Moody's Analytics

Macroeconomic Stress Testing for Ratings

We help our clients implement stress-testing & forecasting frameworks through the following:

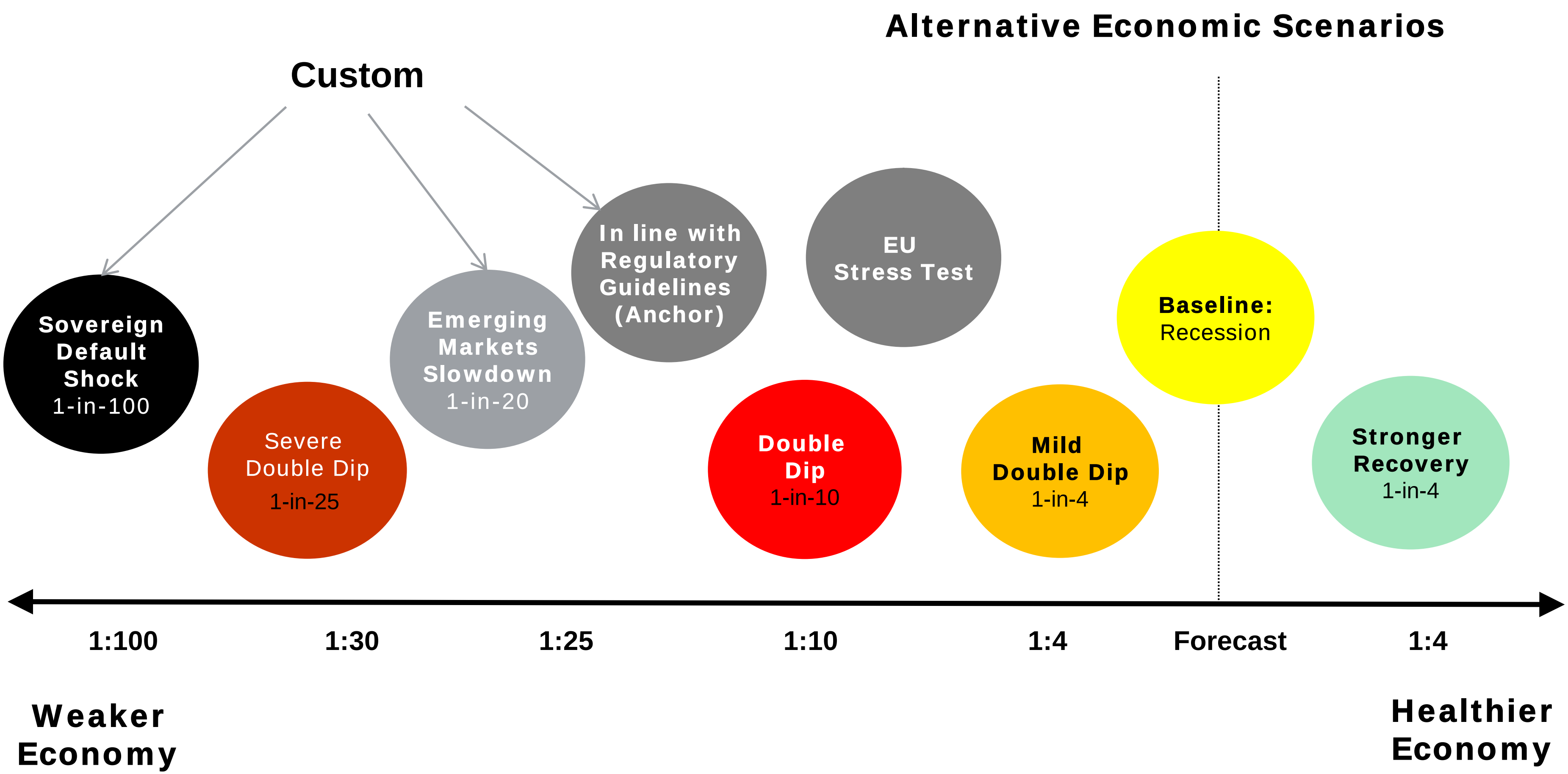
1. Macroeconomic scenario generation
   - Off-the-Shelf and Bespoke
   - Simulations
2. Linking Economic Scenarios to our clients portfolios
   - **Rating Transitions**
   - Capital Markets
   - Retail: Mortgage, Credit Card, Auto Lending, Loans, etc.
   - Structured Finance
   - Corporate loans
   - Commercial Real Estate

Disclaimer: Moody's Analytics is independent of Moody's Investors Services (MIS).

None of the results presented in this study should be related to any ratings actions or views from MIS.

Macroeconomic Scenario Development

Alternative Economic Scenarios: Off-the-Shelf & Custom



Alternative Economic Scenarios

Off-the-Shelf Economic Scenarios

- Moody's Economy.com produces a baseline forecast, representing the most likely to happen through the current business cycle
- Additionally we produce alternative scenarios to the baseline by stressing our forecast econometric models
- This of-the-shelf models allows clients to understand how different types of shocks will affect the future performance of the economy

COVERAGE

Argentina	Chile	Finland	India	Luxembourg	Peru	South Africa	Thailand
Australia	China	France	Indonesia	Malaysia	Philippines	South Korea	Turkey
Austria	Colombia	Germany	Ireland	Mexico	Poland	Spain	United Kingdom
Belgium	Czech Republic	Greece	Israel	Netherlands	Portugal	Sweden	United States
Brazil	Denmark	Hong Kong	Italy	New Zealand	Russia	Switzerland	Venezuela
Canada	Euro Zone	Hungary	Japan	Norway	Singapore	Taiwan	

Baseline Scenario

United Kingdom

GDP_{2011}: 1.30%	GDP_{2012}: 2.4%
$Inflation_{2011}$: 2.57%	$Inflation_{2012}$: 2.43%
$Unempl._{2011}$: 8.25%	$Unempl._{2012}$: 7.13%
$Interest_{2011}$: 0.81%	$Interest_{2012}$: 3.30%

Euro Zone

GDP_{2011}: 0.87%	GDP_{2012}: 1.7%
$Inflation_{2011}$: 0.66%	$Inflation_{2012}$: 1.91%
$Unempl._{2011}$: 10.67%	$Unempl._{2012}$: 10.04%
$Interest_{2011}$: 1.08%	$Interest_{2012}$: 3.75%

Peripheral Europe: Spain

GDP_{2011}: -0.87%	GDP_{2012}: 2.4%
$Inflation_{2011}$: -0.23%	$Inflation_{2012}$: 2.38%
$Unempl._{2011}$: 21.70%	$Unempl._{2012}$: 20.86%

Agenda

Implement fiscal plan
Ensure that the fiscal tightening does not hurt growth
Keep QE2 in the toolkit

Cope with Euro Sovereign Crisis
Coordinate common monetary policy
Deal with sovereign contagion

Fiscal deficit
High unemployment
Corporate distress
Public debt refinancing, high costs
Sovereign crisis contagion

Baseline Scenario

United States

GDP_{2011}: 2.69% | GDP_{2012}: 4.03%

$Inflation_{2011}$: 1.46% | $Inflation_{2012}$: 2.89%

$Unempl._{2011}$: 10.03% | $Unempl._{2012}$: 7.86%

$Interest_{2011}$: 0.25% | $Interest_{2012}$: 2.29%

China

GDP_{2011}: 8.24% | GDP_{2012}: 8.83%

$Inflation_{2011}$: 3.20% | $Inflation_{2012}$: 2.10%

$Unempl._{2011}$: 4.00% | $Unempl._{2012}$: 4.00%

$Interest_{2011}$: 5.55% | $Interest_{2012}$: 5.53%

Agenda

Tax cuts
QE3?
Fiscal deficit
Sustainable recovery
Deflationary fear

Overheating (inflationary pressure)
Currency adjustment
Dependence on external demand
Population demographics

Custom Scenarios: Assumptions & Key Risks

Shock 1: Emerging Markets Slowdown & Monetary Policy Mistakes

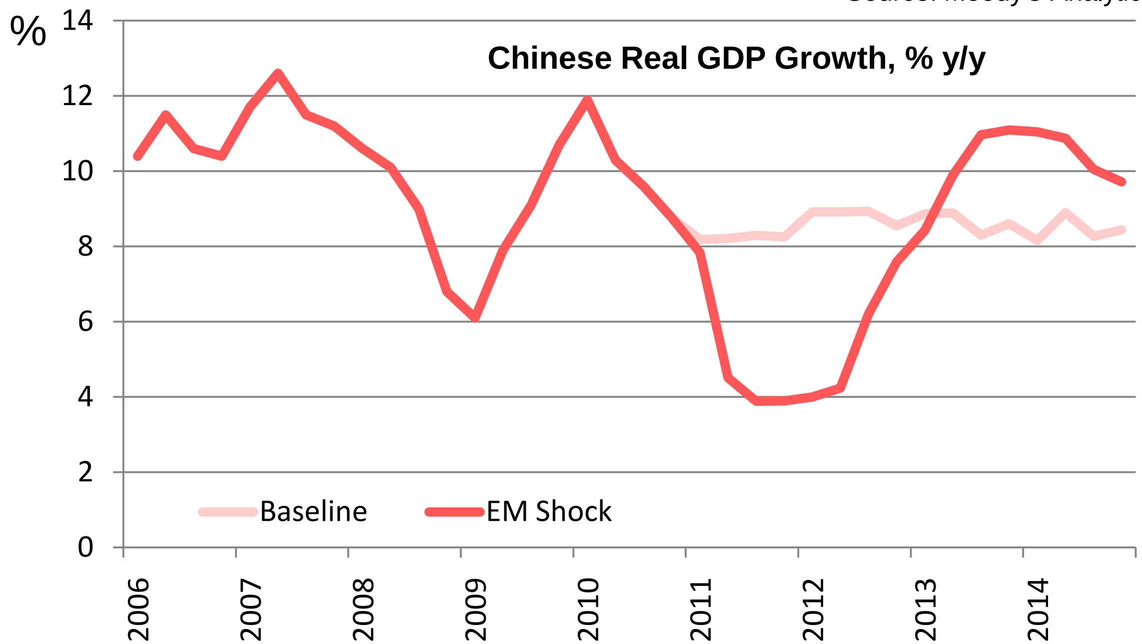
Severe scenario triggered by a slowdown in China and other large Emerging Markets and premature monetary tightening in major developed economies.

» Long term inflationary pressures urge monetary authorities to undo their policies

» Chinese growth is significantly weaker

» Commodity prices fall sharply and the global economy slips into a double dip recession

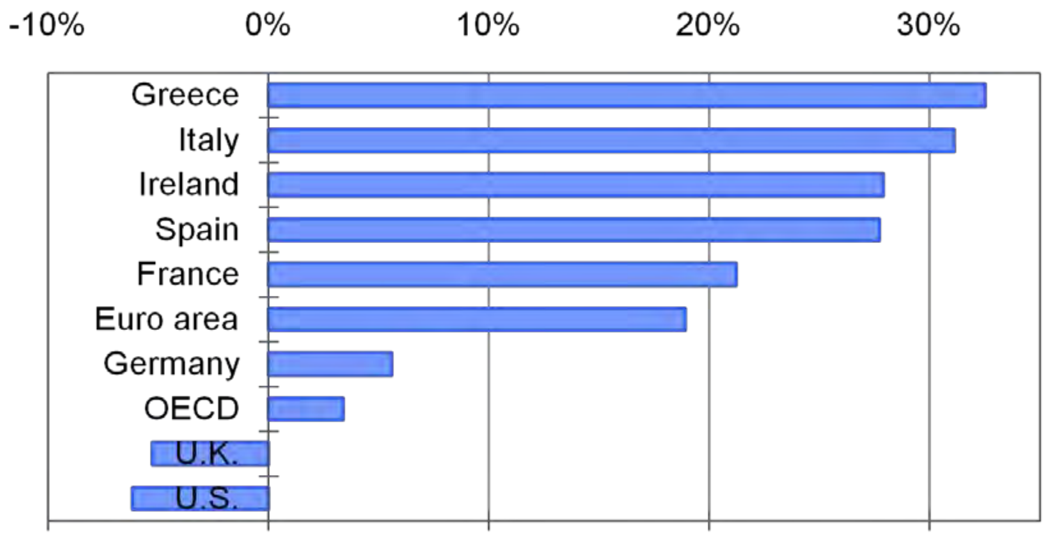
Source: Moody's Analytics



Custom Scenarios: Assumptions & Key Risks

Shock 2: European Debt Crisis: Triggered by sovereign default events in Europe

- » Contagion spreads from Greece, Portugal and Ireland to larger periphery countries: Spain, Italy
- » Greece, Ireland and Portugal fail to meet fiscal targets: (i) economic conditions put pressure on tax revenues and (ii) social pressures mount against cuts on government programs and benefits
- » EU and IMF decide not to support Greece, Ireland and Portugal who therefore default
- » European banking crisis is triggered and Euro Zone reorganizes



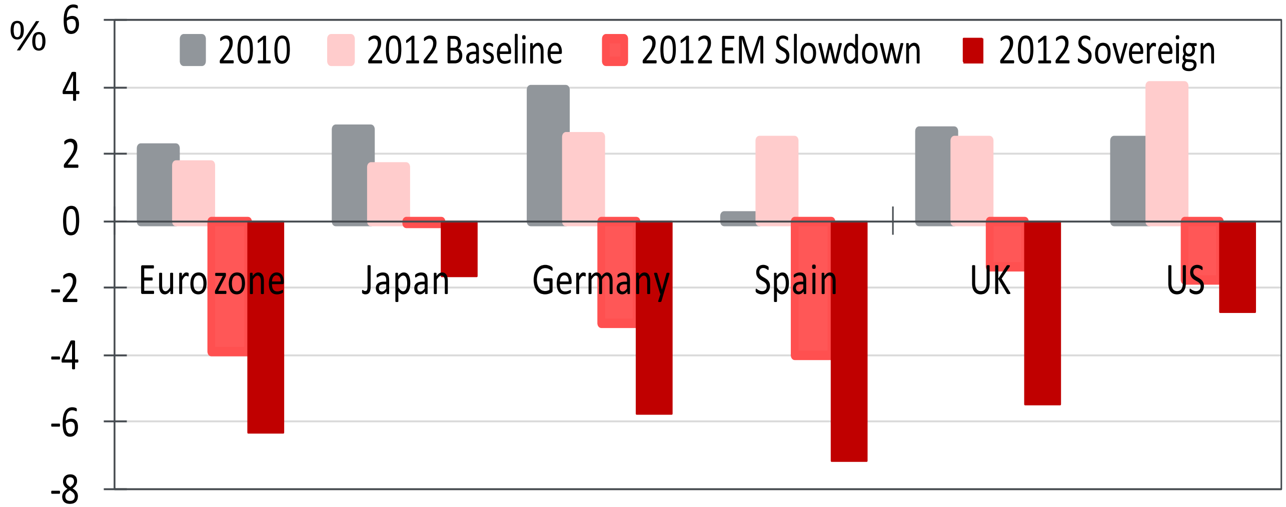
Unit labor costs in Euros, % chg, past decade

KEY STATISTICS ACROSS SCENARIOS

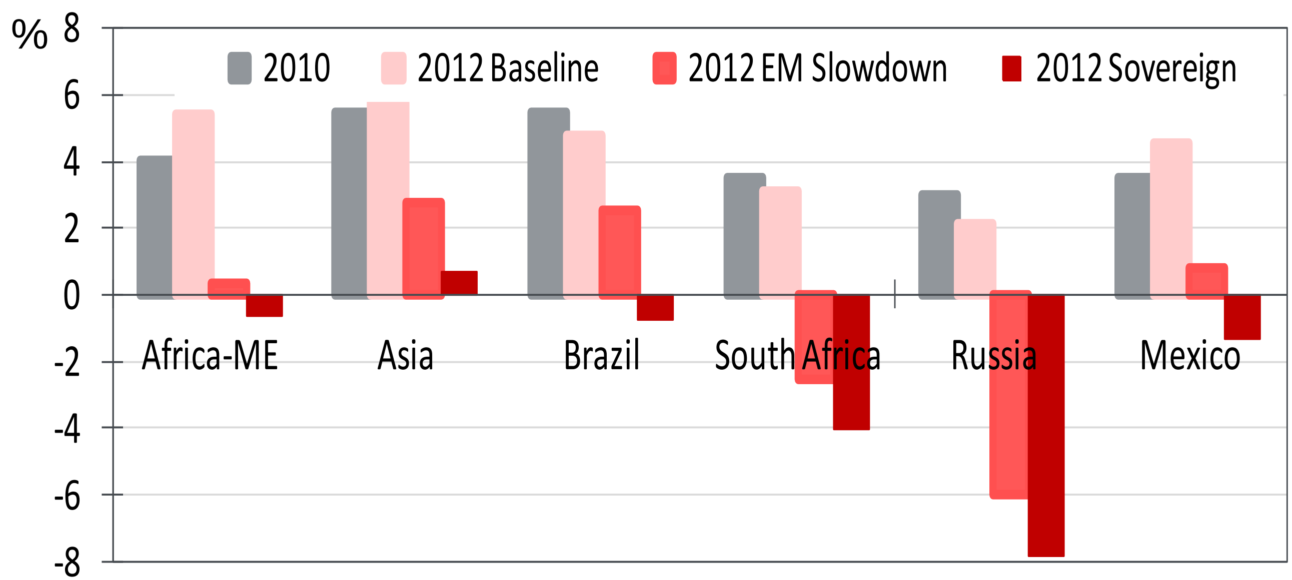
GDP Growth

Source: Moody's Analytics

Developed Markets



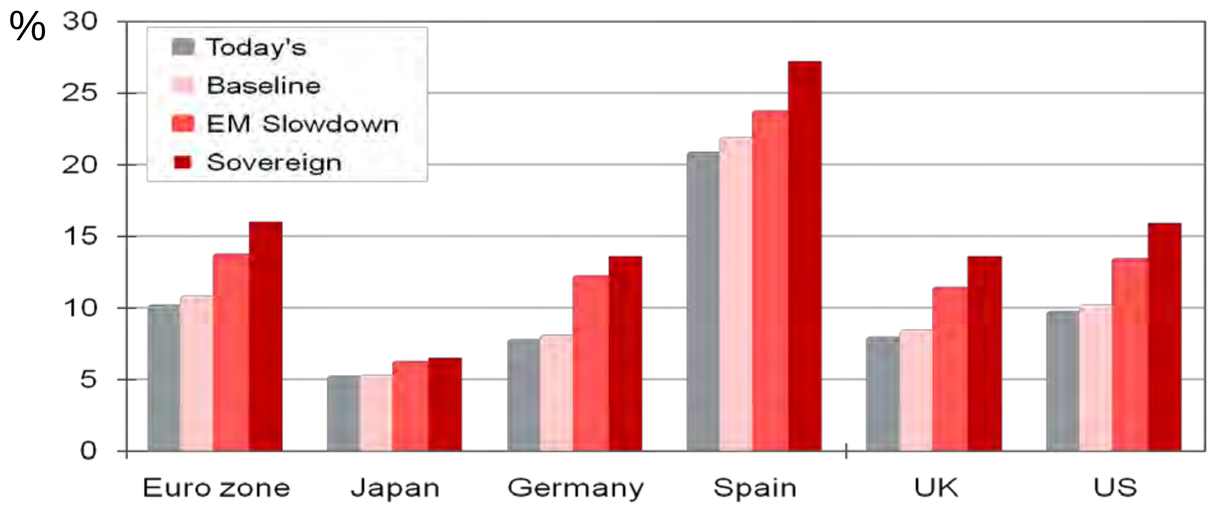
Emerging Markets



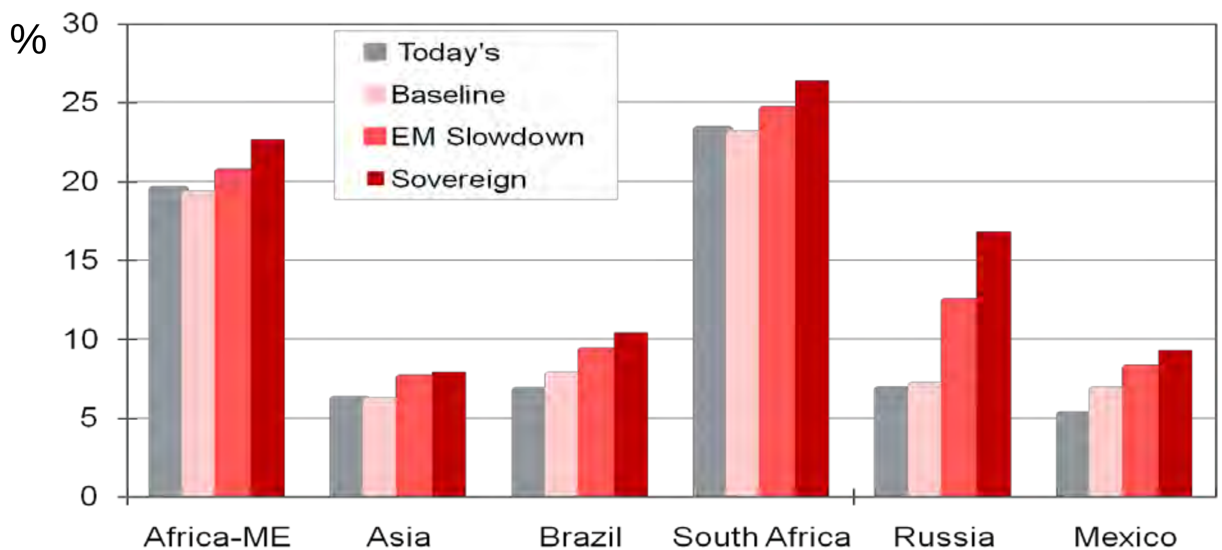
Peak Unemployment Rate

Source: Moody's Analytics

Developed Markets

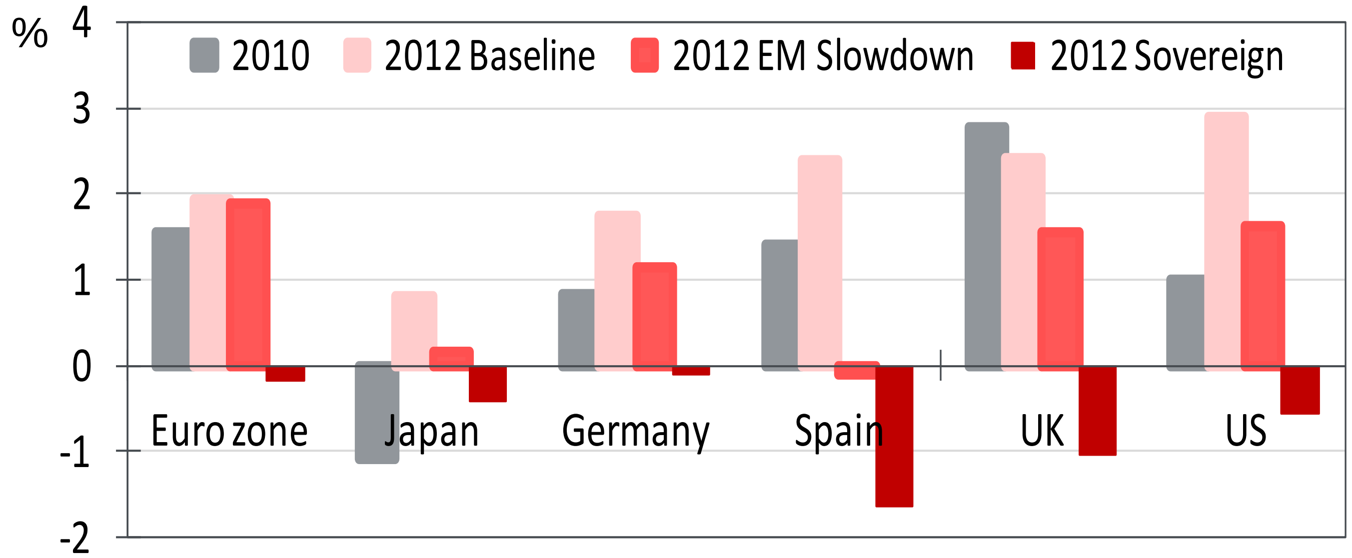


Emerging Markets



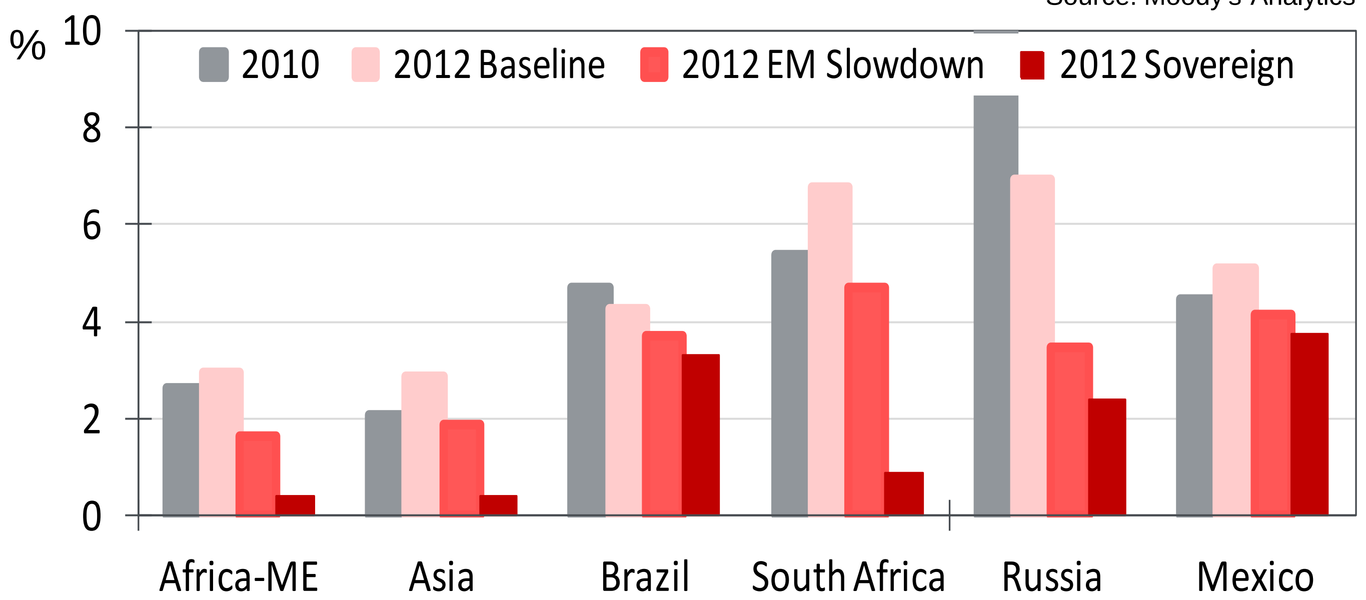
Inflation

Developed Markets



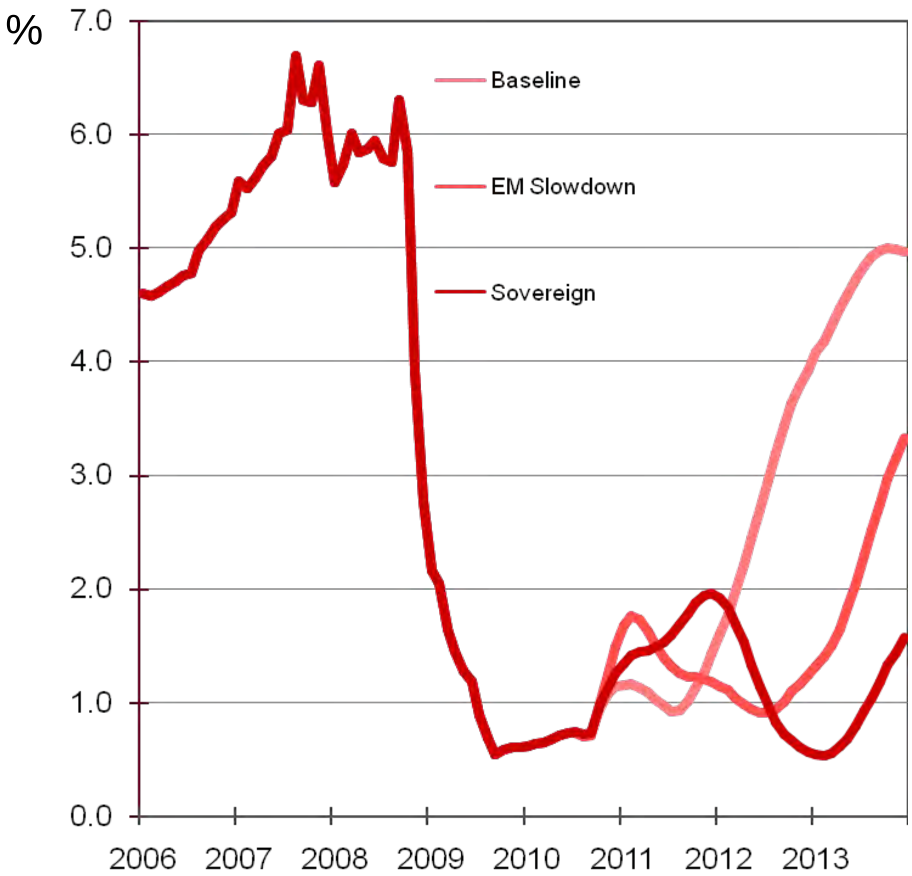
Source: Moody's Analytics

Emerging Markets

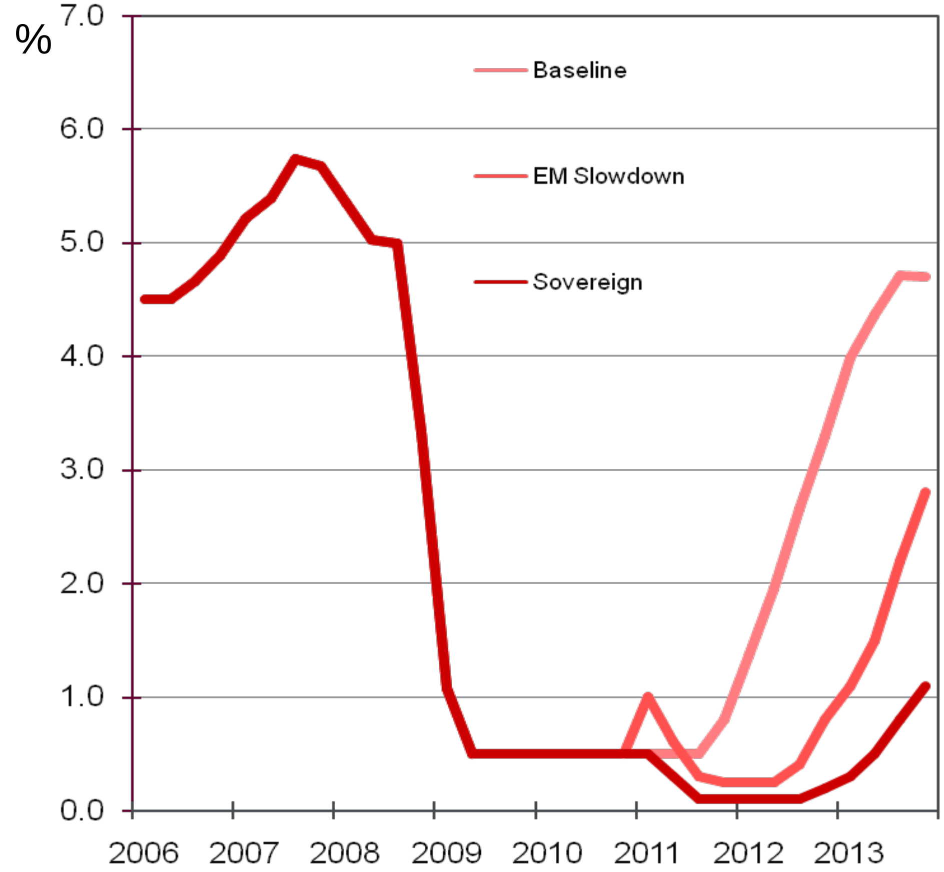


Financial Models: Money Market Rates

Source: Moody's Analytics



3-month GBP Libor

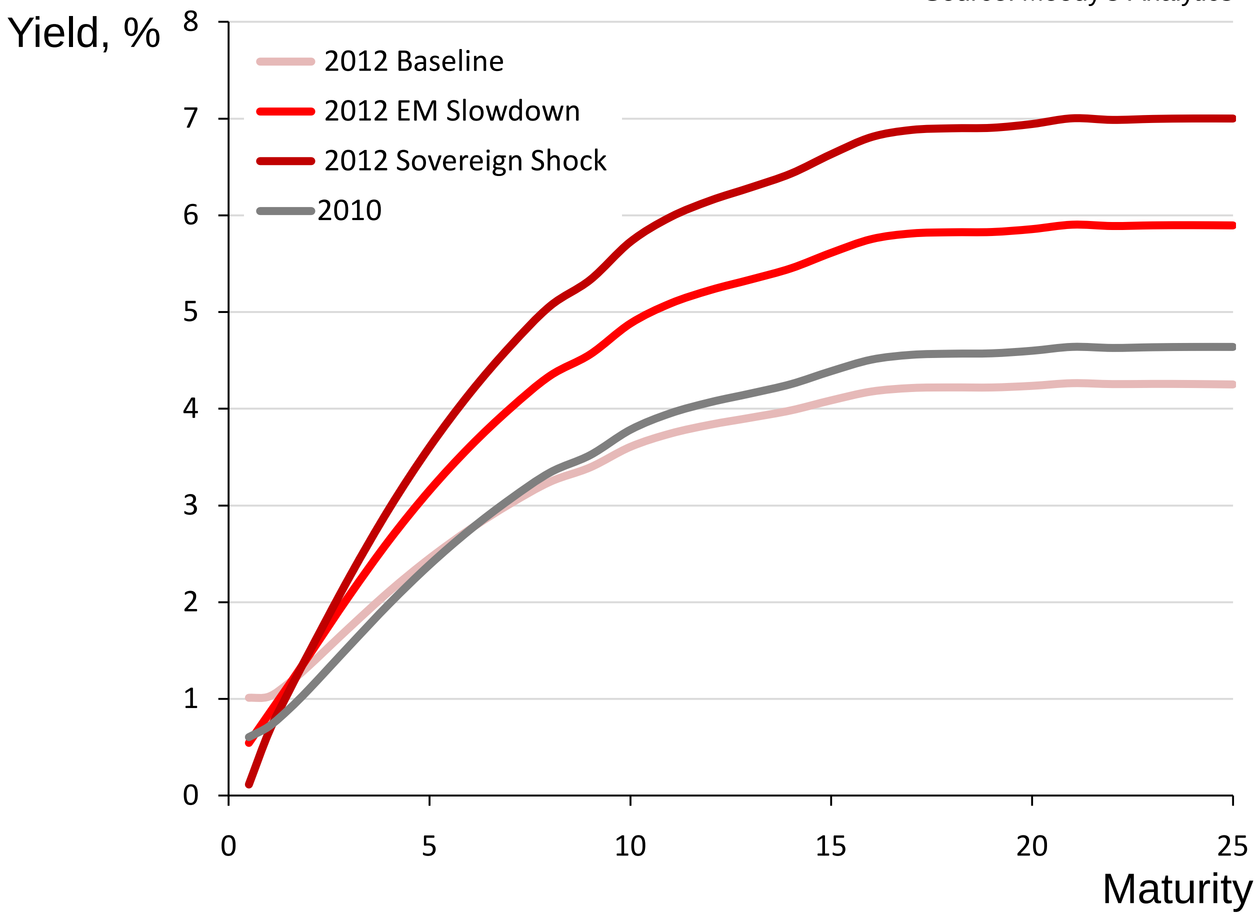


BoE Policy Rate

UK Yield Curves

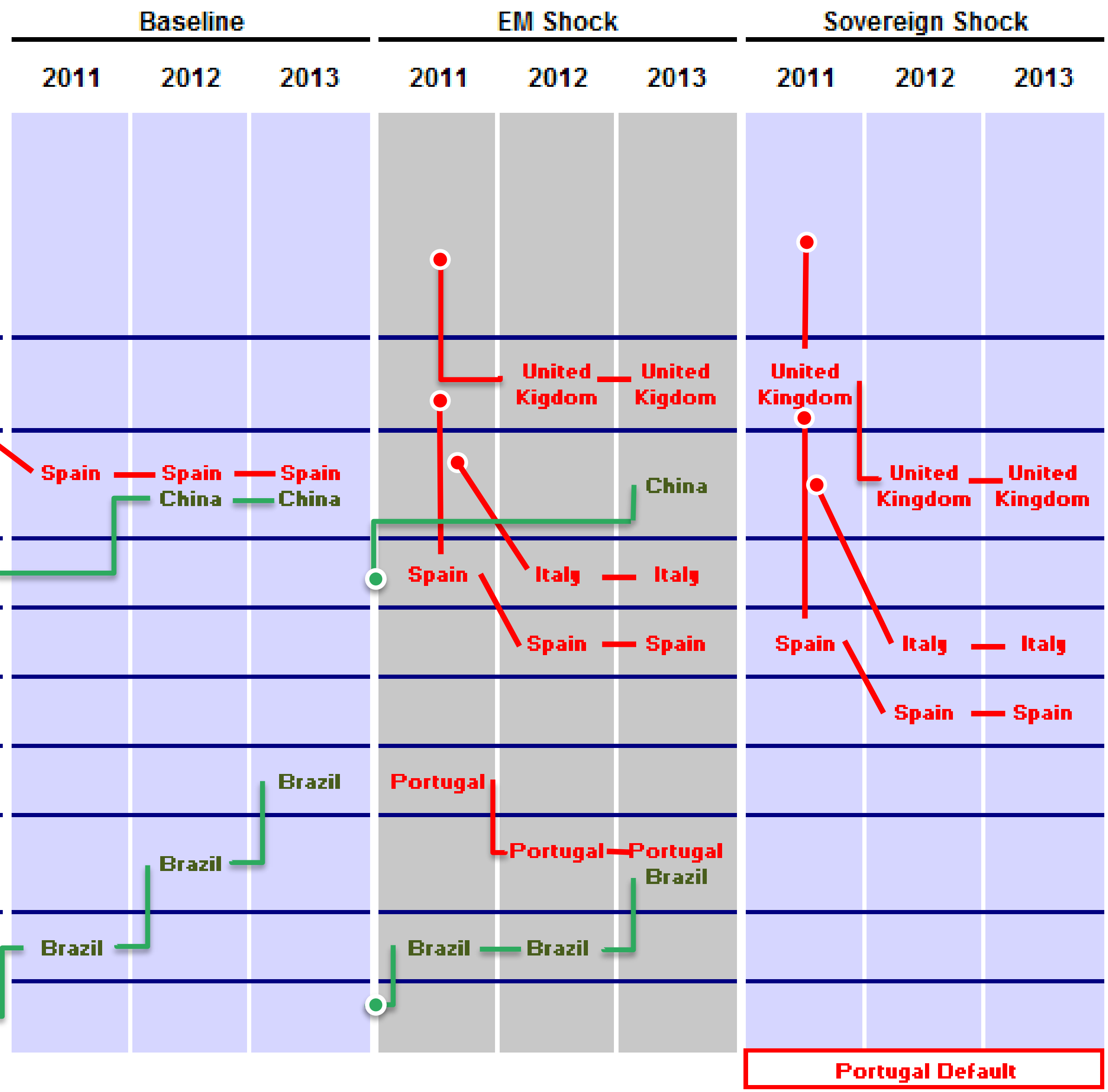
Yield curves get steeper under severe conditions as a result of solvency and currency pressures

Source: Moody's Analytics



Sovereign Credit

AAA	Australia, Austria, Canada, Denmark, Finland, France, Germany, Luxembourg, Netherlands, New Zealand, Norway, Singapore, Sweden, Switzerland, United Kingdom, United States
AA1	Belgium, Spain
AA2	United Arab Emirates, Hong Kong, Italy, Japan, Kuwait, Qatar
AA3	Chile, Saudi Arabia, China
A1	Korea, Portugal
A2	Poland
A3	South Africa
BAA1	Mexico
BAA2	Rusia
BAA3	Brazil



Stress Testing Rating Transition Matrices

Stress Testing of Rating Transitions

(1) Our solution

We can stress-test rating migrations for any portfolio of corporate (financials and non-financials) and sovereign bonds. The migration info can be provided by internal rating models and/or using Moody's transition data

(2) What we model

We model the probabilities of rating changes over time and across regions / sectors

(3) Our approach

Dynamic panel data models to capture the behaviour of transition matrices over time. This exercise allows us to quantify the sensitivity of migrations to changes in macro and financial series

(4) How we track the business and credit cycle

Blocks of probabilities in the rating matrices are modeled against some key macro and financial indicators. Examples of these are unemployment rates, GDP growth, interest rates and inflation, CDS spreads and other credit instruments, etc.

Rating Transitions Example

2011 Q3 BASELINE SCENARIO

	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca-C
Aaa	83.88%	9.12%	5.53%	0.90%	0.16%	0.35%	0.04%	0.01%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa1	1.12%	63.53%	21.69%	7.58%	3.03%	0.52%	2.02%	0.27%	0.14%	0.06%	0.01%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
Aa2	0.53%	2.86%	72.20%	17.40%	4.80%	1.43%	0.25%	0.07%	0.13%	0.19%	0.01%	0.01%	0.01%	0.01%	0.01%	0.08%	0.01%	0.01%	0.00%	0.00%
Aa3	0.06%	0.39%	1.78%	78.40%	11.78%	5.30%	1.40%	0.36%	0.34%	0.05%	0.02%	0.01%	0.01%	0.07%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%
A1	0.00%	0.04%	0.22%	2.21%	68.15%	17.44%	7.80%	2.40%	0.97%	0.31%	0.08%	0.07%	0.11%	0.03%	0.04%	0.08%	0.02%	0.02%	0.01%	0.01%
A2	0.01%	0.02%	0.13%	0.47%	2.67%	69.91%	16.15%	6.31%	2.47%	0.82%	0.31%	0.14%	0.15%	0.05%	0.07%	0.04%	0.02%	0.09%	0.02%	0.02%
A3	0.10%	0.08%	0.06%	0.08%	0.61%	5.04%	75.59%	10.87%	4.94%	1.60%	0.40%	0.17%	0.13%	0.05%	0.09%	0.03%	0.01%	0.01%	0.04%	0.06%
Baa1	0.02%	0.04%	0.06%	0.04%	0.10%	0.99%	3.66%	66.91%	17.82%	6.00%	1.60%	0.84%	0.55%	0.40%	0.24%	0.23%	0.07%	0.04%	0.03%	0.06%
Baa2	0.13%	0.20%	0.14%	0.27%	0.31%	1.55%	4.41%	14.76%	66.85%	7.07%	1.80%	0.96%	0.59%	0.30%	0.18%	0.14%	0.08%	0.03%	0.03%	0.03%
Baa3	0.04%	0.02%	0.06%	0.06%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.27%	1.78%	1.17%	0.52%	0.34%	0.21%	0.17%
Ba1	0.01%	0.01%	0.12%	0.07%	0.34%	0.16%	0.23%	0.79%	3.50%	11.39%	56.18%	9.47%	8.38%	3.26%	2.81%	1.72%	0.71%	0.26%	0.12%	0.17%
Ba2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ba3	0.00%	0.00%	0.05%	0.05%	0.02%	0.22%	0.06%	0.21%	0.47%	1.08%	3.42%	7.81%	74.54%	4.13%	4.20%	2.02%	0.85%	0.40%	0.16%	0.15%
B1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B2	0.02%	0.03%	0.14%	0.14%	0.09%	0.20%	0.47%	0.79%	0.91%	1.03%	2.30%	4.96%	11.80%	24.63%	36.78%	7.63%	3.67%	2.07%	0.79%	0.65%
B3	0.00%	0.05%	0.10%	0.01%	0.06%	0.05%	0.12%	0.13%	0.16%	0.46%	0.33%	0.48%	1.30%	4.22%	8.09%	45.99%	13.48%	11.21%	4.44%	4.28%
Caa1	0.00%	0.03%	0.05%	0.01%	0.04%	0.33%	0.07%	0.10%	0.14%	0.92%	0.60%	0.78%	1.95%	4.44%	10.13%	26.17%	40.25%	5.00%	3.56%	2.75%
Caa2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Caa3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ca-C	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

2011 Q3 SEVERE RECESSION

	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca-C
Aaa	53.39%	19.09%	16.14%	7.52%	1.86%	1.24%	0.39%	0.12%	0.09%	0.06%	0.01%	0.01%	0.00%	0.01%	0.00%	0.03%	0.01%	0.01%	0.00%	0.00%
Aa1	0.37%	25.07%	30.66%	25.88%	9.18%	3.42%	2.69%	1.13%	0.75%	0.38%	0.10%	0.05%	0.04%	0.05%	0.02%	0.08%	0.04%	0.03%	0.01%	0.01%
Aa2	0.17%	0.90%	35.57%	36.70%	15.16%	6.47%	2.38%	0.83%	0.60%	0.46%	0.11%	0.07%	0.06%	0.09%	0.03%	0.13%	0.09%	0.08%	0.03%	0.03%
Aa3	0.02%	0.13%	0.60%	46.83%	26.43%	13.99%	6.62%	2.63%	1.39%	0.48%	0.17%	0.10%	0.11%	0.19%	0.08%	0.06%	0.05%	0.05%	0.01%	0.02%
A1	0.00%	0.01%	0.07%	0.70%	36.68%	27.00%	17.89%	8.78%	4.69%	1.85%	0.64%	0.37%	0.38%	0.15%	0.15%	0.11%	0.12%	0.12%	0.06%	0.08%
A2	0.00%	0.01%	0.04%	0.14%	0.80%	38.43%	26.77%	15.94%	9.34%	3.96%	1.50%	0.76%	0.61%	0.29%	0.28%	0.14%	0.15%	0.19%	0.10%	0.16%
A3	0.03%	0.03%	0.02%	0.03%	0.19%	1.63%	44.74%	23.66%	16.03%	7.16%	2.44%	1.26%	0.86%	0.43%	0.36%	0.20%	0.20%	0.10%	0.12%	0.21%
Baa1	0.01%	0.01%	0.02%	0.02%	0.03%	0.30%	1.11%	36.08%	29.31%	15.84%	5.93%	3.41%	2.39%	1.37%	0.97%	0.61%	0.71%	0.38%	0.21%	0.29%
Baa2	0.06%	0.09%	0.07%	0.13%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6.41%	[illegible]	[illegible]	1.36%	0.99%	0.57%	0.69%	0.33%	0.21%	0.24%
Baa3	0.01%	0.01%	0.02%	0.02%	0.07%	0.08%	0.11%	0.39%	1.57%	32.62%	16.30%	12.01%	10.68%	5.85%	5.18%	2.89%	3.97%	2.18%	1.14%	1.31%
Ba1	0.00%	0.00%	0.04%	0.02%	0.10%	0.05%	0.07%	0.22%	1.01%	3.57%	36.59%	12.51%	13.46%	7.48%	6.96%	3.90%	5.44%	2.89%	1.31%	1.47%
Ba2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ba3	0.00%	0.00%	0.02%	0.02%	0.00%	0.08%	0.02%	0.07%	0.15%	0.32%	1.16%	2.92%	59.31%	7.59%	8.07%	4.35%	6.41%	3.56%	1.56%	1.60%
B1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B2	0.00%	0.01%	0.05%	0.05%	0.02%	0.04%	0.14%	0.22%	0.26%	0.24%	0.55%	1.26%	3.45%	9.31%	30.38%	7.95%	14.06%	10.04%	5.10%	5.51%
B3	0.00%	0.01%	0.02%	0.00%	0.01%	0.01%	0.02%	0.02%	0.03%	0.10%	0.08%	0.07%	0.27%	0.81%	1.48%	12.70%	12.31%	14.46%	10.47%	15.06%
Caa1	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.01%	0.02%	0.15%	0.11%	0.07%	0.31%	0.62%	1.33%	4.69%	23.26%	12.92%	12.55%	16.13%
Caa2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Caa3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ca-C	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Stress Testing of Rating Transitions – Case Study

Case study: Stress Testing of European Corporate Migration

We present a brief case study which considers the effect of a very severe scenario (a sovereign shock) on credit migration of European companies -for all the 35 industries monitored by Moody's, for a total of 1,219 entities.

Historical Matrices 2007-2009 for 1,219 companies

2007

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	92.58%	7.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	3.62%	89.57%	6.81%	0.00%	0.00%	0.00%	0.00%	0.00%
A	0.00%	16.36%	80.14%	3.29%	0.21%	0.00%	0.00%	0.00%
Baa	0.00%	0.42%	10.83%	86.25%	2.08%	0.42%	0.00%	0.00%
Ba	0.00%	0.00%	0.00%	10.55%	80.00%	9.45%	0.00%	0.00%
B	0.00%	0.00%	0.00%	1.60%	16.38%	77.96%	4.06%	0.00%
Caa-C	0.00%	0.00%	0.00%	0.00%	0.00%	12.81%	79.52%	7.66%

2008

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	84.57%	14.06%	0.00%	1.37%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	90.73%	7.29%	0.83%	0.00%	0.00%	0.31%	0.83%
A	0.00%	1.89%	93.26%	3.68%	0.00%	0.00%	0.32%	0.84%
Baa	0.00%	0.00%	5.14%	88.52%	5.46%	0.44%	0.44%	0.00%
Ba	0.00%	0.00%	0.00%	2.03%	84.08%	9.94%	2.99%	0.96%
B	0.00%	0.00%	0.00%	0.77%	5.19%	82.78%	10.49%	0.77%
Caa-C	0.00%	0.00%	0.00%	0.00%	0.00%	2.30%	88.61%	9.09%

2009

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	90.02%	9.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	74.22%	23.59%	1.88%	0.31%	0.00%	0.00%	0.00%
A	0.00%	0.52%	81.37%	17.17%	0.31%	0.00%	0.31%	0.31%
Baa	0.00%	0.00%	1.76%	86.77%	11.03%	0.00%	0.00%	0.44%
Ba	0.00%	0.00%	0.00%	1.04%	65.66%	24.97%	1.04%	7.28%
B	0.00%	0.00%	0.00%	0.00%	0.90%	70.40%	20.90%	7.80%
Caa-C	0.00%	0.00%	0.00%	0.00%	0.00%	12.21%	55.14%	32.65%

Stress Testing of Rating Transitions – Case Study

We dynamically forecast the probability of a credit event taking place (be the credit event CE an upgrade, a downgrade or a default) E(prob(CE) | $\Omega_{j,t}$), where Ω is the information set which includes the macroeconomic drivers, and j = B, A is the Baseline or Alternative scenario at time t

Each Matrix is forecasted under a baseline forecast scenario (most likely to occur) and a very severe custom scenario were we see a sovereign event followed by a deflationary period

Stress Testing of Rating Transitions – Case Study

Forecasts

2011 Baseline Scenario (TOP), 2011 Stressed Scenario (BOTTOM)

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	90.15%	9.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.13%	74.34%	23.47%	1.76%	0.31%	0.00%	0.00%	0.00%
A	0.13%	0.65%	81.50%	17.04%	0.19%	0.00%	0.06%	0.31%
Baa	0.25%	0.25%	2.01%	86.21%	10.78%	0.00%	0.00%	0.00%
Ba	0.25%	0.25%	0.25%	1.29%	65.91%	24.47%	0.54%	7.03%
B	0.25%	0.25%	0.25%	0.25%	1.15%	70.65%	19.65%	7.55%
Caa-C	0.38%	0.38%	0.38%	0.38%	0.38%	12.59%	55.52%	30.02%

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	89.77%	11.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	70.22%	25.59%	3.88%	0.31%	0.00%	0.00%	0.00%
A	0.00%	0.00%	78.15%	19.17%	2.31%	0.00%	0.06%	0.31%
Baa	0.00%	0.00%	0.00%	85.97%	14.03%	0.00%	0.00%	0.00%
Ba	0.00%	0.00%	0.00%	0.00%	51.71%	29.97%	6.04%	12.28%
B	0.00%	0.00%	0.00%	0.00%	0.00%	53.30%	29.90%	16.80%
Caa-C	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	51.64%	48.36%

Stress Testing of Rating Transitions – Case Study

Forecasts

2012 Baseline Scenario (TOP), 2012 Stressed Scenario (BOTTOM)

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	92.83%	7.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	3.87%	89.57%	6.56%	0.00%	0.00%	0.00%	0.00%	0.00%
A	0.25%	16.61%	80.10%	3.04%	0.00%	0.00%	0.00%	0.00%
Baa	0.50%	0.92%	11.33%	85.67%	1.58%	0.00%	0.00%	0.00%
Ba	0.50%	0.50%	0.50%	11.05%	78.75%	8.70%	0.00%	0.00%
B	0.50%	0.50%	0.50%	2.10%	16.88%	76.96%	2.56%	0.00%
Caa-C	0.00%	0.00%	0.00%	0.00%	0.00%	13.56%	80.27%	6.16%

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	84.44%	14.18%	0.00%	1.37%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	90.79%	7.42%	0.96%	0.00%	0.00%	0.00%	0.83%
A	0.00%	1.77%	93.14%	3.81%	0.13%	0.13%	0.19%	0.84%
Baa	0.00%	0.00%	4.89%	88.27%	5.71%	0.69%	0.19%	0.25%
Ba	0.00%	0.00%	0.00%	1.78%	83.83%	9.44%	3.24%	1.71%
B	0.00%	0.00%	0.00%	0.52%	4.94%	82.53%	9.99%	2.02%
Caa-C	0.00%	0.00%	0.00%	0.00%	0.00%	1.92%	88.24%	9.84%

Stress Testing of Rating Transitions – Case Study

Forecasts

2013 Baseline Scenario (TOP), 2013 Stressed Scenario (BOTTOM)

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	96.68%	3.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.70%	95.41%	3.76%	0.13%	0.00%	0.00%	0.00%	0.00%
A	0.12%	1.46%	94.60%	3.82%	0.00%	0.00%	0.00%	0.00%
Baa	0.00%	0.00%	13.69%	83.52%	2.04%	0.25%	0.25%	0.25%
Ba	0.00%	0.00%	0.00%	10.15%	85.46%	3.38%	0.25%	0.75%
B	0.00%	0.00%	0.00%	0.00%	10.62%	83.36%	4.77%	1.25%
Caa-C	0.00%	0.00%	0.00%	0.00%	4.35%	15.25%	74.60%	5.79%

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	96.55%	3.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.58%	95.28%	3.89%	0.25%	0.00%	0.00%	0.00%	0.00%
A	0.00%	1.33%	94.22%	3.95%	0.25%	0.25%	0.00%	0.00%
Baa	0.00%	0.00%	12.94%	83.27%	2.29%	0.50%	0.50%	0.50%
Ba	0.00%	0.00%	0.00%	9.15%	85.21%	3.88%	0.75%	1.00%
B	0.00%	0.00%	0.00%	0.00%	9.37%	83.11%	6.02%	1.50%
Caa-C	0.00%	0.00%	0.00%	0.00%	5.48%	14.88%	71.22%	8.42%

Stress Testing of Rating Transitions – Case Study

Forecasts

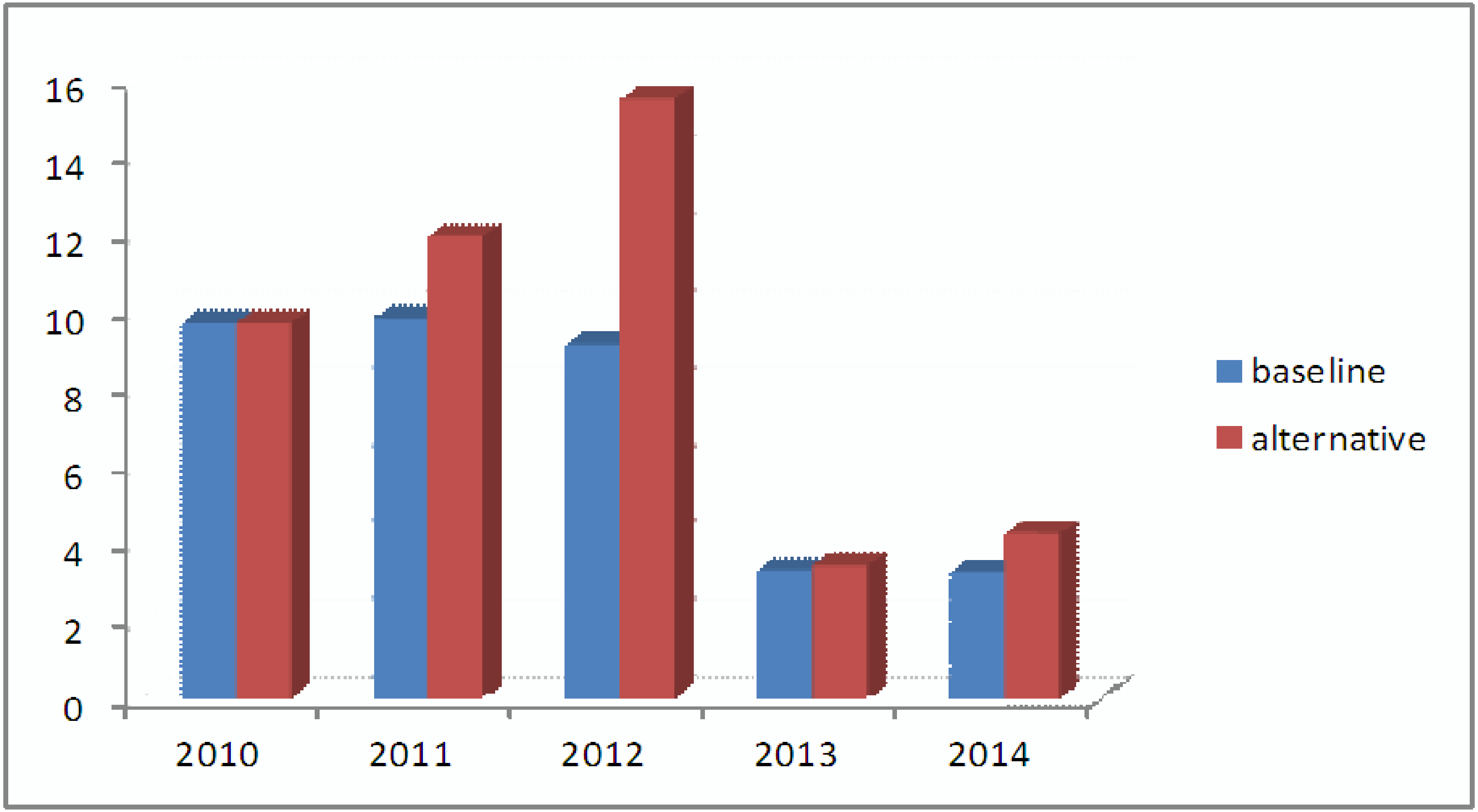
2014 Baseline Scenario (TOP), 2014 Stressed Scenario (BOTTOM)

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	96.73%	3.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.76%	95.46%	3.71%	0.08%	0.00%	0.00%	0.00%	0.00%
A	0.00%	1.51%	94.65%	3.77%	0.08%	0.00%	0.00%	0.00%
Baa	0.00%	0.00%	14.34%	83.67%	1.89%	0.10%	0.00%	0.00%
Ba	0.00%	0.00%	0.00%	10.95%	85.61%	3.23%	0.10%	0.10%
B	0.00%	0.00%	0.00%	0.00%	11.57%	83.51%	4.62%	0.30%
Caa-C	0.00%	0.00%	0.00%	0.00%	5.98%	15.50%	74.85%	3.67%

	Aaa	Aa	A	Baa	Ba	B	Caa-C	Def
Aaa	95.73%	4.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.29%	96.43%	3.16%	0.13%	0.00%	0.00%	0.00%	0.00%
A	0.09%	2.09%	93.03%	4.55%	0.13%	0.13%	0.00%	0.00%
Baa	0.00%	0.87%	4.64%	89.98%	3.40%	0.68%	0.43%	0.00%
Ba	0.00%	0.00%	0.00%	12.25%	79.30%	8.20%	0.15%	0.10%
B	0.00%	0.00%	0.68%	0.00%	7.42%	81.63%	5.01%	5.26%
Caa-C	0.00%	0.00%	0.00%	0.00%	0.00%	17.28%	76.04%	6.68%

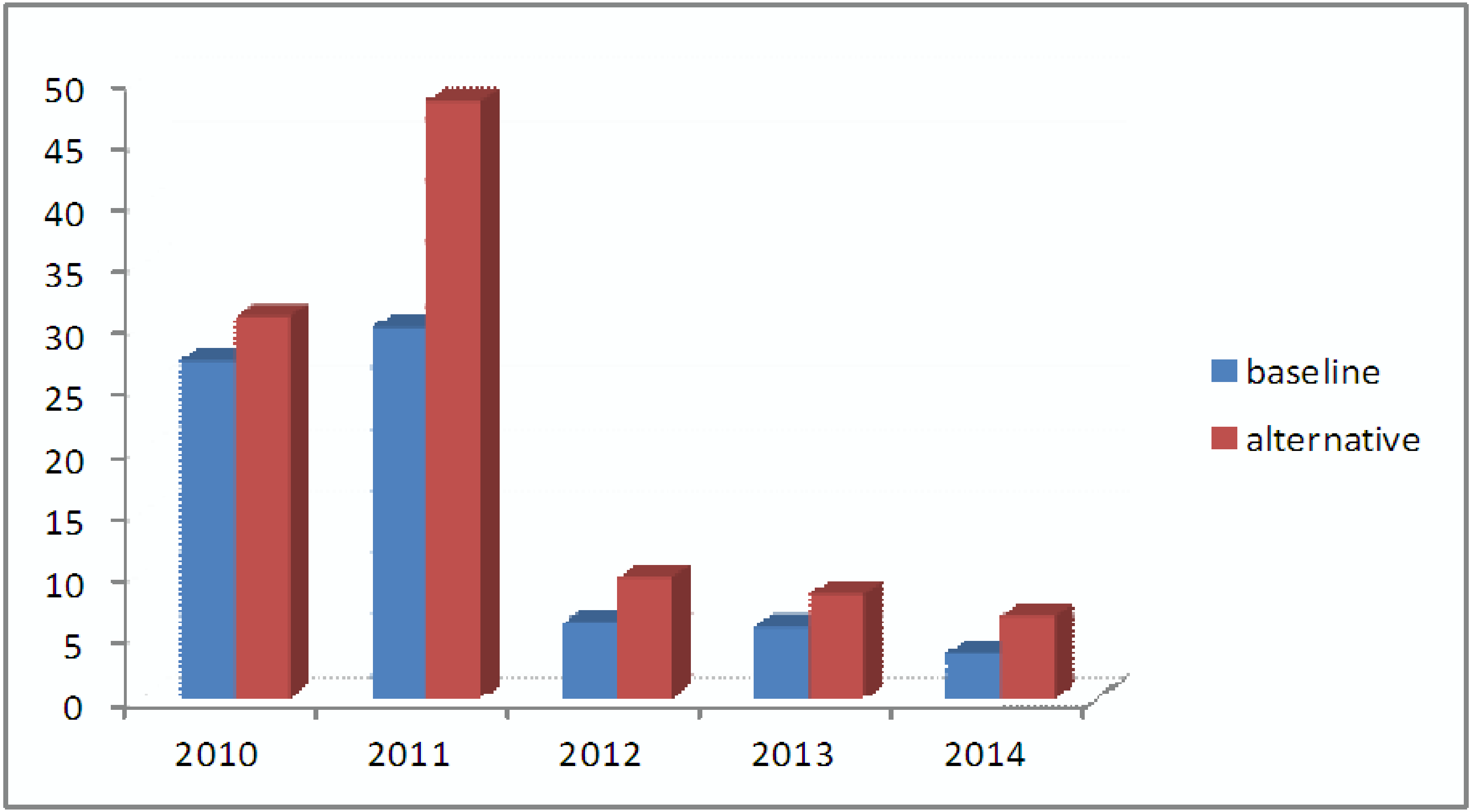
Stress Testing of Rating Transitions – Case Study

AAA Coporates, downgrades, %



Stress Testing of Rating Transitions – Case Study

Caa-C Corporates, defaults, %



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