



SAP Treasury and Risk Management (TRM)

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Portfolio Analyzer (FIN-FSCM-TRM-PA)

Purpose

You use this component to calculate and monitor the rates of return (yields) on your financial assets.

Portfolio Analyzer is designed to be used to measure the profits from investments from different perspectives and using different methods. The calculations are based on the structure of your portfolio in the portfolio hierarchy. You use characteristics to define the hierarchy. For example, you can choose the sector, country, trader, department, or product type to define the hierarchy. This means that you can create your portfolio flexibly, and organize it into different aggregation levels. You can then calculate rate of return key figures for each of the levels. In the reporting functions, you can display results for each node that you defined in the portfolio hierarchy. You can navigate to the data stored for single transactions.

To analyze data from different perspectives, for example, as the internal controller, dealer, or marketing employee, you can define multiple portfolio hierarchies, and use them in your analyses. Portfolio Analyzer creates versions of the portfolio hierarchy, and of the calculations of rates of return and benchmarks. This enables you to look at the figures on which past calculations were based at any time, and reproduce and historize the results.

Methods for Calculating the Rate of Return

Portfolio Analyzer contains various methods for calculating the time-weighted rate of return (TWRR) and the money-weighted rate of return (MWRR). In addition to the exact methods, Portfolio Analyzer also contains the approximation methods Dietz and modified Dietz. In addition to rate-of-return key figures, you can define benchmark rates of return that you can compare with the returns on your portfolios.

Benchmarking

You can manage benchmarks, and compare them with the rates of return calculated for any part of your portfolio. You can also import risk key figures and book values into Portfolio Analyzer, and use the formula editor to link them to new key figures. This enables you to display the active return and excess fair value in the reporting for Portfolio Analyzer.

You can then use Portfolio Analyzer to define your investment strategy. In reporting, any deviations in the planned revenue and risk estimates can be detected at an early stage, and forecasts made about how the portfolio will develop. You can use these analyses to work out proposals for optimizing your investment strategy and for concluding new deals.

Integration

Portfolio Analyzer is part of [SAP Treasury and Risk Management](#) (TRM).

You can calculate the rate of return for the following transactions:

- All positions in [Transaction Manager](#) (TRM-TM)
- Loans in [SAP Loans Management](#) (FS-CML)
- Generic transactions (categories 0 and 9) in the data pool in SEM Banking

Transactions in Portfolio Analyzer

Portfolio Analyzer contains the following transactions:

Function	Transaction Code
Edit Characteristic Values	JBRCV
Transport Characteristic Values	JBRCT
Edit Characteristic Hierarchy	JBWH
Translate Characteristic Hierarchy	JBHTL
Create Portfolio Hierarchy	AFWPH
Display Portfolio Hierarchy	JBRK
Delete/Deactivate Portfolio Hierarchy	JBR4E
Generate Portfolio Hierarchy	JBRW
Update Portfolio Hierarchy	JBRPO
Define Filter	AFWF
Edit Key Figures and Evaluation Procedures	AFWKF_PA
Monitor: Key Figures and Evaluation Procedures	AFWKF_MD
Determination of Single Records	PAEP1
Determination of Single Records: Monitoring	AFWO1
Determination of Final Results	PAEP2
Determination of Final Results: Monitoring	AFWO2
Delete single records that have not been archived	PASRPDEL
Analyzer Information System	AIS_STDREP
Single Value Analysis: Profit and Loss	AISPL
Edit Master Data for Benchmarks	AFWBM
Assign Benchmarks to Nodes in the Portfolio Hierarchy	AFWBMPH
Calculate Benchmark Key Figures	PAEPBM
Calculation of Benchmark Key Figures: Overview	AFWOBM
Define Initial Layout	S_KFM_86000129
Define Formulas for the Analyzer Information System	AIS_FORMULA_DEF

The Basics

Portfolio Hierarchies

Definition

Portfolio hierarchies are used to arrange the characteristics of a view into a structure.

Use

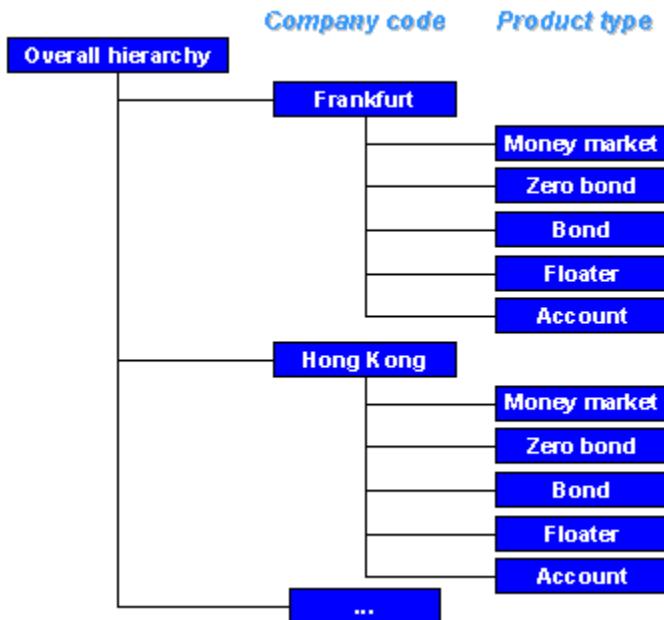
Risk values can be calculated on an aggregated basis. Portfolio hierarchies are used to aggregate, on different hierarchy levels, financial transactions stored in the data pool.

Editing portfolio hierarchies

Defining and generating portfolio hierarchies

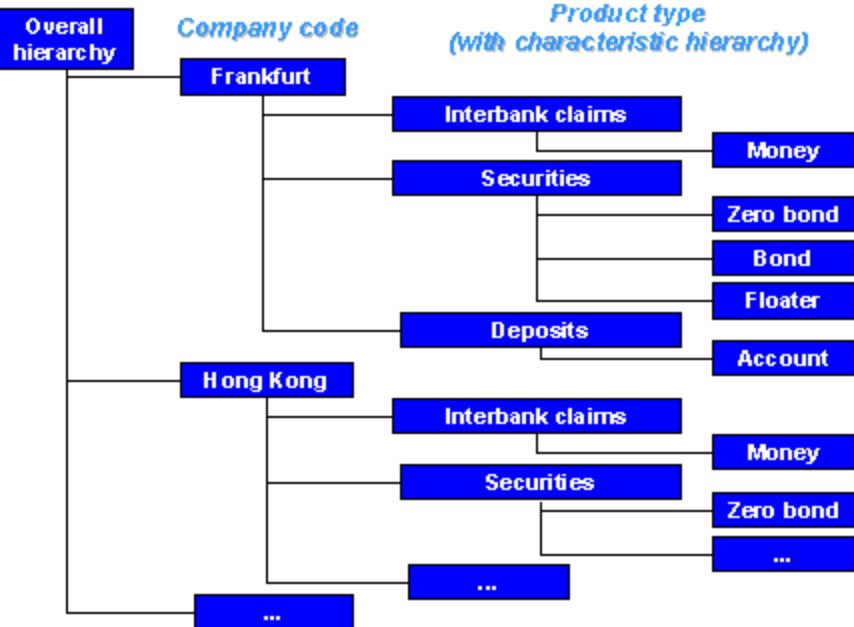
When you define a portfolio hierarchy, choose characteristics from a view, and put in the order required. When you generate a portfolio hierarchy, the system combines each characteristic value with the other characteristic values in succession until all possible combinations ([base portfolios](#)) exist. This results in a tree structure, in which larger evaluation units are divided into increasingly smaller ones.

The following example shows a portfolio hierarchy consisting in the characteristics **company code** and **product type** .

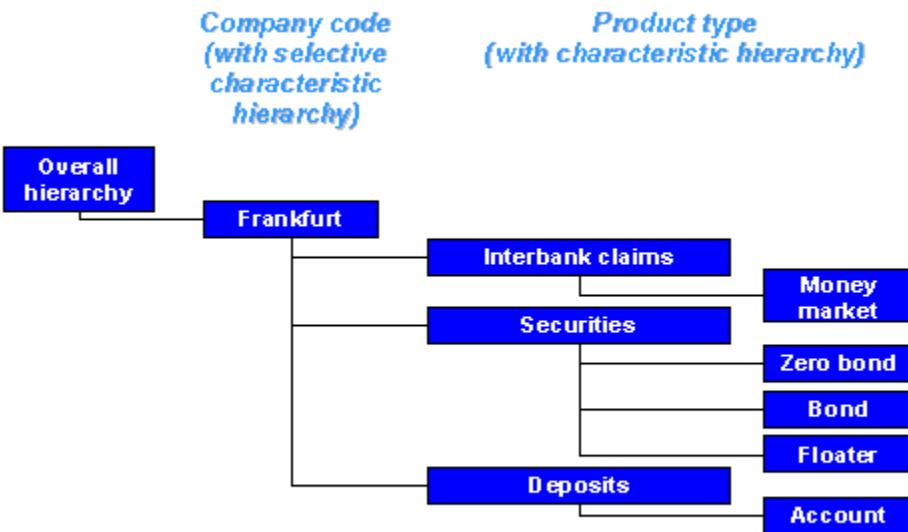


The system then creates base portfolios if transactions exist that have the relevant (new) combination of characteristic values. If the analysis structure does not contain any transactions, then there are no base portfolios, and the portfolio hierarchy consists of its overall structure only.

If multiple characteristic values exist, then we recommend that you use [characteristic hierarchies](#) , which you need to have already defined. You use characteristic hierarchies to group your characteristics, which makes them easier to manage. The following example shows a portfolio hierarchy consisting in the characteristic **company code** and **product type** , and a characteristic hierarchy for the **product type** characteristic.



Based on a view, you can create multiple portfolio hierarchies, whose structures depend upon the sequence of the characteristics, and upon the characteristic hierarchies used. If you want to analyze only certain characteristic values, then you can flag the relevant characteristic hierarchies as **selective**. The following example shows a selective portfolio hierarchy, which is restricted to the value **Frankfurt** for the characteristic **company code**.



When you define hierarchies, you are defining the range of options available to you in the various analysis functions in the Risk Management system. If you create a large number of hierarchies, then you can run evaluations at a relatively detailed level. However, this can lead to long run times, so you have to balance the level of detail you need with system performance.

Extending portfolio hierarchies

You can make the entities you use for evaluations smaller at any time. To do this, you insert one or more new characteristics into the lowest level of the hierarchy. You cannot change the higher levels of the hierarchy, which means that you cannot change the sequence in which the characteristics appear in the hierarchy, or delete characteristics. This would mean that the program could no longer access evaluation data.

Deactivating and reactivating portfolio hierarchies

If a portfolio hierarchy is no longer relevant for evaluations, you can deactivate it. You can even deactivate it if evaluation data based on the portfolio hierarchy is stored in the report data memory, or in the procedure for final results for a result database. Deactivated portfolio hierarchies can only be used to display existing results, and are not updated when financial objects are created. You cannot use a deactivated portfolio hierarchy to select transactions, or run calculations.

When you reactivate a deactivated portfolio hierarchy, the system regenerates it, and, in so doing, updates it. Providing that no nodes have been deleted in the current definition of the characteristic hierarchy, then the system also updates the characteristic hierarchy. It then adds all new base portfolios to the tree structure.

Deleting portfolio hierarchies

If the report data memory, or a procedure for final results for a result database, does not contain any evaluation data, and no archived evaluation data, that are based on a particular portfolio hierarchy, then you can delete that portfolio hierarchy. Otherwise, you must first delete the evaluation data that is based upon it. You do this by using the administration transaction of the respective application. When you delete a portfolio hierarchy, you delete all components of the hierarchy. These include the link between the portfolio hierarchy and the views, the structure, and all texts and attributes.

Updating portfolio hierarchies

The system usually updates the portfolio hierarchy when an analysis structure is created for a financial object. This occurs during data transfer. However, this automatic update is not possible if another user is editing the portfolio hierarchy (in change mode) at the same time. In this case, the system informs you that the portfolio hierarchy has to be updated manually at a later point in time.

For more information about updating and generating portfolio hierarchies, and about reorganizing base portfolios, see [reorganization tools](#).

Editing Portfolio Hierarchies

Defining and Changing Portfolio Hierarchies

1. In the Implementation Guide (IMG) choose the following path, depending on which component you are using:

- ►For SAP Banking choose SAP Banking ➤ SEM Banking ➤ Common Settings for Market Risk and ALM ➤ Views and Portfolio Hierarchies ➤ Define Portfolio Hierarchy. ▶
- ►Financial Supply Chain Management ➤ Treasury and Risk Management ➤ Basic Analyzer Settings ➤ Define Portfolio Hierarchy ▶.

If you are using your system as a productive system, then you can access this transaction from the [SAP Easy Access](#) screen under the respective components by choosing ►Evaluation Control ➤ Portfolio Hierarchy ➤ Define. ▶

2. Define the portfolio hierarchy as follows:

- a. Choose [New Entries](#). The system displays the table in which you define the portfolio hierarchy.
- b. Choose the view upon which the portfolio hierarchy is to be based (not relevant for TRM).
- c. Enter a three-digit number, a name, and a short and long description for the portfolio hierarchy.
- d. If required you can enter an authorization group.
- e. Choose  Save.

3. Define the structure of the portfolio hierarchy as follows:

- a. Select the portfolio hierarchy .
- b. Choose  **Structure** .
- c. Choose **New Entries** . The system displays the table in which you edit the characteristics.
- d. In the **Characteristic** column choose the required characteristics from the view.
- e. In the **Sort** column, use numbers, which do not have to be sequential, to define the order of the characteristics. The lowest number means the highest level of the hierarchy.
- f. If required, in the **CHie** (characteristic hierarchy) column you can choose a [characteristic hierarchy](#) .
- g. In the **Cat** . (category) column, specify whether the characteristic hierarchy is to be used selectively, or not selectively.
- h. Choose  **Save**.

If you want to change the portfolio hierarchy at a later point in time, then you need to repeat Steps 1 and 3a through 3h.

If, in the meantime, evaluation data has been generated based on the portfolio hierarchy, you can only extend the portfolio hierarchy. In this case, you cannot delete any characteristics, or change their sequence. You can add characteristics only at the lowest level of the hierarchy, which means that you have to give them higher sort order numbers.

If a portfolio hierarchy has been deactivated, then you can change only its description.

Displaying Portfolio Hierarchies

1.  From the SAP Easy Access screen, under the respective component choose **Evaluation Control**  **Portfolio Hierarchy** 
2. Choose the view (not relevant for TRM), and then the portfolio hierarchy.

In the right-hand part of the screen, the system displays all the base portfolios that exist for the selected portfolio hierarchy.

Deactivating, Reactivating, and Deleting Portfolio Hierarchies

1. On the SAP Easy Access screen, in the respective component choose  **Evaluation Control**  **Portfolio Hierarchy** 
Delete/Deactivate.  In the left-hand part of the screen, the system displays a list of the portfolio hierarchies, sorted by their views, and their current status.
2. Choose the portfolio hierarchy whose status you want to edit.
3. To **deactivate** a portfolio hierarchy, choose  **Deactivate** . The system sets the status of the portfolio hierarchy to **inactive** .

To **reactivate** an inactive portfolio hierarchy, choose  **Inactive -> Active** . The system sets the status of the portfolio hierarchy to **active** .

To **delete** a portfolio hierarchy choose  **Delete** . The system deletes the portfolio hierarchy if no dependent data exists for it.

For information about other options for processing portfolio hierarchies, see [Reorganization Tools](#) .

Evaluations using the Results Database

Purpose

The results database is used in the following components:

- Market Risk Analysis in SAP Banking
- Market Risk Analyzer in Treasury and Risk Management
- Portfolio Analyzer

You use the results database as part of end-of-day processing to calculate defined key figure values, and to save these figures and analyze them as you require. This is in addition to the previous options for saving and displaying evaluation results (for example, saving report data in drilldown reporting).

The results database differs from former techniques for generating and saving the results of evaluations in that the generation and reporting of the results is carried out separately. This has the following advantages:

You need to generate results data only once in order to be able to use this data in different reports as many times as you want (different combinations of key figures, different layout) without having to carry out any recalculations.

The evaluation results are available permanently, even after a change of release, and can be archived.

You are able to make subsequent changes and corrections to the results. This is necessary if the transaction position changes, or in the event of valuation errors.

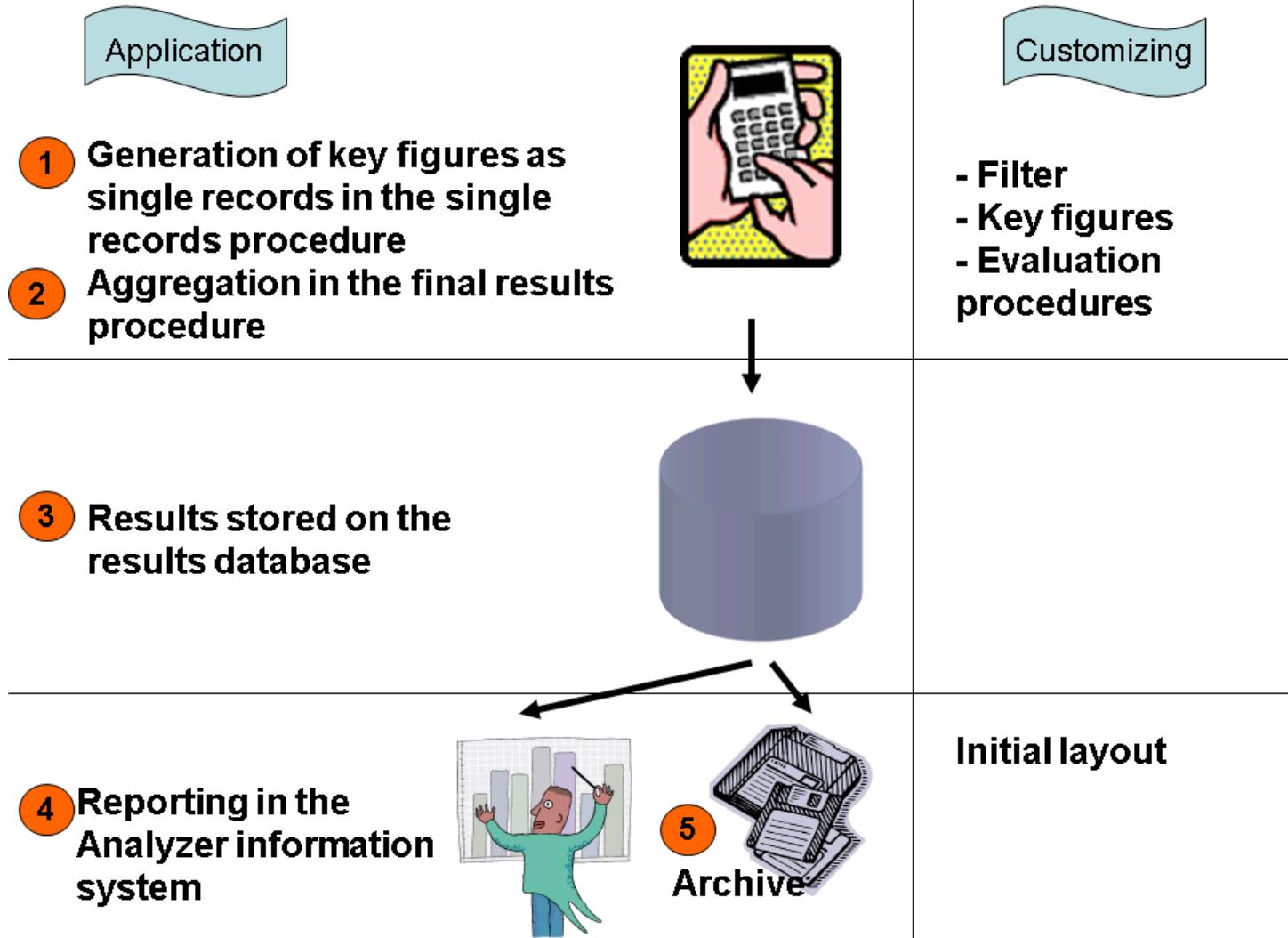
Prerequisites

The key figures that are to be calculated, and the evaluation procedures, must already be defined in Customizing. In particular, the key figures must have been assigned to evaluation procedures. We also recommend that you define a filter to restrict the analysis to particular transactions. You need to have already defined a layout in order to be able to display the results. Note the additional information about Customizing for the respective activity in the Implementation Guide:

- Define Filters (IMG)
- Edit Key Figures and Evaluation Procedures (IMG)
- Define Initial Layout (IMG)

Process

The system can calculate values only for those key figures that are contained in the predefined [hierarchies for key figure categories](#). This shows how key figures interrelate from a calculation point of view. There are two types of key figures: single records key figures, and final results key figures. Single records key figures are calculated for each single transaction; final results key figures are calculated by aggregating the values of single records key figures across an entire portfolio hierarchy.



Generate the values for single records key figures for the selected financial objects, and save them on the database. To do this, choose **Tools** → **Results Database** → **Determine Single Records**.

You need to distinguish between the following runs when generating the single records:

Run	Description
Basic Run/Basic Run with Test Selections from Filter	Key figure values are calculated
Correction Run with Test Selections from Filter	<p>Key figure values are calculated for the following transactions:</p> <p>Transactions that were imported into the system after the generation of single records was started</p> <p>Incorrect transactions from the basic run which have been changed after the basic run was carried out</p>
Reversal Run	The single records acquire reversed status, and can be regenerated in a basic run

If you choose a save ID, you can use a saved data set to analyze an individual record. This is useful for some analyses, and for backtesting in particular.

Generate the key figures value for the final results on the basis of the single results that have already been generated. Save the data on the database. To do this, choose **Tools** → **Results Database** → **Determine Final Results**.



If, having carried out a basic run for single records, you start a basic run for the final results, and then start an adjustment run for the single records, your data may be inconsistent. Therefore, you need to ensure that you delete the final results in a deletion run, and restart the basic run for final results after the correction run for the single records has finished.

Result

The key figure values at single record and final results level (3) are stored on the results database. You can use the [Analyzer information system](#) to display them (4). Single records generated in this way can be archived (5).

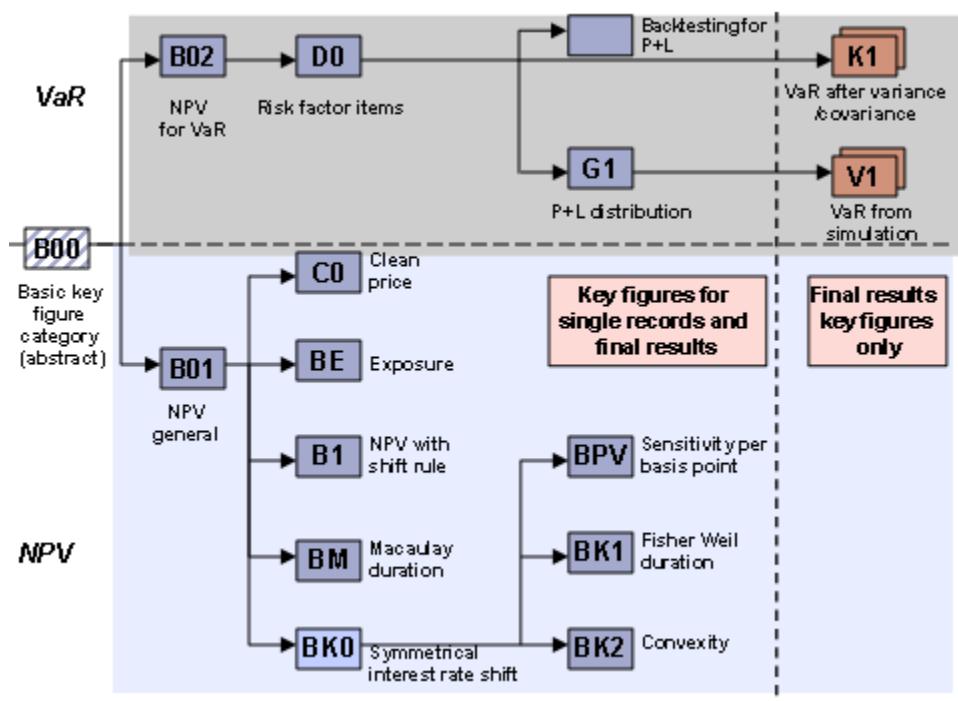
See also:

[Archiving](#)

Hierarchies of Key Figure Categories

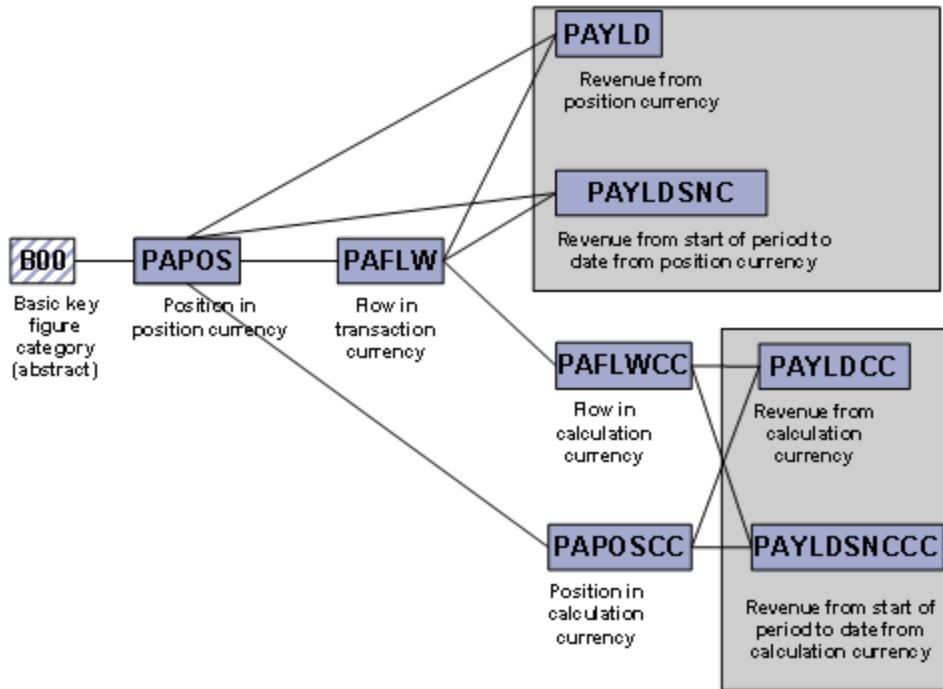
The system can calculate values only for those key figures that are contained in the predefined hierarchies for key figures (each key figure has to have defined attributes). The individual key figures are interdependent both from a business and calculation point of view. The interdependencies for the components are shown in the diagrams below:

Market Risk Analyzer



The symmetrical interest rate shifts are purely single record key figures. The following key figures are additive: NPV general, NPV with shift, exposure, symmetrical interest rate shift, clean price, and NPV for VaR.

Portfolio Analyzer



Key figures for the calculation of revenue (shown in gray) have two basic key figures. The following key figures are additive: position in position currency, flow in transaction currency, flow in calculation currency, and the position in calculation currency.

Use of the Results Database in Portfolio Analyzer

Basis

Portfolio Analyzer saves the results of all evaluations in the Results Database (RDB); it does not contain any online runs.

Unlike Market Risk Analysis, which also uses the Results Database, the final results procedure is a two-step method in Portfolio Analyzer. The final results are calculated as follows:

- **Single record procedure**

The positions and flows are transferred to the Results Database.

- **Final results procedure 1**

Values are translated into the evaluation currency.

- **Final results procedure 2**

Rate-of-return (yield) key figures are calculated.

Key Figure Types

Portfolio Analyzer calculates all key figures based on the key figure categories, which are predefined in the system. You assign each key figure to an evaluation procedure. You can assign more than one key figure to each evaluation procedure, but each key figure can be assigned once only. When you define key figures, you can access key figure categories for positions (PAPOS and PAPOS SCC), flows (PAFLW and PAFLWCC), and rates of return (PAYLDCC and PAYLDSNCCC). The following table shows which key figure categories you can use in which evaluation procedures:

Evaluation Procedure	Key Figure Types	Reason for Creating Multiple Evaluation Procedures
Single record procedure	<ul style="list-style-type: none"> • PAPOS (position in position currency) • PAFLOW (flow in transaction currency) 	
Final results procedure 1	<ul style="list-style-type: none"> • PAPOSCC (position in evaluation currency) • PAFLWCC (flow in evaluation currency) 	Key figures that have the same basic key figure but different evaluation currencies
Final results procedure 2	<ul style="list-style-type: none"> • PAYLDCC (rates of return with fixed yield periods from the evaluation currency) • PAYLDSNCCC (rate of return from start of period to date from the evaluation currency) 	Key figures that have the same basic key figures but rate-of-return methods or different rate-of-return periods

In Customizing for **Financial Supply Chain Management** choose  **Treasury and Risk Management**  **Portfolio Analyzer**  **Results Database**  **Edit Key Figures and Evaluation Procedures**  . In this IMG activity, you can create key figures by choosing a key figure category and entering the attributes of the key figure. You can also use existing key figures as the basis for defining new key figures. You do this by specifying a basic key figure when you define the new key figure. The system then copies the values of the basic key figure and adds them to the new key figure.

i Note

If you use basic key figures to define new key figures, the results of single records methods that have already been calculated are retained. You then only need to define the new final results procedure you require.

Single Record Procedure (SRP)

In the single record procedure, the system takes the position values stored in Treasury and Risk Management and loads them into the Results Database. The step takes a long time, as the system has to calculate the NPVs of all items in the positions. You must assign two key figures to the single records procedure: one for the position (key figure category PAPOS) and one for the flows (key figure category PAFLW).

i Note

To delete single records, on the **SAP Easy Access** screen choose  **Accounting**  **Financial Supply Chain Management**  **Treasury and Risk Management**  **Portfolio Analyzer**  **Tools**  **Results Database**  **Delete Non-Archived Single Records**  . You should use this transaction in your test system only. In your productive system, you should delete single records. On the **SAP Easy Access** screen choose  **Accounting**  **Financial Supply Chain Management**  **Treasury and Risk Management**  **Portfolio Analyzer**  **Tools**  **Results Database**  **Determine Single Records**  .

i Note

To run the single records procedure as a parallel job, on the **SAP Easy Access** screen choose ► **Treasury and Risk Management** > **Portfolio Analyzer** > **Tools** > **Parallel Processing**.

Final Results Procedure 1 (FRP 1)

In final results procedure 1, the system translates the position values and flows calculated in the single records procedure into the evaluation currency. For each evaluation currency, you assign two key figures to the final results procedure: one category PAPOS/CC key figure and one PAFLW/CC key figure.

❖ Example

If, for example, you want to analyze a portfolio in EUR and CHF, then you must define four key figures for the final results procedure. Each key figure should have the same abstract basic key figure; you should use the key figures of the single results procedure (key figure category PAPOS or PAFLW). This ensures that the system calculates the key figures of final results procedure 1 on the basis of the results of the single record procedure.

i Note

Since single record procedure 1 contains additive key figures only (those that can be totaled, which are positions and flows in the evaluation currency), it is independent of the portfolio hierarchy.

Final Results Procedure 2 (FRP 2)

In final results procedure 2, the system calculates the non-additive key figures. In Portfolio Analyzer, these are rate-of-return (yield) key figures. You can assign only the key figures of the key figure category that has the prefix PAYLD* to final results procedure 2. Furthermore, you must assign a portfolio hierarchy to final results procedure 2.

Note that the rate-of-return key figures that you assign to final results procedure 2 must have the same interval category. Therefore, for each procedure you can use either the key figure categories PAYLD and PAYLDCC, or the key figure categories PAYLDSNC and PAYLDSNCCC. The system checks whether all the key figures assigned to the procedure have the same period. The key figures of category PAYLD and PAYLDCC should therefore have the same values for the **Yield Period Start** indicator. In the same way, key figures of category PAYLDSNC or PAYLDSNCCC must have the same value in the **Interval for Periods** field. If this is not the case, the system displays a warning message.

i Note

The results for the final results procedure are based on the data of a single records procedure, and can be recreated at any point in time provided that the single records still exist. This means that you can delete the final results from the database if required.

Additional Notes

If you want to improve system performance during the evaluations, note the following:

- Choose only a small number of analysis characteristics.
- Do not use characteristics that refer to too small an entity (such as business partner number or transaction number).
- Specify the start date and the end date in the analysis parameters of the financial objects.
- Use the continuous compounding method in the yield curve to improve the runtime.
- Ensure that portfolio hierarchies do not contain more than 10,000 end nodes.

Calculation of Rates of Return

Use

You use this function to calculate the rates of return for the nodes of a portfolio hierarchy.

Prerequisites

In Customizing for **Financial Supply Chain Management** under **Treasury and Risk Management** **Portfolio Analyzer** **Results Database** **Edit Key Figures and Valuation Procedures**, you have entered the following settings:

- You have defined key figures for the calculation of rates of return, and assigned each of them the required yield method.

The system calculates the rate of return in the evaluation currency. You can use the following key figure categories:

- PAYLDCC (Key figure category for rates of return with a fixed evaluation period)

You define the yield period in the **Interval for Periods** field. SAP supplies valuation periods for days, months, quarters, and years. You can define additional evaluation periods in Customizing for **Portfolio Analyzer** under **Results Database** **Define Yield Ranges**.

- PAYLDSNCCC (Key figure category for period-to-date yields)

By setting the **Yield Period Start** indicator, you define whether the system is to start calculating the yield one year, half a year, one quarter, or one month before the key date.

- You have defined a single records procedure and a final results procedure.
- You have assigned the key figures for the rate of return (yield calculation to the single records procedure and final results procedure).
- You have assigned at least one portfolio hierarchy to final results procedure 2 (FRP2). You have to do this so that the system can calculate the rate-of-return key figures for each portfolio hierarchy node.

For more information, see [Use of the Results Database in Portfolio Analyzer](#).

Features

The system contains the following rate of return methods:

- Time-weighted rate of return (TWRR)

The time-weighted rate of return describes the returns that result simply from the actions of the portfolio manager. The rate of return is calculated net of the effect of the deposits into or withdrawals from the portfolio made by customers, which are factors that cannot be influenced by the portfolio manager.

The system first breaks down the analysis period into subperiods so that exogenous cash flows fall only at the end of the subperiods, and not within them. The first subperiod ends with the first exogenous cash flow; each subsequent exogenous cash flow defines a new subperiod. The last subperiod ends at the end of the analysis period.

Return R_i for subperiod i is defined as follows:

$$1 + R_i = \frac{MVE_i}{MVB_i} = \frac{PAPOS_{CC_i} + CF_i}{PAPOS_{CC_{i-1}}}, \quad i = 1, \dots, n$$

where MVE_i is the market value of the portfolio at the end of subperiod i , which is calculated as the total of the NPV PAPOS C_i of the portfolio on the end date of subperiod i and the flows CF_i on the end date of subperiod i . MVB_i is the market value of the portfolio at the start of subperiod i , which is the NPV PAPOS C_{i-1} of the portfolio on the previous day. The time-weighted rate of return R_{TWRR} for the whole analysis period is calculated as follows:

$$1 + R_{TWRR} = \prod_{i=1}^n (1 + R_i)$$

- Money-weighted rate of return (MWRR)

Exogenous incoming and outgoing flows of cash are not removed before the money-weighted rate of return is calculated. It is defined as rate of return R_{MWRR} , which is used to calculate the interest rate of the portfolio, including all incoming and outgoing cash flows. The system first calculates the annualized money-weighted rate of return:

$$MVB \cdot (1 + R_{MWRR}^a)^{\frac{T}{360}} + \sum_{i=1}^n CF_i \cdot (1 + R_{MWRR}^a)^{\frac{T-d_i}{360}} = MVE$$

where MVB is the market value of the portfolio at the start of the period, and MVE is the market value of the portfolio at the end of the period; T is the length of the period in days, and CF_i incoming and outgoing cash flows; d_i specifies on which day, calculated from the start of the period, cash flow CF_i flows. The system then calculates the weighted rate of return for the analysis period:

$$1 + R_{MWRR} = (1 + R_{MWRR}^a)^{\frac{T}{360}}$$

Whereas the time-weighted rate of return can be understood as the rate of return obtained by the portfolio manager, the money-weighted rate of return is the rate of return achieved by the owner of the portfolio.

- Modified Dietz Method

The modified Dietz method is an approximation method for calculating the time-weighted rate of return; it is used to calculate the internal interest rate earned from the portfolio. The analysis period is divided into time periods i . A linear interest calculation method is used within these time periods. rate of return of a subperiod is defined as the quotient of the net growth of the subperiod and the average capital invested in the period. Incoming and outgoing cash flows are time-weighted in a linear way, and used to calculate the average capital that is invested:

$$R_i = \frac{MVE_i - MVB_i + \sum_{j=1}^{n_i} CF_{i,j}}{MVB_i + \sum_{j=1}^{n_i} \frac{T_i - d_{i,j}}{T_i} \cdot CF_{i,j}}$$

where MVB_i is the market value of the portfolio at the start of subperiod i and MVE_i is the market value at the end of subperiod i ; T_i is the length of subperiod i in days and $CF_{i,j}$ the incoming and outgoing cash flows in subperiod i ; $d_{i,j}$ specifies on which day, calculated from the start of subperiod i , cash flow $CF_{i,j}$ flows.

Rate of return R_{MDI} is calculated in the modified Dietz method as follows:

$$1 + R_{MDI} = \prod_{i=1}^n (1 + R_i)$$

The subperiods are not longer than one month.

- Dietz Method

In the Dietz method, the rate of return is not calculated for each flow of capital. The system divides the analysis period into equal subperiods. A constant rate of return is assumed for these subperiods. It is also assumed that all flows of capital take place in the middle of the subperiods. Unlike in the modified Dietz method, the flows are not weighted by the length of time over which they have an effect.

Activities

To calculate rates of return, on the **SAP Easy Access** screen, choose **Financial Supply Chain Management** **Treasury and Risk Management** **Portfolio Analyzer** **Tools** **Determine Single Records**, and then **Determine Final Results**.

The system calculates the results as follows:

1. It calculates single records. It calculates only the additive key figures of the categories PAP0S and PAFLW.
2. It applies Final Results Procedure 1 (FRP1).
In this process, it aggregates the additive key figures and converts the single records into the evaluation currency (key figure categories PAPOSC and PAFLWCC).
3. The system applies Final Results Procedure 2 (FRP2) in order to calculate non-additive key figures (key figure categories PAYLDCC and PAYLDSNCCC).

i Note

Subdivision of the final results procedure into two steps is necessary to be able to execute an attribution analysis later.

To display the results of the calculation of rates of return **SAP Easy Access** screen, choose **Financial Supply Chain Management** **Treasury and Risk Management** **Portfolio Analyzer** **Information System** **Analyzer Information System**.

Benchmarking

Use

Benchmarks are used to analyze how the value of financial assets develops. Benchmarks are based on market data, or are constructed so that they give the most useful information possible about the portfolio in question.

In Portfolio Analyzer, you can define your own benchmarks, and display them in the nodes in the portfolio hierarchy. Benchmarks are analyzed in the framework of the Results Database (RDB). This enables you to compare yields in the Analyzer Information System (AIS). You can define benchmarks by referencing them to market data, such as a security or a reference interest rate. You can also define composite benchmarks, which contain multiple benchmarks, each of which has a weighting that you can define. This enables you to define benchmarks so that they reflect your portfolio as closely as possible, and can hence be used for the purposes of comparison.

The system does not use the evaluation procedures already contained in the RDB in order to calculate benchmark values. Instead, it uses a separate benchmark run, which you start independently of the evaluations in the Results Database. In a separate step, you must also assign your benchmarks to the relevant portfolio hierarchy nodes.

Procedure

Define the master data for the benchmarks

In the Customizing for **Financial Supply Chain Management** choose **Treasury and Risk Management** → **Portfolio Analyzer** → **Benchmarks** → **Edit Master Data for Benchmarks**. For more information, see [Editing Master Data for Benchmarks](#).

Assign the benchmarks to the nodes of your portfolio hierarchy

In the Customizing for **Financial Supply Chain Management** choose **Treasury and Risk Management** → **Portfolio Analyzer** → **Benchmarks** → **Assign Benchmarks to Nodes in the Portfolio Hierarchy**. For more information, see [Assignment of Benchmarks to Portfolio Hierarchy Nodes](#).

Define benchmark key figures

In the Customizing for **Financial Supply Chain Management** choose **Treasury and Risk Management** → **Portfolio Analyzer** → **Results Database** → **Monitor: Key Figures and Evaluation Procedures**.

Note the following:

You do not assign evaluation procedures to benchmark key figures, as the system calculates benchmark key figures in a separate job.

The system stores the market data for benchmarks in the following position key figures:

PAPOS (position in position currency)

PAPOSOC (position in evaluation currency)

The system calculates the benchmark rates of return in the followings key figures:

PAYLDCC (rate of return on investment from evaluation currency)

PAYLDSNCCC (rate of return from start of period to date from the evaluation currency)

You link the benchmark master data to the benchmark key figures when you start the benchmark run. For more information, see [Calculation of Benchmark Key Figures in the Benchmark Run](#).

Define an initial layout for the Analyzer Information System (AIS)

In Customizing choose **Financial Supply Chain Management Treasury and Risk Management** → **Portfolio Analyzer** → **Results Database** → **Define Initial Layout**, and assign your benchmark key figures to the portfolio hierarchy area.

If required, define formula-based key figures

In the Customizing for **Financial Supply Chain Management** choose **Treasury and Risk Management** → **Portfolio Analyzer** → **Results Database** → **Define Formulas for Analyzer Information System**. For more information, see [Formula Editor](#).



Note that you have to create formulas for each assignment variant you created for benchmark key figures. Therefore, in the formula editor the system displays the key figures for all assignment variants.

Result

You have defined the properties of the benchmarks, assigned them to the portfolio hierarchy, defined the benchmark key figures that the system is to calculate, and set up the layout for the display of results.

You can now start a benchmark run and display the results in the Analyzer Information System (AIS). In the selection screen in the Analyzer Information System, specify the assignment variant you require. In reporting, the system displays the names of the

master data of the assignment variant selected, and the key figures, as per the definition of the layout.

See also:

[Calculation of Benchmark Key Figures in the Benchmark Run](#)

[Analyzer Information System](#)

Editing of Master Data for Benchmarks

Use

You use this function to create, display, and change benchmarks.

Integration

Once you have created the master data for benchmarks, you need to do the following before you can use benchmarks in Portfolio Analyzer:

[Assign benchmarks to the portfolio hierarchy](#).

Create benchmark key figures in the framework of the Results Database.

[Start a benchmark run](#). This links the benchmark master data you created with the benchmark key figures, and calculates the benchmark values.

For more information, see [Benchmarking](#).

Features

The system contains the following benchmark categories:

Basic benchmark

Basic benchmarks are benchmarks that have a direct reference to market data. These include benchmarks for indexes and exchange rates. The system also contains the following benchmark categories:

Fixed interest rate, which you can use to store an interest rate

Variable interest rate, which you can use to store a variable interest rate

Reference portfolio, which you can use to benchmark against the portfolio yield of some reference portfolio

Composite benchmark

You use composite benchmarks to combine the benchmarks you defined. You specify the weighting of each sub-benchmark in the composite benchmark. The total weights of all sub-benchmarks must be 100%.

You can use the **Readjustment** field in the composite benchmark to define how often the system resets the weighting to the original values. You need to enter this information, as the weighting of the sub-benchmarks in the composite benchmark can change, depending on how the values of the sub-benchmarks change over time.



If you need time periods for the readjustment other than the periods **day**, **month**, **quarter**, and **year** that are predefined in the system, then you can create them in the Customizing for **Financial Supply Chain Management** under **Treasury and Risk Management** **Portfolio Analyzer** **Results Database** **Define Yield Ranges**.

You assign a currency to each benchmark. You can also store other information in the benchmark, such as the authorization group, and you can enter comments to document any changes you make to the benchmarks.

Versioning

The system creates versions of benchmarks by means of the validity date. This enables you to create multiple versions of benchmarks, and each version can have different master data. The versions of a benchmark apply from the validity date specified through to the validity date of the next version. You can create versions for dates that are in the past.

When the system calculates the values of the benchmark, it uses the version of the benchmark master data that is valid on the evaluation date.

The benchmark category is defined when the first version of the benchmark is created. It cannot be changed. You can change other properties of the benchmark only if no key figures have been calculated for the benchmark. Note that if you change the currency of a benchmark, all the older versions of the benchmark are then assigned the new currency. It is not possible to create versions that have different currencies.



For more information about versioning, see the field help for the **Valid From** field in the selection screen of the transaction for editing the master data of benchmarks.

Activities

In Customizing, choose **Financial Supply Chain Management** **Treasury and Risk Management** **Portfolio Analyzer** **Benchmarks** **Edit Master Data for Benchmarks**, and enter a name and validity date for the benchmark.

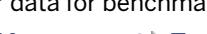
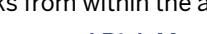
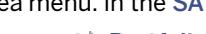
Interaction in the Selection Screen

Action	Function
Create	If the system does not contain a benchmark that has the name you entered, the system creates a new benchmark that has this name. If the system already contains a benchmark with this name, it creates a new version for the date specified.
Change	You can change the properties of the benchmark to those that are valid on the date you specify.
Display	You can display the properties of the benchmark that are valid on the date you specify. If you do not enter a date, the system displays the version that is valid on today's date.

Action	Function
	The input help for the date field contains the dates of all the versions that exist for the benchmark.
 Copy	For the date specified, the system creates a new benchmark that has the same properties as the benchmark specified.
 Delete	The system deletes the version of the benchmark that is valid on the date specified.
 Display History	The system displays all the changes made to the benchmark specified.
 Higher-Level Benchmark	The system displays all the composite benchmarks that contains the benchmark you specified.
 Benchmark 	The system deletes all the version of the benchmark specified.
 Goto 	The system branches to the transaction in which you can assign the specified benchmark to a portfolio hierarchy node (see also Assignment of Benchmarks to Portfolio Hierarchy Nodes).
 Benchmark 	<p>The system displays all the key figure calculations for the benchmark specified. The benchmark key figures and the evaluations periods are displayed.</p> <p>You can use this function to check whether there are any gaps in the calculation of key figures. If you want to change the benchmarks, you can check which key figures you need to delete before you change the benchmarks.</p>

Action	Function
 Check Benchmark	The system checks whether the definition of the benchmark is complete and consistent.
 Assignment of Analysis Characteristic	<p>The system displays the analysis characteristics that are available.</p> <p>You can enter values for analysis characteristics. This enables the system to link the values calculated for the benchmarks to the analysis characteristics.</p>



You can display and change the master data for benchmarks from within the area menu. In the SAP Easy Access screen, choose  **Accounting**  **Financial Supply Chain Management**  **Treasury and Risk Management**  **Portfolio Analyzer**  **Master Data**  **Benchmark** .

Assignment of Benchmarks to Portfolio Hierarchy Nodes

Use

You use this function to assign benchmarks to the nodes of your portfolio hierarchy. The system displays benchmarks in the Analyzer Information System only if you have assigned the benchmarks to portfolio hierarchy nodes.

You assign benchmarks to the portfolio hierarchy by using assignment variants. You use assignment variants when you start the [benchmark run](#) in order to control how the system calculates key figure values. When you call the Analyzer Information System, you define which assignment variants the system is to display.



For more information, see [Benchmarking](#).

Prerequisites

You have defined benchmarks in the Customizing for **Financial Supply Chain Management** under **Treasury and Risk Management** → **Portfolio Analyzer** → **Benchmarks** → **Edit Master Data for Benchmarks**.

Features

You can create up to five assignment variants for each portfolio hierarchy. However, normally you need just one or two assignment variants per portfolio hierarchy.

You can define whether a benchmark is assigned just to the selected node of the portfolio hierarchy, or whether this assignment applies to the lower-level nodes as well.

The system creates versions of assignment variants by means of the validity date. The versions of an assignment variant apply from the validity date specified through to the validity date of the next version. When the system calculates the values of the benchmark, it uses the version of the assignment variant that is valid on the evaluation date.



For more information about versioning, see the field help for the **Valid From** field in the selection screen of the transaction for assigning benchmarks to the portfolio hierarchy.

Activities

In the Customizing for **FinancialSupplyChainManagement**, choose **Portfolio Analyzer** → **Benchmarks** → **Assign Benchmarks to Nodes in the Portfolio Hierarchy**

The system displays a selection screen. You have the following options:

Interaction in the Selection Screen

Action	Function
<input type="checkbox"/> Create	If there is no assignment variant that has the name you entered, the system creates a new assignment variant that has this name. If the system already contains an assignment variant with this name, it creates a new version for the date specified.

Action	Function
Change	You can change the assignment variant that is valid on the date specified.
Display	You can display the assignment variant that is valid on the date specified.
Copy	For the date specified, the system creates a new assignment variant that has the same properties as the assignment variant specified.
Delete	The system deletes the version of the assignment variant that is valid on the date specified.
Display History	The system displays all the changes made to the assignment variant specified.
Assignment Variant → Delete Variant	The system deletes all the version of the assignment variant specified.
Goto → Master Data for Benchmark	The system branches to the transaction for editing the master data of benchmarks .

Action	Function
Benchmark	The system displays the master data of the benchmark selected.
PH Assignment	The system assigns the selected benchmark to the portfolio hierarchy node that is selected in the right-hand area of the screen.
Delete Assignment	The system removes the benchmark that was assigned to the portfolio hierarchy node selected.

Example

Create an assignment variant as follows:

Choose a view and a portfolio hierarchy node, and enter a name and validity date for the assignment variant. Choose **Create**.

The system displays the tab page **Assign Benchmark to PH Nodes**. The left-hand part of the screen contains the benchmarks you defined. The right-hand part of the screen contains the portfolio hierarchy.

In the right-hand part of the screen, open the portfolio hierarchy down to the node to which you want to assign a benchmark.

Using Drag&Drop, assign the benchmark to the portfolio hierarchy node.

Choose the **General Properties/Comments** tab page

The system displays the attributes of the assignment variant. The upper part of the screen contains the attributes that are valid for all versions of the assignment variant. The lower part of the screen contains the attributes that are valid only for the current version of the assignment variant.

Using the **Type of PH Assignment** indicator define whether the assignment of the benchmark applies just for one portfolio hierarchy node, or for all the lower-level nodes as well if they have not been assigned any other benchmarks.

By setting this indicator, you define that the benchmarks are displayed on entire branches of the portfolio hierarchy.

Choose  with the quick info **Save**.

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You can display and change the assignment variants from within the area menu. In the **SAP Easy Access** screen choose **Accounting → Financial Supply Chain Management → Treasury and Risk Management → Portfolio Analyzer → Master Data → Benchmark → Assign Benchmarks to Nodes in the Portfolio Hierarchy**

Calculation of Benchmark Key Figures in the Benchmark Run

Use

You use this function to start benchmark runs. In these runs, the system calculates the values of the benchmarks you defined, and saves the results in the relevant benchmark key figures in the Results Database.

Once the benchmark runs have finished, you can display the results in the [Analyzer Information System](#) (AIS).

Integration

Although the system uses the framework of the Results Database to save and display benchmarks, you have to start the benchmark runs without using the evaluation procedures of the Results Database.

The system does not link the benchmark master data you created with the relevant benchmark key figures until the benchmark run is started.

It calculates the benchmark values only for the portfolio hierarchy nodes to which you assigned benchmarks. For this reason, you enter one or more assignment variants when you start benchmark runs.

Prerequisites

- You have defined at least one benchmark in the Customizing for **Financial Supply Chain Management** under  **Treasury and Risk Management**  **Portfolio Analyzer**  **Benchmarks**  **Edit Master Data for Benchmarks** .
- You have created at least one assignment variant in the Customizing for **Financial Supply Chain Management** under  **Portfolio Analyzer**  **Benchmarks**  **Assign Benchmarks to Nodes in the Portfolio Hierarchy** .
- You have created the key figures that you want to use for benchmarking. You create these in the Customizing for **Financial Supply Chain Management** under  **Portfolio Analyzer**  **Results Database**  **Edit Key Figures and Evaluation Procedures**.  For more information, see [Benchmarking](#).

Features

You can start benchmark runs in the following modes:

- **Basic Run**

You use the following selection parameters to define the scope of the benchmark run: portfolio hierarchy, assignment variant, benchmark, benchmark key figure, and evaluation period. You can enter multiple benchmarks and benchmark key figures. The system calculates key figure values for each combination of benchmark and benchmark key figure you entered.

- **Deletion Run**

You use the deletion run to delete benchmark values that have already been calculated. The system also deletes all composite benchmarks that contain the benchmarks that are to be deleted. You start a deletion run if you want to change the master data of benchmarks, for example, for which the system has already calculated and saved key figure values. In this case, before you change the master data of the benchmarks you must delete the key figure values that were saved.

You can start the basic run and the deletion run as **test runs** in order to check which data is selected, and which benchmark values are calculated without this data being saved in the Results Database.

Saving Worklists

In the basic run and the deletion run, you can save the selection criteria you used for the benchmarks as worklists. You can then use these worklists for a new basic run. The system does the following:

In the basic run, the system saves the selection criteria of all key figure calculations that were terminated.

In the deletion run, it saves the selection criteria of the run. The worklist contains the selection criteria for all the benchmarks that you specified for deletion. It also contains the selection criteria of the higher-level benchmarks, since the system also deletes the key figure values of these composite benchmarks in the deletion run.

You should use the **Save as Worklist** option for deletion runs that you start when you want to change the master data of a benchmark yet the Results Database already contains key figure values for the version of the benchmark in question. You can do this as follows:

1. Choose the **Save as Worklist Option**, and start the run.

The system deletes the relevant key figure values.

2. Change the master data or market data of the benchmark as required.

3. Start the basic run using the worklist that the system created during the deletion run. You can find the name of the worklist by looking in the log of the deletion run.

The system reproduces all the key figure values that were deleted.

Activities

In the **SAP Easy Access** screen choose **Accounting** **Financial Supply Chain Management** **Treasury and Risk Management** **Portfolio Analyzer** **Tools** **Results Database** **Calculation of Benchmark Key Figures**.

The system displays a selection screen.

Enter the run parameters you require and choose with the quick info **Execute**.

The system starts the benchmark run.

Note

To display benchmark runs that already exist, in the **SAP Easy Access** screen choose **Accounting** **Financial Supply Chain Management** **Treasury and Risk Management** **Portfolio Analyzer** **Tools** **Results Database** **Overview of the Calculation of Benchmark Key Figures**.

Determination of Risk-Adjusted Measures

Use

In this function, you can use key figures as the basis for risk measurement to gain a better/deeper understanding of the quality of return. Depending on measure key figure that you select, the system determines intermediate results that have been automatically calculated and saved. The description for the intermediate results of these key figures is set as a combination of the description of the key figure and the related/corresponding intermediate result.

Prerequisites

The “risk-adjusted measure” ratio key-figures require a portfolio yield and a benchmark yield key figure for calculation (the only exception is Jensen's alpha key figure, which requires a risk-free yield in addition to the portfolio and benchmark yield). As the first step:

You have defined and evaluated for the required dates, a portfolio yield key figure. For the detailed procedure, see [Calculation of Rates of Return](#).

You have defined and evaluated for the required dates, a benchmark yield key figure. For the detailed procedure, see [Calculation of Benchmark Key Figures in the Benchmark Run](#).

For a risk free yield, the same benchmark yield key figure can be used or a different benchmark yield key figure can be defined and evaluated.

You have defined the risk-adjusted measure key-figure which you want to evaluate. To do this, go to SAP IMG and choose **Financial Supply Chain Management → Treasury and Risk Management → Portfolio Analyzer → Results Database → Edit Key Figures and Evaluation Procedures**

You have assigned the previously evaluated portfolio and benchmark yield key-figures to the risk-adjusted measure key-figure.

You have associated the appropriate assignment variant to the benchmark yield key figures. The assignment variant should be the one for which you have run the evaluation of benchmark yield key-figure.

Features

To get a better understanding of the quality of the yields, the following key figures are used:

The Sharpe ratio measures the return per unit of risk. The higher the Sharpe ratio, the better is the combined performance of risk and return. For the calculation of the Sharpe ratio the following formula

$$SR = \frac{r_p - b}{\sigma_p}$$

Where r_p = annualized portfolio return, b = annualized benchmark return, σ_p = annualized portfolio risk (standard deviation of the portfolio return).

The standard deviations of the portfolio return and the benchmark return are calculated and stored as intermediate results. As these intermediate results are based on yield key figures, they can only be calculated when the yields are already calculated and stored in the results database (RDB).

Depending on the selected evaluation date and the definition of the number of observations in the attributes of the Sharpe ratio key figure, the dates for the yield-values are determined. If yield-values are missing an error message will appear saying that data for the calculation are missing. If all values are available, the calculation will be done with the following formula:

Standard Deviation

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (r_i - \bar{r})^2}{n}}$$

where n = number of observations, r_i = selected yield-values (of portfolio or benchmark)and

$$\text{Expected value } \mu = r = \frac{\sum_{i=1}^n r_i}{n}$$

Jensen's alpha is the excess return adjusted for the systematic risk. For the calculation of the Jensen's Alpha the following formula is used:

$$\alpha = r_p - r_f - \beta_p * (b - r_f)$$

Where r_p = annualized portfolio return, r_f = annualized return of the risk free rate, b = annualized benchmark return, β_p = regression beta (as defined for Treynor Ratio). The regression beta is calculated and stored as an intermediate result.

The Treynor ratio is similar to the Sharpe ratio. It is a gauge of risk-adjusted performance calculated by dividing the excess return of a portfolio above the risk-free rate by its beta. Higher values are desirable and indicate greater return per unit of risk. For the calculation of the Treynor ratio, the following formula is used:

$$TR = \frac{r_p - b}{\beta_p},$$

Where r_p = annualized portfolio return, b = annualized benchmark return, β_p = regression beta. The regression beta is calculated by the following formula and stored as intermediate result:

$$\beta_R = \frac{\sum_{i=1}^n [(r_i - \bar{r}) * (b_i - \bar{b})]}{\sum_{i=1}^n (b_i - \bar{b})^2}$$

where r_i = return of portfolio, \bar{r} = mean of portfolio return

b_i = return of benchmark, \bar{b} = geometric mean of benchmark return (depending on the choice defined in the key figure definition), n = number of observations

The Information ratio is similar to the Sharpe ratio, but here the excess return is compared to the tracking error or the relative risk. For the calculation of the information ratio the following formula is used:

$$IR = \frac{\text{Annualized excess return}}{\text{Annualized tracking error}}$$

Where the annualized excess return is calculated as:

$$\text{Annualized Arithmetic excess return} = r_p - b$$

The tracking error (TE) is the standard deviation of excess return. It is calculated by the following formula and stored as intermediate result:

$$TE = \sqrt{\frac{\sum_{i=1}^n (a_i - \bar{a})^2}{n}}, \text{ where}$$

α_i = i-th observed excess return

$\bar{\alpha}$ = mean excess return

The Sortino ratio is also similar to Sharpe ratio and the Treynor ratio, but here the return is compared to the downside risk, which means that the focus is set to the variability of underperformance. For the calculation of the Sortino Ratio the following formula is used:

$$\text{Sortino ratio} = \frac{(r_p - r_T)}{\sigma_D}$$

Where σ_D is the Downside Risk, which is calculated by the following formula and stored as intermediate result:

$$\sigma_D = \sqrt{\sum_{i=1}^n \frac{\min[(r_i - b_i), 0]^2}{n}}$$

The minimum target return r_T is the annualized benchmark return of the related benchmark key figure as defined in the Sortino ratio key figure.

Activities

In SAP Menu, go to [Accounting Financial Supply Chain Management Treasury and Risk Management Portfolio Analyzer Tools Results Database Calculate Benchmark Ratio Key Figures](#). Here the system displays a selection screen.

Select the risk-adjusted measure key figures you want to evaluate, along with a proper evaluation period.

Once the results are calculated, they can be displayed in the [Analyzer Information System](#) (AIS). In the selection screen of AIS, you can enter the key dates and the initial layout, which decides what key figures will be displayed in the reporting.

To define an initial layout, go to [SAP Menu Accounting Financial Supply Chain Management Treasury and Risk Management Portfolio Analyzer Tools Analyzer Information System Define Initial Layout](#) (AIS_LAY_DEF).

To run the [Analyzer Information System](#) reporting, go to [SAP Menu Accounting Financial Supply Chain Management Treasury and Risk Management Portfolio Analyzer Tools Analyzer Information System Analyzer Information System](#) (AIS_STDREP)

Using Book Values

Use

In the Analyzer Information System (AIS), the system usually displays only the key figures calculated in Market Risk Analyzer and Portfolio Analyzer and that were saved in the Results Database. In addition to these risk key figures, in the Analyzer Information System you can display book values from operational components. This enables you to compare risk key figures with the book values used in external reporting.

Other central key figures, such as excess fair value, combine book values and key figures from Risk Management. You can use the [formula editor](#) to link book values and risk key figures to formula-based key figures, so that this data can be displayed in the Analyzer Information System.

The system contains function modules that you can use to transfer book values in order to save them in the Results Database. You add these function modules in the Customizing for the price calculator. You can transfer book values from the following components:

Prerequisites

The book values that you want to transfer have to be key-date book values.

You have created an RFC connection for the transfer of the book values. In the **SAP Easy Access** screen choose **Tools → Administration → Administration → Network → RFC Destinations**.

Procedure

To transfer book values to the Results Database, do the following:

Define the function modules that are to be used to transfer the book values

You need a separate implementation of the RFC interface of the price calculator. This function module, which you make known to the price calculator in the Customizing for the evaluation type, reads the relevant key figures from the operational system and saves them in the Results Database.

RFCT2_BOOKVALUE_PC (transfer of book values from TRM, in position currency)

RFCT2_BOOKVALUE_LC (transfer of book values from TRM, in local currency)

These function modules take, for example, the book values of contracts and securities positions from valuation area 001. You can copy the function modules to the custom namespace, and change them to meet your requirements.



To create function modules, in the **SAP Easy Access** screen choose **Tools → ABAP Workbench → Overview → Object Navigator**. For more information about adapting the function modules predefined in the system see the coding of the function modules given above.

Define an **evaluation type**

Create an evaluation type in the Customizing for **SAP Banking**. To do so, under **SEM Banking** choose **Common Settings for Market Risk and Asset/Liability Management → Valuation → Define Evaluation Type**; under **Financial Supply Chain Management** choose **Treasury and Risk Management → Basic Analyzer Settings → Valuation → Define and Set Up Evaluation Types**. Then do the following:

Choose the **External Function Control** tab page.

Set the **External Valuation** indicator.

In the **External Valuation** area, in the **RFC Destination** field, enter the target system. In the **RFC Function Name** field, enter the name of the function module that you want to use to transfer book values.

Define key figures and evaluation procedures

In the Customizing for **Financial Supply Chain Management** under **Treasury and Risk Management → Portfolio Analyzer → Results Database → Edit Key Figures and Evaluation Procedures**, for each key figure, specify the book value that you want to

transfer.

Define a separate key figure for each book value.

When doing so, choose a suitable key figure category.

The system does not contain separate key figures for transferring book values. We recommend that you use the following key figure categories from Portfolio Analyzer:

PAPOS (position in position currency)

PAPOS CC (position in evaluation currency)

By using these key figure categories, you ensure that the system translates values into the evaluation currency correctly, and that it displays these values correctly.

When you define the key figure, enter the evaluation type that you specified earlier.

Define the initial layout that contains the required key figures

In the Customizing for **SAP Banking**, choose **SEM Banking** → **Market Risk Analysis** → **Results Database** → **Define Initial Layout**, or in the Customizing for **Financial Supply Chain Management** choose **Treasury and Risk Management** → **Market Risk Analyzer** or **Portfolio Analyzer** → **Results Database** → **Define Initial Layout** and create an initial layout.

Assign the key figures you defined to one of the following areas:

Portfolio hierarchy

Single records

Position trend

If required, define formula-based key figures

You use the [formula editor](#) to do this.

Save the book values in the Results Database (RDB)

In the **SAP Easy Access** screen choose **Accounting** → **Financial Supply Chain Management** → **Treasury and Risk Management** → **Portfolio Analyzer** → **Tools** → **Determine Single Records**.

In the **SAP Easy Access** screen, then choose **Accounting** → **Financial Supply Chain Management** → **Treasury and Risk Management** → **Portfolio Analyzer** → **Tools** → **Determine Final Results**.

Result

You have transferred the required book values to the SAP system, and stored them in the Results Database (RDB). You can now display the book value, and the formula-based key figures derived from them, in the [Analyzer Information System](#).

Note the following constraints:

The system does not automatically update the book values you transferred. If the book values stored in the operational system change, you have to transfer these values again for the dates required, and store them in the Results Database (RDB).

Note that you can use the **SAP Query** function to transfer key figures from **Market Risk Analysis** and **Portfolio Analyzer** to **Treasury and Risk Management (TRM)**. Therefore, the book values that you transfer to the Results Database can also be risk key figures.

See also:

[Transaction Codes for the Transfer of Book Values](#)

Transaction Codes for the Transfer of Book Values

The following table contains the transaction codes that you use when you transfer book values:

Short Description	Transaction Code
Define the RFC connection	SM59
Define function modules for reading book values	SE80 Templates: RFCT2_BOOKVALUE_PC and RFCT2_BOOKVALUE_LC
Define evaluation types	JBREVAL
Define key figures and evaluation procedures	AFWKF_PA
Define the initial layout	AIS_LAY_DEF
Formula editor for formula-based key figures	AIS_FORMULA_DEF
Determine single records	PAEP1
Determine final results	PAEP2
Reporting for key figures	AIS_STDREP

See also:

[Using Book Values](#)

Formula Editor

Use

In this function, you use existing key figures as the basis for defining formula-based key figures, which you can then display in the Analyzer Information System (AIS).

This is useful in particular when you transfer book values from operational components, and combine them with key figures from Risk Management to create formula-based key figures. Examples of formula-based key figures are excess fair value and excess book value.

Integration

The system calculates formula-based key figures at runtime only. This takes place when the Analyzer Information System is called. In the Analyzer Information System, the system displays the formula-based key figures, and the key figures that you stored in the initial layout for the Analyzer Information System.

Unlike the other key figures, the formula-based key figures are not stored in the database. When the Analyzer Information System is called, the system checks all the formulas of the initial layout.

If errors occur, the system does not display the formulas in question. However, it does display an error log.

This occurs if, for example, you used key figures to define formulas, and these key figures were deleted from the initial layout.

Prerequisites

You have defined all the key figures you need for the formula-based key figures.

If you want to use book values for formula-based key figures, you have entered the settings required to import them into the system.

For more information, see [Using Book Values](#).

Before you can call the Analyzer Information System, you need to have carried out the single records procedure or the final results procedure for all the key figures you require.

Activities

In the Customizing for **SAP Banking**, choose **SEM Banking** → **Market Risk Analysis** → **Results Database** → **Define Formulas for Analyzer Information System**, or in the Customizing for **Financial Supply Chain Management** choose **Treasury and Risk Management** → **Market Risk Analyzer or Portfolio Analyzer** → **Results Database** → **Define Formulas for Analyzer Information System**

The system displays the initial layouts that have already been defined.

Select the initial layout, and choose the area for which you want to define formula-based key figures.

In this area, the system displays the formula-based key figures that exist.

If required, create a new formula-based key figure.

To store a formula for the formula-based key figure, select a key figure and choose with the quick info **Formula editor**.

The system opens the formula editor.

Define the formula as required, and save your entries.

The formula editor contains the basic mathematical functions and an **if** function for defining formula-based key figures.

i

To display the documentation about the formula editor, choose with the quick info **Information**.

Examples

Excess Fair Value

For single transactions, the excess fair value is the difference between the NPV and the book value. If this difference is negative, the excess fair value is zero.

$$\text{excess fair value} = \max[NPV - \text{book value}, 0]$$

Excess fair value for portfolios is the total excess fair value of the single transactions they contain.

Excess Book Value

For single transactions, the excess book value is the difference between the book value and the NPV:

$$\text{excess book value} = \max[\text{book value} - NPV, 0]$$

Excess book value for portfolios is the total excess book value of the single transactions they contain.

Risk-Adjusted Excess Fair Value

For single transactions, the excess fair value is the difference between the NPV and the book value. In this case, the value at risk is deducted from the book value in order to reflect potential losses:

$$\text{risk adjusted excess fair value} = \max[NPV - VaR - \text{book value}, 0]$$

Since the value-at-risk key figures cannot be totaled, the risk-adjusted excess fair value has to be calculated separately for each node in the portfolio hierarchy.



Note that the functions shown in the examples are not available in the formula editor. You therefore have to use an if-function to define the key figures; for example "= IF(NPV > book value, NPV-book value,0)".

Analyzer Information System

Use

You use this function to display the results data that you have stored in the [Results Database](#). You can use the Analyzer Information System to calculate the following key figures in a consistent way:

- Risk key figures that you calculated in the single records and final results procedures (such as the value at risk)
- [Book values](#) that you have imported from your operational systems
- [Formula-based key figures](#)

The system displays the results data and the portfolio hierarchy. You can use the portfolio hierarchy to navigate to the key figures for each portfolio hierarchy node, and in this way to display the results data for various aggregation levels, right down to single records. In addition to the results data, you can display the risk hierarchy, the calculation bases, detailed information about the key figures, and the evaluation procedures used. For value-at-risk key figures you can navigate to the results data either using the portfolio hierarchy or the risk hierarchy.

In Customizing you can define how the Analyzer Information System is to display data, and you can create an initial layout with various key figures and portfolio hierarchies or risk hierarchies, for instance (for example, for key-date value-at-risk analyses, back

testing, and benchmarking).

Prerequisites

In Customizing for SAP Banking under ►SEM Banking ►Market Risk Analysis ►Results Database ►Edit Key Figures and Evaluation Procedures ▶ or in Customizing for Financial Supply Chain Management under ►Treasury and Risk Management ►Market Risk Analyzer ►Results Database ►Edit Key Figures and Evaluation Procedures ▶ you have defined key figures and assigned them analysis procedures.

In Customizing for SAP Banking under ►SEM Banking ►Market Risk Analysis ►Results Database ►Define Initial Layout ▶, or in Customizing for Financial Supply Chain Management under ►Treasury and Risk Management ►Market Risk Analyzer ►Results Database ►Define Initial Layout ▶ you have created an initial layout.

If required, you have imported book values and defined formula-based key figures.

You have run analyses using the Results Database.

i Note

To display results in the Analyzer Information System you need the authorization for authorization object T_RDB_CVKF. The system checks users' authorization to display data on the basis of combinations of characteristic values and key figures.

Activities

1. On the SAP Easy Access screen, choose ►Accounting ►Bank Applications ►SEM Banking ►Market Risk Analysis ►Information System ►Analyzer Information System ▶ or ►Accounting ►Financial Supply Chain Management ►Treasury and Risk Management ►Market Risk Analyzer ►Information System ►Analyzer Information System ▶.

The system displays a selection screen.

2. Enter the characteristics for the selection of results data and choose **Execute**.

The system displays the key figures and their single records and final results procedures in the initial layout you defined.

- o **Portfolio hierarchy**

The top part of the screen contains a navigation structure based on the portfolio hierarchy. To the right of this are the key figures of the hierarchy level.

- o **Detailed information**

To display detailed information, double click a node in the portfolio hierarchy. At the bottom of the screen the system displays additional information about the portfolio hierarchy node. Depending on the evaluation procedure, the system displays the **Risk Hierarchy** and **Backtesting** tab pages.

The **Risk Hierarchy** tab page contains a navigation structure based on the risk hierarchy. To display key figures for each risk factor, double click a risk hierarchy node.

The **Backtesting** tab page contains the [back testing results](#).

i Note

Note that you can define how value-at-risk key figures are displayed not only using the portfolio hierarchy, but also using the risk hierarchy. To do so, choose **Risk Specific Display of VaR**.

You can use the following functions:

Action	Function
 Portfolio Hierarchy in Full Screen Mode	The system hides the detailed information. Only the navigation structure for the portfolio hierarchy is displayed.
 Detail View in Full Screen Mode	The system hides the navigation structure for the portfolio hierarchy. Only the detailed information is displayed.
 Standard Display	At the top of the screen, the system displays the navigation structure for the portfolio hierarchy. At the bottom of the screen the system displays the detailed information for the key figure categories.
 Risk Specific Display of VaR	<p>The system displays a dialog box containing a navigation structure based on the risk hierarchy, plus the results.</p> <p>You can navigate in the risk hierarchy to display the key figures that were selected.</p>
 Single Records	The system displays the single records for the portfolio hierarchy node you selected.
 Selections	The system displays the selection parameters you specified when you called the Analyzer Information System.
 Historical Trend	<p>The system compares the current data records with the older data records from the Results Database.</p> <p>In a dialog box you can enter the start date and time periods for the historical comparison.</p>
 Calculation Bases	The system displays the calculation bases of the evaluations, including market data such as yield curves and volatilities.
 Calculation Log	The system displays the application log for the evaluations.
 Key Figure	The system displays the attributes of the key figure selected, including the key figure name and the key figure category.
 Procedure	The system displays the final results procedure that is assigned to the key figure selected.
 Single Records	The system displays financial objects and their results.
 Key Date	The system displays the key figures for a different analysis date.
 P/L	The system displays the profit and loss calculation for the key figures selected.
 Sim. Scenarios	The system displays the simulation scenarios.