Chapter 3
Stages of Investment Management Policy

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3.1 Investment Management Policy

Investment management policy for the various categories of institutional investors can be divided into the following stages:

- Identification of objectives and constraints,
- Formalisation of the investment strategy,
- Implementation of the financial strategy,
- Periodic rebalancing of the portfolio, and
- Performance assessment and risk control.

The level of detail and structure of each stage of investment management policy varies depending on the category of the institutional investor, size of the portfolio, complexity of the management model adopted, and relative regulation.

3.2 Identification of Objectives and Constraints

The starting point for setting up an investment management policy is the identification of the objectives and obligations of the investor. In general terms, the objectives of such a policy for an institutional investor are those of achieving efficient risk-return combinations on a given time horizon, bearing in mind any constraint or return guarantee to the final investors. More specifically, there is a fundamental difference between institutional investors that need to implement

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investment policies based on asset-liability management and those that can adopt asset-only investment policies.[1]

In the first case, the investment policy must consider and assess the liabilities that correspond to the performance obligations guaranteed to the final investors. In other words, the same investment policy serves to guarantee performance to the final investors within the specified contractual terms and conditions. This obliges the institutional investor to perform a strict and dynamic control of the surplus or deficit between the total amount of investments at a certain date and the current value of the liabilities and obligations in existence at that date, in order to promptly intervene in case of excessive deviation between the two total values.

In the second case, lacking any predefined performance obligation, the institutional investor can adopt an investment policy that exclusively focuses on optimal asset allocation, while maintaining the necessary caution with regard to the liquidity needs required by the adopted management model. Compared to the former case, the latter entails a less strict risk control, at least in relative terms, and in effect, for a given risk level, the investment policy has only an indirect impact on the performances provided to the final investors, in the form of failed performance maximisation.

Constraints of the investment policy include a series of factors that exercise a direct or indirect influence on the definition of the objectives of the investment policy. Moreover, in the case of an institutional investor, these constraints can be traced back to the following factors:

- Liquidity requirements,
- Reference time horizon,
- Tax treatment of financial instruments,
- Legislative-regulatory obligations, and
- Specific factors related to individual institutional investors.

Each of these factors has an impact on the investment policy, but the first two, in particular, influence the ability of the institutional investor to support risks and, therefore, have a direct influence on the identification of the most appropriate risk-return combination. The first significant factor is the need for the institutional investor to have access to cash flows during the life of the investment, in order to honour requests for reimbursements or performance obligations, whether expected or unexpected.[2] This requirement is connected to liquidity risk, which has a

[1] Sharpe et al. (2007).

[2] Liquidity risk implies funding and market liquidity risks for institutional investors. Funding liquidity risk entails the risk in which the institutional investor is not able to cope economically and in a timely manner with the expected and unexpected cash flows, linked to the reimbursement of liabilities or to compliance with performance obligations. Market liquidity risk implies the risk in which the institutional investor is unable to convert a position on a given financial instrument into cash, or is able to liquidate it, but incurs a reduction in price due to the lack of liquidity of the market in which this instrument is negotiated or due to the temporary malfunctioning of the market itself. While institutional investors with an investment policy that has been set according to the

significant impact on the definition of the investment policy and varies depending on the type of institutional investor and, above all, depending on the reimbursement, more or less discretionary, of the capital provided by final investors.[3]

A second factor that has a significant impact on the definition of the investment policy is the reference time horizon adopted by the investor. This factor assumes significance under two different aspects: the effect that it has on the ability of the investor to bear risks and impact it has on the actual construction of the portfolio. In this regard, the traditional principle that is widely accepted by operators, albeit not without criticism, consists of the so-called time diversification, on the basis of which, as the time horizon adopted by the investor increases, so does the weight potentially assignable to assets with a higher risk.[4]

The third factor able to influence investment policy, in particular the security selection stage, is the tax treatment of the different financial instruments. In this case, tax legislation for each category of institutional investor must be analysed in relation to the income provided by the different financial instruments, with the objective of establishing an investment policy that can achieve an optimisation of the tax burden, while complying with other conditions.

Moreover, the fourth factor affecting the investment policy of institutional investors involves legislative-regulatory constraints, which may be more or less stringent depending, in particular, on the type of final investors.[5] These constraints may include restrictions to the overall composition of the portfolio, in terms of the categories of financial instruments and/or homogenous asset classes of financial instruments; restrictions to risk concentration; restrictions to the holding of voting rights, resulting in maximum thresholds for participation in the companies' equity capital; and general prohibitions that identify the type of operations that cannot be made by a particular category of institutional investors.

Lastly, the final factor is represented by non-regulatory restrictions that are set by the institutional investor. One example is the constraint, which is not prescribed by law, of implementing socially responsible investment policies, where not only the risk-return combination of the individual investment is assessed, but also the ethical, social, and environmental impact that it generates. Therefore, the constraints individually set by each institutional investor have a significant impact on the concrete realisation of the investment policy.[6]

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asset-liability management approach can deal with both risks, those with an asset-only approach encounter only the latter risk. See also Hull (2015).

[3] Tschampion et al. (2007).

[4] For a critical analysis of the traditional principle of time diversification, see Bodie (1995).

[5] There is a clear distinction between final investors that are retail clients and those that are professional. In fact, legislation provides a greater degree of protection for the former than for the latter.

[6] Reilly and Brown (2012).

3.3 Formalisation of the Investment Policy

Once the objectives and constraints of the investment policy have been defined, institutional investors need to identify the financial strategy they intend to implement, in order to achieve efficient risk-return combinations from the resources invested during a given period of time. This stage—beyond any regulatory requirement—demands the formalisation of the following:

- Objectives to achieve using the investment policy,
- Criteria to follow in its implementation,
- Tasks and responsibilities of the subjects involved in the process, and
- Control and assessment system of the results obtained.

In order to reach these objectives, the investor must identify:

- The approach underlying the investment policy;
- Financial instruments in which to invest, and the associated risks;[7]
- *Ex ante* constraints to risk exposure;[8]
- Management style adopted;
- Management method, whether internal or delegated, to adopt when such a choice is possible; and
- Organisational division of tasks and responsibilities of the various subjects involved in the investment process.

The financial strategy must be subjected to periodical review, in order to assess its effective congruence with the objectives and requirements of the investor.

3.4 Implementation of the Financial Strategy

The next stage of investment management policy involves the implementation of the financial strategy, which depends on specific factors regarding the investor, as well as on economic and market factors. The approaches underlying the investment decisions are based on two alternative methods:

- The bottom-up approach, and
- Top-down approach.[9]

In the bottom-up approach, the investment process starts directly with the selection of single securities in which to invest, on the basis of a sector analysis,

[7] Quantitative limits (minimum and maximum) and qualitative limits (issuer reliability, issuer nationality, negotiation markets, etc.) for each financial instrument and/or homogenous asset class can be established for an even more rigorous control of the risks.

[8] See Chap. 5.

[9] Farrell (1997).

an analysis of the company fundamentals, a quantitative analysis, or any other selection criterion deemed reliable. The resulting overall investment portfolio is, therefore, given by the sum of the single securities chosen during the initial stage.

In contrast, a top-down approach focuses, first, on the strategic allocation of the investor's portfolio, identifying the division between macro-classes of financial assets, consistent with the objectives of medium-long-term investments, and only later concentrates on the selection of individual financial instruments. In the case of institutional investors, it is usual and, in some cases, compulsory to follow the top-down approach, in which the investor starts by dividing the portfolio into different investment classes and, in the final stage, selects individual financial instruments. This preference is linked to three factors.

The first factor is the hypothesis that the forecast of the expected return of the homogenous asset classes of financial instruments may be subject, on average, to more limited margins of error, if compared to the forecast of the return expected from each single security. If the specific risks of the single security included in a homogenous asset class are mutually offset, it would undoubtedly seem more rational and less complex to concentrate only on the forecast of the variables that are the source of total risk which cannot be diversified. The second factor is an improvement of the diversification effect, due to an easier forecast of the risks, at least in relative terms, and, above all, of the correlations between homogenous asset classes, instead of between single securities. Finally, the third factor is a better adaptation of the top-down approach to hierarchical decision-making structures and allocation of tasks, with the identification of the subjects responsible for each stage of the investment policy.[10]

The most well-known model for realising a top-down investment approach is Markowitz's mean-variance optimisation, which, after decades, still constitutes one of the most applicable methods for reconciling methodological rigour with practical feasibility today.[11] As you will read, Chap. 4 is dedicated to the analytical presentation of the model in the logic of strategic asset allocation, its theoretical assumptions, the problems associated with its practical application, and the relative solutions.[12] Based on a top-down approach, the management of an investment portfolio may be broken down into three consecutive stages:

- Strategic asset allocation,
- Tactical asset allocation (or market timing), and
- Stock picking.

[10] Gibson (2013).

[11] Markowitz (1952).

[12] A top-down alternative to Markowitz's mean-variance optimisation is the creation of the naïve portfolio. This consists in putting together equally weighted portfolios that are extremely diversified, in terms of asset classes, without making forecasts of the individual market sector trends. Although this strategy, also known as 1/N strategy, does have the undoubted advantage of highly diversifying the portfolio, it does not pursue any objective of maximising return for a given risk level. Other two alternatives to Markowitz's mean-variance optimisation are global minimum-variance strategy and optimal risk-parity strategies, which are presented in Chap. 6.

3.4.1 Strategic Asset Allocation

Strategic asset allocation consists of the identification of the weights that the different asset classes must keep within the portfolio in the medium to long term. It is derived from the forecasts of the real and financial trends of each market sector, and from the consequent assessment of comparative convenience, bearing in mind the investor's objectives and constraints. Therefore, the target weights obtained with strategic asset allocation define the structure that the portfolio must maintain, within the time period assumed by the investor.

At the first level, strategic asset allocation envisages the identification of different asset classes in which to divide the investment universe, where each asset class represents a group of financial assets with a certain degree of homogeneity, in terms of risk-return combination. The significance of the identification of the asset classes is obvious, if we note that the market variables forecasting process is achieved via the formulation of expectations regarding the evolution of the general economic scenario, in order to obtain forecasts on the future of the single-market sectors, which are specifically distributed into as many asset classes.

As mentioned, it is obvious that the creation of a connection between macroeconomic forecasts and the return of a single share or bond is a difficult task, given that the return of each security is significantly influenced by the specific factors associated with each company. However, if we consider an entire asset class consisting of a range of securities with homogenous characteristics, the specific factors tend to mutually compensate and disappear, thereby tightening the connection between formulated economic forecasts and asset-class trends.[13]

The composition criteria vary according to whether we consider equity, bond, or money-market asset classes; however, in all three cases, it is essential that the selected asset classes satisfy the following three requirements:

- Completeness,
- Internal consistency, and
- External differentiation.

The first requirement entails that the selected asset classes be able to completely represent the investment universe. The second requirement imposes that each asset class consist of financial instruments that are as homogenous as possible, and similarly exposed to systematic risk factors. Lastly, the third requirement posits that the different asset classes have different exposure levels to the various macroeconomic and political factors, or sources of systematic risk.

Table 3.1 provides the possible segmentation criteria for equity, bond, and money-market asset classes.

At the second level, we need to identify a benchmark index suitable for representing each asset class, and on which to formulate forecasts of the

[13] Kaplan (2012).

Table 3.1 Identification of asset classes

In the case of the equity market, asset classes are usually identified using:
– Geographical criteria, dividing the markets according to the country or economic area from which the shares originate, or
– Sector criteria, distinguishing the industry group of the companies.
The geographical criteria are justified in the fact that securities from the same market tend to move in a similar manner, since companies:
– Operate with the same currency and are subject to the effects of the same economic policy,
– Have the same basic interest rates, and
– Are subject to the same country risk.
The sector criteria assume that securities operating within the same industry move in a similar way because the company's industry group determines the sensitivity of the securities *vis-à-vis* different macroeconomic and political factors, or sources of systematic risk.
The table below presents the distribution of the global equity Morgan Stanley Capital International (MSCI) All Country World Index (ACWI) in the different geographical markets and their different industry groups.

MSCI All Country World Index					
MSCI World			MSCI Emerging Markets		
Developed markets			*Emerging markets*		
America	**Europe and Middle East**	**Pacific**	**America**	**Europe, Middle East, and Africa**	**Asia**
Canada	Austria	Australia	Brazil	Czech Republic	China
USA	Belgium	Hong Kong	Chile	Egypt	India
	Denmark	Japan	Colombia	Greece	Indonesia
	Finland	New Zealand	Mexico	Hungary	Korea
	France	Singapore	Peru	Poland	Malaysia
	Germany			Qatar	Philippines
	Ireland			Russia	Taiwan
	Israel			South Africa	Thailand
	Italy			Turkey	
	Netherlands			United Arab Emirates	
	Norway				
	Portugal				
	Spain				
	Sweden				
	Switzerland				
	United Kingdom				

(continued)

Table 3.1 (continued)

MSCI All Country World Index									
Consumer discretionary	Consumer staples	Energy	Financials	Health care	Industrials	Information Technology	Materials	Telecommunication	Utilities

More recently, two further criteria for the segmentation of the equity market and consequent identification of equity asset classes have been gaining ground, based on:

- The economic characteristics of companies and, in particular, on the price/earning (P/E) and price/book value (P/BV), and
- The size of companies in terms of capitalisation or, as an alternative, the value of the free-float capital.

A study by Fama and French showed that the different share trends can be explained, to a large extent, by[a]:

- Sensitivity to the market trend as a whole, measured by the security beta;
- Size, represented by the market capitalisation of the listed company; and
- Economic characteristics of the companies (growth or value shares), measured by the ratio between the price of the share and net earnings per share or, alternatively, by the ratio between price and book value per share.

In addition, the different trends of the shares may be attributed, on the one hand, to the size of the company (small-, medium-, and large-cap) or, on the other hand, to high P/E or P/BV ratios (growth shares) or low P/E or P/BV ratios (value shares).[b] The operational practice following these results consists in segmenting the equity market using a matrix, in which one dimension consists of the company's capitalisation, while the other focuses on the P/E and/or P/BV ratios.

In the case of the bond market, there is a higher level of homogeneity in the definition of the asset classes, both at the theoretical and operational levels. Usually, market segmentation is based on the ascertainment that the return of a bond in a specific currency can be divided into three components:

- The risk-free rate on that currency,
- Premium for duration/liquidity risk, and
- Premium for credit risk.

Consequently, in the case of bond asset classes, the global and individual geographical market segments (Euro, Europe, United States, Japan, emerging countries, etc.), or the categories of the issuers (Government, Government-Related, Corporate, or Securitised), are distinguished according to:

- The rating of the securities in the portfolio, and
- Duration.

In this case, it is also possible to segment the bond market in a matrix with the following dimensions: creditworthiness (high, medium, or low), identified based on the rating, and exposure to volatility risk (long, intermediate, or short), determined based on the duration.

The table below illustrates the distribution of the Barclays Global Aggregate Bonds index, which represents a broad market index of investment-grade bonds.

Barclays Global Aggregate				
U.S. and Canadian Aggregate	Pan-European Aggregate		Asian-Pacific Aggregate	
Barclays Global Aggregate				
Treasury	Government-related	Corporate	Securitized	
Barclays Global Aggregate				
Global Aggregate 1–3 years	Global Aggregate 3–5 years	Global Aggregate 5–7 years	Global Aggregate 7–10 years	Global Aggregate 10+ years
Barclays Global Aggregate				
Global Aggregate AAA	Global Aggregate AA	Global Aggregate A	Global Aggregate BBB	

In the case of the money market, asset classes are identified depending on the currency of the financial instruments to which they refer.

[a]Fama and French (1992)

[b]At times, when shares cannot be assigned univocally to the categories of growth or value securities, there is a third, intermediate security category, known as blend (or core)

optimisation process inputs.[14] Each benchmark can play a key role in strategic asset allocation via two distinct methods. They can represent:

– A portfolio to replicate, in case of indexed management, and
– A reference portfolio to beat, in case of active management.

As mentioned in Chap. 2, financial theory does not agree on which investment strategy is preferable between indexed and active management, since there are valid arguments in support of both.[15] A somewhat hybrid approach, which is able to grasp, albeit partially, the strengths of both management styles, is the so-called core-satellite strategy. This strategy divides the portfolio into two sub-portfolios: the core portfolio and satellite portfolio. The core portfolio is managed using an indexed (or semi-indexed) strategy, with the objective of minimising both benchmark-related risk and costs. The satellite portfolio is managed with an active management strategy, which aims to reach an over-performance, with respect to the benchmark, and, consequently, with respect to the core portfolio.[16]

At the third level, we need to determine whether the investment strategy is constrained to the long-only investment approach, or whether the long-short approach is possible. In the first case, even in a situation of highly negative forecasts for a given market sector, it would not be possible to open short positions because of the long-only constraint; moreover, it is only possible to zero the weight of that asset class in the portfolio. In the second case, by removing the no-short-selling constraint, it is possible to open short positions for a given sector, for which there are highly negative forecasts.[17]

Numerous empirical verifications have demonstrated how strategic asset allocation and the medium-long-term weights of the corresponding strategic benchmarks are able to explain most of the variability in the returns of an investment portfolio over time, conversely leaving a marginal role to market timing and stock picking, in explaining the variance of an investment portfolio's historical returns.[18]

[14] When defining the benchmark index representative of each asset class, we need to define: the inclusion criteria of the securities, depending on the specific, selected asset class; weighting methods, which have a considerable impact on index efficiency; treatment of periodical cash flows, depending on the decision of whether to accumulate or distribute; and index currency.

[15] See Flood and Ramachandran (2000), as well as the bibliography quoted in Chap. 2, regarding this subject.

[16] Gastineau et al. (2007) and Scherer (2015).

[17] This second investment approach is generally reserved for special types of institutional investors.

[18] Brinson et al. (1986), Brinson et al. (1991) and Ibbotson and Kaplan (2000).

3.4.2 Tactical Asset Allocation

Tactical asset allocation (or market timing) entails a temporary overweight/underweight of some asset classes, depending on short-term expectations. Therefore, it is composed of the set of actions to manage, in the short term, the portfolio established during the strategic asset allocation, in order to take advantage of the best market opportunities offered by the evolution of the economic outlook in the near term. In other words, tactical asset allocation refers to the possibility of deviating from the medium-long-term portfolio strategy for short or very short periods, with the objective of achieving over-performance with respect to the market.

The possibility of achieving a positive differential return with respect to the benchmark depends on the ability to correctly predict the timing of the upward or downward trends of the market, and the consequent variation of the portfolio's exposure to systematic risk. Operationally, tactical asset allocation involves the fixing of admissible fluctuation bands, with respect to the medium-long-term weight defined at the strategic asset allocation stage. In the short term, therefore, an overweight/underweight is allowed, with respect to the medium-long-term strategic weights, in compliance with the range of predefined fluctuations.[19] Thus, this is valid for the active management approach. However, in the case of indexed management, there is no form of market timing, and deviations from the strategic benchmark are not sought.

The impact of tactical asset allocation on costs and risk requires attention. Of course, management costs increase as the intensity of the use of market-timing policies increases. Since it is one of the levers available to the active manager to beat the reference benchmark, the use of market timing takes us back to the issue of comparative convenience between costs, market efficiency, and, finally, the investor's degree of risk tolerance.

In terms of risk, market timing may increase or decrease the total risk, depending on the type of choices made, while it increases, in any case, the relative risk in relation to the benchmark.

A model that is able to simultaneously manage strategic asset allocation—on the basis of a Bayesian approach—and tactical asset allocation—via the use of absolute or relative views, in relation to the evolution expected for the various market sectors in the short term, and the identification of a degree of trust associated with each estimate—is that developed by Black and Litterman. This model is described in Chap. 4.

[19] The distinction between the long-only and long-short approaches is important. The latter allows short positions to exploit brief downward expectations.

3.4.3 *Stock Picking*

Stock picking, also known as security selection, consists of the identification of the individual financial instruments to be included in each asset class. The degree of complexity involved in this activity varies according to the type of management strategy used, whether indexed or active.

With indexed management, the selection activity is conducted by reproducing the risk-return combination of the benchmark of each asset class, with the objective of minimising replication errors.[20] At the same time, the need to contain transaction costs may prompt the indexed manager to not acquire all of the financial instruments included in the benchmark—in the same proportion with which they compose that benchmark according to the full-replication approach—but may persuade him to operate using the mimicking portfolio approach, with the objective of more economically replicating the benchmark's risk-return combination. There are many methods for creating mimicking portfolios, and they all have the same objective of saving the portfolio's trade-related costs, with respect to the full-replication method. These methods range from the acquisition of only a sample of securities, which are able to create a portfolio that is sufficiently similar to the benchmark, to the use of derivatives, which are able to reproduce the risk-return combination of the same benchmark.

With active management, the manager attempts to create value added via an efficient selection of securities due to his skill in acquiring undervalued securities and avoiding overvalued ones.[21] The selection criteria vary according to the market; in the bond markets, criteria are based mainly on forecasts on the evolution of interest rates, their volatility, and credit spreads, while in the equity markets, they are based on fundamental, technical, or quantitative analysis.[22]

3.5 Periodic Portfolio Rebalancing

An investment policy must necessarily define the methods that guide the portfolio's periodic rebalancing, which is aimed at aligning the proportions of the single asset classes to the original weights from the strategic asset allocation. A periodic rebalancing action may also be required solely because of the effect of the portfolio's natural deviation from its strategic combination, due to the higher performance of some asset classes over others. In this situation, the implementation of periodic rebalancing could be interpreted as a so-called contrarian strategy, since it comprises a reduction in the weight of the asset classes subject to relative appreciation

[20] In reality, even full replication does not guarantee a perfect replication of the index, since it is hindered by the various factors described in Chap. 2.

[21] A long-only investment approach is implicit here.

[22] Grinold and Kahn (2000).

and an increase in the weight of those that recorded relative depreciation, with the consequent temptation to opt for a non-rebalancing strategy.

The holding of a non-rebalanced portfolio for a preset time horizon is known as the buy-and-hold strategy, also known as the do-nothing strategy. In this situation, which does not occur very frequently, especially with institutional investors, the investment policy concentrates on the definition of an initial optimum portfolio, identifying the weights of the different asset classes, without any further intervention. Although having the advantage of limiting portfolio trade-related costs, due to the absence of a periodic rebalancing activity, this strategy has three significant consequences on the portfolio:

- Redistribution of the weights of the asset classes with respect to the original asset allocation target;
- Lack of consideration of the risk control function implicit in the rebalancing action; and
- Incoherence between the investor's risk aversion and exposure of the portfolio to market volatility, which is increasingly more concentrated in the highest performing asset classes.

In support of periodic rebalancing, it is also worth considering the broad quantitative analysis that documents a mean-reverting behaviour of the asset classes, which is, therefore, in contrast with the idea of the indefinitely high or low returns of a single asset class.[23]

Thus, the information that has been presented supports the expediency of periodic rebalancing, through the implementation of a constant-mix strategy (also known as do-something strategy), where interventions to the portfolio are periodically made, in order to restore the weights of each asset class to the original asset allocation target.

From the operational perspective, the adoption of a constant-mix strategy requires the definition of the periodical rebalancing timing and methods. These are important aspects, given that each rebalancing intervention involves transaction costs, which have an inevitable effect on the overall performance. With regard to rebalancing timing, there are three main alternative methods available for implementing a constant-mix strategy:[24]

- Periodic rebalancing (calendar rebalancing) with a predefined time interval (monthly, quarterly, etc.);
- Periodic rebalancing, based on exceeding the predefined thresholds (percent range rebalancing), which determines a restoration of the original asset mix when the set fluctuation bands are exceeded; and
- Rebalancing of the intervals within an allowed range (rebalancing to the allowed range), which, like the previous case, requires fixing restoration once the set

[23] Fama and French (1988), Lo and MacKinlay (1988) and Poterba and Summers (1988).

[24] Arnott et al. (2007).

bands have been exceeded; however, in this case, restoration does not re-establish the original asset mix, but restores the upper or lower limit of the threshold.[25]

An alternative rebalancing method to the above is the so-called constant-proportion strategy, which cannot be considered simply a method for realising periodic rebalancing, but part of a greater framework of strategies aimed at seeking a dynamic form of protection for the investment portfolio value. This strategy is summarised in Table 3.2. It is useful to note that a periodic rebalancing action is not a tactical asset-allocation activity, but consists in the elimination of the active positions created by the market, or deriving from previous choices that were aware of the overweight/underweight of some of the asset classes, even though its implementation requires the simultaneous consideration of the choices made during tactical asset allocation.

3.6 Performance Assessment and Risk Control

The final stage of the investment process is performance assessment, its breakdown, and risk control. The first step in performance assessment is the calculation of returns, which requires the identification of the most appropriate measure for the objective pursued among the methods of calculation available. As you will see in Chap. 7, the alternatives are:

- Simple, compounded, and continuous returns;
- Arithmetical and geometrical returns;
- Time- and money-weighted returns; and
- Gross and net returns.

As such, the formulation of an opinion on portfolio performance requires the identification of the risk of that investment portfolio in its different forms of absolute, asymmetric, and relative risk, and the calculation of the consequent risk-adjusted performance measures, which will enable us to assess the efficiency of the portfolio asset manager, with respect to the benchmark, competitors, and *ex ante* risk limits.

When comparing the performance of competitors, it is essential that homogenous peer groups be created, consisting of portfolios with the same management approach. To this end, the most common operational solution is to create a peer group, based on the "investment style" adopted using a deductive approach founded

[25] If, for example, the fluctuation bands were absolute ±5 % and the original weight of the asset class was 30 %, exceeding the threshold by 35 % or 25 % would determine the restoration of the weight of the single asset class to 35 % and 25 %, respectively, and not to 30 %, as in the case of range rebalancing. The underlying logic to this rebalancing method is based on the need to reduce the transaction costs associated with the period recomposition of the portfolio.

Table 3.2 The constant-proportion portfolio insurance strategy

In the constant-proportion strategy, the weight of risky assets in the overall portfolio is a function of the difference between the market value of the portfolio and a predefined minimum portfolio value (floor), below which the portfolio value must not fall. In practice, once the floor below which the portfolio value must not fall has been established, the constant-proportion strategy formulates a simple rule for determining the combination of risk-free and risky assets. The former have the objective of achieving the established protection level, while the latter have the task of generating returns. To be more precise, the size of the risky assets is defined according to the following algorithm:

Target investment in risky assets $= m \cdot$ (portfolio value $-$ floor value) $= m \cdot$ cushion,

where:

$m =$ preset multiple,

portfolio value = portfolio market value,

floor value = minimum value below which the portfolio value must not fall, and

cushion = portfolio value $-$ floor value.

The floor value is a function of the investor's risk tolerance and influences, in inverse proportion, the exposure level of the portfolio to risky assets. The cushion value depends on the floor value and dynamically represents the maximum acceptable loss to ensure that the portfolio value does not fall below the minimum safety value. This minimum value can be identified as the present value of the amount the investor has to dispose of at a certain date, calculated by discounting this amount based on the risk-free rate.

The preset multiple m is a function of the investor's risk appetite. This strategy is defined as constant proportion, since risky assets are kept in the portfolio based on a constant multiple of the cushion. If, for example, the cushion were equal to zero, the weight of the risky assets in the portfolio would be zero.

When m is greater than one, the constant-proportion strategy is known as the constant-proportion portfolio insurance strategy (CPPI).[a] In the CPPI strategy, risky assets must be sold when their value falls, and bought when their value rises. Therefore, in bullish markets, the increase of the weight of risky assets is greater than that of their value, given the presence of a constant m greater than 1, which leads to a progressive reduction in the weight of the risk-free asset, as we move away from the floor value. Conversely, in bearish markets, the decrease of the weight of risky assets is greater than that of their value, producing a rapid increase in the weight of the risk-free asset, as we approach floor value. Thus, the CPPI strategy should produce higher returns when risky assets face a rising market and limit losses when risky assets face a falling market. By contrast, CPPI strategies perform poorly in markets characterised more by reversal than by trends.

In addition, precise rebalancing rules must be set within the CPPI strategies by setting the thresholds over which the portfolio must be rebalanced. As the portfolio's market value changes, it is necessary to measure the size of the cushion and rebalance the portfolio again. If, theoretically, continuous rebalancing should be implemented, in practice, changes to portfolios are periodically made based on established rules that must necessarily consider two key factors: transaction costs and any tax charge consequent to rebalancing.

The CPPI strategy provides results that are very similar to those of a risky assets portfolio, which is protected by the purchase of a put option on the appropriate underlying instruments. However, in a stable or rising market, a put option with a strike price equal to or lower than the current index level reaches maturity with zero value. Moreover, the CPPI strategies follow another path, seeking dynamic protection through the change of the portfolio composition, according to preset rules depending on market trends. In contrast to the options-based insurance strategies, a CPPI strategy does not involve explicit hedging costs, with the exception of the transaction costs associated with the periodic rebalancing of the portfolio. However, it is evident that the CPPI

(continued)

Table 3.2 (continued)

strategy must also be subjected to the fundamental laws that govern the financial markets; high levels of protection are obtained at the price of a lower participation in a rising market, making this lower return potential a sort of implicit hedging cost, to be compared to the explicit costs of the option-based portfolio insurance strategies.

In order to understand the dynamic implementation of the CPPI strategy, we shall consider the following example, based on a portfolio with an initial value of 100 euros. If the floor value below which the investor does not want to fall is, for example, 80 and the multiple m is equal to 2, the initial weight of the risky assets is:

$$\text{Risky assets} = 2 \cdot (100 - 80) = 2 \cdot 20 = 40.$$

Therefore, the initial combination will contain 40 euros in risky assets and 60 in risk-free asset. If the risky assets increased by 10 % and the value of the risk-free asset remained at 60, the new value of risky assets would be equal to 44, and that of the portfolio, 104. Thus, on the basis of the CPPI algorithm, the new size of the risky assets would be:

$$\text{Risky assets} = 2 \cdot (104 - 80) = 48.$$

This implies that the sale of risk-free asset for an amount of 4 euros, and the further acquisition of a corresponding amount of risky assets, will increase risky assets from 44 to 48. If, soon after rebalancing, the price of the risky assets falls by 20 %, their value will fall to 38.4, and the value of the portfolio—assuming a constant value for the risk-free asset—to $96.4 = 38.4 + 56$. In this context, the CPPI rule demands a rebalancing of the portfolio, reducing the weight of the risky assets to:

$$\text{Risky assets} = 2 \cdot (96.4 - 80) = 32.8.$$

Thus, we obtain a decrease in the risky assets from 38.4 to 32.8, with a corresponding increase of 5.6 in the risk-free asset. This example highlights the difference between the CPPI and constant-mix strategies, since an increase in the price of the risky assets leads to an increase in their weight in the portfolio, and not to a reduction, as happens with the latter strategy. In contrast, the reduction in price of the risky assets, in the CPPI strategy, leads to a reduction of their weight, not an increase, as happens in the constant-mix strategy.

The multiplier m is the instrument through which the degree of management aggressiveness is defined; the higher the level of m, the higher the exposure to risky assets and pro-cyclicality of the portfolio.

Moreover, exposure to risky assets is influenced by the size of the cushion and, consequently, by the size of the floor value. In reference to the latter, it is useful to note that the protection of the portfolio is, in reality, uncertain and linked to the downward variation of the market value of risky assets. When risky assets undergo a reduction equal to $1/m$, the quota of risky assets is set to zero, and the value of the portfolio, corresponding to the floor value, consists entirely of risk-free asset. When there is a decline in the market value of risky assets greater than $1/m$, the floor value would no longer be guaranteed, due to the rapid fall of the prices of risky assets, which does not leave time for rebalancing the portfolio.[b]

[a]If we consider a preset multiple equal to 1 and floor value of zero, the constant-proportion strategies will coincide with those of buy-and-hold. In the case of a multiple between zero and 1 ($0 < m < 1$) and floor value of zero, the constant-proportion strategies coincide with those of constant-mix

[b]Having considered this aspect, the preset multiple m should be defined according to the maximum loss encountered by the risky assets between one rebalancing and another. If, for example, the maximum risk encountered was 20 %, m should not be greater than 5, to prevent the sharp decline in the price of the risky assets from causing a reduction in the market value of the portfolio to below the minimum safety margin

Source: Black and Jones (1987) and Perold and Sharpe (1988)

on the so-called style analysis. Based on this logic, the mimicking portfolio is obtained with a regression of the portfolio returns, with respect to the returns of a series of benchmark indices that are representative of the investment universe, setting the benchmark weights inside the portfolio as unknown quantities, and putting two constraints, so that the sum of the weights is equal to one and each weight has an admissible value between zero and one.[26] This approach is described further in Chap. 8.

With the non-indexed strategy, performance assessment requires the evaluation of the ability to realise an effective stock-picking activity via the selection of the best market securities taken as reference. To this end, we have to identify the most suitable measuring model, which, as is discussed in Chap. 7, depends upon the simultaneous presence or absence of a tactical asset-allocation activity.

Where simultaneous activities of stock picking and market timing occur, it is essential to jointly measure both the ability to realise an effective securities selection and to realise a profitable tactical asset allocation that is able to temporarily overweigh the asset classes designated to over-perform the market and, at the same time, to underweight the asset classes that will underperform the market.[27]

However, a separate measurement of the two abilities could be misleading and confuse the results of the first activity with those of the second. An in-depth *ex post* performance assessment requires the identification of the most appropriate performance attribution model, aimed at shedding light on those management choices that generated the gap between the overall result of the portfolio and benchmark, breaking down relative performance into its determinants, and attributing it to the various factors that contributed to its generation. This is discussed further in Chap. 9.

Therefore, the performance assessment activity must be framed within a suitable control system, aimed at verifying that the results of the actions set by the different subjects involved in the investment process are in line with the established financial objectives.[28] The control system must refer to management parameters and risk thresholds formalised *ex ante* at the portfolio level, and, in the case of delegated management, at the manager level.

Finally, the consistency between the established investment policy and investor's financial objectives must be verified, bearing in mind the constraints and assessing any adjustments that may be required, including those due to changes in external circumstances and financial market trends.

[26] Sharpe (1992).

[27] Here too, the long-only investment approach is implicit.

[28] Lee et al. (2010) and Scherer (2015).

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