	383	2.306	1.735	11.987 ***	10.875 ***
Users	150	2.393	1.769	9.005 ***	7.570 ***
Non Users	38	2.411	2.009	3.000 ***	3.140 ***
New Users	94	2.428	1.652	7.558 ***	6.575 ***
Total risk	383	4.486	2.889	28.091 ***	15.601 ***
Users	150	4.560	2.979	20.501 ***	10.277 ***
Non Users	38	4.621	2.962	9.112 ***	4.909 ***
New Users	94	4.616	2.774	19.588 ***	8.317 ***
Alpha	385	-0.187	-0.049	-4.319 ***	-5.180 ***
Users	150	-0.163	-0.049	-2.587 **	-3.267 ***
Non Users	38	-0.561	-0.283	-2.495 **	-2.458 ***
New Users	94	0.006	0.160	-2.510 **	-3.452 ***
Skewness	383	-0.280	-0.807	14.197 ***	11.550 ***
Users	150	-0.303	-0.863	9.794 ***	7.735 ***
Non Users	38	-0.495	-0.569	0.649	0.848
New Users	94	-0.155	-0.930	10.685 ***	7.193 ***
Kurtosis	383	2.924	3.967	-16.779 ***	-12.978 ***
Users	150	2.883	4.095	-11.465 ***	-8.498 ***
Non Users	38	3.241	3.747	-2.532 **	-2.226 **
New Users	94	3.047	4.118	-10.043 ***	-7.084 ***

Table 2

Differences in risk and performance between non users, users, and new users of derivatives

This table contains the average differences in beta, idiosyncratic risk, total risk,alpha, as well as the skewness and kurtosis of the funds' returns, for all Italian funds before the regulation was announced and after it was set in place. The first block of columns contains the difference in performance before and after the regulation took place for non-users of derivatives. The second block of columns contains the difference in performance before and after the regulation took place for users of derivative, and the unpaired t-tests and Wilcoxon tests for equality of the average difference among users and non-users of derivatives. The third block of columns contains the difference in performance before and after the regulation took place for new users of derivative, and the unpaired t-tests and Wilcoxon tests for equality of the average difference among new users and non-users of derivatives before and after the regulation change. To measure total risk we use the standard deviation of the funds´ monthly returns in each sub-period. The standard deviation of the residuals of a market model regression of fund excess returns on a constant and the market premium are used to calculate the idiosyncratic risk. Finally, we calculate market risk as the estimated beta in the same market model regression. As unique measure of performance, we use the estimated alpha in the market model explained above.

In Panel A, a user of derivatives is defined as a fund that had a positive allocation on derivatives at least once during each subperiod. In Panel B, a user of derivatives allocated an average of at least 0.1% to derivatives.

Panel A: Used derivatives at least during one period

	Non-Users		Users				New Users			
	N	Mean	N	Mean	T-stat	Wcx-z	N	Mean	T-stat	Wcx-z
Beta	14	-0.119	223	0.055	-2.091 *	-2.098 **	67	0.103	-2.481 **	-2.386 ***
Idiosyncratic Risk	14	-0.594	223	-0.585	-0.038	-0.044	67	-0.771	0.682	0.600
Total Risk	14	-1.858	223	-1.708	-0.678	-0.374	67	-1.613	-0.972	-0.712
Alpha	14	0.486	223	0.149	1.609	2.455 ***	67	0.065	1.890 *	2.361 ***
Skewness	14	-0.013	223	-0.574	2.322 **	2.403 ***	67	-0.647	2.501 **	2.548 ***
Kurtosis	14	0.290	223	1.112	-2.219 **	-2.198 **	67	0.980	-1.795 *	-1.849 **

Panel B: Allocated on average at least 0.1% to derivatives

	Non-Users		Users				New Users			
	N	Mean	N	Mean	T-stat	Wcx-z	N	Mean	T-stat	Wcx-z
Beta	38	-0.022	150	0.067	-1.506	-1.849 **	94	0.067	-1.427	-1.875 **
Idiosyncratic Risk	38	-0.402	150	-0.624	1.474	0.961	94	-0.777	2.222 **	1.483 *
Total Risk	38	-1.658	150	-1.581	-0.394	-0.200	94	-1.842	0.894	1.287 *
Alpha	38	0.278	150	0.114	1.365	1.779 **	94	0.154	0.977	1.272
Skewness	38	-0.074	150	-0.561	3.832 ***	3.514 ***	94	-0.776	5.212 ***	4.840 ***
Kurtosis	38	0.507	150	1.211	-3.113 ***	-3.137 ***	94	1.071	-2.490 **	-2.528 ***

Table 3
Change in fund performance

The analyzed regression equation is the following:

$$\Delta MEASURE = \alpha + \beta_1 \Delta DER + \sum_{i=2}^{5} \beta_i \Delta ALLOC_i + \beta_6 PERF + \beta_7 LagMEAS + \sum \beta_j Controls \quad (1)$$

*where $\Delta MEASURE$ is the change between the period before the regulation was announced and the period after it was set in place, of beta (column 1) , idiosyncratic risk (column 2), standard deviation (column 3), alpha (column 4), skewness (column 5), and kurtosi (column 6). ΔDER is the change in the average derivative allocation between these same periods, $\Delta ALLOC_i$ is the change in equity, bond, preferred stock and convertible bond allocation during these periods, $PERF$ is the difference between the mean excess return on the fund and the mean excess return for funds with the same Morningstar category during the period previous to the announcement of the regulatory change, $LagMEAS$ is the value of the market risk measure before the announcement of the regulatory change. As control variables we include investment styles and size classification, as summarized by the Morningstar Equity Style Boxes. Standard deviations are in brackets. *, **, *** refer to 10%, 5%, and 1% levels of significance*

	1 beta	2 idio	3 sd	4 alfa	5 skew	6 kurt
Δ derivatives	0.006	0.006	0.019	-0.004	0.01	-0.002
	[0.003]**	[0.92]	[2.15]**	[0.88]	[1.59]	[0.30]
Δ equity	0.004	0.007	0.017	-0.002	0.007	-0.003
	[0.002]**	[1.76]*	[2.86]***	[0.74]	[1.60]	[0.64]
Δ bond	0.005	-0.01	0.003	0.003	0.009	0.003
	[0.004]	[1.20]	[0.27]	[0.46]	[1.01]	[0.29]
Δ conv. Bond	0.017	-0.055	-0.056	-0.084	0.039	-0.019
	[0.028]	[0.87]	[0.63]	[1.63]	[0.60]	[0.24]
Δ pref. stock	-0.009	-0.05	-0.081	-0.031	0.022	0.044
	[0.017]	[1.29]	[1.46]	[0.98]	[0.56]	[0.92]
Missing allocation	0.048	0.128	0.274	-0.102	0.089	-0.04
	[0.031]	[1.87]*	[2.76]***	[1.83]*	[1.26]	[0.46]
Prev. performance	0.03	-0.225	-0.046	-0.109	0.022	0.066
	[0.021]	[4.89]***	[0.70]	[2.57]**	[0.45]	[1.16]
Prev. beta	-0.694					
	[0.038]***					
Prev. idio		-0.566				
		[31.07]***				
Prev. sd			-0.695			
			[22.31]***			
Prev. alfa				-0.626		
				[19.15]***		
Prev. skew					-0.903	
					[15.79]***	
Prev. kurt						-0.059
						[1.30]
Investment style	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.519	0.647	1.453	-0.056	-0.729	0.488
	[0.032]***	[11.50]***	[9.47]***	[1.66]*	[16.11]***	[3.50]***
Observations	380	380	380	380	380	380
R-squared	0.54	0.75	0.65	0.63	0.56	0.14

Table 4
Change in fund performance

The analyzed regression equation is the following:

$$\Delta MEASURE = \alpha + \beta_1 User + \beta_2 NewUser + \beta_3 StoppedUse + \beta_4 PERF + \beta_5 \text{lagMEAS} + \text{Controls} \quad (1)$$

where $\Delta MEASURE$ is the change between the period before the regulation was announced and the period after it was set in place, of beta (column 1) , idiosyncratic risk (column 2), standard deviation (column 3), alpha (column 4), skewness (column 5), and kurtosi (column 6). $User$ is a dummy for funds using derivatives before and after the regulatory change, $NewUser$ is a dummy for funds starting use of derivatives after the regulatory change, and StoppedUse a dummuy for funds that stopped using derivatives after the regulation changed. $PERF$ is the difference between the mean excess return on the fund and the mean excess return for funds with the same Morningstar category during the period previous to the announcement of the regulatory change, $LagMEAS$ is the value of the market risk measure before the announcement of the regulatory change. As control variables we include investment styles and size classification, as summarized by the Morningstar Equity Style Boxes.
In Panel A, a user of derivatives is defined as a fund that had a positive allocation on derivatives at least once during each subperiod.
In Panel B, a user of derivatives allocated an average of at least 0.1% to derivatives.
*Standard deviations are in brackets. *, **, *** refer to 10%, 5%, and 1% levels of significance*

Panel A: Used at least once during each subperiod

	1	2	3	4	5	6
	beta	**idio**	**sd**	**alfa**	**skew**	**kurt**
Users	0.16	-0.041	0.245	-0.059	-0.193	-0.109
	[0.062]***	[0.29]	[1.22]	[0.51]	[1.34]	[0.63]
New users	0.145	-0.073	0.262	0.028	-0.197	-0.063
	[0.065]**	[0.49]	[1.23]	[0.23]	[1.29]	[0.35]
Stopped using	-0.011	-0.063	-0.111	-0.098	0.001	-0.168
	[0.080]	[0.34]	[0.42]	[0.66]	[0.00]	[0.75]
Missing alloc.	0.174	0.051	0.427	-0.135	-0.11	-0.124
	[0.065]***	[0.34]	[2.00]**	[1.11]	[0.72]	[0.67]
Prev. performance	0.03	-0.217	-0.043	-0.116	0.033	0.063
	[0.020]	[4.62]***	[0.65]	[2.74]***	[0.69]	[1.11]
Prev. beta	-0.697					
	[0.037]***					
Prev. idio		-0.566				
		[30.63]***				
Prev. sd			-0.702			
			[22.56]***			
Prev. alfa				-0.633		
				[19.17]***		
Prev. skew					-0.891	
					[15.63]***	
Prev. kurt						-0.061
						[1.34]
Investment style	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.39	0.723	1.316	-0.014	-0.529	0.581
	[0.067]***	[4.91]***	[5.40]***	[0.13]	[3.64]***	[2.55]**
Observations	380	380	380	380	380	380
R-squared	0.55	0.74	0.64	0.63	0.56	0.14

Table 4 (continued)
Change in fund performance

Panel B: Allocated an average of at least 0.1% on each subperiod						
	1	2	3	4	5	6
	beta	idio	sd	alfa	skew	kurt
Users	0.051	-0.158	0.048	0.028	-0.209	0.19
	[0.040]	[1.75]*	[0.37]	[0.38]	[2.28]**	[1.73]*
New users	0.018	-0.255	-0.119	0.152	-0.264	0.31
	[0.043]	[2.65]***	[0.86]	[1.95]*	[2.68]***	[2.67]***
Stopped using	0.03	-0.168	-0.146	-0.041	-0.031	-0.085
	[0.050]	[1.50]	[0.90]	[0.45]	[0.27]	[0.63]
Missing alloc.	0.064	-0.072	0.175	-0.042	-0.113	0.149
	[0.045]	[0.71]	[1.19]	[0.51]	[1.10]	[1.19]
Prev. performance	0.033	-0.208	-0.035	-0.12	0.043	0.04
	[0.021]	[4.50]***	[0.53]	[2.87]***	[0.91]	[0.71]
Prev. beta	-0.699					
	[0.037]***					
Prev. idio		-0.566				
		[30.99]***				
Prev. sd			-0.699			
			[22.45]***			
Prev. alfa				-0.638		
				[19.63]***		
Prev. skew					-0.882	
					[15.55]***	
Prev. kurt						-0.048
						[1.08]
Investment style	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.501	0.839	1.547	-0.102	-0.53	0.284
	[0.046]***	[8.91]***	[8.33]***	[1.46]	[5.92]***	[1.65]
Observations	380	380	380	380	380	380
R-squared	0.53	0.75	0.64	0.63	0.57	0.17

Table 5
Event study

The analyzed regression equations are the following:

$r - r_f = \alpha + \beta\left(r_m - r_f\right) + \varepsilon$ *and* $r - r_f = \alpha + \beta\left(r_m - r_f\right) + \gamma D + \delta D\left(r_m - r_f\right) + \varepsilon$

where D *takes the value of one for the event period and zero otherwise,* r *is the return of the equally weighted portfolio,* r_f *the risk free rate, and* r_m *the return of the market portfolio. In particular, D1 is equal to one for t larger or equal to April 2004, D2 is equal to one if t is larger or equal to October 2004, and D3 is equal to one for t larger or equal to May 2005: for any other t the D's are equal to zero. The equally weighted portfolio is the portfolio of funds that use derivatives in the first four columns, the equally weighted portfolio of funds that do not use derivatives (second block of columns), and the portfolio that consists of the difference of the two previous portfolio (last block of columns)..*

*Standard errors are in brackets and *, **, ***, stand for 10%, 5% and 1% confidence levels.*

Panel A: Used derivatives at least once during each subperiod

	Users of derivatives				Non-users of derivatives				Difference			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Mkt premium	0.845	0.831	0.834	0.82	0.778	0.842	0.837	0.78	0.067	0.021	0.026	0.051
	[0.028]***	[0.037]***	[0.037]***	[0.034]***	[0.050]***	[0.067]***	[0.065]***	[0.062]***	[0.029]**	[0.038]	[0.037]	[0.036]
D1: Date>=April 2004		0.075				0.317				-0.256		
		[0.226]				[0.395]				[0.223]		
D1*Mkt premium		0.033				-0.152				0.109		
		[0.058]				[0.102]				[0.058]*		
D2: Date>=Oct 2004			0.131				0.607				-0.305	
			[0.215]				[0.370]				[0.212]	
D2*Mkt premium			0.021				-0.163				0.107	
			[0.060]				[0.102]				[0.058]*	
D3: Date>=May 2005				0.082				0.45				-0.26
				[0.215]				[0.385]				[0.220]
D3*Mkt premium				0.071				-0.031				0.057
				[0.062]				[0.109]				[0.062]
Constant	-0.255	-0.322	-0.34	-0.319	-0.752	-0.899	-1.028	-0.938	0.148	0.274	0.276	0.241
	[0.103]**	[0.184]*	[0.156]**	[0.135]**	[0.184]***	[0.319]***	[0.268]***	[0.241]***	[0.105]	[0.180]	[0.153]*	[0.138]*
Observations	54	54	54	54	54	54	54	54	54	54	54	54
Adj. R-sq	0.94	0.94	0.94	0.94	0.82	0.82	0.82	0.81	0.07	0.11	0.11	0.07

Panel B: Allocated on average at least 0.1% to derivatives on each subperiod

	Users of derivatives				Non-users of derivatives				Difference			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Mkt premium	0.838	0.818	0.823	0.809	0.806	0.826	0.825	0.779	0.041	0.012	0.015	0.037
	[0.032]***	[0.043]***	[0.042]***	[0.039]***	[0.048]***	[0.064]***	[0.062]***	[0.059]***	[0.024]*	[0.032]	[0.031]	[0.030]
D1: Date>=April 2004		0.059				0.001				-0.115		
		[0.258]				[0.383]				[0.190]		
D1*Mkt premium		0.045				-0.049				0.07		
		[0.066]				[0.099]				[0.049]		
D2: Date>=Oct 2004			0.129				0.338				-0.201	
			[0.245]				[0.362]				[0.180]	
D2*Mkt premium			0.03				-0.062				0.071	
			[0.067]				[0.100]				[0.050]	
D3: Date>=May 2005				0.074				0.267				-0.223
				[0.246]				[0.366]				[0.185]
D3*Mkt premium				0.078				0.061				0.025
				[0.069]				[0.105]				[0.053]
Constant	-0.248	-0.308	-0.335	-0.31	-0.635	-0.612	-0.799	-0.775	0.103	0.148	0.185	0.191
	[0.117]**	[0.210]	[0.178]*	[0.154]*	[0.174]***	[0.309]*	[0.262]***	[0.229]***	[0.088]	[0.153]	[0.130]	[0.115]
Observations	54	54	54	54	54	54	54	54	54	54	54	54
Adjusted R-sq	0.93	0.93	0.93	0.93	0.84	0.84	0.84	0.84	0.03	0.03	0.04	0.02

ANNEX OF FIGURES

Figure 1
Regulatory Timeline
The figure presents the evolution of the changes in the regulatory enviornment for investment funds in Europe and Italy from January 2002 to April 2005.

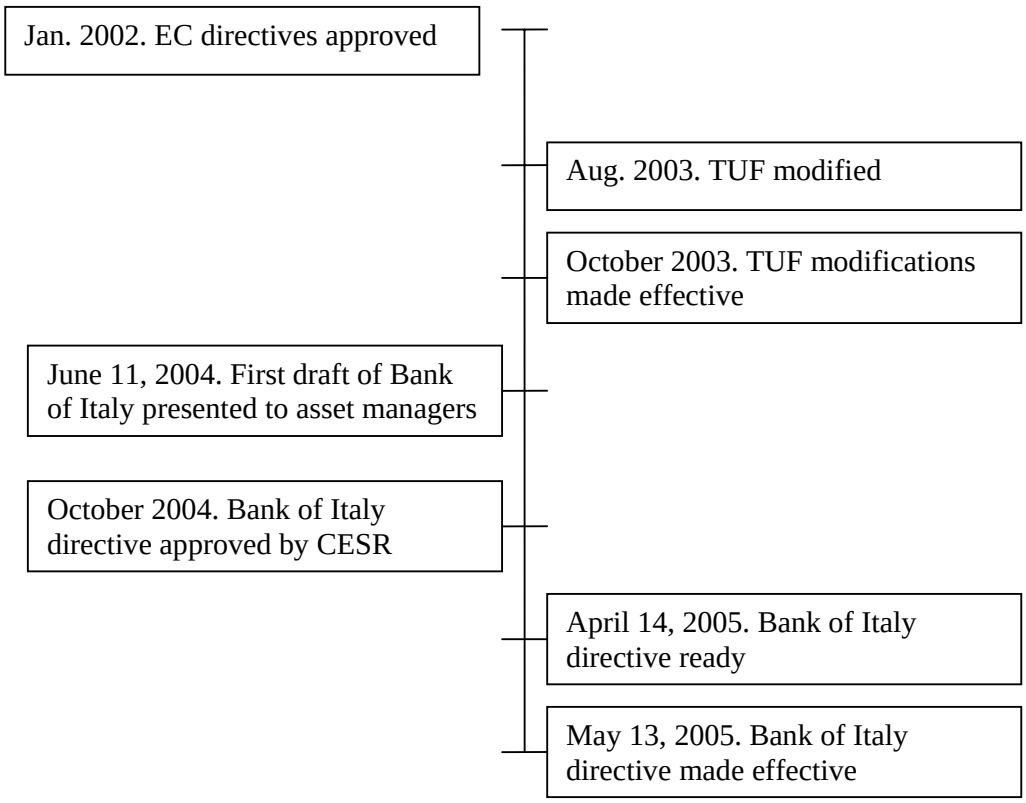
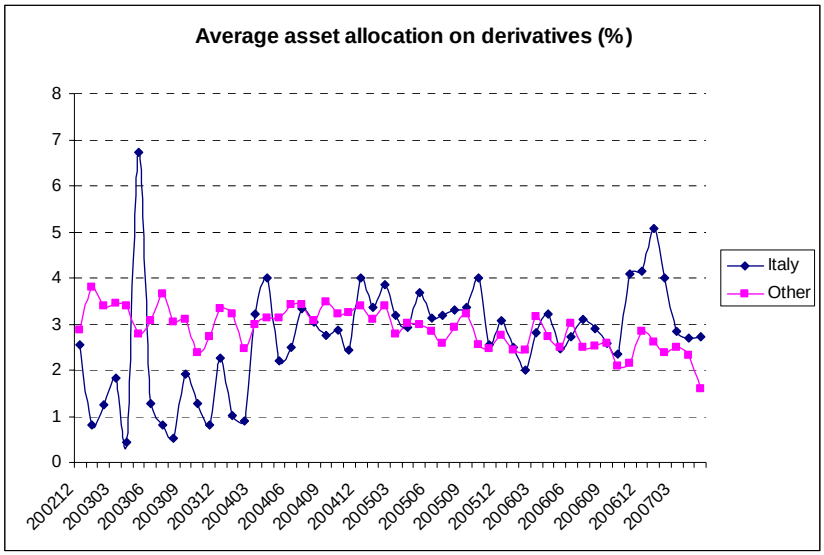


Figure 2

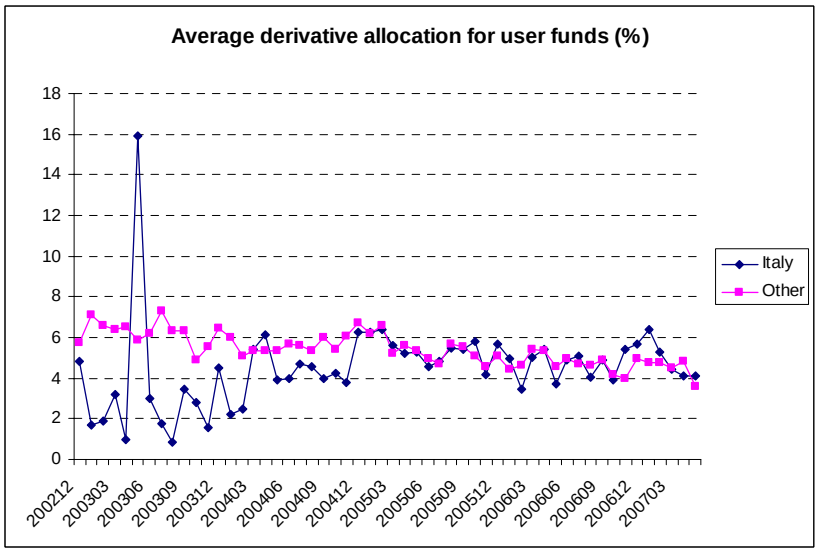
Panel A

The following graph represents the evolution over time of the asset allocation in derivatives for all Italian (Italy) and European (Other) mutual funds, with an equity investment objective, from December 2002 to May 2007



Panel B

The following graph represents the evolution over time of the asset allocation in derivatives for all Italian (Italy) and European (Other) mutual funds, with an equity investment objective and that where identified to be users of derivatives, from December 2002 to May 2007



APPENDIX: REGULATION OF DERIVATIVE USE IN ITALIAN MUTUAL FUNDS

A.1
Organization of Italian mutual funds

Italian mutual funds are organized in three layers (Greenbaum 2000). At the highest level of organization there is an investment management company (Società di Gestione del Risparmio, or SGR) which is a registered stock company authorized to provide collective management services. The SGR is in charge of setting up the mutual fund and its investment rules, and exercises voting rights on behalf of the subscribers. The SGR is, however, not allowed to possess the assets of the fund. These are instead entrusted to a depositary bank, the second layer in the organization. Apart from holding the securities of the fund, the depositary bank implements the instructions of the SGR and verifies the legitimacy of the operations of issuance and withdrawal of shares from the fund, the calculation of their value and the destination of their profits. The final layer consists of the mutual fund itself, which is an autonomous entity set up by the SGR. Mutual funds allowed to operate in Italy can be open- or closed-end funds. The former funds allow investors for the reimbursement of their holdings at any time, while the investors holding the latter funds can only withdraw at predetermined times.

A.2
Regulatory framework

Current regulation of Italian open-end mutual funds is summarized in the Pronouncement of the Governor of Bank of Italy, April 14, 2005 ("Regolamento sulla gestione collettiva del risparmio", henceforth PBI).[7] The PBI includes a number of detailed rules that govern four main macro areas of the mutual fund industry, namely: the set up and management of investment companies, the set up and management of the funds themselves, the activities of the depositary bank, and the cross-border operations. The PBI is one of several Italian directives[8] based on the main national regulatory policies given by

[7] *Pronouncement of Bank of Italy of April 14, 2005 (effective on May 13, 2005).*

[8] *Other directives governing different aspects of the operation of mutual funds in Italy are given by the Italian Securities Commission (Consob) and the Ministry of the Treasury.*

the Consolidated Financial Brokerage Law (Testo Unico della Finanza, henceforth TUF).[9] Likewise, the TUF follows the directives of the European Economic Community for the creation of a single market for financial services. Hence, the TUF and consequently the PBI have been constantly reformed to adopt the changes implemented at a European level. To understand the evolution of Italian regulation it is therefore necessary to understand the variations made to the European directives.

The current European regulation for mutual funds is given by the 1985 Undertakings for Collective Investment in Transferable Securities Directive (UCITS).[10] The UCITS Directive was the first step towards the unification of the European financial market for mutual funds. It aimed at allowing the free operation of collective investment instruments throughout the EU, authorizing funds with certain characteristics to trade freely throughout member states. Well intentioned as it was, the original 1985 directive failed to work as expected for several reasons. On the one hand, the Directive did not dictate equivalent market access rules across member states, hence individual marketing rules of each country effectively blocked the unification of the European markets for mutual funds. On the other hand, the original UCITS Directive was very limited in terms of the range of financial instruments authorized to trade across the member states. Two amendments were made during 2001 to solve these limitations. The first one was aimed at the investment management companies.[11] Among other things, this amendment created the so-called "European passport" allowing management companies to operate throughout the EU either freely or by establishing branches in other member states. According to this amendment, the rules of funds operating throughout European countries are approved by the management company's home country.

The second 2001 amendment to the original UCITS Directive refers to financial instruments.[12] This revision widens the range of financial instruments in which funds may invest, other than the original "transferable securities". For example, it explicitly permits UCITS to invest in money market instruments, bank deposits, and financial derivatives. Of particular interest for this study are the regulations given in this amendment regarding the limits to risk taking, which are exposed in two fronts: limits to counterparty risk, and limits to the exposure to derivatives instruments. Regarding the latter matter, exposure to derivatives is not allowed to exceed the net asset value of the fund.

The 2001 revisions to the EU Directives have been included in the Italian law in two steps. In 2003, the TUF was modified to define the legal procedures necessary for Italian SGRs to operate in other European countries, and for foreign European investment companies to operate in Italy[13] (in particular, it specifies the procedures for the establishment of branches in Italy for the local commercialization of foreign mutual funds). Subsequently, the amendments were included in the PBI.[14]

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[9] *Legislative Decree of February 24, 1998, No. 58 (effective July 1, 1998)*

[10] *Directive 85/611/EEC of the European Council of December 20, 1985.*

[11] *Directive 2001/107/EC of the European Parliament and of the Council of January 21, 2002.*

[12] *Directive 2001/108/EC of the European Parliament and of the Council of January 21, 2002.*

[13] *Legislative Decree of August 1st, 2003, No. 274 (effective on October 7, 2003)*

[14] *Effective May 13, 2005*

Previous to the 2005 PBI, regulation of mutual funds operating in Italy was contained in two documents: the Pronouncements of the Bank of Italy of July 1st, 1998[15] and of September 20, 1999.[16] Regarding harmonized open-end funds, these rules permitted to allocate resources in listed financial instruments, shares of other harmonized UCITS funds, shares of non-harmonized open funds (as long as its investment policies are compatible with the open-end fund's policies), deposits of banks in EU member states or G-10 countries, unlisted securities (within the limit of 10% of fund assets) and derivative instruments. The use of derivatives was limited to a maximum exposure of 10% of the fund's net assets. Any fund exceeding such exposure was obliged to hold the assets generating the cash flows promised by the derivative instrument (or its cash equivalent). The use of derivatives was conditioned to it being permitted by the fund bylaws, which should define the criteria of use of derivatives and the goals sought with the usage (for example, hedging risks). Moreover, derivatives could not be used to change the risk profile of the fund indicated among the objectives of the fund as set out in its bylaws.[17]

The new PBI effectively relaxed the previous limits regarding the permitted investments of the funds in four dimensions. On the one hand, the new rules allow open-end funds to exceed the previous 10% limit investment in unlisted securities, whenever these securities satisfy one of the following conditions: (i) they are issued or guaranteed by a government or organism belonging to the EU, the G-10, or that has received investment grade certification by at least two rating agencies; (ii) are issued by a firm with quoted securities, or (iii) are issued or guaranteed by any institute that is regulated by an EU or G-10 agency. The second change refers to investment in other open funds. Investment in harmonized funds is now unlimited, whereas it was limited to a maximum of 5% of assets in the previous law. At the same time, investment in non-harmonized funds is not restricted anymore to the funds that have compatible investment policies, but to funds that satisfy the conditions given by Italian regulations to operate in Italy. Third, investment in bank deposits is now allowed, as long as the banks belong to an EU member state or to the G-10. Finally, restrictions on the use of derivatives were modified in two aspects. First, the maximum exposure to derivatives can be set up to a maximum of 100% of the fund's net asset value, instead of the previous limit of 10%. Second, the exposure now includes a measure of counterparty risk.

Limits to the maximum permitted exposure of a harmonized fund to a single issuer remained intact in the new PBI, except for two innovations. First, a reduction to 20% (instead of 30%) of the exposure to issuers belonging to the same group or holding company. More notably, the second change regards a waiver of all limits for newly constituted funds, for a maximum period of 6 months.

Other general prohibitions for open end funds, such as the issuance of loans, shorting the market, investment in financial instruments issued by a controlling SGR, or purchase of precious metals or precious stones or certificates representing such items, continue to hold under the new PBI.

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[15] *"Regolamento in materia di modalita' di deposito e subdeposito degli strumenti finanziari e del denaro di pertinenza della clientela."*

[16] *"Regolamento recante disposizioni per le società di gestione del risparmio."*

[17] *See Pronouncement of September 20, 1999, Chapter II, Section II, Article 4.*

The new rules also relaxed previous prohibitions of Italian rules regarding the investments of non-harmonized funds. For example, these funds may invest in listed closed-end funds, in unlisted closed-end funds (but limited to a maximum of 10% of the fund's assets), and in speculative funds, both Italian or foreign, up to a maximum limit of 20% of all assets. Apart from these exceptions, non-harmonized funds must follow the same rules as harmonized funds.[18]

[18] *See Figure 1 for an overview of the changes of the regulatory framework over time for investment funds in Europe and Italy.*