CHAPTER 38
BACKTESTING AND SIMULATION

1. (C) Strategy design, historical investment simulation, and analysis of output.

Explanation

The three steps in backtesting an investment strategy are: (1) strategy design, (2) historical investment simulation, and (3) analysis of output.

(Module 38.2, LOS 38.b)

Related Material

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2. (C) ensures that a strategy will perform well in the future.

Explanation

Backtesting approximates the real-life investment process by using historical data to evaluate whether a strategy would have produced desirable results in the past. However, not all strategies that perform well in a backtest will produce excess returns in the future. Backtesting provides investors with additional insight, and lends rigor to the investment process.

(Module 38.1, LOS 38.a)

Related Material

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3. (B) Backtesting a model during periods of high volatility and periods of low volatility.

Explanation

Historical scenario analysis involves backtesting over discrete periods of structural breaks–over different regimes. The specification of different investment universes is not scenario testing.

(Module 38.4, LOS 38.e)

Related Material

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4. (A) is incompatible with quantitative and systematic investment styles.

Explanation

Backtesting is a natural fit for quantitative and systematic investment styles. Backtesting is based on the implied assumption that the future will somewhat resemble history. Methods such as Monte Carlo analysis can allow backtesting to take into account the randomness of the future.

(Module 38.1, LOS 38.a)

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5. (C) Survivorship bias, look-ahead bias, and data snooping.

Explanation

Problems likely to emerge in a backtest of an investment strategy include: Survivorship bias (when using data that only includes entities that have persisted until today), Look-ahead bias (from using information that would have been unavailable at the time of the investment decision), and Data snooping (when a model is chosen based on backtesting performance).

(Module 38.3, LOS 38.d)

Related Material

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6. (B) skewed Student's t-distribution.

Explanation

The use of a skewed Student's t-distribution is most likely to help account for properties such as skewness (asymmetry) and excess kurtosis in the underlying return data. .

(Module 38.4, LOS 38.f)

Related Material

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7. (C) look-ahead bias.

Explanation

Factors such as the price-to-book ratio rely on accounting data (from the balance sheet), which is usually available with a lag—therefore, it may not be available at the time of stock selection. This fact is often overlooked while using historical data and is called the look-ahead bias. Survivorship bias results from inclusion of only survivors in the investment universe, while data snooping involves selection of a winning model (from many) based on statistical strength of the test results. The question does not provide any evidence to support either the survivorship bias or the data snooping bias.

(Module 38.3, LOS 38.d)

Related Material

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8. (C) Backtesting the performance of the strategy, assuming that the CBOE VIX Index is greater than 55.

Explanation

Historical scenario analysis (or historical stress testing) involves backtesting a strategy during actual historical periods. Assumed VIX level is not a historical period. The recessionary period following the global financial crisis of 2008 and the high market return period of 2017-2018 are both historical periods.

(Module 38.4, LOS 38.e)

Related Material

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9. (C) Positive skewness.

Explanation

Positive skewness indicates an above-average probability of returns above the mean, a desirable attribute. Negative skewness indicates an above-average probability of returns below the mean, which would not be a desirable attribute for a risk-averse investor. Excess kurtosis or fat tails indicates higher (than normal) probability of extreme events–again, an undesirable attribute for a risk-averse investor.

(Module 38.4, LOS 38.f)

Related Material

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10. (C) the out-of-sample data becomes the in-sample data for the subsequent period.

Explanation

Rolling window relies on an overlap between in-sample and out-of-sample data, allowing repeated in-sample training data to adjust portfolio positions based on information available at that time. Data is not divided into just two samples (one for training and the other for testing).

(Module 38.2, LOS 38.b)

Related Material

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11. (A) Data snooping.

Explanation

Data snooping refers to a situation where a model is chosen based on backtesting performance. Look-ahead bias refers to using information that would have been unavailable at the time of the investment decision. Survivorship bias is a form of look-ahead bias in which results are based on data that only includes entities that have persisted until today.

(Module 38.3, LOS 38.d)

Related Material

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12. (A) In the "historical investment simulation" step, we rebalance the portfolio periodically.

Explanation

The three steps in backtesting an investment strategy are: (1) strategy design, (2) historical investment simulation, and (3) analysis of output.

In the "strategy design" step, we specify investment hypothesis and goal(s), determine investment rules and process, and decide key parameters.

In the "historical investment simulation" step, we form investment portfolios for each period according to the rules specified in the previous step, and rebalance the portfolio periodically based on predetermined rules.

In the "analysis of backtesting output" step, we calculate portfolio performance statistics and compute other key metrics (such as turnover, etc.)

(Module 38.2, LOS 38.b)

Related Material

SchweserNotes - Book 5

13. (B) skewed Student's t-distribution.

Explanation

To conduct a sensitivity analysis, we fit return data to a distribution that accounts for skewness and excess kurtosis, such as a multivariate skewed Student's t-distribution and then repeat the Monte Carlo simulation. .

(Module 38.4, LOS 38.h)

Related Material

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14. (B) the number of trials is larger than the dataset.

Explanation

Historical simulation sometimes makes use of bootstrapping, whereby random samples are drawn with replacement. Bootstrapping is useful when the number of simulations needed is large relative to the size of the historical dataset. .

(Module 38.4, LOS 38.g)

Related Material

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15. (A) Maximum drawdown, Sharpe ratio, and Sortino ratio.

Explanation

The backtest of an investment strategy will produce return metrics, such as average return, as well as risk measures, such as volatility and downside risk. Other measures commonly calculated include the Sharpe ratio, the Sortino ratio, and maximum drawdown (the maximum loss from a peak to a trough).

(Module 38.3, LOS 38.c)

Related Material

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16. (A) a new methodology that is slowly gaining acceptance in the investment community.

Explanation

Backtesting is not a new methodology; rather, it has been widely used in the investment community for many years. Backtesting can be employed as a rejection or acceptance criterion for an investment strategy. Backtesting is a natural fit for quantitative and systematic investment styles, but it is also widely used by fundamental managers.

(Module 38.1, LOS 38.a)

Related Material

SchweserNotes - Book 5