NORTHFIELD | modeling financial markets worldwide

At a Push of a Button: Private Asset Data and Risk Analytics Working Together

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Full Cycle of Modeling Private Assets

- Get financial document from investor – normally a quarterly PDF statement from GP
- Define the types and fields of information to obtain from document
- Ingest and parse using Nedelma's document processing solution
- Place data in a user allocated database which is customizable
- Convert the data in the required format by an analytical process – XML, JSON, Excel, flat, etc. and automatically feed to risk modeling process
- Run through Northfield's Multi-Asset Risk Model EE
- Upload risk model output to Northfield's online risk system NEXUS

Northfield CRE Input Format

1. Property ID	2. Property Type	3. Location	4. Value	5. LTV	6. Cost of Debt	7. Currency	8. Composite Asset
The actual or encoded name of the property	Office, Retail, Residential, Industrial	Metro Area, Country	Market or Appraised Value of Property in Investor's Base Currency Units	Loan to Value in Investor's Base Currency Units	In per cent per annum	The currency of the investment cash inflows (if omitted, assume local currency per col 3)	The Name of a headline portfolio segment of which this investment is part (i.e. name of a third party fund)
AspireHeights	Residential	Orlando	85800000.00	0.47	6.10%	USD	EBF_CAPITAL_FUND_II
BaysideHaven	Residential	Denver	72800000.00	0.5	5.50%	USD	EBF_CAPITAL_FUND_II
BeaconTower	Industrial	New York	86708867.00	0.43	4.75%	USD	Moon_Realty_IV_LP
CrescentValleyMeadows	Hotel	Charlotte	44699144.00	0.59	5.50%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
EmeraldCoveVillas	Hotel	Fort Lauderdale	62058953.00	0.54	4.75%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
GoldenGrove	Industrial	New York	125527143.00	0.48	3.90%	USD	Moon_Realty_IV_LP
GoldenPeakResidences	Hotel	Orlando	70324141.00	0.55	5.50%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
HarmonyPlaza	Industrial	Orlando	41319509.00	0.58	4.75%	USD	Moon_Realty_IV_LP
HavenwoodPark	Hotel	Fort Lauderdale	41090092.00	0.62	4.75%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
LakeviewLanding	Hotel	Fort Lauderdale	96825856.00	0.48	4.75%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
MapleResidences	Hotel	Raleigh	63164823.00	0.51	5.50%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
OakstoneManor	Residential	Denver	60900000.00	0.63	5.50%	USD	EBF_CAPITAL_FUND_II
PinehavenVillas	Hotel	Philadelphia	63368552.00	0.45	5.00%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
SquarePlaza	Hotel	Miami	127545345.00	0.57	4.75%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
StonebridgeVillas	Hotel	Orlando	67117435.00	0.44	4.75%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
SummitRidgeEstates	Hotel	Tampa	54860077.00	0.58	4.75%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
SunsetHarborProperties	Hotel	Tampa	40679572.00	0.65	4.75%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
TheOrchardResidences	Hotel	Philadelphia	115122483.00	0.58	5.00%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
VistaCove	Industrial	Miami	64760681.00	0.41	4.75%	USD	Moon_Realty_IV_LP
VistaPointeRetreats	Hotel	Raleigh	52090375.00	0.62	5.50%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III
WillowbrookHeights	Hotel	Tampa	66230702.00	0.49	4.75%	USD	CHARLSTON_NORTH_REAL_ESTATE_FUND_III

Real Estate Portfolio In NEXUS

Risk Report

Summary | **Risk Decomposition** | Active Contribution | Portfolio Contribution | Benchmark Contribution | Sector Contribution | Security Contribution | Exceptions

Risk Decomposition

Factor	Portfolio Exposure	Benchmark Exposure	Active Exposure	Factor Variance	Variance Contribution Active		Variance Contribution Portfolio		Variance Contribution Benchmark	
+ Region					0.573	1.11%	0.573	1.11%	0.000	%
+ Super Sectors					6.049	11.71%	6.049	11.71%	0.000	%
+ Economic					-0.390	-0.75%	-0.390	-0.75%	0.000	%
+ Fundamental					0.057	0.11%	0.057	0.11%	0.000	%
+ Statistical					0.000	0.00%	0.000	0.00%	0.000	%
+ Currency					0.000	0.00%	0.000	0.00%	0.000	%
+ Treasury Curve					44.283	85.75%	44.283	85.75%	0.000	%
Total Factor Variance					50.572	97.93%	50.572	97.93%	0.000	%
Stock Specific Variance					1.067	2.07%	1.067	2.07%	0.000	%
Total Tracking Variance					51.639	100.00%	51.639	100.00%	0.000	%
Tracking Error					7.186		7.186		0.000	
R-Squared					0.000					
Beta to Benchmark					0.000					

	Calculated	10 Day ParVar
Tracking Error	7.186	235,459.76
Active Risk	8.018	262,731.88
Absolute Risk	7.186	235,459.76

Real Estate Portfolio In NEXUS (cont’d)

Risk Report

Summary | **Risk Decomposition** | Active Contribution | Portfolio Contribution | Benchmark Contribution | Sector Contribution | Security Contribution | Exceptions

Risk Decomposition

	Factor	Portfolio Exposure	Benchmark Exposure	Active Exposure	Factor Variance	Variance Contribution Active		Variance Contribution Portfolio		Variance Contribution Benchmark	
	Region					0.573	1.11%	0.573	1.11%	0.000	%
	Super Sectors					6.049	11.71%	6.049	11.71%	0.000	%
1	INDUSTRIAL SECTOR	0.009	0.000	0.009	212.848	0.548	1.06%	0.548	1.06%	0.000	%
2	CONSUMER SECTOR	0.073	0.000	0.073	144.640	3.831	7.42%	3.831	7.42%	0.000	%
3	TECHNOLOGY&HEALTH SECTOR	0.010	0.000	0.010	229.584	0.657	1.27%	0.657	1.27%	0.000	%
4	INTEREST RATE SENSITIVE SECTR	0.022	0.000	0.022	172.767	0.953	1.85%	0.953	1.85%	0.000	%
5	NON-ENERGY MINERALS	0.001	0.000	0.001	354.116	0.057	0.11%	0.057	0.11%	0.000	%
6	ENERGY MINERAL SECTOR	0.000	0.000	0.000	202.532	0.002	0.00%	0.002	0.00%	0.000	%
	Economic					-0.390	-0.75%	-0.390	-0.75%	0.000	%
	Fundamental					0.057	0.11%	0.057	0.11%	0.000	%
	Statistical					0.000	0.00%	0.000	0.00%	0.000	%
	Currency					0.000	0.00%	0.000	0.00%	0.000	%
	Treasury Curve					44.283	85.75%	44.283	85.75%	0.000	%
1	TREASURY CURVE FACTOR1	-9.035	0.000	-9.035	0.573	39.307	76.12%	39.307	76.12%	0.000	%
2	TREASURY CURVE FACTOR2	-112.915	0.000	-112.915	0.002	22.619	43.80%	22.619	43.80%	0.000	%
3	TREASURY CURVE FACTOR3	-916.802	0.000	-916.802	0.000	-17.643	-34.17%	-17.643	-34.17%	0.000	%
	Total Factor Variance					50.572	97.93%	50.572	97.93%	0.000	%
	Stock Specific Variance					1.067	2.07%	1.067	2.07%	0.000	%
	Total Tracking Variance					51.639	100.00%	51.639	100.00%	0.000	%
	Tracking Error					7.186		7.186		0.000	
	R-Squared					0.000					
	Beta to Benchmark					0.000					

	Calculated	10 Day ParVar
Tracking Error	7.186	235,459.76

Real Estate Portfolio In NEXUS (cont'd)

Risk Report

Summary | Risk Decomposition | Active Contribution | Portfolio Contribution | Benchmark Contribution | Sector Contribution | **Security Contribution** | Exceptions

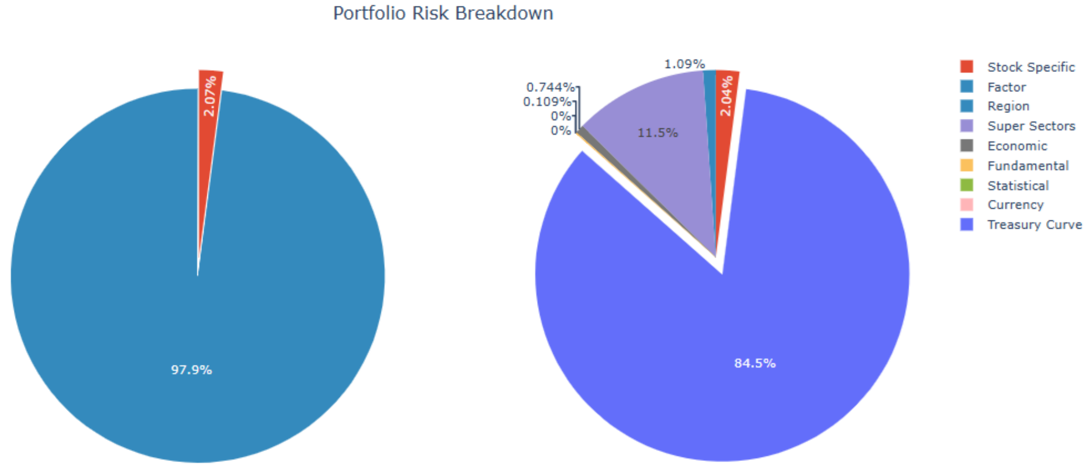
Top Active Risk Contributors

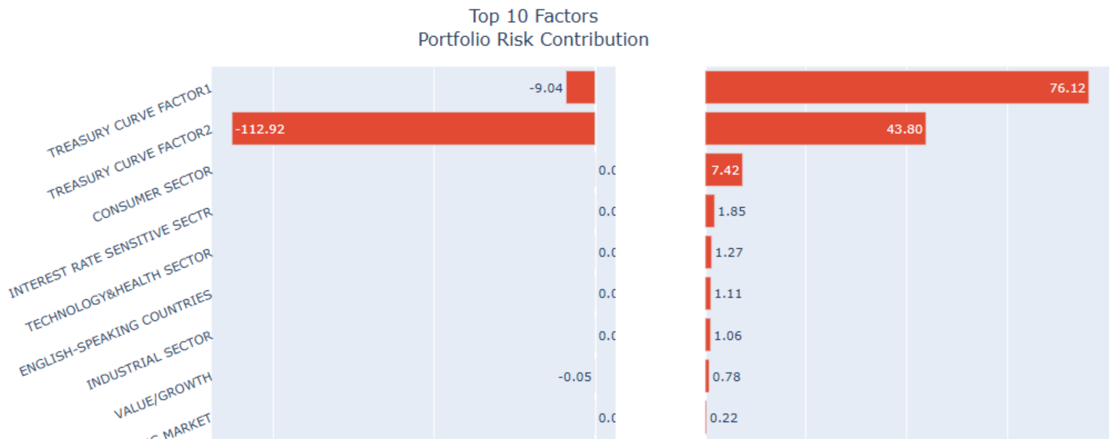
	ID	ActiveWt%	PortWt%	BenchWt%	ActiveContr%	PortContr%	BenchContr%	MV	MV Factor	MV Residual	Implied Return	Sector	Name
1	111_BaysideHaven	5	5	0	6.454	6.454	0.000	133.305	131.753	1.551	12.907	0.000	111_BaysideHaven
2	111_OakstoneManor	5	5	0	6.454	6.454	0.000	133.305	131.753	1.551	12.907	0.000	111_OakstoneManor
3	111_HarmonyPlaza	5	5	0	5.885	5.885	0.000	121.557	107.610	13.947	11.770	0.000	111_HarmonyPlaza
4	111_BeaconTower	5	5	0	5.595	5.595	0.000	115.564	115.375	0.189	11.190	0.000	111_BeaconTower
5	111_GoldenGrove	5	5	0	5.595	5.595	0.000	115.564	115.375	0.189	11.190	0.000	111_GoldenGrove
6	111_AspireHeights	5	5	0	5.303	5.303	0.000	109.530	108.844	0.686	10.605	0.000	111_AspireHeights

Bottom Active Risk Contributors

	ID	ActiveWt%	PortWt%	BenchWt%	ActiveContr%	PortContr%	BenchContr%	MV	MV Factor	MV Residual	Implied Return	Sector	Name
1	*$$$	-100	0	100	0	0.000	0.000	0	0	0	0	Unclassified	U.S. Dollar
2	111_VistaPointeRetreats	4	4	0	3.581	3.581	0.000	92.452	91.867	0.585	8.952	0.000	111_VistaPointeRetreats
3	111_TheOrchardResidences	4	4	0	3.605	3.605	0.000	93.083	92.274	0.809	9.013	0.000	111_TheOrchardResidences
4	111_WillowbrookHeights	4	4	0	3.654	3.654	0.000	94.341	93.004	1.337	9.135	0.000	111_WillowbrookHeights
5	111_SunsetHarborProperties	4	4	0	3.654	3.654	0.000	94.341	93.004	1.337	9.135	0.000	111_SunsetHarborProperties
6	111_VistaCove	4	4	0	4.344	4.344	0.000	112.149	110.157	1.993	10.859	0.000	111_VistaCove

Real Estate Portfolio In NEXUS (cont'd)





Conclusions

- The ability to incorporate private assets with the comparable ease as public assets in the risk management process is already here
- The process is extremely flexible to ingest unstructured documents of practically any file format used in practice
- The data in the file does not need to be tagged or be in the same location within the file each quarter, but can automatically be captured once it is found and trained in the first file of the type
- Audit trail is an inherent feature of the data service
- The data process is seamlessly integrated in the trusted analytical processes covering risk, portfolio construction, valuation, and cash flow forecasting.

Questions and Answers:

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