

Categories, Creditworthiness and Contagion

How Investors' Shortcuts Affect Sovereign Debt Markets

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Variation in Market-Based Constraints

- The prices governments pay to borrow on international markets vary markedly:
 - **Across countries** (sovereign credit ratings, macroeconomic fundamentals)
 - **Over time** (liquidity, risk appetite, elections)

(Archer et al 2007; Bernhard and Leblang 2006; Cantor and Packer 1996; Hardie 2006; Jensen and Schmith 2005; Mosley 2003; Tomz 2007)
- And different **types** of governments are treated differently:
 - developed vs. developing (Mosley 2003)
 - After accounting for policy outcomes, emerging and frontier market countries pay higher risk premiums than developed nation borrowers.
 - borrowers from commercial banks vs. bond markets (Kaplan 2012)
 - Commodity vs. manufacturing exporters (Campello 2012, Wibbels 2006)

Are market constraints also interdependent?

- Professional investors often manage diversified portfolios of highly dissimilar assets
 - sovereign debt, corporate debt, equities, derivatives, cash
 - in a broad range of geographic locations.
- They rely on information shortcuts to assess risk (heuristics)
 - Summary indicators of fiscal and monetary outcomes.
 - Also: *categories*
 - Professional investors sort countries into “peer” groups
 - “developed” vs. “developing”
 - peripheral Europe: “emerging Europe” in the 1990s → “eurozone” in the 2000s → “PIIGS” in the 2010s

For the (financial) record...

Ministers deny contagion in the Eurozone.



"Spain is not Greece" - Elena Salgado, Spanish Finance Minister, Feb 2010.

"Portugal is not Greece" - The Economist, April 2010.

"Greece is not Ireland" - George Papaconstantinou, Greek Finance Minister, Nov 2010.

"Spain is neither Ireland nor Portugal" - Elena Salgado, Spanish Finance Minister, Nov 2010.

"Ireland is not in 'Greek Territory'" - Irish Finance Minister Brian Lenihan, Nov 2010.

"Neither Spain nor Portugal is Ireland" - Angel Gurría, Secretary-general OECD, Nov 2010.

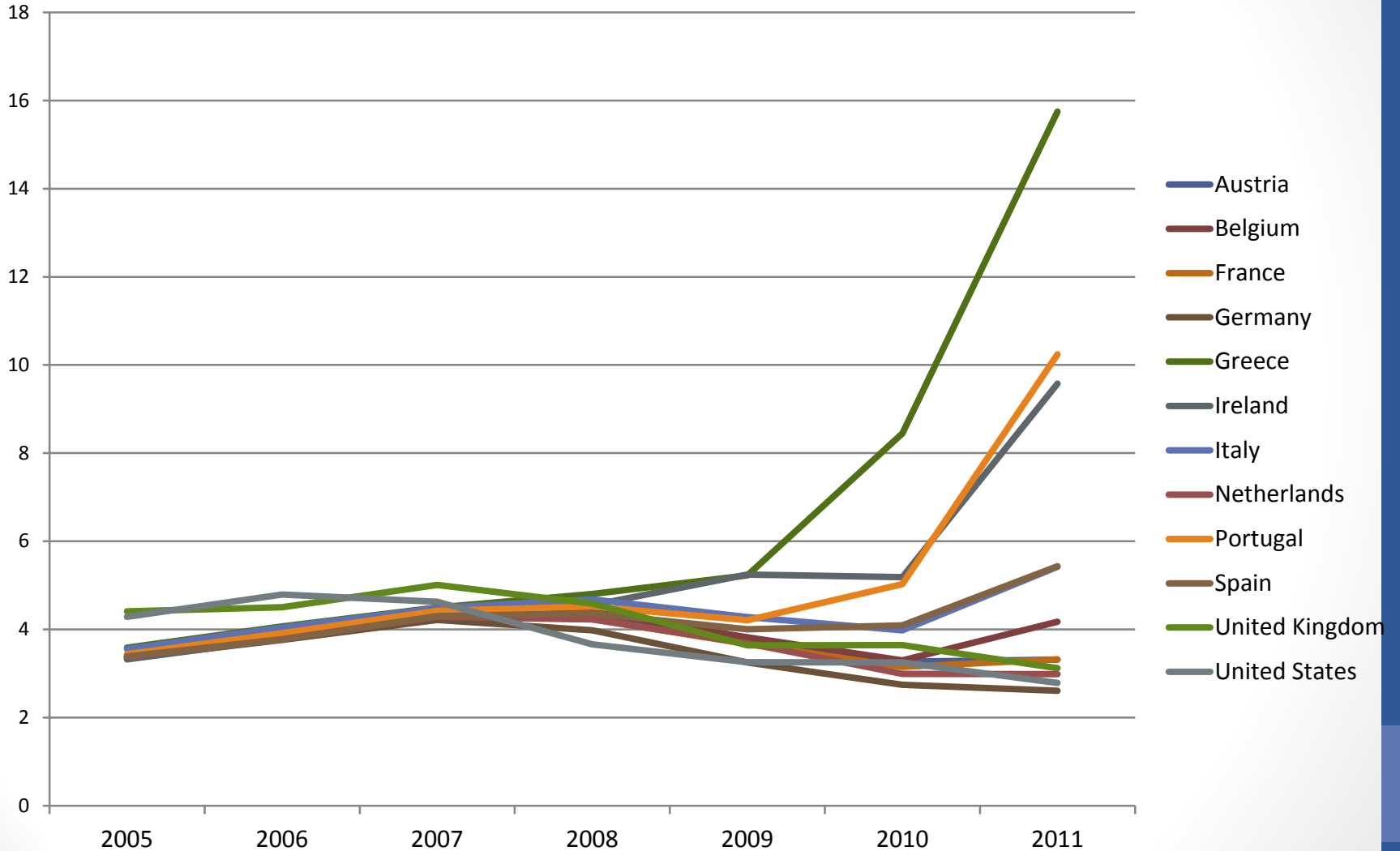
"Italy is not Spain" - Ed Parker, Fitch MD, June 2012.

"Spain is not Uganda" - Spanish PM Mariano Rajoy, June 2012.

"Uganda does not want to be Spain" - Ugandan Foreign Minister, June 2012.

Heard through Alex Banbury of Hamilton Capital
who sent this to IFRAAsia.

Government Bond Rates, 2005-2011



Interdependent Sovereign Risk

- Over the long term, sovereign risk assessments should vary with country fundamentals.
- In the short term, sovereign risk also may correlate across nations due to contagion from crises or changes in global liquidity.
- But, even after controlling for these short- and long-term effects, we expect an additional effect of “country category”
 - Country risk premiums will be significantly correlated with the risk premiums paid by other borrowers in the same category.
 - This implies that investors’ responses to domestic policy are neither fixed, nor fully objective.

Sovereign Peer Groupings

- Investors may over- or under-estimate sovereign risk based on the category into which the country is grouped:
 - When investors are more optimistic about a given group of countries, each country in that group will experience an improvement in market access.
 - When investors are more pessimistic about a category of countries, a borrower within that category may suffer – even if the country's fundamentals do not warrant such pessimism.

Which Peer Groups Matter?

1. Region:

- Asia, Western Europe, post-Communist Europe, Latin America, Non-Latin Caribbean, Middle East and North Africa, North America, South Asia, and Africa [[World Bank categories](#)]

2. Market and Economic Development:

- a. MSCI: Emerging Markets; Frontier; Developed
- b. FTSE: Emerging Markets; Frontier; Developed; Advanced Emerging; Secondary Emerging

3. Risk Rating:

- Long-Term Sovereign Credit Ratings [Fitch]

Data and Method

- **Dependent variables:**
 - Sovereign spreads (EMBI): monthly and annual data for 26 emerging market economies, 2001-2010.
 - Credit default swap (CDS) prices, monthly data for 26 developed **and** developing countries, 2000-2010.
- **Independent variables:**
 - Domestic economic: government debt, budget balance, inflation, current account deficit, capital account openness, level of development.
 - Domestic political: democracy, government ideology, opposition party ideology, electoral cycle, presidential/parliamentary
 - Global: US interest rate, US treasury bond yields, US stock market returns, commodity prices. [Also, direct effect of category]
 - Peer group (spatial lag)

Data and Method

- We estimate cross-sectional time series models, using an Error Correction Model (ECM).
 - This allows us to consider both the short-term and long-term effects of the regressors.
 - Generalized least squares estimator, country fixed effects, linear time trend.

Main Findings

| Dependent Variable | Annual EMBI Spread | Monthly EMBI Spread | Monthly CDS Price |
|----------------------------------|--------------------|---------------------|-------------------|
| Peer Category | | | |
| Geographic Region | Short Term | Short Term | Short Term |
| | Long Term | Long Term | |
| Market: MSCI (3 category) | Short Term | Short Term | Short Term |
| | Long Term | | |
| Market: FTSE (5 Category) | | Short Term | |
| | Long Term | | |
| Credit Rating (Fitch) | Short Term | Short Term | |

Other significant correlates of risk/spreads (annual analysis):

Sovereign debt (+)

Budget balance (-)

Capital account openness (-)

Time to elections (-)

US interest rates (+)

Caveats and Conclusion

- The ways in which countries are grouped – and changes in groupings – may be important determinants of governments' access bond markets.
 - How, then, do categorizations change over time?
- Annual (and even monthly) data obscure what are often shorter-term movements:
 - Almost all of the disturbances to equilibrium in risk premiums are corrected within one year.
 - Many of the political variables included in our models, however, are measured on an annual basis.
 - Sample: a limited set of countries (e.g. those for which there is a CDS market or which are included in EMBI+)
- More generally, aggregate-level observational data may not be the best way to assess our proposed causal mechanisms.
 - Survey of professional investment managers, using an experimental research design (Response rate issues)

| DV: Annual Δ Spread | | Table 1. Explaining Annual Changes in Sovereign Debt Spreads | | | | | | | |
|--------------------------------------|------------|--|---------------|-----------|------------|-----------|------------|-----------|--|
| Peer Category: | Region 1 | | Risk Rating 2 | | | MSCI 3 | | FTSE 4 | |
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. | |
| Spread $t-1$ | -1.08 *** | 0.07 | -1.12 *** | 0.06 | -0.94 *** | 0.07 | -1.11 *** | 0.07 | |
| <i>Peer Diffusion</i> | | | | | | | | | |
| Peer Spread | | | | | | | | | |
| $t-1$ | 0.21 ** | 0.10 | -0.20 * | 0.11 | 0.22 * | 0.13 | -0.26 *** | 0.09 | |
| Δ | 0.37 *** | 0.07 | 0.09 | 0.07 | 0.45 *** | 0.10 | -0.13 | 0.09 | |
| <i>Domestic Politics and Economy</i> | | | | | | | | | |
| Gov Consumption | | | | | | | | | |
| $t-1$ | 1.02 | 24.23 | 4.59 | 27.13 | 3.72 | 24.43 | 19.76 | 25.89 | |
| Δ | -23.86 | 19.78 | -4.07 | 21.34 | -15.16 | 20.08 | -36.84 * | 22.33 | |
| Debt | | | | | | | | | |
| $t-1$ | 4.37 ** | 2.18 | 4.15 ** | 1.88 | 2.77 | 2.24 | 5.51 *** | 2.10 | |
| Δ | 6.40 *** | 2.26 | 5.78 *** | 1.76 | 7.04 *** | 2.13 | 7.88 *** | 2.15 | |
| Maturity | | | | | | | | | |
| $t-1$ | 1.15 | 5.10 | -3.85 | 5.46 | -7.16 | 5.38 | -2.40 | 4.82 | |
| Δ | -1.79 | 3.56 | -6.35 * | 3.62 | -8.14 ** | 3.66 | -2.77 | 3.51 | |
| Inflation | | | | | | | | | |
| $t-1$ | 0.33 | 0.46 | 0.07 | 0.48 | 0.68 | 0.46 | 0.63 | 0.52 | |
| Δ | 0.02 | 0.33 | -0.11 | 0.34 | 0.10 | 0.34 | 0.02 | 0.39 | |
| Budget Balance | | | | | | | | | |
| $t-1$ | -20.89 ** | 10.57 | -26.37 ** | 10.98 | -16.42 | 11.20 | -20.98 * | 11.21 | |
| Δ | -31.89 *** | 8.30 | -25.73 *** | 8.47 | -25.46 *** | 8.64 | -23.93 *** | 8.79 | |
| Democracy | | | | | | | | | |
| $t-1$ | 11.86 | 14.17 | 20.07 | 14.42 | 12.47 | 13.52 | 15.10 | 12.90 | |
| Δ | 22.40 | 22.37 | 25.12 | 21.99 | 5.68 | 23.53 | 32.87 | 22.03 | |
| KA Open | | | | | | | | | |
| $t-1$ | -80.68 ** | 33.55 | -65.33 * | 35.37 | -54.40 | 33.85 | -59.09 * | 33.26 | |
| Δ | -59.39 * | 36.41 | -56.40 | 40.39 | -58.81 | 40.33 | -31.58 | 35.59 | |
| Years to Election | | | | | | | | | |
| $t-1$ | -32.76 ** | 14.63 | -29.64 * | 15.49 | -25.99 * | 14.44 | -25.52 ** | 13.04 | |
| Δ | -9.47 | 9.92 | -12.17 | 9.98 | -10.52 | 9.90 | -7.66 | 8.88 | |
| Left | | | | | | | | | |
| $t-1$ | 128.18 | 267.97 | 26.77 | 385.25 | -30.57 | 440.41 | 28.30 | 337.53 | |
| Right | | | | | | | | | |
| $t-1$ | 36.95 | 400.40 | -673.79 * | 399.72 | -642.29 * | 377.14 | -650.50 * | 346.34 | |
| Opposition Right | | | | | | | | | |
| $t-1$ | 85.90 | 61.58 | 40.49 | 61.68 | 56.35 | 57.26 | 50.99 | 45.05 | |
| Opposition Left | | | | | | | | | |
| $t-1$ | 116.75 * | 70.25 | 104.07 | 68.31 | 93.53 | 67.58 | 54.50 | 55.99 | |
| System | | | | | | | | | |
| $t-1$ | -52.33 | 39.09 | -7.75 | 39.86 | 1.05 | 39.45 | -29.78 | 39.05 | |
| <i>Common Shocks</i> | | | | | | | | | |
| US Prime Rate | | | | | | | | | |
| $t-1$ | 29.75 ** | 12.28 | 30.99 *** | 12.44 | 34.93 *** | 13.21 | 33.09 *** | 13.00 | |
| Δ | -25.89 * | 14.80 | -68.22 *** | 14.88 | -10.85 | 17.29 | -70.54 *** | 15.19 | |
| Time | | | | | | | | | |
| $t-1$ | -12.85 | 8.95 | -22.22 *** | 8.47 | -9.43 | 9.64 | -19.05 ** | 8.42 | |
| Const. | 25956 | 17988 | 44910 *** | 16975 | 19192 | 19351 | 38372 ** | 16896 | |
| N. obs | 171 | | 171 | | 171 | | 171 | | |
| Wald χ^2 | 454.59 | | 1353.14 | | 479.67 | | 444.68 | | |
| Prob > χ^2 | 0 | | 0 | | 0 | | 0 | | |

FGLS error correction model of annual change in Sovereign Stripped Spreads *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Explaining Monthly Changes in Credit Default Swap Prices

| DV: Monthly ΔCDS | | (1) <i>Region</i> | | (2) <i>Risk Rating</i> | | (3) <i>FTSE</i> | | (4) <i>MSCI</i> | |
|--------------------------------------|-----|----------------------|-----------|---------------------------|-----------|--------------------|-----------|--------------------|-----------|
| | | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| CDS | t-1 | -0.109*** | 0.018 | -0.118*** | 0.017 | -0.076*** | 0.016 | -0.086*** | 0.020 |
| <i>Peer Diffusion</i> | | | | | | | | | |
| Peer CDS | t-1 | 0.007 | 0.021 | -0.005 | 0.012 | -0.025 | 0.022 | -0.013 | 0.025 |
| | Δ | 0.349*** | 0.051 | 0.010 | 0.013 | 0.032 | 0.033 | 0.163*** | 0.048 |
| <i>Categories' Direct Effect</i> | | | | | | | | | |
| Category | t-1 | - | | 1.550 | 3.287 | -1.911 | 3.651 | 115.797 | 95.155 |
| | Δ | - | | -1.779 | 6.235 | -4.299 | 4.328 | -136.715 | 169.291 |
| <i>Domestic Politics and Economy</i> | | | | | | | | | |
| Debt | t-1 | 0.697** | 0.313 | 0.808*** | 0.287 | 1.455*** | 0.556 | 1.186* | 0.670 |
| Budget Balance | t-1 | -0.413 | 1.283 | -0.298 | 1.190 | 1.421 | 1.282 | 0.127 | 1.647 |
| Current Account Balance | t-1 | 0.679 | 0.653 | 0.556 | 0.666 | 0.717 | 0.638 | 0.906 | 0.881 |
| Inflation | t-1 | 0.775 | 1.017 | 0.458 | 0.971 | 1.030 | 1.168 | 1.288 | 1.390 |
| GDP per capita | t-1 | 0.018 | 0.016 | 0.015 | 0.019 | -0.003 | 0.014 | 0.006 | 0.019 |
| KA Open | t-1 | -3.960 | 5.046 | -5.582 | 4.476 | -5.439 | 5.031 | -7.823 | 7.319 |
| FX Rate | t-1 | 448.631*** | 121.959 | 406.193*** | 98.061 | 438.020*** | 97.828 | 449.537*** | 122.503 |
| | Δ | 290.856*** | 79.730 | 276.396*** | 64.599 | 381.735*** | 65.415 | 366.030*** | 81.059 |
| Democracy | t-1 | -0.563 | 1.018 | -0.580 | 0.965 | 0.286 | 0.732 | 0.465 | 1.233 |
| Months to Election | t-1 | 0.006 | 0.108 | 0.030 | 0.100 | -0.034 | 0.096 | -0.020 | 0.129 |
| <i>Common Shocks</i> | | | | | | | | | |
| US Prime Rate | t-1 | -1.095 | 1.505 | -1.772 | 1.374 | -1.368 | 1.818 | -0.537 | 2.031 |
| | Δ | -16.209 | 11.160 | -24.851** | 9.973 | -24.099** | 10.281 | -27.524** | 13.263 |
| US Stock Market | t-1 | -3.020*** | 0.859 | -4.535*** | 0.756 | -3.261*** | 0.747 | -3.048*** | 1.043 |
| | Δ | -2.794*** | 0.488 | -3.954*** | 0.420 | -3.356*** | 0.404 | -2.901*** | 0.600 |
| Invest. Grade Yield | t-1 | -5.950 | 6.426 | -3.892 | 5.817 | -2.758 | 5.692 | -2.217 | 7.415 |
| High Yield | t-1 | -10.277** | 4.913 | -7.549* | 4.471 | -11.091** | 4.623 | -6.701 | 5.687 |
| Treasury Yield | t-1 | -7.627 | 10.280 | -7.183 | 9.252 | -10.269 | 8.374 | -8.504 | 11.548 |
| Volatility Premium | t-1 | -0.006 | 0.391 | 0.592* | 0.349 | 0.609* | 0.320 | 0.596 | 0.441 |
| Equity Premium | t-1 | 245.374 | 717.482 | 111.000 | 644.827 | 880.823 | 620.661 | 133.458 | 782.645 |
| Term Premium | t-1 | 1.365 | 2.406 | 2.278 | 2.143 | 2.837 | 1.965 | 2.959 | 2.684 |
| Stock Flows | t-1 | -51.067 | 34.865 | -65.267** | 31.732 | -99.449*** | 32.831 | -114.839*** | 42.740 |
| | Δ | -53.423** | 22.117 | -65.180*** | 20.187 | -82.229*** | 20.693 | -94.636*** | 26.757 |
| Bond Flows | t-1 | 0.000 | 0.000 | -0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | Δ | -0.000 | 0.000 | -0.001** | 0.000 | -0.000 | 0.000 | -0.000 | 0.000 |
| Energy Index | t-1 | -0.081 | 0.083 | -0.087 | 0.072 | -0.103 | 0.083 | -0.124 | 0.094 |
| Time | | -0.106 | 0.217 | -0.077 | 0.194 | 0.467 | 0.328 | 0.195 | 0.325 |
| Constant | | -8.252 | 28.879 | -22.494 | 56.988 | 2.994 | 56.357 | -134.346 | 116.496 |
| <i>N</i> | | 927 | | 1021 | | 825 | | 885 | |
| Wald χ^2 | | 447.631 | | 480.874 | | 508.820 | | 368.359 | |
| Prob > χ^2 | | 0 | | 0 | | 0 | | 0 | |

FGLS error correction model of monthly change in CDS prices.

*** p<.01; ** p<.05; * p<.1.

Explaining Monthly Changes in Sovereign Bond Spreads

| DV: Monthly EMBI | | (1) <i>Region</i> | | (2) <i>Risk Rating</i> | | (3) <i>FTSE</i> | | (4) <i>MSCI</i> | |
|--------------------------------------|-----|----------------------|-----------|---------------------------|-----------|--------------------|-----------|--------------------|-----------|
| | | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| EMBI | t-1 | -0.122*** | 0.017 | -0.119*** | 0.013 | -0.108*** | 0.014 | -0.101*** | 0.016 |
| <i>Peer Diffusion</i> | | | | | | | | | |
| Peer EMBI | t-1 | 0.056*** | 0.019 | -0.013 | 0.010 | 0.008 | 0.021 | 0.016 | 0.022 |
| | Δ | 0.492*** | 0.045 | 0.039*** | 0.014 | 0.330*** | 0.068 | 0.343*** | 0.048 |
| <i>Categories' Direct Effect</i> | | | | | | | | | |
| Category | t-1 | - | - | -2.575 | 2.665 | 0.459 | 2.604 | -69.661* | 38.010 |
| | Δ | - | - | -19.162*** | 6.609 | -16.145*** | 4.727 | -293.124*** | 112.390 |
| <i>Domestic Politics and Economy</i> | | | | | | | | | |
| Debt | t-1 | 0.288 | 0.238 | 0.447** | 0.224 | 0.147 | 0.395 | 0.300 | 0.423 |
| Budget Balance | t-1 | -0.738 | 1.017 | -1.554 | 1.021 | -0.877 | 0.934 | -1.107 | 1.029 |
| Current Account Balance | t-1 | -0.096 | 0.597 | -0.458 | 0.603 | -0.192 | 0.630 | -0.936 | 0.694 |
| Inflation | t-1 | 1.100 | 0.861 | 0.429 | 0.848 | 0.010 | 0.871 | 0.147 | 0.944 |
| GDP per capita | t-1 | 0.026** | 0.013 | 0.034** | 0.016 | 0.028** | 0.011 | 0.021 | 0.013 |
| KA Open | t-1 | -3.834 | 4.170 | -6.304 | 3.942 | -4.891 | 4.524 | -8.141 | 5.131 |
| FX Rate | t-1 | 423.703*** | 92.772 | 414.844*** | 80.726 | 396.472*** | 75.466 | 391.487*** | 84.073 |
| | Δ | 7.831 | 63.174 | 36.580 | 55.836 | 65.519 | 53.593 | 40.872 | 58.096 |
| Democracy | t-1 | 4.745* | 2.680 | 2.721 | 2.643 | 1.825 | 1.743 | 6.596*** | 1.975 |
| Months to Election | t-1 | -0.016 | 0.092 | 0.085 | 0.087 | 0.085 | 0.079 | 0.055 | 0.091 |
| <i>Common Shocks</i> | | | | | | | | | |
| US Prime Rate | t-1 | 0.001 | 1.237 | -1.889 | 1.184 | -2.719** | 1.242 | -1.414 | 1.397 |
| | Δ | -8.785 | 9.612 | -16.836* | 8.956 | -18.168* | 9.654 | -15.345 | 10.361 |
| US Stock Market | t-1 | -1.844*** | 0.703 | -4.407*** | 0.649 | -2.300*** | 0.770 | -1.933** | 0.789 |
| | Δ | 0.585 | 0.375 | 0.687* | 0.374 | 0.464 | 0.369 | 0.451 | 0.397 |
| Invest. Grade Yield | t-1 | 10.286* | 5.937 | 15.674*** | 5.670 | 12.279** | 6.014 | 15.440** | 6.008 |
| High Yield | t-1 | 5.700 | 4.498 | 13.519*** | 4.301 | 12.254*** | 4.604 | 14.447*** | 4.533 |
| Treasury Yield | t-1 | -3.146 | 8.900 | -6.066 | 8.773 | -6.348 | 8.456 | -6.166 | 9.133 |
| Volatility Premium | t-1 | -0.021 | 0.352 | -0.572* | 0.341 | -0.161 | 0.349 | -0.143 | 0.355 |
| Equity Premium | t-1 | - | 684.621 | - | 637.559 | - | 602.452 | - | 661.678 |
| | | 2001.165*** | | 3256.430*** | | 2409.243*** | | 2165.226*** | |
| Term Premium | t-1 | -0.446 | 1.954 | -0.798 | 1.955 | -0.473 | 1.940 | -0.370 | 2.050 |
| Stock Flows | t-1 | -75.523** | 31.015 | -99.812*** | 29.805 | -88.432*** | 30.169 | -99.549*** | 33.008 |
| | Δ | -9.290 | 20.898 | -14.108 | 20.200 | 9.496 | 20.475 | 3.988 | 21.805 |
| Bond Flows | t-1 | -0.000 | 0.000 | -0.001*** | 0.000 | -0.000 | 0.000 | -0.000* | 0.000 |
| | Δ | -0.000 | 0.000 | -0.000 | 0.000 | -0.000 | 0.000 | -0.000 | 0.000 |
| Energy Index | t-1 | -0.185** | 0.077 | -0.229*** | 0.070 | -0.207*** | 0.072 | -0.217*** | 0.076 |
| Time | | -0.150 | 0.168 | -0.046 | 0.166 | -0.132 | 0.210 | 0.067 | 0.198 |
| Constant | | 2.636 | 22.365 | -33.663 | 47.754 | -35.713 | 44.449 | -3.795 | 59.086 |
| N | | 940 | | 1023 | | 911 | | 959 | |
| Wald χ^2 | | 771.753 | | 741.527 | | 877.219 | | 777.530 | |

Summary Statistics: Annual Data

| Variable | Obs | Mean | Std. Dev | Min | Max |
|------------|------|--------|----------|----------|---------|
| Spread | 493 | 573.76 | 754.82 | 0.00 | 6342.27 |
| Debt | 962 | 53.11 | 36.92 | 0.65 | 384.01 |
| Maturity | 970 | 17.21 | 7.89 | 0.00 | 48.38 |
| Inflation | 1821 | 28.07 | 247.55 | -16.12 | 7481.66 |
| Budget | 1081 | -1.51 | 8.11 | -202.70 | 29.06 |
| GDP/cap | 1930 | 10315 | 11202 | 221 | 56389 |
| Fitch | 2046 | 1.91 | 2.12 | 0 | 12 |
| KA Open | 1783 | 0.85 | 1.56 | -1.85564 | 2.45573 |
| System | 1888 | 1.65 | 0.63 | 1 | 3 |
| Yrs Office | 1887 | 6.42 | 7.48 | 1 | 46 |
| Left | 1885 | 0.13 | 0.34 | 0 | 1 |
| Right | 1885 | 0.77 | 0.42 | 0 | 1 |
| Opp Right | 1614 | 0.57 | 0.49 | 0 | 1 |
| Opp Left | 1614 | 0.36 | 0.48 | 0 | 1 |
| US Prime | 2046 | 6.64 | 2.07 | 3.25 | 10.01 |