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Demographics, Debt & Sovereign ratings

Global Demographics and Pensions Research

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Can demographics help explain sovereign ratings?

In this report, we draw on our experience in modelling crises and sovereign ratings, quantitative macroeconomic modelling focused on "micro foundations of macroeconomics" and demographics. The subprime credit crisis and the post-Lehman European credit crisis has led to ratings changes of many countries—Spain, Greece, Ireland, the US and the UK. We show that demographics plays a role in explaining sovereign ratings using a set of macro factors that is affected by demographics.

- We extend our previous modeling framework that explained sovereign ratings across 36 emerging markets to 36 developed countries in this report. We focus on 36 developed countries over three years (2009, 2010 and 2011). The countries in our sample include the EU28 members, Australia, Canada, Iceland, Japan, New Zealand, Norway, Switzerland and the US.
- Our previous research on demographics has related it to, among others, GDP growth, fiscal sustainability and asset prices. At a simple level, demographics is important as it directly influences GDP per capita. We re-emphasize the need to balance investor focus on both GDP per capita and GDP, rather than just on GDP and GDP growth. Many developing countries have high GDP growth but much lower GDP per capita and GDP per capita growth.
- The focus on GDP per capita and disposable income is important as they influence individual and household consumption, savings, borrowing and debt. Aggregating individual numbers gives a measure at a country or aggregate level but the micro-dynamics at individual levels is very important too.
- We show that long-term sovereign foreign currency debt ratings assigned by Moody's as well as Standard & Poor's can be explained by GDP per capita, narrow money growth, household savings, government debt and openness of an economy. This is similar to the results from a similar framework that we developed to explain EM sovereign ratings across 36 countries in 2000.
- While more than five years have passed since the Lehman debacle, a very important yet simple lesson that we have learnt and emphasize is that "fundamental macro factors" need to be followed closely to understand the sovereign ratings and fiscal sustainability of countries. In our previous research, we acknowledge that "self-fulfilling crises, sentiment and herding behaviour" have emerged as very important supplementary factors that have explained the debt crises in Russia, Brazil and Mexico.

ANALYST CERTIFICATIONS AND IMPORTANT DISCLOSURES ARE IN THE DISCLOSURE APPENDIX. FOR OTHER IMPORTANT DISCLOSURES, PLEASE REFER TO https://firesearchdisclosure.credit-suisse.com.

In this report we connect demographics to sovereign ratings through economic variables which explain the foreign currency long-term debt ratings of developed market sovereigns assigned by Moody's and Standard & Poor's. The foreign currency ratings reflect the strength of a country to service its long-term foreign currency debt. They are an assessment (by ratings agencies) of the ability of governments to mobilize foreign reserves to repay their outstanding foreign currency debt on a timely basis.

Demographics in our view relates to consumer and worker characteristics. In previous reports, we detailed how demographics links with GDP growth[1], inflation, savings, capital flows[2], household budgets, government debt[3] and fiscal sustainability[4]. We explain the variation in Moody's and S&P ratings of 36 developed markets in 2009-11 based on five macroeconomic variables, which are affected by underlying demographic factors. The macro variables are log (GDP per capita), year-on-year change in M1, net savings ratio of households and non-profit institutions (as a share of disposable income), general government gross debt (as a share of GDP) and trade openness (as a share of GDP). Our analysis extends our previous modelling framework used to explain emerging markets' sovereign ratings[5] to developed markets and builds on the research of Cantor and Packer (1996)[6].

The macro variables act as a summary statistic that influences the foreign currency rating of countries. "Fundamental macro factors" need to be followed closely to understand the sovereign ratings of countries. We acknowledge that "self-fulfilling crises, sentiment and herding behaviour[7]" have emerged as very important supplementary factors too.

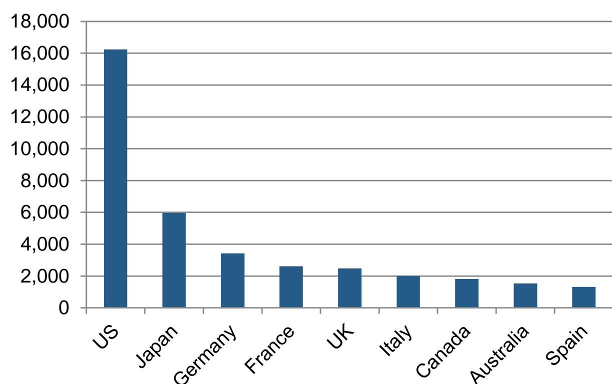
We find that the power of the regressions and the significance of the macro variables changes across the three years. This reflects changes in the way the ratings agencies assign ratings over the years, stage of business cycle and policy responses.

GDP vs. GDP per capita

Our 36-country sample includes 28 member countries of the European Union (the EU), Australia, Canada, Iceland, Japan, New Zealand, Norway, Switzerland and the US.

Exhibit 1: Ranking of selected countries by nominal GDP, 2012

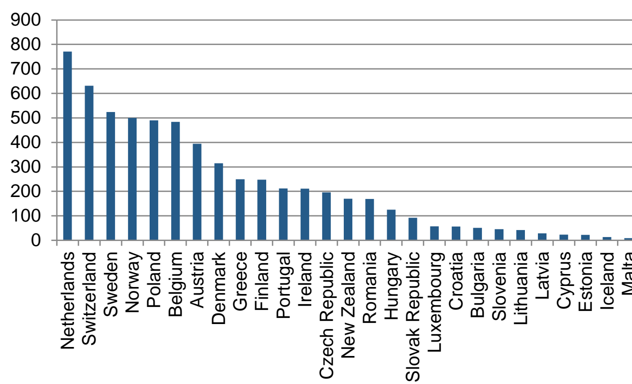
Current USD in billions



Source: IMF, Credit Suisse

Exhibit 2: Ranking of selected countries by nominal GDP, 2012

Current USD in billions



Source: IMF, Credit Suisse

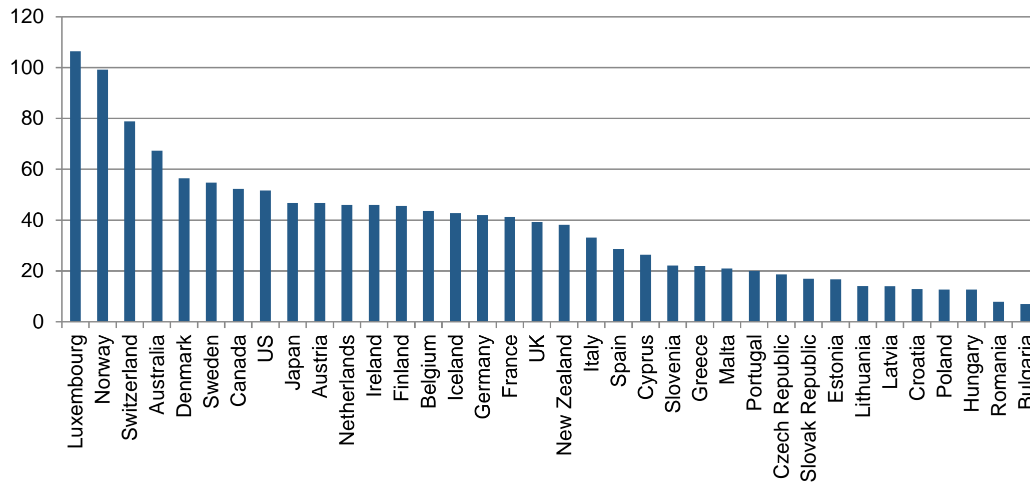
[1] Credit Suisse Demographics Research, "A Demographic Perspective of Economic Growth" (2009)
[2] Credit Suisse Demographics Research, "Demographics, Capital Flows and Exchange Rates" (2007)
[3] Credit Suisse Demographics Research, "European Demographics and Fiscal Sustainability" (2013)
[4] Credit Suisse Demographics Research, "A Demographic Perspective of Fiscal Sustainability: Not Just the Immediate Term Matters" (2010)
[5] Credit Suisse Research, "The Emerging Markets Ratings Model (2000)
[6] Cantor R. and Packer F.," Determinants and Impact of Sovereign Credit Ratings" (1996), FRBNY Economic Policy Review
[7] Kindleberger C," Manias, Panics and Crashes- A History of Financial Crises" (1996)

We restrict ourselves to developed countries due to reasons of data comparability and statistics. Exhibits 1 and 2 present the GDP ranking of countries in our sample. The 2012 GDP of the selected countries ranges from 8.75 current USD billion in Malta to 16.24 current USD trillion in the US. We caution against a singular emphasis on GDP and its growth, stressing that GDP per capita and its growth are also very important.

This is evident from Exhibit 3 which presents the GDP per capita rankings of countries (current USD) in 2012. Luxembourg, Norway, Switzerland and Australia rank very highly in terms of GDP per capita, which isn't the case if we rank countries by GDP. Population size and other core demographic indicators for our sample countries are presented in Exhibit 18 in the Appendix.

Exhibit 3: Ranking of selected countries by GDP per capita, 2012

Current USD in thousands

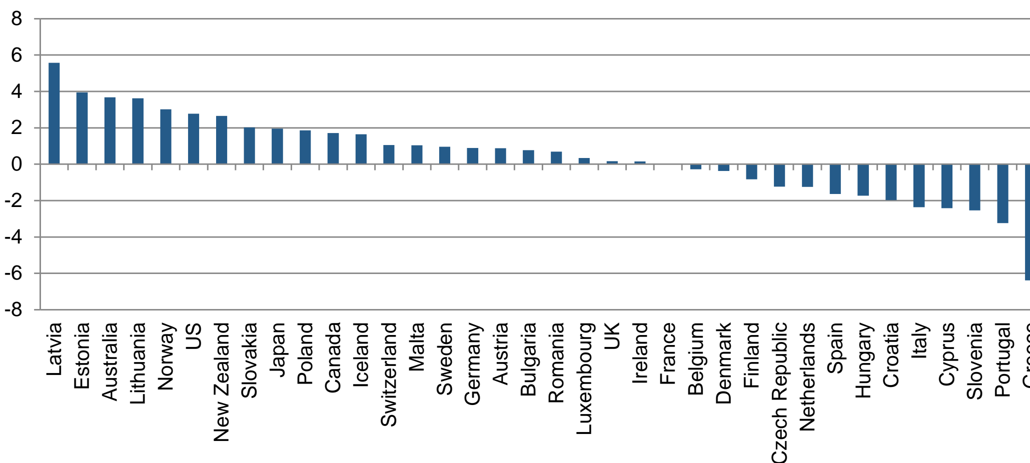


Source: IMF, Credit Suisse

Popular financial news tends to focus a lot on GDP growth. In Exhibit 4 we present country rankings based on real GDP growth which are different from the rankings in Exhibit 3.

Exhibit 4: Ranking of selected countries by real GDP growth, 2012

Rate per annum (%)



Source: IMF, Credit Suisse

We believe that it is also important to focus on GDP per capita growth of countries as an indicator of improvements or changes in average economic well-being.

Estimation Methodology and Variables

In order to explain sovereign ratings using macroeconomic factors, we use the scale in Exhibit 5 to convert the sovereign long-term debt ratings assigned by Moody's[8] and S&P[9] to scores. The numerical scores range from 1 to 20 with 1 assigned to the highest sovereign credit rating that any country could attain and 20 to the lowest. A higher score indicates a worse sovereign rating than a lower score.

Exhibit 5: Conversion Scale: Moody's and S&P ratings to score

Moody's foreign currency long-term debt rating	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	SD
Converted Score	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20	20	20	20
S&P foreign currency long-term debt rating	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	SD
Converted Score	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20	20	20	20

Source: Moody's, S&P, Credit Suisse

Note the frequent Moody's ratings downgrades in Greece, Portugal and Spain relative to Germany, Japan and the US since 2007 in Exhibit 6.

Exhibit 6: Moody's ratings since 2007: Greece, Portugal, Spain, Germany, Japan and the US

Greece		Portugal		Spain		Germany		Japan		US	
Rating since	Rating	Rating since	Rating	Rating since	Rating	Rating since	Rating	Rating since	Rating	Rating since	Rating
Jan 1 2007	A1	Jan 1 2007	Aa2	Jan 1 2007	Aaa	Jan 1 2007	Aaa	Jan 1 2007	Aaa	Jan 1 2007	Aaa
Dec 22 2009	A2	Jul 13 2010	A1	Sep 30 2010	Aa1			May 18 2009	Aa2		
Apr 22 2010	A3	Mar 15 2011	A3	Mar 10 2011	Aa2			Aug 24 2011	Aa3		
Jun 14 2010	Ba1	Apr 5 2011	Baa1	Oct 18 2011	A1						
Mar 7 2011	B1	Jul 5 2011	Ba2	Feb 13 2012	A3						
Jun 1 2011	Caa1	Feb 13 2012	Ba3	Jun 13 2012	Baa3						
Jul 25 2011	Ca										
Mar 2 2012	C										

Source: Moody's, Credit Suisse

The S&P ratings changes (Exhibit 7) are more frequent than Moody's (Exhibit 6) for Greece, Spain and the US.

Exhibit 7: S&P ratings since 2007: Greece, Portugal, Spain, Germany, Japan and the US

Greece		Portugal		Spain		Germany		Japan		US	
Rating since	Rating	Rating since	Rating	Rating since	Rating	Rating since	Rating	Rating since	Rating	Rating since	Rating
Jan 1 2007	A	Jan 1 2007	AA-	Jan 1 2007	AAA	Jan 1 2007	Aaa	Jan 1 2007	AA	Jan 1 2007	AAA
Jan 14 2009	A-	Jan 21 2009	A+	Jan 19 2009	AA+			Jan 27 2011	AA-	Aug 5 2011	AA+
Dec 16 2009	BBB+	Apr 27 2010	A-	Apr 28 2010	AA						
Apr 27 2010	BB+	Mar 24 2011	BBB	Oct 13 2011	AA-						
Mar 29 2011	BB-	Mar 29 2011	BBB-	Jan 13 2012	A						
May 9 2011	B	Jan 13 2012	BB	Apr 26 2012	BBB+						
Jun 13 2011	CCC			Oct 10 2012	BBB-						
Jul 27 2011	CC										
Feb 27 2012	SD										
May 2 2012	CCC										
Dec 5 2012	SD										
Dec 18 2012	B-										

Source: S&P, Credit Suisse

[8] Moody's Investors Service, "Sovereign Bond Ratings - Rating Methodology" (2013)
[9] Standard & Poor's Ratings Services, " Sovereign Government Rating Methodology And Assumptions" (2013)

The contentious 2011 US downgrade of the S&P rating appears in the last column above. The ratings assigned by Moody's and Standard & Poor's in 2009 for the foreign currency long-term debt of our 36 selected countries and corresponding scores are presented in Exhibit 8.

Exhibit 8: Moody's and S&P foreign currency long-term debt ratings and corresponding scores, 2009

Country	Moody's rating		S&P rating		Country	Moody's rating		S&P rating	
	Rating	Score	Rating	Score		Rating	Score	Rating	Score
Australia	Aaa	1	AAA	1	*Japan	Aa2	3	AA	3
Austria	Aaa	1	AAA	1	Latvia	Baa3	10	BB	12
Belgium	Aa1	2	AA+	2	Lithuania	Baa1	8	BBB	9
Bulgaria	Baa3	10	BBB	9	Luxembourg	Aaa	1	AAA	1
Canada	Aaa	1	AAA	1	*Malta	A1	5	A	6
Croatia	Baa3	10	BBB	9	Netherlands	Aaa	1	AAA	1
Cyprus	Aa3	4	A+	5	New Zealand	Aaa	1	AA+	2
Czech Republic	A1	5	A	6	Norway	Aaa	1	AAA	1
Denmark	Aaa	1	AAA	1	Poland	A2	6	A-	7
Estonia	WR	NA	A-	7	Portugal	Aa2	3	A+	5
Finland	Aaa	1	AAA	1	Romania	Baa3	10	BB+	11
France	Aaa	1	AAA	1	Slovakia	A1	5	A+	5
Germany	Aaa	1	AAA	1	Slovenia	Aa2	3	AA	3
Greece	A2	6	BBB+	8	Spain	Aaa	1	AA+	2
Hungary	Baa1	8	BBB-	10	Sweden	Aaa	1	AAA	1
Iceland	Baa3	10	BBB-	10	*Switzerland	Aaa	1	AAA	1
Ireland	Aa1	2	AA	3	UK	Aaa	1	AAA	1
Italy	Aa2	3	A+	5	*US	Aaa	1	AAA	1

*Moody's ratings for Japan, Malta, Switzerland and the US are based on foreign currency issuer ratings as they do not have a long-term foreign currency debt rating.
Source: Moody's, S&P, Credit Suisse

In the Appendix (Exhibits 19-24) we illustrate how the rating score based rankings (of the selected 36 countries) have changed over 2009-11 for both Moody's and Standard & Poor's.

We use a set of macro explanatory variables[10] which capture the overall level of income and economic activity (log GDP per capita), inflation (year-on-year change in M1[11]), household budgets (household savings), fiscal burden (government gross debt) and trade openness[12]. Exhibit 9 describes the variables used in our estimations along with their units and sources.

Exhibit 9: Selected variables, symbols, units and source

Variables	Units	Source
Moody's foreign currency long-term debt rating scores	Index score	the BLOOMBERG PROFESSIONAL™ service
S&P foreign currency long-term debt rating scores	Index score	the BLOOMBERG PROFESSIONAL™ service
Log (GDP per capita)	GDP per capita in current USD	IMF
M1 YoY change	Percentage change	Thomson Reuters Datastream
Household & Non-profit Institutions, net savings ratio	Percentage of disposable income	Thomson Reuters Datastream
General government gross debt	Percentage of GDP	IMF
Openness	Percentage of GDP	World Bank

Source: Credit Suisse

[10] In a paper on "Demographic dynamics over business cycles and crises: What matters is how different", we show that macro and demographic factors vary across countries over the recent credit crisis and therefore policies need to vary to account for these differences.

[11] M1 is defined as currency in circulation plus domestic currency sight deposits of the private sector (including pension funds), local governments and public enterprises. This variable measures M1's YoY change.

[12] Trade openness ratio is used to measure the importance of international transactions relative to domestic transactions. This indicator is calculated for each country as the total trade (i.e. the sum of exports and imports) relative to GDP.

The dependent variable in our regressions is the ratings score (Exhibit 8). A higher ratings score corresponds to lower sovereign ratings by the ratings agencies. We discuss below the expected relationship between the ratings scores and the independent macro variables.

1. Log GDP per capita: We expect a higher output per capita to be associated with better economic performance and thereby a better ability to service foreign currency debt. We expect that the higher the GDP per capita, the higher the sovereign rating and a correspondingly lower rating score. Expected coefficient sign: Negative.

2. M1 (narrow money) change on a year-on-year basis: An increase in narrow money reflects a loose monetary policy stance of the central bank. Higher narrow money supply leads to lower interest rates and lower cost of debt which lowers the cost of capital. A lower cost of capital stimulates higher private net investment on the real side. All these point towards an expansionary economy in terms of real GDP and sometimes an inflationary economy too. The coefficient could take on either a positive or a negative coefficient depending on the relative aggregate demand and supply effects. In some cases, an excessive increase in the money supply over short periods has been associated with asset price bubbles too, more so in emerging markets over the past three decades or so. The bubbles have led to disruptive aggregate effects when they burst. Expected coefficient sign: Positive or Negative.

3. Net savings ratio of households and non-profit institutions: Similar to log GDP per capita, a higher household savings ratio allows households or firms or economies to cushion themselves against downturns or cyclical shocks while retaining the ability to pay off debts. A higher savings ratio acts as a buffer/resiliency factor to enable households and aggregate economies to be more robust through downturns in business cycles. We expect a higher savings ratio to be associated with a higher ability to service debt, a higher sovereign rating and a lower sovereign rating score. Expected coefficient sign: Negative

4. General government gross debt: This measures the ratio of aggregate government debt to GDP. A government accumulating huge debts may not be in a position to comfortably service its foreign currency debt. We expect that the higher the government debt, the higher its debt-servicing needs and lower the sovereign rating and higher the ratings score. In earlier research we highlight that the magnitude, the maturity and the entity/parties to which the sovereign debt is owed are important factors to consider while assessing debt sustainability too[13]. Expected coefficient sign: Positive.

5. Openness: Openness basically refers to the importance of global trade in economic terms relative to the size of the economy. It is a structural characteristic of an economy that is worth paying attention to in addition to growth and GDP measures. The openness of an economy is a characteristic that is related to its ability to be able to generate enough foreign revenues to pay off its foreign currency debt. It is defined as the ratio of exports plus imports to GDP. Depending on the relative magnitude of exports and imports in the numerator, the effects on the macroeconomy could either be positive or negative. In general, openness could also be an indication of greater vulnerability to external conditions for smaller and poorer export dependent economies and this could lead to a lower rating and a higher score. Expected coefficient sign: Positive.

The scatter plots of Moody's and S&P ratings scores with some of the explanatory variables confirm the expected theoretical reasoning underlying the signs that we discussed above.

In Exhibits 10-12, we plot the Moody's rating scores against log GDP per capita, the year-on-year change in the money supply and household savings in 2009. There appears to be a strong negative relationship between the Moody's sovereign ratings and log GDP per capita (correlation = -0.82), the year-on-year change in M1 (correlation = -0.64) and household savings (correlation = -0.65) in 2009.

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[13] Credit Suisse Demographics Research (2011), "Macro-Fiscal Sustainability to Microeconomic Conditions of the Old in the Oldest Five Countries"

Similarly, as in Exhibits 13-15, there is a strong negative relationship between S&P's sovereign ratings and log GDP per capita (correlation = -0.83), the year-on-year change in M1 (correlation = -0.60) and household savings (correlation = -0.60) in 2009.

Exhibit 10: Correlation between Moody's ratings & log GDP per capita, 2009

Ratings are converted to a score & GDP per capita is measured in current USD.

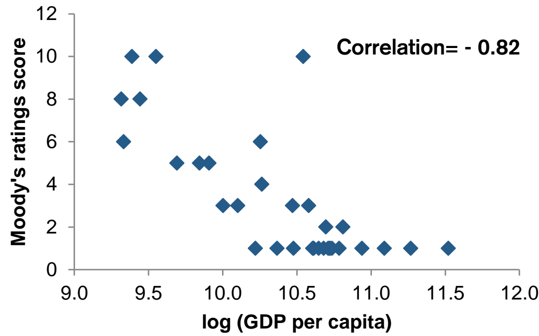


Exhibit 11: Correlation between Moody's ratings & year on year change in money supply (M1), 2009

Ratings are converted to a score & yoy M1 change is a percentage.

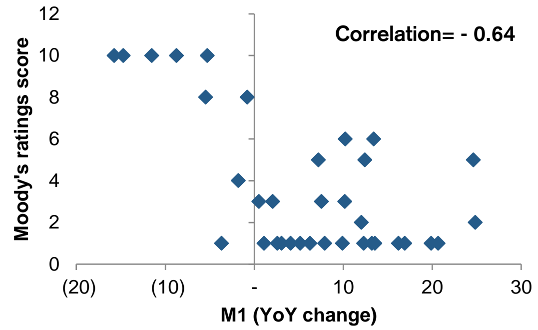


Exhibit 12: Correlation between Moody's ratings & household savings, 2009

Ratings are converted to a score and household (and non profit institutions) savings is measured as a share of disposable income.

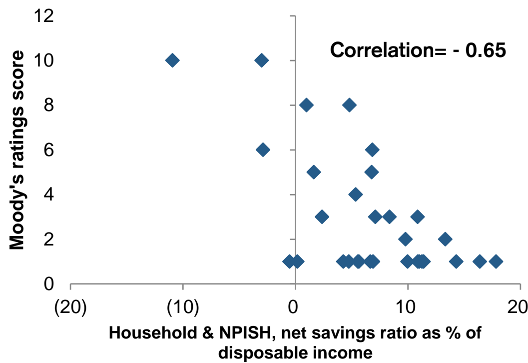


Exhibit 13: Correlation between S&P ratings & log GDP per capita, 2009

Ratings are converted to a score & GDP per capita is measured in current USD.

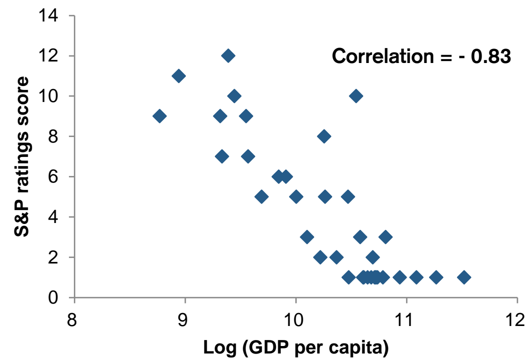
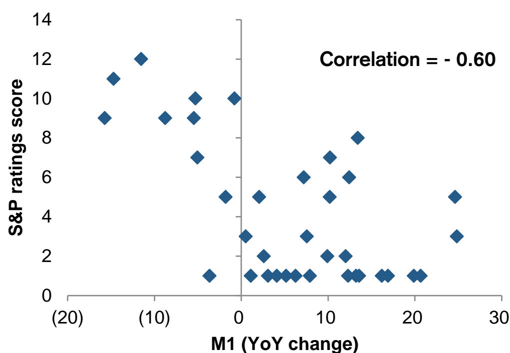


Exhibit 14: Correlation between S&P ratings & year on year change in money supply (M1), 2009

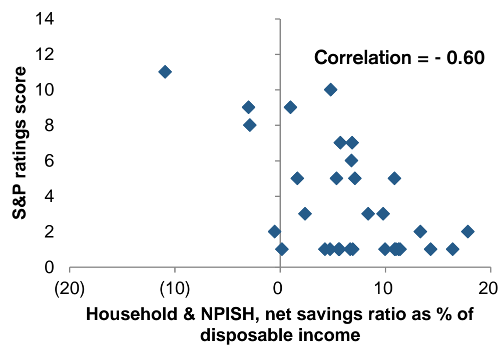
Ratings are converted to a score & yoy M1 change is a percentage.



Source: Moody's, S&P , the BLOOMBERG PROFESSIONAL™ service, Thomson Reuters Datastream, IMF, World Bank, Credit Suisse

Exhibit 15: Correlation between S&P ratings & household savings, 2009

Ratings are converted to a score and household (and non profit institutions) savings is measured as a share of disposable income.



Source: Moody's, S&P, the BLOOMBERG PROFESSIONAL™ service, Thomson Reuters DataStream, IMF, World Bank, Credit Suisse

Estimation Results

We report estimation results from regressions for Moody's and S&P foreign currency long-term debt ratings. We estimated different specifications for Moody's and S&P using a combination of various macroeconomic variables. Our preferred estimation specification for Moody's and S&P ratings is listed in Exhibits 16 and 17 respectively. Besides being parsimonious, this specification is the one for which all/most of the variables are individually statistically significant with the correct expected signs and a good combined explanatory power.

Exhibit 16: Regressions for Moody's Ratings, 2009-11

	2009			2010			2011		
Variable	**Coefficient**	**t-Statistic**	**Prob.**	**Coefficient**	**t-Statistic**	**Prob.**	**Coefficient**	**t-Statistic**	**Prob.**
Constant	37.24	11.51	0.00	40.33	7.38	0.00	44.33	3.90	0.00
Log (GDP per capita)	-3.42	-10.35	0.00	-3.72	-7.07	0.00	-3.91	-3.63	0.00
Yoy change in M1	-0.03	-1.58	0.13	-0.11	-1.80	0.08	-0.29	-3.00	0.01
Households savings rate	-0.10	-2.88	0.01	-0.13	-1.92	0.07	-0.17	-1.47	0.16
General government gross debt	0.01	2.53	0.02	0.02	1.79	0.09	0.03	1.87	0.07
Openness	0.01	4.07	0.00	0.02	3.63	0.00	0.01	1.22	0.24
R-squared	0.91			0.79			0.69		
Adjusted R-squared	0.89			0.74			0.62		
F-statistic	51.28			17.83			10.33		
Prob(F-statistic)	0.00			0.00			0.00		

Source: Credit Suisse

High GDP per capita and household savings imply a strong economy, hence higher ratings and a lower score. GDP per capita has a negative and statistically significant coefficient for all years, while household savings has a negative and statistically significant coefficient for 2009 and 2010 in the case of Moody's and for 2009 and 2011 in the case of S&P.

Exhibit 17: Regressions for S&P Ratings, 2009-11

	2009			2010			2011		
Variable	**Coefficient**	**t-Statistic**	**Prob.**	**Coefficient**	**t-Statistic**	**Prob.**	**Coefficient**	**t-Statistic**	**Prob.**
Constant	42.47	9.72	0.00	44.54	8.10	0.00	39.90	3.93	0.00
Log (GDP per capita)	-3.93	-8.77	0.00	-4.09	-7.72	0.00	-3.46	-3.58	0.00
Yoy change in M1	-0.04	-1.27	0.22	-0.10	-1.67	0.11	-0.20	-2.35	0.03
Households savings rate	-0.09	-1.82	0.08	-0.08	-1.21	0.24	-0.23	-2.26	0.03
General government gross debt	0.02	2.81	0.01	0.02	1.84	0.08	0.03	2.04	0.05
Openness	0.02	3.15	0.00	0.02	2.70	0.01	0.01	0.82	0.42
R-squared	0.87			0.78			0.70		
Adjusted R-squared	0.84			0.74			0.63		
F-statistic	33.75			18.16			11.03		
Prob(F-statistic)	0			0			0.00		

Source: Credit Suisse

High general government debt and openness imply greater vulnerability, hence lower ratings and a higher score. Gross government debt has a positive and statistically significant coefficient for all years, while openness has a positive and statistically significant coefficient for 2009 and 2010. The explanatory power of the regressions reduces and the significance of these variables changes over time. This suggests that there are changes in the way ratings agencies assign ratings over the years and these economies have found themselves in different phases of the business cycle over the past few years.

Conclusions

We emphasize the need to follow macro fundamentals as they help shape the debt repaying ability of sovereigns. A small set of macro factors can act as a sufficient statistic for sovereign ratings. Whatever the stage in the cycle, any macro-analysis to gauge the ability of sovereigns to service their debt should pay attention to these fundamental factors.

In the spirit of Lucas-Sargent-Sims-Hansen macro models, we should focus on the "***micro-foundations of macroeconomics***", i.e., while macro aggregates are important their constituent underlying individual components are important too. The individual behaviour of consumers and workers are affected by demographic characteristics which are not homogeneous as assumed by many economists, investors and policymakers. GDP per capita is a very important macro aggregate that combines the economics with the demographics.

The factors that we find explain 60-80% of sovereign ratings are GDP per capita, narrow money growth, openness of the economy, government debt and household savings. These are a mix of individual, household and national aggregates that are influenced by demographics.

References

Cantor R. and Packer F.," Determinants and Impact of Sovereign Credit Ratings" (1996), FRBNY Economic Policy Review

Credit Suisse Demographics Research, "Demographic dynamics over business cycles and crises: What matters is how different", (2013)

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Moody's Investors Service, "Sovereign Bond Ratings- Rating Methodology" (2013)

Standard & Poor's Ratings Services, " Sovereign Government Rating Methodology And Assumptions" (2013)

Appendix

Exhibit 18: Core demographic variables of 36 selected countries

	Population	Population growth	Old-age dependency ratio	Life expectancy	Total fertility rate
Unit	millions	Rate per annum (%)	Ratio of pop aged 65+ per 100 pop aged 15-64	Years	Children per woman
Period	2012	2010-2015	2015	2010-2015	2010-2015
Australia	23.1	1.3%	22.7	82.4	1.9
Austria	8.5	0.4%	27.9	81.0	1.5
Belgium	11.1	0.4%	29.0	80.4	1.8
Bulgaria	7.3	-0.8%	30.1	73.5	1.5
Canada	34.8	1.0%	23.7	81.4	1.7
Croatia	4.3	-0.4%	28.6	77.0	1.5
Cyprus	1.1	1.1%	18.1	79.8	1.5
Czech Republic	10.7	0.4%	26.3	77.6	1.6
Denmark	5.6	0.4%	29.1	79.3	1.9
Estonia	1.3	-0.3%	28.2	74.3	1.6
Finland	5.4	0.3%	32.3	80.5	1.9
France	63.9	0.5%	29.6	81.7	2.0
Germany	82.8	-0.1%	32.7	80.7	1.4
Greece	11.1	0.0%	31.1	80.7	1.5
Hungary	10.0	-0.2%	26.1	74.5	1.4
Iceland	0.3	1.1%	20.3	82.0	2.1
Ireland	4.6	1.1%	19.2	80.6	2.0
Italy	60.9	0.2%	33.8	82.3	1.5
Japan	127.2	-0.1%	43.6	83.5	1.4
Latvia	2.1	-0.6%	28.2	72.1	1.6
Lithuania	3.0	-0.5%	22.8	72.1	1.5
Luxembourg	0.5	1.3%	21.2	80.5	1.7
Malta	0.4	0.3%	26.0	79.7	1.4
Netherlands	16.7	0.3%	27.8	80.9	1.8
New Zealand	4.5	1.0%	22.5	81.0	2.1
Norway	5.0	1.0%	25.2	81.4	1.9
Poland	38.2	0.0%	22.0	76.3	1.4
Portugal	10.6	0.0%	29.3	79.8	1.3
Romania	21.8	-0.3%	22.3	73.7	1.4
Slovakia	5.4	0.1%	19.1	75.3	1.4
Slovenia	2.1	0.2%	26.4	79.5	1.5
Spain	46.8	0.4%	27.6	82.0	1.5
Sweden	9.5	0.7%	31.8	81.7	1.9
Switzerland	8.0	1.0%	27.1	82.5	1.5
UK	62.8	0.6%	28.1	80.4	1.9
US	317.5	0.8%	22.2	78.9	2.0

Source: UN, Credit Suisse

Exhibit 19: Moody's foreign currency long-term debt rating score, 2009 Rankings

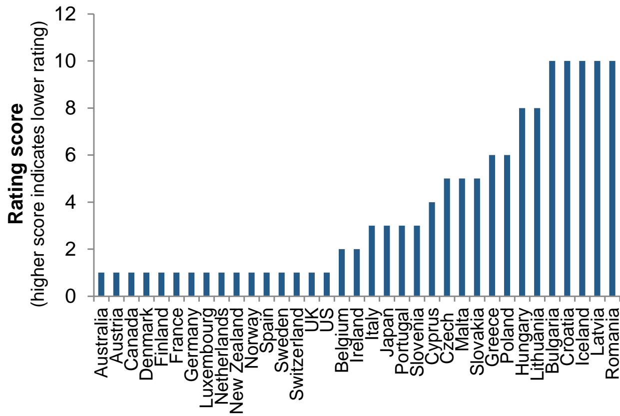


Exhibit 20: Moody's foreign currency long-term debt rating score, 2010 Rankings

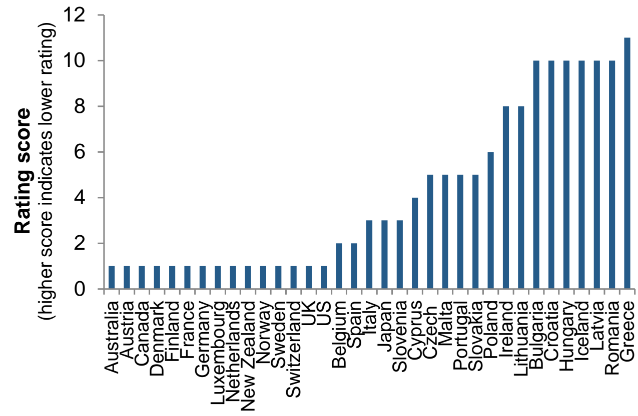


Exhibit 21: Moody's foreign currency long-term debt rating score, 2011 Rankings

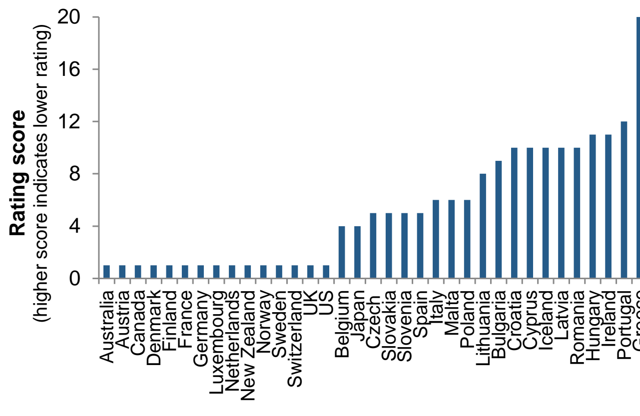


Exhibit 22 S&P foreign currency long-term debt rating score, 2009 Rankings

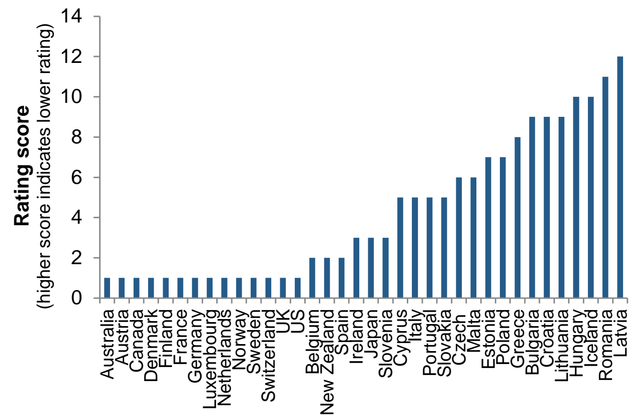
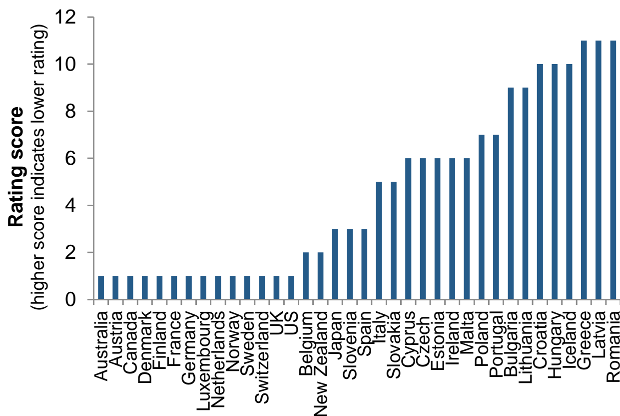
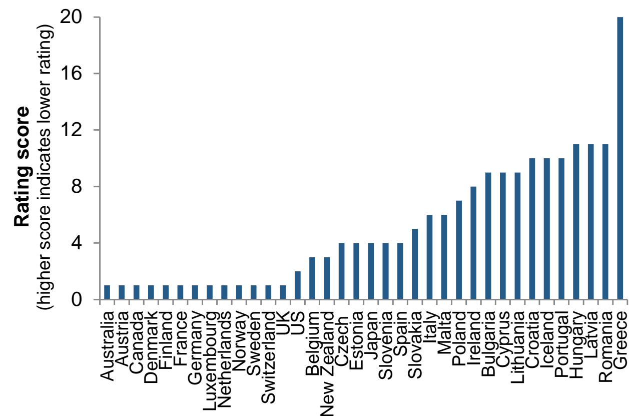


Exhibit 23: S&P foreign currency long-term debt rating score, 2010 Rankings



Source: Moody's, S&P, Credit Suisse

Exhibit 24: S&P foreign currency long-term debt rating score, 2011 Rankings



Source: Moody's, S&P, Credit Suisse

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Disclosure Appendix

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Amlan Roy, Sonali Punhani and Angela Hsieh each certify, with respect to the companies or securities that the individual analyzes, that (1) the views expressed in this report accurately reflect his or her personal views about all of the subject companies and securities and (2) no part of his or her compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this report.

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