

**Discussion Paper**  
**on**  
**Standard Formula Design and Calibration**  
**for Certain Long-Term Investments**

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## **1. Responding to the Discussion Paper**

EIOPA welcomes comments on the „Discussion Paper on Standard Formula Design and Calibration for Certain Long-Term Investments“.

The discussion paper package includes:

- The Discussion Paper
- Template for comments

Please send your comments to EIOPA in the provided template for comments, via email [LTI@eiopa.europa.eu](mailto:LTI@eiopa.europa.eu), by May 28 2013 at the latest (earlier comments are very much appreciated).

Contributions not provided in the template for comments, or sent to a different email address, or after the deadline will not be processed.

Comments are most helpful if they:

- indicate the specific question to which the comment relates;
- respond to the question stated;
- contain a clear rationale;
- provide evidence to support the view expressed;
- describe any alternatives EIOPA should consider

### **Publication of responses**

All contributions received will be published, unless you request otherwise in the respective field in the template for comments. A standard confidentiality statement in an email message will not be treated as a request for non-disclosure. A confidential response may be requested from us in accordance with EIOPA's rules on public access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by EIOPA's Board of Appeal and the European Ombudsman.

### **Data protection**

Information on data protection can be found at [www.eiopa.europa.eu](http://www.eiopa.europa.eu) under the heading "Legal notice".

### **Disclaimer**

The views expressed in this discussion paper are preliminary and will not bind in any ways EIOPA in the future. They are aimed at gathering the stakeholders' input.

## 2. Executive Summary

### 2.1 Background

The European Council of June 2012 expressed its determination to stimulate smart, sustainable, inclusive, resource-efficient and jobcreating growth, in the context of the Europe 2020 Strategy, and initiated Compact for Growth and Jobs. This action to be taken by the Member States and the European Union aims at relaunching growth, investment and employment as well as making Europe more competitive.

Investment in the drivers of growth, productivity and competitiveness generally requires finance over an extended time horizon.

In this context the European Commission (EC) asked EIOPA in a letter from 26/9/2012 to examine whether the calibration and design of regulatory capital requirements for insurers' long-term investments in certain asset classes under the envisaged Solvency II regime necessitates any adjustment or reduction under the current economic conditions without jeopardising the prudential nature of the regime.<sup>1</sup> The Solvency II directive is to be taken as a given. As a minimum, EIOPA should cover the following assets in its analysis:

- Infrastructure financing and other long-term financing through project bonds, other types of debt and equity;
- Small and Medium sized Enterprises (SME) financing through debt and equity;
- Socially Responsible Investments (SRI) and social business financing through debt and equity;
- Long-term financing of the real economy through securitisation of debt serving the above mentioned purposes.

The analysis is to be based on the non-public working document "draft implementing measures Solvency II" made available to EIOPA by the European Commission on 3 November 2011. It should properly take into account the influence that the maturity of insurance liabilities has on regulatory capital requirements for long-term investments. Moreover, consistency with the regulatory capital requirements in the banking sector has to be considered.

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<sup>1</sup> [http://ec.europa.eu/internal\\_market/insurance/docs/solvency/20120926-letter-faull\\_en.pdf](http://ec.europa.eu/internal_market/insurance/docs/solvency/20120926-letter-faull_en.pdf)

## **2.2 Aim of the Discussion Paper**

EIOPA has already carried out an in-depth analysis of the asset classes explicitly listed in the EU Commission's letter. The first step in the analysis was to gain a thorough understanding of the economic rationale for the asset class and its specific risk profile. To achieve this EIOPA has analysed for each asset class the available literature on the adequateness of the Solvency II calibration as well as academic and practitioners' literature on its performance and riskiness. A second step was the analysis on the availability of data for the individual asset classes which may be used for a potential refinement of the regulatory capital requirements.

The aim of this discussion paper is to present EIOPA's preliminary findings. This is intended to offer stakeholders an opportunity to inform EIOPA's further technical work on these issues, in particular in relation to data limitations. The further insights and valuable input gathered in this way will help EIOPA to produce a well-informed recommendation on the design and calibration of the standard formula in relation to the asset classes considered.

Stakeholders should be aware that EIOPA continues in parallel to analyse the appropriateness of the design and calibration of the standard formula. EIOPA will also look at the influence that the maturity of insurance liabilities has on regulatory capital requirements for long-term investments. Last but not least EIOPA will look at non-regulatory obstacles for long-term investments by insurers.

The scope of this analysis has been limited to investments. In parallel EIOPA is performing the Long-term Guarantee Impact Assessment (LTGIA). The main focus of this exercise is on possible adjustments to the calculation of technical provisions to take into account the specificities of insurers' long-term guarantees business. The issues of long-term investments and long-term guarantees are of course closely connected. There are already several elements in the existing Solvency II framework that incentivize long-term investments. Combining the results of both work streams will allow a comprehensive analysis whether it is necessary to add further ones.

## 2.3 The Standard Formula

Under the standard formula the Solvency Capital Requirement (SCR) is calculated using a modular approach. The modules cover the major risk categories insurers are subject to (e.g. market risk, counterparty default risk and life underwriting risk). For each module, the capital requirements are calibrated to the overall target criteria for the SCR as laid out in the Solvency II Directive (i.e. Value-at-Risk at a confidence level of 99.5% and under a one-year time horizon).

The riskiness of an asset determines its contribution to the capital an insurer has to set aside to cover market risk. This risk-sensitivity is a significant progress compared to Solvency I.

A general point to have in mind is that the standard formula entails a trade-off between risk-sensitivity and simplicity. In every asset class there are subsets that have relatively lower risk and others with higher risk than the standard formula implies. Introducing separate treatments for such subsets may lead to a more risk-sensitive formula, but will also increase the complexity of the standard formula. Therefore for each case a well-considered decision will have to be made whether the benefits of a more granular approach outweigh the drawbacks.

Another aspect to consider is that any preferential treatment of a certain asset class might result in a build-up of risk concentrations in the sector with the associated higher level of systemic risk.

Insurers can adopt a more granular approach if they use approved full or partial internal models. In particular large insurers which are already investing in areas like infrastructure can be expected to use full or partial internal models.

Under Solvency II Member States cannot require insurance and reinsurance undertakings to invest in particular categories of assets. There will be no longer quantitative restrictions on investments into individual asset classes. This gives insurers a higher degree of flexibility with respect to their asset allocation. Assets have to be invested in accordance with the prudent person principle.

## 2.4 Preliminary results

The analysis has covered the following investments:

- Private Equity/Venture Capital
- Socially Responsible Investments (SRI) and social business debt and equity finance
- Infrastructure project debt and equity
- Securitisations of SME debt

Venture Capital has been chosen because it allows insurers to invest in SME equity. Despite this ultimate focus the analysis was extended to private equity in general as literature and data is more widely available for the private equity asset class as a whole, and in any case then applicable to the venture capital subset.

Within the area of infrastructure investments debt and equity of corporates in the infrastructure sector have not been covered. This avoids delineation problems and ensures that only investments in infrastructure potentially benefit from lower regulatory capital requirements.

Faced with a lack of data for other securitisations EIOPA has so far concentrated its efforts on analysing securitisations of SME loans.

For these investments EIOPA has considered both quantitative and qualitative information on the size of the markets, the extent to which insurers invest in them and their risk profiles. Sources were - where available - the literature analysing the adequateness of the Solvency II calibration for the respective investment as well as academic and practitioners' literature on performance and riskiness. EIOPA has also entered into discussions with a significant number of stakeholders including industry associations, data providers and rating agencies as well as academics specialized in the respective field.

Given the relative novelty of some of the investments considered, an apparent lack of a sufficiently long history of market (consistent) values has been a major challenge.

In the following, the preliminary findings for the individual investments are summarized.



## Private Equity/Venture Capital

Private Equity (PE) comprises the sectors venture capital, buyout, growth capital and mezzanine. Given the focus on fostering growth and the crucial importance that the availability of early-stage or expansion capital has in this context EIOPA has decided to focus on Venture Capital as a source of SME equity financing. As the available literature covers only the adequateness of the standard formula for private equity as a whole it proved nevertheless useful to cover this as well.

EIOPA analysed the riskiness of Venture Capital based on historical data for an index of listed venture capital funds. This index includes mainly the shares of general partners while insurers invest as limited partners in a fund. For this reason a similar analysis was performed for an index that describes the development of market prices for shares of limited partners. The results provide no evidence that the currently foreseen regulatory capital requirements are not appropriate.

The lower calibrations for Private Equity proposed by industry are usually calculated using Net Asset Values (NAV) from a database of Private Equity funds. EIOPA has considerable concerns regarding this approach: The databases suffer generally from biases. Moreover, an insurer could only achieve a comparable level of diversification by investing in funds of funds with an additional layer of fees. Finally, in a stressed market an insurer might have to accept a substantial discount from the NAV in a sale.

## Socially Responsible Investments (SRI)

A generally accepted definition of SRI does not seem to exist. EIOPA has taken a pragmatic approach. To warrant a separate category for SRI it should be broad enough to allow insurers a meaningful allocation to it. Moreover, it should be easy to decide whether a particular investment falls into such a SRI category or not. Finally, there has to be a sufficiently long history of reliable market data to support a specific calibration.

The academic evidence on the under- or outperformance of SRI compared to other investments is inconclusive. The main economic argument for a higher risk of SRI is the reduced diversification that

results from limiting the investment universe to a subset of all possible investments. The argument for lower risk rests on the assumption that a company with high environmental, social or ethical quality (a “good” company) is less risky and the market price does not fully reflect this.

For the purpose of checking the equity risk calibration an adequate index from the set of established SRI indices with a sufficiently long history would have to be chosen. But in many cases they display in their composition a large extent of overlap with conventional indices.

The general dilemma is that for practical reasons enough investment opportunities to allow a meaningful allocation by insurers and a long enough history of reliable market data are needed. But this implies a broader definition of SRI. As a result there is significant overlap with conventional investments which makes it difficult to justify a different treatment.

### Social Businesses

For the purposes of the analysis the definition of social businesses from the text of the Regulation on European Social Entrepreneurship Funds as adopted by the European Parliament on 12 March 2013 was used. Among other things it requires the social business to be unlisted and to have the achievement of measurable, positive social impacts as a primary objective.

Given this characteristics social businesses are unlisted and will generally not issue bonds listed on an exchange. There are some unlisted funds investing in social businesses. But at the moment EIOPA does not see that a robust calibration could be produced on this basis.

According to the Impact Assessment performed by the European Commission on the proposal for the above mentioned regulation there is “a ‘trade-off’ between expected financial returns and ‘social’ returns (which can be characterized as taking on more risk for the same return or lower return for the same risk)”.<sup>2</sup> Given the mentioned focus on social returns at the possible expense of financial returns EIOPA has so far

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<sup>2</sup> European Commission (2011): Commission Staff Working Paper Impact Assessment accompanying the document “Proposal for a Regulation of the European Parliament and of the Council on European Social Entrepreneurship Funds”. p. 13.

doubts that a more favourable treatment than for “conventional” investments can be justified.

### Infrastructure project debt and equity

The analysis conducted by EIOPA has covered investments in infrastructure project debt and equity (both directly and via funds). Debt and equity of corporates in the infrastructure sector have been excluded. This avoids delineation problems and ensures that only investments in infrastructure potentially benefit.

Infrastructure project equity is generally unlisted. A sufficiently long history of market prices needed for a robust calibration is therefore lacking. An alternative EIOPA is exploring at the moment is the use of listed infrastructure corporates as a “proxy” in terms of risk. However, EIOPA notes that such a proxy may be only of limited use since there are clearly differences in the risk profile of project equity and corporates like utilities, toll road operators etc.

The vast majority of infrastructure project debt takes the form of loans. As there are in general no market prices available for such loans, their potential contribution to a spread risk calibration for infrastructure debt appears to be rather limited. According to the information EIOPA has gathered so far only a relatively small number of infrastructure projects bonds was issued in the past in Europe. A significant portion of them was guaranteed by monoline insurers. This means they are of questionable value for a calibration as the spreads reflect to a significant degree the creditworthiness of the guarantor. As a result, EIOPA considers that it might be difficult to produce a robust spread risk calibration for infrastructure project debt. EIOPA has also so far seen no evidence that the spread risk for infrastructure project debt with a certain rating differs significantly from the spread risk of corporate debt with the same rating.

A particular case of infrastructure project bonds are Europe 2020 project bonds. In this initiative the EIB provides a credit enhancement for the senior bonds issued to finance selected infrastructure projects in Europe. The enhancement is structured to achieve a certain rating for the senior bonds and is determined in a collaborative process with the rating agencies. EIOPA has so far no evidence that a Europe 2020

project bond has a lower spread risk than another bond with the same rating.

### Securitisations of SME debt

According to the information EIOPA has gathered so far the volume of securitisations of SRI and social businesses debt is negligible. There are securitisations of infrastructure debt but apparently no dedicated indices. For this reason EIOPA has so far concentrated its work on securitisations of SME loans.

EIOPA has engaged with industry to produce a spread risk calibration for SME loans securitisations. The approach is the same as was used by the EU Commission for the calibration of the spread risk charge for tradable securities or other financial instruments based on repackaged loans in the draft implementing measures. Preliminary results are available but further work has to be done.

### **Structure of this paper**

Section 3 describes for each of the assets covered the analysis performed and the preliminary findings. Each subsection ends with questions to stakeholders. Section 4 contains a summary of these questions as well as additional ones of a more general nature.

### **Invitation for feedback**

EIOPA invites comments on any aspect of this paper and in particular on the specific questions summarised in Section 4.

### **Next Steps**

The additional research by EIOPA on long-term investment should lead to a final report early July, enabling EIOPA to take full account of the Long-term Guarantee Impact Assessment (LTGIA) scheduled for the end of June. A combination of the results of these two important work streams enables a full examination whether the regulatory framework of Solvency II should be amended to facilitate long-term investments.

### 3. Analysis for certain long-term investments

EIOPA has focussed its analysis on the asset classes included in the list set out in the EC letter.

The following subsections describe for each of them the analysis performed and the preliminary results. At the end specific questions are asked.

For each asset class, the potential treatment in the standard formula as outlined in the "Technical Specification on the Long Term Guarantee Assessment (Part I)"<sup>3</sup> (hereafter LTGA TS) is briefly described. The technical specifications should not be seen as a complete description of the currently foreseen Solvency II framework, since for the purpose of feasibility of testing exercises, shortcuts and ad hoc simplifications have been included.

When looking at the risk charge for a specific asset class at the sub-module level, one should be aware that the actual contribution to the SCR for the undertaking as a whole after taking into account diversification benefits and the loss absorbing capacity of technical provisions and deferred taxes is significantly lower. In QIS5 for example both factors lowered the SCR by 35.1 % and 23.7 % respectively.<sup>4</sup>

There is no separate section on SME financing but other sections cover relevant aspects. SMEs are a crucial part of the European economy. More than 99% of European businesses are SMEs, totalling 20 million firms and employing 87 million people.<sup>5</sup>

The most commonly used form of SME financing is retained earnings; Pre-crisis data suggests that this is as much as two thirds of all financing.<sup>6</sup> Secondary is external debt financing. A 2011 report by the EC surveyed more than 15,000 SMEs across the European Union and found that 75% of SMEs had used at least one form of debt financing in the past six months, most commonly bank overdrafts (40%), bank loans (30%), and trade

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<sup>3</sup>[https://eiopa.europa.eu/fileadmin/tx\\_dam/files/consultations/QIS/Preparatory\\_forthcoming\\_assessments/final/A/A\\_-\\_Technical\\_Specification\\_on\\_the\\_Long\\_Term\\_Guarantee\\_Assessment\\_Part\\_I.pdf](https://eiopa.europa.eu/fileadmin/tx_dam/files/consultations/QIS/Preparatory_forthcoming_assessments/final/A/A_-_Technical_Specification_on_the_Long_Term_Guarantee_Assessment_Part_I.pdf)

<sup>4</sup> EIOPA (2011): EIOPA Report on the fifth Quantitative Impact Study (QIS5) for Solvency II. p. 31.

<sup>5</sup> ECORYS (2012): EU SMEs in 2012: at the crossroads. Annual report on small and medium-sized enterprises in the EU, 2011/2012. Client: European Commission. p. 15.

<sup>6</sup> World Bank/European Bank for Reconstruction and Development (2005): 2004 Business Environment and Enterprise Performance Survey (BEEPS). (<http://www.ebrd.com/pages/research/economics/data/beeps/beeps04.shtml>).

credit (32%).<sup>7</sup> SMEs are highly dependent on these bank loans and credit lines, areas where insurers can only play a secondary role.

At present insurers only play a small part in SME debt financing. Insurers may support debt financing through securitisations or through the holdings of direct loans. The securitisation of SME loans is discussed in section 3.5. Additionally, EIOPA recognise that while still only a small number, more insurers work alongside banks to hold direct SME loans on their balance sheets. The treatment of these loans within the standard formula is the same as for infrastructure project loans as set out in paragraph 104.

Alternatively, insurers may invest in SME equity. One vehicle is venture capital that is covered in section 3.1.

Throughout the analysis the SME definition of the European Commission is used.<sup>8</sup>

## Questions<sup>9</sup>

Q1: Are there any further channels for SME financing by insurers that EIOPA should consider?

### 3.1. Private Equity, Venture Capital and SME

#### 3.1.1. Preliminary Analysis

##### Introduction

1. Private equity is currently a small asset class for insurers; of the €6tn in total European insurance assets, only 1% to 2% of insurance investments are held within the private equity asset class<sup>10</sup>. In 2011,

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<sup>7</sup> European Commission (2011): SME's Access to Finance. Survey 2011. Analytical report. p. 6.

<sup>8</sup> Less than 250 employees and either turnover not exceeding € 50 m or balance sheet total not exceeding € 43 m. ([http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index\\_en.htm](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm)).

<sup>9</sup> Further questions regarding SME investments may be found in the relevant asset class sections below.

<sup>10</sup> Globally there is an average asset allocation of 2.7% of total assets into Private Equity (Preqin (2012): Preqin Special Report: Insurance Companies Investing in Private Equity. p. 3).

investments by insurers into private equity funds accounted for at least 6% of all investment into private equity funds<sup>11</sup>.

2. Across Europe private equity and venture capital funds are collective investment schemes that make investments in unlisted companies. Approximately 1,945 private equity fund managers are active in Europe; as of 2010 these firms managed 4,200 active funds with €524bn of capital under management (4% of the €14tn assets held by the EU asset management industry). They have invested in more than 25,000 European companies. Over 80% of the investments (by number of companies) are in SMEs.<sup>12</sup> To further the analysis of SME investments, EIOPA has therefore looked at the private equity asset class.
3. A private equity fund is typically structured as a 10 year, closed-end, limited partnership. At inception, institutional investors make an unfunded commitment to the limited partnership, which is then drawn on over the term of the fund. While investors ordinarily make this investment with the expectation of remaining committed to the fund for the entire duration of the fund's life, under adverse conditions, an insurer may have to sell its investment earlier on the secondary market. There is therefore a question of the appropriate discount to fund value (the discount is the realised difference between sales price and book value) during distressed conditions, in the event that the insurer wants to sell. Efforts to quantify this effect are discussed in the Analysis section below.
4. An insurer may invest via a fund of fund structure for a more diversified exposure. Alternatively, an insurer may also invest directly into a private equity fund provided it has sufficient resource to structure and monitor these investments effectively.
5. The broad private equity asset class may be defined via investments of the following sectors:

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<sup>11</sup> Figures from European Private Equity and Venture Capital Association (EVCA). Direct investments from insurers into private equity funds totalled 6% of investments. Additionally, insurers may invest into funds of funds, in aggregate funds of funds totalled 19% of the private equity fund investments in 2011. No split is available for the insurance industries' share of funds of funds investments.

<sup>12</sup> Numbers provided to EIOPA by EVCA.

- i. Buyout – Acquire an investment, predominantly a controlling stake, in an established company. Buyout investments will frequently use some form of leverage.
- ii. Venture capital – Equity investments into start-up or young companies. While closely associated with technology, healthcare, and biotechnology fields, venture funding is also used for more traditional businesses.
- iii. Growth capital – Equity investments into relatively mature companies who are looking to expand.
- iv. Mezzanine – A fund that provides (generally subordinated) debt facilities to support buyout financing.

The buyout sector is the most important in terms of volume. In 2011 €25.9bn was invested into buyout sector funds, 4.9bn into venture capital, 4.5bn into growth capital, 2.8bn into Mezzanine, and 1.7bn into generalist funds (a fund that may focus on any of the above).

#### *Current Solvency II treatment under the standard formula*

6. The Technical Specification of the LTGA classifies private equity as “type 2 equity” within the equity-risk sub-module of the standard formula. The stress is the sum of 49% and the symmetric adjustment (a value within the range -10% and +10%). There is a correlation of 75% between type 1 and type 2 equities, and implicitly private equity has a 100% correlation with all other type 2 equities (Non-EEA or non-OECD member equity, unlisted equity, hedge funds, commodities, and other alternative investments). This choice of calibration is discussed further in the “Analysis” section below.

### **Analysis**

7. The following is a summary of the calibration analysis from EIOPA for private equity and venture capital. While the ultimate focus has been towards venture capital, literature and data is more widely available for the private equity asset class as a whole, and in any case then applicable to the venture capital subset. There have also been a number of papers and articles written about the private equity calibration in the standard formula and the resource of the long term investments taskforce has allowed a timely opportunity to review any new industry research. These are referenced below.



## Private equity

8. The choice of a calibration method for private equity is a challenging issue given: its unique characteristics, absence of any single ideal performance standard and the fact that there are few indexes. Private equity exhibits illiquidity, infrequent pricing and J-curve effects<sup>13</sup>, which makes measurement of returns and benchmark selection difficult.
9. To guide the earlier standard formula calibration of the “type 2 equity” stress the LPX 50 Total Returns Index was used. This index contains a combination of the 50 largest listed and most liquid private equity firms. It is frequently used in industry as a performance benchmark for the private equity asset class. During the financial crisis the largest annual fall of this index was approximately 70%, and the 99.5<sup>th</sup> private equity stress included in EIOPA’s consultation paper on the equity risk sub-module is 69%.<sup>14</sup>
10. The choice of the LPX index has been written about extensively since the publication of the calibration document. The concern voiced is that the private equity portfolio represented by the index is a poor proxy for the typical private equity investments of insurers and that consequently the risk profiles are different:
  - i. An index of 50 companies may carry too much idiosyncratic risk to be considered a good measure for all private equity. Typically private equity funds and funds of funds will have a more diversified portfolio.
  - ii. Some buyout firms in the LPX 50 index are more leveraged (and therefore riskier) than the average private equity firm.<sup>15</sup>
  - iii. The performance of unlisted PE firms and funds may be different to the listed companies represented in the index.
  - iv. The listed companies within the index are the management companies. This is not the same as the value of the portfolios under management, although there is some indirect correlation between

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<sup>13</sup> The J-curve is a phenomenon of the life cycle of typical PE investments: The returns are typically negative in the early “investment phase”, break even in the “maturation phase”, and become positive in the later “harvesting phase”. The entire life cycle of a fund may last a decade or more implying that the time required in realising longer-term investment return can be significant.

<sup>14</sup> CEIOPS (2009): Consultation Paper No. 69. Draft CEIOPS’ Advice for Level 2 Implementing Measures on Solvency II: Article 109 b. Equity risk sub-module. p. 22.

<sup>15</sup> Arias, L./ El Hedi Aroui, M./Foulquier, P (2010): On the Suitability of the Calibration of Private Equity Risk in the Solvency II Standard Formula. EDHEC Financial Analysis and Accounting Research Centre Publication. p. 25.

the two. Part of the return for firms in the LPX50 index is due to management fees and other non-investment driven returns, not only the performance of any underlying investments. This may make the LPX50 more or less volatile than the portfolio under management.

11. It would be technically very challenging, if not impossible, to quantify these effects. Nevertheless, EIOPA recognise that they will impact the calibration to various degrees. EIOPA has therefore investigated a number of alternative calibration approaches proposed by industry, the most common of which use a data set from a database of unlisted fund performance<sup>16</sup>. Some widely used databases of PE performance are provided by: Thomson Reuters, Cambridge Associates, Prequin, and Pevera. These databases cover a wide data set (many hundreds or thousands of funds; the Prequin database contains data from 1,882 funds) across a wide range of geographical areas, vintage years, and product types. Using the underlying performance data it is possible to create a synthetic index before calculating corresponding Value-at-Risk and correlation metrics.
12. Using this approach industry papers find a lower 99.5<sup>th</sup> percentile measure. EVCA calculate a stress of 29% using Prequin data and 25% using Pevera data; Partner's group calculate a 30% stress using Thomson Reuter's data; and the CRO Forum suggest a stress of 42% for a diversified portfolio (although higher for an un-diversified portfolio) using a Thomson Reuters index. However, as we explain below, these papers do not adequately take account of a number of biases within the data sets.
13. Intuitively, it is also no surprise that the figures are lower than the LPX 50 index. While one private equity fund may have high risk characteristics, there will be some diversification when we analyse the risk characteristics of multiple funds. This diversification can be between investment strategies and geographies, or between time frames when considering funds from different vintage years<sup>17</sup>. Using the database approach and calculating risk and return characteristics

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<sup>16</sup> e.g. EVCA (2012): Calibration of Risk and Correlation in Private Equity; Partners Group Research (2011): Private equity under Solvency II: Evidence from time series models; and CRO Forum (2010): Calibration recommendation for the market risks in the Solvency II standard formula.

<sup>17</sup> This diversification effect is helpfully illustrated in Diller, C./Herger, I. (2009): Assessing the risk of private equity fund investments.

across many hundreds of funds will inherently allow for considerable diversification.

14. If an insurer was to maximise its diversification within the private equity asset class, it would invest across multiple funds of funds. These funds of funds charge management fees and performance fees that will change the risk/return characteristics of the data, an effect that has not been quantified in any of the industry papers.<sup>18</sup>
15. Under an internal model approach insurers have the ability to demonstrate to national supervisory authorities that their investment strategy gains this level of diversification. The standard formula is limited as there must be just one number to represent the investment in Private Equity by the standard European insurer. Due to the small amount of private equity investments in the average insurer portfolio, EIOPA believe that these methods may overstate an appropriate level of diversification within the asset class, and by consequence understate the risk.
16. EIOPA also recognises that it is difficult for any database to be free from biases. A database of unlisted fund performance – or an index – is likely to suffer from at least one of the following biases:<sup>19</sup>
  - i. Survivorship bias – It is often argued that there is survivorship bias inherent in any private performance data. This has been a common area of research for the financial sector more broadly.<sup>20</sup> In an index, the worst performing funds or companies may fall out as they fail, while the successful funds will remain in the index biasing any performance in an upwards direction. If a database includes only active managers, failed PE funds may be erased from the history.
  - ii. Backfill/Instant history bias – A database may add funds once they have achieved success and include their entire history in the

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<sup>18</sup> For comparison, Ammann and Moerth (Ammann, M./Moerth, P. (2005): Impact of Fund size on Hedge Fund Performance. *Journal of Asset Management*. Vol. 6. No. 3. pp. 219-238) compare the returns characteristics of funds against funds of funds (FoF) in the hedge fund universe. Between 1994 and 2005 FoF suffered from a 1.84% load on returns due to the extra layer of management fees and performance fees.

<sup>19</sup> Gupta (Gupta, V. (2012): Benchmarking Private Equity. Russell Investments paper) discusses biases with respect to private equity fund performance. Discussion of these biases more generally in the context of measuring investment fund performance may be found from numerous sources.

<sup>20</sup> For example, Elton et al (Elton, E.J./Gruber, M.J./Blake, C.R. (1996): Survivorship bias in mutual fund performance. *Review of Financial Studies*. Vol. 9. pp. 1097-1120) conclude that almost all prior mutual fund studies suffer from survivorship bias. Additionally, Fung and Heish (Fung, W./Heish, D.A. (2000): Performance Characteristics of Hedge Funds and Commodity Funds: Natural vs Spurious Biases. *Journal of Financial and Quantitative Analysis*. Vol. 35. pp. 291-307) calculate a survivorship bias on returns of around 1% in mutual funds, 2.5% in commodity funds, 3% in hedge funds, and 1.5% in funds of hedge funds.

process.<sup>21</sup> This bias may be synthetically generated by database collection methods.

- iii. Mark-to-Market or reporting bias – Private equity is not typically reported on a mark-to-market basis. Due to the illiquid nature of PE appraisal-based prices or NAV estimates are often used. This may lead to artificial smoothing of the returns. The prices are “stale” as they do not reflect all information available. Performance of PE may, therefore, be more volatile and more correlated with other asset classes than reported.
- iv. Self-reporting or selection bias – Databases are subject to the manager’s willingness to report performance in an industry where voluntary performance reporting dominates. In some instances, poor performers may elect not to report.
- v. Database selection bias – The selection of funds within a database will only be a subset of the investible universe. The weightings towards particular investment types, geographic regions, or vintage years may skew the characteristics of the data.

17. The industry papers reviewed by EIOPA take only minimal account of these biases. While different databases may suffer from the above biases to a greater or lesser extent, any robust standard formula calibration requires an elimination or at least quantitative estimation of their effects.

18. The reporting bias is one of the most significant of the above, although it is not yet clear to EIOPA how much of an adjustment should be made for its impact. The study by EVCA attempts to remove smoothing by adjusting the data for autocorrelation. They consider the lag in the dataset to be only statically significant for one quarter, and of minimal consequence. However, other studies find a statistically significant lag of a greater number of quarters. Conroy (2007) finds the longest significant lag at four quarters; by adjusting for this staleness the quarterly standard deviation increases from 13% to 25%.<sup>22</sup> Woodward (2009) considers a lag effect of up to five or six

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<sup>21</sup> The back-fill bias may change the shape of a returns distribution. Fung and Heish (Fung, W./Heish, D.A. (2000): Performance Characteristics of Hedge Funds and Commodity Funds: Natural vs Spurious Biases. *Journal of Financial and Quantitative Analysis*. Vol. 35. pp. 291-307) calculate a returns bias of 3.6% in commodity funds, 1.4% in hedge funds, and 0.7% in funds of hedge funds.

<sup>22</sup> Conroy, R. (2007): Private Equity, Capital Structure, and Payout Policy. *Journal of Applied Corporate Finance*. Volume 19. No. 3. pp. 96-108. Conroy uses data from Venture Economics with time series from 1989 to 2005. He adjusts for auto-correlation using a Dimson Beta regression method.

quarters in her analysis of time series data for buyout funds; by adjusting for this the risk measure more than doubles.<sup>23</sup>

19. An alternative way of adjusting stale values is to consider the price difference between net asset values and listed market values (a discount when listed market values are below net asset values). While EIOPA does not have data for unlisted funds, the universe of listed funds gives a useful starting place. One publication co-authored by Prequin and LPX compares the LPX 50 Total Returns index (originally used to aid calibration) and LPX NAV index – an index constructed from the balance sheet net asset values of the 50 constituent companies.<sup>24</sup> It notes an average discount at the reports time of writing in June 2012 of 30%, and a much larger discount that exceeded 60% during the stressed market conditions of 2008.
20. This discount is a consequence of a variety of factors including: liquidity, disclosure, the J-curve effect, and relationships with credit markets (from interest rates and credit spreads) and equity markets (through investor sentiment). Its presence increases the volatility of the data and correlation with other equity markets. It should still be recognised, however, that some of this discount might be due to the fact that the shares do represent a claim to the earnings of the management company and not the underlying fund.
21. Another study by Lahr and Kaserer (2010)<sup>25</sup> looks at a sample of listed funds that include some management firms, but also a sizable population of pure funds. These pure listed funds are just the same as their unlisted counterparts, except that shares in the fund are tradable on the financial markets. A long term average discount of 21% is calculated. While it is clear from the paper that there is volatility in this discount over time, this volatility is not explicitly calculated.
22. For unlisted funds, however, data is not so publically available. Any market transactions take place on the secondary markets. To further this area of research EIOPA welcome any data on market transactions.
23. Analysing the data from the available studies EIOPA notes that a time series of private equity data may appear relatively uncorrelated with

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<sup>23</sup> Woodward, S.E. (2009): Measuring Risk for Venture Capital and Private Equity Portfolios.

<sup>24</sup> Prequin/LPX (2012): Listed Private Equity – Opportunities for Institutional Investors. Special Report.

<sup>25</sup> Lahr, H./Kaserer, C. (2010): Net Asset Value Discounts in Listed Private Equity Funds. CEFS Working Paper No. 2009-12.

other asset classes (across the investment cycle), and most significantly the MSCI World Index (used to calibrate the “type 1 equity” stress). However, the tail correlations remain high. For example, after the dotcom bubble, and during the financial crises, there were significant losses in both the MSCI World Index and private equity markets. EIOPA has seen no evidence to justify any alterations in the private equity correlation assumptions.

## **Venture capital and growth capital**

24. As already stated, EIOPA’s primary consideration has been to investigate channels for investment into SMEs. The European Commission is implementing regulation for an EU-wide “passport” for venture capital funds in an effort to make it easier for venture capitalists to raise funds across Europe for the benefit of start-ups<sup>26</sup>. The provision of this regulation has provided EIOPA with a useful definition for any calibration considerations.

25. By definition venture capital is the financing of early-stage companies, with potentially high returns, but also high risks. The inherent riskiness of the investment philosophy would seem to suggest the venture capital investments has greater volatility than the wider private equity asset class. Nevertheless, EIOPA has considered the available datasets to examine this assertion. While a venture capital investment into one company is highly risky, an investment into a venture capital fund will, to some extent, diversify this risk.

26. The approach of using a database of unlisted private equity funds may also be applied to this subclass. The subset of funds fitting the relevant venture and growth capital considerations can be analysed using the same methods. However, for the same concerns discussed above, EIOPA is yet to analyse the approach in more detail. It is noted, however, that analysis within the CRO Forum and ECVA papers referred to in footnote 16 indicates greater volatility for venture capital funds than the private equity database as a whole.

27. To remain consistent with previous calibrations, EIOPA has first investigated the volatility of venture capital investments using the LPX

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<sup>26</sup> The passport will be available for venture capital funds that: invest 70% of their committed capital into unlisted SMEs; provide equity or quasi-equity to these SMEs; do not employ leverage; and have managers whose assets under management do not exceed €500m (above this threshold funds will be regulated by the EU’s new alternative investment rules (AIFMD)). Further information can be found on the website of the European Commission ([http://ec.europa.eu/internal\\_market/investment/venture\\_capital/index\\_en.htm](http://ec.europa.eu/internal_market/investment/venture_capital/index_en.htm)).

index family. LPX publishes the LPX Venture Index (LPX VE), an index containing 30 of the largest and most liquid venture capital firms. While this may suffer from the same limitations as the LPX 50 index, it allows an initial comparison between the venture capital subclass and the wider private equity asset class.

28. In the aftermath of the dotcom bubble the largest annual fall for the LPX VE is 61%, and during the financial crises of 2008 the largest annual fall is also 61%. These figures are comparable to the largest 69% annual fall from the LPX 50 series.
29. EIOPA has also analysed the Dow Jones Venture Capital Index (DJI). This is an index constructed with data from the Dow Jones Venture Source database; a database tracking 67,000 venture-backed companies in the US, Canada, Europe, China, Israel, and India. Firms are established at market value at each round of financing: seed, early, and late funding stages. A late funding stage may be seen to be more comparable to a growth capital category. A firm exits the index when there is an IPO, an acquisition, or the firm shuts down. To ensure a complete time series values are interpolated between financing stages.<sup>27</sup> The largest annual fall for this index is 67%. The figures from these indices suggest that a venture capital calibration should be no less than that for private equity.
30. EIOPA has considered the correlations between the LPX VE and the MSCI World Index, and the DJI and MSCI World Index. In the recent history market shocks of the dotcom bubble and the 2008 financial crises the data indicates a high tail correlation in both cases.

### **Preliminary Results**

31. The evidence EIOPA has gathered so far supports the current private equity calibration within the "type 2 equity" sub-module. The data that has so far been put forward to support lower regulatory capital requirements suffer from severe limitations. Pending any improved data sets or other insights a change in the current calibration based on this evidence seems not justified.
32. Similarly, the venture capital subset suffers from the same limitations as private equity. While the data suggests similar characteristics at the 99.5<sup>th</sup> percentile to private equity, the risk is perhaps even higher. This

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<sup>27</sup> More details may be found on the Sand Hill Econometrics website (<http://www.sandhillecon.com/index.html>).

is, however, inconclusive unless data limitations are solved. Again, the evidence gathered so far supports the currently foreseen treatment.

33. In periods of market stress the analysed data sets show correlated falls across the private equity markets and wider equity markets. This is in line with the current standard formula correlation assumptions and EIOPA has seen to date no evidence to justify an alteration.

### **3.1.2. Questions**

- Q2: Further to the information in the introduction of 3.1.1, what are the most common investment channels for the average insurance firm to invest in Private Equity, Venture Capital, and in particular SMEs? Is there data available to support this answer?
- Q3: Are there methods or data that EIOPA could use to quantify or eliminate the biases described in paragraph 16?
- Q4: Regarding paragraphs 19 to 22, is there suitable data on secondary market transactions that allows the quantification of the discount to NAV (in particular under stressed market conditions)?
- Q5: How can the risk characteristics effects of the additional layer of fees (described in paragraph 14) be quantified when investing via funds of funds?
- Q6: Are there any further market indices for private equity or venture capital that EIOPA should consider?
- Q7: What economic factors contribute to the risk-profile of private equity investments and how?



## 3.2 Social Businesses

### 3.2.1 Preliminary Analysis

#### Introduction

34. For the purpose of the analysis the definition of social businesses from the text of the Regulation on European Social Entrepreneurship Funds as adopted by the European Parliament on 12 March 2013 is used:<sup>28</sup>

‘qualifying portfolio undertaking’ means an undertaking that:

(i) at the time of an investment by the qualifying social entrepreneurship fund is not admitted to trading on a regulated market or on a multilateral trading facility (MTF) as defined in point (14) and point (15) of Article 4(1) of Directive 2004/39/EC;

(ii) has the achievement of measurable, positive social impacts as its primary objective in accordance with its articles of association, statutes or any other rules or instruments of incorporation establishing the business, where the undertaking:

– provides services or goods to vulnerable or marginalised, disadvantaged or excluded persons;

– employs a method of production of goods or services that embodies its social objective; or

– provides financial support exclusively to social undertakings as defined in the first two indents;

(iii) uses its profits primarily to achieve its primary social objective in accordance with its articles of association, statutes or any other rules or instruments of incorporation establishing the business and with the predefined procedures and rules therein, which determine the circumstances in which profits are distributed to shareholders and owners to ensure that any such distribution of profits does not undermine its primary objective;

(iv) is managed in an accountable and transparent way, in particular by involving workers, customers and stakeholders affected by its business activities...’

35. An essential element of this definition is that the social business has the achievement of measurable, positive social impacts as a primary objective. Profits are primarily used to achieve this primary objective instead of distributing them. Finally, the social business is not listed on a regulated market.

36. An example is a business in Germany that organizes exhibitions and business workshops in total darkness. Blind guides lead attendees through a completely dark environment, where they learn to interact

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<sup>28</sup> [http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P7-TA-2013-0072&language=EN#def\\_1\\_2](http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P7-TA-2013-0072&language=EN#def_1_2)

by relying on other senses than sight. Further examples for social businesses can be found in Annex 4.

#### *Current Solvency II treatment under the standard formula*

37. The LTGA TS classifies equity investments in social businesses as “type 2 equity”.<sup>30</sup> The stress is the sum of 49% and the symmetric adjustment (a value within the range -10% and +10%).<sup>31</sup> There is a correlation of 75% between “type 1 equity” and “type 2 equity”.<sup>32</sup>

38. According to the LTGA TS social business debt is subject to interest rate, spread and potentially market risk concentration risk charges.<sup>33</sup> The treatment is not different from the calculation for any other bond or loan.

### **Analysis**

39. EIOPA has researched the existing literature and liaised with stakeholders. The preliminary results are as follows:

40. The social focus of social businesses correlates with a strong focus on inclusive development, and on tackling social challenges across EU societies. Social businesses will typically not offer dividends to investors, but will re-invest any financial surpluses in the business. Investors in social businesses are happy to make a “trade-off” between expected financial returns and “social returns” (which can be characterised as taking on more risk for the same returns or lower returns for the same risk).<sup>34</sup>

41. As the European Social Investment Taskforce notes “Social investors ... seek a financial return – usually the aim across the portfolio is to at least recover the capital so that it can be recycled elsewhere, but may charge below commercial rates, and overall aim to break even as opposed to generate financial returns.”<sup>35</sup>

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<sup>30</sup> See SCR 5.34.

<sup>31</sup> See SCR 5.36.

<sup>32</sup> See SCR.5.43.

<sup>33</sup> See sections SCR 5.4., SCR 5.8. and SCR 5.9.

<sup>34</sup> European Commission (2011): Commission Staff Working Paper Impact Assessment accompanying the document “Proposal for a Regulation of the European Parliament and of the Council on European Social Entrepreneurship Funds”. p. 13.

([http://ec.europa.eu/internal\\_market/investment/docs/social\\_investment/20111207ia\\_en.pdf](http://ec.europa.eu/internal_market/investment/docs/social_investment/20111207ia_en.pdf).)

<sup>35</sup> Ibid.

42. The trade-off mentioned above indicates that investments in social businesses have no lower risks than comparable investments. Moreover, there is no clear economic rationale why social businesses would have a lower risk compared to “conventional” investments. It seems also not clear that a social business would generate any direct payments to investors (of course there are the social benefits plus the advantage of being seen as responsible corporate citizen).
43. Given the characteristics outlined above social businesses are not listed and unlikely to issue bonds listed on an exchange. EIOPA has so far not found any data that could be used to derive in a reliable way a capital charge for social businesses.

### **Preliminary Result**

44. The evidence gathered so far supports the calibration currently foreseen for debt and equity investments in social businesses.

### **3.2.2 Questions**

- Q8: What data could be used to produce a reliable calibration for investments in social businesses?
- Q9: What data can be used to calculate the correlation between social businesses and other asset classes?
- Q10: What could be the economic rationale for a different calibration than for other debt and equity investments?
- Q11: What is the volume of current investments by insurers in businesses with similar features as set out in the definition above?

## **3.3 Socially Responsible Investments (SRI)**

### **3.3.1 Preliminary Analysis**

#### **Introduction**

45. Finding a workable definition of SRI in the context of regulatory capital requirements is a challenge. In 2003 the European Social Investment Forum (Eurosif) stated that “SRI encompasses a wide number of extra-financial criteria within the realm of Corporate Social Responsibility (CSR). The sectors various applications range from a passive respect of one or many of those criteria to an active approach where investors directly promote social responsibility with the

companies in which they invest.”<sup>36</sup> The scope of SRI as defined by Eurosif at that time can be found in Annex 1.

46. Over the years the idea of Responsible Investing has been extended to take also environmental and governance aspects into account. Consequently, in its latest European SRI Study 2012 Eurosif used the abbreviation SRI for “Sustainable and Responsible Investment” and defines it on its website as follows: “Sustainable and Responsible Investment (SRI) combines investors' financial objectives with their concerns about social, environmental, ethical (SEE) and corporate governance issues. SRI is an evolving movement and even the terminology is still very much in the evolving phase. Some SRI investors refer only to the SEE risks while others refer to ESG issues (Environmental, Social, Governance)”.<sup>37</sup>

47. There are also “Principles for Responsible Investments” backed by the United Nations. For their purposes Responsible Investments are defined as follows:<sup>38</sup>

“Responsible investment is an approach to investment that explicitly acknowledges the relevance to the investor of environmental, social and governance (ESG) factors, and the long-term health and stability of the market as a whole.”

48. In addition there are different approaches to SRI, e.g. exclusion or inclusion of certain investments and the “best-in-class” approach.

49. EIOPA is in no position to judge what the “right” definition of SRI is. The selection of the investments analysed has to be based on pragmatic considerations: There should be enough investments available to allow a meaningful allocation by insurers to it. Moreover, it should be easy to decide whether a particular investment falls into the category. Finally, there has to be a long enough history of reliable market data. Once a data source has been chosen (e.g. an SRI equity index) a definition at least similar to the one applied for compiling the data has to be used. For pragmatic reasons EIOPA has restricted its analysis to established SRI indices and the definition of SRI they imply.

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<sup>36</sup> Eurosif (2003): Socially Responsible Investment among European Institutional Investors. 2003 Report. p. 6. ([http://www.eurosif.org/images/stories/pdf/eurosif\\_srireprt\\_2003\\_all.pdf](http://www.eurosif.org/images/stories/pdf/eurosif_srireprt_2003_all.pdf)).

<sup>37</sup> <http://www.eurosif.org/sri-resources/intro-to-sri>

<sup>38</sup> Principles for Responsible Investment (PRI) Initiative (2012): What is responsible investing?. p. 1. (<http://www.unpri.org/viewer/?file=wp-content/uploads/1.WhatIsResponsibleInvestment.pdf>).

### *Current Solvency II treatment under the standard formula*

50. Depending on whether and where they are listed the LTGA TS classifies SRI equity investment as “type 1 equity” or “type 2 equity”.<sup>39</sup> The stress is the sum of 39% and the symmetric adjustment (a value within the range -10% and +10%) in case of “type 1 equity” and 49% and the symmetric adjustment for “type 2 equity”.<sup>40</sup> There is a correlation of 75% between “type 1 equity” and “type 2 equity”.<sup>41</sup>
51. According to the LTGA TS SRI debt is subject to interest rate, spread and potentially market risk concentration risk charges.<sup>42</sup> The treatment is not different from the calculation for any other bond or loan.

### **Analysis**

52. The analysis consists of two parts, a review of the academic literature on performance and risk of SRI and a brief look at SRI bond and equity indices.

### **Academic literature review**

53. The academic literature is inconclusive on the performance of SRI compared with conventional investments. Below the possible arguments for lower or higher risk of SRI are listed that can be extracted from the literature by disregarding the return dimension:<sup>43</sup>
54. The main argument for the higher risk of SRI is the reduced diversification that results from limiting the investment universe to a subset of all possible investments. Another argument is that the range of activities a company can pursue is restricted and therefore its operations are possibly less diversified.
55. The argument for lower risk rests on the assumption that a company with high environmental, social or ethical quality (a “good” company) is less risky and that the market price does not fully reflect this. There are different possible reasons for the first assumption: Good companies may have a lower risk of being the target of negative press, NGO actions, consumer boycotts and lawsuits. Another benefit may be

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<sup>39</sup> See SCR 5.34.

<sup>40</sup> See SCR 5.36.

<sup>41</sup> See SCR.5.43.

<sup>42</sup> See sections SCR 5.4., SCR 5.8. and SCR 5.9.

<sup>43</sup> The following is based on Rathner, S. (2012): The Performance of Socially Responsible Investment Funds: A Metaanalysis. Department of Economics and Social Sciences Working Paper No. 2012-03.

that environmentally responsible actions cause cost reductions by reducing waste. Good corporate behaviour may also be a source of differentiation while bad behaviour may harm a company's brand. A 'good' company may attract a highly educated workforce, be more successful in motivating the employees and generate less principal-agent friction costs, because its good governance allows to align the interests of managers and investors.

56. Apparently there are no studies that cover the adequateness of the foreseen Solvency II regulatory capital requirements for SRI investments.
57. Numerous studies have investigated the performance of shares of socially responsible companies and investment funds consisting of these shares. The results are not conclusive (i.e. there is no clear evidence for under- or outperformance compared to other investments).<sup>44</sup> The under- or outperformance of fixed income SRI funds has received significant less attention. In a study by Derwall and Koedijk (2009) socially responsible fixed-income funds performed no worse than their conventional peers.<sup>45</sup>

#### Analysis of SRI bond indices and SRI stock indices

58. As there are different possibilities to interpret "socially responsible" (see section "Introduction") there is no objective way to determine whether a given asset belongs to this class or not. Providers of dedicated indices and funds use different sets of criteria.<sup>46</sup>
59. Based on these considerations the scope of the investigation was restricted to stocks and bonds included in suitable SRI equity and fixed-income indices.
60. Depending on the definition of SRI used there can be a large overlap with general stock indices. An example is the "EURO STOXX Sustainability 40 Index" which offers "a consistent, flexible and investable blue-chip representation of the largest sustainability leaders in the Eurozone, i.e. the Eurozone leaders in terms of long-term

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<sup>44</sup> For an overview see Rathner, S. (2012): The Performance of Socially Responsible Investment Funds: A Metaanalysis. Department of Economics and Social Sciences Working Paper No. 2012-03.

<sup>45</sup> Derwall, J./Koedijk, K. (2009): Socially Responsible Fixed-Income Funds. *Journal of Business Finance & Accounting*, 36(1) & (2). 210–229. January/March 2009. p. 227.

<sup>46</sup> There are for example information providers who make assessments with respect to the relevant dimensions ('ratings'). Inclusion in an index or in the potential investment set of a fund could then be restricted to assets with a minimum rating.

environmental, social and governance criteria"<sup>47</sup>. It includes the following banks and insurance companies: BBVA, Santander, BNP Paribas, Societe Generale, Intesa Sanpaolo, Allianz, Generali, AXA, ING and Munich Re.

61. Apparently SRI fixed income indices play a much smaller role than the corresponding stock indices. The only one found so far is the "ECPI Ethical Index Global Composite Bond EUR"<sup>48</sup>. It does not contain sub-indices for rating classes and therefore does not seem to be appropriate for the calibration of spread risk.

### **Preliminary Results**

62. The evidence gathered so far supports the currently foreseen treatment of SRI.
63. EIOPA can see at the moment no clear economic case for a lower risk of SRI investments relative to conventional ones.
64. For the purpose of checking the equity risk calibration an adequate index from the set of established SRI indices with a sufficiently long history would have to be chosen. But in many cases they display a large extent of overlap with conventional indices in their composition (e.g. the "EURO STOXX Sustainability 40 Index" mentioned above).
65. With a narrow definition of SRI the overlap would be limited. But this implies a significant reduction in diversification.
66. Apart from the fundamental doubts whether a more favourable treatment could be justified there would also be some practical problems in implementing it: A clear and objective definition has to be found. It would then have to be decided when exactly a different treatment should apply (e.g. already to an individual SRI stock which might very well be also included in a general index or only for a sufficiently diversified portfolio of SRI stocks). In addition, in case SRI stocks would represent a significant proportion of all equity investments and warrant a lower risk charge the corresponding charge for non-SRI equity would have to be increased.

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<sup>47</sup> [http://www.stoxx.com/indices/index\\_information.html?symbol=SUBE](http://www.stoxx.com/indices/index_information.html?symbol=SUBE)

<sup>48</sup> The description of this index can be found under [http://www.ecpigroup.com/PDF\\_Indici/ECPI\\_Euro\\_Ethical\\_Corporate\\_Bond.pdf](http://www.ecpigroup.com/PDF_Indici/ECPI_Euro_Ethical_Corporate_Bond.pdf)

67. To justify a different treatment for SRI debt the case would have to be made that the spread risk of SRI debt differs significantly from the spread risk of non-SRI debt within the same rating class. EIOPA has so far seen no evidence for this and there seems to be a lack of suitable data.<sup>49</sup>

68. The general dilemma seems to be that for practical reasons enough investment opportunities to allow a meaningful allocation by insurers and a long enough history of reliable market data are needed. But this implies a broader definition of SRI. As a result there is significant overlap with conventional investments and a different treatment would be difficult to justify.

### **3.3.2. Questions**

Q12: What is in your view a suitable definition of SRI that allows a clear distinction between SRI and non-SRI?

Q13: What empirical data is available for a SRI calibration based on the definition you suggested?

Q14: Do you have any suggestions how the problems outlined in paragraph 68 could be overcome?

Q15: Do you agree with the qualitative analysis of SRI risks and the preliminary conclusion EIOPA has drawn from it?

## **3.4 Infrastructure investments**

### **3.4.1 Preliminary Analysis**

#### **Introduction to Infrastructure and its investment vehicles**

69. As infrastructure is a heterogeneous and relatively new asset class it seems useful to lay down some basic properties that are relevant for the considerations in the next sections.

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<sup>49</sup> The “ECPI Ethical Index Global Composite Bond EUR” contains bonds with different rating classes from AAA to BB but no sub-indices. To check the calibration for spread risk the individual components of the index would have to be identified and an analysis similar to the one performed for the calibration of the spread risk charge in general would have to be conducted. Then the results of both calibrations, the one for spread risk in general and the one for spread risk of SRI bonds, could be compared to each other. This analysis could of course also be performed for bonds gathered from another source.



70. The OECD glossary defines infrastructure as “The system of public works in a country, state or region, including roads, utility lines and public buildings”.<sup>50</sup> In the investment context, it typically includes:

<b>Economic infrastructure</b>	<b>Social infrastructure</b>
<ul style="list-style-type: none"> <li>• Transport</li> <li>• Utilities</li> <li>• Communication</li> <li>• Renewable energy.</li> </ul>	<ul style="list-style-type: none"> <li>• Schools</li> <li>• Healthcare facilities, senior homes</li> <li>• Governmental buildings</li> <li>• Sports structure</li> </ul>

**Figure 1: Types of infrastructure**

71. It must be acknowledged that the infrastructure sector as such is difficult to define even within the investors and economics’ universe. Some will include construction companies because they build the so-called infrastructure. Others will include energy generation within the infrastructure sector,<sup>51</sup> with all the variety this entails (even pure fossil energy extraction), while some will separate utilities or energy from infrastructure.

72. An obvious obstacle will therefore appear when examining vertically integrated companies, for instance a power provider that does extraction of uranium, power generation, and power distribution: For some, only the distribution part, which necessitates the construction of a grid network, might be considered as infrastructure. Telecommunications also provide the same difficulties: while the building of optic fiber cable networks is considered as infrastructure<sup>52</sup>, some investors and academics don’t include telecommunication companies in the infrastructure sector. This makes the use of benchmark indices, as well as the different studies, whether academic or produced by the industry, particularly complex in this context.

73. Infrastructure building and operating can involve public actors, and therefore exhibit various levels of public involvement. For instance cooperation between public sector and private sector can take the

<sup>50</sup> <http://stats.oecd.org/glossary/detail.asp?ID=4511>.

<sup>51</sup> For instance, Peng & Newell, in a 2008 study on Australian infrastructure sector performance, include companies exclusively doing energy generation, without differentiating between fossil energy extraction, power generation (renewable or fossil) (Newell, G./Peng, H.W. (2008): The role of US infrastructure in investment portfolios. *Journal of Real Estate Portfolio Management*, (14:1), pp. 21-33). The energy generation represents more than a third of their sample.

<sup>52</sup> The European budget allocation 2014-2020 proposed in 2011 by the EC devotes €50bn to infrastructure building, 40 of them within the “Connecting Europe Facility” (roughly 10 bn for energy infrastructures, 20 bn for transport infrastructures, and 10 bn for ICT/digital infrastructures – mainly broadband cable networks).

special form of a Private-Public Partnership (PPP), where the administrative authority generally acts as the main contractor (known as the offtaker<sup>53</sup> in project finance).

74. Private actors' involvement regarding infrastructure assets is usually linked to its nature:
- i. Some infrastructures will be mostly operated and supervised by public authorities (schools, public buildings), and therefore always take the form of PPPs. The operator, when there is one, will receive its operating fees from a public authority.
  - ii. Other infrastructures will be operated by private agents, but under a public service delegation agreement, which fosters heavy supervision by a public authority (port or airport building and operating, water supply, waste disposal facility, railway building, transport facilities in urban areas, etc.). This will usually still fall under the category PPP.
  - iii. Finally, other infrastructures will be built and operated in an environment with little public involvement: this covers mainly power plants (gas, coal, wind farms, etc.) or energy commodities extraction and treatment facilities (refinery, mines), as well as toll roads. Most of these infrastructure projects will not be built and operated within the context of a PPP.

75. Investors' exposure to infrastructure can take many forms:

<b>Debt Capital</b>				
<b>Bonds</b>		<b>Loans</b>		
Corporate bonds	Project bonds (incl. guarantee mechanisms)	Infrastructure loan securitisation	Corporate loans	Project loans
<b>Equity Capital</b>				
<b>Listed</b>		<b>Unlisted</b>		
Corporate equity	Listed infrastructure equity/ bond funds	Direct investment (unlisted infrastructure, incl. project finance equity)		Unlisted equity funds

**Figure 2: Infrastructure Investment Vehicles**

76. Given the extremely wide range of infrastructure investments, EIOPA decided to exclude corporate debt and equity from the scope of the study. Indeed, they are hardly distinguishable from already existing asset classes in the Solvency II framework. Consequently, it seems not

<sup>53</sup> Recipient of the final product of the project.

justified to introduce separate risk categories for these types of assets in the standard formula. Moreover, some delineation problems would ensue as these companies might conduct a wide range of operations (as highlighted above).

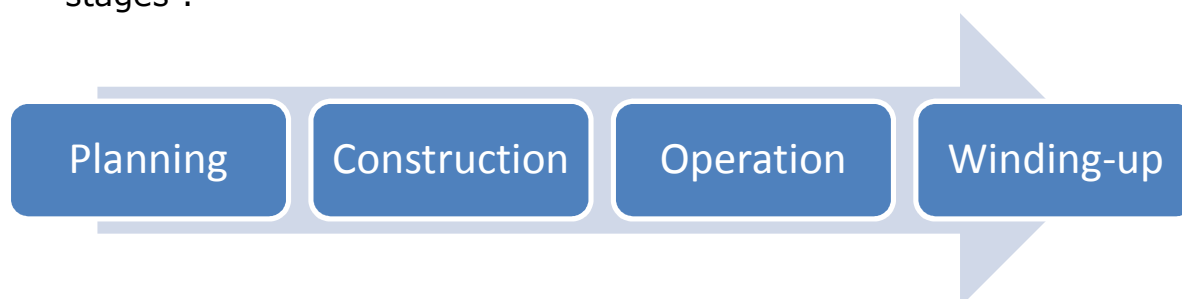
77. With respect to long-term investment by insurers in the infrastructure sector the following three investment vehicles seem to be the most promising:

- i. Direct project finance (bonds, loans or equity)
- ii. Infrastructure investment funds (listed and unlisted)
- iii. Infrastructure loan securitisation vehicles

It has proved difficult to gather price data on infrastructure loan securitisation vehicles (see section 3.5). An area where EIOPA is interested in further study are the so-called “monotranche securitisation loans”, i.e. loan portfolios that have been securitised but with no subordination relation between the different securities being issued.

### **Introduction to Infrastructure Project finance**

78. Generally speaking, an infrastructure project can be split in four main stages :



**Figure 3: Infrastructure Project phases**

79. The duration of each phase is deeply linked to the infrastructure specifications, especially in terms of building complexity and lifetime. The Winding-up phase might not be reached if the built infrastructure does not meet current expectations or the initial need. There are specific terms for certain development stages:

- i. “Greenfield” involves an asset or structure that needs to be designed and constructed. Investors fund the building of the infrastructure asset as well as the maintenance when it is operational.
- ii. “Brownfield” involves an existing asset or structure that requires improvements, repairs, or expansion. The infrastructure asset or

structure is usually partially operational and may already be generating income.

iii. "Secondary" means fully operational.

80. Investment behavior of private investors is mainly driven by the return of their investments and infrastructure projects are no exception. As such, there is a need to determine the nature of revenues generated by an infrastructure project. Usually, these financial resources depend only on the level of usage at the chosen price. Financial viability studies are performed at early stages of the project, which assess the uncertainty of this level and take into account possible guarantees provided by another party such as a government or public authority. The main characteristic to be considered is the nature of revenues to private investors. In the context of this analysis two forms are of particular importance:

- i. Availability-Based Projects: These are typically projects where the government procures essential facilities or services in return for payments linked to availability rather than usage levels. Projects typically include schools, hospitals and government accommodation, but also roads and transit.
- ii. Demand based projects: These are projects where the assets are subject to a long-term contractual pricing framework underwritten as targeting a pre-defined range of returns to investors. This includes for example toll roads with a limited downside risk. They often have inflation-linked returns with exposure to economic growth.

81. Globally, infrastructure project investments in 2011 represented USD 405bn<sup>54</sup> all around the world (+13% against 2010). The breakdown is as follows:

- i. Loans: 328bn (81%)
  - Banks are the main players but they are reducing their lending.
  - New ways of insurers investing in infrastructure loans are developing.
  - Insurers may hold loans on their balance sheet, either by direct issuance or mostly via transfer of credit claims from banks to insurers, through securitisation or otherwise.
- ii. Equity: 62bn (15%)
  - Equity is held mostly by infrastructure funds, pension funds or project stakeholders (construction companies or operating companies)
    - The amount of money raised by infrastructure funds is decreasing.

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<sup>54</sup> <http://mediacommun.ca-cib.com/sitegenic/medias/DOC/15951/2012-01-26-agefi-detteinfra.pdf>

- In Europe, equity accounts for less than 5% of total infrastructure investments.
- iii. However, a growing trend can be observed: Private equity funds are acknowledging the desire of many actors (e.g. pension and sovereign funds) to get out of listed markets that are deemed too volatile, and try to offer adapted investment vehicles. Offering access to low risk, unlisted infrastructure equity is a possible way, and it may very well affect insurance companies.
- iv. Infrastructure bonds: 16 bn (4%)
- They represent only a very minor part of total funding.
  - However, new possibilities of credit enhancement through guarantees make for a promising trend which could expand the market for such securities (for instance the EU2020 Project Bond Initiative).<sup>55</sup>

82. The volume of infrastructure investments on insurance companies' balance sheets is for now still negligible. For example, in Germany, infrastructure investments on average currently make up less than 1% of institutional investors' portfolios.<sup>56</sup> However EIOPA is trying to anticipate future developments such as insurance companies issuing direct loans to infrastructure corporations or buying portfolios of infrastructure loans from banks.

### **Infrastructure Project Equity**

83. Project finance equity is the fraction of the investment capital raised by the project which does not give right to fixed payments, as opposed to project debt. In contrast to usual corporate stock, project equity has normally an expiration date.<sup>57</sup> Depending on whether the project company has property of the underlying asset, the return of invested capital will either come from the proceeds of the sale of the asset, or only from the dividend payments made during the life of the project.<sup>58</sup> These features make project equity similar to private equity investments<sup>59</sup>.

84. Project equity is, by nature, unlisted and therefore no market values are available<sup>60</sup>. As pointed out in the section on Private Equity and Venture Capital EIOPA is skeptical about the usefulness of reported Net

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<sup>55</sup> According to an EU forecast € 1-5 billion per annum at the beginning of the Initiative and in the range of € 10-20 billion by 2020.

<sup>56</sup> RCFFS/Deka Bank (2012): Risk and Return Profiles for Equity and Debt Capital Investments in Infrastructure. p. 2.

<sup>57</sup> Aside from highly specific risk given the undiversified nature of the underlying activity.

<sup>58</sup> Most contracts have a zero terminal value, as they end with the project.

<sup>59</sup> Which is usually a close-ended process where the investment fund is created for a fixed period and capital is recouped in the end.

<sup>60</sup> Although there are listed investment funds, albeit very few, which invest only in project equity.

Asset Values (NAV) for calculating a Solvency II market consistent 99,5% equity shock. According to Blanc-Brudé “all existing papers on unlisted infrastructure investment focus on private equity funds and use data from private equity databases”.<sup>61</sup>

85. As a consequence, the vast majority of performance data available for this kind of investment is of very limited use for calibration purposes. Moreover, investors typically target an exit after five to seven years which creates substantial additional risks due to volatile exit values.

86. A way around the issue of missing market values could be to select suitable listed equity representatives for project equity. Roughly speaking one can distinguish between the following categories of infrastructure sector companies:

- i. Broad companies, which tend to own infrastructure-related businesses, such as construction companies and diversified communications providers, rather than direct infrastructure assets.
- ii. Core companies, which exhibit some characteristics of pure-play companies by virtue of regulation or contractual agreement, and many have loosely related infrastructure side businesses. They typically have lower margins, are not capital intensive, and/or do not derive cash flows from long-duration contracts.
- iii. Pure-play companies, which typically own or operate assets that naturally exhibit fundamental infrastructure characteristics, such as high barriers to entry and relatively inelastic demand.<sup>62</sup>

87. In principle, it might be possible to select a representative set of pure-play companies and to use them as a proxy for project equity. But there are substantial difficulties: According to industry representatives project equity investments are very heterogeneous. They are also keen to point out that by careful contract design the political risks that listed companies in regulated industries (e.g. utilities) are subject to, can be substantially mitigated. If such specificities exist, it is impossible to integrate them into a standard formula. The results of some empirical studies relevant for a possible capital charge calibration based on such proxies are discussed below in the listed infrastructure funds section.

88. A qualitative analysis of the risks associated with infrastructure projects can provide an idea about the riskiness of infrastructure project equity. The table below contains the main infrastructure

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<sup>61</sup> Blanc-Brudé, F. (2013): Towards Efficient Benchmarks for Infrastructure Equity Investments. Edhec Risk Institute. p. 47.

<sup>62</sup> There are some “pure play” infrastructure equity funds (DSW, Meridian PPP, Magellan Core Infrastructure).

project risks identified by Blanc-Brudé and Grimsey & Lewis.<sup>63</sup> These risks are exogenous (out of the control of equity owners) or endogenous (within the control of equity owners).

<b>Risk type</b>	<b>Exogenous/endogenous</b>	<b>Revenue scheme</b>
Construction risk (cost escalation, delays, etc.)	Endogenous (managed by contracts with the construction company)	Availability/Demand
Operating risk (higher than expected operating and maintenance costs)	Endogenous (managed by contracts with the operating company)	Availability/Demand
Revenue risk	Exogenous	Demand only
Regulatory/Political risk (legal changes or unsupportive government policies; this might also include a potential default on payment due to budgetary difficulties, or contract renegotiation)	Exogenous	Availability/Demand (PPP or Privatisation mainly)
Financial risks (inadequate hedging of revenue streams, respect of cover ratios, cost of debt and refinancing, etc.)	Endogenous (bad management of cash flows and excessive initial rates of debt instruments)/ Exogenous (higher than expected refinancing in a later stage of the project life)	Availability/Demand
Handback risk (lower than expected value of the asset at handover)	Exogenous	Availability/Demand

**Figure 4: Infrastructure risks**

89. Some of these risks, as highlighted by Blanc-Brudé (2013), can be mitigated by an efficient contract design at the origination of the project (particularly construction risk), but faulty design is a possibility. Most of those risks, however, are typical for all companies, with the added downside that a project company doesn't benefit from any diversification in its activities.

<sup>63</sup> Blanc-Brudé, F. (2013): Towards Efficient Benchmarks for Infrastructure Equity Investments. Edhec Risk Institute; Grimsey, D./Lewis, M.K. (2002): Evaluating the Risks of Public Private Partnerships for Infrastructure Projects. International Journal of Project Management. Vol. 20. No. 2. pp. 107-118.

90. On the other hand, most PPP schemes will be availability-based, and the infrastructure asset will belong to the public authority from the beginning, thus eliminating revenue and handback risks. This could provide an argument for PPPs being less risky than private infrastructure projects. However, in certain countries, the regulatory/political risk is likely to be very high for PPPs or privatisation of public services,<sup>64</sup> where the delegating authority has a very strong bargaining position, and is likely to try and modify revenue sharing when it becomes too favorable to the equity owners.
91. Grimsey & Lewis,<sup>65</sup> using the example of a water treatment project, argue that usually, there is very few upside potential for equity owners: Most risks are very well managed through contract designs, but this tends to cap the potential revenues at their level in the base case scenario. Most likely, when things don't go as planned, they will turn out worse than expected.
92. Another relevant factor for the risks of infrastructure project equity is the usually high leverage of such projects (usually a leverage ratio of more than 3 to 1).<sup>66</sup> Blanc-Brudé (2013) argues that this is actually a signal of lower equity risk:<sup>67</sup> To attract a high amount of debt, the profitability of the project has to be demonstrable to investors at the origination, and therefore incentives to minimize risk are created. However, Moody's project finance bank loans' default and recovery rates study shows that, although infrastructure project are at the lower end of the default rate spectrum within project finance, they do not exhibit higher leverage ratios, suggesting that those issues are uncorrelated.<sup>68</sup> On the contrary, basic corporate finance theory states that – other things being equal – the more an entity is leveraged, the more sensitive to asset profitability its return on equity is.
93. Based on the above EIOPA cannot see a convincing qualitative argument that the overall risk of infrastructure project equity is fundamentally lower than for usual corporate equity. As a matter of fact, infrastructure projects still exhibit average default rates that are at the limit of the Investment/Speculative Grade frontier in the corporate universe (see below).

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<sup>64</sup> Utility companies often operate in this context.

<sup>65</sup> Grimsey, D./Lewis, M.K. (2002): Evaluating the Risks of Public Private Partnerships for Infrastructure Projects. *International Journal of Project Management*. Vol. 20. No. 2. pp. 107-118.

<sup>66</sup> The leverage ratio is the proportion of debt divided by the proportion of equity. For instance, with 75% debt and 25% equity the leverage ratio is 3.

<sup>67</sup> Blanc-Brudé, F. (2013): *Towards Efficient Benchmarks for Infrastructure Equity Investments*. Edhec Risk Institute.

<sup>68</sup> Moody's (2012): *Default and Recovery Rates for Project Finance Bank Loans, 1983-2010*. Moody's Investor Services.



## *Current Solvency II treatment under the standard formula*

94. Investments in project equity would currently be treated under the equity risk sub-module of Solvency II, most likely as "type 2 equity" since the probability is high that the equity will be unlisted, meaning a 49% shock plus or minus the symmetric adjustment. If this equity investment fulfills the criteria to be of a strategic nature, it would be subject to a 22% shock.

### **Project bonds**

95. Project bonds are fixed income debt securities, with their coupons being serviced by the revenue streams generated by the project. In the traditional model of project finance, debt is mostly raised by bank syndication, meaning that project bonds, and particularly infrastructure project bonds, play a relatively minor role, especially in Europe, as demonstrated by the figures related to the overall volume of bond financing compared to loan or even equity finance.

96. To perform a proper calibration for project bonds with a 99,5% confidence level, a sufficiently large volume of historical price data is needed. The preliminary results of the EIOPA analysis raise some doubts whether such data is available. According to the EC Impact Assessment for the Europe 2020 Project Bond Initiative pilot "prior to 2008 a very limited number of EU infrastructure projects accessed the bond markets via privately guaranteed bonds. Essentially, this private guarantee is provided by insurance companies known as "monolines" and they guarantee the timely payment of 100% of the interest and principal. Moreover, in 2009-2010, the infrastructure bond markets in the EU have shown de facto no activity".<sup>69</sup>

97. So far EIOPA has not been able to identify a project bond index. The price behavior of bonds guaranteed by a monoline insurance company reflects to a large extent the creditworthiness of the guarantor and not the riskiness of the project. Therefore it is of very limited use for an analysis. The "wrapped bonds" resulting from the monoline guarantee had a rating of AAA, reflecting the rating of the insurer and allowing investors to ignore the characteristics of the underlying project.<sup>70</sup>

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<sup>69</sup> European Commission (2011): Impact Assessment Accompanying the document COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. A pilot for the Europe 2020 Project Bond Initiative. Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL. p. 9.

([http://ec.europa.eu/economy\\_finance/financial\\_operations/investment/europe\\_2020/documents/sec2011\\_1237\\_en.pdf](http://ec.europa.eu/economy_finance/financial_operations/investment/europe_2020/documents/sec2011_1237_en.pdf))

<sup>70</sup> Ibid. p. 43.

98. Comprehensive research efforts on the topic are only starting now.<sup>71</sup> The only performance study for project bonds EIOPA has found so far was conducted by Sawant in 2010.<sup>72</sup> He analysed the returns of 60 emerging market infrastructure bonds from 15 countries and five sectors – therefore unfortunately none from EU countries - with an average tenor of 12.7 years and average rating of BBB– over the period December 2002 to March 2009. The result was that the risk-return profile was not attractive.
99. An important development in this field relates to the provision of financial guarantees by different public or private sponsors, the main effort being the well-publicized EU 2020 Bond initiative, sponsored by the European Investment Bank (EIB). In the Europe 2020 project bond initiative the EIB provides junior debt or a corresponding guarantee of up to 20% of the senior debt amount. The aim is to achieve a “single A” rating. The level of the needed enhancement is determined in close cooperation with the rating agencies. The process includes a thorough scrutiny of the project by the EIB. The inclusion of the project in the program can therefore be seen as a seal of quality (According to EIB staff members none of the projects supported by the EIB has ever failed).

#### *Current Solvency II treatment under the standard formula*

100. Project bonds shall be treated under the bond sub-category of the spread risk sub-module under the Solvency II framework. It is worth mentioning that the progression of the calibration according to duration is not linear but follows a so-called “kinked approach”. As a result the marginal increase in capital requirement is lower as duration increases. This creates incentives for holding longer term bonds. Generally, due to its design guarantees such as those provided by the European Investment Bank in the framework of the EU2020 bonds cannot directly be taken into account in the spread risk sub-module calculation. Those mechanisms would act as credit enhancement and could have an indirect effect on the spread risk charge due to a better final rating.

### **Project loans**

101. Project loans represent the vast majority of infrastructure debt and insurers are increasingly taking on a role of long term lenders. This is done directly through the origination of loans (possibly jointly with banks as co-origiators with some risk retention), especially project loans, or indirectly through the investment in instruments issued by a

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<sup>71</sup> For example led by the Edhec risk institute in partnership with Natixis

<sup>72</sup> Sawant, R.J. (2010): Emerging Market Infrastructure Project Bonds: Their Risks and Returns. Journal of Structured Finance. Vol. 15. No. 4. pp. 75-83.

special purpose vehicle, which itself holds loans on the asset side of the insurers' balance sheet. This recent involvement of insurers is not taken into account in current insurance prudential framework and the unavailability of market prices for infrastructure loans means that their potential contribution to a calibration consistent with the Solvency II market consistent framework is limited. A possible way to use the available information would be to infer a hypothetical spread behavior from empirical default and recovery rates of loans, but such method presents many shortcomings and would require very strong assumptions.<sup>73</sup>

102. Other useful creditworthiness information can be retrieved from Moody's study on default and recovery rates on project loans.<sup>74</sup> It states essentially that the 10 year cumulative default rates are consistent with "low-investment grade/high-speculative credit grade" and are actually on average higher than corporate Ba (that is to say speculative grade quality) in the first two years of the project and then decrease. This reflects the high initial construction phase risk, followed by the less risky operation period. The infrastructure sector as defined by Moody's is by far the least risky within the project finance perimeter (though still below Baa corporate grade on average), but this finding has to be put in perspective for the delineation reasons already put forward above: Many would include the Media & Telecom and Power sectors, which are treated by Moody's as separate categories, in the infrastructure category, and they exhibit significantly higher default rates.

103. The study also shows significantly higher ultimate recovery rates than in the corporate debt universe (76.4% on average, 72.6% for infrastructure projects as defined by Moody's). However, distressed sales recovery rates might very well be a better reflection of market consistent recovery rates for illiquid assets such as loans, and they are on average substantially lower (47.8%). The assessment of the construction phase as being riskier is confirmed by recovery rates, which are lower in early stage defaults, making a project in its construction phase unambiguously less creditworthy. Annex 3 provides a more in-depth assessment of the study.

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<sup>73</sup> The assumption would be that the 'fundamental' part of the spread is determined by the expected loss calculated as the product of the hazard rate (derived from the PD) and loss given default (LGD). There is some evidence that the LGD in the infrastructure sector is lower relative to other sectors (see Moody's (2012): Default and Recovery Rates for Project Finance Bank Loans, 1983-2008). Assuming that ratings take only into account the PD an infrastructure bond would have on average a lower fundamental spread than a bond from another sector with the same rating. But a lower fundamental spread does not necessarily mean lower spread volatility, which would depend on hazard rate volatility, which is unknown. Furthermore, is it doubtful that market prices would actually reflect empirical default rates, as it is not the case for corporate bonds credit spreads. The fact that market would also implicitly value LGD at its fundamental observed level is uncertain.

<sup>74</sup> Moody's (2012): Default and Recovery Rates for Project Finance Bank Loans, 1983-2010. Moody's Investor Services.

### *Current Solvency II treatment under the standard formula*

104. In Solvency II, loans other than mortgage loans are treated in the sub-category for bonds and loans in the spread risk sub-module of the standard formula, and are consequently subject to the same requirements as bonds. The allocated risk charge depends on the duration and the external rating of the instrument. Unrated loans and bonds get a spread risk charge that is between the charge for rated bonds and loans with credit quality steps 3 and 4.

### **Infrastructure Investment funds**

105. Infrastructure investment funds are a wide category, and include also funds that invest only in corporate stock of large infrastructure or utilities companies (which are out of the scope). Following the perimeter definition set out in paragraph 76, only funds investing in project finance (debt or equity) should be considered. However, due to the extreme scarcity of data for those particular funds, analysis will have to be carried out using a broader range of funds. As a consequence, the reported figures on infrastructure funds performance should be interpreted very cautiously.

### **Listed funds**

106. There are 21 listed infrastructure funds in Australia, which has long been a pioneer in the domain, and a few more in the rest of the world. Prequin counts 46 in total. Preliminary figures show an extremely high dispersion of performance; According to Inderst,<sup>75</sup> there is no thorough analysis on the topic available. One first, major, caveat for any further calibration is that private investors experience with infrastructure funds is rarely longer than 4 to 5 years. Second, and consequently, one is faced with two major issues: a dearth of data, as well as, more surprisingly, the absence of any theoretical work to structure the debate in any way.

107. Although a number of new infrastructure bond funds are raising money these days, it is still too early to have any hindsight on such investments, even more so to infer a Solvency II calibration for infrastructure project funds. Prequin's infrastructure database contains 29 debt/mezzanine funds, of which 14 are closed and 11 are raising capital. The five funds using the term "debt" and the one using "loan" in their names are vintages of 2010.

108. A study performed by Meridiam Fund uses data that is seemingly better suited to capture true market consistent project equity risk. It

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<sup>75</sup> Inderst, G. (2010): Infrastructure as an Asset Class. EIB Papers. Volume 15. No1. p. 82.

analyses the performances of 5 listed funds that invest in infrastructure project equity. The observed population has characteristics that make it potentially relevant for the calibration of a dedicated infrastructure project equity sub-module. But sample size and time span (2 years of monthly data) mean that the data are not sufficient to produce a Solvency II consistent calibration (see Annex 2).

109. Eligible proxies could be corporate infrastructure equity indices. Literature on listed infrastructure indices traces back to pioneering work by UBS,<sup>76</sup> or Newell and Peng.<sup>77</sup> In many cases the results are highly sensitive to the specific index chosen.<sup>78</sup> Sawant finds the following results for the distributions of listed infrastructure indices:<sup>79</sup>

- i. High correlation with general stock market indices;
- ii. Negative skews (indicating that negative returns are more likely);
- iii. High kurtosis (fat tail).

110. Blanc-Brudé examines returns and volatilities of major infrastructure indices consisting of infrastructure companies (see table below).<sup>80</sup>

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<sup>76</sup> UBS (2006): Asset Bubble, Structural Change or Fundamental Re-Rating? Q-Series: Infrastructure & Utilities. UBS Investment Research, United Bank of Switzerland.

<sup>77</sup> Newell, G./Peng, H.W. (2008): The role of US infrastructure in investment portfolios. *Journal of Real Estate Portfolio Management*, (14:1), pp. 21-33; Newell, G./Peng, H.W. (2008): European Infrastructure Investment: A Valuable Addition to the Mixed-Asset Portfolio." *Fibre Series*, RICS, London; Newell, G./Peng, H.W. (2009): The significance and performance of infrastructure in China. *Journal of Property Investment & Finance*, (27:2), pp. 180-202.

<sup>78</sup> "...depending on the construction of the index and the period chosen, volatility can be somewhat higher or lower than for broader indices" (Inderst, G. (2010): *Infrastructure as an Asset Class*. EIB Papers. Volume 15. No1. p. 81)

<sup>79</sup> Sawant, R.J. (2010): Emerging Market Infrastructure Project Bonds: Their Risks and Returns. *Journal of Structured Finance*. Vol. 15. No. 4. pp. 75-83.

<sup>80</sup> Blanc-Brudé, F. (2013): *Towards Efficient Benchmarks for Infrastructure Equity Investments*. Edhec Risk Institute.

**Table 1: Risk return characteristics of major infrastructure indices in June 2012**

	MSCI World Infra (sector capped)	MSCI World Infra	S&P Global Infra	FTSE Macquarie Global Infra	UBS World Infra	UBS World Infra & Utilities	UBS World Infra & 50-50 & Utilities	Gloal Infra & S&P Composite	500 FTSE Share	All
<b>Performance†</b>										
3 year	14%	13%	17%	14%	17%	14%	15%	16%	17%	
5 year	-5%	-6%	-7%	-7%	-6%	-6%	-6%	-3%	-3%	
7 year	10%	8%	16%	13%	23%	14%	16%	10%	10%	
10 year	3%	3%	6%	5%	9%	5%	6%	3%	3%	
<b>Risk*</b>										
3 year	14%	13%	17%	14%	17%	14%	15%	16%	17%	
5 year	18%	17%	22%	17%	25%	17%	21%	21%	22%	
7 year	16%	15%	20%	16%	22%	16%	19%	19%	19%	
10 year	16%	15%	18%	16%	20%	16%	17%	18%	18%	
<b>Sharpe ratio#</b>										
3 year	0.7	0.5	0.6	0.4	0.8	0.5	0.6	1.0	0.7	
5 year	-0.3	-0.4	-0.3	-0.4	-0.3	-0.4	-0.3	-0.2	-0.2	
7 year	0.3	0.2	0.4	0.4	0.5	0.4	0.4	0.2	0.2	
10 year	0.1	0.1	0.3	0.2	0.4	0.2	0.3	0.1	0.0	

† annualised monthly returns, \* annualised standard deviation of monthly returns, # ratio of annualised excess monthly returns over 3-months risk-free rate to annualised standard deviation of monthly excess returns  
All data in US\$, source: Datastream & author's calculations

**Table 2: Characteristics of major infrastructure indices before and after 2008**

	MSCI World Infra (sector capped)	MSCI World Infra	S&P Global Infra	FTSE Macquarie Global Infra	UBS World Infra	UBS World Infra & Utilities	UBS Gloal 50- 50 Infra & Utilities	S&P 500 Composite	FTSE All Share
<b>Performance</b>									
Pre-dislocation*	12%	13%	21%	17%	26%	17%	20%	9%	9%
Post dislocation†	-5%	-6%	-7%	-7%	-6%	-6%	-6%	-3%	-3%
<b>Risk</b>									
Pre-dislocation	12%	13%	11%	13%	11%	13%	12%	14%	13%
Post dislocation	18%	17%	22%	17%	25%	17%	21%	21%	22%
<b>Sharpe ratio</b>									
Pre-dislocation	0.7	0.8	1.6	1.1	2.1	1.1	1.4	0.4	0.5
Post dislocation	-0.3	-0.4	-0.3	-0.4	-0.3	-0.4	-0.3	-0.2	-0.2

\* June 2002 to June 2005 † June 2007 to June 2012  
Source: Datastream & author's calculations

111. The calculation of annualised standard deviations of monthly returns as a measure of risk gives some insight regarding infrastructure equity. Tables 1 and 2 show key performance metrics for several major infrastructure indices as well as the S&P composite and the FTSE All share indices between 2002 and 2012. Looking at risk figures over 10 years in Table 1, one can easily calculate a very rough first approximation of the 99.5% VaR within the Solvency II calibration framework and it implies minimum figures in a range between 45%

and 60%, which is higher than the currently foreseen calibration. More importantly, if we look at Table 2 which separates the data in two five-year periods before and after 2008, one can easily see that the risk significantly increased “post-dislocation” (i.e. June 2007 to 2012) for all funds but one, and implies minimum figures between 51% and 75%.

112. In terms of correlation/diversification, Inderst notes that studies of the (global and national) listed infrastructure indices show high correlations with general stock market indices, typically in the region of 50–80 percent.<sup>81</sup>

*Current Solvency II treatment under the standard formula*

113. Provided that funds are able to make the relevant information with the necessary degree of granularity available (which is still not entirely clear) the look-through principle applies under the Solvency II framework. This means that the same risk charges apply as if the insurer invested directly in the underlying assets (infrastructure corporate equity, loans or bonds, depending on the investment strategy) of the fund.

**Unlisted funds**

114. According to Blanc-Brudé “unlisted infrastructure equity funds are a very recent invention. Their volume grew ten-fold in less than 5 years, with US\$3.6bn of capital raised in 2004 turning into US\$37.1bn in 2008. As of July 2011, there were 195 unlisted infrastructure equity funds seeking to invest, or having invested, cumulative capital commitments of \$160 billion”.<sup>82</sup>

**Available studies show that unlisted infrastructure funds have an average return of more than 8% and annualised volatility of around 6%**

Overview of the study results on the risk-return profile of unlisted infrastructure funds

Study	Duration	Calculation frequency	Average annual return	Annualised volatility	Sharpe ratio
Peng and Newell (2007)	Q3 1995 – Q2 2006	quarterly	14.1%	5.8%	1.47
Newell et al. (ongoing)	Q3 1995 – Q2 2009	quarterly	14.1%	6.3%	1.34
	Q2 2007 – Q2 2009	quarterly	8.2%	6.7%	0.32
Finkenzeller et al. (2010)	Q4 1994 – Q1 2009	quarterly	8.2%	3.8%	-
Prequin <sup>1</sup>	2004 - 2008	annual	7.4%	-	-

<sup>81</sup> Inderst, G. (2010): Infrastructure as an Asset Class. EIB Papers. Volume 15. No1.

<sup>82</sup> Blanc-Brudé, F. (2013): Towards Efficient Benchmarks for Infrastructure Equity Investments. Edhec Risk Institute.

**Figure 5: Study results on risk-return profile of unlisted infrastructure funds<sup>83</sup>**

115. Existing studies are mainly based on Australian unlisted funds. Peng and Newell analyse quarterly returns of 5 unlisted infrastructure funds and utilities funds in Australia.<sup>84</sup> Results show that the volatility of unlisted infrastructure funds is lower than that of the listed assets, but higher than for bonds and direct property. According to a more recent study by Newell,<sup>85</sup> taking into account effects from the crisis, five-year rolling volatility results suggest little change for unlisted infrastructure during the financial crisis, again in contrast to increased volatility of the listed assets and even direct property.
116. Finkenzeller et al. analyse similar data over a longer time period between Q4 1994 and Q1 2009, including the impact of the financial crisis.<sup>86</sup> The authors make adjustments to get “de-smoothed” and “unlevered” returns for better comparability with transaction-based indices of listed assets (removing a gearing level of 60 percent). Unlisted infrastructure and utility showed returns similar to equities and bonds, but returned less than direct property and listed infrastructure. However, unlisted infrastructure displayed the lowest volatility, even lower than bonds and direct property. Again, listed infrastructure is found to have higher returns and much higher risk than unlisted infrastructure.
117. The most up-to-date performance data are published by CFS.<sup>87</sup> They use their own index of five equally-weighted Australian unlisted infrastructure funds over the ten years to June 2010. The study confirms the low volatility compared to other asset classes and the high risk-adjusted returns over one, three, five and ten years. The rolling 12-month return slipped only briefly into negative territory in 2009.
118. In summary the Australian performance studies of unlisted funds find relatively high risk-adjusted returns and relatively strong resilience in the market downturn. However, strong caveats are necessary, some of them already mentioned by the authors themselves:
- i. Small and incomplete sample of funds (different sizes and inception years – only two funds before the year 2000);

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<sup>83</sup> RCFFS/Deka Bank (2012): Risk and Return Profiles for Equity and Debt Capital Investments in Infrastructure. p. 43.

<sup>84</sup> Peng, H.W./Newell, G. (2007): The Significance of Infrastructure in Australian Investment Portfolio. Pacific Rim Real estate Society Conference.

<sup>85</sup> Newell, G./Peng, H.W./De Francesco, A. (2011): The Performance of Unlisted Infrastructure in Investment Portfolios. *Journal of Property Research*. 28(1). pp. 59-74.

<sup>86</sup> Finkenzeller, K./Dechant, T./ Schäfers, W. (2010): Infrastructure: a new dimension of real estate? An asset allocation analysis. *Journal of Property Investment & Finance*. (28:4). pp. 263-274.

<sup>87</sup> CFS (2010): Unlisted infrastructure: a proven performer. Infrastructure Research Note, Colonial First State Global Asset Management, August.



- ii. Data gathering from different sources;
- iii. Results depend on the specific period analysed; and
- iv. Appraisal-based valuation of unlisted infrastructure and direct property, which tends to underestimate volatility and correlations with listed instruments, and overestimates their diversification potential.

119. Many other questions remain. In addition to the availability of data, there are a number of difficult questions, including the construction of appropriate indices for unlisted assets, the likely existence of survivor (and other) biases, the frequency of data, the appropriate measures for return and risk, the diversity of vehicles, the impact of fees, the effect of gearing and the appropriate performance measurement methodology in general.

120. In terms of diversification, according to Inderst,<sup>88</sup> studies seem to generally confirm a diversification opportunity as correlations with other asset classes turn out to be rather low. This is shown by correlation values ranging between 0.05 and 0.27 for equities across the different studies, and between -0.10 and 0.17 for bonds. The correlation coefficients between unlisted and listed infrastructure are somewhat higher. Unfortunately, no historical correlation data are known for unlisted infrastructure funds in regions other than Australia. Furthermore, none of the known empirical studies measures the correlation of unlisted infrastructure with private equity or other asset classes.

#### *Current Solvency II treatment under the standard formula*

121. Provided that funds are able to make the relevant information with the necessary degree of granularity available (which is still not entirely clear) the look-through principle applies under the Solvency II framework. This means that the same risk charges apply as if the insurer invested directly in the underlying assets (infrastructure corporate equity, loans or bonds, depending on the investment strategy) of the fund.

### **Preliminary Results**

122. In its analysis EIOPA has looked at available data as well as economic determinants for the risks of infrastructure projects.

123. Directly owned project infrastructure equity is unlisted. The resulting lack of historical market values makes a reliable calibration very

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<sup>88</sup> Inderst, G. (2010): Infrastructure as an Asset Class. EIB Papers. Volume 15. No1. p. 92.

difficult. To circumvent this problem listed infrastructure could be used as a proxy in terms of risk. But there are some indications that the risk profile may be different. Moreover, the choice of a suitable listed infrastructure index might have a material impact on the results. The considerable inherent idiosyncratic risks and the generally high degree of leverage support the currently foreseen calibration.

124. For directly owned infrastructure debt instruments (whether bonds or loans), a similar lack of data seems to exist. The analysis of historical default and recovery rates performed by EIOPA was inconclusive. Moreover, so far no evidence was found that infrastructure debt with a certain rating exhibits a different behaviour in market prices (and thus spreads) than other corporate bonds with the same rating.

125. Investment funds can be divided into two main categories: Funds investing in a broad range of infrastructure linked assets, or pure player investing only in infrastructure projects, usually through equity. Regarding the former, the economic literature assessing their risk seems to be inconclusive. The evidence EIOPA has gathered so far supports the current treatment foreseen within the Solvency II framework for such investments. No calibration can be done for infrastructure projects because of insufficient data.

### **3.4.2. Questions**

Q16: What is the overall volume of infrastructure investments by insurers? What is the volume for types of investment vehicles (shares of funds, loans, bonds, project equity, etc.)? What is the volume for different types of infrastructure (energy, traffic etc.)?

Q17: Do you expect loans to become a more significant part of infrastructure investments by insurers in the future? What portion in terms of overall investments and term of infrastructure investments can be expected?

Q18: What is the volume of investments by insurers in bonds issued by monotranches loan securitisation vehicles? To what extent is this realised through a partnership with the originating financial institution?

Q19: What kind and degree of expertise do insurers need for infrastructure investments via different vehicles? Do insurers have this kind of expertise and what developments do you expect in this respect in the future?

- Q20: What are potential data sources that might be useful to perform a calibration analysis for the investments mentioned in this section?
- Q21: Do you have any suggestions how market data for listed infrastructure could be used for calibrating infrastructure project equity? What would be suitable indices and subsets of the infrastructure project universe? Why would the risk profiles be comparable?
- Q22: Consider the following statement: "The high degree of leverage often used in infrastructure project finance results in a high sensitivity of equity values to changes in the total value of the project and thus a high overall risk". Do you disagree? Why?
- Q23: Do you have suggestions as to how a more granular treatment for unrated loans could be introduced in the framework of the standard formula?
- Q24: To what extent will insurers rely on full or partial internal models to achieve a more granular treatment of unrated loans?

## **3.5 Securitisation of SME debt**

### **3.5.1. Preliminary Analysis**

#### **Introduction**

126. The list of assets in the EC letters includes securitisations of infrastructure, SME, SRI and social business debt (in the following "securitisations considered").
127. According to the information EIOPA has gathered so far the volume of SRI and social business debt securitisations seems to be negligible. There is a meaningful amount of SME loan securitisations. It is more difficult to make an authoritative statement for infrastructure debt securitisations as they are not a commonly used category of securitisations as SME loans are.
128. Following the structure of the standard formula as set out in the LTGA TS the analysis is restricted to the treatment of securitisations in the spread risk sub-module.
129. Faced with difficulties in gathering data on market prices for infrastructure debt securitisations EIOPA decided to focus initially on SME loan securitisations.

#### *Current Solvency II treatment under the standard formula*

130. The spread risk charge depends on rating and modified duration. The LTGA TS provides a full table with all the necessary information.<sup>89</sup> A securitisation rated AAA with a modified duration of 3 years for example has a spread risk charge of 21 %.

#### **Analysis**

131. The riskiness of a securitisation depends on the risk characteristics of the underlying asset pool as well as how the cash flows from the pool are divided among investors. In principle a higher risk in the underlying pool can be compensated by a more conservative financial structure (e.g. credit enhancements). Rating agencies take both factors into account.

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<sup>89</sup> see SCR.5.97.

132. Given these considerations it is not a priori clear why a SME loan securitisation with a certain rating should be more or less risky than a securitisation of other assets with the same rating.
133. One element in the EIOPA analysis is to look at the historical behavior of spreads for SME loan securitisations. For this purpose a sufficiently long history of prices for a sufficiently large number of SME loan securitisations is needed. The Markit Floating Rate European ABS European SME CLOs Index was identified as the most commonly used index in the industry.
134. An analysis of the spread behavior for the securitisations included in the index was performed following the methodology used for deriving the calibration in the "draft implementing measures Solvency II"
135. EIOPA is not yet in a position to share the preliminary results. A still open question is whether the number of securitisations included in the index is sufficient to produce reliable results. The AAA-rated SME securitisations considered had a volume of 30.2 billion EUR at the end of 2006. This dropped to 1.6 billion in the middle of 2011. If the result is negative, additional data points could be added.
136. Further consideration is also needed to decide whether the results for the SME loans included in the analysis also apply for loans to SMEs falling under the definition of the European Commission.

### **3.5.2. Questions**

When answering the questions below please be aware that EIOPA is generally also interested in information that is useful for comparing the securitisations considered with other securitisations in terms of risk

Q25: What is the volume of securitisations of infrastructure, SME, SRI and social business debt? On what definition for the different debt categories are the numbers based?

Q26: What is the volume of investments by insurers in these securitisations?

Q27: What are potential sources for historical price data for the securitisations considered?

- Q28: What are the characteristics of the securitisations considered with respect to their underlying asset pool (granularity, legal form, collateral, individual risk assessment, diversification, etc.)?
- Q29: What are the characteristics of the securitisations considered with respect to their financial structure (tranching, credit enhancements etc.)?
- Q30: What are the characteristics of the securitisations considered in terms of their originator?
- Q31: How robust are the payments generated by the securitisations considered? Why?
- Q32: How difficult is it to assess the riskiness of payments? What accounts for the differences?
- Q33: What risk-relevant information is disclosed on the securitisations considered? Does this information allow a reliable risk assessment? To what extent is the investment a „black box“?
- Q34: How knowledgeable are investors about the securitisations considered (experience, internal capacities for risk assessment vs. reliance on ratings, etc.)?
- Q35: To what extent do investors rely on ratings with respect to the securitisations considered? What accounts for any differences?
- Q36: To what extent do the securitisations considered differ in terms of the information asymmetry between originator and investor?
- Q37: What is the economic rationale, if any, for a higher or lower risk of the securitisations considered compared with other securitisations?

## **4. Summary of Questions**

### **Channels for SME financing**

Q1: Are there any further channels for SME financing by insurers that EIOPA should consider?

### **Private Equity, Venture Capital and SME**

Q2: Further to the information in the introduction of 3.1.1, what are the most common investment channels for the average insurance firm to invest in Private Equity, Venture Capital, and in particular SMEs? Is there data available to support this answer?

Q3: Are there methods or data that EIOPA could use to quantify or eliminate the biases described in paragraph 16?

Q4: Regarding paragraphs 19 to 21, is there suitable data on secondary market transactions that allows the quantification of the discount to NAV (in particular under stressed market conditions)?

Q5: How can the risk characteristics effects of the additional layer of fees (described in paragraph 14) be quantified when investing via funds of funds?

Q6: Are there any further market indices for private equity or venture capital that EIOPA should consider?

Q7: What economic factors contribute to the risk-profile of private equity investments and how?

### **Social Businesses**

Q8: What data could be used to produce a reliable calibration for investments in social businesses?

Q9: What data can be used to calculate the correlation between social businesses and other asset classes?

Q10: What could be the economic rationale for a different calibration than for other debt and equity investments?

Q11: What is the volume of current investments by insurers in businesses with similar features as set out in the definition above?

### **Socially Responsible Investments (SRI)**

Q12: What is in your view a suitable definition of SRI that allows a clear distinction between SRI and non-SRI?

Q13: What empirical data is available for a SRI calibration based on the definition you suggested?

Q14: Do you have any suggestions how the problems outlined in paragraph 69 could be overcome?

Q15: Do you agree with the qualitative analysis of SRI risks and the preliminary conclusion EIOPA has drawn from it?

### **Infrastructure Investments**

Q16: What is the overall volume of infrastructure investments by insurers? What is the volume for types of investment vehicles (shares of funds, loans, bonds, project equity, etc.)? What is the volume for different types of infrastructure (energy, traffic etc.)?

Q17: Do you expect loans to become a more significant part of infrastructure investments by insurers in the future? What portion in terms of overall investments and term of infrastructure investments can be expected?

Q18: What is the volume of investments by insurers in bonds issued by monotranches loan securitisation vehicles? To what extent is this realised through a partnership with the originating financial institution?

Q19: What kind and degree of expertise do insurers need for infrastructure investments via different vehicles? Do insurers have this kind of expertise and what developments do you expect in this respect in the future?

Q20: What are potential data sources that might be useful to perform a calibration analysis for the investments mentioned in this section?



Q21: Do you have any suggestions how market data for listed infrastructure could be used for calibrating infrastructure project equity? What would be suitable indices and subsets of the infrastructure project universe? Why would the risk profiles be comparable?

Q22: Consider the following statement: "The high degree of leverage often used in infrastructure project finance results in a high sensitivity of equity values to changes in the total value of the project and thus a high overall risk". Do you disagree? Why?

Q23: Do you have suggestions as to how a more granular treatment for unrated loans could be introduced in the framework of the standard formula?

Q24: To what extent will insurers rely on full or partial internal models to achieve a more granular treatment of unrated loans?

### **Securitisation of SME debt**

Q25: What is the volume of securitisations of infrastructure, SME, SRI and social business debt? On what definition for the different debt categories are the numbers based?

Q26: What is the volume of investments by insurers in these securitisations?

Q27: What are potential sources for historical price data for the securitisations considered?

Q28: What are the characteristics of the securitisations considered with respect to their underlying asset pool (granularity, legal form, collateral, individual risk assessment, diversification, etc.)?

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- Q36: To what extent do the securitisations considered differ in terms of the information asymmetry between originator and investor?
- Q37: What is the economic rationale, if any, for a higher or lower risk of the securitisations considered compared with other securitisations?

## **General**

- Q38: What are the main factors for the level of investments by insurers in the asset classes considered in this discussion paper at present and in the past?
- Q39: To what extent does a lack of expertise prevent insurers from investing in the asset classes considered in this discussion paper?
- Q40: What role does the economic risk/return profile play in the decision by insurers not to invest in the asset classes considered in the discussion paper?
- Q41: Are there elements in the currently foreseen Solvency II rules outside the regulatory capital requirements that might prevent insurers from long-term investing?
- Q42: What are the main obstacles for long-term investments by insurers?
- Q43: Are there other measures than changes to the SII requirements that might incentivize more efficiently long-term investing by insurers?

## **Annex 1: A Broad Scope of Responsibility: What is Socially Responsible?**

Corporate governance/board membership	Environmental and social performance
Sustainability and related reporting	Human Resources management
Political involvement	Worker's/Contractor's rights
Intellectual property	Socio-economic impacts in developing countries
Business risk assessment + Reputation risk assessment	Community involvement
Procurement policy and practice	Social-ethical or moral issues
Environmental and social impact of products	Compliance with SEE regulation
Environmental and social management	

Source: Eurosif<sup>90</sup>

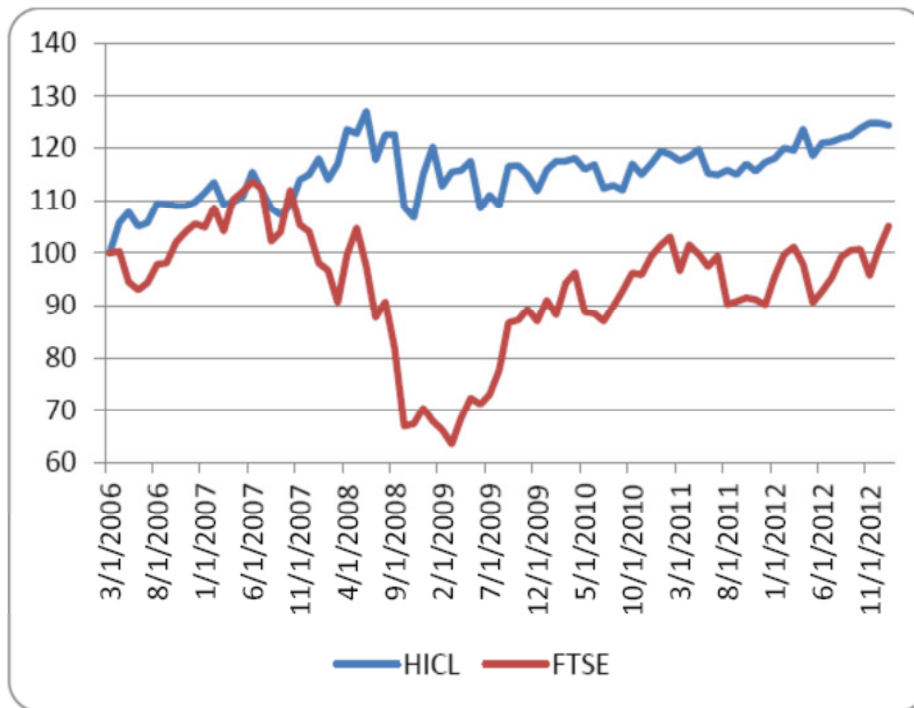
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<sup>90</sup> Eurosif (2003): Socially Responsible Investment among European Institutional Investors. 2003 Report. p. 6.

## Annex 2: Meridiam study of listed funds investing in infrastructure equity

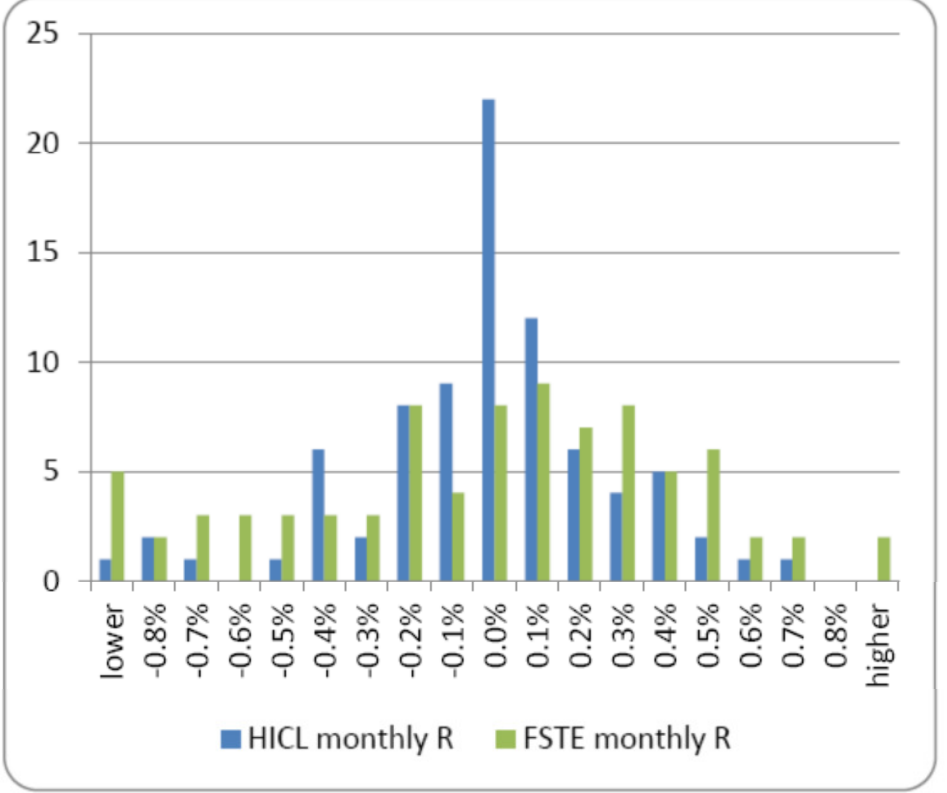
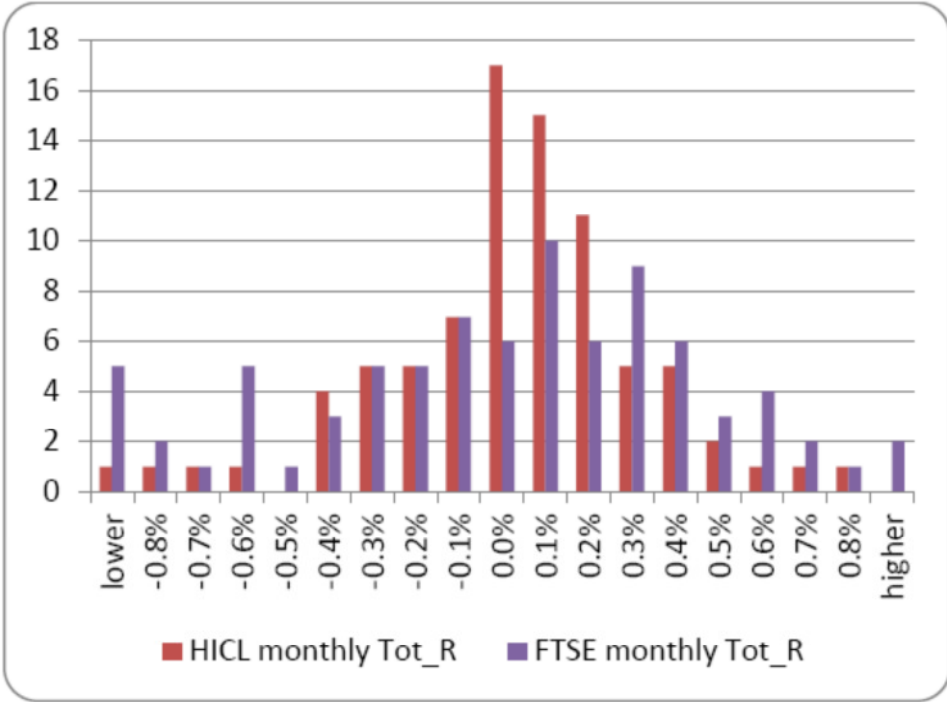
### HICL vs. FTSE All Shares

HICL is building a portfolio of Social infrastructure or equivalent project finance SPV equity, without targeting short term exit sales. It currently holds 79 investments with participations ranging from 20 to 100% (mostly majority stakes).



Annualised monthly data for 2006-2012		
	HICL	FTSE ALL SHARES
Price return	3.19%	0.71%
Risk	10.62%	17.18%
Sharpe Ratio	0.086	-0.09
Market beta	0.277	n.a.
99.5% VaR	24%	44%
Total return	8.74%	4.18%
Risk	10.64%	17.19%
Sharpe Ratio	0.596	0.11
Market beta	0.278	n.a.
99.5% VaR	19%	40%

### HICL vs. FTSE monthly return distributions

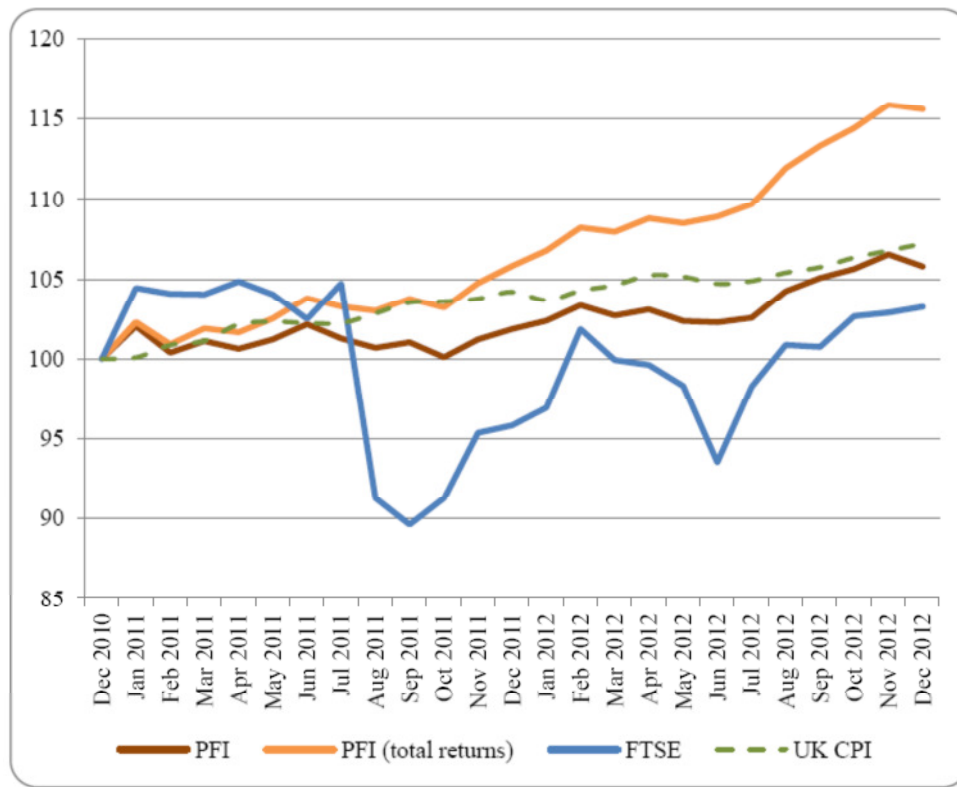


## Listed PFI Index (2010-2012)

5 listed investment companies holding PPP/PFI equity in SPV and collecting availability payments.

*Annualised monthly data*

	PFI index	FTSE All Shares
Price return	2.86%	1.61%
Risk	3.00%	12.48%
Sharpe Ratio	0.810	0.10
Market beta	0.094	n.a.
99.5% VaR	9%	30.54%
Total return	7.52%	5.02%
Risk	3.04%	12.50%
Sharpe Ratio	2.326	0.37
99.5% VaR	3.94%	27.17%



### **Annex 3: Analysis of results from Moody's and S&P studies regarding credit risk associated to project finance**

The purpose of this annex is to present the main results from studies by Moody's and S&P regarding the credit risk associated to project finance, and more specifically infrastructure projects, debt instruments (bank loans and securities such as bonds).

The main source is the Moody's report "Default and Recovery Rates for Project Finance Bank Loans, 1983-2008". The database used by Moody's consists of banks' project finance loan portfolios from a consortium of leading project lenders. Loans were included in the database if they fell under the Basel II definition of Project Finance<sup>91</sup>, which was retained by Moody's to define the study's perimeter.

The dataset includes 2639 projects accounting for 45% of all project finance transactions originated from the end of 1983 to the end of 2008.

The definition for default is Basel II's definition, as put forth by BCBS 128: „A default is considered to have occurred with regard to a particular obligor when either or both of the two following events have taken place.

- The bank considers that the obligor is unlikely to pay its credit obligations to the banking group in full, without recourse by the bank to actions such as realising security (if held).
- The obligor is past due more than 90 days on any material credit obligation to the banking group. Overdrafts will be considered as being past due once the customer has breached an advised limit or been advised of a limit smaller than current outstandings.”

The elements to be taken as indications of unlikelihood to pay include:

- The bank puts the credit obligation on non-accrued status.

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<sup>91</sup> Art. 220 & 221 (BCBS 128) "Project finance (PF) is a method of funding in which the lender looks primarily to the revenues generated by a single project, both as the source of repayment and as security for the exposure. This type of financing is usually for large, complex and expensive installations that might include, for example, power plants, chemical processing plants, mines, transportation infrastructure, environment, and telecommunications infrastructure. Project finance may take the form of financing of the construction of a new capital installation, or refinancing of an existing installation, with or without improvements. In such transactions, the lender is usually paid solely or almost exclusively out of the money generated by the contracts for the facility's output, such as the electricity sold by a power plant. The borrower is usually an SPE that is not permitted to perform any function other than developing, owning, and operating the installation. The consequence is that repayment depends primarily on the project's cash flow and on the collateral value of the project's assets. In contrast, if repayment of the exposure depends primarily on a well established, diversified, credit-worthy, contractually obligated end user for repayment, it is considered a secured exposure to that end-user"

- The bank makes a charge-off or account-specific provision resulting from a significant perceived decline in credit quality subsequent to the bank taking on the exposure.
- The bank sells the credit obligation at a material credit-related economic loss.
- The bank consents to a distressed restructuring of the credit obligation where this is likely to result in a diminished financial obligation caused by the material forgiveness, or postponement, of principal, interest or (where relevant) fees.
- The bank has filed for the obligor's bankruptcy or a similar order in respect of the obligor's credit obligation to the banking group. »

The database includes 213 projects where the project company has defaulted on its debt. Only 116 have emerged from default, and the recovery rate is computed based only on this subset.

An important methodological precision is that the estimation of Recovery Rates is performed at the aggregated project level, bundling together different loans whether from different lenders, or with different characteristics (seniority, maturity, amortization profile, etc.). While this may influence the estimated value, Moody's also performed a basic consistency check at the facility level (which showed similar results). This is mostly due to the fact that for a given defaulted project, there is often only one lender and one facility in the database<sup>92</sup>. When there are many, the report states that some discrepancies regarding the timing of the recovery process and the bank's methodologies to evaluate the recovery rate also explain the results.

9 sectors were defined in order to classify the projects: Chemicals Production, Infrastructure, Leisure & Recreation, Manufacturing, Media & Telecom, Metals & Mining, Oil & Gas, Power and Other.

As already mentioned earlier in the report, ***the definition for infrastructure is not widely accepted***, and Moody's used the following: "strategically important, capital intensive assets, utilities, services and primary industries, fulfilling major economic and social needs. The infrastructure sector is characterized by inelastic demand for outputs or services, potentially underpinned by natural monopoly assets, which support predictable and resilient long term revenues". It is important to notice that this definition doesn't include Power generation projects, as

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<sup>92</sup> The 116 projects which have experienced an ultimate recovery, only correspond to 180 facilities.



well as Media & Telecom projects, which are included in other definitions of infrastructure.<sup>93</sup>

It also has to be acknowledged that the sub-sector for PFI/PPP was deemed too small a sample to infer robust estimators, meaning the supposed better creditworthiness of those projects cannot be assessed from the Moody's study. As much of the industry's critics regarding the current calibration focuses on PPPs, one therefore has to recall that the Moody's study doesn't give much quantitative information to conclusively evaluate the credit risk of this type of projects independently.

The main findings of Moody's study are now summarized in the following:

First of all, 10y cumulative default rate for project finance are consistent with 10y cumulative default rate for low investment grade/high speculative grade. Two remarks must be made on the table reproduced below:

- Due to small sample size, the cumulative default rates by cohorts from projects started between 1984 and 1990 are not computed, which means that the economic cycle of the 80's decade doesn't appear in the data ;
- Similarly, the study ends at the end of 2008, and therefore doesn't allow the computation of cumulative default rates with a 10Y horizon for projects started after 2000. Furthermore, it is unquestionable that this data doesn't reflect the financial crisis that started in 2007 in the wake of the subprime mortgages bust. The fact that the data set contains a much larger amount of project

The default rates pattern puts project finance as a whole between Baa (S&P BBB) and Ba (BB) in the corporate universe<sup>94</sup>. The following table summarises the cumulative default rates by date of origination, as well as the average value.

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<sup>93</sup> And are included in many Infrastructure market indices.

<sup>94</sup> The benchmark corporate data set still barely includes the financial crisis started in 2007-2008.

Cumulative default rates by origination year cohorts for the period 1990 – 2008 (in %)											
	n(0)	1	2	3	4	5	6	7	8	9	10
1990	47	0.00	10.6	10.6	15.10	24.30	26.90	26.90	26.90	26.90	26.90
1991	64	0.00	7.80	7.80	11.10	17.90	21.60	21.60	21.60	24.20	24.20
1992	91	5.50	7.70	11.20	17.10	19.70	19.70	19.70	21.40	21.40	21.40
1993	108	1.90	4.70	9.70	12.90	12.90	12.90	15.60	15.60	15.60	15.60
1994	134	3.00	6.90	10.20	10.20	11.10	13.10	13.10	14.30	14.30	1.80
1995	225	2.30	4.90	6.00	7.90	10.00	10.00	10.80	14.60	15.70	15.70
1996	281	1.90	3.90	6.10	8.50	9.00	11.90	14.50	15.90	15.90	15.90
1997	349	1.50	4.60	8.30	9.10	11.90	15.50	17.50	18.10	18.10	18.10
1998	443	2.60	5.60	7.20	9.90%	14.70	16.50	17.00	17.00	17.50	17.50
1999	582	2.30	3.80	6.50	11.50	14.00	15.10	15.50	15.90	15.90	15.90
2000	695	1.40	4.00	10.10	13.20	14.60	14.90	15.20	15.20	15.20	
2001	810	2.40	9.50	13.20	14.40	14.60	14.90	15.10	15.10		
2002	915	7.00	11.90	13.40	13.80	14.00	14.20	14.40			
2003	947	4.50	6.00	6.30	6.70	6.80	7.00				
2004	1006	1.50	1.90	2.30	2.70	3.10					
2005	1057	0.30	0.80	1.10	1.40						
2006	1085	0.40	0.70	1.10							
2007	1178	0.30	0.90								
2008	1368	0.50									
<b>Study Data 1990-2008</b>		<b>2.00</b>	<b>4.10</b>	<b>6.00</b>	<b>7.60</b>	<b>8.90</b>	<b>9.90</b>	<b>10.60</b>	<b>11.20</b>	<b>11.40</b>	<b>11.50</b>
Moody's Baa 1983-2009		0.20	0.54	0.97	1.47	2.03	2.60	3.13	3.66	4.20	4.82
Moody's Ba 1983-2009		1.21	3.43	6.17	9.04	11.44	13.64	15.60	17.48	19.32	21.13

Source: Moody's "Default and Recovery Rates for Project Finance Bank Loans, 1983-2008"

Significantly, the table shows that the cumulative default rates are actually higher than the average Ba corporate data in the first years after the financial close of the project: the curves intersect only after the 2<sup>nd</sup> year, which is consistent with the observation that more defaults occur during the early stage of the project (or the construction phase, when relevant). **During this early stage, the creditworthiness can be considered as quite speculative for general project finance.** The following table, displaying the cumulative default rates by sectors, confirms the average picture, as one can notice that even the "narrow" infrastructure category still displays more default risk than the Baa corporate grade until after the 10<sup>th</sup> year, although it is by far the category with the smallest number of defaults. Media&Telecom projects are well below the Ba corporate grade, while Power projects are also riskier than Ba rated corporate in the early stages.

<b>Cumulative default rates by industry for the period 1990 - 2008</b>										
	1	2	3	4	5	6	7	8	9	10
Chemicals Production	2,2	4,9	7,4	10,6	14,5	16,1	18,6	20,6	20,6	20,6
<b>Infrastructure</b>	<b>0,6</b>	<b>1,3</b>	<b>2,2</b>	<b>3,0</b>	<b>3,8</b>	<b>3,9</b>	<b>4,1</b>	<b>4,4</b>	<b>4,4</b>	<b>4,4</b>
Leisure & Recreation	3,1	7,0	10,0	11,4	11,4	11,4	11,4	11,4	11,4	11,4
Manufacturing	3,9	8,9	13,1	14,5	16,5	16,5	16,5	16,5	16,5	16,5
<b>Media &amp; Telecom</b>	<b>5,2</b>	<b>11,2</b>	<b>15,6</b>	<b>18,0</b>	<b>19,4</b>	<b>21,5</b>	<b>25,1</b>	<b>25,1</b>	<b>25,1</b>	<b>25,1</b>
Metals & Mining	2,7	5,9	9,4	13,2	15,9	17,7	17,7	17,7	17,7	17,7
Oil & Gas	1,5 0	3,30	4,70	6,30	7,8	9,2	10,4	12,0	12,0	12,0
Other	4,2	9,7	15,3	18,3	22,6	29,0	29,0	29,0	29,0	29,0
<b>Power</b>	<b>2,2</b>	<b>4,4</b>	<b>6,3</b>	<b>7,8</b>	<b>9,0</b>	<b>9,9</b>	<b>10,6</b>	<b>11,1</b>	<b>11,5</b>	<b>11,7</b>
Average	2,0	4,1	6,0	7,6	8,9	9,9	10,6	11,2	11,4	11,5
<b>Moody's Baa 1983-2009<sup>95</sup></b>	<b>0,2</b>	<b>0,5</b>	<b>1,0</b>	<b>1,5</b>	<b>2,0</b>	<b>2,6</b>	<b>3,1</b>	<b>3,7</b>	<b>4,2</b>	<b>4,8</b>
<b>Moody's Ba 1983-2009<sup>96</sup></b>	<b>1,2</b>	<b>3,4</b>	<b>6,1</b>	<b>9,0</b>	<b>11,4</b>	<b>13,6</b>	<b>15,6</b>	<b>17,5</b>	<b>19,3</b>	<b>21,1</b>

Source: Moody's "Default and Recovery Rates for Project Finance Bank Loans, 1983-2008".

The above frequencies of default, however, cannot be used to quantify the average one-year default rate, as they are default rates conditional to survival, while the average one-year default rate should be the unconditional one-year probability.

The infrastructure sector as defined by Moody's has indeed the lowest average default rate of the sample; it is not a small sample, as it accounts for a third of the total dataset (867 on 2639). But Power and Media & Telecom projects are also sizeable contributors to the set (840 and 270 respectively), and adding them to the infrastructure category would notably increase the estimated default probability, as both of them exhibit a frequency of default higher than the global sample (11,0% and 14,8%, respectively).

<sup>95</sup> rounded

<sup>96</sup> rounded

<b>Average Default Rates By Industry</b>			
<b>Industry</b>	<b>Count of Projects in Study Data Set</b>	<b>Count of Defaults in Study Data Set</b>	<b>Average Default Rate (%)</b>
Chemicals Production	101	11	10.9
<b>Infrastructure</b>	<b>867</b>	<b>19</b>	<b>2.2</b>
Leisure & Recreation	39	5	12.8
Manufacturing	39	6	15.4
<b>Media &amp; Telecom</b>	<b>270</b>	<b>40</b>	<b>14.8</b>
Metals & Mining	121	14	11.6
Oil & Gas	326	19	5.8
Other	56	7	12.5
<b>Power</b>	<b>840</b>	<b>92</b>	<b>11.0</b>
Total	2639	213	N/A
Average	N/A	N/A	8.0

Source: Moody's "Default and Recovery Rates for Project Finance Bank Loans, 1983-2008"

*Computing the average default rate of the sample by combining infrastructure, Power and Media&Telecom into a broader "Infrastructure" category yields an average default rate of 7,6%.*

This figure cannot be interpreted in a straight forward manner, because it isn't consistent with the one-year average default rate which is usually used to evaluate creditworthiness.

Another fact that is worth mentioning is that, although the report doesn't feature a complete analysis of annual default rates by sectors, the global dataset shows a clear correlation of the default rate with the economic cycle, exhibiting spikes in 1992, 1998-1999 and 2002-2003.

As far as recovery rates are concerned, ultimate recovery rates for project finance are consistently high, across all regions and sectors, however, the level is markedly sector-dependent. Their level is comparable to corporate bank loans recovery rates, although gearing and tenors are usually higher than for bank loans. Average corporate recovery rates as computed by Moody's or S&P are closer to 40% - although they usually rely on a default definition that is not Basel II compliant, are estimated only on samples of publicly rated companies (as opposed to the data set of the Project Finance study) and correspond mostly to debt securities rather than bank loans.

Consistent with the higher frequency of default observed at early stages of the project, average ultimate recovery rates for construction phase defaults (67.5%) are lower than average ultimate recovery rates for operations phase defaults (80.1%). More generally, the data shows that average ultimate recovery rates are higher for projects that default in the later stages of the project life.

An important finding of the study is that average ultimate recovery rates realized through a work-out process (76.4%) exceed significantly average recovery rates achieved through distressed sale exits (47.8%). Namely, of the 213 defaults, 116 have led to an ultimate recovery, while 34 have been sold by the lenders ("Distressed Sale"). If one can agree that the "true" LGD level should be estimated after the work-out process has been completed, however, the Distressed Sale LGD estimate gives valuable information as to how market transactions would price Project Finance debt LGD. This empirical fact leads to the following remarks:

- As is widely documented for the corporate universe, recovery rates are structurally higher for bank loans than for bonds, because of the higher bargaining powers of the lender as opposed to that of the security holder. ***A consequence might be that, as far as bonds are concerned, one cannot take for granted the high recovery rate values for infrastructure project loans<sup>97</sup>***. It is not obvious, however, that the "distressed sale" recovery rate of a loan, which is a less liquid asset that only few agents are willing to hold on their balance sheet, is a good proxy for the recovery rate of a bond.
- It has to be remembered that, as opposed to the Basel II Risk Weighted Assets for loans held in the banking book, the Solvency II framework assumes market consistent fair-value: a distressed sale thus gives better information on the market value of an infrastructure project loan in an adverse environment, since it is a transaction price.
- The higher level of recovery rates for project finance can be explained by the fact that lenders are very important stakeholders within the project and can greatly influence its contractual equilibrium and its general course, because the project wouldn't even start without the initial funding. Generally speaking, information provisions by the project company and monitoring capabilities by senior lenders is greater than for usual corporate

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<sup>97</sup> The Moody's "Default and Recovery rates for Project Finance debts, 1992-2008" study exhibits an average recovery rate of 82%, however showing high sensitivity to seniority. But those results seem to be quite uncertain given the very low sample size of the study, as is discussed below.

lending. However, the question whether (re)insurance undertakings, which so far are not significant actors in the project finance funding market, can rapidly acquire the capacities and expertise that banks currently have in managing such investments, ought to lead to caution regarding the potential use of banking data for the calibration of the SCR shocks.

The following table displays ultimate recovery rates by sectors, as well as information on time to default and time to emergence.

Industry	Count	Average Years to Default	Count	Average Ultimate Recovery Rate (in %)	Average Years to Emergence
Chemicals Production	7	5.2	6	100.0	1.7
<b>Infrastructure</b>	<b>12</b>	<b>4.7</b>	<b>11</b>	<b>72.6</b>	<b>4.3</b>
Leisure & Recreation	4	3.1	2	78.2	1.0
Manufacturing	5	2.9	5	49.2	2.7
<b>Media &amp; Telecom</b>	<b>25</b>	<b>2.2</b>	<b>20</b>	<b>60.2</b>	<b>2.0</b>
Metals & Mining	14	3.8	10	58.3	2.8
Oil & Gas	12	4.3	10	73.4	2.2
Other	3	3.7	2	55.5	2.2
<b>Power</b>	<b>68</b>	<b>3.8</b>	<b>50</b>	<b>88.5</b>	<b>2.3</b>
Total	150	3.6	116	76.4	2.4

Source: Moody's "Default and Recovery Rates for Project Finance Bank Loans, 1983-2008".

Finally, an interesting fact reported in the Moody's study is that average ultimate recovery rates for project finance bank loans were essentially independent of economic cycle at default as well as economic cycle at emergence. Years prior to 2000, however, were excluded from this observation because of small sample sizes.

The second source that was used to assess the average credit quality of Infrastructure projects was Moody's report on "Default and Recovery Rates for Project Finance Debts, 1992-2008" which was released in November 2009. This report has not been updated since.

This study focuses on debt securities issued by project companies. While filling an obvious data gap, the study cannot be exploited for quantification purposes, for the following reasons:

- The dataset suffers from the limitations of a very small sample size (only 599 individual rated projects from 1992 to 2008).

- A significant amount of them is bearing credit enhancement from a monoline insurer (38%), which influences the trajectory to default. Furthermore, the worldwide demise of monoline insurers happened just after the final date of the observations in the dataset.
- The dataset is worldwide, and many projects that defaulted on their bonds are located in emerging countries (South America, Asia), which is not so relevant for an assessment within the Solvency II framework.
- Due to the available projects, categories are not identical to those of the loan study, rendering comparisons difficult.

The sectors identified by the study are the following: airports, mining, oil & gas, PPP, power, rail infrastructure and toll road.

A broad definition of Infrastructure would include airports, PPP, power, rail infrastructure and toll roads. The average 1Y default rates, which cannot be judged as statistically significant, exhibit a very wide range, as shows the following table:

<b>Average One-Year Default Rates, by Broad Sector, 1992-2008</b>	
<b>Sector</b>	<b>Average one-year Default Rate (%)</b>
Airports	0.00
Mining	33.33
Oil & Gas	0.62
Other	0.07
PPP	0.00
Power	1.15
Rail Infrastructure	23.53
Toll Road	4.39

Source : Moody's "Default and Recovery Rates for Project Finance Debts, 1992-2008".

According to this data PPPs seem to be quite low credit risk investments, but Rail infrastructure and Toll Roads project, which undoubtedly would qualify as infrastructure projects, exhibit default frequencies that would put them at the low end of speculative grade investment in the corporate world. The same is true for Power projects.

The other conclusion of the study is that recovery rates for such Project Finance Bonds are actually quite high (82%). However, the sample is extremely small (as some of the default didn't allow observing recovery rates, there are only 17 observations), are based only on 30-day post default recovery price, which is not consistent with the methodology used

for corporate recovery rates calculations<sup>98</sup>, and are skewed by multiple pari passu issuances from the same projects (only 10 projects are actually concerned).

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<sup>98</sup> This methodology considers ultimate recoveries coming from complete work-out processes rather than transaction prices shortly after default.



## Annex 4: Examples for Social Businesses

- In Italy, a medical centre provides high-level specialised assistance to people in need (immigrants for example), particularly in areas poorly served by public services.
- In Romania, a company with five members of staff and five volunteers has been working since 1996 to provide cultural services in the Romanian language to approximately 90 000 blind people by adapting media (especially audio books and films) to their needs.
- In 2004, in France, a business launched an innovative concept of water-free car washing services by using biodegradable products and employing unqualified or marginalised staff in order to reintegrate them in the labour market.
- In Hungary, a foundation set up a restaurant employing disabled staff (40 employees) and provided them with training and childcare to ensure the transition to stable employment.
- In The Netherlands, a company teaches reading using innovative digital tools and a method based on playing. This method is particularly suitable for hyperactive or autistic children but can also be used for illiterate people and immigrants.
- In Poland, a social cooperative comprising two associations employs long-term unemployed and disabled staff. It provides a variety of services: catering and food services, small construction and handicraft jobs and employability training for disadvantaged people.
- In Denmark, a business exclusively hires employees with autism spectrum disorder (ASD).  
The business' objective is to tailor a working environment for specialist people such as people with ASD in order to let them solve valuable tasks for the business sector at market terms.

Source: Impact assessment of the European Commission on the proposal for a Regulation on Social Businesses<sup>99</sup>

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<sup>99</sup> European Commission (2011): Commission Staff Working Paper Impact Assessment accompanying the document “Proposal for a Regulation of the European Parliament and of the Council on European Social Entrepreneurship Funds”.  
[http://ec.europa.eu/internal\\_market/investment/docs/social\\_investment/20111207ia\\_en.pdf](http://ec.europa.eu/internal_market/investment/docs/social_investment/20111207ia_en.pdf).