William Blair

Case Study
May 2013

How We Apply Game Theory
Eurozone Debt Crisis

WHAT IS GAME THEORY?

- Events, geopolitics, and policy changes affect market prices in ways that can seem uncertain or random.
- William Blair's Dynamic Allocation Strategies team uses game theory in its analysis to provide clarity on investment opportunities.
- Game theory considers the interests and incentives of the "players"—in this case, governmental and economic leaders.
- Today's leaders are engaged in a multilateral bargaining game where players devise a strategy and demonstrate various powers as they interact with other players to achieve a desired outcome.
- In order for us to assess investment opportunities and risks, we examine four strategic powers.

Game Theory Powers and Behaviors

Strategic Powers	Examples	Demonstrated Behaviors
Endowment	Political capital, nuclear warheads	Confidence, aggression
Threat	Lob some bombs, sacrifice collateral	Bluffs, aggression, sacrifice
Risk tolerance	Willing to accept "no agreement"	Bluffs, disinterest, 11th hour
Coalition	"Merkozy" (Merkel & Sarkozy), media	Solidarity, adaptability

Our Investment Process

Step 1:
Identify Value to Price Discrepancies

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Fundamental analysis identifies *where* value/price discrepancies exist

Step 2:
Understand Macro Themes

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Game theory helps explain *why* prices deviate from values

Step 3:
Design Portfolio and Integrate Risk Exposures

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Dynamic risk capital allocations help determine *how* best to capture investment opportunities

CASE STUDY: MARKET EVENT OVERVIEW

- In August 2011, a financial system funding crisis in Europe resulted in a collapse of risky asset prices—from November 2011 through March 2012, risky assets recovered a significant portion of the funding crisis depreciation
- In the second quarter of 2012, Europe experienced a second crisis—compounding crises of sovereign insolvency and bank capital adequacy—resulting in another risky asset price collapse

GAME THEORY ANALYSIS HIGHLIGHTS

- Germany anchored a powerful coalition with France in the first quarter of 2012–referred to as "Merkozy"–that pushed for stringent austerity in the peripheral European countries
- The Greek elections in May and June of 2012 began a shift away from Merkozy austerity, and the coalition power of Germany dropped below that of many other players
- France shifted sides and became a powerful cornerstone of the "anti-austerity now" coalition that includes the peripheral countries
- Given the high debt in Italy and the exposure of Europe to Italian debt and financial difficulties, Italy commands tremendous threat power
- The European Central Bank (ECB), with its provision of liquidity to the financial system and influence over long-term interest rates in specific countries, has immense endowment power. Because the ECB's endowment power is so strong when combined with its ability to wield that power as a threat to wayward countries, it is the superior power in the eurozone theater.

See back page for Strategy Implications

"We strongly believe that broad macro themes increasingly will dominate portfolio performance. Robust investment processes will need to include a greater focus on integrating the disciplines of game theory, macroeconomic theory, and geopolitical science – the tools required to fathom the behaviors of these players and understand the ramifications of their decisions."

-Brian D. Singer, CFA

- Started in Industry: 1981
- Head of Dynamic Allocation Strategies Team
- M.B.A., University of Chicago
- B.A., Northwestern University

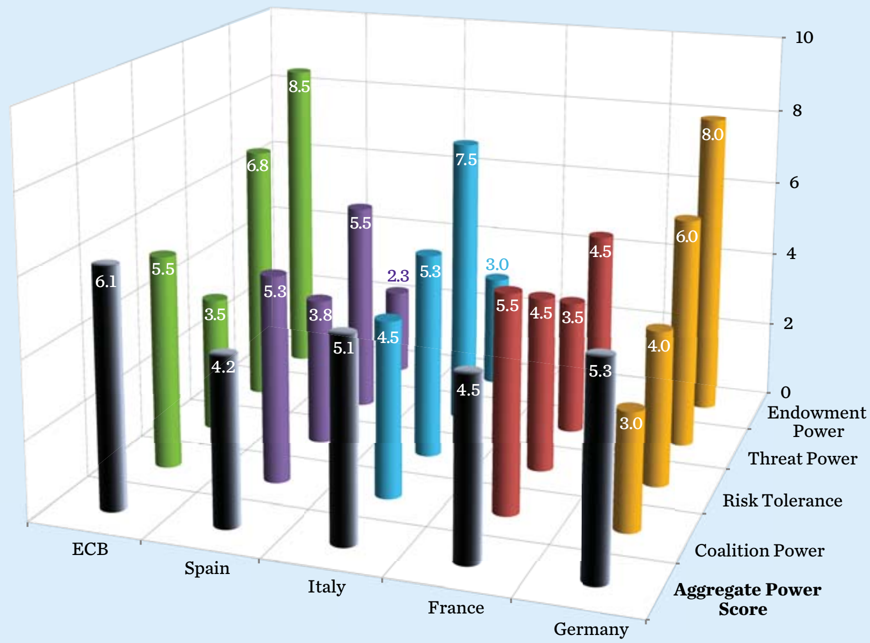
WHY MACRO MATTERS

- Historically, over 90% of portfolio return variation has been attributable to top-down allocation decisions[1]
- Global interconnectedness has increased the relevance and pace at which macro political and economic factors affect investment results
- Traditional asset allocation/portfolio rebalancing may not be dynamic enough to fully reflect opportunities and risks as they unfold

1 Source: Determinants of Portfolio Performance II: An Update Brinson, Gary P.; Singer, Brian D.; Beebower, Gilbert L. Financial Analyst Journal; May/June 1991; 47, 3; ABI/INFORM Global pg. 40.

Eurozone Bargaining Powers

Here's a look at the powers that the William Blair Dynamic Allocation Strategies team attributed to key eurozone players in the first quarter of 2013.



Power Score Scale
1: Weak 10: Omnipotent

1Q2013 Assessment
Source: William Blair & Company

STRATEGY IMPLICATIONS

- While we expect ongoing asset price volatility, we believe the euro will survive for the foreseeable future and that the insolvency and illiquidity issues have been resolved in the near term, enabling risky assets to reward patient investors
- Our understanding of the shifting European political alignments prompted us to increase equity risk exposure, particularly in Spain, Italy, and emerging markets in June 2012

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