

IMPROVING YOUR PORTFOLIO RETURN/RISK

ADVANCED PORTFOLIO RISK AND ANALYTICS TOOLS TO BUILD
BETTER PORTFOLIOS IN PORT<GO>

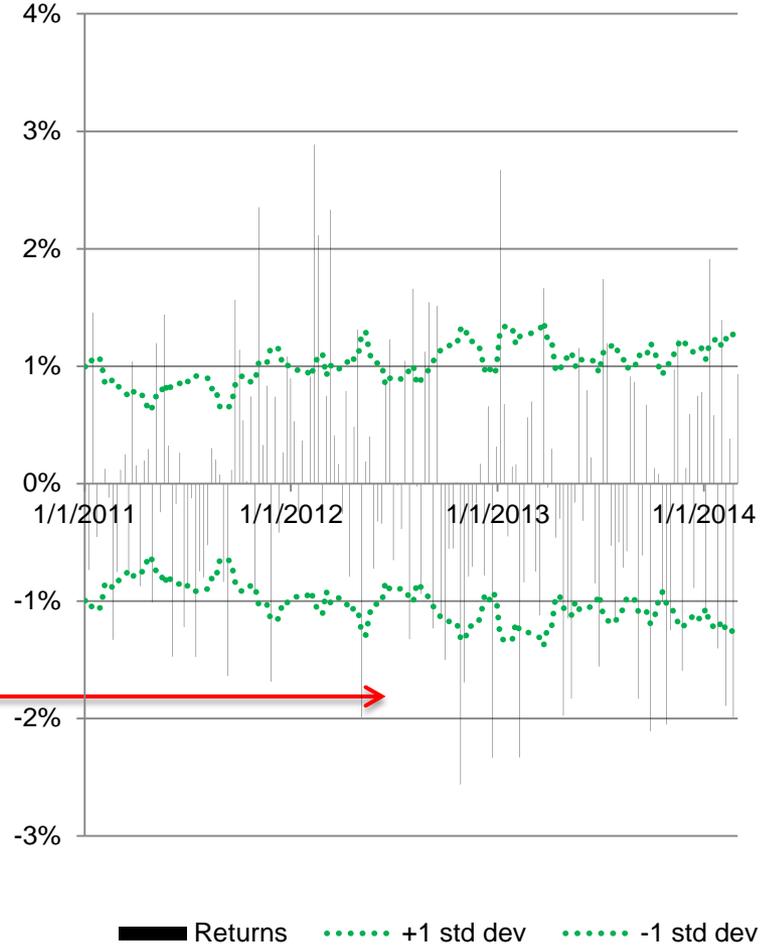
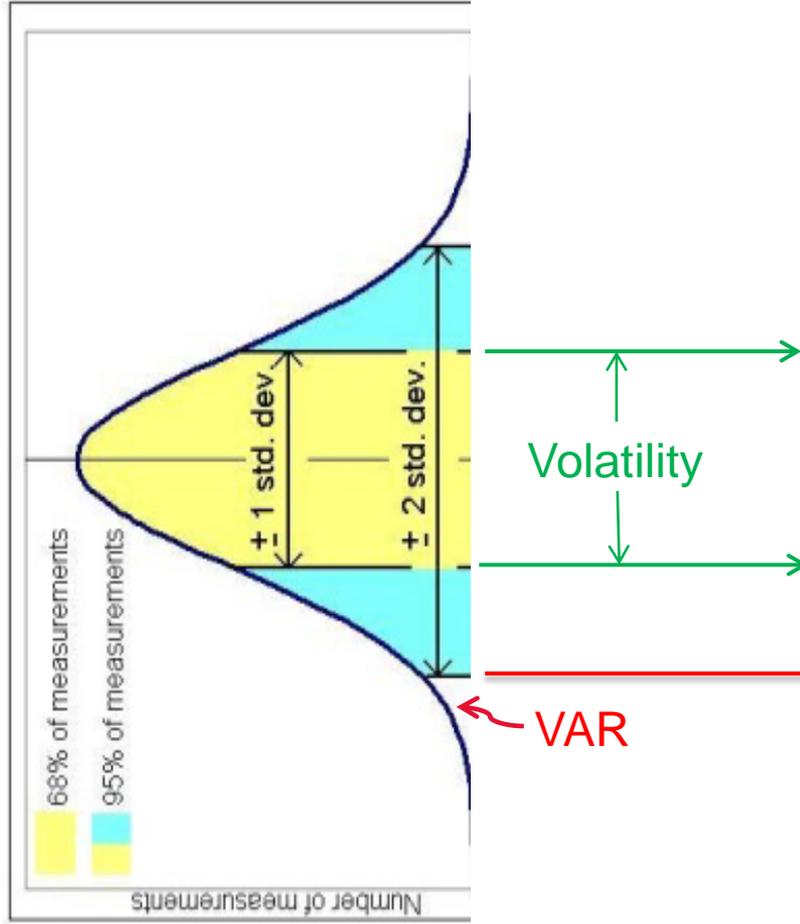
NOVEMBER // 19 // 2013

Bloomberg

SUMMARY

- » What are risk factor models and why use them
- » Introducing Bloomberg Multi-Asset Class Regional Model
- » Model coverage
- » Identifying sources of portfolio risk and return
- » Building a better portfolio in PORT<GO>

WHAT IS RISK?



FACTOR MODELS

Factor Exposures (sensitivities)

$$r_{it} = b_1 f_{1t} + b_2 f_{2t} + \dots + b_k f_{kt} + \varepsilon_{it}$$

Security Returns Factor Returns Non-Factor Returns

The diagram shows the equation $r_{it} = b_1 f_{1t} + b_2 f_{2t} + \dots + b_k f_{kt} + \varepsilon_{it}$. A red arrow points from the label 'Security Returns' to r_{it} . Another red arrow points from the label 'Non-Factor Returns' to ε_{it} . A red arrow points from the label 'Factor Returns' to the entire sum of terms $b_1 f_{1t} + b_2 f_{2t} + \dots + b_k f_{kt}$. A red arrow points from the label 'Factor Exposures (sensitivities)' to the coefficients b_1, b_2, \dots, b_k .

This return decomposition also allows easy risk decomposition:

- Need exposures, b
- Factor covariances
- Non-factor risk magnitudes

WHY USE FUNDAMENTAL FACTOR MODELS?

- *Intuitive* decomposition of portfolio **return** and **risk** into exposures and factors
- Actionable: e.g. *“I like my Korea market exposure”* or *“I want lower duration at the long end”*
- *A relatively* small number of key factors explain risk/return of millions of securities
- Similar exposures = similar risk, makes sense!
- Small number of factors => on-the-fly risk calculations even for very large portfolios
- Can cover securities with (almost) no data: EM, IPO, new issues

EXAMPLE: SAMSUNG STOCK IN A REGIONAL MODEL

$$r_{\$} = 1 * f_{Asia}$$

→ **Market return**

$$+ 1 * f_{Semicond}$$

→ **Industry return**

$$+ 1 * f_{Korea}$$

→ **Country return**

$$+ 1 * \Delta f_{\chi_{KRW:\$}}$$

→ **Currency return**

$$+ 2.22 * f_{Size} + 0.53 * f_{Value}$$

$$+ 0.71 * f_{Profit} + 0.47 * f_{Growth}$$

Style returns

$$\dots - 0.70 * f_{Leverage}$$

$$+ \varepsilon$$

As of:
10/30/13

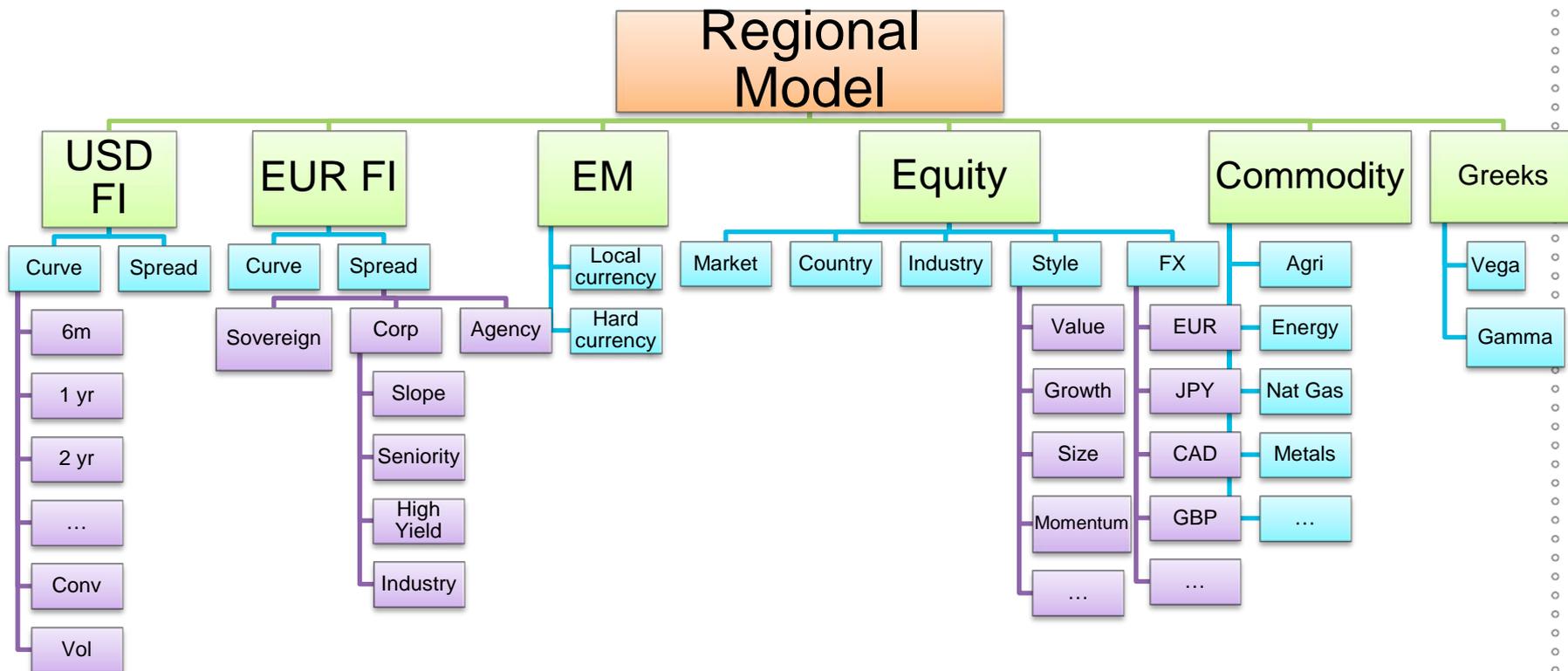
Factor returns

Non-Factor return

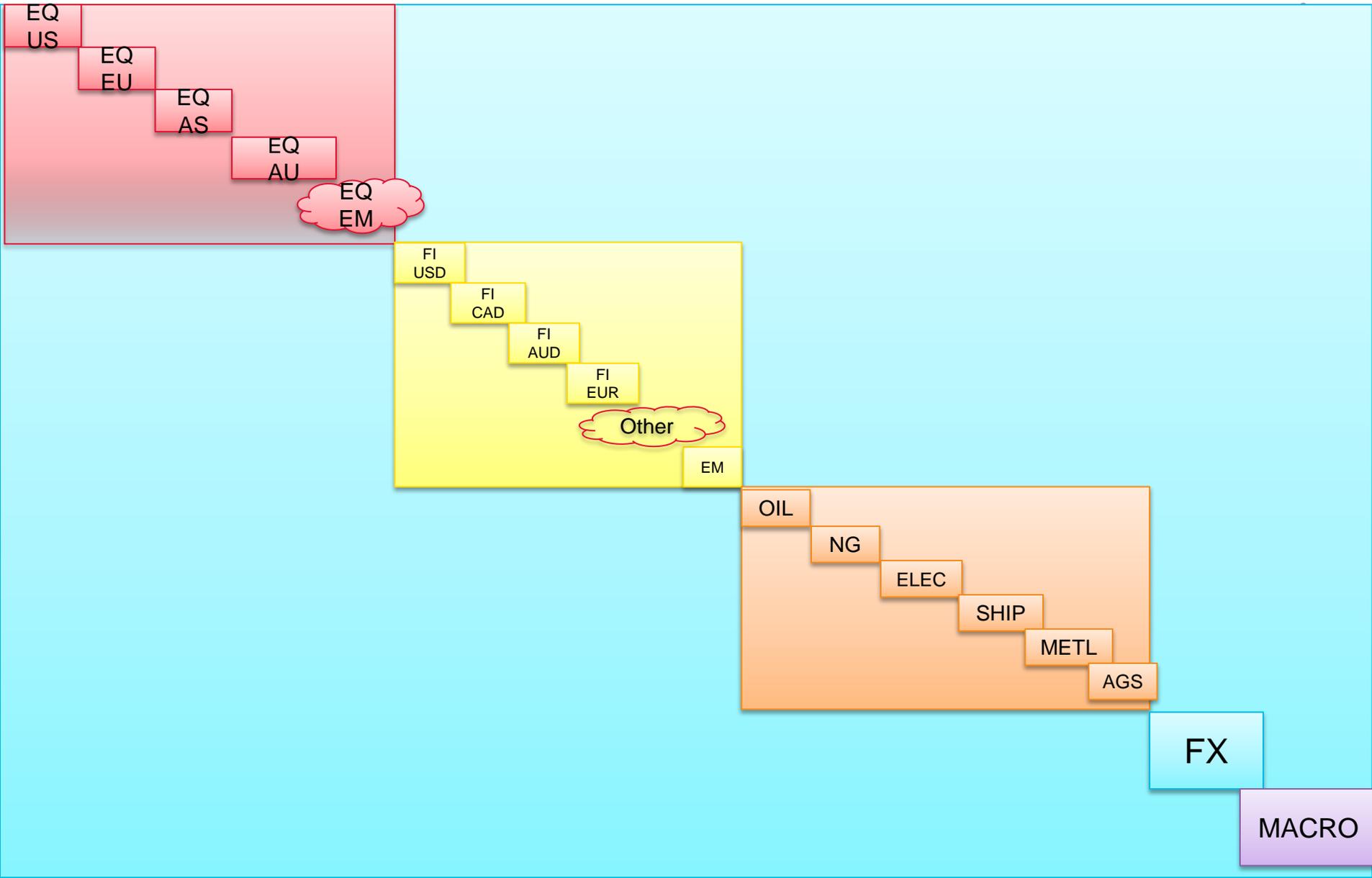
BLOOMBERG REGIONAL MODEL: ~1500 FACTORS

- **EQUITY:** ~400 FACTORS
 - (10 Market + 100 Country + 170 Industry + 100 Style)
- **FIXED INCOME:** ~700 FACTORS
 - (450 curve + 250 Spread)
- **FX:** ~160 FACTORS
- **COMMODITY:** ~220 FACTORS
 - (60 Agri + 10 Coal + 70 Crude + 15 Electricity + 30 Metals +
• 15 Nat Gas + 20 Shipping)
- **GREEKS** ~20 FACTORS

BLOOMBERG REGIONAL MODEL: FACTOR HIERARCHY



COMBINING MANY MODELS INTO ONE SUPERMODEL



RISK MODEL ASSET TYPE COVERAGE

- Equities: REITs, ADR, GDR, NVDR, ordinary and preferred classes, 80,000+ issues
- Sovereign, agency, corporate bonds in almost all developed and emerging markets
- Securitized: ABS, CMBs, RMBS, ARMs, TBAs, pools
- Sovereign inflation linked bonds
- Municipal bonds
- Bank loans (new!)
- Money market securities
- Convertible bonds
- Preferred and hybrid preferred
- CDS/CDX
- IRS
- Equity, single stock, commodity and volatility (VIX) futures
- Bond futures, STIR futures
- Options on equity futures, options on VIX ETF
- Equity, FI, commodity and balanced ETFs
- Listed equity, index, and commodity options
- FX futures and forwards
- Equity, FI, commodity and balanced funds *without holdings* (new!)

WORKED EXAMPLE WITHIN PORT <GO>

We will look at: -

- Holdings
- Risk (TE, VaR) decomposition and bets
- Return (total, factor P&L)
- Trade simulation
- Optimization and back-testing

FIRST LOOK AT HOLDINGS

<HELP> for explanation.

1) View ▾ 12) Actions ▾ 13) Settings ▾ 14) Trade Simulation ▾ 99) Feedback Portfolio & Risk Analytics

Characteristics Holdings VaR Scenarios Tracking Error Performance Attribution Intraday ⚙

Main View Allocation Summary

Port EXPERT INV SIC vs Default (None) by Market Sector in USD As Of 11/15/13

Date Trend

Name	% Wgt	ISIN	Mkt Val	Pos	Px	Close	Crcy	Ticker	Exp
EXPERT INV SICAV-SIF ATH...	100.00		61,265,951						61,265,951
Cash	39.99		24,499,474						24,499,474
Equity	23.78		14,569,859						14,569,859
Funds	17.57		10,762,452						10,762,452
Government Debt	13.39		8,202,085						8,202,085
Corporate Debt	5.28		3,232,025						3,232,025
Corporate Bonds	5.28		3,232,025						3,232,025
GE 2.1 01/07/14	3.30	US36962G4X95	2,019,708	2,000,000.00	100.24		USD	GE 2.1 01/07/14	2,019,708
BNG 2 1/8 08/26/14	1.98	XS0669364068	1,212,318	8,000,000.00	100.41		SEK	BNG 2 1/8 08/26/14	1,212,318
Options	0.00		55						55

Submitted at: 18:20 Zoom - + 80%

Looks reasonably diversified, if cash heavy

Type "EXATGAA LX Equity PORT<go>" into the drop down -> more sources -> Funds

PERFORMANCE YTD: NOT TOO GOOD



BREAKING DOWN YOUR PERFORMANCE

11) View ▾ 12) Actions ▾ 13) Settings ▾ 14) Trade Simulation ▾ 99) Feedback Portfolio & Risk Analytics

Characteristics Holdings VaR Scenarios Tracking Error Performance Attribution Intraday ⚙

Main View Total Return Period Analysis Seasonal Analysis Statistical Summary

Port EXPERT INV SIC vs Default (None) by Market Sector in USD As Of 11/14/13

Unit Percentage

Name	% End Wgt	Tot Rtn 1D	Tot Rtn MTD	Tot Rtn YTD	Sharpe	Std Dev	Max Draw
EXPERT INV SICAV-SIF ATH...	100.00	0.66	-1.70	-13.40	-1.45	13.23	-19.15
Equity	23.74	1.78	-3.78	-29.69	-1.07	34.41	-39.37
Funds	17.58	1.10	-3.24	-24.71	-1.28	27.83	-36.34
Closed-End Funds	3.93	0.80	-5.18	-32.64	-1.33	34.01	-44.64
CENTRAL FUND CANADA ...	3.93	0.80	-5.18	-32.64	-1.33	34.01	-44.64
ETFs	13.65	1.18	-2.66	-22.08	-1.15	27.79	-33.78
ZKB SILVER ETF USD	4.77	1.04	-5.10	-31.08	-1.14	37.88	-45.52
ZKB GOLD ETF-A (USD)	5.71	1.37	-1.99	-22.30	-1.28	24.85	-30.86
ZKB PLATINUM ETF	2.36	1.29	0.18	-4.67	-0.41	24.44	-24.57
ZKB PALLADIUM ETF	0.81	0.43	-0.64	4.81	0.87	31.19	-18.11
Options	0.00	-0.27	-12.26	-22.34	0.55	150.67	-72.80
Government Debt	13.35	0.30	-1.16	-1.87	-0.03	8.18	-6.69
Corporate Debt	5.28	0.15	-1.09	-0.20	0.43	5.03	-2.69
Corporate Bonds	5.28	0.15	-1.09	-0.20	0.43	5.03	-2.69
BNG 2 3/8 08/26/14	1.98	0.40	-2.85	-1.33	0.39	13.12	-7.22
GE 2.1 01/07/14	3.30	0.00	0.00	0.48	1.65	0.41	-0.13
Cash	40.05	0.00	0.00	0.00		0.00	0.00

(!) 2 Notices Submitted at: 18:37 Zoom - 80%

We can see a range of ex-post risk and return measures in the performance tab. To select others right click on the column header -> "Add/remove fields"

A lot of underperformance was due to bets on precious metals

TE SUMMARY: UNDERSTAND YOUR RISK SOURCES

1) View | 2) Actions | 3) Settings | 14) Trade Simulation | 99) Feedback | Portfolio & Risk Analytics

Characteristics | Holdings | VaR | Scenarios | Tracking Error | Performance | Attribution | Intraday

Main View | **Summary** | Factors | Risk Bets | Trends | Exposures | Factor P&L

Port: EXPERT INV SIC vs Default (None) by Market Sector in USD As of 11/15/13

Model: Bloomberg Risk Unit: Returns (%) Horizon: 1 Year

Portfolio Value: 61,190,065.00 USD (127 name(s), 100% Gross MV) Portfolio Beta(ex-ante): NA

Item	Risk (Std)			Factor Risk (Std)			
	Total Risk	Factor	Non-Factor	Equity	Fixed Income	Currency	Commodity
Portfolio	8.17	8.05	1.38	4.91	0.05	2.02	3.59
Benchmark	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Active	8.17	8.05	1.38	4.91	0.05	2.02	3.59

Click a number to see breakdown

Item	Risk Contribution (%)			Risk Contribution (%)		
	Total Risk	Factor	Non-Factor	Equity	Currency	Commodity
Portfolio	100.00	97.14	2.86	0.03	16.41	31.15
Benchmark	0.00	0.00	0.00	0.00	0.00	0.00
Active	100.00	97.14	2.86	0.03	16.41	31.15

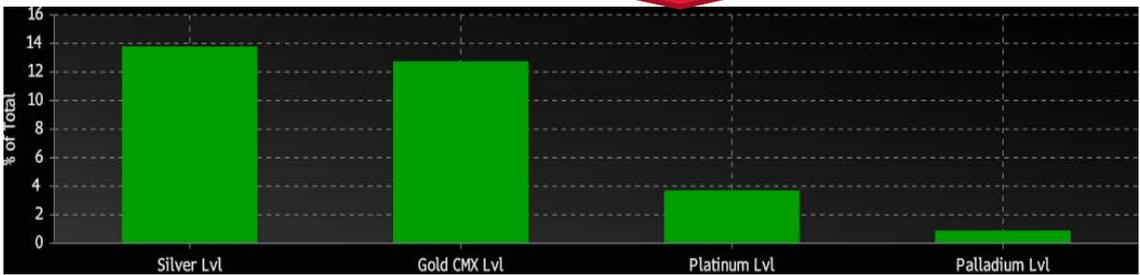
Total Risk(Portfolio) Click chart bars to drill down

Legend: Risk (blue), Exposure (orange)

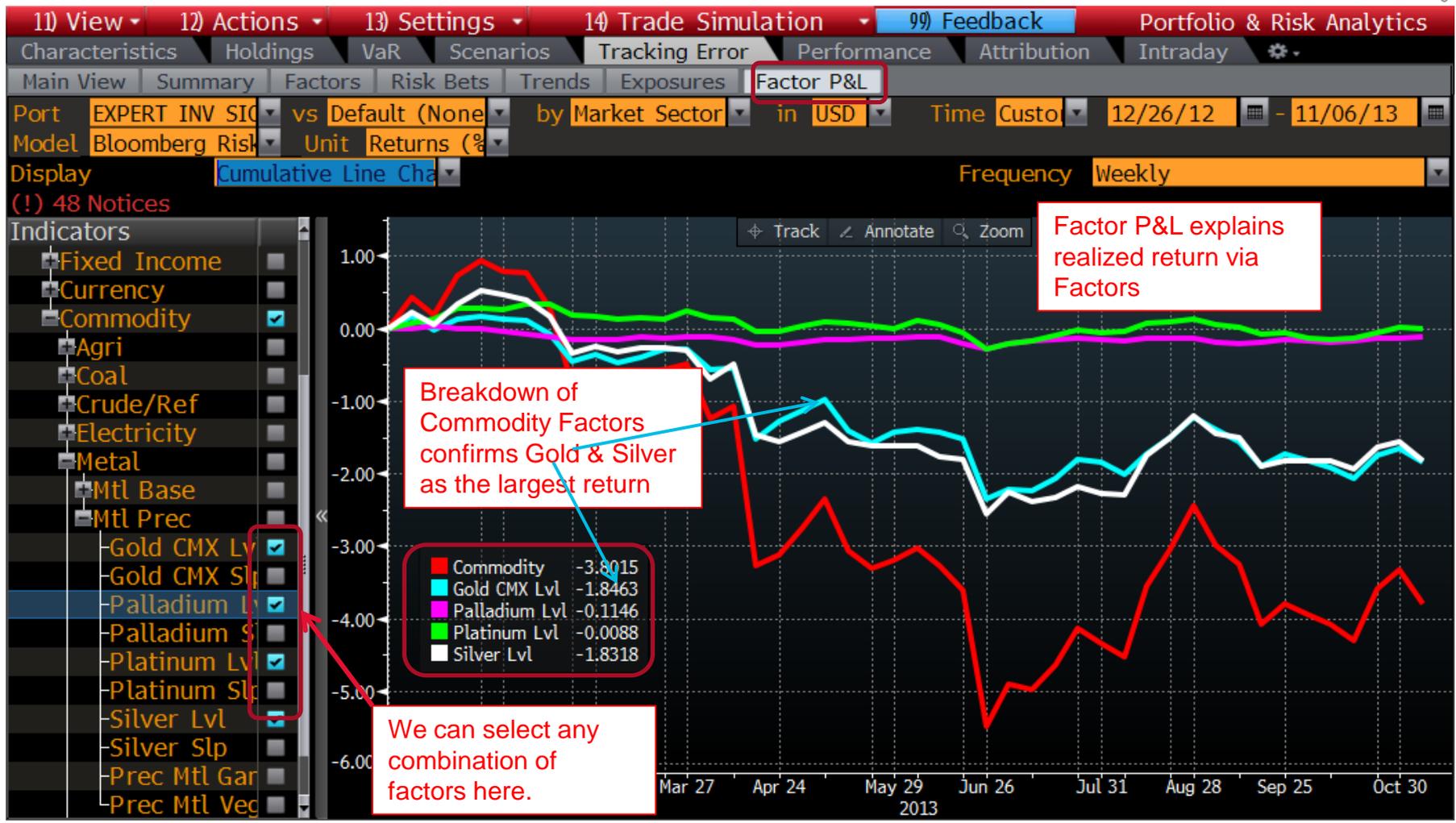
The ex-ante volatility is displayed here (or it is tracking error if a benchmark is selected).

We can click into Commodity factor group to find Silver and Gold as the largest risk factors

31% of the factor risk comes from Commodity funds (17% by weight).



FACTOR P&L: RISK FACTOR-BASED RETURN ATTRIBUTION



RISK BETS BY FACTORS: WHAT DOMINATES MY RISK?

1) View ▾ 12) Actions ▾ 13) Settings ▾ 14) Trade Simulation ▾ 99) Feedback Portfolio & Risk Analytics

Characteristics Holdings VaR Scenarios Tracking Error Perform

Main View Summary Factors Risk Bets Trends Exposures Factor P&L

Port EXPERT INV SIC vs Default (None) by Market Sector in USD

Model Bloomberg Risk Unit Returns (%) Horizon 1 Year

Top 5 Bets Categories Contribution to Active Risk Group by Factors

Item	Exposure				Risk		
	Portfolio	Benchmark	Active	Tot. Active (Std)	Marginal (X100)	Contribution %↑	
1. Market:US Market	0.18	0.00	0.18	2.33	9.17	19.84	
2. Mtl Prec:Silver Lvl	0.05	0.00	0.05	1.71	21.11	13.79	
3. Mtl Prec:Gold CMX Lvl	0.08	0.00	0.08	1.64	12.34	12.75	
4. Materials:US Materials	0.13	0.00	0.13	1.30	6.69	10.30	
5. Volatility:US Volatility	0.31	0.00	0.31	0.98	1.92	7.22	

Bottom 5 Bets

Item	Exposure				Risk		
	Portfolio	Benchmark	Active	Tot. Active (Std)	Marginal (X100)	Contribution %↓	
1. Leverage:US Leverage	-0.09	0.00	-0.09	0.14	0.39	-0.42	
2. Value:US Value	-0.05	0.00	-0.05	0.12	0.58	-0.39	
3. HealthCare:US PharmaBi	0.01	0.00	0.01	0.05	-3.75	-0.29	
4. HealthCare:US Health	0.01	0.00	0.01	0.05	-2.95	-0.26	
5. ConsumerStap:US FoodB	0.01	0.00	0.01	0.04	-3.50	-0.26	

This becomes contribution to volatility if no benchmark is selected.

Gold and Silver are the largest contributors and the highest marginal risk

Consumer Staples and HealthCare factors are diversifying bets

TRADE SIMULATION: MANUAL REBALANCE

1) View - 2) Actions - 3) Settings - **14) Trade Simulation** - 99) Feedback - Portfolio & Risk Analytics

TRADE SIMULATION ENABLED

Optimizer Show Trades Add Simulated Holdings Save/Trade Settings

Characteristics Holdings VaR Scenarios Tracking Error Performance Attribution Intraday

Main View Summary Factors Risk Bets Trends Exposures Factor P&L

Port EXPERT INV SIC vs Default (None) by Market Sector in USD As of 11/15/13

Model Bloomberg Risk Unit Returns (%) Horizon 1 Year

Name	Incl	Simulated Wgt	Orig Wgt (%)	Wgt +/- (%)	Buy/Sell	Port % Wgt	% Wgt	Total Risk	Factor	Non-Factor	Contribution (%)	Metal
EXPERT INV SICAV-SIF AT...	<input checked="" type="checkbox"/>	100.00	100.00	0.00		100.00		5.87	5.74	1.24	100.00	0.00
+ Corporate Debt	<input checked="" type="checkbox"/>	10.97	5.28	5.68		10.97		0.46	0.46	0.01	4.37	0.00
+ Cash	<input checked="" type="checkbox"/>	40.00	40.04	-0.04		40.00		0.00	0.00	0.00	0.00	0.00
+ Government Debt	<input checked="" type="checkbox"/>	27.83	13.40	14.43		27.83		1.75	1.75	0.01	21.44	0.00
+ Equity	<input type="checkbox"/>	21.20	21.20	0.00		21.20		4.58	4.41	1.24	74.19	0.00
+ Funds	<input checked="" type="checkbox"/>	0.00	20.07	-20.07				0.00	0.00	0.00		0.00

Funding settings in here

Risk went down significantly

Trade out of Funds, while keeping cash at 40% and redistribute money to other assets

Then click "Optimizer"

TRADE SIMULATION: OPTIMIZER – LETTING BLOOMBERG DO THE WORK

1) Run Backtest 2) Tasks 3) Settings 99) Analyze in PORT Portfolio Optimization

Port EXPERT INV SICAV... Bmrk NONE Risk Model Bloomberg Risk Model Backtest Enabled

Setup Frontier Trades

1. Goals

Action	Field	Trade-Off
Minimize	Turnover	20
Minimize	Metal	1
Minimize	Portfolio Total Risk	2

2. Trade Universes

Rule	Source	Security List
Trade List	Favorites	Current Portfolio

3. Constraints

Constraint Group	Relative	Unit	Min	Max	Trade-Off
Cash (USD Currency)	Relative		0 %	40 %	
Security	Relative		Min Wgt(%)	Max Wgt(%)	Max Trade
Default for all secu	Init. Portfolio		-20	20	
<Type or drag to o	None				

4. Security Properties

Security	Relative	Min Wgt(%)	Max Wgt(%)	Max Trade	Lot Size
Default for all secu	Init. Portfolio	-20	20		1
<Type or drag to o	None				

Notices Stored Results

1. Minimize turnover, minimize risk from Metal factor group and minimize Total risk ...

2 ... while using assets in current portfolio ...

3 ... keeping at most 40% cash, long only positions and not deviating by more than 20% on any asset from the initial portfolio weight

4. Now can run a backtest too!

WE NOW GET IMPROVED PERFORMANCE ...



... AND LOWER REALIZED RISK

11) View ▾ 12) Actions ▾ 13) Settings ▾ 14) Trade Simulation ▾ 99) Feedback Portfolio & Risk Analytics									
Characteristics Holdings VaR Scenarios Tracking Error Performance Attribution Intraday ⚙									
Main View Total Return Period Analysis Seasonal Analysis Statistical Summary									
Port EXATGAA_BACKT ▾ vs EXPERT INV SIC ▾ by Market Sector ▾ in USD ▾ As Of 11/14/13 📅									
Unit Percentage									
EXATGAA_BACKTEST4									
	3 Months		6 Months		Year To Date		9 Month(s) ▾		
Portfolio Statistics	Port	Bench	Port	Bench	Port	Bench	Port	Bench	
2. Return									
Total Return	-2.26	-3.71	-1.69	-3.86	-13.38	-6.42	-12.10		
Maximum Return	1.00	1.45	1.25	1.89	1.89	1.25	1.89		
Minimum Return	-1.03	-1.95	-2.25	-3.55	-3.79	-2.25	-3.79		
Mean Return (Annualized)	-11.63	-18.20	-4.25	-9.36	-19.78	-11.33	-20.60		
Mean Excess Return (Annualized)	8.03		5.64			11.67			
3. Risk									
Standard Deviation (Annualized)	7.28	12.78	8.76	14.53	13.87	8.88	14.60		
Downside Risk (Annualized)	5.22	9.17	6.47	10.69	10.52	6.66	11.10		
Skewness	0.01	-0.13	-0.60	-0.54	-0.93	-0.71	-0.93		
VaR 95% (ex-post)	-0.61	-1.10	-0.66	-1.14	-1.14	-0.76	-1.21		
Tracking Error (Annualized)	6.21		6.37			6.37			
4. Risk/Return									
Sharpe Ratio	-1.61	-1.43	-0.50	-0.65	-1.44	-1.29	-1.42		
Jensen Alpha	-1.77		1.19			0.77			
Information Ratio	1.29		0.88			1.83			
Treynor Measure	-0.22		-0.07			-0.19			
Beta (ex-post)	0.54		0.59			0.59			
Correlation	0.9549		0.9710			0.9694			

Ex-post realized risk based on daily returns

VAR SUMMARY: HOW BIG IS MY TAIL RISK?



CONCLUSION

- » Bloomberg is now a provider of advanced portfolio and risk analysis tools
- » A comprehensive suite of detailed fundamental risk factor models
- » Covering the vast majority of asset types
- » These tools can help you better understand your portfolio performance, characteristics and risk
- » And ultimately allow you to construct a better portfolio
- » For more information on PORT tools, please see [HELP PORT<go>](#) or contact Bloomberg customer support

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