

IMPROVING YOUR PORTFOLIO RETURN/RISK

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

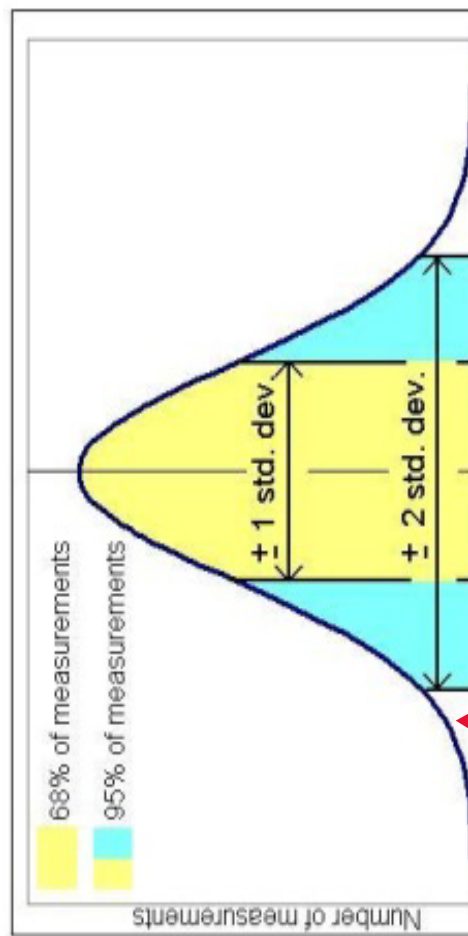
NOVEMBER // 19 // 2013

Bloomberg

SUMMARY

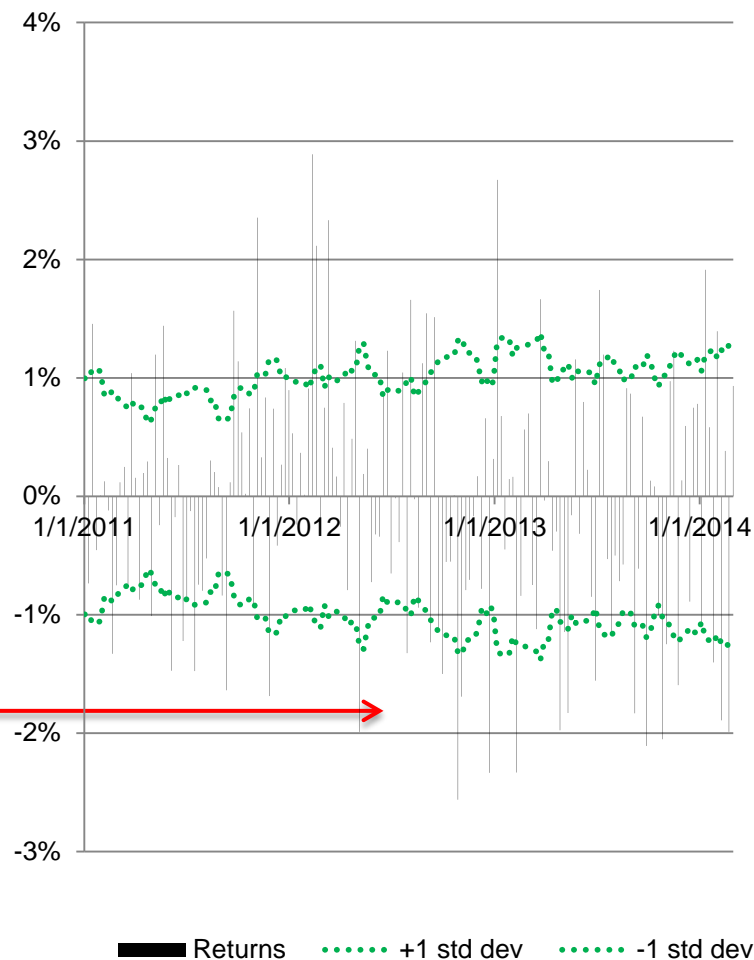
- » What are risk factor models and why use them
- » Introducing Bloomberg Multi-Asset Class Regional Model
- » Model coverage
- » Identifying sources of portfolio risk and return
- » Building a better portfolio in PORT<GO>

WHAT IS RISK?



Volatility

VAR



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 $r_{it} = b_1 f_{1t} + b_2 f_{2t} + \dots + b_k f_{kt} + \varepsilon_{it}$. Red arrows point from the labels to the corresponding terms: 'Security Returns' points to r_{it} , 'Factor Exposures (sensitivities)' points to the b coefficients, 'Factor Returns' points to the f terms, and 'Non-Factor Returns' points to ε_{it} .

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

$$\begin{aligned} r_{\$} = & 1 * f_{Asia} & \longrightarrow & \text{Market return} \\ & + 1 * f_{Semicond} & \longrightarrow & \text{Industry return} \\ & + 1 * f_{Korea} & \longrightarrow & \text{Country return} \\ & + 1 * \Delta f x_{KRW:\$} & \longrightarrow & \text{Currency return} \\ & + 2.22 * f_{Size} + 0.53 * f_{Value} & & \\ & + 0.71 * f_{Profit} + 0.47 * f_{Growth} & & \\ & \dots - 0.70 * f_{Leverage} & & \\ & + \varepsilon & & \end{aligned}$$

As of:
10/30/13

Factor returns

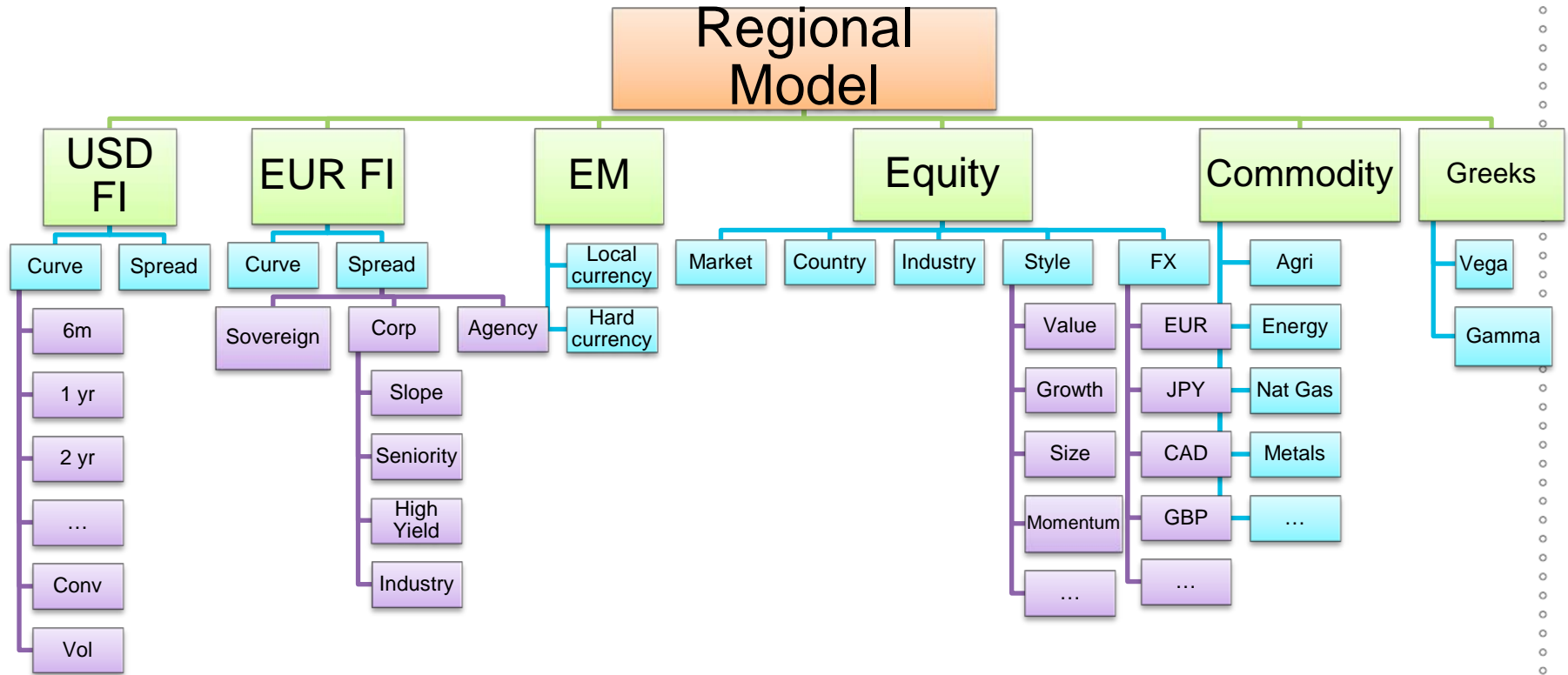
Style returns

Non-Factor return

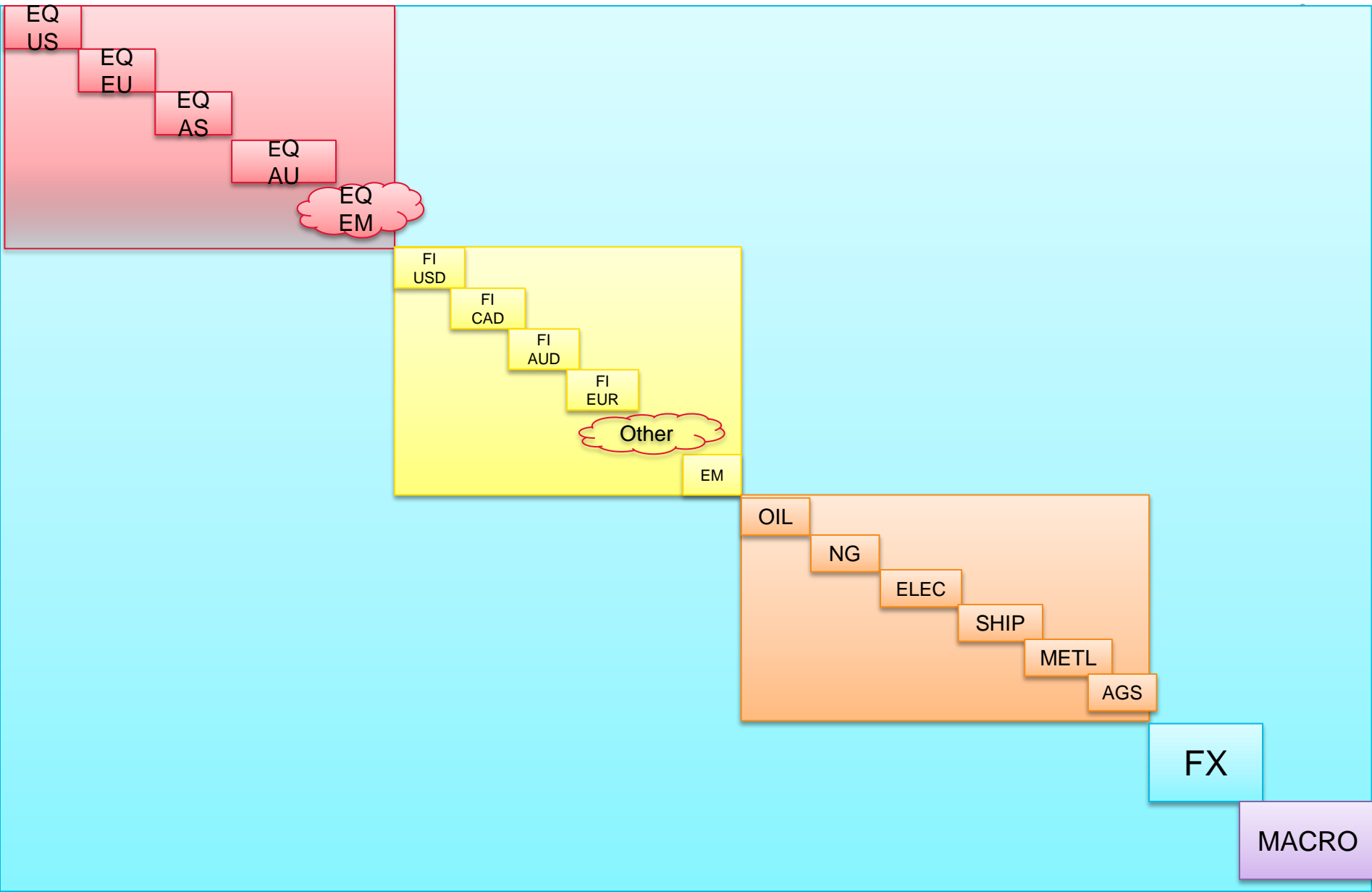
BLOOMBERG REGIONAL MODEL: ~1500 FACTORS

- **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.

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 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	Cnry	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 ½ 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		

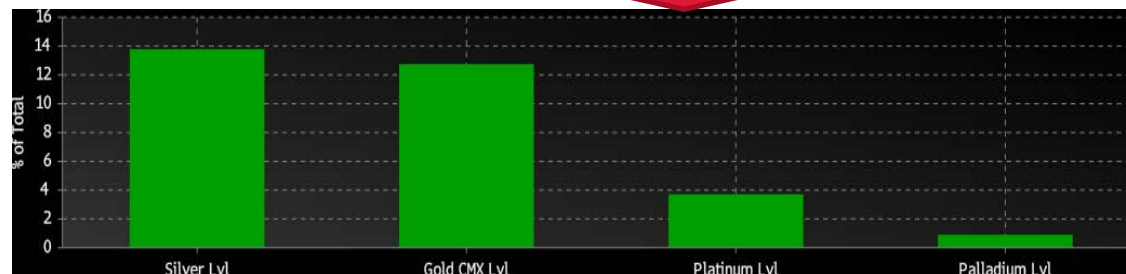
(!) 2 Notices Submitted at: 18:37 Zoom - 80%

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

15

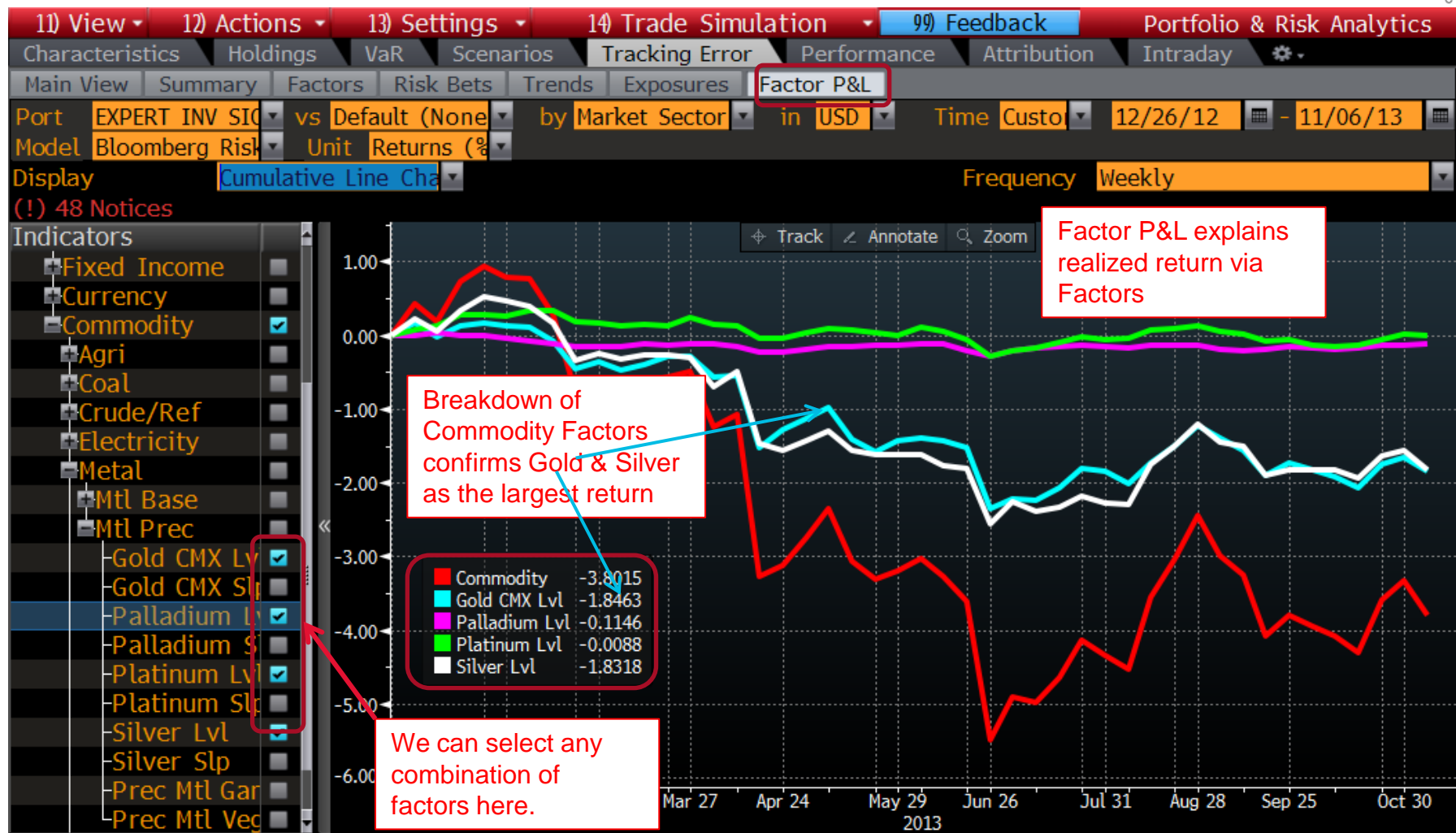


FACTOR P&L: RISK FACTOR-BASED RETURN ATTRIBUTION

16

IMPROVING YOUR PORTFOLIO RISK/RETURN

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RISK BETS BY FACTORS: WHAT DOMINATES MY RISK?

17

11) View ▾		12) Actions ▾		13) Settings ▾		14) Trade Simulation ▾		99) Feedback		Portfolio & Risk Analytics	
Characteristics		Holdings		VaR		Scenarios		Tracking Error		Performance	
Main View		Summary		Factors		Risk Bets		Trends		Exposures	
Port		EXPERT INV SIC ▾		vs Default (None) ▾		by Market Sector ▾		in USD ▾		AS OF 11/19/19	
Model		Bloomberg Risk ▾		Unit Returns (%) ▾						Horizon 1 Year	
Top 5 Bets		Categories		Contribution to Active Risk ▾		Group by		Factors			
		Exposure				Risk					
Item		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		Exposure				Risk					
Item		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

18

11) View - 12) Actions - 13) 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	Inc	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 checked="" 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

19

The screenshot shows the Bloomberg PORT interface for Portfolio Optimization. The top navigation bar includes tabs for '1) Run Backtest', '2) Tasks', '3) Settings', '99) Analyze in PORT', and 'Portfolio Optimization'. The 'Portfolio Optimization' tab is active, showing a 'Backtest Enabled' checkbox. Below this, the 'Setup' section includes 'Frontier' and 'Trades' sub-tabs. The '1. Goals' section lists three goals: 'Minimize Turnover' (Trade-Off: 20), 'Minimize Metal' (Trade-Off: 1), and 'Minimize Portfolio Total Risk' (Trade-Off: 2). The '2. Trade Universes' section shows 'Trade List' and 'Source' set to 'Favorites'. The '3. Constraints' section shows 'Constraint Group' set to 'Relative' and 'Unit' set to 'Min'. The '4. Security Properties' section shows 'Cash (USD Currency)' with 'Min' at 0% and 'Max' at 40%, and 'Long Positions Only' selected. Four numbered callouts provide additional context: 1. 'Minimize turnover, minimize risk from Metal factor group and minimize Total risk ...' points to the goals list. 2. '... while using assets in current portfolio ...' points to the 'Current Portfolio' dropdown. 3. '... keeping at most 40% cash, long only positions and not deviating by more than 20% on any asset from the initial portfolio weight' points to the 'Max' cash constraint and the 'Long Positions Only' dropdown. 4. 'Now can run a backtest too!' points to the 'Backtest Enabled' checkbox.

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 Add Goal

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

2. Trade Universes Add Universe

Rule	Source	Security List
Trade List	Favorites	Current Portfolio

3. Constraints Add Frontier Add Constraint Delete

Constraint Group	Relative	Unit	Min	Max	Trade-Off

4. Security Properties

Cash (USD Currency) Min 0 % Max 40 % Long Positions Only Clear All Export

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

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 SI ▾ 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?

22



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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