Index, Portfolio and Risk Solutions

António B. Silva
+1 212 526 8880
antonio.silva@barclays.com

Sovereign Risk in Credit and Equity Markets

Applied to European Markets

Presentation to the GARP Risk Management Convention
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PLEASE SEE ANALYST CERTIFICATIONS AND IMPORTANT DISCLOSURES BEGINNING ON PAGE 42.

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Research

Sovereign Risk in Credit and Equity Markets

Applied to European Markets

Yael Eisenthal Berkovitz
+1 212 516 4086
yael.eisenthal-berkovitz@barclays.com

Jay Hyman
+972 3 623 8745
jay.hyman@barclays.com

Anando Maitra
+44 (0)20 3134 0091
anando.maitra@barclays.com

Simon Polbennikov
+44 (0)20 3134 0752
simon.polbennikov@barclays.com

Antonio B. Silva
+1 212 526 8880
antonio.silva@barclays.com

Agenda

- Introduction
  - Who we are and what we do
- Sovereign risk in
  - Treasury markets
  - Credit markets
  - Equity markets
  - Replication and hedging
- Conclusion

Introduction

Where do we sit at Barclays?

Barclays (Investment Banking)		
Sales & Trading	Research	Investment Banking

Barclays Index, Portfolio and Risk Solutions (IPRS)

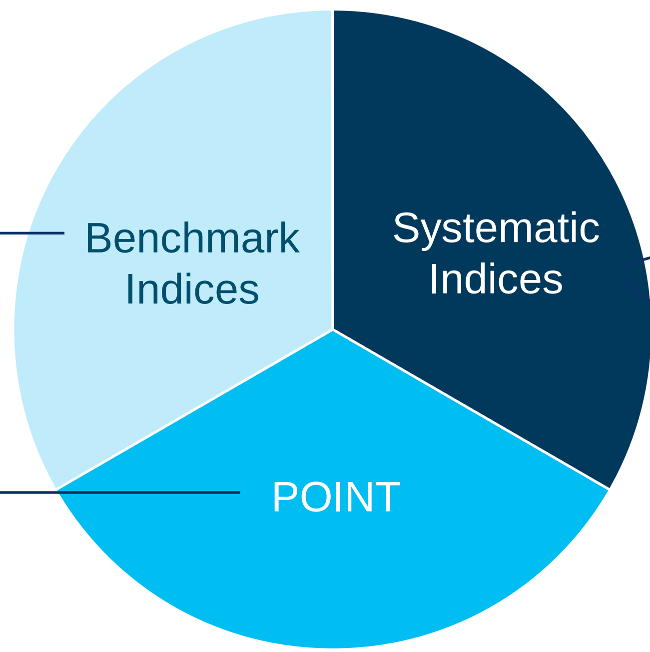
Leading provider of indices, portfolio analytics, and portfolio management research and tools

Market Leader of Fixed Income Indices

Barclays U.S. Aggregate Index

Multi-Asset, Multi-Currency Portfolio Management Tool

Risk, Performance, Optimization, Scenario Analysis, capital structure



Non-traditional-Beta Indices

Equity Sector Rotation Index

Systematic Strategies for Portfolio Construction

Timed FX Carry

Topics of Research

POINT (Modeling team)

- Sovereign risk in credit portfolios
- Term structure of risk

Benchmark Indices

- LDI-based benchmarks
- Fiscal strength weighted indices

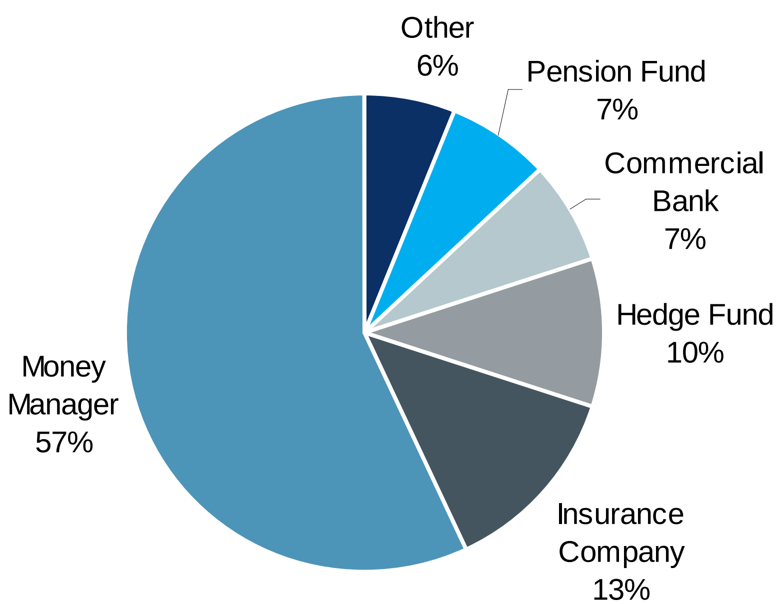
Systematic Indices

- Risk parity and budgeting portfolio construction
- Replication of risk premia (e.g., EM and Credit)

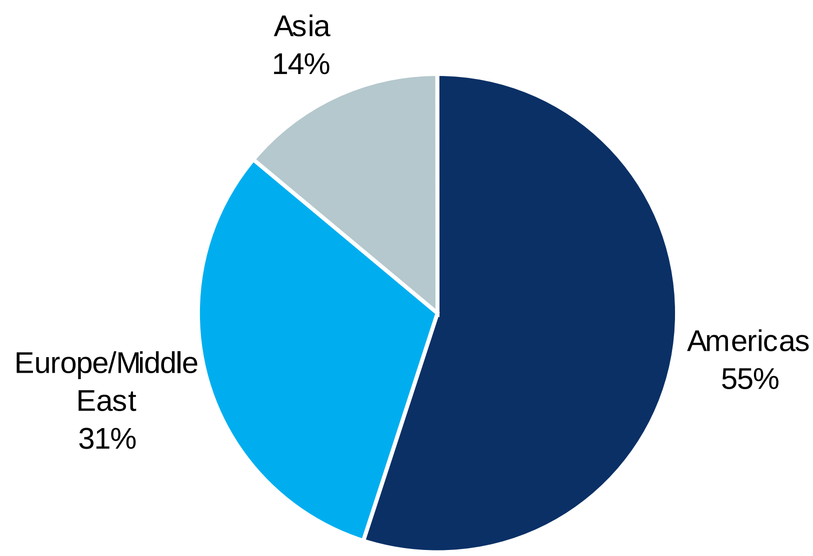
Who Uses POINT?

POINT's highly scalable technology solution supports a diverse customer base of global institutions.

Breakdown by Client Type



Breakdown by Region



Source: Barclays Research

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Key Themes in Fixed Income Indexing

Alternative Weight Indices

- Market Value weight indices are an objective representation of the investment choice set
- Demand for rules-based alternative weight themes that match investors' desired portfolio objectives
- **Barclays indices: GDP Weighted & Fiscal Strength Weighted**

Increased EM Exposures

- In low rate environment, global investors are on the "hunt for yield"
- EM have improved fundamentals and increased liquidity
- EM investing is also expanding beyond sovereign bonds to Corporates and Government-related issuer
- **Barclays indices: EM USD Aggregate, EM Local Currency Government, Global Treasury Universal**

ESG / SRI in Fixed Income

- Investors look to incorporate environmental, social, and governance considerations in their investment process
- Many investors are affirming their commitments through channels like the UN PRI
- ESG has been equity-focused, but is becoming more of a cross asset consideration
- **Barclays indices: Barclays-MSCI ESG Fixed Income**

Concerns over Rising Rates

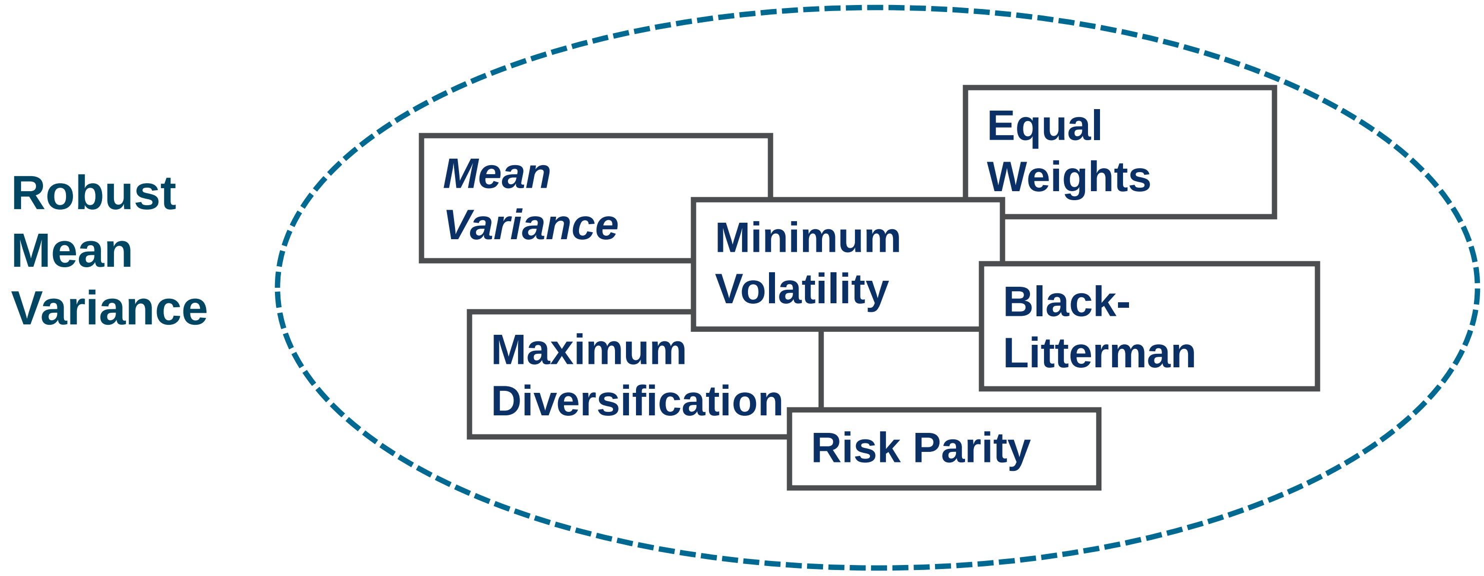
- After a sustained bull market in fixed income and periods of extremely low rates, investors are preparing for rising rates in their fixed income portfolios, in our view
- Look into less rate sensitive instruments (floating rate securities, short duration bonds, etc.) within typical indices

Which Portfolio Construction Method?

Investors need a clear framework to compare alternative portfolio construction methods

- All may be interpreted as "robust" Mean Variance Optimization
- Each method = an MVO that uses as forecasts a particular combination between historical estimates and pre-defined values
- It is hard to give these methods another interpretation without departing from

Maximize *Performance* vs *Risk*



Robust MVO Construction Methods

	Equivalent MVO		
Method	**Volatility forecast**	**Correlation forecast**	**Sharpe Ratio forecast**
Minimum Volatility	Historical	Historical	Inverse of volatility (Equal Returns)
Maximum Diversification	Historical	Historical	Equal
Equal Volatility	Historical	Equal	Equal
Equal Notional	Equal	Equal	Equal
Risk Parity	Historical	Historical & Zero	Equal
Volatility Budgeting	Historical	Zero	Risk Budget
Risk Budgeting	Historical	Historical & Zero	Equal & Risk Budget
Black Litterman	Historical & Pre-defined	Historical & Pre-defined	Historical & Pre-defined

Source: Barclays Research

Combining Market and Alternative Betas

	Market	Carry	Curve	Value	Trend	EM	Arbitrage	Liquidity
Equities								
Rates								
Currencies								
Credit								
Securitized								
Commodities								
Volatility								

See **Barclays Risk Premia Family**, 2 May 2011, Systematic Strategies Research series.

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Asset Allocation Example: Building Blocks

Global Liquid Risk Premia

Beta Factors

Global Equity Markets
- US Equity
- EM Equity
- Euro Equity
- Asia Equity

Global Rates Markets
- US Rates
- EU Rates
- US TIPS
- EU Linkers
- UK Rates
- JP Rates
- UK TIPS
- US MBS

Commodities Markets
- Energy
- Industrials

Credit Spreads
- CDX IG
- CDX HY
- iTraxx IG
- iTraxx XO

Alternative Beta Factors

Carry/Curve/Value Premia
- Rates Curve
- FX Carry
- Commodities Curve
- Volatility Curve
- Commodities Value
- Equity Value

Trend Premia
- Commodity Trend
- Rates Trend
- Volatility Trend
- FX Trend

Diversifiers

Tail-Hedge
- Long Equity Volatility
- Gold
- Long Rates Volatility

Source: Barclays Research

Sovereign Risk in Financial Markets (applied to European markets)

Motivation – Adjustments to the Traditional Framework

- Emergence of sovereign risk changes nature of traditional asset classes and how they interact
  - Treasuries, Corporates and Equities

- Goals of this analysis
  - Document the changes
  - Consequences for portfolio management
    - How to measure sovereign influence?
    - How to construct pure credit/equity portfolios?
    - How to adapt hedging and risk frameworks?
  - Do we need a different framework – do we have a paradigm shift?

Major results

- Breakdown of Treasury markets
  - Clear divide between Core and Local (peripheral) countries
  - Specific nature of treasuries is revealed through correlations

- Significant noise on both credit and equity allocations
  - Regional considerations are essential
  - Financial industry severely affected
  - Very few issuers free of influence

- Portfolio management
  - More restricted universe for traditional allocations
  - More noisy performance measurement
  - Significant change in the nature of risk exposures
  - Significant additional tail risk: rating spillover

The Data

- European recent experience
- Five countries
  - Core (C): France, the Netherlands, and Germany
  - Local (L): Spain and Italy

- Indices
  - Barclays European Treasuries
  - Barclays European Investment Grade Bonds
    - Issuer (127) returns consolidated across issues
    - The majority of the results are robust to CDS
  - Major Equity indices

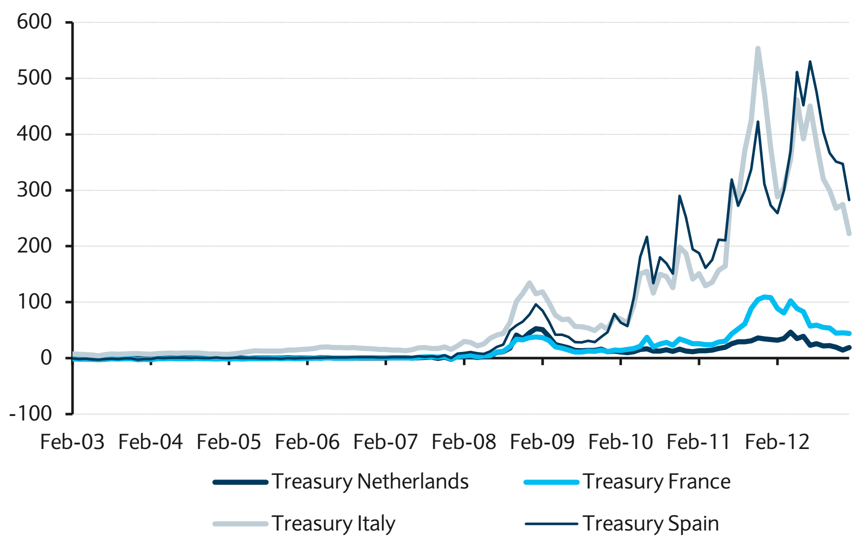
- Monthly data from January 2005 to January 2013

Treasury Portfolios

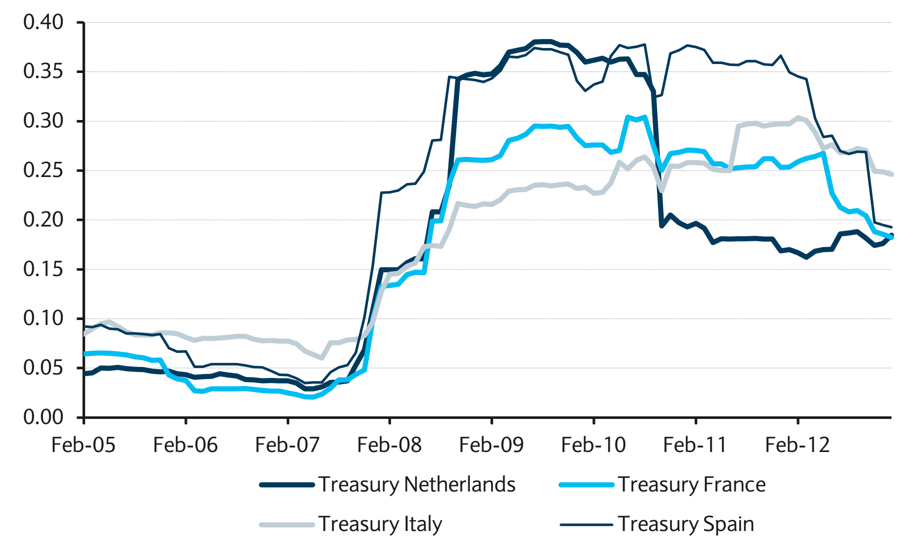
Spreads in the Treasury Market

- Levels of spreads increased significantly for Local countries
  - Spread divergence is staggering
- Volatility of percentage change in spreads (PCS) increased dramatically
  - Volatilities are much higher than for a typical corporate bond

Level of Spreads



Volatility of PCS



Source: Barclays Research

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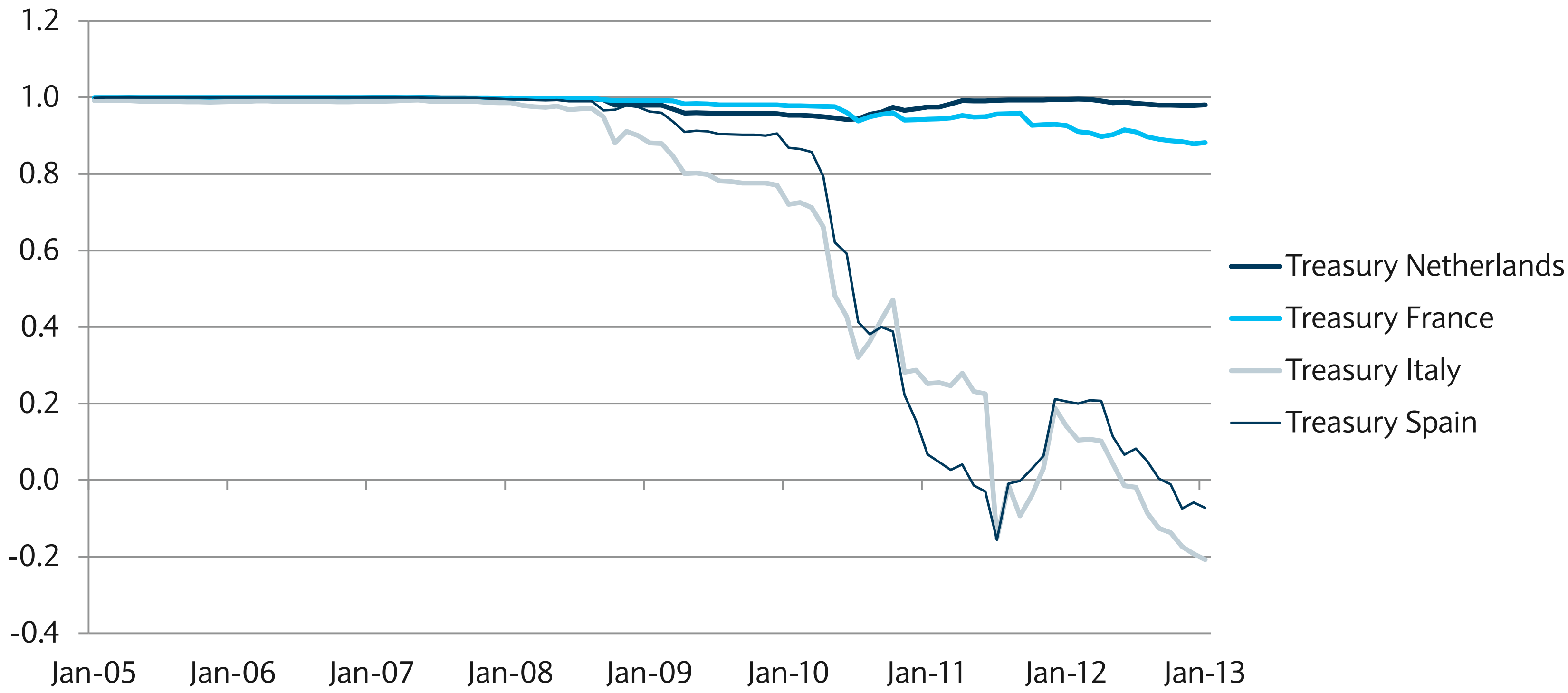
Correlations in Treasury Markets

- Correlations with Germany
  - Little changed for core treasuries
  - Drop significantly for local treasuries – currently no correlation!
  - Abnormal behavior?

Correlation of Total returns with German Treasuries

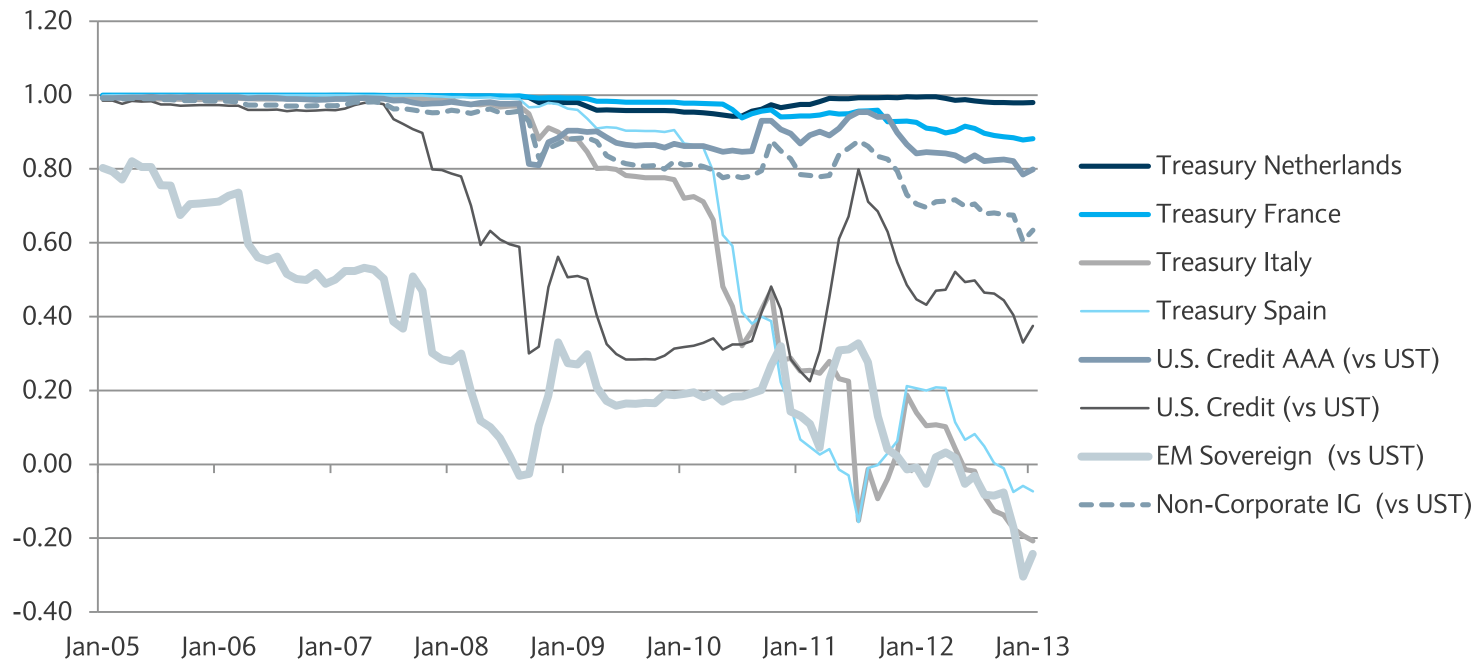


Source: Barclays Research

Correlations across Markets

- Correlations with German treasuries (or UST)
  - Correlations of Local countries close to that of emerging markets
  - Correlations lower than for credit (both corporates and non-corporates)
  - Consistent with spread levels?

Correlation of Total returns with German Treasuries

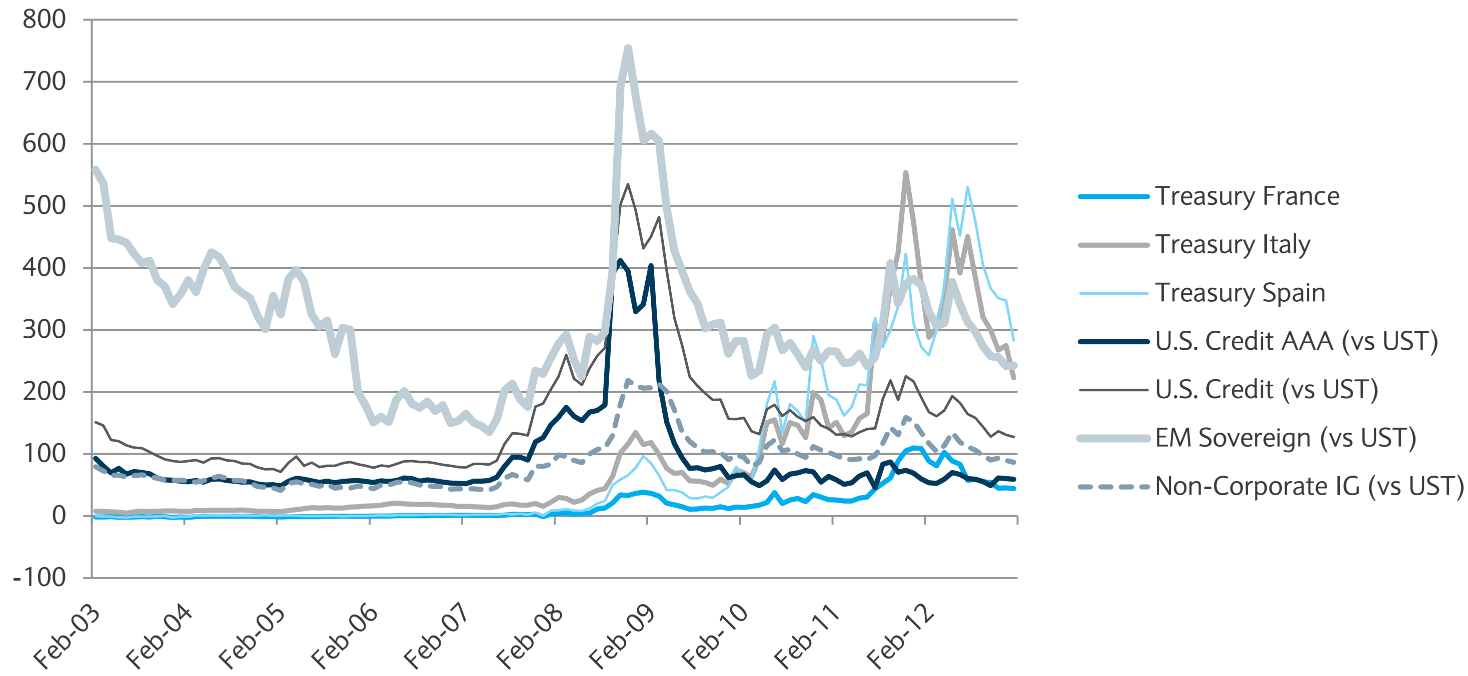


Source: Barclays Research

Spreads across Markets

- Compare the spread level of Local countries with other asset classes
  - Spread level very close to that of Emerging countries
  - Monotonic relation between spreads and correlations with treasuries expected
  - Local treasuries are just new “corporates”?

Spread level across Treasury and Credit Markets

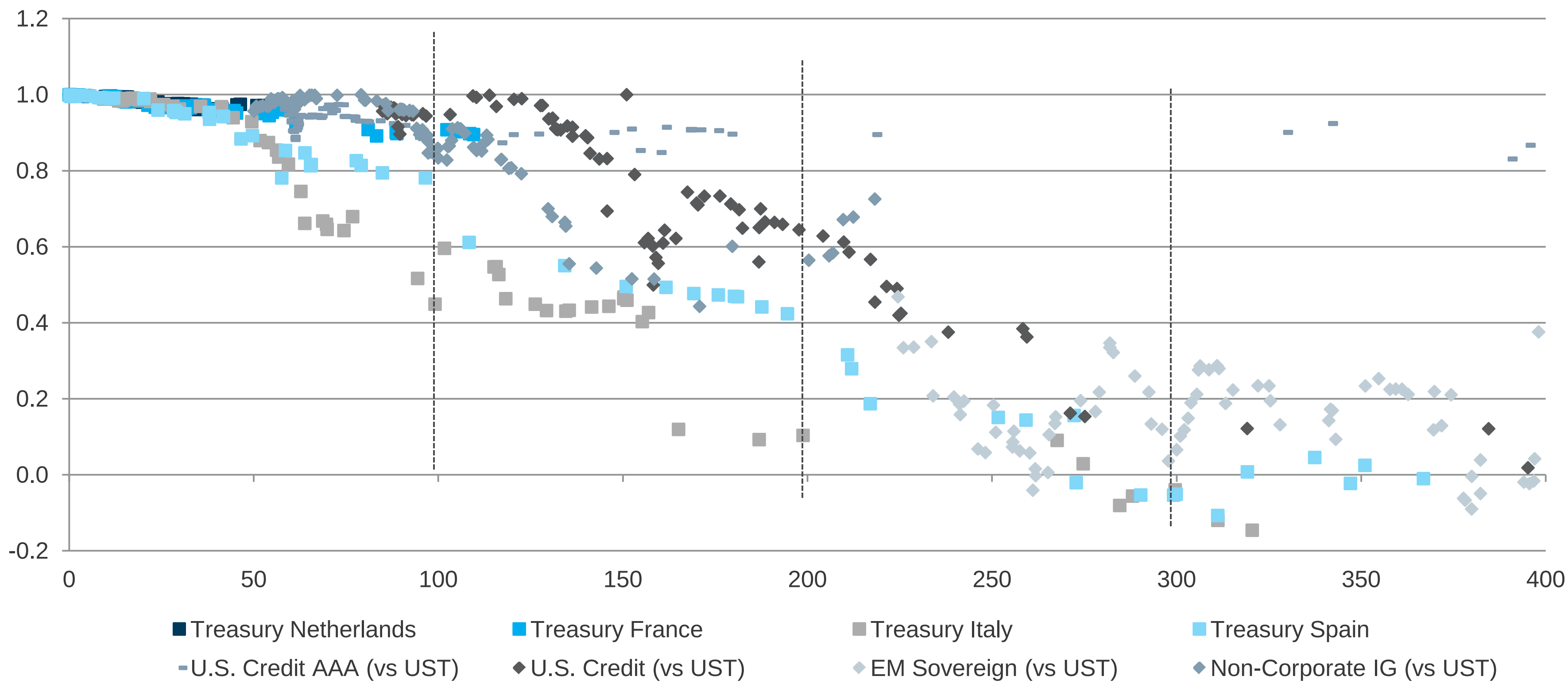


Source: Barclays Research

Correlations as a Function of Spread Levels

- Correlations of total returns with “risk-free” treasuries (24-month rolling window)
  - Credit AAA has persistently high correlations
  - Correlations breakdown significantly faster for treasuries
  - Nature of risk change dramatically for OAS >100 – asset class definition tested

Correlations with treasuries



Source: Barclays Research

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Major Results - Treasuries

- Breakdown of Treasury markets
  - Clear divide between Core and Local countries
  - Overall evolution seems consistent with spread levels

- However
  - Treasury correlations break down faster as bond characteristics change significantly
    - Empirical betas of Local treasuries against Germany is zero
    - What does a Local treasury bond represent?

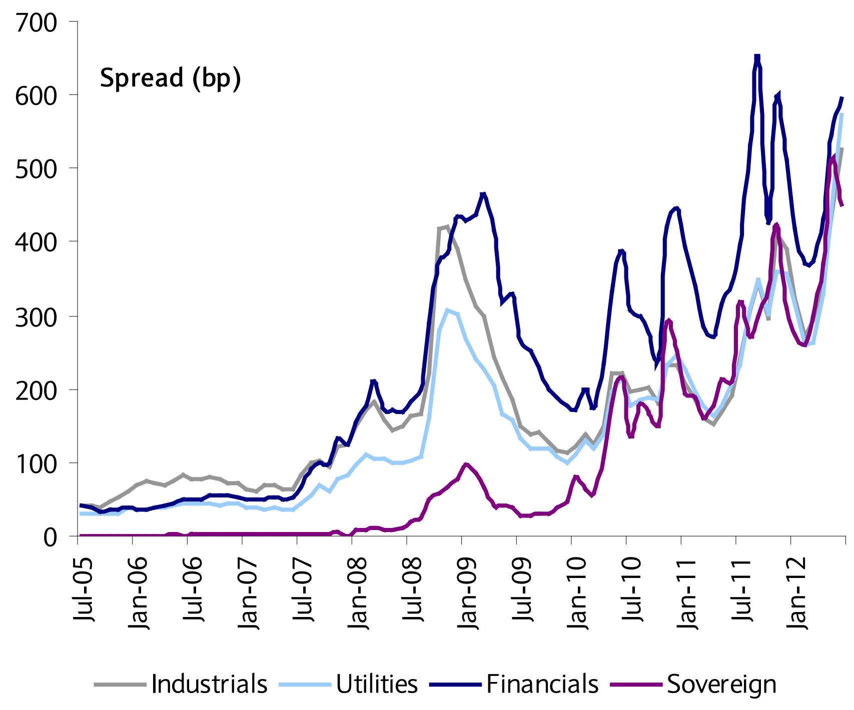
- Reversible?

Corporate Portfolios

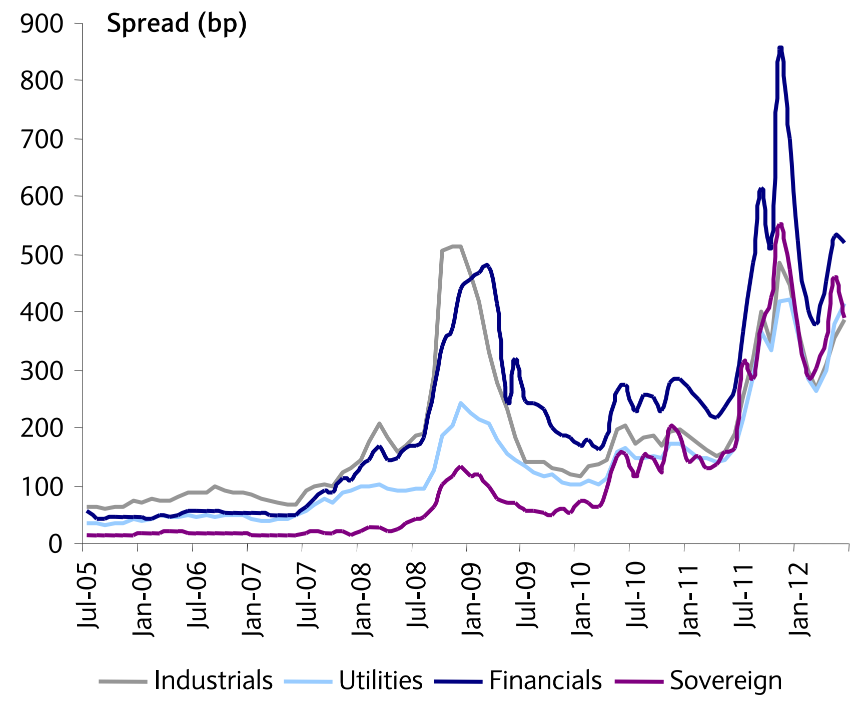
Local Corporates Trading with Sovereigns

- Co-movements and spread levels increased significantly
- Shocks are seen both in 2008 and 2010; but after 2010 the levels converge
- In recent recovery periods, some corporates have been trading through sovereigns
  - They are typically not Financials

Spain



Italy

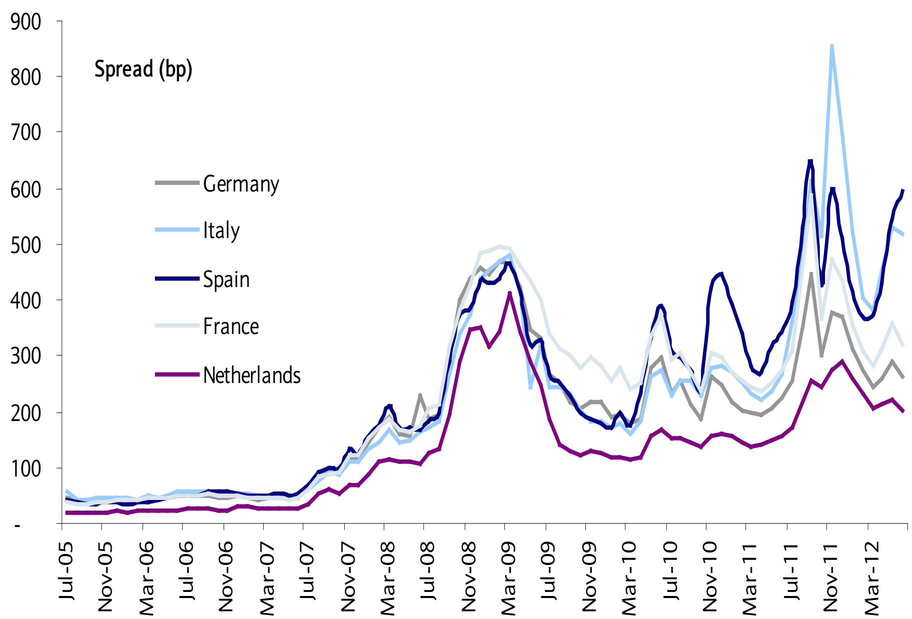


Source: Barclays Research

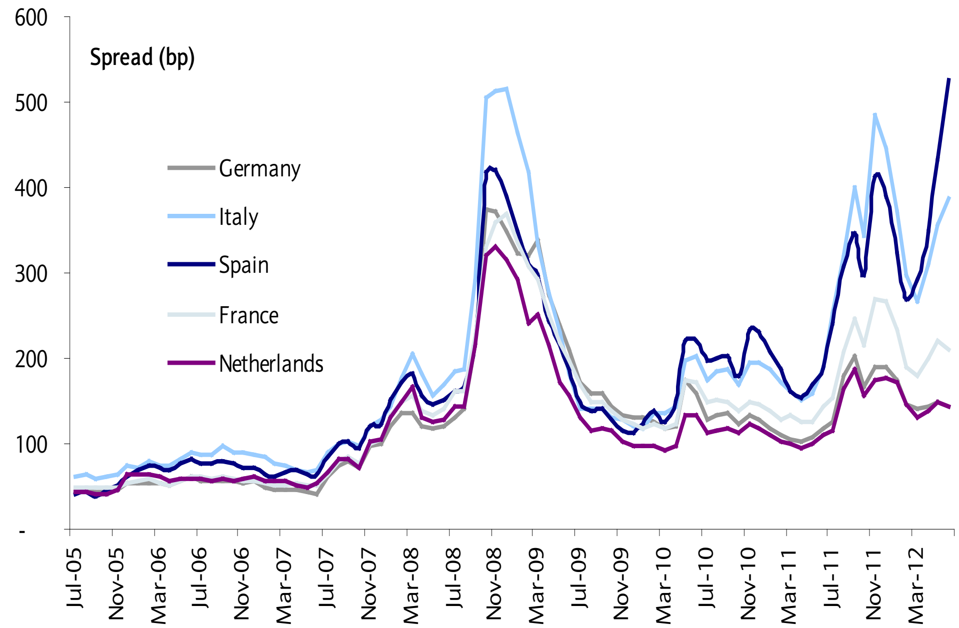
Changes in Dynamics across Industries

- Strong divide across countries for both industries
  - Spreads for corporates in local markets is significantly higher
- Spreads are particularly high for Financials, across all countries, especially for 2011/12

Financials



Industrials



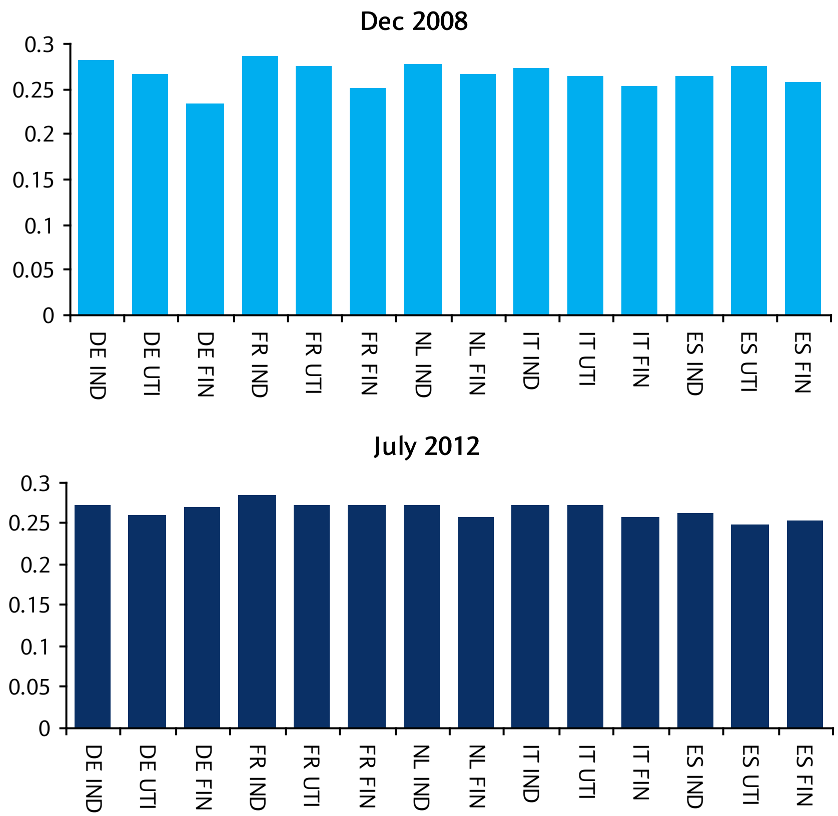
Source: Barclays Research

- How to further quantify the influence of country risk?
  - Several different ways to analyze this issue

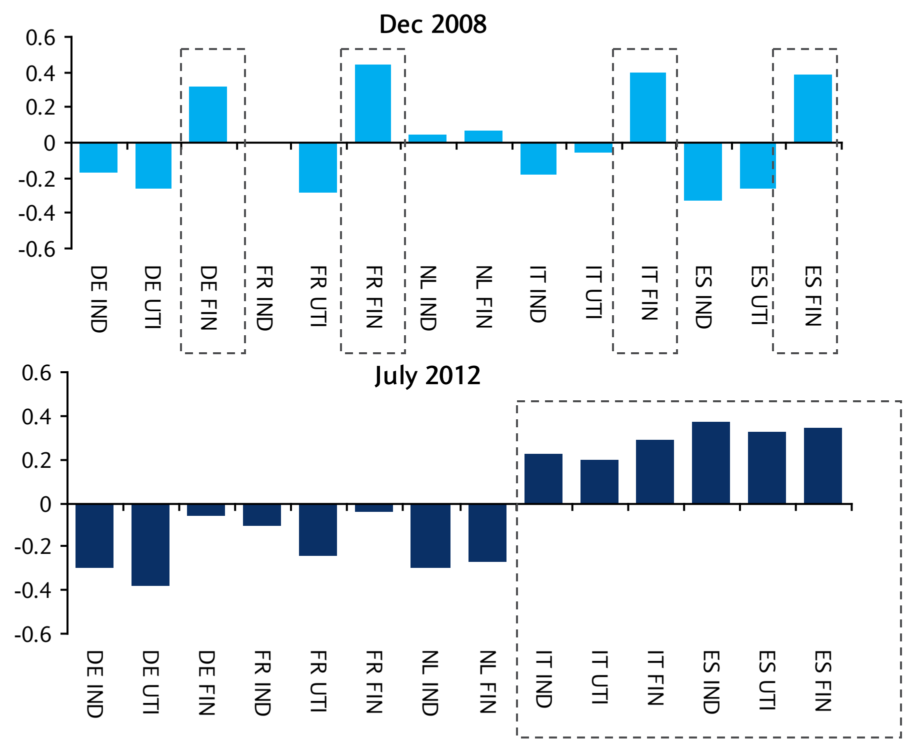
PCA Analysis: Country x Industry Factor Correlation

- Analyze the correlation matrix of 15 buckets: 5 countries x 3 regions
- PC1 explains about 80%: indicates significant commonality
- PC2 explains roughly 6%: 2008 crisis in industry-driven; 2012 is region-driven

PC1 loadings in the 2008 and 2012



PC2 loadings in the 2008 and 2012



Source: Barclays Research

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Explaining Excess Returns of Country Sub-Indices (continued)

- Unexplained returns: Difference between the realized returns of a country sub-index and the returns projected by factor models
- The better the model, the smaller the volatility of unexplained returns
- The Country-Industry factor model seems to do a significantly better job, especially recently

Volatility of Unexplained Returns by Country Sub-Indices (%/m)

Spain		
Period	Industry Only Model	Country-Industry Model
Jan 2008 - Dec 2009	0.68	0.36
Jan 2010 - Dec 2011	0.51	0.24
Jan 2012 - Jun 2012	1.26	0.41

Italy		
Period	Industry Factors	Country-Industry Factors
Jan 2008 - Dec 2009	0.42	0.44
Jan 2010 - Dec 2011	0.85	0.43
Jan 2012 - Jun 2012	1.10	0.26

Germany		
Period	Industry Factors	Country-Industry Factors
Jan 2008 - Dec 2009	0.56	0.44
Jan 2010 - Dec 2011	0.30	0.17
Jan 2012 - Jun 2012	0.69	0.17

France		
Period	Industry Factors	Country-Industry Factors
Jan 2008 - Dec 2009	0.52	0.43
Jan 2010 - Dec 2011	0.47	0.26
Jan 2012 - Jun 2012	0.49	0.21

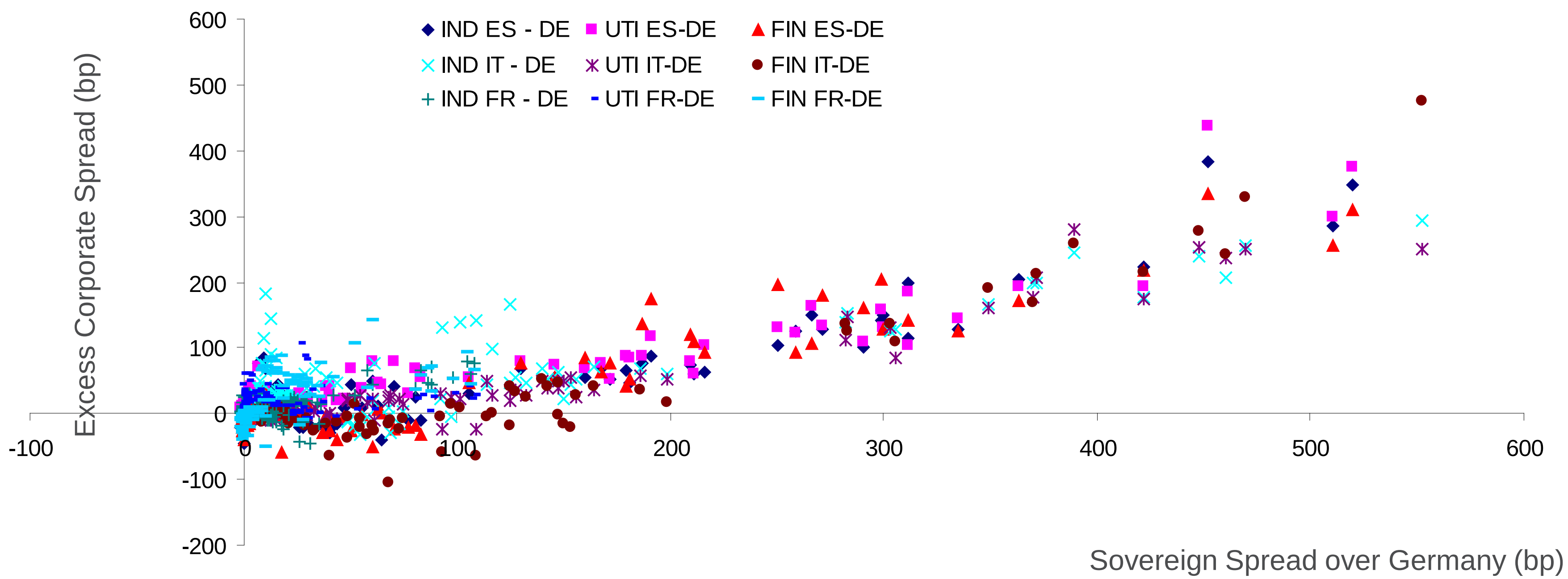
Source: Barclays Research

- Evidence suggests the use of Industry and Region as major sources of risk

Comparison with German Corporates

- Plot excess spread of corporates vs German peers
  - Analysis per country x industry
- Spread premia over German peers seem to be positively related to sovereign spread levels beyond a 100-200bp threshold
- The relationship seems to be similar for different country / industry groups

Excess Corporate Spreads (by Industry x Country) over German Peers vs. Sovereign Spreads



Source: Barclays Research

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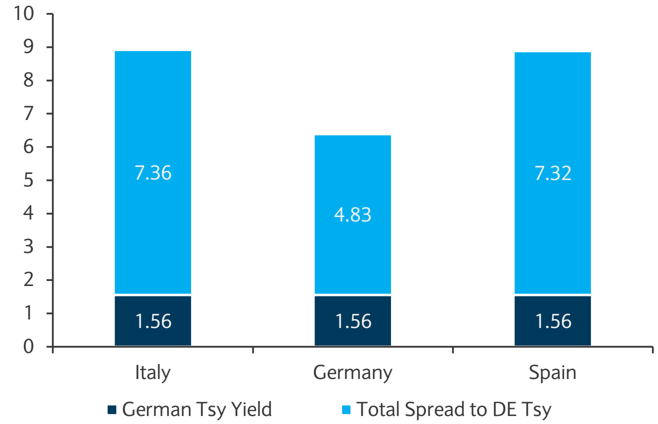
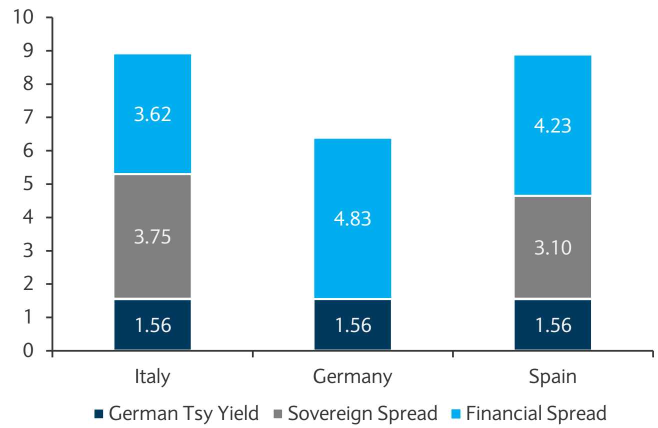
How to define the Corporate Spread Exposure

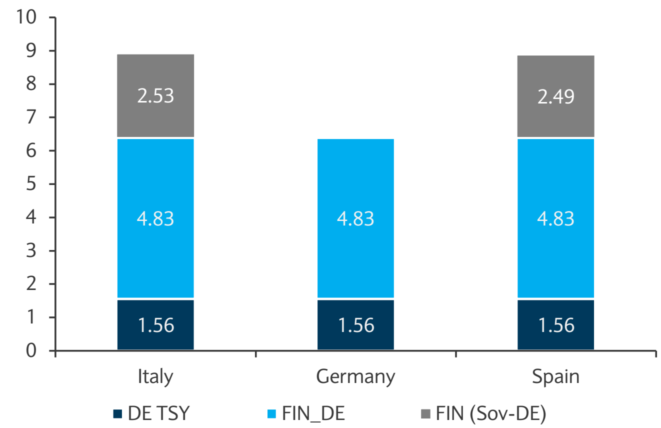
- Spreads to what? Let's take a look at Financials spread level



A. German Treasuries



B. Local Treasuries



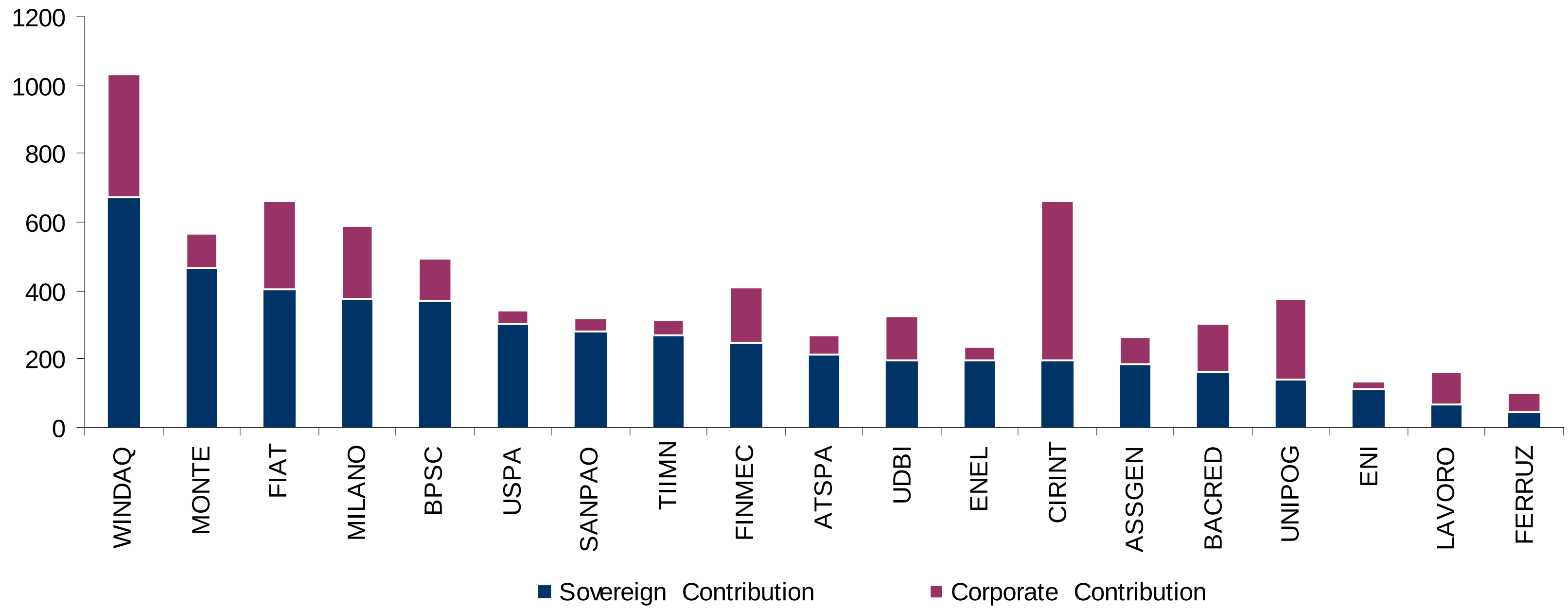
C. Sovereign-risk-free Corporates

Source: Barclays Research

- How to measure the credit exposure to sovereigns? How to measure risk and hedge?

A. Spreads over German Treasuries

- Decomposition of spreads between sovereign and issuer risk



Source: Barclays Research

- Our spread exposure is separated into a sovereign and a residual component
- Estimate the sovereign exposure and hedge accordingly

➢ View: Disaggregation of the European credit markets
  - Core markets: allocate per industry
  - Local markets: residual return only (e.g., all Financial may have higher betas)

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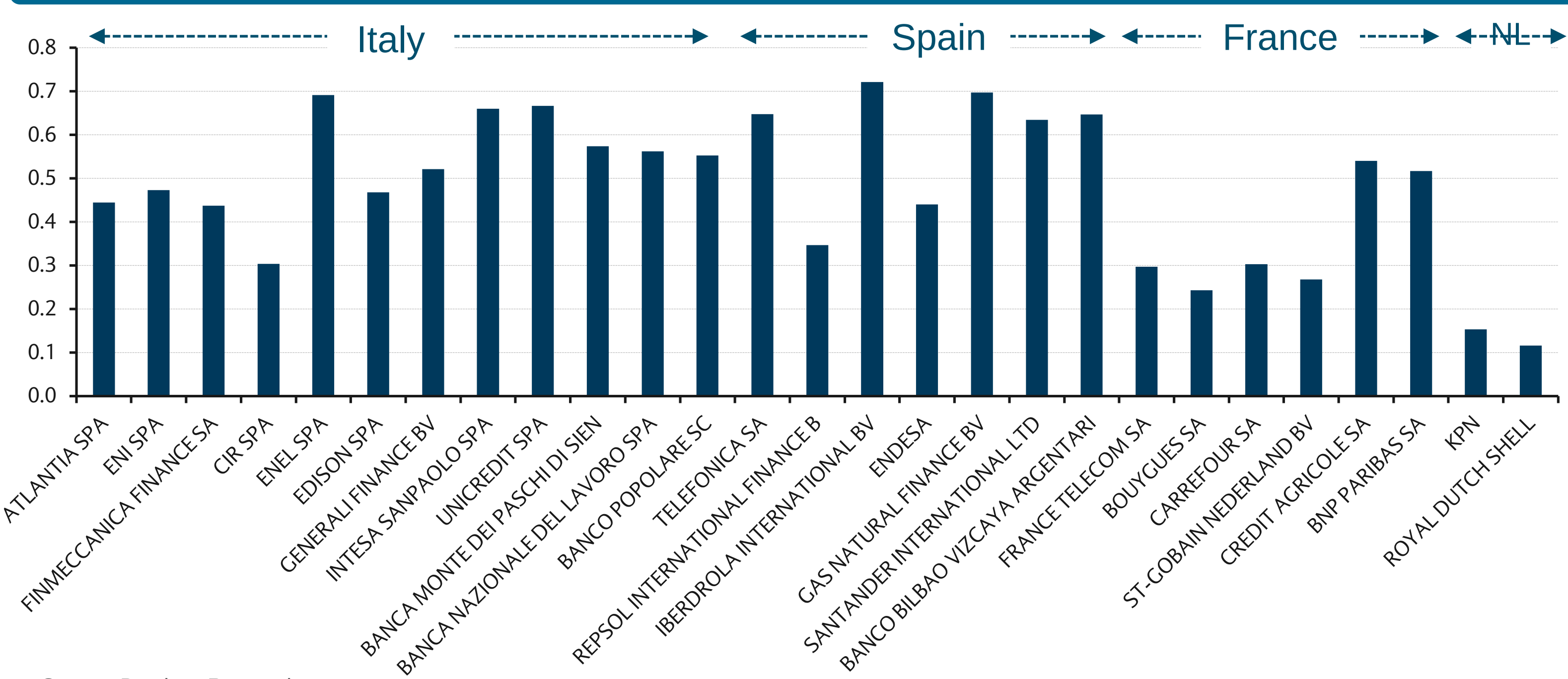
B. Factor out Sovereign Spreads from Corporates

- ➢ View: Corporate exposures has a mechanical and direct sovereign component
- All firms have the same sovereign exposure (=1)
- Well identified sovereign exposure, therefore hedge directly that exposure
- ➢ Problems: Mechanical; No empirical support (especially industrials)
  - Applicable to more distressed/financials portfolios?

Corporate Sovereign Betas



Source: Barclays Research

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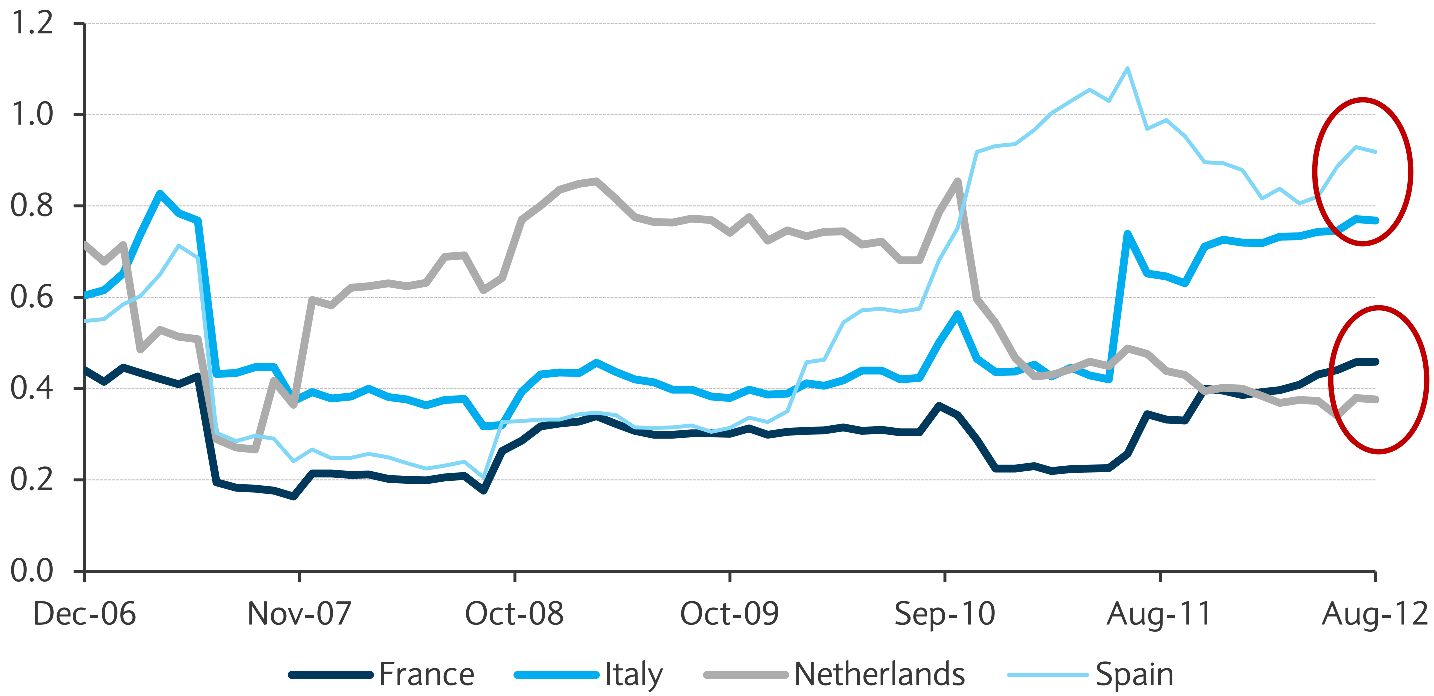
C. Construct Country Credit Factors

- Augment the traditional industry-based analysis with a residual country factor
- From a typical volatility model

$$PCS_{it} = F_t^{IND} + \varepsilon_{it}$$

$$\sigma(\varepsilon_{country,t}) / \sigma(F_t^{IND})$$



Source: Barclays Research

➢ Residuals can be interpreted as a country systematic factor

C. Construct Country Credit Factors (continued)

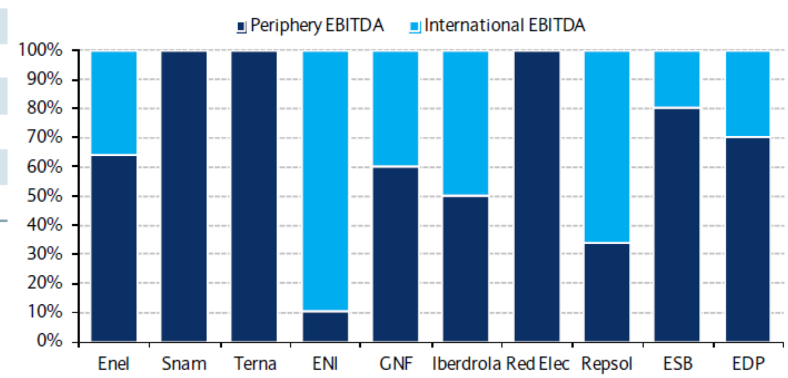
- How can the sovereign risk be hedged within this framework?
  - Restrict the analysis to core countries
  - Estimate sovereign exposure of particular issuers:
    - Significant role for more fundamental analysis

Figure 5: Sovereign overhang goes away – peripheral utility/energy best comparables

Company	Enel	Snam	Terna	ENI	GN	Iberdrola	Red Elec.	Repsol	ESB	EDP
Country	Italy									
Sovereign Rating*	Baa2									
Government ownership	31%	30%	30%	30%	0%	0%				
Corporate Rating*	Baa1	Baa1	Baa1	A3	Baa2	Baa1				
Regulated Income	50%	86%	90%	0%	60%	50%				
Peer Comparable	**E.ON**	**NGGLN**	**NGET**	**Total**	**GDF Suez**	**E.ON**				
Peer regulated income	30%	~100%	~100%	~0%	50%	30%				
Peer standalone rating*	A3	Baa1	A3	Aa3	A2	A3				

Note: *Lowest ratings show using Moody's rating classifications
Source: Barclays Research, S&P

Figure 6: % EBITDA in periphery



Note: ENI is adjusted EBIT inc. Snam. Source: Barclays Research

  - Avoid the ones with higher exposures
  - Hedge portfolio aggregated exposures – how correlated are the factors?
    - For sovereign tail event, betas will converge (rating mechanical relationship)

Major results – Credit Markets

- Significant additional noise on credit allocations
  - Regional considerations are essential
    - Including the relationship between Credit and Treasuries
  - Financial industry severely affected
  - Very few issuers free of sovereign influence

- Difficult to assess sovereign influence
  - Scope for more fundamental analysis?

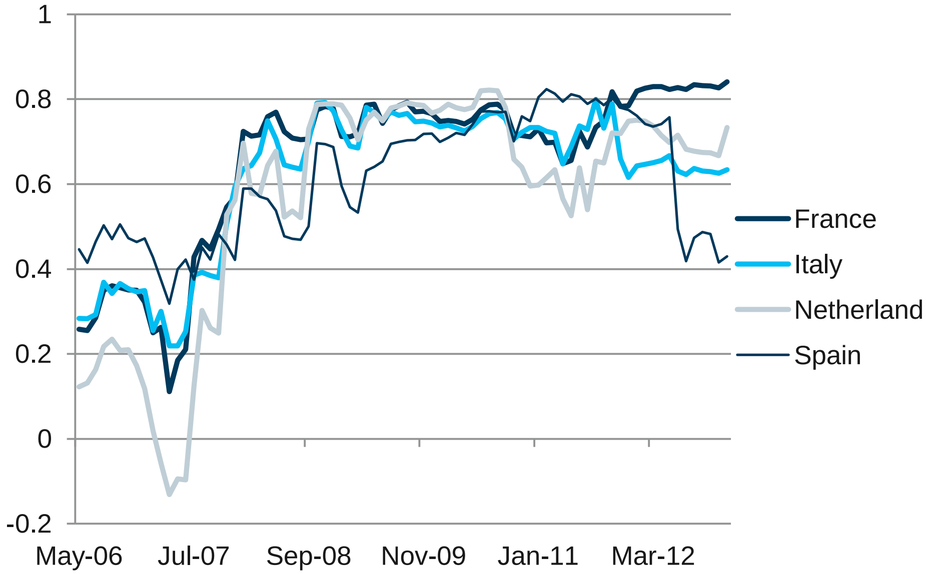
- We prefer the last approach (C.) to assess sovereign risk in credit portfolios
- This approach can be useful also to construct synthetic credit exposures

Equity Portfolios

Equity Return Correlations

- Correlations of equity total returns with other asset classes

With Corporates (Excess returns)

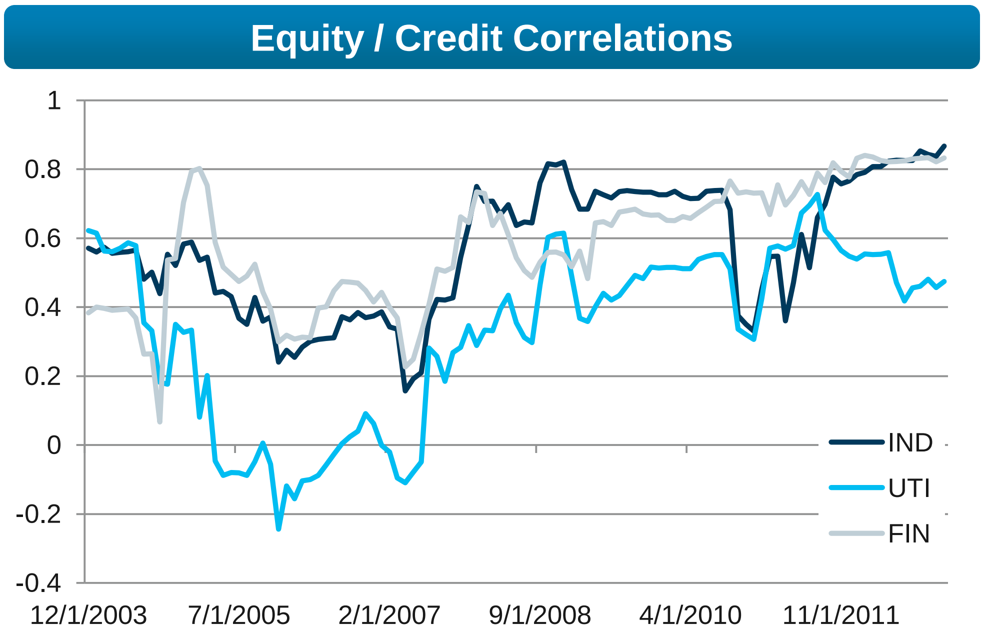


With Treasuries

Source: Barclays Research

- Correlations are typically high with corporate portfolios
  - How much of it is due to Sovereign vs other systematic sources of risk?
  - Correlations high for France and the Netherlands, drops abruptly for Spain
- Correlations with treasuries broke across blocks
  - Another clear indication, in our view, that local treasuries are “risky”

Equity / Credit Correlations across industries



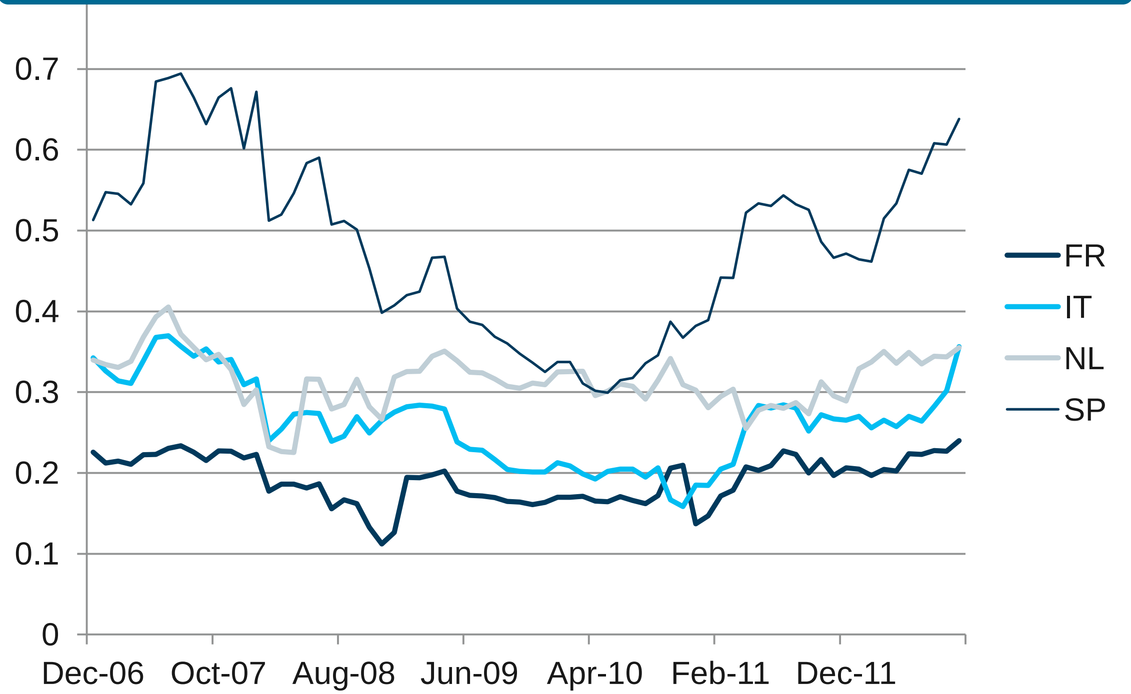
Source: Barclays Research

- The analysis across industries suggest a common component that may be independent of sovereign risk
  - Highly regulated utilities show somewhat smaller correlations
- Analyze residual returns from an industry-only factor risk model across the two markets? What should we expect?

Equity Country-Residual Factors

- Construct country residual factors from a industry-only factor model
- Compare the volatility of these country factors to industry factors (as before)

Ratio of country to Industry Factor volatilities



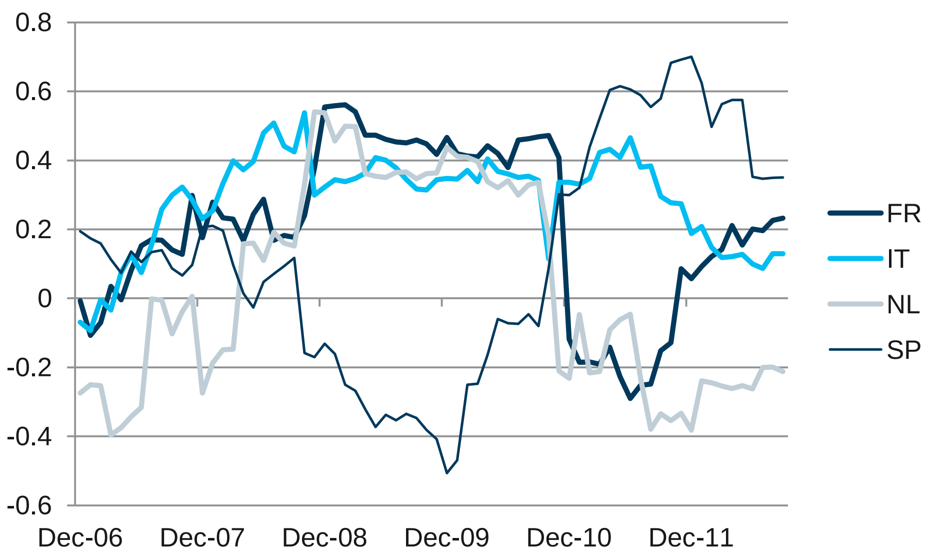
Source: Barclays Research

- Volatility significantly higher for Spain and recently significantly higher for Italy too
  - Overall lower, but comparable magnitude to credit
- How can we hedge / replicate this equity volatility?

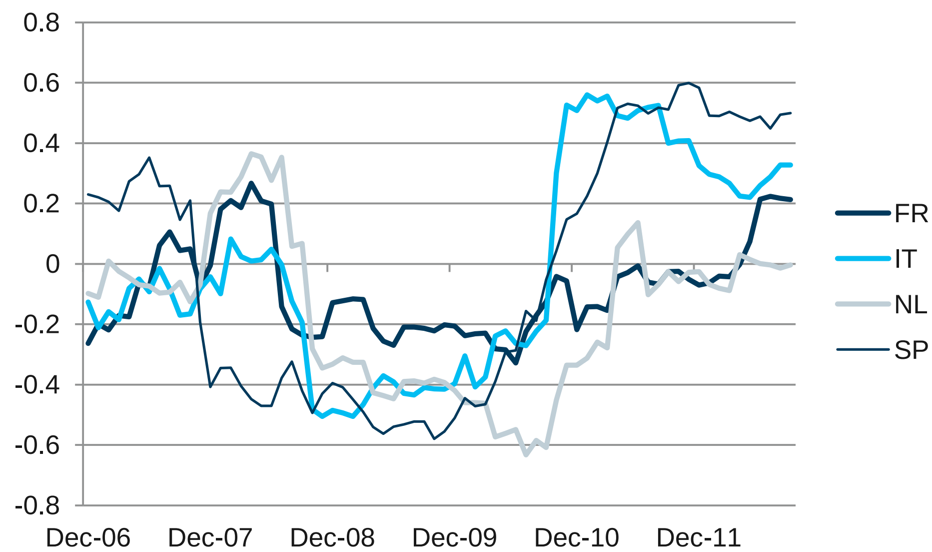
Hedging Residual Equity Country Exposure

- We can hedge the equity exposure to sovereign risk using strategies similar to credit
  - But relationship between equity and credit specific country is volatile
  - More recently, equity residual correlations with treasury seem more stable and relatively high
- Hedging success depends significantly on market conditions

Equity and Credit Residual Country Factor Correlation



Equity Residual and Treasury Factor Correlation



Source: Barclays Research

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Conclusion

- Breakdown of Treasury markets
  - Clear divide between Core and Local countries
  - Specific nature of treasuries is revealed through correlations

- Significant noise on both credit and equity allocations
  - Regional considerations are essential
  - Financial industry severely affected
  - Treasury markets useful to hedge / replicate corporate and equity exposures
    - Very few issuers free of influence
    - More influence from fundamental analysis?

- Portfolio management
  - More restricted universe for traditional allocations
  - More noisy performance measurement
  - Significant change in the nature of risk exposures
  - Significant additional tail risk: rating spillover

Analyst Certifications and Important Disclosures

Analyst Certification(s)

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