

Measuring the performance of ethical mutual funds: a DEA approach

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Extended abstract

Ethical or socially responsible investments are playing an increasing role among the financial investments, thanks to their ability to marry profitability and social engagement together. One of the main instruments of ethical finance is given by ethical mutual funds.

By investing in mutual funds with ethical aims, savers can support social activities and non profit organizations or have the guarantee that their savings are not used to finance companies involved in the weapon industry or in polluting activities. It is also possible to make use of these financial tools in order to finance companies which are sensitive to social, cultural and environmental problems.

Hence, the solidarity and social responsibility features that characterize the ethical mutual funds satisfy a deep human need to act according to one's conscience, in a socially useful manner. However, these ethical features may involve a penalty from the financial point of view of the investment returns. In particular, ethical mutual funds are likely to underperform over the long term, at least as they select their investments among a subset of the assets available on the market.

As a matter of fact, the empirical studies which have analyzed the performance of the ethical assets and mutual funds do not corroborate the idea that socially responsible investments really give a lower return than the non ethical ones.

In any case, the two reasons that make savers invest in ethical mutual funds, first to satisfy an ethical need and secondly to obtain a satisfactory return, have both to be taken into consideration when assessing the performance of ethical mutual funds. Nevertheless, the traditional performance indicators for financial portfolios cannot take into account both objectives, since they assume by definition that the only aspect to assess is the investment return, which should have the highest expected value with the minimum risk. In particular, the widely used Sharpe ratio,

reward-to-half-variance index and Treynor index are computed as ratios between the expected excess return and a risk indicator and cannot consider additional features.

In this contribution we define a performance indicator which considers simultaneously the various aspects of the portfolio performance: the investment return and risk, on the one hand, and the ethical behaviour on the other hand. Moreover, the performance measure proposed can take into account also the subscription and redemption costs, which contribute to determine the overall performance of the investment.

The performance measure proposed is obtained using a data envelopment analysis (DEA) approach, which is an operational research methodology introduced by Charnes, Cooper and Rhodes (1978, 1979) that allows to measure the relative efficiency of decision making units in presence of a multiple input-multiple output structure.

Recently the DEA technique has been geared to the problem of mutual fund performance evaluation by Murthi, Choi and Desai (1997) and Basso and Funari (2001). The DEA mutual fund performance indexes permit to compare the investment fund efficiency not only on the basis of the fund return and risk, but also on the basis of the investment costs (subscription costs and redemption fees). In addition, different risk measures can be taken into account together; it is also possible to include in the analysis a stochastic dominance indicator that reflects the investor's preferences and the occurrence of the returns. Another application of the philosophy of the DEA approach to the mutual fund performance appraisal is proposed by Morey and Morey (1999) to simultaneously consider the fund risks and returns measured over different time horizons.

A first direct generalization of the DEA mutual fund performance indexes proposed in the literature suggests to exploit the multiple input-multiple output structure of a DEA model. In particular, a proper ethical level indicator can be added to the outputs; in this way the DEA model allows consideration of a second objective besides the investment return. Of course, in order to be able to make such an addition, one should have at his disposal an indicator which measures the ethical level. However, such an ethical measure is not used in practice.

Usually we have at our disposal only the binary information on the ethical/non-ethical nature of a fund or, at the most, a rating of mutual funds into categories of different ethical levels. In this case, the basic DEA model has to be conveniently modified (see Banker and Morey, 1986a, 1986b). Indeed, the ethical level is often chosen by savers a priori, so that it has to be considered as an exogenously fixed variable; moreover, it is not a real variable but a categorical variable with a discrete set of values put on an ordinal scale. Therefore, a more appropriate DEA categorical model with an exogenously fixed output is proposed. As a special case of this model we get the binary ethical/non-ethical case. For ease of presentation, the intermediate exogenously fixed output DEA model is also discussed.

Lastly, in order to test the operational effectiveness and compare the differences in the performance measures computed with the various models proposed, we have carried out an empirical analysis on a set of randomly generated mutual funds.

References

- Banker R.D. and Morey R.C. (1986a). Efficiency analysis for exogenously fixed inputs and outputs. *Operations Research* **34**: 513–521.
- Banker R.D. and Morey R.C. (1986b). The use of categorical variables in Data Envelopment analysis. *Management Science* **32**: 1613–1627.
- Basso A. and Funari S. (2001). A data envelopment analysis approach to measure the mutual fund performance. *European Journal of Operational Research* **135**: 477–492.
- Charnes A., Cooper W.W. and Rhodes E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research* **2**: 429–444.
- Charnes A., Cooper W.W. and Rhodes E. (1979). Short communication. Measuring the efficiency of decision making units. *European Journal of Operational Research* **3**: 339.
- Morey M.R. and Morey R.C. (1999). Mutual fund performance appraisals: a multi-horizon perspective with endogenous benchmarking. *Omega* **27**: 241–258.
- Murthi B.P.S., Choi Y.K. and Desai P. (1997). Efficiency of mutual funds and portfolio performance measurement: A non-parametric approach. *European Journal of Operational Research* **98**: 408–418.