

An ethical investments evaluation for portfolio selection

By: **Carla Barracchini** [[biography](#)]

Abstract

The Socially Responsible Investing (SRI) is an assets allocation, whose aim is to maximize not only the portfolio expected return but the benefits for a consumer who as a whole operates according to the ethical principles. The wealth of a market economy is to cross the different ethical identities of families, of enterprises, of banks, in order to improve the allocation of the resources for a sustainable development. In this paper, we aim at describing the portfolio selection realized on the basis of the ethical principles - positive /negative, inclusionary/exclusionary - of an investor. The first part of this paper describes Socially Responsible Investing (SRI) and ethical funds market in the world; the second part builds an ethical index as evaluation of the coherence of the ethical principles of the investor in comparison with the ethical principles respected in the investment. The paper also illustrates the set of admissible portfolios for an ethical investor, obtained on the basis of the following indexes - of risk, of expected return and of ethicality.

Key-words

Socially responsible investing, ethical screening, portfolio theory

1. Introduction

Evidence from psychology, game theory, anthropology and contingent valuation surveys reveals a more complex pattern of decision-making than that described by neoclassical utility theory. In this paper, we aim at describing the portfolio selection realized on basis of ethical principles, that is on basis of investment quality - in order to know, for instance, the production of the income and the coherence of the destination of the funds to the sustainable development.

The Selection Portfolio Theory consists in the allocation of a capital among n possible investments, and is divided into two phases:

1. Portfolio selection;
2. Portfolio management.

For the first phase, a static model can be enough; for the second, a dynamic model is opportune due to information and transaction costs. In this paper we're going to analyse the first phase. The most meaningful results - both theoretical and practical - of the Portfolio Theory comes from H. Markowitz approach (1959). In comparison with Tobin, Markowitz gives a theoretical interpretation of the behaviour of a subject, who is rational and adverse to the risk, and individualizes the class of the efficient portfolios.

On the basis of the different inclinations of the subject, such an approach individualizes an optimal portfolio. In the Markowitz model, the assets diversification in the portfolio is the tool used to reduce the risk, without penalizing the return too much. The Socially Responsible Investing (SRI) consists in the selection and/or the management of the investments (shares, bonds) realized on the basis of ethical positive/negative (of inclusion and/or of exclusion) screening. Within the Modern Portfolio Theory, this paper aims at illustrating a third index - besides the expected return and the risk - an ethical index, that quantitatively expresses the coherence of the ethical values of the subject compared to the ethical values respected by the asset.

Therefore, we are going to describe the diffusion in the world of the SRI; we intend to propose an evaluation of an ethical investment and of a portfolio by the building of an ethical index. Finally, we show how the set of portfolios changes for an investor, who is rational, ethical and adverse to the risk, in comparison with the formulation of the Modern Portfolio Theory.

2. The Socially Responsible Investing (SRI)

The SRI phenomenon is provoking above all a change of the enterprises and consumers. SRI attracted the attention of the main banks and asset management firms in the world: they have seen ethical investments as new ways to attract investors. Ethical products have the same characteristics as existing financial products, with an important difference in qualitative aspects, such as the objective of investments, the respect of social and environmental principles, the transparency in management, etc. Financial funds invested in ethical funds can be allocated according to three different criteria:

1. Screening (negative and positive);
2. Shareholders activism or advocacy;
3. Community investing.

Screening is the inclusion or exclusion of stocks and shares in unit trusts, investment trusts or other investment portfolios on ethical, social or environmental grounds. Ethical screening is usually divided into "negative" screening to exclude unacceptable shares from the portfolio, and "positive" screening to select companies with superior social or environmental performance.

Shareholders' advocacy is the process of using shareholder influence to help to bring positive social and environmental change to corporations. Proxy resolutions on social issues are generally aimed at influencing corporate behaviour toward a more responsible level of corporate citizenship, steering management toward action that enhances the well-being of all the company's stakeholders, and improving financial performance over time.

Community Investing - also known as social venture capital - is the investment of money into community development or micro-enterprise initiatives that contribute to the growth and well-being of particular communities and/or environmental concerns.

The most common is, so far, the screening criteria which involve an ethical evaluation of the investment object. Both the exclusionary and positive screens are shown in the following tables:

Table 1

Exclusionary screens	% of Funds
Armaments, firearms and military contracting	91%
Nuclear power (production of energy and components)	76%
Tobacco (manufacture and sale)	76%
Gambling	67%
Human rights violations, child labour and oppressive regimes	58%
Pornography (production, sale and broadcasting)	58%
Animal Welfare (unnecessary testing and factory farming) and furs	58%
Alcohol	58%
Excessive environmental impact and consumption of natural resources, infringements of environmental law	55%
Genetically Modified Organisms(GMO) in agriculture and food	45%
Products dangerous to health/environment	45%

Table 2

Positive criteria	% of Funds
Environmental policy, codes, management systems (including certified schemes), environmental assessment	64%
Products beneficial to the environment and quality of life	58%
Environmental processes and performances (inputs and outputs)	55%
Customers & Suppliers, product safety, advertisement, competition issues	52%
Employees, working conditions, family-friendly policies, industrial relations and unions, training	48%
Environmental and social reporting, accountability and transparency	48%
Provision of environmental services and technologies	48%
Social policy, codes and management systems including certified schemes	45%
Good relationships with communities	39%
Environmental technical innovations (recycling, preventive measures, eco-design ...)	36%
Corporate governance	24%
Good records and practices on diversity and minorities	24%
Preventive measures to avoid human rights violations	24%

Source: Avanzi/SiRi Group in cooperation with CSR Europe, 2002

The attribution of a different priority to one criteria more than another only depends on investor principles. Furthermore, while the existence of a negative criteria automatically exclude a company (or asset), the absence of a positive criteria can be balanced by other considerations. Such considerations are of fundamental importance in the ethical evaluation function, that builds the ethical index of portfolio (section 4). The variables to be taken into account are numerous, and an ad hoc selection, on the basis of the ethics of the client, is impossible. The ethical market is supposed to split: every religion in America has its codes of ethical selection of the investment.

Before building financial products, it is necessary to understand the ethical identity and the objective function of the investors, since the wealth of a market economy is to cross the different ethical identities of families, of enterprises, of banks, in order to improve the allocation of the resources for a sustainable development.

3. The market of ethical funds

The transparency, for the socially responsible products market, is still weak and confusion between screened funds or assets and humanitarian funds or assets is still strong. There is a fundamental difference between ethical funds and humanitarian funds:

- Ethical asset portfolios invest socially responsible, a company should have all these characteristics;
- Humanitarian funds, also known as devolution funds, are those where the investor give up to a part or all the profit to community or solidarity activities.

Humanitarian funds cannot be considered ethical funds because, according to prevailing opinion, it is just an indirect form of donation that doesn't give to investors responsibility for the way money is used in the investment process. Worldwide financial markets are able to generate huge crises, but they could also been seen as the main channel to create a new way of making finance.

This section describes the diffusion of ethical funds throughout the world.

The American market is the market leader in ethical investment: 18% of all new funds collected by asset management companies is invested in SRI¹, Europe is growing and the data released confirm this trend. There is an important analysis, done by the Italian rating agency Avanzi², that shows the state of ethical funds in Europe. The report is the result of collective research carried out during the year 2002 by organisations belonging to the Sustainable Investment Research International (SiRi) Group, a worldwide coalition of local research organisations devoted to the advancement of socially responsible investing.

SiRi Group members that participated in the project are: Avanzi covering Italy, Caring Company covering Sweden, Denmark, Finland, Norway, Poland, Centre Info Suisse covering Switzerland, Fundacion Ecologia y Deasarrollo covering Spain and Portugal, PIRC - Pensions & Investment Research Consultants covering the United Kingdom, Scoris covering Germany and

Austria, Stock and Stake / Ethibel covering Belgium and Luxembourg and Triodos Research, covering the Netherlands.

Other SiRi Group members that did not take part in the project (mainly due to its geographical scope) are: KLD - Kinder, Lydenberg & Domini & Co., Inc. (United States), MJRA - Michael Jantzi Research Associates (Canada) and SIRIS (Australia).

The project has also been promoted and supported by CSR Europe, a business driven membership network of 60 companies whose mission is to place Corporate Social Responsibility (CSR) in the mainstream of business practice and by Euronext, the company who manage the Stock Exchange of Paris, Brussels and Amsterdam.

The funds considered in this report³ should all:

- use ethical, social and environmental screens for portfolio selection;
- be marketed as socially responsible investment products;
- be available to the public (retail funds);
- be UCITS⁴ funds.

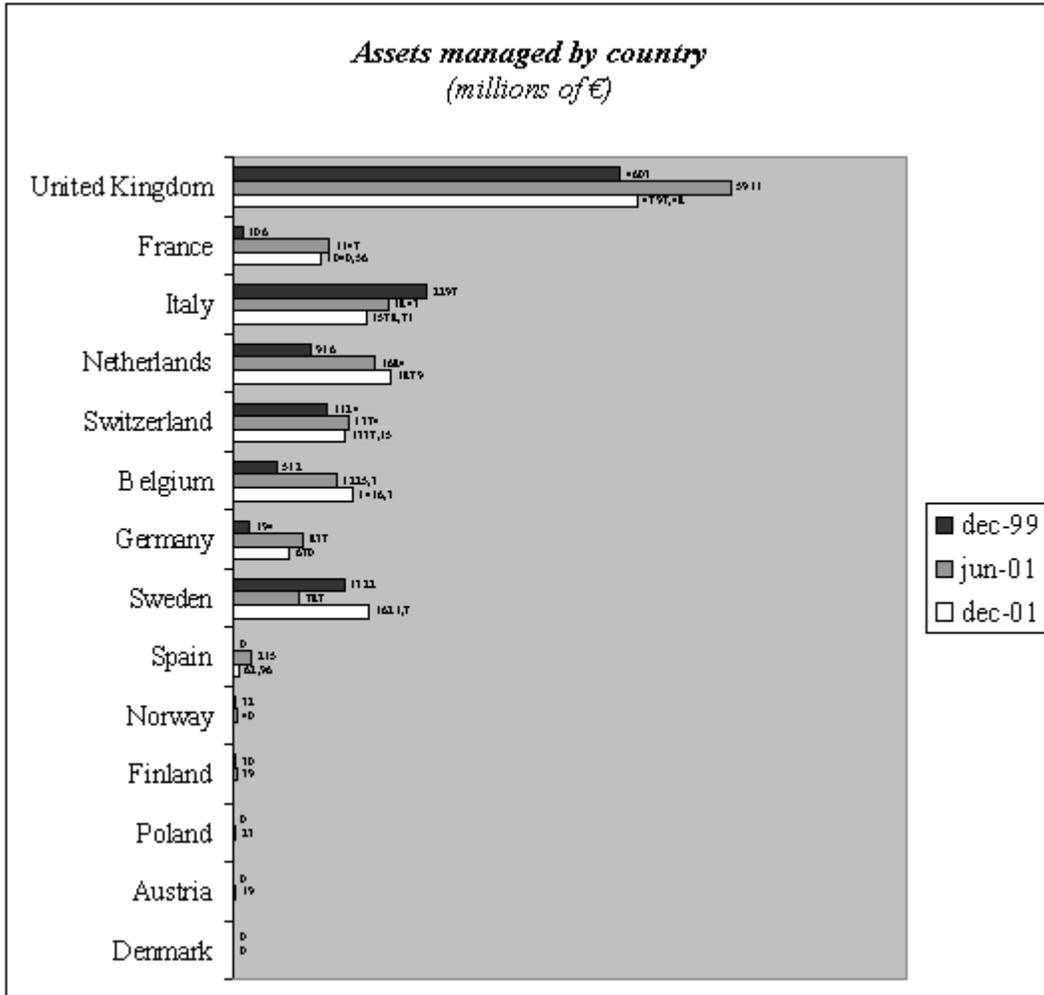
Any fund has to meet all of these conditions in order to be eligible for the analysis.

Therefore the research does not take into account:

- funds that simply donate a part of commissions or profits to charitable or other "good" causes;
- funds specialised only in investing in environmental technologies or in the environmental industry (waste management, water treatment);
- funds and other investment products available only to institutional investors.

Here follow some indicative data on the growth of the ethical market.

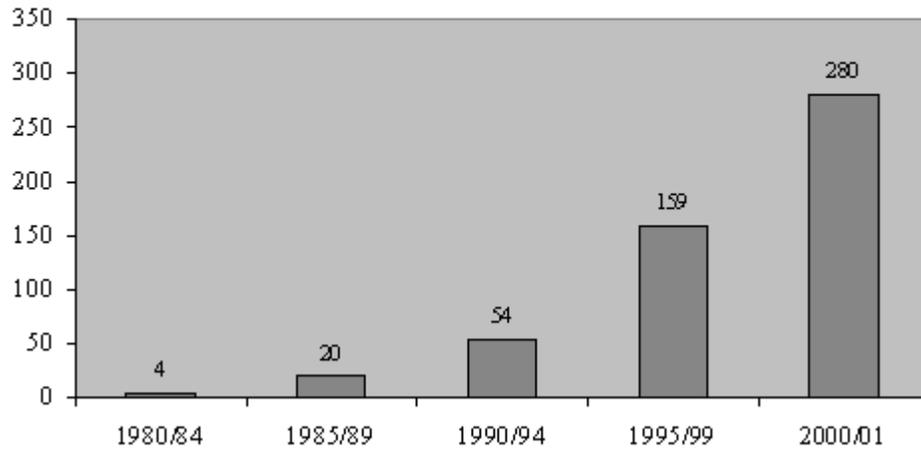
From the Green, Social and Ethical Funds in Europe 2001, a growth rate emerges that is particularly interesting when considering the reference period coincides with a difficult period for asset management and financial investment activities throughout Europe. Socially responsible investments can therefore be considered to be one of the most dynamic and rapidly growing activities in the investment funds industry with an increase of more than 30%: from €1,1 million in 1999 to 14,9 by the end of 2001.



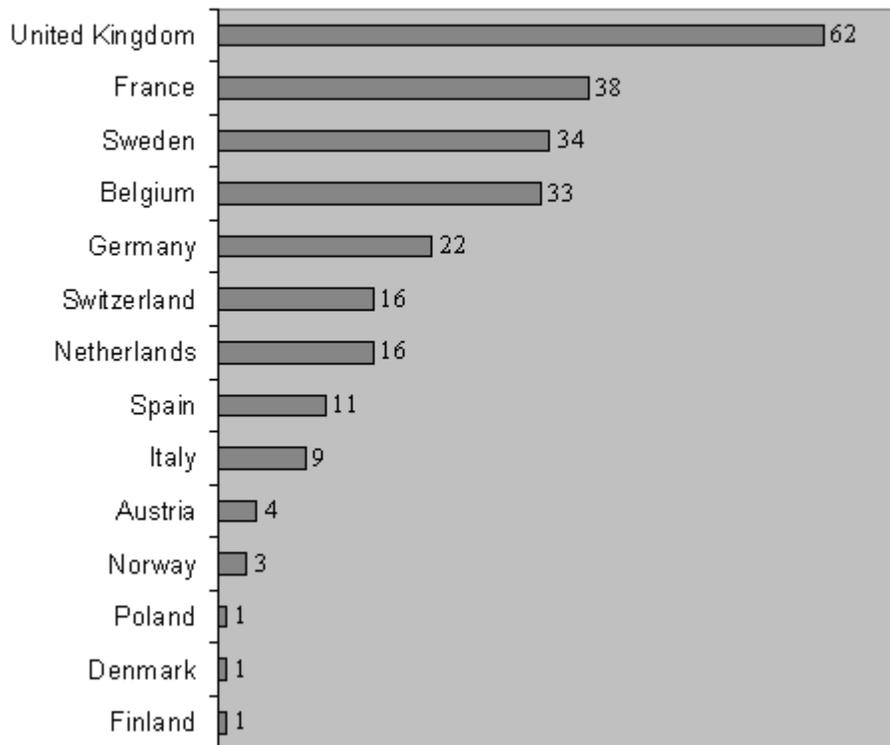
Source: SiRi Group / Avanzi supported by CSR Europe and Euronext

On 31 December 2001 there were 280 green, social and ethical funds operating in Europe, a +78% increase in the 24-month period since the end of 1999, as shown in the graph below.

*Growth of ethical funds in Europe from 1980 to 2001
(absolute value)*



Number of funds divided by country up to 30/06/2001



Source: SiRi Group / Avanzi supported by CSR Europe and Euronext

The comparison between assets of SRI funds and the total asset managed in European funds (UCITS funds, as defined in the European legislation), shows that SRI funds are still a very small portion of all funds in Europe, and the assets under management are just 0.43% of the total asset managed by UCITS funds.

Percentage of assets managed by SRI funds compared to those managed by non SRI funds in selected countries (at June 30, 2001)

Funds	DE	FR	IT	UK	NL	BE	CH	Total
SRI	837	1.147	1.842	5.910	1.683	1.225	1.368	15.137
EU(UCITS)	801.292	874.200	429.513	571.776	116.439	83.388	92.907	3.632.475
%	0,10%	0,13%	0,43%	1,03%	1,45%	1,47%	1,47%	0,43%

Source: Green, Social and Ethical Funds in Europe 2001, SiRi Group

Assets under management and growth rate for the European funds (mlns € at June 30, 2001)

Funds	1999	2001	(%) Change
SRI	11.136	15137	+35,9%
EU (UCITS)	3.233.000	3.632.200	+12,3%

We are going to complete the first part of the introduction to the SRI, proposing to the reader some questions:

- The choices of ethical investors affect the behaviour of the enterprises?
- This behaviour could lead to an abandonment of the non coherent productions with a such as: fiscal facilitations for productions, management and ethical certifications and/or taxations sustainable development (and to a consequent cost of the lowest capital), also following government provisions on productions that do not promote the sustainable development?
- The increasing attention of the firms to a sustainable development could be a new form of marketing?
- The job of ethical committees for the control and the certification of the ethicality of the investments - is it accurate? What is its cost? to whom is it charged?

Following these considerations, the section 4 of this paper describes the decisional path of a subject who allocates resources on ethical investments.

4. An ethical investments evaluation

In recent years, attention has been drawn to some of the earlier controversies in utility theory due to questions about environmental, armaments, human rights violations, Genetically Modified Organisms (GMO) in agriculture evaluation based on neoclassical axioms of consumer choice - in particular the contingent evaluation method by some economists (see Stigler and Becker, 1977; Becker, 1996; most contemporary microeconomists, for examples see van den Bergh et al., 2000). We are aware of the rich body of theories extending neoclassical utility theory to include interpersonal comparison of choice, altruism, lexicographic preferences, and other phenomena of human behaviour. We argue that these axioms of consumer choice do not confirm the accepted models of human behaviour verified after experimental and theoretical work in economics, psychology, anthropology and game theory.

The neoclassical utility theory ignores the biological basis of human existence. In standard theory, ethical needs are indistinguishable from whims of consumer choice. In a survey of the contributions of environmental psychology, economics and environmental philosophy to the debate about the human evaluation of nature, Lockwood (1999) concludes that when non-compensatory preferences are present (meaning that a change in one alternative cannot be compensated by a change in another alternative) a multifaceted evaluation framework is necessary.

Much of the criticism of neoclassical economics is directed at the notion that humans are rational calculating individuals. The methodological individualism of consumer choice theory systematically ignores the hierarchical nature of social and ecological systems when preferences and utility are aggregated within social systems.

In this paper, we aim at illustrating the portfolio selection that is also realised on the basis of the ethical satisfaction of the choice of the investor. In order to achieve such a goal, we build an ethical index η $0 \leq \eta \leq 1$, that is typical of the investor and the portfolio, as a result of the ethical principles evaluation respected in the portfolio investments.

The risk and the expected return indexes (σ, μ) are indexes that refer to the stochastic return of the portfolio. It is necessary, therefore, to characterize the couple of indexes (σ, μ) in comparison to the index η as follows:

Definition 1. objective quantitative indexes

The expected return and the standard deviation are objective quantitative indexes, obtained by objective quantitative greatness, whose values are independent from the investor preferences.

Definition 2. subjective qualitative index

The ethical index is a subjective qualitative index, referring to the qualitative features of the investments and whose value, not negative, is referred to the ethical preferences of the investor.

We're now going to illustrate how the index η can be allocated by a subject to an investment and a portfolio.

Remark: The following treatment, with proper changes, can be extended to the ethical funds evaluation and to the control of the ethicality of the enterprises.

4.1 A mathematical model for the building of an ethical index

Let C be a capital to invest on the ethical assets B_1 and B_2 ,

C_k = a capital to be allocated on the k -th asset/fund, so that $\sum_k C_k = C$, $k=1,2$,

$x_k = C_k/C$ the quotas of the k -th asset/fund, so that $\sum_k x_k = 1$, $k=1,2$.

Furthermore, we indicate with

$\eta(B_1) = \eta_1$ the ethical index that the subject assigns to the ethical asset/fund B_1

$\eta(B_2) = \eta_2$ the ethical index that the subject assigns to the ethical asset/fund B_2

where η_1 and η_2 are not the expected values, but non negative values.

Indicating with $X = (x_1, x_2)$ the portfolio so that $x_1 + x_2 = 1$, its ethical index is defined as X :

$$\eta(X) = \eta = x_1\eta_1 + x_2\eta_2,$$

usually for n asset/funds, we have $\eta(X) = \sum_{k=1}^n x_k\eta_k$

We suppose that a subject invests x_k on the k -th asset/fund ($k=1,2,\dots,n$), with an expected return μ_k , a standard deviation α_k and an ethicality η_k . The ethical index η_k obtained through a function measuring if and how much the ethical principles of the subject are coherent with those of the k -th investment.

Indicated with $\mathcal{S} = \{e_i\}_{i=1,2,\dots,N}$, $N < +\infty$, the family of all the Ethical Principles, we suppose that a subject has an ethical system of his own S , of numerosness $N \leq N$ and therefore $S \subseteq \mathcal{S}$. Without losing the generality, we suppose that the first N elements of the family \mathcal{S} constitute the system $S = \{e_i\}_{i=1,2,\dots,N}$ of the subject.

On the basis of the system S , the subject associates to the k -th fund or asset, with ethical system

$$S_k = \{(e_{k,h})_{h=1,2,\dots,nk}\}; k=1,2,\dots,n\},$$

an ethical index η_k , as a result of a subjective evaluation, that we are going to illustrate as follows.

Such a system is typical of the subject and does not change on the basis of the fund; on the contrary, it changes the level of the index η_k from fund to fund, so that it can assume values $0 \leq \eta_k \leq 1$.

The subjectivity of the preference and the attention to the ethical values could lead the subject to also choose an ethical investment with smaller expected return and greater risk (see Figure 2.), pushed by a middle-long term strategy of investment.

We are now going to describe the building of the ethical index η_k , through the following relationship

$$\eta_k = \Phi(E_k(e_1, e_2, \dots, e_N)) = \Phi(E_k(S)) \quad k=1,2,\dots,n$$

and the ethical index η of the portfolio $X = (x_k) \quad k=1,2, \dots,n$ through

$$\eta = \eta(X) = \eta_1 x_1 + \eta_2 x_2 + \dots + \eta_n x_n = \sum_{k=1}^n \eta_k x_k$$

We articulate in steps the building of the index η_k , of the k -th ethical investment:

Step 1. classifying the Ethical Principles of the system S of the subject;

Step 2. defining the generic function E_k , related to the k -th fund;

Step 3. defining the evaluation function Φ that works independently from the index k ;

Step 1. Classification of the Ethical Principles in S of the subject in two categories:

A) Primary or Intransigent Ethical Principles;

B) Secondary or Not-Intransigent Ethical Principles.

The Intransigent Ethical Principles are so called because their absence from the system S_k excludes the k -th asset from the portfolio selection; on the contrary, the Not-Intransigent Principles are so called because their absence from S_k does not exclude the choice of that fund but it is compensated by the presence of other principles.

In this way, every subject individualizes, on basis of such a classification, a partition of S in Primary Ethical Principles and in Secondary Ethical Principles. Having defined $\{1,2,\dots,N\} = I$, it results that

$$S = \{e_i; i \in I\} = \{e_i; i \in I\} \cup \{e_j; j \in NI\}; \quad I \cup NI = I \quad \text{e} \quad I \cap NI = \emptyset$$

where

$\{e_i; i \in I\}$ = the set of Intransigent Ethical Principles of the system S ;

$\{e_j; j \in NI\}$ = the set of Not-Intransigent Ethical Principles of the system S ;

Every individual assigns some coefficients in order to express the importance of that ethical principle in the individual ethical system.

Step 2.

We define the generic function E_k , related to the k -th ethical investment, that works on the ethical system of the subject

$$E_k(S) = \{E_k(e_i); i \in I\} = \begin{cases} E_k(e_i); i \in I = & \begin{cases} 0 & e_i \notin S_k \\ 1 & e_i \in S_k \end{cases} & \forall i \in I \\ E_k(e_j); j \in NI = & \begin{cases} 0 & e_j \notin S_k \\ 1 & e_j \in S_k \end{cases} & \forall j \in NI \end{cases}$$

The distinction, within the system S , of two categories of principles aims at the building of two ethical indexes $\eta_k^{(1)}$ and $\eta_k^{(2)}$ - the former referring to the Intransigent Ethical Principles, the latter to those not intransigent - defined through the following expressions

$$\eta_k^{(1)} = \prod_{i \in I} E_k(e_i) \quad \text{ed} \quad \eta_k^{(2)} = \sum_{j \in NI} E_k(e_j) \alpha_j$$

where $\alpha_j, \forall j \in NI$, are not negative real coefficients.

The different functional structure of the two indexes is explained by the different role of the principles in the choice of the portfolio.

While the absence of an intransigent or primary principle excludes the asset/fund from the portfolio - so that \mathcal{I} can be explained- the absence of an Not-Intransigent Principle can be balanced by the presence of other Secondary Principles, so that \mathcal{S} can be explained.

Step 3.

We build the ethical index η_k of the k -th asset/fund through a function of evaluation, indicated with Φ and defined by the following combination

$$\eta_k = \Phi(E_k(S)) = \eta_k^{(1)} (\alpha + \eta_k^{(2)})$$

where $\eta_k^{(1)}$ is the ethical index of the Intransigent Ethical Principles,

$\eta_k^{(2)}$ is the ethical index of the Not-Intransigent Ethical Principles and

α is a not negative real coefficient, $\alpha < 1$

The so-described index of the Intransigent Ethical Principles contributes to the value of η_k with a coefficient α in the case where $\eta_k^{(1)} = 1$, so determining the choice of the portfolio.

Therefore, the function of ethical evaluation of the k -th asset results

$$\eta_k = \Phi(E_k(S)) = \eta_k^{(1)} (\alpha + \eta_k^{(2)}) = \prod_{i \in I} E_k(e_i) \left(\alpha + \sum_{j \in NI} E_k(e_j) \alpha_j \right),$$

$\alpha, \alpha_j > 0 \quad \forall j \in NI$

with $\alpha + \sum_{j=1}^{NI} \alpha_j = 1$

The expression of η_k is equal to zero if it exists at least an Intransigent Ethical Principle of the subject not respected by the asset: $e_i \notin S_k$ for some $i \in I$, while it results equal to 1 if all the Primary Ethical Principles of the investor are respected, $e_i \in S_k \quad \forall i \in I$.

Remark

Φ is a function of subjective evaluation that considers the ethical system S of the investor. Following the building of such an ethical index in the section 4.2, we illustrate the set of ethical efficient or dominant portfolios on the basis of three indexes (σ, μ, η) for an economic subject, who is rational, adverse to the risk and careful to the Ethical Principles.

Example

An investor is supposed to select a portfolio of ethical investments. On the basis of his ethical system, he evaluates the declared ethical system in the investment, in order to get the index η_k and then the index η . In particular, we build his η_k index. Let the ethical system S be described from

$$S = \{e_i\}_{i \in I} = \{e_i\}_{i \in I} \cup \{e_j\}_{j \in NI} \quad \text{so that } I \cup NI = \underline{I}$$

with the following ethical principles:

$$\{e_i\}_{i \in I} = \{\text{armaments, minors' defence, environment}\} \quad i=1,2,3,$$

Intransigent or Primary Ethical Principles

This means that the subject does not invest on firms producing armaments, not cooperating for the minors' defence and not operating for the environmental protection.

$$\{e_j\}_{j \in NI} = \{\text{social policies, nuclear weapons/energy}\}; \quad j=1,2$$

Not-Intransigent or Secondary Ethical Principles

This means that the subject invests on firms promoting social initiatives (in general, for the welfare of the community), not investing in nuclear weapons/energy with dangerous effects on mankind and environment.

The coefficients describing the importance given by the investor to such principles, are

$$\alpha = 0.6 \quad \alpha_1 = 0.3, \quad \alpha_2 = 0.1,$$

The generic k -th asset/fund has an ethical system S_k , which is supposed to have all the Intransigent Principles of the investor and some of those Not-Intransigent:

$$S_k = \{\{e_{k,h}; h=1,2,\dots,nk\}; k=1,2,\dots,n\} = \{e_{k,h}; h=1,2,3,4\}; k=1,2,\dots,n\}$$

$$= \{e_i\}_{i \in I} \cup \{\text{social policies}\} \quad k \neq n$$

$$= \{\{\text{armaments, minors' defence, environment} \cup \text{social policies}\}; k=1,2,\dots,n\}$$

Remark:

If the S_k system was short of one of the Primary Principles, the ethical index $\eta_k^{(1)}$, as well as index η_k , would be void, so that there could be incoherence between the ethical choice of the subject and the ethical proposal of the investment.

In this case, it results that

$$E_k(S) = \{E_k(e_i)\}_{i \in I} = \begin{cases} E_k(e_i)_{i \in I} = & \begin{cases} 1 & e_i \in S_k \quad \forall i \in I \\ 0 & e_i \notin S_k \end{cases} \\ E_k(e_j)_{j \in NI} = & \begin{cases} 1 & e_j \in S_k \\ 0 & e_j \notin S_k \end{cases} \end{cases}$$

The two indexes, the former referring to the Intransigent Ethical Principles and the latter to the Not-Intransigent Ethical Principles, are described as follows

$$\eta_k^{(1)} = \prod_{i \in I} E_k(e_i) = 1$$

$$\eta_k^{(2)} = \sum_{j \in NI} E_k(e_j) \alpha_j = 0.3 \cdot 1 = 0.3$$

and, being $\alpha = 0.6$, the ethical index of the k -th asset evaluated by the investor, is

$$\eta_k = \eta_k^{(1)} (\alpha + \eta_k^{(2)}) = 0.6 + 0.3 = 0.9$$

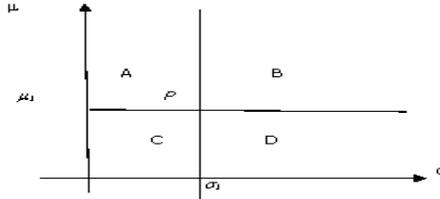
4.2 Preference, Non-Preference or Hesitation Regions

In the classical portfolio theory, the question of the portfolio selection consists in the reduction of such a choice in a couple of indexes: expected return and risk.

If (σ, μ) is the couple of indexes in the Cartesian plan (σ, μ) , referring to a P portfolio, the set of portfolios dominated by P can be identified. The dominance concept expresses that the rational and adverse to the risk investor will never choose portfolios that, in comparison to $P: (\sigma, \mu)$, are non admissible, or that they show greater risks and smaller returns.

Figure 1:

A = Preference Region
 B e C = Hesitation Region
 D = Non-Preference Region

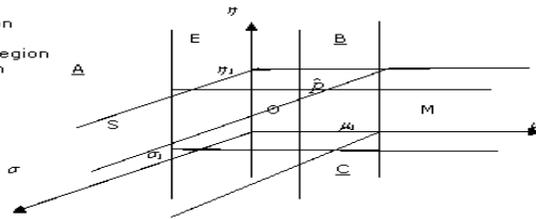


In the **Figure 1**, all the portfolios, whose couples of indexes belong to the region D of the plan, are dominated by the portfolio P . In this case you can define D as *Non-Preference Region*. The region A has all the portfolios dominating the P portfolio and you can be defined A as *Preference Region*. The portfolios of the regions C and B are not comparable with P , as they introduce an index of greater risk and an index of greater return or an index of smaller risk and an index of smaller return. Therefore C and B can be defined *Hesitation Region* in comparison with the P portfolio. If the set of portfolios is found, the efficient portfolios (not dominated by those admissible) are determined on the basis of the individual characteristics of the investor.

For an immediate comparison to the ethical model, we propose to replace the couple of the indexes (σ, μ) with the indexes (σ, μ, η) , preserving the concept of dominance in comparison to a $\hat{P} : (\sigma_1, \mu_1, \eta_1)$ portfolio

Figure 2:

E, B = Preference Region
 S, C = Non-Preference Region
 O, C' = Hesitation Region
 M = Not-Ethical Preference Region
 A = Ethical Preference Region



In this case, the dominant concept expresses that the ethical, but still rational and adverse to the risk investor does not choose situations that in comparison to the $\hat{P} : (\sigma_1, \mu_1, \eta_1)$ portfolio are worse:

Risk $\sigma_2 > \sigma_1$

Return $\mu_2 < \mu_1$

Ethics $\eta_2 < \eta_1$

Other cases will be preferred on the basis of the sensibility and ethical behaviour of the investor.

In Figure 2, we define the portfolio regions of the non-negative subspace $\eta \geq 0, \sigma \geq 0, \mu \geq 0$, whose points belong to the regions indicated with S, E, M and O and with A, B and C:

S: (σ, μ, η) so that $\sigma > \sigma_1, \mu \leq \mu_1, \eta \leq \eta_1$

M: (σ, μ, η) so that $\sigma \leq \sigma_1, \mu > \mu_1, \eta \leq \eta_1$

E: (σ, μ, η) so that $\sigma \leq \sigma_1, \mu \leq \mu_1, \eta > \eta_1$

O: (σ, μ, η) so that $\sigma \leq \sigma_1, \mu \leq \mu_1, \eta \leq \eta_1$

A: (σ, μ, η) so that $\sigma > \sigma_1, \mu \leq \mu_1, \eta > \eta_1$

B: (σ, μ, η) so that $\sigma \leq \sigma_1, \mu > \mu_1, \eta > \eta_1$

C := C' ∪ C- where

C': (σ, μ, η) so that $\sigma > \sigma_1, \mu > \mu_1, \eta > \eta_1$

C-: (σ, μ, η) so that $\sigma > \sigma_1, \mu > \mu_1, \eta \leq \eta_1$

In this case, a possible definition and classification of admissible portfolios is more flexible due to the presence of the ethical index, whose value is subjective. From a comparison with the portfolio $(\sigma_1, \mu_1, \eta_1)$, the dominated portfolios are certainly those belonging to S region, defined *Non-Preference Region*; the portfolios belonging to M region are preferable or dominant according to the classical portfolio theory, having less risks and greater expected returns, but introducing a smaller ethical index. Therefore, we can define M as a *Not-Ethical Preference Region*: an ethical investor could not select such a portfolio. The portfolios of E region are admissible portfolios and therefore dominant of the \hat{P} portfolio; E is defined as a *Preference Region*.

The portfolios in O region cannot be compared with \hat{P} , as it has smaller indexes; O is defined as an *Hesitation Region*. In B region, the portfolios dominate \hat{P} , then it is a *Preference Region*; the portfolios in A region, having greater risk and ethicality and smaller return in comparison with \hat{P} portfolio, could be admissible and even efficient for some investors above all careful to the ethics and the risk; then A is defined as an *Ethical Preference Region*.

C- inferior region, delimited by S and M, is dominated by \hat{P} , then C- is defined as a *Non-Preference Region*; on the contrary in C' superior region, the portfolios have the most greater indexes in comparison to $(\sigma_1, \mu_1, \eta_1)$ and, they cannot be compared with \hat{P} : so C' is defined as an *Hesitation Region*.

5. Conclusions and future directions

Predictions based on the axioms of consumer choice have proved to be less accurate than those based on more realistic assumptions of human behaviour (Gintis, 2000, chapter 11). Game theoretic models of altruism, for example, are proving to be better predictors of human behaviour than models based on the axioms of consumer choice (Friedman, 1991; Bergstrom and Stark, 1993; Bowles and Gintis, 1997; Bohnet and Frey, 1999; Gächter and Fehr, 1999). Economic journals now routinely publish papers questioning the standard characterization of human nature, the standard representation of economic production, and even the standard assumption of growth as progress.

These considerations, drawn by the economic literature, together to the growth of the offer and the variety of ethical financial products have encouraged our study. The purpose of the paper is to describe the subjectivity and the differentiation of the portfolio selection, in basis to the ethical principles of the subject, through the construction of an ethical index.

In other terms, this paper describes the evaluation process of the ethical characteristics of financial products from an investor having his ethical system. Besides this paper describes the different regions of portfolios, in basis to ethical evaluations, and shows that the ethical investor choices are more articulate: can belong to Preference, Non-Preference or Hesitation Regions, but also can belong to Not-Ethical Preference or Ethical Preference Regions.

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¹ Di Turi A., Fondi etici +1: parte Zenit Etico & Ricerca, Eticare, 23 October 2002.

² Avanzi, from 1997, is a research consultancy company centre for the promotion of innovative tools for environmental, economic and social sustainability. It is the first Italian company to develop social and environmental rating of Italian quoted companies (MIB 30 index) and other listed companies in North America. Europe and Japan.

³ see: Green and ethical funds in Europe 2001.

⁴ UCITS stands for Undertaking for Collective Investment in Transferable Securities which is a collective investment fund that complies with the EU UCITS Directive N° 85/611/EEC of 20 October 1985 (OJ L 375/3 of 12-31-1985) and consequently can be marketed in all EU countries.