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The Impact of European Initiatives on the Treatment of Insurers' Infrastructure Investments under Solvency II

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THE IMPACT OF EUROPEAN INITIATIVES ON THE TREATMENT OF INSURERS' INFRASTRUCTURE INVESTMENTS UNDER SOLVENCY II

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ABSTRACT

Against the background of seriously underfunded infrastructure and the risk of a resulting lower competitiveness of the European economic area, the European Commission aims to incentivize private and institutional investments in infrastructure, thereby laying one main focus on pension funds and insurance companies. At the same time, insurers seek attractive long-term investment opportunities with stable cash flows that help match their long-term liabilities as an alternative to long-term government bonds, which currently suffer from low interest rates. However, financing volumes are still low, indicating the existence of certain investment barriers. The aim of this paper is to study these major barriers to infrastructure investments with focus on the insurance industry and Solvency II along with the impact of several European initiatives that are intended to reduce barriers, thereby also providing numerical examples regarding solvency capital requirements.

Keywords: Infrastructure, investment barriers, European Fund for Strategic Investment (EFSI), Solvency II

1. INTRODUCTION

After the financial and economic crisis, infrastructure financing conditions impaired across Europe, resulting in a worsening of European infrastructure conditions.¹ Public investments have been decreasing since the 1970s and only satisfy a low percentage of the required investments,² implying a considerable infrastructure financing gap, which according to the

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¹ European Commission (EC) (2010, p. 8), Heymann (2013, p. 1).

² Inderst (2013, pp. 5-6). In the European Union (EU), annual infrastructure investments amount to 2.6% of the European GDP (based on the GDP of 2010) for the years of 1992-2011, whereas estimated needs for a projected growth from 2013-2030 require an investment volume of 3.1% (Dobbs et al., 2013, pp. 12-13). Inderst (2013, p. 12) outlines different growth scenarios, whereby the required annual amount of European infra-

World Economic Forum (2012) annually amounts to approximately 1 trillion USD worldwide. To promote private and institutional investments, several European governments grant subsidy payments and policy incentives by means of support schemes, such as e.g. feed-in tariffs for wind and solar park investments.³

At the same time, against the background of the current low interest-rate environment, insurance companies – as the largest institutional investors in Europe’s financial markets with assets under management of approximately 9.8 trillion Euro (in 2014)⁴ – are currently looking for attractive and stable long-term investment opportunities.⁵ However, among other aspects, insurers’ investment decisions strongly depend on the new European regulatory system Solvency II, which since 2016 imposes risk-based solvency capital requirements depending on the type of infrastructure investment (e.g., equity, bonds, etc.). Thus, investment decisions in insurance companies will increasingly not only depend on risk-return profiles, but also on profitability in terms of Solvency II capital charges, which have recently been amended by EIOPA (European Insurance and Occupational Pensions Authority) for qualifying infrastructure investments.⁶

The literature has addressed infrastructure investments in various ways. Several articles discuss infrastructure vehicles and study their risk-return profiles (e.g., Bird et al., 2012; Bitsch et al., 2010; Blanc-Brude, 2013; Blanc-Brude et al., 2014; Finkenzeller et al., 2010; Inderst, 2010; Peng and Newell, 2007; Rödel and Rothballer, 2012; Rothballer and Kaserer, 2012). With respect to the insurance industry’s perspective, Gatzert and Kosub (2014) provide an overview of characteristics and risks as well as the treatment of different types of infrastructure investments under Solvency II. Potential barriers to infrastructure investments in Europe are discussed by Inderst (2013, pp. 37-40), including bank lending, investor regulations, and other barriers. Della Croce and Yermo (2013) show different obstacles, such as appropriate financing vehicles or regulatory barriers, for instance. The relevance and suitability of the EU2020 Project Bonds Initiative as a potential solution to infrastructure investment barriers is thereby also discussed by Bassanini et al. (2011, pp. 3-4).⁷

structure investments varies between 470 billion Euro (2.6% of GDP in 2010) and 810 billion Euro (4.5% of GDP in 2010).

³ Turner et al. (2013, p. 6), Gatzert and Kosub (2016).

⁴ <http://www.insuranceeurope.eu/insurancedata>, access 12/24/2015.

⁵ EC (2014a, p. 2).

⁶ http://ec.europa.eu/finance/insurance/solvency/solvency2/index_en.htm, access 11/11/2015.

⁷ The authors advise policy makers to undertake certain changes such as i) the creation of a new asset class for infrastructure, ii) the allocation of 15 to 20 billion Euro to support the EU2020 Project Bond Initiative, and iii) to create a Pan-European public infrastructure bond agency to improve liquidity.

In general, most papers focus on certain important aspects of barriers to or incentives for infrastructure investments and, furthermore, do not focus on the insurance industry's perspective and their specific regulatory environment. Against this background, this paper contributes to the literature by studying major barriers to infrastructure investments from the insurance industry's perspective with focus on Solvency II and by analyzing the EU2020 Project Bond Initiative as well as the Investment Plan for Europe Initiative, which are intended to promote infrastructure investments and to increase competitiveness in the European economic area. We provide numerical examples to assess the impact of EIOPA's solvency capital amendments for infrastructure investments as well as the effect of credit enhancements implied by the EU2020 Project Bond and the Investment Plan for Europe Initiatives on solvency capital requirements. In this sense, we also further develop the work of Gatzert and Kosub (2014), who studied the treatment of infrastructure investments under Solvency II before EIOPA's planned amendments. Overall, such an analysis is of high relevance to enable adequate policy and management decisions and to ensure further sustainable growth of infrastructure investments.

The paper is structured as follows. Section 2 presents characteristics and barriers to infrastructure investments from an insurer's perspective, including solvency capital requirements under Solvency II. Section 3 first discusses the impact of political initiatives to reduce barriers to infrastructure investments in Europe. Finally, Section 4 summarizes the results and provides a critical discussion of implications.

2. INFRASTRUCTURE INVESTMENTS: CHARACTERISTICS AND BARRIERS FROM THE INSURANCE INDUSTRY'S PERSPECTIVE

2.1 Characteristics of infrastructure investments and solvency capital requirements

Characteristics of infrastructure investments strongly depend on the type of investment, typically including a long economic lifetime and thus long capital commitment. Such investments generally exhibit a low elasticity of demand with stable cash flows and partly inflation hedging ability (e.g., if payments are linked to projects with pricing power given to the investors),⁸ which is particularly preferred by life insurance companies due to their long-term liabilities and in order to reduce the duration gap between assets and liabilities.⁹ In addition, infrastructure projects are often regulated objects in monopolistic or quasi-monopolistic markets with high entry barriers, not divisible and required to fulfill minimum investment sizes.

⁸ E.g., Gatzert and Kosub (2014) for an overview of the (empirical) literature.

⁹ Berdin and Gründl (2015, p. 413).

While infrastructure investments thus exhibit several desirable characteristics from an insurer's perspective and while policy incentives in case of renewable energy projects generally increase the attractiveness of these investments, the associated risks may also be considerable. Risks include a high level of idiosyncratic risks due to high regulatory and construction risks, potential concentration and cluster risks for investments with a regional or sectoral focus as well as illiquidity risks.¹⁰

One important decision criterion for insurers is also the treatment of infrastructure investments under Solvency II. To derive the risk-based solvency capital requirements (SCR), several individual risk modules (e.g., market risk, health risk, life risk, counterparty risk, etc.) are aggregated, taking into account diversification effects between the different risk classes.¹¹ In what follows, we particularly focus on the SCR from the market risk module, which comprises several submodules, e.g., interest rate risk, spread risk, and concentration risk, and which strongly depends on the type of infrastructure investment as shown in Gatzert and Kosub (2014). The aggregation of the submodules is done by applying the so-called square-root formula using the correlation $Corr_{i,j}$ between different risks (e.g. between interest rate risk and spread risk), i.e., the SCR for the market risk module is given by

$$SCR_{market} = \sqrt{\sum_{i,j} Corr_{i,j} \cdot SCR_i \cdot SCR_j}.$$

For each risk submodule, the SCR is calculated as the difference between the present value of future cash flows with and without a predefined shock or stress scenario (e.g., a decrease or increase in interest rates). In particular, the SCR for each submodule is thus given by the change in the net asset value (NAV) (i.e. basic own funds), which is defined as the difference between assets A and liabilities L , given a certain shock scenario:

$$SCR = \Delta NAV = \max(NAV - (NAV | shock), 0) = \max((A - L) - ((A - L) | shock), 0).$$

For *equity* investments, the shock scenario, i.e., a reduction of equities values, is given by 39% for “type 1” equity (companies listed in EEA or OECD countries), while “type 2” equity investments (non-EEA or non-OECD firms, hedge funds, non-listed equity) require 49%. The SCR is further corrected by a symmetric adjustment based on the behavior of a European equity index, which is published monthly by EIOPA and limited to -10% to +10%. Its purpose is

¹⁰ Gatzert and Kosub (2014, pp. 356-357, 362).

¹¹ The SCR can either be calculated based on the so-called standard model provided by the regulatory authorities or an internal model, which more adequately reflects the insurer's individual risk situation and which must be certified by the regulatory authority.

to prevent possible pro-cyclical effects.¹² For instance, on 11/30/2015 EIOPA reported a daily symmetric adjustment of 0.73%.¹³ The total SCR for the equity risk module is then derived by

$$SCR_{equity} = \sqrt{SCR_{type1equities}^2 + 2 \cdot 0,75 \cdot SCR_{type1equities} \cdot SCR_{type2equities} + SCR_{type2equities}^2}$$

Investments in the form of *strategic participations*¹⁴ are charged with an overall stress factor of 22%, while *property* investments require an SCR of 25%.

Highly relevant in case of infrastructure is typically the SCR for *bonds* or bond-like investments, which, among other risks, particularly comprises the spread risk and interest rate risk submodules. The SCR for the spread risk submodule is based on the duration of the bond and the shock depends on the bond's respective rating, which is measured by credit quality steps (CQS).¹⁵ In particular, risks arise from the sensitivity of assets and liabilities to changes in credit spreads (exceeding the risk-free interest rate). As we focus on bond investments and exclude securitization as well as credit derivatives, the SCR is calculated as follows,

$$SCR_{spread}^{bonds} = \max(\Delta NAV | \text{spread shock}, 0) = \max(MV_i \cdot F^{up}(rating_i; duration_i), 0),$$

where MV_i denotes the market value of bond i , $duration_i$ refers to the modified Macaulay duration of the bond, and F^{up} denotes the shock depending on the bond's rating (CQS) (EC, 2015a, Article 176).

¹² In particular, the symmetric adjustment has the following objectives: “1) To avoid that insurance and reinsurance undertakings are unduly forced to raise additional capital or sell their investments as a result of adverse movements in financial markets; 2) To discourage or avoid fire sales which would further negatively impact the equity prices i.e. prevent a pro-cyclical effect of the capital requirements which would in times of stress lead to an increase of capital requirements and hence have a potential de-stabilising effect on the economy.” (EIOPA, 2014, p. 19). The corresponding formula can be found in EIOPA (2014, p. 19).

¹³ See <https://eiopa.europa.eu/regulation-supervision/insurance/solvency-ii-technical-information/symmetric-adjustment-of-the-equity-capital-charge>, access 12/28/2015.

¹⁴ Criteria that are required for investments to be recognized as “strategic participation” are listed in Article 171 in EC (2015a, p. 110) and refer to equity investments of strategic nature as investments that are likely to be less volatile than investments in other equities for the following 12 months, caused by i) the nature of the investment and ii) the influence of the participation. Additionally, strategic investments need to fulfil various requirements, e.g., the existence of a clear strategy to continue holding the participation for a long period (EC, 2015a, p. 110).

¹⁵ Credit quality steps represent a standardized categorization of credit ratings from external credit assessment institution (ECAI) using an objective scale of credit quality steps, which is intended to increase comparability and transparency (e.g., Moody's “Aaa” corresponds to CQS 0; 1 (“Aa”), 2 (“A”), 3 (“Baa”), 4 (“Ba”), 5 (“B”), and 6 (“Caa”, “Ca”, “C”)).

Interest rate risk refers to the risk that the value of assets or / and liabilities adversely changes due to a change in the underlying term structure of interest rates or interest rate volatility. The SCR for interest rate risk is calculated by

$$SCR_{interest} = \max(SCR_{interest}^{up}, SCR_{interest}^{down}),$$

where $SCR_{interest}^{up} = PV_{interest} - PV_{interest}^{up}$ is the difference between the present value ($PV_{interest}$) of the bond without stress and with the applied upward shock ($PV_{interest}^{up}$),¹⁶ which is given by

$$PV_{interest}^{up} = \sum_{t=1}^T \frac{CF(t)}{(1+r_f(t) \cdot (1+s^{up}(t)))^t}, \quad T = \max(t | CF(t) \neq 0),$$

where $CF(t)$ denotes the cash flow in period t , r_f refers to the risk-free rate given by EIOPA¹⁷, and s^{up} the upward adjustment of the term structure. Overall especially long-term and low-rated fixed income investments (such as infrastructure investments) are thus generally exposed to higher capital charges.

2.2 Barriers to infrastructure investments

Although institutional investors such as insurers or pension funds have various incentives and reasons to invest in long-term oriented infrastructure, the required investment volumes are not achieved.¹⁸ The literature generally points out several reasons for lacking infrastructure investments. In what follows, we focus on reasons apart from general investment or project risks that were mentioned above, including, e.g., a high level of idiosyncratic risks due to high regulatory and construction risks, potential concentration and cluster risks for investments with a regional or sectoral focus, illiquidity risks, demand / volume risk (e.g. in case of transport infrastructure), political risks (such as expropriation depending on the respective country etc.) or policy risks (e.g. a reduction or cut of support schemes such as feed-in tariffs).¹⁹

¹⁶ As we focus on the asset side, the shock scenario only refers to the upside movement of the interest rate curve, reducing the market value of bonds.

¹⁷ The risk-free rate published and regularly updated by EIOPA is based on interest rate swap rates, government bond rates and corporate bond rates traded in deep, liquid and transparent markets (EIOPA, 2016a, p. 26); further details on the risk-free rate can be found on <https://eiopa.europa.eu/regulation-supervision/insurance/solvency-ii-technical-information/risk-free-interest-rate-term-structures>.

¹⁸ E.g., Inderst (2013, pp. 10, 38), Della Croce (2011, p. 9), Della Croce and Yermo (2013, p. 27).

¹⁹ See, e.g., Gatzert and Kosub (2016) for a comprehensive discussion of risks and risk management associated with renewable energy investments from the investors' perspective.

In particular, one major investment barrier for private and institutional investors comprises the lack of adequate investments, i.e., a lacking project pipeline, which implies that funds cannot be invested.²⁰ In addition, besides a lack of adequate investment opportunities, several authors point out the lack of suitable financing vehicles and debt instruments, which also hinders infrastructure investments.²¹ Furthermore, there is a shortage of objective high quality data on infrastructure, thus reducing the overall transparency of infrastructure investments in general.²² Finally, a lack of experience and knowledge on infrastructure as an investment obstacle is pointed out in this context.²³

Another main barrier arises from regulatory restrictions.²⁴ Besides the sectoral regulation of various infrastructure sectors (and the associated sectoral regulatory risks), e.g. in the energy sector or for road infrastructure, investment regulations play a major role for institutional investors. Here, especially Solvency II will considerably influence the insurers' investment behavior. As laid out in the previous subsection, infrastructure investments can require solvency capital requirements of up to 49% (and more including pro-cyclical adjustments) depending on the respective type of infrastructure investment (e.g., equity, bond, property etc.), implying that certain investments may be less attractive than others. Apart from the recently introduced regulatory capital requirements under Solvency II, Della Croce et al. (2011, p. 27) further point out investment constraints by rules-based regulatory restrictions. For instance, the German Investment Regulation ("Anlageverordnung") restricted investments in certain asset classes such as infrastructure investments, which, however, was abandoned with the introduction of the principles-based Solvency II framework to avoid a double regulation. Note that regulatory barriers are similar in the banking industry, where restrictive requirements from Basel III with respect to liquidity management (liquidity coverage ratio, net stable funding ratio) may prevent banks to finance more costly and thus less attractive long-term infrastructures.²⁵ Furthermore, illiquid assets also appear less attractive due to higher capital requirements.²⁶ Overall, these developments will particularly affect the non-recourse financing,²⁷ which tradition-

²⁰ Della Croce and Yermo (2013, p. 28).

²¹ Della Croce and Yermo (2013, p. 28), Kaminker et al. (2013), Inderst (2013, p. 39).

²² Della Croce and Yermo (2013, p. 28), Della Croce et al. (2011, p. 27), Della Croce (2011, p. 9), Inderst (2013, p. 39).

²³ Della Croce (2011, p. 9), Della Croce et al. (2011, p. 27), Inderst (2009, pp. 21-24).

²⁴ Inderst (2013, pp. 38-39).

²⁵ Inderst (2013, p. 37), Narbel (2013, p. 15), Reviglio (2012), Shearman & Sterling (2014, pp. 1, 3).

²⁶ Narbel (2013, p. 15).

²⁷ Non-recourse financing describes a financing structure where the lender (i.e. bank) is only entitled to receive the payments from the project's profit and not from other assets of the borrower. This makes renewable energy more risky, as renewables are exposed to various risk factors (e.g., Gatzert and Kosub, 2016).

ally has been used for large infrastructure projects especially in the renewable energy sector such as wind parks, for instance.²⁸

Further minor investment barriers in the literature include, e.g., a potential lack of risk transfer instruments for certain types of risks,²⁹ reluctance of stakeholders regarding a culture of “deal-making” with investment banks,³⁰ as well as legal and reputational risks.³¹

3. THE IMPACT OF POLITICAL INITIATIVES TO REDUCE BARRIERS TO INFRASTRUCTURE INVESTMENTS IN EUROPE FROM THE INSURANCE INDUSTRY’S PERSPECTIVE

To counterbalance barriers as described in the previous section and to increase investment volumes, politics has implemented several measures in terms of public policy incentives, which include amendments by EIOPA to allow SCR relief for certain infrastructure investments and the EU2020 Project Bond Initiative along with the Investment Plan for Europe initiative, which provides further capital relief by means of (partial) guarantees. In what follows, we study the impact of these two initiatives on solvency capital requirements and discuss further implications from the insurance industry’s perspective.

3.1 The impact of EIOPA’s amendments regarding solvency capital requirements for insurers’ infrastructure investments

Amendments of SCRs for infrastructure investments by the Delegated Regulation 2016/467

In April 2016, the EU agreed upon the Delegated Regulation 2016/467 as an amendment of the Delegated Regulation 2015/35, in which certain “qualifying” infrastructure investments are allowed to reduce the SCR in case of the Solvency II standard model.³² The definition of “qualifying infrastructure projects” can thereby be found in Article 164a, which requires that the infrastructure project entity (as a special-purpose vehicle)³³ needs to fulfil various criteria in order to “qualify” for the SCR relief. The major criteria are summarized in Figure 1 and include, e.g., predictable cash flows for equity and debt investors and that “infrastructure as-

²⁸ Della Croce and Yermo (2013, p. 29), Narbel (2013, pp. 2, 15).

²⁹ E.g., Gatzert and Kosub (2016) for risks and risk management of renewables.

³⁰ Inderst (2009, p. 23).

³¹ Della Croce and Yermo (2013), Inderst (2009), Inderst (2013).

³² EC (2014a, pp. 2-3), <https://eiopa.europa.eu/Pages/News/EIOPA-advises-to-set-up-a-new-asset-class-for-high-quality-infrastructure-investments-under-Solvency-II.aspx>, access 12/28/2015; EC (2016)

³³ EC (2016, p. 4): “Infrastructure project entity” means an entity which is not permitted to perform any other function than owning, financing, developing or operating infrastructure assets, where the primary source of payments to debt providers and equity investors is the income generated by the assets being financed”.

sets are governed by a contractual framework that debt and equity investors are provided with a high degree of protection”, among other aspects.

Figure 1: EIOPA’s criteria for qualifying infrastructure (Article 164a)

Criteria for infrastructure project entity

- Meet financial obligations under sustained stress (Article 164a (1a))
- Cash flows are predictable (definition on predictable cash flows in Article 164a (2)) (Article 164a (1b))
- Project is governed by a contractual framework to ensure high degree of protection, i.e.
 - where revenues are not funded from large number of users; contractual framework shall include provisions to protect debt providers and equity investors against losses from project termination (Article 164a (1c, a))
 - project entity shall have sufficient reserve funds or other financial arrangements (to cover contingency funding and working capital requirements)(Article 164a (1c, b))

Specific criteria for the contractual framework for bond or loan investments

- Debt providers have security to the extent permitted by applicable law (Article 164a (1c, i))
 - Equity is pledged to debt providers (i.e. prior to default) (Article 164a (1c, ii))
 - Use of net operating cash flows after mandatory payments from the project for purposes other than servicing debt obligations is restricted (Article 164a (1c, iii))
 - Contractual restrictions regarding detrimental actions to debt providers (including request if new debt should be issued) (Article 164a (1c, iv))
-

Specific criteria for bond or loan investments

- Ability to demonstrate to supervisor that investment can be held to maturity (Article 164a (1d))

Specific criteria for bond investments

- If no ECAI credit assessment is available, investment instrument shall be senior to all other claims (other than statutory claims and claims from derivatives counterparties) (Article 164a (1e))

Specific criteria for bond, loan or equity investments

- If no ECAI credit assessment is available,
 - infrastructure assets and project entity are located in the EEA or OECD (Article 164a (1f, i))
 - if infrastructure project entity is in the construction phase equity investor (or group of investors) shall (Article 164a (1f, ii))
 - have a history of successfully overseeing infrastructure projects and the relevant expertise
 - have a low risk of default, or there is a low risk of material losses for the infrastructure project entity as a result of the their default
 - be incentivized to protect the interests of investors
 - the project entity should have safeguards to ensure completion of the project according to the agreed specification, budget or completion date (Article 164a (1f, iii))
 - (material) operating risks shall be properly managed (Article 164a (1f, iv))
 - the project entity shall use tested technology and design (Article 164a (1f, v))
 - the capital structure shall allow to service the project entity’s debt (Article 164a (1f, vi))
 - refinancing risk shall be low (Article 164a (1f, vii))
 - the project entity uses derivatives only for risk mitigation (Article 164a (1f, viii))
-

Source: Own presentation based on Article 164a (EC, 2016, p. 4).

Equity: First and as before (explicitly stated in Article 169), capital requirements for qualifying infrastructure equity are lowered from 39%/49% to a stress factor of 22% in case investments are of strategic nature (“strategic participation”) (Article 169 (3) (a)) (EC, 2016, p. 8). Second and most importantly, capital charges for qualifying infrastructure equity capital are reduced to 30% plus 77% of the symmetric adjustment (Article 169 (3) (b) and Article 172, see Section 2).³⁴

³⁴ In regard to using 77% of the symmetric adjustment, EIOPA (2015, p. 14) states: “...to scale the symmetric risk charge linearly according to the selected equity risk charge. If, for example, 35 % was chosen then the

(Unrated) bonds and loans: In case unrated debt instruments are guaranteed by a collateral, i.e., a security is provided, the risk reducing effect is recognized within the spread risk module (Article 176 (5); EC, 2015a). Qualifying infrastructure bonds and loans as defined in Article 164a (e.g. credit quality step between 0 and 3; the actual spread risk adjustments for qualifying infrastructure in the form of bonds and loans are further specified in Article 180 (11, 12, 13)) have been assigned lower stress factors (e.g. around 30% lower SCR for an investment with CQS 3) (Article 180 (11)).³⁵ As shown in Table 1, spread risk charges for qualifying infrastructures are considerably lower as compared to the regular stress factors for bonds or bond-like investments. For unrated qualifying bonds and loans, the credit quality step is set to 3 (Article 180 (13)).

Table 1: EIOPA’s amendments of the spread risk module

Credit quality step (CQS)		0		0		1		1	
		(non-qualifying infrastructure)		(qualifying infrastructure)		(non-qualifying infrastructure)		(qualifying infrastructure)	
Duration	stress _i	a _i	b _i	a _i	b _i	a _i	b _i	a _i	b _i
Up to 5	$b_i \cdot dur$	-	0.9%	-	0.64%	-	1.1%	-	0.78%
5 – 10	$a_i + b_i \cdot (dur_i - 5)$	4.5%	0.5%	3.2%	0.36%	5.5%	0.6%	3.9%	0.43%
10 – 15	$a_i + b_i \cdot (dur_i - 10)$	7.0%	0.5%	5.0%	0.36%	8.5%	0.5%	6.05%	0.36%
15 – 20	$a_i + b_i \cdot (dur_i - 15)$	9.5%	0.5%	6.8%	0.36%	11%	0.5%	7.85%	0.36%
...

Notes: dur_i is the duration of the underlying bond or loan; a_i and b_i are parameters that are stated within Articles 176 as well as 180 and serve to calculate the correspondent stress_i for the underlying asset.

Source: Own representation based on EC (2015a, pp. 111-112), EC (2016, p. 9).

Specific bonds and loans: Although not having been amended recently, we still need to take into account the following rules for specifically structured bonds and loans. In particular, in case debt instruments are structured in the form of bonds or loans (“fully, unconditionally and irrevocably guaranteed”)³⁶ by the European Central Bank (ECB), member states’ central governments and central banks, multilateral development banks (e.g., European Investment Bank (EIB) or European Investment Fund (EIF)) or international organizations (such as, e.g., the International Monetary Fund (IMF) or the Bank for International Settlements (BIS) - Article 118 of Regulation (EU) No 575/2013), risk charges for spread and concentration risks are reduced to 0%.³⁷

symmetric adjustment would be 35 divided by 39 multiplied with the symmetric adjustment for type 1 and type 2 equities. The underlying rationale is that the lower equity risk charge results from lower price volatility, which should be reflected in a reduced symmetric adjustment (especially if a value at the lower end of the range was chosen).”

³⁵ See EC (2016, p. 9) and <https://eiopa.europa.eu/Pages/News/EIOPA-advises-to-set-up-a-new-asset-class-for-high-quality-infrastructure-investments-under-Solvency-II.aspx>, access 12/28/2015.

³⁶ Article 180 (2) (EC, 2015a, p. 118).

³⁷ See spread risk in Article 180 (2) (EC, 2015a), market concentration risk in Article 187 (3) (EC, 2015a).

Implications for insurance companies

The amendments made by EIOPA address the barriers to infrastructure investments from the insurance industry's perspective that relate to regulatory requirements as laid out in Section 2. A summary of the amendments in SCRs regarding infrastructure investments along with a comparison with the previous requirements is laid out in Table 2.

Table 2: The impact of EIOPA's amendments on SCR depending on the type of infrastructure investments

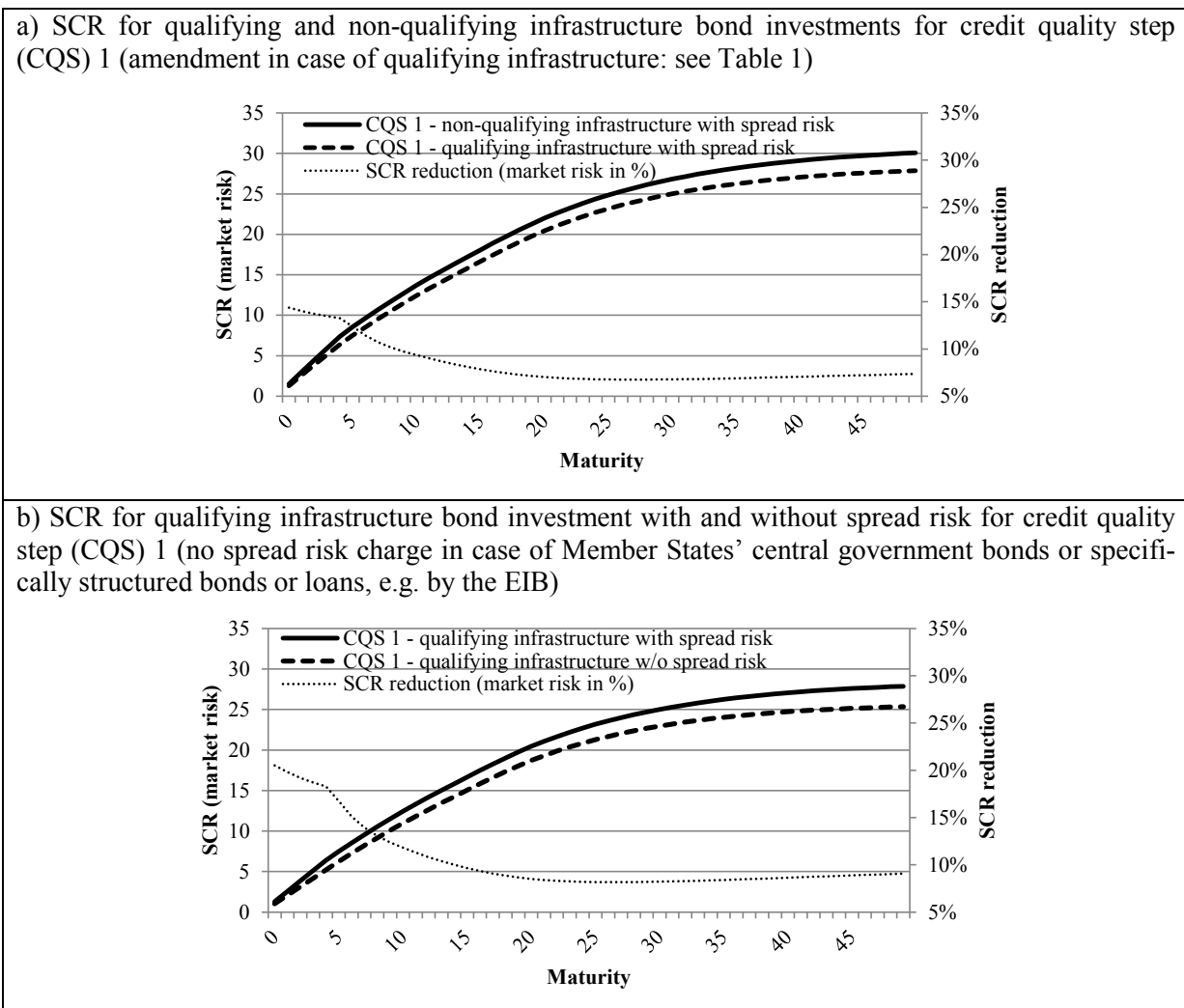
<i>Type of investment</i>	<i>Criteria for qualifying for SCR relief</i>	<i>SCR previously</i>	<i>SCR for qualifying infrastructure after amendments</i>
Equity	Multiple criteria as outlined in the amendments of the Solvency II directive (Article 164a), e.g. predictable cash flows, infrastructure assets governed by contractual framework, providing high degree of protection	Type 1 equity: 39% + symmetric adjustment Type 2 equity: 49% + symmetric adjustment	Sum of 30% + 77% of symmetric adjustment
Bonds and loans (rated and unrated)		Dependent on maturity/duration and rating (interest risk and spread risk module)	Adjusted shock factors for spread risks for rated bonds (CQS 0 to 3), F^{up} (e.g., ~30% lower SCR for CQS 3 investment); unrated bonds are set to CQS 3
Bonds and loans (e.g., guaranteed by ECB, etc.)		Exemption of spread and concentration risk for specific bonds and loans	- (No changes)

Source: Own presentation based on EC (2015a), EC (2016).

Figure 2a) illustrates the new SCR charges for a qualifying infrastructure bond and a non-qualifying infrastructure bond with identical credit rating, which strongly shows the effect of the reduced spread risk charges for “qualifying infrastructure” and the thus lower overall SCR. While in the present example the absolute reduction in SCR increases for higher maturities, the relative (percentage) reduction, displayed by the dotted line on the secondary axis, generally decreases, ranging from 14% for shorter maturities around 1 to 5 years to about 7% for bonds with a maturity of around 20 to 50 years. For example, a qualifying infrastructure bond investment with a maturity of 10 years would imply an approximately 10% lower SCR as compared to an identical non-qualifying infrastructure bond.

In case bonds or loans are fully guaranteed by, e.g., the EIB or European member states, or in case bond-like infrastructures are issued by government-owned development banks, for instance (see also next subsection), no spread risk charges apply for the Solvency II standard model. Figure 2b) illustrates how Solvency II capital charges can be lowered in case only interest rate risk is taken into account (even in case of non-qualifying infrastructure). In particular and similarly to the case in Figure 2a), the relative reduction of total SCR decreases in the considered example from 21% for short maturities (1 to 3 years) to around 9% for maturities of 50 years (see dotted line in Figure 2b).

Figure 2: The impact of the recently implemented rules for infrastructure investments on the derivation of the SCR for bonds



Source: Own calculations based on input data in Table 1 as well as the following assumptions: Coupon 3%, maturity 1 to 50, face value 100, market value 100.

As described in Section 2, one further benefit of long-term investments, which is not reflected in Figure 2 due to its focus on the asset side only, arises from a reduced duration mismatch between assets and liabilities, which in turn can generally contribute to reducing the SCR from interest rate risk (in case of a sufficiently relevant investment portion). This is particularly relevant for life insurers and pension funds with their long-term guarantees and especially for Germany life insurers that primarily offered products with long-term guarantees and a longer duration on the liability side as compared to other European countries (e.g., France, Italy, or United Kingdom).³⁸ As mentioned in Berdin and Gründl (2015, pp. 388, 395), the German Insurance Association states that the modified duration for assets ranges between 7.5

³⁸ IMF (2014, p. 55), Schwarz et al. (2011, p. 8).

to 9 years and the duration for liabilities is between 11 to 13 years, implying an average duration gap of 3.5 to 4 years.

Despite these amendments and the resulting SCR relief for infrastructure investments, the German Insurance Association, for instance, commented on the changes, suggesting that the reduced stress factors for equity investments should be furthered reduced.³⁹ However, risks associated with infrastructure investments can also be considerable depending on the type of investment. To account for the various risks, in addition to introducing requirements for qualifying infrastructure as briefly laid out in Figure 1, EIOPA (2015, p. 14) set the equity capital charges for qualifying infrastructure on the basis of lower and upper bounds. The upper bound was set to 39%, arguing that “listed infrastructure corporates displayed similar price behavior to listed shares in general”. Regarding the lower bound, EIOPA (2015, p. 14) stated that for investments in the form of a private finance initiative, “empirical data would support an equity risk charge clearly below 20%”. However, EIOPA (2015) set a “safety margin” on the lower bound, as the “empirical evidence has limitations”, ultimately setting equity charges for qualifying infrastructures to range between 30% and 39%, which due to the limitations of empirical data still remains in question.

3.2 EIOPA’s planned amendments for infrastructure corporates

Regarding infrastructure corporates, EIOPA advises the European Commission to once more amend the Delegated Regulation 2015/35 and to extend the different types of infrastructure investments into i) “project-like” infrastructure corporates and ii) infrastructure corporates.⁴⁰ In this regard, EIOPA proposes to treat “project-like” infrastructure corporates (i.e. rated and unrated debt and equity) that fulfil the criteria for qualifying infrastructure to be equal to the recently made amendments of the Delegated Regulation for qualifying infrastructure projects financed using a special purpose vehicle (SPV) structure.⁴¹ For infrastructure corporates, EIOPA distinguishes between debt and equity investments, whereby debt-like infrastructure investments are suggested to remain unchanged in accordance with the amended Delegated Regulation 2015/35 and respectively the Delegated Regulation 2016/467. For infrastructure corporate equity investments that meet certain defined requirements (e.g. with respect to revenue predictability and financial structure), EIOPA suggest implementing a new asset class with an equity stress of 36% and a correlation with type 1 equity of 75% and type 2 equity of

³⁹ <http://www.gdv.de/2015/07/vorschlaege-der-eiopa-gehen-nicht-weit-genug/>, access 07/21/2015.

⁴⁰ EIOPA (2016b, pp. 5-7, 20).

⁴¹ EIOPA (2016b, p. 20).

100%, using the same symmetric adjustment as for non-infrastructure equity.⁴² As these planned amendments are not effective yet, we do not include them in the following analysis.

3.3 The impact of European initiatives to promote infrastructure investments

While the amendments by EIOPA already imply a relief regarding the SCR, there are further initiatives with the objective to promote infrastructure investments in Europe, which at the same time also contribute to reducing SCRs for insurers by enhancing the credit quality of infrastructure investments, namely the EU2020 Project Bond Initiative and the Investment Plan for Europe.

The EU2020 Project Bond Initiative (2012-2016)

The EU2020 Project Bond Initiative started its operations in 2012 as a pilot project by the European Investment Bank and the European Commission and was intended to reduce the investment backlog in European countries.⁴³ The European Commission further attempted to support structural and regional policy goals in the European Union by enhancing the productivity of economic agents, increasing competitiveness in particular regions and to thus ultimately stimulate economy growth.⁴⁴ The pilot phase was set between 2012 and 2016 with a financial volume of 230 million Euro.⁴⁵ As a major goal, the initiative aims to incentivize private and institutional investors to finance infrastructure projects by improving the risk-return profiles of project bonds by means of subordinated debt (by the EIB) or contingent facilities,⁴⁶ implying at least an “A” rating for the project bonds. However, the initiative was only available for selected projects, where the investments needed to be economically profitable and technologically feasible. Eligible projects were further required to be capable of achieving the financial close by the end of 2016 and had to be approved before the end of 2014.⁴⁷ Furthermore, focus was primarily laid on investments in the Trans-European Networks (TEN), such as the TEN-E (Energy), TEN-T (Transport) and ICT (IT and Telecommu-

⁴² EIOPA (2016b, pp. 7, 20-21).

⁴³ EIB (2012, p. 4), Heymann (2013, p. 1), http://ec.europa.eu/economy_finance/financial_operations/investment/europe_2020/index_en.htm, access 02/02/2015.

⁴⁴ Heymann (2013, p. 8).

⁴⁵ EIB (2012, p. 5), <http://eib.europa.eu/products/blending/project-bonds/index.htm>, access 02/02/2015.

⁴⁶ EIB (2012, p. 5), Heymann (2013, pp. 1, 4).

⁴⁷ EIB (2012, p. 5).

nication).⁴⁸ The initiative was planned to be further continued as the “Connecting Europe Facility” as part of the 2014-2020 Multiannual Financial Framework.⁴⁹

As illustrated in Figure 3, the EU2020 Project Bond Initiative is based on a financial vehicle, where in contrast to regular project loans, the EIB improves the bond’s credit-worthiness by providing a subordinated debt (Figure 3a) or a contingent credit line (Figure 3b).⁵⁰ The infrastructure project thereby has the form of a public-private-partnership (PPP) and is structured using a special purpose vehicle,⁵¹ which is founded by one or more companies providing equity with the aim to design, build, finance, and operate the infrastructure project.

The EIB provides two types of “Project Bonds Credit Enhancements” (PBCEs), which may not exceed 20% of the project volume or 200 million Euro,⁵² as reflected in Figures 3a) and 3b): i) a “funded PBCE” where less institutionally borrowed capital is necessary in total (see Figure 3a), as the EIB covers part of the amount by providing ex-ante subordinated debt or ii) an “unfunded PBCE” where the EIB provides a credit line to the already fully funded project (see Figure 3b).

For the “funded PBCE”, the remaining project costs are transferred to debt investors and are subdivided into tranches of senior debt and subordinated debt.⁵³ While the senior debt tranche is mainly intended for long-term investors such as pension funds or insurance companies, the subordinated debt is covered by the EIB by means of the PBCE.⁵⁴

In contrast, the credit line may be used in case, e.g., construction costs increase or if temporary earnings from the infrastructure project are not sufficient to cover senior debt payments.⁵⁵ Credit may be raised multiple times if the previous credit lines have been repaid by the SPV.⁵⁶ Comparing the two alternatives, Heymann (2013, p. 5) argues that as in case of the “funded PBCE” all of the capital is already available at the beginning of the project, possible unforeseen costs (e.g., during the construction phase) that exceed the available capital cannot

⁴⁸ EIB (2012, p. 5), Heymann (2013, pp. 4, 6).

⁴⁹ http://ec.europa.eu/economy_finance/financial_operations/investment/europe_2020/index_en.htm, access 02/08/2016.

⁵⁰ Heymann (2013, p. 1).

⁵¹ EIB (2012, p. 21). For detailed information on PPPs, see World Bank (2014).

⁵² EIB (2012, p. 8).

⁵³ Heymann (2013, p. 4).

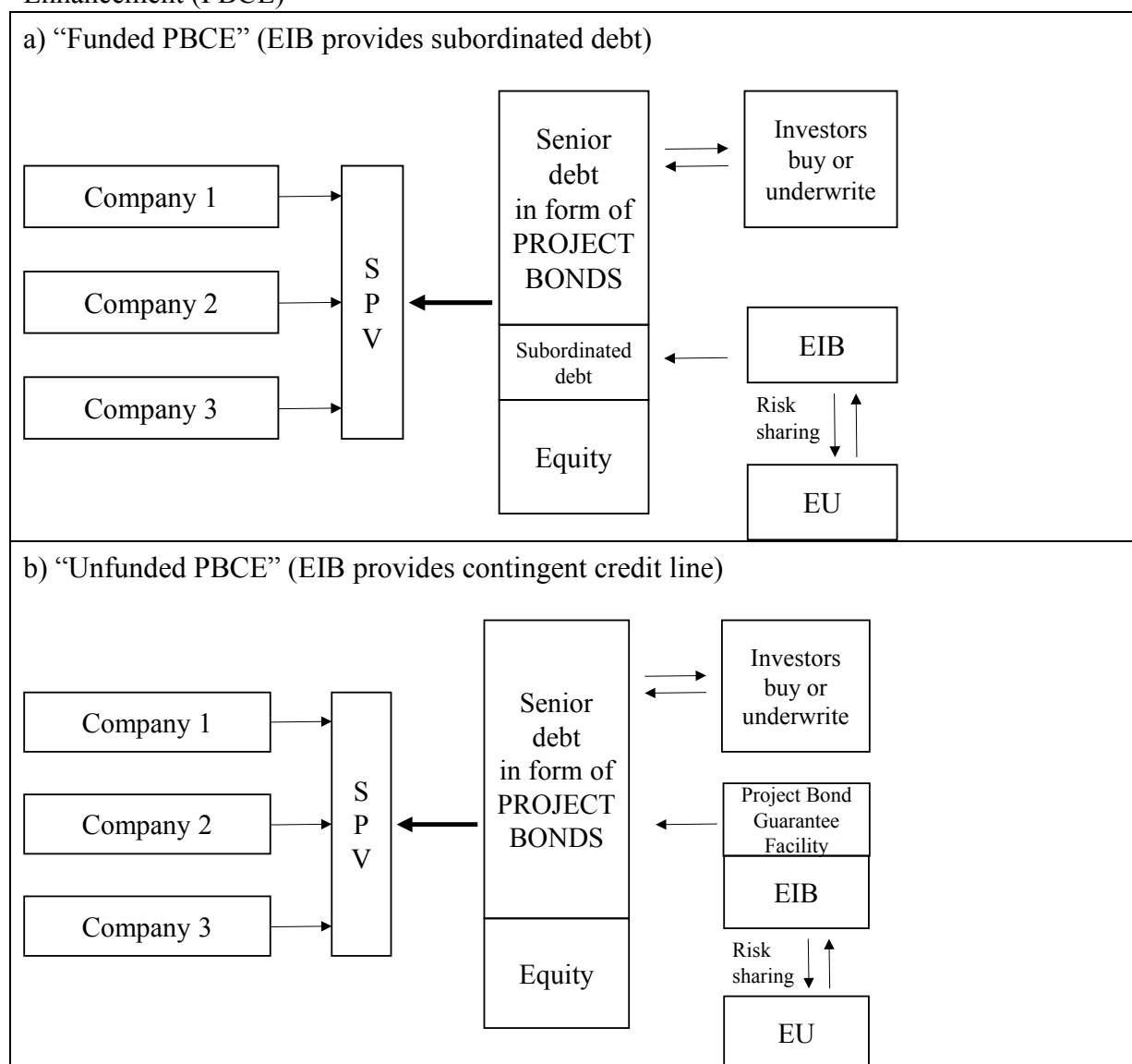
⁵⁴ EIB (2012, p. 8).

⁵⁵ EIB (2012, p. 13), Heymann (2013, p. 4).

⁵⁶ Heymann (2013, p. 5).

be covered as effectively as compared to the “unfunded PBCE”, where the availability of the credit line generally provides more capital if needed.

Figure 3: The EU2020 Project Bond Initiative – funded and unfunded Project Bonds Credit Enhancement (PBCE)



Source: Own presentation based on EIB (2012, pp. 10, 12), http://ec.europa.eu/economy_finance/financial_operations/investment/europe_2020/index_en.htm, access 02/02/2015.

Table 3 provides an overview of the supported projects (by December 2015) under the EU2020 Project Bond Initiative, and shows that only few infrastructure projects used the supportive instrument of the European Union and EIB.

Table 3: Projects supported by the EU2020 Project Bond Initiative as of December 2015

<i>Release date</i>	<i>Project (SPV)</i>	<i>Country</i>	<i>Bond information</i> - <i>Bond volume</i> - <i>(EIB support)</i>	<i>Change of rating</i>
Jul 30, 2013	Castor energy storage project (Watercraft Capital S.A.)	Spain	5.756% due 12/2034 - 1.4 billion Euro - (200 million Euro liquidity line, 300 million Euro anchor investment)	BBB+ (Fitch) “rating more attractive”
Nov 26, 2013	Offshore transmission link (Greater Gabbard OFTO Plc)	United Kingdom	4.137% due 11/2032 - 304 million Pound sterling - (45.8 million Pound sterling guarantee)	<i>Baa1</i> to <i>A3</i> (Moody’s)
Mar 24, 2014	A11 motorway (Via A11 N.V.)	Belgium	4.49% due 09/2045 - 578 million Euro - (115 million Euro sub. credit facility, 145 million Euro anchor investment)	<i>Baa3</i> to <i>A3</i> (Moody’s)
Jul 23, 2014	Broadband (FCT France Broadband Infrastructures)	France	2.622% due 06/2025 - 189 million Euro - (20% senior debt enhancement)	<i>Ba1</i> to <i>Baa2</i> (Moody’s)
Aug 27, 2014	A7 motorway (Via Solutions Nord GmbH Co. KG)	Germany	2.957% due 07/2043 - 170 million Euro - (90 million Euro sub. loan)	<i>A3</i> stable (Moody’s)
Feb 13, 2015	Gwynt y Mor offshore transmission link (Gwynt y Mor OFTO Plc)	United Kingdom	2.778% due 02/2034 - 339 million Pound sterling - (51 million Pound sterling on-demand letter of credit)	<i>Baa1</i> to <i>A3</i> (Moody’s)
Jul 22, 2015	Port of Calais	France	-	-
Aug 25, 2015	West of Duddon Sands Offshore Windfarm (WoDS Transmission Plc)	United Kingdom	3.446% due 08/2034 - 254.8 million Pound sterling - (on-demand letter of credit)	<i>Baa1</i> to <i>A3</i> (Moody’s)

Source: Own presentation based on information in Norton Rose Fulbright (2014) and http://ec.europa.eu/economy_finance/financial_operations/investment/europe_2020/index_en.htm, access 02/02/2015.

Investment Plan for Europe / European Fund for Strategic Investment (EFSI) (2015-2017)

In addition to the EU2020 Project Bond phase, in fall 2014 the president of the European Commission announced the Investment Plan for Europe by providing a 315 billion Euro investment vehicle, the so-called European Fund for Strategic Investment (EFSI), for strategic investments in long-term investments as well as small and medium-sized enterprises (SMEs) and mid-cap firms across Europe during a three-year-period from 2015 to 2017.⁵⁷ As the EU2020 Project Bond phase has served as a pilot project, the intended replacement initiative “Connecting Europe Facility” along with its budget of 3.3 billion Euro was reallocated and

⁵⁷ EC (2014c, p. 7), EC (2014b, p. 3), http://ec.europa.eu/news/2014/11/20141126_de.htm, access 02/05/2015. Note that in September 2016, the president of the EC announced a proposal “to extend its successful European Fund for Strategic Investments, at the heart of its Investment Plan for Europe, to increase its firepower and reinforce its strengths; and to set up a new European External Investment Plan (EIP) to encourage investment in Africa and the EU Neighbourhood to strengthen our partnerships and contribute to achieve the Sustainable Development Goals” (http://europa.eu/rapid/press-release_IP-16-3002_en.htm, access 11/02/2016).

merged with the Investment Plan for Europe initiative.⁵⁸ The proposed Investment Plan has been operating since September 2015 and has three major objectives: “reverse downward investment trends and help boost job creation and economic recovery, without weighing on national public finances or creating new debt, take a decisive step towards meeting the long-term needs of our economy and increase our competitiveness, strengthen the European dimension of our human capital, productive capacity, knowledge and physical infrastructure, with a special focus on the interconnections vital to our Single Market).”⁵⁹

The initiative comprises three strands:

- i) “First, the mobilisation of at least EUR 315 billion in additional investment over the next three years, maximising the impact of public resources and unlocking private investment.”
- ii) “Second, targeted initiatives to make sure that this extra investment meets the needs of the real economy.”
- iii) “[...] Third, measures to provide greater regulatory predictability and to remove barriers to investment, making Europe more attractive and thereby multiplying the impact of the Plan.”⁶⁰

Regarding barriers to infrastructure investments, particularly the first and second strands are relevant. The second strand thereby includes the implementation of a project pipeline to be established at the European level. In particular, an “Investment Task Force” was established to screen potentially viable investment projects that are of relevance for Europe. The list of viable projects should be dynamic and be based on a simple and recognized evaluation framework.⁶¹ A project list from member states is already available. For example, Germany offers 60 infrastructure projects with a total volume of 89 billion Euro in total costs (of which 27.7 billion Euro could be invested from 2015 to 2017).⁶² In total, the project list comprises around 2,000 European projects with a potential investment volume of 1.3 trillion Euro.⁶³ In July 2015 the European Commission (2015b) further decided the establishment of a European Investment Project Portal (EIPP) to provide clear and transparent information on investment opportunities.⁶⁴

⁵⁸ Wettach et al. (2014).

⁵⁹ EC (2014c, p. 5), <http://www.reuters.com/article/2015/01/30/us-eu-fund-idUSKBN0L319Q20150130>, access 02/05/2015.

⁶⁰ EC (2014c, p. 4), <http://www.reuters.com/article/2015/01/30/us-eu-fund-idUSKBN0L319Q20150130>, access 02/05/2015.

⁶¹ EC (2014c, p. 12).

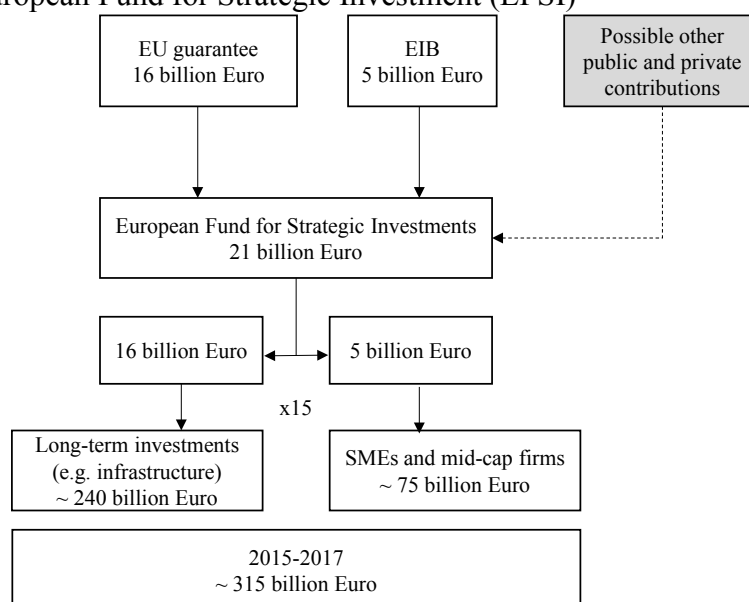
⁶² EC (2014c, p. 12), Special Task Force (2014, p. 204-213).

⁶³ Wettach et al. (2014).

⁶⁴ http://ec.europa.eu/priorities/jobs-growth-investment/plan/eipp/index_en.htm, access 11/16/2015.

In particular and even more important, the first strand of the initiative aims to incentivize private and institutional investors to invest 315 billion Euro during the three years (2015-2017) via the EFSI as shown in Figure 4, where the EU guarantees 16 billion Euro and the EIB 5 billion Euro. This implies that the European Commission assumes a multiplication of the invested capital by a factor 15 based on historical experience,⁶⁵ leading to the potential overall sum of 315 billion Euro of which 240 billion Euro of the total EFSI investment volume are planned to be invested in long-term projects such as infrastructure (see Figure 4). In addition, even though not all of the screened projects should or will be financed by the EFSI, private and institutional investors should be allowed to access the relevant and transparent information on these projects via the EIPP, which can be beneficial even if the projects are not financially supported by the EFSI and thus also create investment incentives.

Figure 4: The European Fund for Strategic Investment (EFSI)



Source: Own presentation based on EC (2014c, p. 7).

Comparing the EFSI with the EU2020 Project Bond Initiative shows several differences. The EFSI is more flexible as it allows investments in different sectors (e.g., transportation, energy, telecommunication, energy efficiency, education, environment), which is not the case for the EU2020 Project Bond Initiative, which is rather restrictive with its three investment sectors (energy, transport, information and communication technology).⁶⁶ In addition, the EFSI includes different financial instruments (e.g., equity, guarantees, subordinated debt and senior debt) and a single tool to provide credit enhancing capacity for the capital market (subordinated debt, guarantee facility).

⁶⁵ EC (2014c, p. 8).

⁶⁶ EC (2014b, p. 14).

Implications of the European initiatives regarding barriers

With respect to the barriers discussed in the previous section, the two initiatives generally address the issues regarding the availability of infrastructure projects, adequate financing vehicles, transparency and sufficient data, which is also of relevance for insurers. In particular, the pilot project EU2020 Project Bond Initiative improves the availability of infrastructure investment vehicles (in certain sectors) while the Investment Plan for Europe and especially the European Investment Project Portal additionally contribute to reducing information deficits and increasing transparency regarding infrastructure projects. However, the viability of the listed projects in the Investment Plan initiative along with potential risks should still be carefully evaluated by potential investors.⁶⁷

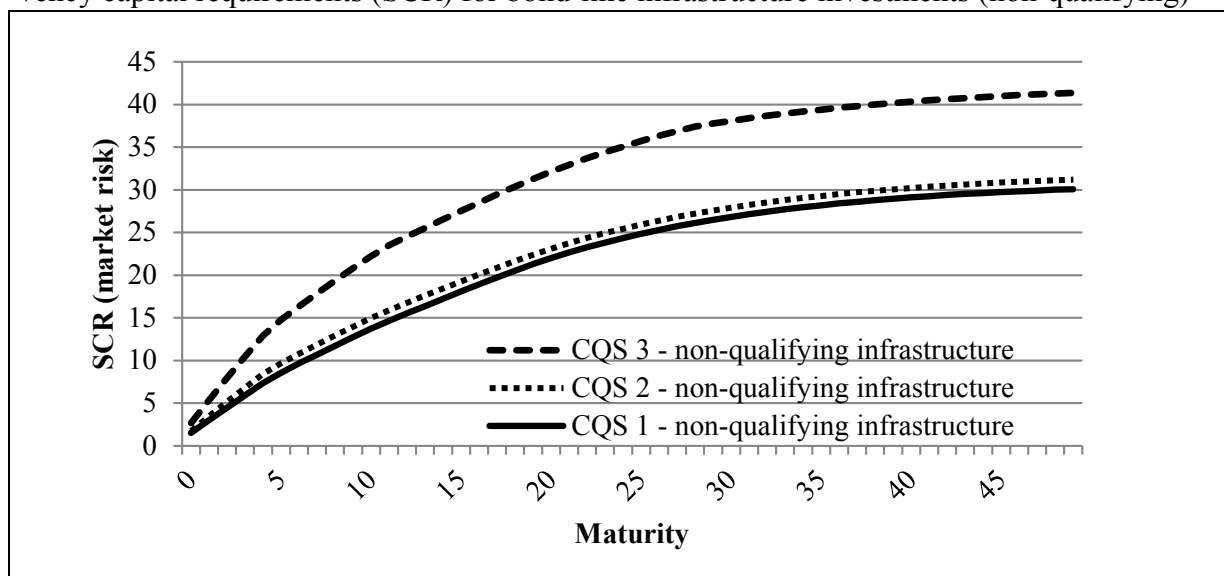
Besides the increasing availability of long-term investment vehicles in general, infrastructure investments that were eligible via the EU2020 Project Bond Initiative, for instance, allow investors access to infrastructure with credit quality enhancements and thus higher ratings.⁶⁸ In this way, the European initiatives also address the barrier regarding regulation through solvency capital reductions as displayed in Figure 5, which illustrates the impact of changing the credit quality from step 3 to step 2.

The option to reduce solvency capital requirements by only taking into account interest rate risk without spread risk (see Section 3.1, Figure 2b) in case bonds or loans are fully guaranteed by, e.g., the EIB or European member states, is currently not applicable within the EU2020 Project Bond Initiative or the EFSI-supported infrastructure investments, as only partial guarantees and credit enhancements are available.

⁶⁷ Wettach et al. (2014). For the valuation and performance measurement of unlisted infrastructure debt, see, e.g., Blanc-Brude et al., (2014).

⁶⁸ Bassanini et al. (2011, p. 3).

Figure 5: The impact of credit enhancements (improving credit quality steps CQS) on solvency capital requirements (SCR) for bond-like infrastructure investments (non-qualifying)



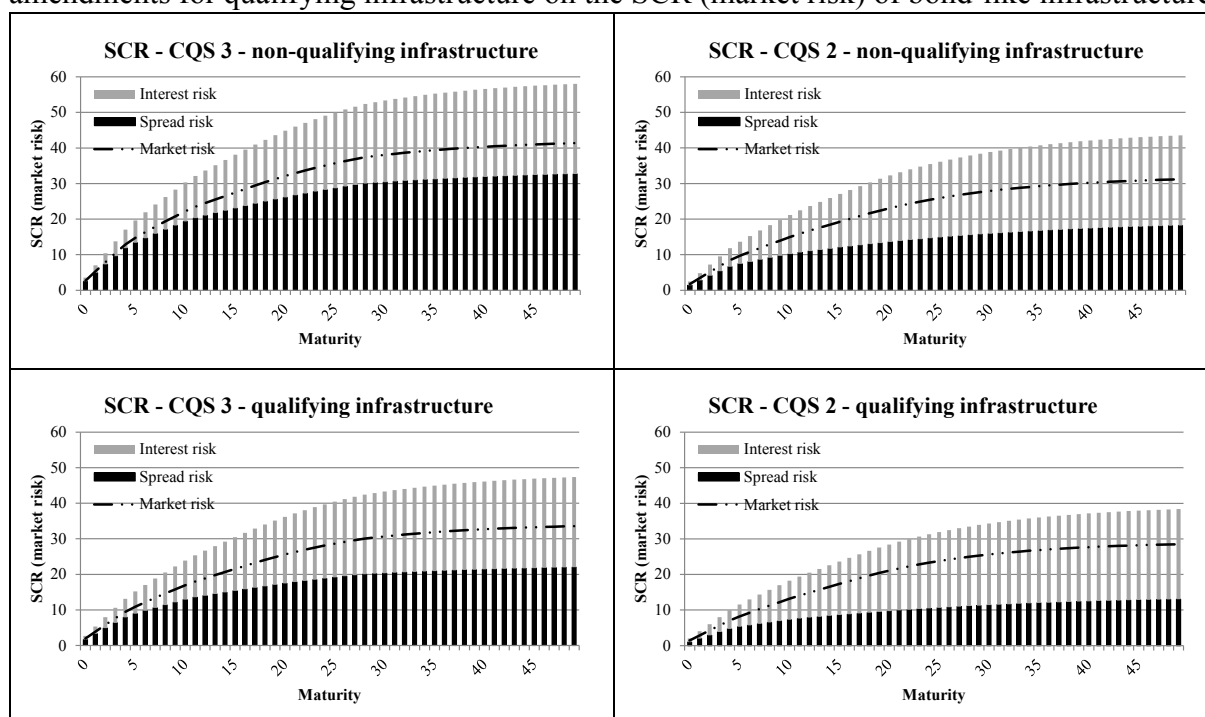
Source: Own calculations based on input data in Table 1 as well as the following assumptions: Coupon 3%, maturity 1 to 50, face value 100, market value 100.

Figure 6 summarizes the impact of the different initiatives on the SCR of bond-like infrastructure investments by displaying the SCR reductions from credit enhancements due to European initiatives (compare left and right graphs) as well as the impact of SCR reductions due to the amendments by EIOPA regarding qualifying infrastructure (compare upper and lower graphs). Figure 6 also shows the strong impact of diversification effects arising from imperfect dependencies between interest and spread risk.

As can be seen from Figure 6, credit enhancements imply a strong decrease of SCR, which in our example for non-qualifying infrastructure with credit enhancement from CQS 3 to CQS 2 ranges between 36% for short maturities (1 to 5 years) to 25% for maturities of approximately 40 to 50 years. For a given CQS, the SCR reduction of qualifying bonds (as compared to non-qualifying bonds) is not as pronounced, but still with a considerable relative SCR reduction for CQS 3 non-qualifying infrastructure to CQS 3 qualifying infrastructure between 28% (1 to 5 years) to 19% (30 to 50 years). Especially a combination of credit enhancements along with obtaining the status of “qualifying infrastructure” can considerably increase investment attractiveness of infrastructure for insurance companies (in terms of SCR relief) as the relative SCR reduction for a change from non-qualifying CQS 3 infrastructure to qualifying CQS 2 infrastructure (compare upper left graph and lower right graph in Figure 6) amounts to between 47% (1 to 5 years) and 31% (40 to 50 years) in the considered example. Hence, with the maximum reduction of capital requirements due to credit enhancement and the classification as a

qualifying infrastructure, an originally CQS 3 investment with a maturity of 20 years would require an about 35% lower SCR.

Figure 6: The impact of credit enhancements by European initiatives and as well as SCR amendments for qualifying infrastructure on the SCR (market risk) of bond-like infrastructure



Source: Own calculations based on input data in Table 1 as well as the following assumptions: Coupon 3%, maturity 1 to 50, face value 100, market value 100.

4. SUMMARY AND DISCUSSION

The aim of this paper was to study the impact of European initiatives that are intended to reduce barriers to infrastructure investments and promote investments with focus on the treatment of insurers' infrastructure investments under Solvency II. Toward this end, we focused on EIOPA's adjustments of solvency capital requirements in case of infrastructure investments, the EU2020 Project Bond Initiative as well as the Investment Plan for Europe Initiative, thereby using numerical examples to illustrate the impact on capital requirements under Solvency II. The main investment barriers identified from the literature apart from numerous project-related risks (e.g. construction or political risks) particularly include regulatory restrictions as well as issues associated with insufficient transparency regarding data or knowledge along with a lack of infrastructure investment opportunities or suitable financing vehicles.

Our study suggests that political initiatives such as the EU2020 Project Bond or the Investment Plan for Europe / EFSI Initiative can contribute to increase the transparency and

availability of long-term investment vehicles. Especially life insurers can benefit from more long-term infrastructure investment opportunities with an improved credit rating in order to reduce their duration mismatch between assets and liabilities. Concerning the investment barrier associated with solvency regulation, amendments regarding Solvency II offer the possibility to lower solvency capital requirements for certain qualifying debt and equity infrastructure investments. Reductions for infrastructure corporates are currently in discussion. In addition, insurers will benefit from credit enhancements in the context of infrastructure projects by the Investment Plan for Europe (the EFSI) and thus lower capital requirements, which make these long-term investments financially more attractive in this regard.

Overall, EIOPA's amendments regarding the SCR, the EU2020 Project Bond Initiative as well as the Investment Plan for Europe (EFSI) thus generally contribute to reducing certain potential barriers of insufficient infrastructure investments. Furthermore, insurance companies face lower solvency capital requirements due to improved project ratings and a reduced duration mismatch, while simultaneously finding available and transparent long-term investment alternatives. However, despite the generally positive effects,⁶⁹ several critics point out that the EU2020 Project Bond Initiative may promote risky and economically as well as technically potentially unprofitable projects. In particular, the credit enhancement of the EU2020 Project Bond Initiative improves the financing structure of the project, but not the feasibility of the actual infrastructure project itself – which may still result in a project failure and consequently cause the default of the project for its investors. In this regard, political motivation may play a crucial role,⁷⁰ as projects selected for the EU2020 Project Bond or the Investment Plan for Europe / EFSI initiative may be of political importance for governments or the European Union, but possibly not economically attractive,⁷¹ thus potentially leading to a higher default risk for the investors than actually desired.

For instance, the European PPP Expertise Centre (EPEC) (2012, p. 3) emphasizes that PPP projects are typically structured to achieve a “BB+” or “BBB-“ rating (before receiving a credit enhancement) and can thus be classified as a risky investment for equity or junior debt investors (while senior debt risk is reduced). In this regard, a broader study by Moody's

⁶⁹ While the EFSI operations have only recently started, experiences from the EU2020 Project Bond Initiative are already available.

⁷⁰ Fitch (2013, 2014), Wettach et al. (2014).

⁷¹ EIOPA (2015, p. 27), Wettach et al. (2014). Regarding determinants for policy and regulatory risks in the context of renewable energy investments, we refer to Gatzert and Kosub (2015), and Gatzert and Vogl (2016) regarding a quantification approach for policy and regulatory risks.

(2013) on default and recovery rates for project finance bank loans from 1983 to 2011 shows rather low historical default risks. However, one thereby has to take into account that infrastructure as defined by Moody's excludes the risky media and telecommunication as well as the power sector. In addition, one has to keep in mind that individual projects can still fail. For instance, the first EU2020 Project Bond Initiative financed a Castor energy storage project, which was initially rated as BBB+ by Fitch in August 2013. The increased "uncertainty and lack of visibility on the outcome of the Castor gas storage"⁷² caused Fitch (2014) to downgrade the project to BB+ and thus to non-investment (speculative) grade.⁷³

Thus, overall especially long-term investors such as insurance companies (with an investment volume of about 9.8 trillion Euro in 2014) or pension funds should carefully monitor such investments and take into account that certain (and potentially material) project risks remain. Whether the European initiatives actually contribute to the promotion of infrastructure investments will be seen after the first Solvency II (and asset allocation) figures are published by the national authorities or EIOPA, as the ongoing Solvency II reporting covers information on infrastructure investments and particularly information on qualifying infrastructures.

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⁷² Presumably, the location of the castor project was disadvantageous, leading to several minor earthquakes in Spain. As a result, the Spanish government stopped the operations of this project and the Spanish government reimbursed 1.35 billion Euro to the project responsible (Fitch, 2014; Wettach et al., 2014; <http://www.reuters.com/article/2013/09/27/spain-gas-idUSL5N0HN0OZ20130927>, access 02/05/2015).

⁷³ Fitch (2013, 2014), Wettach et al. (2014).

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