CLAIMS

1. A computer implemented method of collateralizing counterparty credit risk by modeling both linear and non-linear data sets, the method comprising:

receiving as input, by at least one computing device from at least one first computerized data source, data defining at least one first financial product belonging to a first data class defining non-linear financial products ("a non-linear data set") and at least one second financial product belonging to a second data class defining linear financial products ("a linear data set"), said computing device comprising memory and at least one processor executing computer-readable instructions;

empirically modeling, by the at least one computing device, the linear and non-linear data sets by a same empirical modeling process that comprises:

decomposing the at least one first and second financial products into their respective components;

selectively identifying, for each of the at least one first and second financial products, at least one of the respective components that drives profitability, the identified respective components each representing at least one risk factor;

retrieving, by the at least one computing device from at least one second computerized data source, historical pricing data for the at least one risk factor;

executing, by the at least one computing device, a risk factor simulation process involving the at least one risk factor, said risk factor simulation process comprising a filtered historical simulation process;

generating, by the at least one computing device, product profit and loss values for the at least one first and second financial products based on output from the risk factor simulation process; and

determining, by the at least one computing device, an initial margin for the at least one first and second financial products based on the product profit and loss values.

2. The method of claim 1, wherein said decomposing comprising mapping each of the at least one first and second financial products to the at least one risk factor identified as driving profitability.

3. The method of claim 1, wherein the risk factor simulation process further comprises:

determining, by the at least one computing device, statistical properties of the historical pricing data;

identifying, by the at least one computing device, any co-dependencies between prices that exist within said historical pricing data; and

generating, as said output, normalized historical pricing data based on said statistical properties and said co-dependencies.

4. The method of claim 3, wherein the filtered historical simulation process comprises:

executing a co-variance scaled filtered historical simulation that includes:

normalizing the historical pricing data to resemble current market volatility by applying a scaling factor to said historical pricing data, said scaling factor reflecting the statistical properties and co-dependencies of said historical pricing data.

5. The method of claim 3, wherein generating the product profit and loss values comprises:

calculating, via a pricing model embodied in the at least one computing device, one or more forecasted prices for the at least one first and second financial products based on the normalized historical pricing data input into said pricing model; and

comparing each of said forecasted prices to a current settlement price of each of the at least one first and second financial products to determine a product profit or loss value associated with each of said forecasted prices.

6. The method of claim 5, wherein determining the initial margin comprises:

sorting the product profit and loss values, most profitable to least profitable or vice versa; and

selecting the product profit or loss value among the sorted values according to a predetermined confidence level,

wherein the selected product profit or loss value represents said initial margin.

7. The method of claim 6, wherein the historical pricing data comprises pricing data of the at least one risk factor over a period of at least one-thousand (1,000) days, the method further comprising:

calculating, via said pricing model, one-thousand forecasted prices, each based on the normalized pricing data pertaining to a respective one of the one-thousand days;

determining, by the at least one computing device, a product profit or loss value associated with each of the one-thousand forecasted prices by comparing each of the one-thousand forecasted prices to a current settlement price of each of the at least one first and second financial products;

sorting, by the at least one computing device, the product profit and loss values associated with each of the one-thousand forecasted prices from most profitable to least profitable or vice versa; and

identifying, by the at least one computing device, a tenth least profitable product profit or loss value,

wherein said tenth least profitable product profit or loss value represents the initial margin, and

wherein said tenth least profitable product profit or loss value represents a ninety-nine percent confidence level.

8. A computer implemented method of collateralizing counterparty credit risk by modeling both linear and non-linear data sets, the method comprising:

receiving as input, by at least one computing device from at least one first computerized data source, data defining at least one financial portfolio, the at least one financial portfolio comprising at least one first financial product belonging to a first data class defining non-linear financial products (“a non-linear data set”) and at least one second financial product belonging to a second data class defining linear financial products (“a linear data set”), said computing device comprising memory and at least one processor executing computer-readable instructions;

empirically modeling, by the at least one computing device, the linear and non-linear data sets by a same empirical modeling process that comprises:

decomposing the linear and non-linear data sets and identifying, for each of the at least one first and second financial products, at least one respective component that drives profitability, the identified at least one respective component representing at least one risk factor;

retrieving, by the at least one computing device from at least one second computerized data source, historical pricing data for the at least one risk factor;

executing, by the at least one computing device, a risk factor simulation process involving the at least one risk factor, said risk factor simulation process comprising a filtered historical simulation process;

generating, by the at least one computing device, product profit and loss values for the at least one first and second financial products based on output from the risk factor simulation process;

generating, by the at least one computing device, portfolio profit and loss values for the at least one financial portfolio based on the product profit and loss values; and

determining, by the at least one computing device, an initial margin for the at least one financial portfolio based on the portfolio profit and loss values.

9. The method of claim 8, wherein said composing comprises mapping each of the at least one first and second financial products to the at least one risk factor identified as driving profitability.

10. The method of claim 8, wherein the risk factor simulation process further comprises:

determining, by the at least one computing device, statistical properties of the historical pricing data;

identifying, by the at least one computing device, any co-dependencies between prices that exist within said historical pricing data; and

generating, as said output, normalized historical pricing data based on said statistical properties and said co-dependencies.

11. The method of claim 10, wherein the filtered historical simulation process comprises a co-variance scaled filtered historical simulation that includes:

normalizing the historical pricing data to resemble current market volatility by applying a scaling factor to said historical data, said scaling factor reflecting the statistical properties and co-dependencies of said historical pricing data.

12. The method of claim 10, wherein generating product profit and loss values comprises:

calculating, via a pricing model embodied in the at least one computing device, one or more forecasted prices for the at least one first and second financial products based on the normalized historical pricing data input into said pricing model; and

comparing each of said forecasted prices to a current settlement price of the at least one first and second financial products to determine a product profit or loss value associated with each of said forecasted prices.

13. The method of claim 12, wherein the generating portfolio profit and loss values comprises:

aggregating at least one respective product profit or loss value from the at least one first and second financial products in said at least one financial portfolio.

14. The method of claim 13, wherein determining the initial margin comprises:

sorting the portfolio profit and loss values, most profitable to least profitable or vice versa; and

selecting the portfolio profit or loss value among the sorted values according to a predetermined confidence level,

wherein the selected portfolio profit or loss value represents said initial margin.

15. The method of claim 14, wherein the historical pricing data comprises pricing data of the at least one risk factor over a period of at least one-thousand (1,000) days and wherein said at least one financial portfolio comprises a plurality of financial products in said first and second data classes, the method further comprising:

calculating, via said pricing model, one-thousand forecasted prices for each of the plurality of financial products, said forecasted prices each based on the normalized pricing data pertaining to a respective one of the one-thousand days;

determining, by the at least one computing device, one-thousand product profit or loss values for each of the plurality of financial products by comparing the forecasted prices associated each of the plurality of financial products to a respective current settlement price;

determining, by the at least one computing device, one-thousand portfolio profit or loss values by aggregating a respective one of the one-thousand product profit or loss values from each of the plurality of financial products;

sorting, by the at least one computing device, the portfolio profit and loss values from most profitable to least profitable or vice versa; and

identifying, by the at least one computing device, a tenth least profitable portfolio profit or loss value,

wherein said tenth least profitable product profit or loss value represents the initial margin, and

wherein the tenth least portfolio product or loss value represents a ninety-nine percent confidence level.

16. A system for collateralizing counterparty credit risk by modeling both linear and non-linear data sets, the system comprising:

at least one computing device comprising memory and at least one processor executing computer-readable instructions that cause the system to:

receive as input, from at least one first computerized data source, data defining at least one first financial product belonging to a first data class defining non-linear financial products ("a non-linear data set") and at least one second financial product belonging to a second data class defining linear financial products ("a linear data set");

empirically model the linear and non-linear data sets by a same empirical modeling process that, when executed, causes the at least one computing device to:

decompose the at least one first and second financial products into their respective components;

selectively identify, for each of the at least one first and second financial products, at least one of the respective components that drives profitability, the identified respective components each representing at least one risk factor;

retrieve, from at least one second computerized data source, historical pricing data for the at least one risk factor;

execute a risk factor simulation process involving the at least one risk factor, said risk factor simulation process comprising a filtered historical simulation process;

generate product profit and loss values for the at least one first and second financial products based on output from the risk factor simulation process; and

determine an initial margin for the at least one first and second financial products based on the product profit and loss values.

17. The system of claim 16, wherein the at least computing device comprises computer-readable instructions that, when executed, cause the system to map each of the at least one first and second financial products to the at least one risk factor identified as driving profitability.

18. The system of claim 16, wherein the at least computing device is configured to:

execute the risk factor simulation process by executing computer-readable instructions that, when executed, cause the system to:

determine statistical properties of the historical pricing data;

identify any co-dependencies between prices that exist within said historical pricing data; and

generate, as said output, normalized historical pricing data based on said statistical properties and said co-dependencies.

19. The system of claim 18, wherein the filtered historical simulation process comprises a co-variance scaled filtered historical simulation and wherein the at least computing device comprises computer-readable instructions that, when executed, cause the system to:

normalize, as part of said co-variance scaled filtered historical simulation, the historical pricing data to resemble current market volatility by applying a scaling factor to said historical pricing data, said scaling factor reflecting the statistical properties and co-dependencies of said historical pricing data.

20. The system of claim 18, wherein the at least computing device is configured to:

generate the product profit and loss values by executing computer-readable instructions that, when executed, cause the system to:

calculate, via a pricing model embodied in the at least one computing device, one or more forecasted prices for the at least one first and second financial products based on the normalized historical pricing data input into said pricing model; and

compare each of said forecasted prices to a current settlement price of each of the at least one first and second financial products to determine a product profit or loss value associated with each of said forecasted prices.

21. The system of claim 20, wherein the at least one computing device is configured to:

determine the initial margin by executing computer-readable instructions that, when executed, cause the system to:

sort the product profit and loss values, most profitable to least profitable or vice versa; and

select the product profit or loss value among the sorted values according to a predetermined confidence level,

wherein the selected product profit or loss value represents said initial margin.

22. The system of claim 21, wherein the historical pricing data comprises pricing data of the at least one risk factor over a period of at least one-thousand (1,000) days, said at least one computing device executing computer-readable instructions that, when executed, cause the system to:

calculate, via said pricing model, one-thousand forecasted prices, each based on the normalized pricing data pertaining to a respective one of the one-thousand days;

determine a product profit or loss value associated with each of the one-thousand forecasted prices by comparing each of the one-thousand forecasted prices to a current settlement price of each of the at least one first and second financial products;

sort the product profit and loss values associated with each of the one-thousand forecasted prices from most profitable to least profitable or vice versa; and

identify a tenth least profitable product profit or loss value,

wherein said tenth least profitable product profit or loss value represents the initial margin, and

wherein said tenth least profitable product profit or loss value represents a ninety-nine percent confidence level.

23. A system for collateralizing counterparty credit risk by modeling both linear and non-linear data sets, the system comprising:

at least one computing device comprising memory and at least one processor executing computer-readable instructions that cause the system to:

receive as input, from at least one first computerized data source, data defining at least one financial portfolio, the at least one financial portfolio comprising at least one first financial product belonging to a first data class defining non-linear financial products (“a non-linear data set”) and at least one second financial product belonging to a second data class defining linear financial products (“a linear data set”);

empirically model the linear and non-linear data sets by a same empirical modeling process that, when executed, causes the at least one computing device to:

decompose the linear and non-linear data sets and identify, for each of the at least one first and second financial products, at least one respective component that drives profitability, the identified at least one respective component representing at least on risk factor;

retrieve, from at least one second computerized data source, historical pricing data for the at least one factor;

execute a risk factor simulation process involving the at least one risk factor, said risk factor simulation process comprising a filtered historical simulation process;

generate product profit and loss values for the at least one first and second financial products based on output from the risk factor simulation process;

generate portfolio profit and loss values for the at least one financial portfolio based on the product profit and loss values; and

determine an initial margin for the at least one financial portfolio based on the portfolio profit and loss values.

24. The system of claim 23, wherein the at least one computing device is configured to map the at least one first and second financial products to the at least one risk factor identified as driving profitability by executing computer-readable instructions.

25. The system of claim 23, wherein the at least one computing device is configured to:

execute the risk factor simulation process by executing computer-readable instructions that, when executed, cause the system to:

determine statistical properties of the historical pricing data;

identify any co-dependencies between prices that exist within said historical pricing data; and

generate, as said output, normalized historical pricing data based on said statistical properties and said co-dependencies.

26. The system of claim 25, wherein the filtered historical simulation process comprises a co-variance scaled filtered historical simulation process and wherein the at least one computing device is configured to execute the co-variance scaled filtered historical simulation process by executing computer-readable instructions that, when executed, cause the system to:

normalize the historical pricing data to resemble current market volatility by applying a scaling factor to said historical data, said scaling factor reflecting the statistical properties and co-dependencies of said historical pricing data.

27. The system of claim 25, wherein the at least one computing device is configured to:

generate product profit and loss values by executing computer-readable instructions that, when executed, cause the system to:

calculate, via a pricing model embodied in the at least one computing device, one or more forecasted prices for the at least one first and second financial products based on the normalized historical pricing data input into said pricing model; and

compare each of said forecasted prices to a current settlement price of the at least one first and second financial products to determine a product profit or loss value associated with each of said forecasted prices.

28. The system of claim 27, wherein the at least one computing device is configured to generate portfolio profit and loss values by executing computer-readable instructions that, when executed, cause the system to aggregate at least one respective product profit or loss value from the at least one first and second financial products in said at least one financial portfolio.

29. The system of claim 28, wherein the at least one computing device is configured to:

determine the initial margin by executing computer-readable instructions that, when executed, cause the system to:

sort the portfolio profit and loss values, most profitable to least profitable or vice versa; and

select the portfolio profit or loss value among the sorted values according to a predetermined confidence level,

wherein the selected portfolio profit or loss value represents said initial margin.

30. The system of claim 29, wherein the historical pricing data comprises pricing data of the at least one risk factor over a period of at least one-thousand (1,000) days and wherein said at least one financial portfolio comprises a plurality of financial products in said first and second data classes, the at least one computing device executing computer-readable instructions that, when executed, cause the system to:

calculate, via said pricing model, one-thousand forecasted prices for each of the plurality of financial products, said forecasted prices each based on the normalized pricing data pertaining to a respective one of the one-thousand days;

determine one-thousand product profit or loss values for each of the plurality of financial products by comparing the forecasted prices associated each of the plurality of financial products to a respective current settlement price;

determine one-thousand portfolio profit or loss values by aggregating a respective one of the one-thousand product profit or loss values from each of the plurality of financial products;

sort the portfolio profit and loss values from most profitable to least profitable or vice versa; and

identify a tenth least profitable portfolio profit or loss value,

wherein said tenth least profitable product profit or loss value represents the initial margin, and

wherein the tenth least portfolio product or loss value represents a ninety-nine percent confidence level.