SRI and performance of bond funds

Do extra-financial ratings affect sovereign borrowing cost?

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Motivation

- Failure of common determinant of spreads (international risk, credit risk, liquidity risk) to explain the increased dispersion of spreads (Mody, 2009).
- Studies are not unanimous regarding the role of each of the three determinant (Afonso et al., 2012).
- Empirical results support the relevance of government's creditworthiness in determining the spreads (credit ratings, information from financial markets (CDS)...)(Barbosa et Costa, 2010).
- Evidence suggests that qualitative country's factors (political risk, corruption) affect their risk of default (Moser, 2007).

$\Rightarrow$ Look at sustainability criteria such as ESG as a new class of risk.

Literature overview

- An increasing amount of evidence that sustainability criteria such as Environmental, Social and Governance (ESG) factors are too important to be ignored as predictor of bond spreads.
    - Corruption (key indicator of governance) proved to be a significant predictor of bond spreads (Connolly, 2007 ; Union Investment, 2012; Ciocchini, 2003).
      $\Rightarrow$ countries perceived as more corrupt must pay higher yields when issuing bonds.
    - Social : A high standards of health and education, respect for labour rights and access to quality infrastructure all contribute to economic growth, which promote stability, this stability in turn reduce country default risk (PRI, 2013).
    - Environment: Scholtens (2009) assesses the environmental performances of sovereign bond funds in Netherlands and shows that they differ according to the environmental indicator.

ESG analysis

- Drut (2010) examined the theoretical loss due to diversification resulting from a preference for bonds from developed countries at a given time. He showed the possibility to increase the socially responsible value of a sovereign bond portfolio without a significant loss of diversification in the mean-variance plan.
- AXA IM (2013) comparing the total return of bonds issued by countries with high ESG scores against a group with low ESG scores, observes that bonds issued by the countries with high ESG scores outperformed those with lower scores.
- Union Investment (2012) compared a portfolio of sovereign eurozone bonds weighted according to ESG performance and found it performed better against a a euro-zone benchmark of five-year bonds.
- MSCI (2012) showed that countries with the largest discrepancies between financial performance and ESG rankings were the most likely to be downgraded in subsequent years.

Research question

- Do the performance of states in terms of ESG criteria affect their borrowing cost?

  i.e

  Is countries ESG score a significant predictor of bond spreads?

Empirical strategy

Panel data : "23" OCDE countries, from 2007 to 2012

- Country's borrowing cost : Yield spread
  - The difference between the interest rate the government pays on its external US dollar denominated debt and the rate offered by US Treasury on debt of comparable maturity
- Country's performance on ESG criteria : Vigeo sustainability country ratings (SCR)
- Control variables: Macroeconomic fundamentals

Vigeo SCR

Table : Themes taken into account by dimension

Environmental responsibility	
Participation in environmental	Air Biodiversity Water Land Information systems
Air emissions	climate change Ozone layer protection Local and regional air quality
Water	Measure of water withdrawal
Biodiversity	Percentage of threatened species Percentage of protected areas
Land use	Proportion of land covered by forest Evolution of the proportion of forest
Environmental pressure	Nuclear waste Energy consumption measures
Institutional responsibility	
Respect protection and human	Respect, protection and promotion of human rights Respect, protection and promotion of labor rights
Democratic institution	Political freedom and stability measure Control of corruption measure Independence of justice measure Market regulation measure Press freedom measure

Social responsibility and solidarity	
Social protection	Inequality measure Total unemployment Youth unemployment
Education	Public education expenditure Primary school education enrollment Secondary school education enrollment
Health	Public health expenditure Mortality (Infant mortality, life expectancy) HIV/Aids prevalence rate Tuberculosis prevalence and death rates
Gender Equality	Gender equality Gender empowerment index
Development aid	Development aid measures
Safety and quality of policy	Participation in international conventions

Vigeo SCR Determinants

Table : Description of variables

Variable Name	Definition	Unit of Measurement
CO2 emission	Greenhouse gas emission	Thousand tonnes CO2
Fertility rate	(per 1,000 people)	Percent
Employment rate	% of working age population	Percent
Education expenditure	% of GDP	Percent
Per capita income	GDP per capita	Thousands of dollars
R&D Expenditure	% of GDP	Percent
Human development index	United Nations measure	Indicator variable:100= high human development,0=not developed
Corruption Index	World bank index of quality of policies CPIA	Indicator variable: 100= not corrupted 0= corrupted

Vigeo SCR determinants

Variable	Coefficient	St.Errors
CO2 emission	-0.034***	-0.013
Fertility rate	2.470***	0.245
Employment rate	0.119**	0.060
Education expenditure	0.882***	0.358
R&D expenditure	-0.517	0.409
Human development index	0.730***	0.124
Corruption Index	0.176***	0.055
Intercept	-17.05	10.55
R-sq	0.70	
Observations	138	

***,**,* significant respectively at 1%, 5%, 10%

Descriptive statistics

Table : Mean spread by Vigeo SCR

Country	Vigeo (SCR)	Spreads
Australia	75.15	1.946
Austria	79.13	0.551
Belgium	75.79	0.848
Canada	71.87	0.028
Czech Republic	79.90	0.901
Denmark	81.92	0.091
Finland	83	0.276
France	78.18	-0.039
Germany	79.41	0.489
Iceland	77.88	4.985
Ireland	77.23	3.181
Italy	72.37	2.073
Japan	71.46	-1.688
Korea	68.71	1.659
Netherlands	80.46	0.220
New Zealand	74.69	2.245
Norway	86.96	0.600
Poland	78.07	2.720
Portugal	71.04	3.794
Spain	75.15	1.840
Sweden	86.50	-0.068
Switzerland	81.91	-1.131
United Kingdom	80.99	0.307

Variables

Variable	**Mean**	**SD**	**Min**	**Max**
Government Bond spread				
ten-years maturity	1.12	1.94	-2.54	11.68
$X + M/GDP$	85.54	36.43	25.02	188.90
FDI/GDP	4.30	6.43	-6.71	36.43
$Fis./GDP$	0.10	6.51	-28.35	15.95
$G.GV.Debt/GDP$	66.02	41.53	-1.00	236.56
$Ext.Debt/GDP$	234.51	235.63	0	1139.48
$Reserves/M$	2.93	3.36	0.032	18.25
$S\&P$	9.10	2.61	1	11
Vigeo SCR	77.75	4.85	67.21	88.71

		1	2	3	4	5	6	7	8
1	$X + M/GDP$	1.00							
2	FDI/GDP	0.46	1.00						
3	$Fis./GDP$	-0.05	0.00	1.00					
4	$G.GV.Debt/GDP$	-0.11	-0.06	-0.38	1.00				
5	$Ext.Debt/GDP$	0.47	0.42	-0.38	0.09	1.00			
6	$Reserves/M$	-0.34	-0.13	0.08	0.45	-0.29	1.00		
7	$S\&P$	-0.03	0.01	0.28	-0.26	-0.29	-0.17	1.00	
8	Vigeo SCR	0.23	0.00	0.35	-0.32	0.16	-0.24	0.41	1.00

Results

	Bond Spreads(10 year)				
	Model (1)	Model(2)	Model (3)	Model(4)	Model(5)
Intercept	11.818***	13.350***	12.676*	10.484	22.881***
	(6.832)	(7.41)	(7.27)	(7.341)	(6.442)
Vigeo SCR	-0.143*	-0.186***	-0.197***	-0.156*	-0.172***
	(0.084)	(0.093)	(0.091)	(0.092)	(0.078)
$X + M/GDP$		0.028***	0.020***	0.021*	-0.005
		(0.013)	(0.013)	(0.013)	(0.011)
FDI/GDP		0.033	0.039*	0.026	0.018
		(0.025)	(0.024)	(0.025)	(0.021)
$Fis./GDP$			-0.044	-0.078	-0.058
			(0.049)	(0.057)	(0.048)
$G.GV.Debt/GDP$			0.021***	0.025***	0.0007
			(0.009)	(0.009)	(0.009)
$Ext.Debt/GDP$				-0.004	-0.005***
				(0.003)	(0.002)
$Reserves/M$				0.147	0.267***
				(0.119)	(0.103)
$S\&P$					-0.676**
					(0.103)
R-sq	0.709	0.725	0.742	0.754	0.829

***,**,* significant respectively at 1%, 5%, 10%

Results

	Bond Spreads		
	2 year	5 year	10 year
Intercept	32.89***	30.971***	22.88***
	(10.13)	(8.960)	(6.44)
Vigeo SCR	-0.283***	-0.249***	-0.172***
	(0.122)	(0.108)	(0.078)
$X + M/GDP$	-0.008	-0.006	-0.005
	(0.018)	(0.016)	(0.011)
FDI/GDP	0.014	0.029	0.018
	(0.033)	(0.029)	(0.021)
$Fis./GDP$	-0.27	-0.013	-0.058
	(0.075)	(0.066)	(0.048)
$G.GV.Debt/GDP$	-0.002	-0.003	0.007
	(0.014)	(0.01)	(0.009)
$Ext.Debt/GDP$	-0.008*	-0.006*	-0.005***
	(0.004)	(0.003)	(0.002)
$Reserves/M$	0.518***	0.421***	0.267***
	(0.160)	(0.142)	(0.103)
$S\&P$	-0.616***	-0.74***	-0.676**
	(0.162)	(0.143)	(0.103)
R-sq	0.701	0.746	0.829

***,**,* significant respectively at 1%, 5%, 10%

Conclusion

- Our results show that Vigeo SCR are a significant predictor of bond spreads. $\Rightarrow$ Investor are so invited to look at sustainability criteria as a new class of risk.

- Avenue for further research
  - Study how the sub-ratings related to the environment, social concerns and public governance could affect the cost of sovereign borrowing.
  - As we worked only on advanced countries, one interesting direction for further research would be to focus on emerging and developing countries

Thank you for your attention