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SOLVENCY ASSESSMENT FOR INSURANCE GROUPS IN THE UNITED STATES AND EUROPE – A COMPARISON OF REGULATORY FRAMEWORKS

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Solvency Assessment for Insurance Groups in the United States and Europe – a Comparison of Regulatory Frameworks

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Abstract

As a reaction to the increasing trend of insurers forming and participating in financial conglomerates and insurance groups, insurance supervisory authorities are currently developing group-wide capital standards. The International Association of Insurance Supervisors (IAIS) recently published an issues paper that discusses the challenges to group supervision and defines criteria for a thorough group solvency framework. Based on these criteria, this article provides an overview and comparison of three important group solvency models – the U.S. solo plus approach of the National Association of Insurance Commissioners, Switzerland’s group structure model, and the Solvency II proposal on group solvency assessment.

The analysis reveals various deficits within the group capital standard of the United States implying the need for future regulatory work. By contrast, the performance of the European frameworks with regard to the IAIS criteria is good. In particular, the Swiss framework can be seen as a prime example of an innovative and solid group solvency model.

Key words: group supervision, insurance group, regulation, risk-based capital, Solvency II, Swiss Solvency Test

JEL classification: G22, G28, G32, K23, L50

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1 Introduction

Today, most internationally operating insurance companies are organized in financial conglomerates or insurance groups. As a result, over the past decade, many countries have set up additional regulatory frameworks that are applied on the group level. These group-wide capital standards, however, do not replace the solvency assessment of individual legal entities within the group. They are rather meant to supplement the solo supervision, which remains a key tool to provide for policyholder protection (see also IAIS, 2009b).

The interactions of the legal entities within an insurance group may have a substantial impact on the group's solvency as well as the risks to the financial sector as a whole. In order to set incentives for a solid enterprise risk management and a group-wide capital management that complements risk management at the solo level, establishing appropriate group-wide capital standards is of vital importance.

The International Association of Insurance Supervisors (IAIS) has therefore set out principles on group-wide supervision as an internationally applicable guidance for the establishment of consistent and effective group-wide capital standards (see IAIS, 2008b). Based on these principles, the IAIS's issues paper explores different issues and challenges associated with group supervision and provides an analysis of possible approaches (see IAIS, 2009b). This has encouraged us to extend the contribution of the IAIS by conducting a comparison of three current group solvency approaches, based on the different challenges associated with a risk-sensitive group-wide solvency assessment.

Within the recent literature on insurance regulation, Eling and Holzmüller (2008), Cummins and Phillips (2009), as well as Holzmüller (2009) carry out comparisons of different solo capital standards. Eling and Holzmüller (2008) provide an overview and comparison of the solo-level risk-based capital charges of the United States, New Zealand, as well as the European Union and Switzerland, whereas Cummins and Phillips (2009) and Holzmüller (2009) base their analyses on the implications of the U.S. risk-based capital approach, Solvency II, and the Swiss Solvency Test (SST). However, their work does not focus on the consideration of group solvency issues.

In fact, the literature on insurance group solvency assessment is rather scarce. The paper by van Rossum (2005) examines the changes in the insurance industry, such as the emergence of financial groups, and the alignment of its regulatory frameworks to those of the banking industry. Furthermore, Darlap and Mayr

(2006) consider important challenges to group supervisors under the Solvency II proposal. The authors argue that there are several risks specific to financial conglomerates and insurance groups that are not covered by modern portfolio theory, such as concentration risks and financial contagion, and recommend the introduction of copula-based solvency models (see Darlap and Mayr, 2006).

Our paper presents an outline and comparison of three current group capital approaches: the group capital approach of the National Association of Insurance Commissioners (NAIC), the group structure model of the Swiss Solvency Test, and the Solvency II proposal on group capital assessment. The U.S. approach and the proposal of the European Union were selected because of their international importance, whereas the group structure model of the SST was included because it is currently regarded as one of the most innovative group capital standards. The comparison is based on five different issues and challenges that are provided by the IAIS's issues paper (see IAIS, 2009b) and that are usually associated within the discussion of a risk-sensitive group-wide solvency assessment of insurance companies.

The paper is structured as follows: Section 2 provides the overview of the three group solvency models. The comparison, the main part of the paper, is conducted in Section 3. Section 4 concludes and evaluates the three group solvency approaches with regard to the results of the previous section.

2 Assessing Group Solvency: an Overview

Typically there are two different approaches according to which a group solvency assessment can take place (see IAIS, 2009b): a legal entity perspective and a consolidated viewpoint of the insurance group. A legal entity approach regards the group as an accumulation of separate legal entities that are interdependent from each other. Here, the capital requirements of each group member are aggregated, taking intra-group transfers into account. By contrast, a consolidated group model regards the insurance group as one single entity and calculates the group capital requirement on the basis of consolidated accounts (see IAIS, 2009b). Ideally, a solid group model should incorporate aspects of both types of approach.

This section presents a description of the three capital standards under consideration, beginning with a general discussion of the framework. Afterwards, an overview of the group solvency model of the respective capital standard is provided.

2.1 NAIC Approach to Group-Wide Capital Standards

The NAIC risk-based capital system was introduced in 1994 and constituted by that time one of the first capital standards to incorporate an insurance company’s risk exposition to assess capital requirements. It determines solvency through a two-component approach (for the following paragraph see NAIC, 2009c):

The first component is a factor-based formula specific for each insurance type (life, health, and property/casualty insurance) that calculates the required “risk-based capital” (RBC), a required minimum capital level. The RBC is compared to the “total adjusted capital” (TAC), an insurer’s available amount of capital (including surplus). The capital charges depend upon different risk-factor charges, which are multiplied by several financial statement magnitudes of the insurer. Subsequently, a covariance calculation leads to the final adjusted RBC.

The second component is a law that identifies five levels of regulatory intervention. This rules-based component defines the level of supervisory action based on the quotient of the risk-based capital over the total adjusted capital ($\frac{RBC}{TAC}$) (for the following paragraph see NAIC, 2009c):

The first level represents a ratio of $\frac{RBC}{TAC} \geq 200\%$ implying no regulatory intervention. A solvency quotient between 150% and 200%, the “company action level”, results in the regulatory requirement of an additional report that comprises a financial plan of how to address the undercapitalization of the company. The “regulatory action level” involves a solvency ratio between 100% and 150%. Apart from the required additional report, this level triggers the intervention of the insurer’s assigned state commissioner. The “authorized control level” ($70\% \leq \frac{RBC}{TAC} < 100\%$) involves the adoption of control over the company by the regulator. Finally, a solvency ratio of less than 70% triggers “mandatory control” by the regulator.

The NAIC’s approach to group supervision is currently regulated through the Insurance Holding Company System Regulatory Act (Model #440) and the Insurance Holding Company System Model Regulation with Reporting Forms and Instructions (Model #450) (see NAIC, 2010a; NAIC, 2010b). During the “Solvency Modernization Initiative” (SMI), which started in June 2008 (see, e.g., NAIC, 2009a), they were modified and adopted in December 2010. They require disclosure of relevant information on the change in control of an insurance company, mergers and acquisitions, material intra-group transactions, as well as information on the interrelations between affiliated insurance companies (see, e.g., NAIC, 2009a). The models apply to “insurance holding company systems”, which are defined as two or more affiliated organizations or legal persons of which at least one has to be an insurance company (see NAIC, 2010a).

As pointed out by the NAIC, the current U.S. regulatory system for insurance groups can be described as a “solo plus” regime that utilizes an aggregation method for the group adjustments (NAIC, 2010d). That is, the solvency assessment is based on the single legal entity but is adjusted for intra-group transactions (see NAIC, 2011d). This means, i.a., that the regulatory control levels of intervention are left within the single entity solvency assessment (see, e.g., NAIC, 2010d). In addition, insurance groups are obliged to submit an annual report on the ultimate insurance holding company (see IAIS, 2009b), and regulators are required to consider group capital risks during their annual review process (see NAIC, 2010d).

In response to the financial crisis of 2007, one of the NAIC’s declared goal is to enhance U.S. group supervision, i.a., by means of the SMI. The modifications from 2010 to the Insurance Holding Company System Regulatory Act were an important step toward achieving this goal. The most important modifications to Model #440 include (in the following see NAIC, 2011c):

- The requirement to disclose information on possible operations of the insurer that could potentially give rise to enterprise risk, that is operations or events which might adversely affect the financial condition, liquidity, or reputation of one or more insurers of an insurance holding company system.
- The expansion of regulators’ access to financial information on affiliated companies.
- The establishment of and participation in supervisory colleges.

Also, the NAIC plans to release Holding Company and Supervisory Best Practices and a study of the financial reporting requirements for insurance holding companies (see NAIC, 2011c).

2.2 Group Structure Model of the Swiss Solvency Test

The Swiss Solvency Test was initiated by the Federal Office of Private Insurance of Switzerland in 2003 and came into effect in 2008. It is a risk-based solvency standard that incorporates both quantitative and qualitative solvency requirements. Concerning the latter, the SST requests an annual report on the overall risk situation of the insurance company. With regard to the quantitative capital charges, the SST is based on an economic capital concept. Here, an insurance company’s available economic capital (also called “risk-bearing capital” under the SST), which constitutes a financial cushion to buffer variations in assets and liabilities throughout the business year, is defined as the company’s comprehensive assets minus the discounted best estimate of its liabilities (see, e.g., FOPI, 2006). The SST is based on a market-consistent valuation calculating a lower capital bound, called “minimum solvency”, and an upper

bound, called “target capital” (see FOPI, 2004). While the former is a statutory magnitude, the latter is calculated consistent with the market and is defined as the tail value at risk of the change in available economic capital plus the capital cost over a one-year time horizon (see, e.g., FOPI, 2006).

An insurance company has to calculate its “SST quotient”, the ratio of risk-bearing capital over the target capital (see, e.g., FINMA, 2008b). The three thresholds of supervisory intervention of FINMA are determined according to the value of this ratio (for the following paragraph see FINMA, 2008b).

Threshold 1 is reached with an SST quotient of 100%. Thresholds 2 and 3 are drawn at solvency quotients of 80% and 33%, respectively. An insurer with a SST ratio above threshold 1 is regarded as sufficiently solvent and is not subject to regulatory intervention. A ratio between thresholds 1 and 2, however, triggers an intensified observation of the respective insurance company by FINMA. An insurance company with an SST quotient between 80% and 33% has to submit a restructuring plan within the next two months to FINMA. Furthermore, the authorities can prohibit any risky new business and require an additional liquidity plan. An insurance company falling below threshold 3 is subject to immediate intervention by FINMA, and the insurer is forced to take immediate actions to increase the risk-bearing capital and to decrease the target capital. If FINMA finds the actions to ensure policyholder protection insufficient, it can revoke the insurer’s license.

The SST group structure model is a supplement to the individual Swiss Solvency Test for financial conglomerates and in particular for insurance groups. The model is intended to complement the solo SST by applying the same methodology to calculate target capital and available economic capital from a group-level perspective. It is a legal entity approach in the sense that capital requirements are calculated for each legal entity of the group separately, taking into account group effects such as ownership structure and capital and risk transfer instruments (CRTIs) (see IAIS, 2009b).¹ Consequently, the methodology of the group structure model does not lead to one single SST quotient denoting the solvency of the whole insurance group but calculates separate capital charges for each legal entity of the group. However, an additional solvency assessment on a consolidated basis can be required by the supervisory authority or may be granted upon application of the insurance group (see, e.g., FINMA, 2008a).

The group level SST is based on several general principles and assumptions, which can be summarized

¹Capital and risk transfer instruments are, for example, dividends, intra-group retrocession, loans, participations, guarantees, and reinsurance agreements (see, e.g., Filipović and Kupper, 2007).

as follows (in the following see Filipović and Kupper, 2007 and Keller, 2006):

- An insurance group is considered to be a collection of different legal entities that are connected through a set of legally binding CRTIs and organized as a parent-subsiary group structure.
- Limited fungibility² of capital and limited transferability³ of assets and risks is assumed, meaning group effects are recognized only by taking into account the web of legally binding capital and risk transfer instruments. In times of financial distress, available economic capital is not transferred between the legal entities unless legally binding CRTIs are in place.
- The available economic capital of subsidiaries is defined as the entities' economic values less a market value margin, the latter being calculated via a cost of capital approach.
- When determining the SST quotient of the parent company, the economic values of its subsidiaries are taken into account as assets of the parent company.

In addition to the individual capital requirements and the inclusion of all legally binding CRTIs into the calculation of the group solvency, the Swiss framework requires a scenario analysis on the group level. Here, the effects of several possible stress scenarios on all legal entities of the insurance group as well as the expected economic loss to the group as a whole have to be quantified.

The requirements of the group structure model are satisfied when the individual SST ratios of all group members lie above 100% (see FINMA, 2008b).

2.3 Solvency II Proposal on Group Solvency Assessment

Solvency II is the European Commission's showcase to harmonize European insurance regulation across EU countries. From 2013 onward, it will replace the Solvency I framework. The risk-based Solvency II system is based on three main thematic areas, the "pillars" (see EC, 2011). Pillar I determines quantitative capital requirements, which contains, similar to the SST, two key magnitudes that have to be calculated: the "solvency capital requirement" (SCR) and the "minimum capital requirement" (MCR). The SCR corresponds to the target capital of the SST and is calibrated on the basis of a value at risk

²According to Keller (2006), "fungibility" is hereafter defined as the ability to quickly generate cash by converting transferable assets.

³The term "transferability" in this context refers to the actual capability of transferring assets and risks from one entity of the group to another, even and especially when the group has to face financial distress in one or more entities (see IAIS, 2009b).

concept with a confidence level of 99.5% (in contrast to the tail value at risk concept with a 99% confidence level under the SST). The second magnitude, the MCR, constitutes a minimum capital level below which the amount of financial resources is not supposed to fall (see EC, 2009), and is comparable to the minimum solvency of the SST approach. It is calculated via a linear formula that is based on the SCR. Additionally, the regulators have defined a fixed minimum absolute floor that is set to €2.2 million for non-life insurers and €3.2 million for life insurers as well as reinsurers (see, e.g., EC, 2010). The focus of Pillar II is on qualitative requirements regarding the risk management policy of insurers, whereas Pillar III sets out disclosure and transparency rules (see EC, 2009).

The Solvency II proposal on group-wide solvency assessment improves and modernizes the Insurance Group Directive from 1998 (EC, 1998). It assigns the same set of principles and goals that apply to an individual insurer to the insurance group as a whole (see, e.g., CEIOPS, 2009a). To each insurance group a group supervisor is assigned who organizes supervision (see EC, 2011). In order to ensure group solvency, Solvency II requires to determine the group SCR as well as the amount of eligible own funds on the group level (see, e.g., CEIOPS, 2009a). The group SCR is calculated on the same $\text{VaR}_{99.5\%}$ concept as the SCRs for the individual legal entities and equals the amount of economic capital needed to ensure the solvency of the entire group.

The Solvency II proposal for calculating group-wide capital charges tries to combine the two approaches to group solvency assessment mentioned above: the understanding of the insurance group as being a collection of separate legal entities and the integrated view of the group as one consolidated entity (see, e.g., IAIS, 2009b). However, due to the standard formula to assess group-wide capital requirements, and especially in comparison to the group SST and the NAIC approach, it can clearly be categorized under the models with a consolidated focus.

The standard approach to compute group solvency is the “Accounting Consolidation-Based Method” (see, e.g., EC, 2010). It calculates the group SCR on the basis of consolidated balance sheets and can be described as the consolidated solvency capital requirement SCR^* of those insurance companies for which the consideration of diversification effects is approved plus the sum of the solo SCRs of the residual group members for which diversification is not approved (see CEIOPS, 2009a). In order to calculate the SCR^* ,

insurance companies may apply the standard formula for solo entities to the consolidated data, as if the group were an integrated entity (see EC, 2010). The insurance group’s solvency margin is then defined as the difference between its eligible own funds and the group SCR.

When applying the accounting consolidation-based method, a group capital floor has to be calculated. It is given by the sum of the solo MCRs (determined according to Article 129(1) and Article 129(3) of the Solvency II Framework Directive), of the participating entities, as well as the proportional share of the solo MCRs of the related entities (see EC, 2010).

If the group supervisor comes to the conclusion that the application of the standard method described above is not appropriate for a specific group, Article 220 of the Solvency II Directive 2009/138/EC states that an alternative method should be applied, the “Deduction and Aggregation Method” (see EC, 2009). Under this approach, group solvency is given by the difference between the sum of the aggregated eligible own funds of all group members and the aggregated solo SCRs (see CEIOPS, 2009a).

Apart from the two methods described above, it is also possible for an insurance group to apply for permission to calculate group solvency on the basis of an internal model (see EC, 2009).

3 Comparison

This section sets out a comparison of the three group solvency frameworks displayed above. We aim to contrast the three models with respect to several group solvency issues identified by the Issues Paper on Group-Wide Solvency Assessment and Supervision of the IAIS (in the following see IAIS, 2009b):

1. **Assessment of risk dependencies:** a group solvency approach should be able to appropriately model dependencies between different risk categories.
2. **Fungibility of capital and recognition of diversification effects:** the restriction in the transferability of assets and the fungibility of capital has to be modeled, and diversification effects should be adequately recognized.
3. **Prevention of multiple capital gearing:** a group solvency model needs to prevent any intra-group generation of capital so that an insurance group’s capital resources can be correctly compared with the group capital requirements.

4. **Avoidance of regulatory arbitrage and implementation of supervisory colleges:** in order to harmonize regulatory frameworks, close cooperation between the supervisory authorities of different financial sectors as well as different jurisdictions is needed.
5. **Scope of group supervision and treatment of nonregulated entities:** in order to be able to assess all relevant risks an insurance group is exposed to, a group solvency approach needs to provide adequate mechanisms to deal with nonregulated entities of a group.

3.1 Assessment of Risk Dependencies

The issue of how diversification effects and the pooling of risks within insurance groups should be recognized has gained additional relevance after the subprime crisis of 2007 to 2009. As risk dependencies typically increase in times of financial distress, the modeling of the tail characteristics of a risk category's distribution function becomes particularly important in such situations. As Embrechts et al. (2002) point out, the assumptions of multivariate normally distributed returns and linearly correlated risks are especially problematic in the insurance sector, due to the claims data which often exhibits skewness and fat tails.

However, former solvency models often relied on linear correlation measures and were not able to capture heavy tails. Therefore, the IAIS requires in its issues paper the standardized methods of current capital standards to ensure adequate quantification of the underlying risks an insurance group is exposed to and to pay particular attention regarding the modeling of the distribution functions' tails (see IAIS, 2009b).

The NAIC's RBC system uses a standard formula to calculate solo capital charges that aggregates risks on the basis of a covariance adjustment to account for diversification. More precisely, the formula squares the sum of risks that are believed to be not independent of each other, adds up the squares, and takes the square root of the sum of the squares; the remaining risks that are not believed to be correlated are added to this sum (see, e.g., NAIC, 2009c).

Although most recent changes to the RBC system include scenario analyses for market and interest rate risks within the life insurance formula, the approach still relies on a static formula rather than a full stochastic model (see also Cummins and Phillips, 2009). It assumes linear correlation between risk

categories and is therefore not able to take nonlinear tail-dependencies into account. Consequently, the status quo of U.S. capital standards fails to fulfill the first criterion of our comparison.

In order to compute the solo target capital of an insurance company, the SST standard model for market risk uses the change in 79 preset risk factors to measure the change in risk-bearing capital. The random vector of the changes in risk factors is assumed to be multivariate, normally distributed and linearly correlated. However, the model accounts for the fact that risk factor changes might often exhibit skewness and excess kurtosis by requiring an additional scenario analysis. These scenarios constitute stresses to several risk factors and can be translated into changes in the RBC (see FOPI, 2006). Consequently, a distribution function for each scenario can be calculated, and the scenarios as well as the standard case of a normal year are summed up to an aggregate cumulative distribution function which is no longer normally distributed but exhibits fat tails.

With respect to the model calibration, the risk factors and their pairwise correlation of the standard model for market risk have to be estimated by the insurers according to the latest 10-year data on pre-specified, well-known indices. This ensures a flexible parameter calibration of a model that is grounded on empirical actualities.

Furthermore, the Swiss regulator encourages insurers to develop their own, more sophisticated internal model that might be better able to capture the insurers' specific financial data, for example, by taking other distributional assumptions into account or by defining additional scenarios.

To sum up, the SST's standard model ensures an appropriate assessment of risk dependencies and an adequate recognition of tail dependence by incorporating scenario analysis into an empirically well-grounded and flexible solvency model.

According to the quantitative impact studies 5 technical specifications, the empirically calibrated stress factors that are used to calculate the overall SCR of the standard formula of Solvency II guarantee a solvency level of a 99.5% value at risk (see EC, 2010). Thereby, the European Commission aims to generate capital charges that are stable with regard to different risk dependencies under stressed financial conditions (see EC, 2010).

Although linear correlation techniques are used to aggregate different risks and risk modules, the Committee of European Insurance and Occupational Pension Supervisors points out that the calibration

of stress factors is carried out on the basis of extreme value analysis, where necessary, and is therefore able to account for fat tails (see CEIOPS, 2010b).

In contrast to the Swiss Solvency Test, however, the static standard formula of Solvency II does not offer a framework that is able to reflect new market information by readjusting its parameter settings according to the latest available market data. This is a clear disadvantage as new political situations and changing economic structures can affect the dependencies between different risk categories of an insurer in significant ways.

3.2 Fungibility of Capital and Recognition of Diversification Effects

With regard to the appropriate recognition of diversification effects within an insurance group, the extent to which assets and risks are fungible between different group members becomes an important issue. As explained by the IAIS (see IAIS, 2009b), there may be conflicts of interest as well as various legal constraints restricting the transferability of assets and risks and the fungibility of capital.

A pure, consolidated group-wide capital approach implicitly assumes full fungibility of capital and risks leading to a maximum diversification effect on the group level that significantly reduces group capital requirements (see, e.g., IAIS, 2009b). In practice, however, the transferability of assets and risks is usually restricted, especially when one or more group members experience financial distress (see Keller, 2007). The IAIS therefore points out that, under a consolidated group solvency approach, it is important to consider the impediments to free intra-group capital flows and the transfers of assets and risks by means of stress tests (see IAIS, 2009b).

By contrast, an approach to group supervision with a legal entity focus is generally able to take the actual constraints to transferability of assets and risks and fungibility of capital into account and is therefore likely to reflect the interactions within an insurance group in all of its financial states.

The NAIC solo plus framework (displayed in Section 2.1) fits into the legal entity group solvency approaches that take limited fungibility and transferability into account. As already mentioned, it constitutes a solo approach that focuses on the legal entity, but requires group-level information, as well. Regarding intra-group transactions, the Insurance Holding Company System Regulatory Act forces the insurer to provide the supervisor with information on CRTIs such as intra-group loans, guarantees, reinsurance agreements, management agreements, as well as exchanges of assets (see NAIC, 2010a). Fur-

thermore, the Group Solvency Issues (EX) Working Group, established under the Solvency Modernization Initiative, recently issued a draft on group capital assessment that proposes a risk assessment tool, the “own risk and solvency assessment” (ORSA). The ORSA requires, i.a., all U.S.-based legal entities of an insurance holding company system to conduct an annual qualitative and quantitative analysis of their solvency situation on the group level (see NAIC, 2011a). Within the quantitative group-wide solvency assessment, the draft suggests eliminating intra-group transactions, either by applying a consolidated method in which all CRTIs are canceled out or by adjusting for intra-group holdings when summing up capital resources and requirements under an aggregation method (see NAIC, 2011a; NAIC, 2011b). However, it does not require the consideration of CRTIs in the sense of imposing minimum capital requirements for the group that result, when violated, in regulatory interventions (see NAIC, 2011b). It needs to be critically noted that, in turn, diversification effects cannot be recognized within the standard RBC formula (see NAIC, 2011a).

The SST group structure model can also be categorized under the legal entity approaches. Here, only the economically available capital of a subsidiary is considered fungible, that is its economic value less the cost of capital (see, e.g., Keller, 2006). Furthermore, the fungibility is only recognized when legally binding capital transfer contracts are in place. Similarly, the transferability of assets and risks must be ensured by a legal agreement between the group members in order to be taken into consideration for the group solvency test. In contrast to the U.S. solo plus approach, the SST group structure model does not only rely on the declaration of intra-group transfers, but also requires the consideration of these transfers within the quantitative capital requirements of the solvency test. The impact of a CRTI on the transferring and the benefiting company’s risk situation has to be assessed, and the change in solvency capital charges, due to the transfer, has to be quantified. Therefore, Switzerland’s group approach is able to appropriately assign and recognize diversification effects.

As for the Solvency II proposal on group solvency assessment, we already explained in Section 2.3 that it belongs to the consolidated group models. The standard accounting consolidation-based method initially incorporates the problem of implicitly assuming full fungibility of capital and transferability of assets and risks. However, as pointed out by CEIOPS, the current proposal plans to develop requirements under Pillars II and III, demanding scenario analyses on the impact of limited fungibility of capital due

to certain stress events for all members of the insurance group as well as a strategic plan on how to deal with financial distress in one or several entities (see CEIOPS, 2009a). Additionally, the group supervisor is expected to assess the insurance group's management of free capital under stress scenarios such as fungibility constraints.

Under the alternative deduction and aggregation method, diversification effects on the group level are not recognized. Here, intra-group transactions are not implicitly eliminated as within the standard approach. Therefore, capital and risk transfers have to be eliminated in a separate calculatory step.

The assessment of intra-group transactions is placed within the qualitative requirements for governance and risk management under Pillar II. The Solvency II Directive establishes that the (re)insurance company at the head of the group has to report on a regular basis all noteworthy inter-linkages between the group's legal entities (see EC, 2009). Having received the necessary information and after consulting the supervisory authority, the assigned group supervisor has to identify the type of CRTI and its impact on the financial situation of the insurance group.

In summary, we can see that criterion 2 is taken into account under Solvency II only within the qualitative requirements of Pillars II und III. Unless the finalized group approach, which is expected in 2012, considers intra-group transactions and limited fungibility additionally within Pillar I, calculating quantitative group capital requirements, the approach might overestimate the fungibility of capital and therefore the financial health of the insurance group, as its standard approach relies on a consolidated balance sheet.

3.3 Prevention of Multiple Capital Gearing

Group-wide capital standards need to prevent any intra-group generation of capital so that the financial health of the individual companies and the insurance group as a whole is not overestimated (see IAIS, 2009b). This internal capital creation, called "multiple capital gearing", takes place when the same regulatory capital is used to cushion risks in more than one legal entity of the group (see Joint Forum on Financial Conglomerates, 1999).

A group solvency model that is based on consolidated accounts calculates, by definition, consolidated capital resources and capital requirements from which intra-group transactions are already subducted. Thus, such an approach ensures that multiple capital gearing cannot occur on the group level. However, as a consolidation method cannot provide information about the distribution of capital between different

legal entities of the group, the IAIS requires an additional analysis examining the amount of capital resources of each legal entity (see IAIS, 2009b).

In contrast to the implicit elimination of intra-group transactions under a consolidated approach, group solvency models with a legal entity focus consider the applied capital and risk transfer instruments within an insurance group when determining group capital charges. In order to prevent multiple gearing of capital, legal entity approaches need to take each relevant transaction and participation between group members into account and value each of them consistently with the market (see IAIS, 2009b).

As already mentioned in Section 3.2, the NAIC's solo plus approach so far does not require to consider intra-group transactions within the standard formulas to calculate minimum capital charges. However, ORSA will require a qualitative as well as quantitative group-wide solvency assessment. This implies that the NAIC's group approach will be able to account for multiple capital gearing by eliminating intra-group transactions, as specified in more detail in Section 3.2. Thus, the solo plus approach, once revised and extended, will be able to control capital gearing.

Under the SST group structure model, the mechanism to avoid multiple capital gearing is twofold: Firstly, an insurance group is modeled as a parent-subsidary constellation in which the market value of the subsidiaries is an asset to the parent company and the risks of the subsidiaries are therefore taken into account within the capital requirement for the parent company (see also IAIS, 2009b). Secondly, by considering every capital and risk transfer between group members quantitatively. Therefore, capital resources and capital requirements are increased/decreased for each legal entity, appropriately. Regarding the qualitative requirements, an insurance group under Swiss regulation has to semiannually prepare an SST report on the group level (see FINMA, 2008b). Consequently, the SST group model fulfills the third criterion.

Articles 222 and 223 of the Solvency II Directive deal with the elimination of multiple capital gearing and intra-group capital creation (for the following paragraph see EC, 2009).

They require the exclusion of the asset values of participating or related companies that simultaneously constitute free capital qualifying for the solvency capital requirement of other legal entities of the group, whenever another calculation method than the consolidation-based method is applied. Further-

more, Article 223 establishes that the calculation of group capital charges is to ignore any eligible own funds for the SCR that are generated through “reciprocal financing”⁴ between a participating company and another group member (see EC, 2009). Therefore, the Solvency II group framework is able to anticipate multiple gearing of capital.

3.4 Avoidance of Regulatory Arbitrage and Implementation of Supervisory Colleges

Regulatory arbitrage is the opportunity to exploit differences in regulation between jurisdictions, regulated sectors, or business divisions, to achieve capital or profit goals in the best possible way (see IAIS, 2009b).

The rationale behind the avoidance of regulatory arbitrage, from a supervisory perspective is, on the one hand, that it may entail risks because some countries require significantly lower levels of regulatory capital and the overall quality of supervision is considered insufficient from a European or North American point of view. On the other hand, the principle of regulatory consistency requires that a different regulatory treatment of the legal entities within an insurance group should be based on discrepancies in economic characteristics instead of differences in the legal structure (see IAIS, 2009b).

In order to prevent regulatory arbitrage, a successful harmonization of solvency frameworks on an international level is crucial. It is important for the supervisors of the different legal entities within an insurance group to closely cooperate and share information that is relevant for the group’s solvency. In this context, the IAIS suggests to designate a group-wide supervisor for each insurance group who is in charge of coordinating the cooperation and assessment of group-wide solvency as well as the group’s risk management, risk reporting, and allocation of capital (see IAIS, 2008a). Furthermore, it is argued that an important tool to coordinate regulatory activities and cooperation is the establishment of a college of supervisors (see IAIS, 2009a). These supervisory colleges provide a forum of communication and knowledge transfer for the supervisors involved in the regulation of a particular insurance group and facilitate group supervision.

⁴According to the Solvency II Directive, “reciprocal financing” is assumed at least when an insurance company, or a related entity, grants loans to or holds stakes in another entity that, directly or indirectly, holds eligible capital for the SCR of the first company (see EC, 2009).

The first meeting of a supervisory college in the U.S. took place in 2008. It mainly dealt with agreements on information sharing and the assessment of common supervisory goals (see, e.g., NAIC, 2009b). Since that time, the NAIC has continued to develop the regulation tool of supervisory colleges (see NAIC, 2009b). The revised Insurance Holding Company System Regulatory Act of 2010 provides the chief insurance regulatory official with the power to participate in a supervisory college and to cooperate with foreign or other federal or state regulators in order to assess the financial, legal, and regulatory position of any domestic insurance company that is part of an international insurance holding company system (see NAIC, 2010a). However, it prohibits delegation of the supervisory power of the insurance commissioner over the legal entities and affiliates located within its jurisdiction to the supervisory college.

Switzerland's FINMA stays in close contact to foreign supervisory authorities such as the Committee of European Insurance and Occupational Pension Supervisors (CEIOPS), the Committee of European Banking Supervisors (CEBS), the European Commission (EC), as well as the U.K. and U.S. regulatory authorities. Furthermore, it is actively involved in international committees such as the International Association of Insurance Supervisors (IAIS) and the Financial Stability Board (FSB). FINMA heads and takes part in a number of supervisory colleges and organizes crisis management for the Swiss banking and insurance industry (see FINMA, 2010a).

In its publication on the lessons learned from the subprime financial crisis, CEIOPS points out that in order to avoid regulatory arbitrage across sectors, to aim to set the stress factors of the different sub-modules of the market risk module such that a cross-sectional consistency with the banking industry is given (see CEIOPS, 2009c).

With respect to arbitrage opportunities across jurisdictions, Articles 248 to 259 of the Solvency II Directive introduces, similar to the other two group capital standards, the tools of group supervisors and supervisory colleges. It requires that the authorities, involved in the supervision of a particular insurance group, closely cooperate and share information, without bias toward the tasks they have to fulfill with respect to the solo supervision (see EC, 2009). In case of unsolvable disagreements within the supervisory college of a particular group, it states that any member of the supervisory college is allowed to approach CEIOPS for advice (see EC, 2009). Furthermore, Article 249 requires the supervisors of the different legal entities of an insurance group to immediately call for a meeting whenever the SCR

or MCR of a group member is breached or when the group capital requirements cannot be met in full (see EC, 2009). Apart from the cooperation between the insurance supervisors of individual entities of an insurance group, the Solvency II Directive also requests close collaboration between an insurance supervisor and any supervisory authority of a credit institution or an investment firm that is related to or has a common participating company as the insurer (see Article 252 of EC, 2009).

The issue of regulatory arbitrage and the harmonization of different regulatory frameworks is a difficult task. As discussed above, the regulatory authorities of the United States, Switzerland, and the European Union are currently taking steps to enhance international cooperation between insurance supervisors. Notwithstanding these efforts, in the long run, globally binding minimum capital standards will be needed in order to contribute to the prevention of future global financial crises. Additionally, the regulatory frameworks need to stay flexible enough to concede effective implementation on a national level (see also FINMA, 2010a). To date, this common goal has not yet been achieved.

3.5 Scope of Group Supervision and Treatment of Nonregulated Entities

The rapid development of the financial industry over the past two decades has contributed to an increasing complexity in the structure of financial conglomerates and insurance groups. This has brought forth, i.a., the formation of insurance groups that are made up of a multitude of different legal entities, including “nonregulated entities”. According to the definition of the IAIS (see IAIS, 2010), a non-regulated entity is a legal entity of an insurance group that is either a “nonoperating holding company” (NOHC) or an operating entity that is not subject to any form of direct supervisory activities (“nonregulated operating entity” (NROE)).

The existence of nonregulated entities additionally complicates the assessment of capital requirements for insurance groups. For a group solvency approach to ensure transparency and to appropriately measure the nature, scale, and interdependencies of risks faced by the insurance group, it is important to establish mechanisms to provide for an adequate handling of these entities (see IAIS, 2010).

The IAIS guidance paper on the treatment of nonregulated entities in group-wide supervision lists several risks that may be caused by the existence of NOHCs and NROEs (for the following paragraph see IAIS, 2010).

Some of those risks are related to the issue of corporate governance, such as a lack of transparency

and inappropriate disclosure policies, as well as conflicts of interest between the different stakeholders of the group. Furthermore, regulatory arbitrage is an issue, as nonregulated entities can be used to avoid capital requirements and to engage in business activities that are not permitted for a regulated group member. Other related risks are financial contagion and reputational risks. NROEs might face considerable amounts of risks without providing an appropriate capital buffer. These risks might be directly transferred to other entities of the group through CRTIs or might be carried over indirectly by adversely affecting the reputation of the whole insurance group.

In order to effectively deal with nonregulated entities, the IAIS therefore defines certain key characteristics a good group solvency approach needs to entail (in the following see IAIS, 2010):

- (a) Supervisors should have a comprehensive understanding of the insurance group’s organizational structure, including the activities of nonregulated entities and their influence on other regulated entities’ risk exposure.
- (b) In order to avoid regulatory arbitrage, enhance the harmonization of regulatory frameworks, and provide enough flexibility to react to new risks, supervisors that are engaged in the same insurance group should cooperate and exchange information across states, countries, and sectors.
- (c) Disclosure and transparency rules as well as a possibility to implement risk mitigation measures should certify the timeliness, pertinence, and reliability of information.
- (d) The assessment of group capital requirements should take risk exposures from NROEs into account.

There is no explicit mention of how to treat nonregulated entities within insurance groups in the Insurance Holding Company System Regulatory Act as of 2010. However, when interpreted correctly, some of its provisions implicitly exhibit the key characteristics required above. As mentioned before, the U.S. regulatory framework provides for intra-group transactions within Section 5 of the Regulatory Act (see NAIC, 2010b). Furthermore, the powers granted to the group supervisor, especially the permit to engage in supervisory colleges, provides the regulatory framework to react to supranational and group-wide risk exposures.

With regard to disclosure and transparency rules, the Regulatory Act requires to disclose any relevant information on changes in control of an insurance company, as well as information on any material

transactions and interrelations between an insurer and its affiliates, within a pre-specified time period (see NAIC, 2010a).

Although the task force for the SMI suggests considering potential risk sources and contagion effects stemming from nonregulated entities (see NAIC, 2009a), it does not plan to account for such effects within the quantitative capital requirements (see NAIC, 2011d). This holds also true for risks indirectly transferred from nonregulated legal entities that can potentially result in undersized capital requirements.

Therefore, key characteristic (d) is not quantitatively accounted for, under the NAIC group solvency approach.

The organizational structure and transactions of an insurance group that is subject to the Swiss solvency regulation are taken into account, qualitatively and quantitatively, through the granular group solvency model of the SST. The consideration of legally binding risk and transfer contracts between all group members includes interactions with nonregulated entities. Regarding key characteristic (b), the various efforts to enhance the cooperation with other international supervisors have already been referred to in Section 3.4.

Considering the disclosure of relevant and timely information on the solvency situation of a group, FINMA requires semiannual reports on the current group SST results as well as the data from the two previous semesters. Apart from relevant information on risks concentrations and the risk management systems of the group members, the reports entail the group's target capital and risk-bearing capital, which are computed on the basis of the solvency margins of all group members, including fictitious solvency margins for nonregulated entities, preset by the Swiss Financial Market Supervisory Authority (see FINMA, 2008a). In addition, Swiss law sets specific criteria for placing NOHCs under supervision insofar as to require adherence to certain corporate governance standards and the existence of appropriate risk management tools (see IAIS, 2010).

The group structure model of the SST, therefore, is fully able to satisfy criterion 5.

According to the Solvency II Directive of November 2009, the supervisory authorities should take all intra-group transactions and relationships between regulated and nonregulated entities of a group into account (see EC, 2009). Similar to the U.S. and Swiss regulatory authorities, the European Commission aims to increase the harmonization of regulatory frameworks across countries and sectors (see Section 3.4).

Furthermore, key characteristic (c) of the IAIS guidance paper can be found in Articles 253 to 256 of the Solvency II Directive. They enforce, i.a., the exchange of relevant and verified information between supervisors and require the disclosure of an annual report on the solvency situation of the insurance group as a whole (see EC, 2009).

Finally, with regard to the group capital charges, nonregulated entities are taken into account by including notional SCRs into the calculation of the group’s solvency capital requirement. The notional solvency requirement is the capital requirement an entity would need to fulfill when treated as a regulated entity under the particular sectoral rules (see EC, 2010). Hence, the group solvency approach of Solvency II possesses key characteristic (d) as well.

4 Conclusion

In most jurisdictions, supervision of insurance companies is still based on the solvency assessment of each legal entity. During the past decade, however, group-wide capital requirements have been developed to complement solo supervision so that the risks and chances of a group membership for an insurance company can be quantified. Furthermore, the expansion of financial groups across countries increasingly requires supervisors to internationally cooperate with each other and to converge regulatory frameworks in order to prevent future global financial crises.

This paper gives an overview and a comparison of the group-wide capital standards of the United States, Switzerland, and the European Union on the basis of a criteria catalog that is in line with the group solvency issues specified by the IAIS’s Issues Paper on Group-Wide Solvency Assessment and Supervision (see IAIS, 2009b). Table 1 summarizes the main findings of this comparison. A check mark indicates that the respective criterion is fulfilled, whereas a check mark in brackets indicates that the criterion is only partly fulfilled by the group approach. A cross signifies that the group model is not able to satisfy the criterion at hand.

The main results from our comparison can be summarized and interpreted as follows:

The U.S. RBC approach to group solvency is significantly inferior to the European group models of Switzerland and the European Union. Admittedly, the RBC standards have been the last of the three approaches under consideration to be revised. Nevertheless, the “solo plus approach” of the United States will need further modernization within the coming years in order to keep up with the regulatory

Table 1: Summary of the Group Model Comparison

Criterion	United States of America	Switzerland	European Union
1. Assessment of risk dependencies	×	✓	(✓)
2. Fungibility of capital and recognition of diversification effects	(✓)	✓	(✓)
3. Prevention of multiple capital gearing	✓	✓	✓
4. Avoidance of regulatory arbitrage and implementation of supervisory colleges	(✓)	(✓)	(✓)
5. Scope of group supervision and treatment of nonregulated entities	(✓)	✓	✓
	×	(✓)	✓
	not fulfilled	partly fulfilled	completely fulfilled

developments in Europe.

Switzerland's group structure model, by contrast, is able to achieve the highest score with regard to the five group criteria. It therefore seems slightly superior to Solvency II in terms of appropriately assessing risk dependencies and with regard to the recognition of group synergies and diversification effects. Nevertheless, the Solvency II proposal on group solvency assessment is a solid group model that incorporates the latest experiences with financial crises and the recent findings in risk management (e.g., the requirement of group-wide capital charges, the assignment of group supervisors to align the regulation of legal entities within an insurance group, as well as the allowance to develop internal group models).

Finally, with regard to the IAIS's goal to avoid regulatory arbitrage and to harmonize the national regulatory frameworks, U.S. and European supervisors are making efforts to cooperate more closely on an international basis. The goal of globally binding minimum capital standards as one possible answer to the increasing internationalization of insurance groups (e.g., as discussed by FINMA, 2010a), however, is still a distant prospect.

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