

Sovereign Bonds & Socially Responsible Investment

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Sovereign Bonds and Socially Responsible Investment

- **A lot of research on SRI has still to be done (this is why we're here today)**
- **Very high level of government debt (in the US: from 65 % of GDP in 2007 to 90% in 2009)**
 - **How to construct a responsible sovereign bond portfolio?**

Sovereign Bonds and Socially Responsible Investment

- **Research in the “govies” SRI framework**
- **Data and methodology**
- **Responsible sovereign bond portfolio without significant diversification cost**

Research in the SRI framework

- **Very few papers on the links between sovereign bond returns and extrafinancial features**
 - Erb, Harvey & Viskanta (1996): winning strategy with long govies with decreasing political risk and short increasing risk
 - Connolly (2007): SP credit ratings strongly correlated with corruption indexes
- **Nothing on the construction of a govies portfolio with an SRI “constraint”**

Research in the SRI framework

- **According to the theory, with efficient markets, imposing a constraint on the portfolio implies a diversification cost**

- **So, I want to answer to the question:**
 - When does the increase of the SRI value of a sovereign bond portfolio implies a significant cost of diversification?

 - In other words, is the efficient frontier significantly modified when you increase the SRI value of a portfolio?

Data and methodology

- **Sample: 20 countries with the highest GDP per capita. Very homogeneous**
- **Sovereign bonds: World Government Bonds Indices (WGBI) in all maturities in US dollars hedged for FX variations (for each country)**
- **Socially responsible index: the Sustainability Country Rating of Vigeo**
 - For 162 countries, Vigeo rates from 0 to 100 the countries on the three dimensions of SRI:
 - The Environmental rating
 - The Governance rating
 - The Social and Solidarity rating
 - International data sources (World Bank, United Nations, etc.)

Data and methodology

| Country | Vigeo Sustainability Country Rating | E | S | G |
|-----------------------|--|----------|----------|----------|
| Sweden | 86.89 | 71.05 | 91.18 | 98.45 |
| Norway | 86.27 | 68.30 | 92.89 | 97.64 |
| Finland | 82.51 | 65.18 | 84.68 | 97.67 |
| Switzerland | 81.77 | 74.24 | 79.48 | 91.58 |
| Denmark | 81.20 | 60.94 | 84.86 | 97.80 |
| Austria | 80.71 | 67.14 | 77.60 | 97.40 |
| United Kingdom | 80.63 | 64.94 | 81.98 | 94.98 |
| Netherlands | 80.56 | 56.80 | 87.71 | 97.18 |
| Germany | 77.64 | 61.71 | 76.65 | 94.56 |
| France | 77.38 | 60.29 | 80.27 | 91.58 |
| Belgium | 75.79 | 52.44 | 85.54 | 89.39 |
| Ireland | 75.66 | 51.25 | 82.84 | 92.89 |
| Spain | 74.57 | 52.84 | 77.91 | 92.95 |
| Australia | 74.11 | 57.74 | 72.93 | 91.67 |
| New Zealand | 73.55 | 54.20 | 80.46 | 86.00 |
| Italy | 72.33 | 54.14 | 77.09 | 85.76 |
| Portugal | 71.27 | 51.67 | 68.54 | 93.60 |
| Canada | 70.60 | 48.91 | 78.95 | 83.92 |
| Japan | 67.41 | 52.69 | 72.20 | 77.34 |
| United States | 59.46 | 47.75 | 67.89 | 62.83 |

Data and methodology

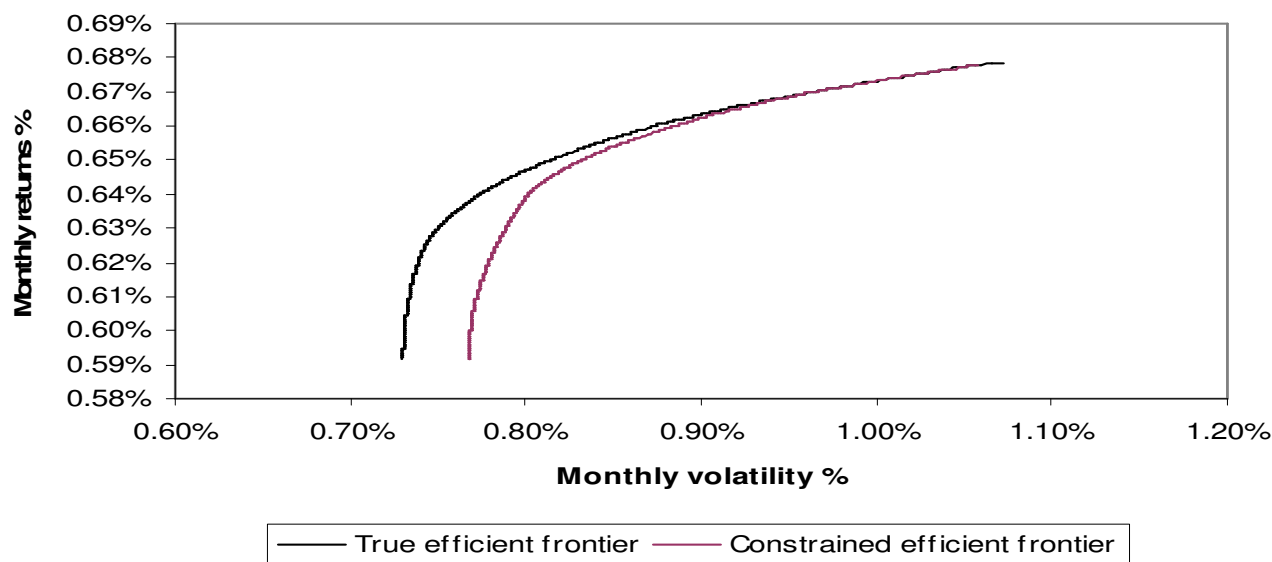
- As measure of the responsibility of a portfolio, I introduce the SRI portfolio rating:

$$SRI \text{ Portfolio rating} = \sum_i weight_i \text{ country SRI rating}_i$$

- High SRI portfolio rating means that you invest more on well-rated countries.
- The idea is to measure the effect on the efficient frontier of imposing a constraint on the SRI portfolio rating

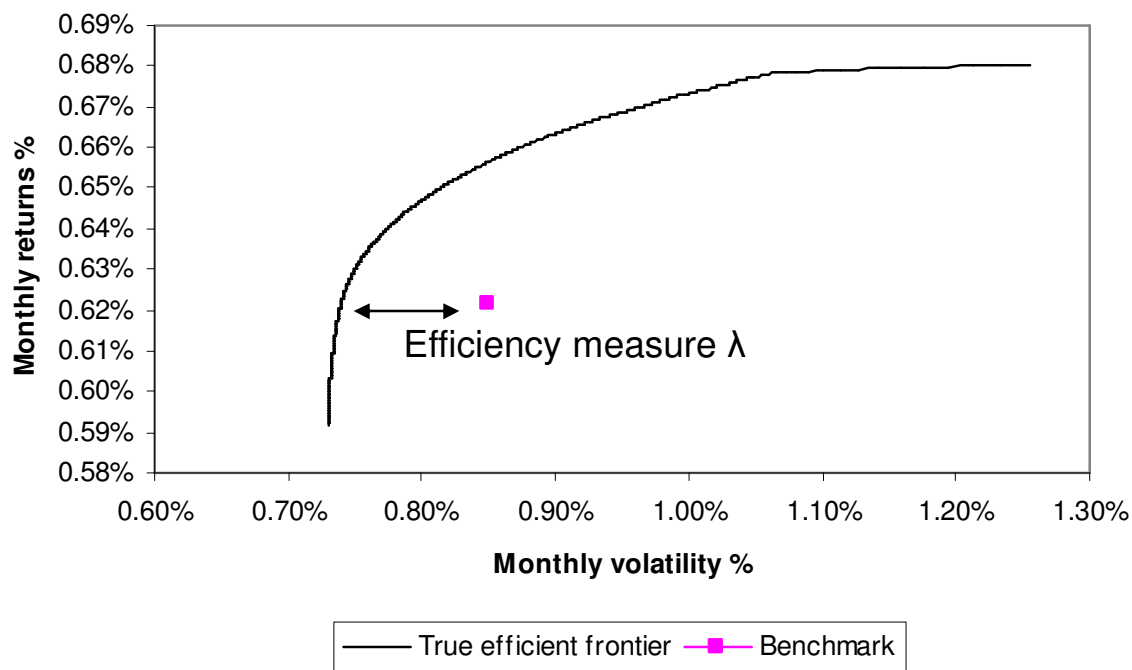
Data and methodology

- Computation of the true efficient frontier (*without constraint*)
- Computation of a set of constrained efficient frontiers
“Portfolio rating > threshold” *with increasing thresholds*
- For each efficient frontier, I measure if the diversification cost is significant



Data and methodology

- The Basak, Jagannathan and Sun (2002) test allows to measure the mean-variance efficiency of a given benchmark to a given efficient frontier:

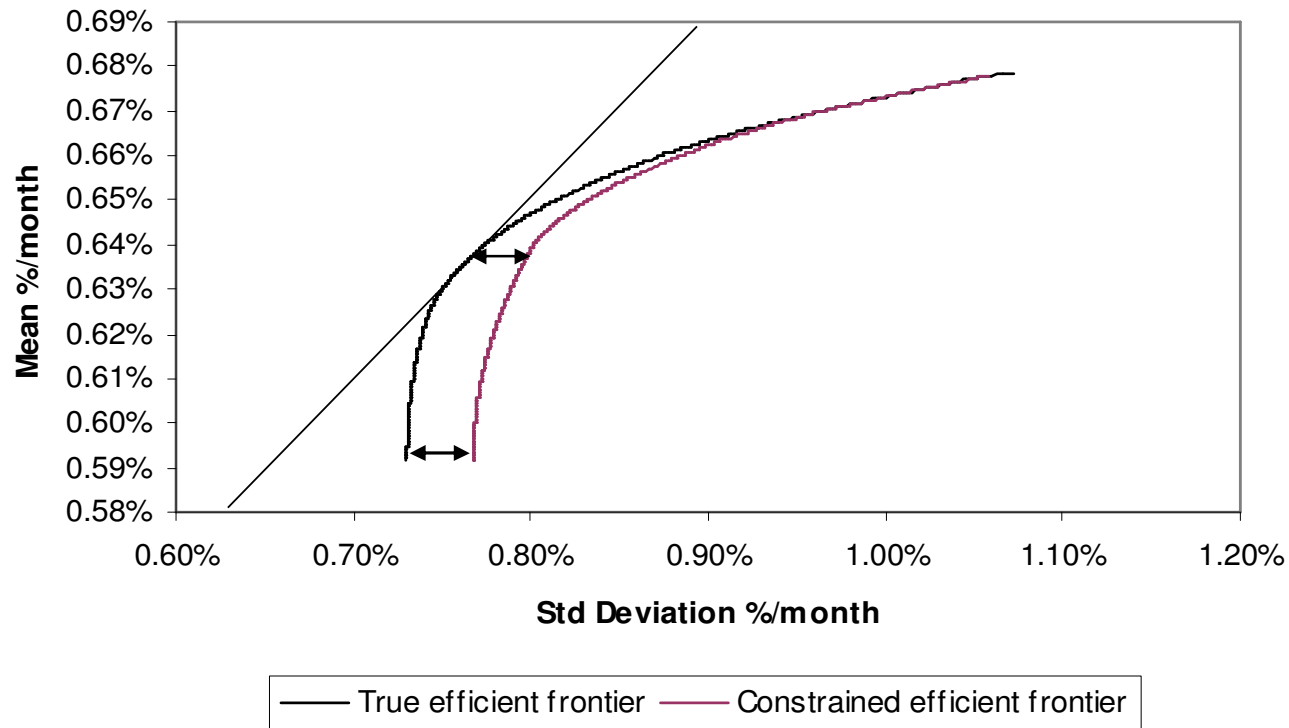


- BJS (2002) derive the asymptotic distribution of λ :

$$\sqrt{T}(\lambda_T - \lambda) \rightarrow N(0, \sigma^2)$$

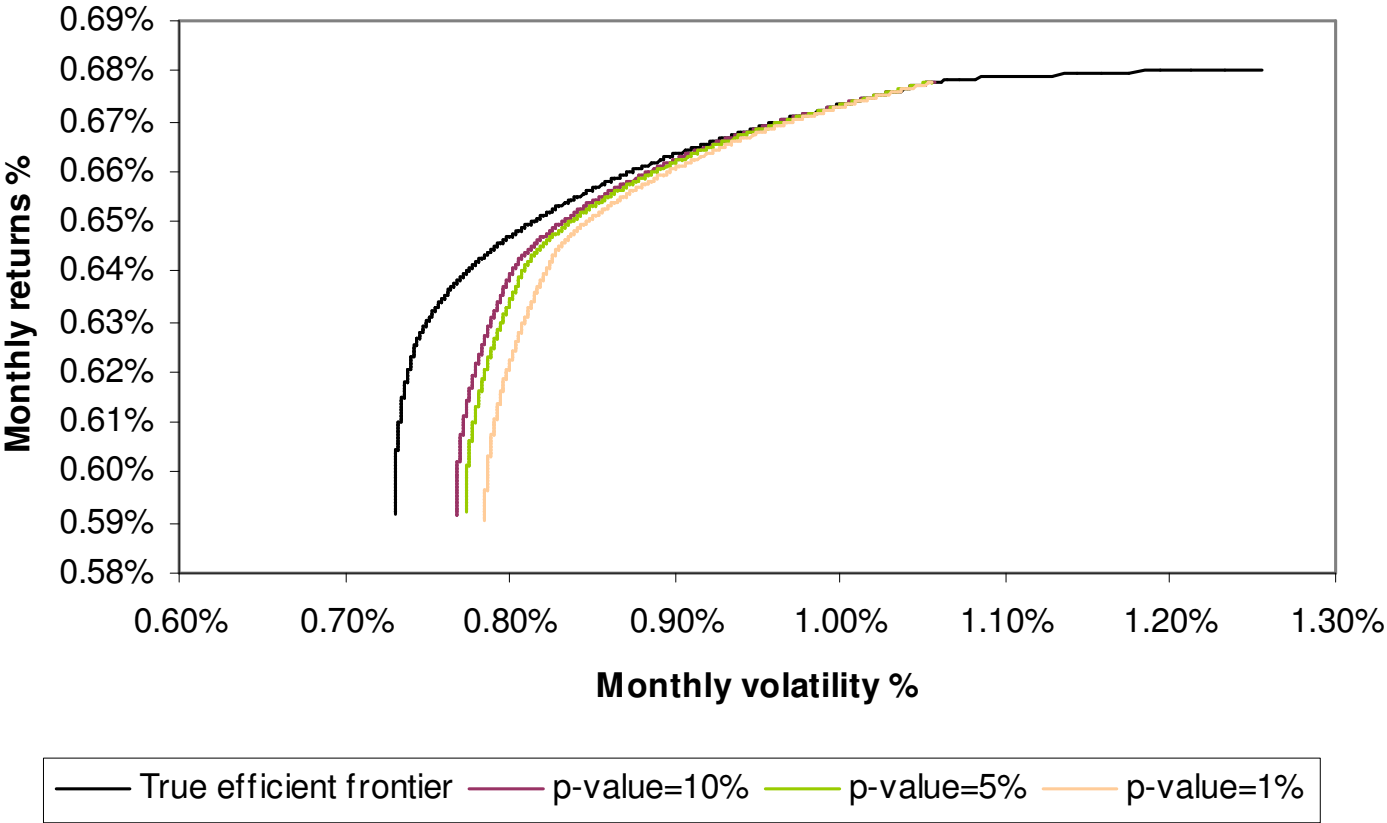
Data and methodology

- Ehling & Ramos (2006) procedure
- For each threshold on the SRI portfolio rating, we process as:
 - BJS test for the minimum variance portfolio
 - BJS test for the tangency portfolio



Sovereign bond SRI portfolio without diversification cost

With the Sustainability Country Rating from Vigeo



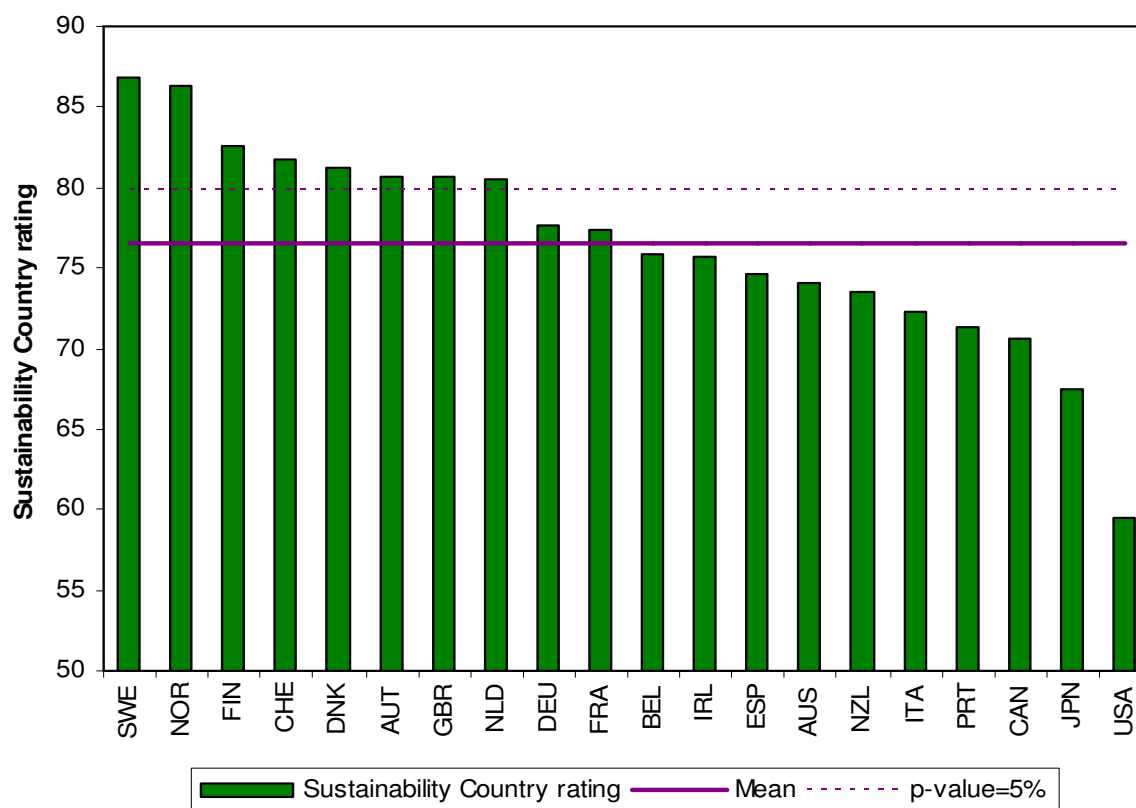
Sovereign bond SRI portfolio without diversification cost

- It is possible to increase the responsible portfolio rating a lot without significant diversification cost.

| | Constrained SRI Frontier | |
|------------------------|--------------------------|---------------------------------------|
| | True Frontier | with significant diversification cost |
| Annualized return | 7.10% | 7.10% |
| Annualized Volatility | 2.53% | 2.69% |
| Maximum monthly return | 2.60% | 2.53% |
| Minimum monthly return | -1.86% | -1.85% |
| Skewness | -0.13 | -0.11 |
| Kurtosis | 3.57 | 2.95 |
| Sharpe Ratio | 0.33 | 0.31 |
| Vigeo SCR | 73.33 | 80.01 |

Sovereign bond SRI portfolio without diversification cost

The weighted-average portfolio rating when appears a significant diversification cost is clearly above the country rating average



Conclusion

- **It is possible to build a socially responsible sovereign bond portfolio without a significant diversification cost**
 - **Investors should not be worried to invest in responsible sovereign bond portfolio**
- **Further research: extend the results to emerging countries for example**

Crédit Agricole Asset Management

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