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Solvency II assumptions for increasing the international competitiveness of EU insurance industry

Valentina Peleckienė[a]*, Kęstutis Peleckis[a]

[a]*Vilnius Gediminas technical university, Saulėtekio al. 11, LT-10223 Vilnius, Lithuania*

Abstract

This paper aims to analyze Solvency II quantitative impact study made under conditions of undergoing legislative changes in the insurance market of European Union, called Solvency II regime. The main contribution of this paper is to present the analysis of quantitative and qualitative requirements, which insurers will have to meet under new Solvency II regime, how to escape mistakes during implementation period. Implementation into practice Solvency II Directive will help to increase the international competitiveness of EU insurance industry as they could reallocate own funds according the results of potential decrease or increase in solvency requirement relative to the standard formula.

Keywords: Solvency II; quantitative impac study; technical provisions; solvency requirements.

1. Introduction

The Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) was approved on 25 November 2009 and shortly is called Solvency II. The European Commission believes that Solvency II it is an ambitious proposal that will completely overhaul the way of ensuring the financial soundness of insurers and will contribute to the modernisation of the European insurance sector and to it‘s competitiveness. Solvency II is a world-leading standard that requires insurers to focus on managing all the risks they face and enables them to operate much more efficiently. It is positive news for consumers, for the insurance industry and for the EU economy as a whole.

* Corresponding author. Tel.: +37066177521.
E-mail address: valentina.peleckiene@vgtu.lt

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Insurance supervision in the European Union is undergoing significant changes as the Solvency II Directive is going to implement new risk-based capital standards. Firstly, the risk-based capital was developed by the National Association of Insurance Commissioners of the United States (NAIC, 2007), which is the minimum theoretical amount of capital that an insurance company needs to support its overall business operations. Risk based capital is used to set capital requirements considering size and degree of risk taken by insurer (Pitselis, 2009). In recent literature an overview of the new Solvency II regime is provided by Eling *et al.* (2007), Doff (2008), Steffen (2008), Buckham *et al.* (2011), O'Donovan (2011), Clipici (2012), Eling & Pankoke (2013). They presented various aspects of the EU efforts to develop a harmonized set of insurer solvency regulations. In the context of Solvency II, different aspects of harmonization are discussed in the insurance sector of Lithuania, such as the convergence of Solvency II and future accounting standards or insurance undertaking's risk management. Liebwein (2006) argues for some requirements for Solvency II internal risk models, which is one of Solvency II innovations. A few approaches and aspects of a standard model under Solvency II have been discussed by Sandström (2010), Schubert & Grieÿmann (2007). The study used the following research methods: analysis of competitiveness of the insurance industry of Europe by comparative analysis of quantitative impact studies (QIS 1-5) for Solvency II. Our study has limitation that nearly all data are taken from CEIOPS and Insurance Supervisory Authority of Lithuania and may not reflect other member states.

2. The analysis of Quantitative impact of Solvency II

Solvency II introduces a new, harmonized EU-wide regulatory regime, which replaces 14 existing insurance Directives. The main objectives of Solvency II are:

- better regulation and deeper integration of EU insurance market;
- protection of policyholders and increasing competitiveness of EU insurers.

Given that, the main target of new Solvency II system is to ensure the financial soundness of insurance undertakings, and in particular to ensure their survival during difficult periods, protection of policyholders and keeping stability of the financial system as a whole. 2011 year was devoted for adoption of Implementing Measures. The deadline of transposition Solvency II Directive into national legislation of member states was adopted by the end of October, 2012 but have been postponed to a later period due to the Omnibus II Directive, which will set the final date. Therefore, before Solvency II can be applied, a package of measures for insurers issuing products with long-term guarantees (the LTG package) needs to be incorporated in the regime. This is to be done via a draft Directive known as "Omnibus II", currently is in discussion in Council and Parliament.

Now when the experts and supervisory authorities from all EU Member States are preparing implementing measures of Solvency II Directive it is very important to introduce insurance industry and policyholders on the advantages of the new Solvency II regulatory system by insurers on a voluntary basis, of the impact of proposed new Solvency II requirements on their financial resources. These four QIS have been organized by the Committee of European Insurance and Occupational Pension Supervisors (CEIOPS), on the request of The European Commission (EC). The QIS are the primary means for testing the design of the future European Standard Formula, as well as the main route for finding the correct calibration. The QIS are also instrumental in collecting data on the potential impact of the new Formula. This provides background to the various policy options that have been considered and analysis of the expected impact of the new rules. The main outcome of QIS1, QIS2, QIS3, QIS4 are presented in the Table 1 below.

As it is seen in Table 1 in the first quantitative impact study (QIS1) participated 150 insurance undertakings of life business, 190 insurance undertakings that exercise non-life business and 4 specifically identified reinsurance undertakings from EU. Since some of these undertakings were mixed or composite undertakings, the total was 312. Insurance undertakings of Lithuania didn't participated in QIS1. CEIOPS got valuable information on the impact of the best estimate and the risk margins on the required technical provisions and on the ability of undertakings to perform the requested calculations, which were the two main goals of the study. Types and sources of data analyzed:

1. Estimation of claims provisions was usually based on run-off triangles of paid and incurred claims;

2. Number of claims, average claim sizes and historical loss ratios were also mentioned;
3. Number of run-off years covered by the triangles varied depending on insurer and line of business;
4. For estimation of premium provisions, historical loss ratios were taken into account from QIS1 Summary Report CEIOPS-FS-01/06 2006-03.

Table 1. Analysis of Quantitative impact studies outcomes

QIS	EU	LT	Objectives	Outcomes
QIS 1	**312**	–	– to test impact of the best estimate and the risk margins on the required technical provisions; – to test ability of undertakings to perform the requested calculations.	1) Technical provisions in life insurance undertakings calculated on the „best estimate“ method plus risk margin tends to be less than the provisions on current bases; 2) the level of technical provisions in non-life insurance undertakings decreased 10–15% by discounting ; 3) the risk margins tend to be small, for most undertakings and classes of business.
QIS 2	**514**	**6**	– Issues relating to the calculation of SCR and MCR, internal models, eligible capital, technical provisions; – to improve the formulation of the Standard Approach; – to test structural design options.	The MCR in life undertakings will consist 60% of the SCR; in non- life undertakings – 47% of the SCR. Using internal models: – the life underwriting risk charges exceeded the corresponding risk module of the SCR by a significant amount – for non-life underwriting risk, the internal models generally give lower outcomes than the placeholder SCR – for credit risks – almost all give higher values for credit risk than the SCR.
QIS 3	**1027**	**11**	– to obtain information about the practicability and suitability of the calculations involved, and the alternatives tested; – CEIOPS was looking for quantitative information about the possible impact on the balance sheets, and the amount of capital that might be needed, if – the approach and the calibration set out in the QIS3 specification were to be adopted as the Solvency II Standard; – to collect information about the suitability of the suggested calibrations for the calculation of the SCR and MCR; – the effect of applying the QIS3 specification to insurance groups.	The solvency ratio on average substantially increased. Technical provisions were reported lower than the current technical provisions on average. For most participants, the decrease ranges from 0% to 20%. On average, the SCR was reported 2,7 times higher than the Solvency I capital requirement. The factor ranged from 0,9 to 3,5 for most of the participants. Meeting the MCR was no problem for the vast majority of insurance undertakings: only 2% of firms would have to raise additional capital to meet the MCR, small undertakings had a higher chance than large firms not to meet the MCR: 16% of firms do not meet the SCR under QIS3. No general conclusions could be made on the group results due their different structures of business or diverse nature (the variations between the different groups were too high). But it was noticeable that capital requirements generally decreased for groups engaged more in the life business, and for non-life generally increased.
QIS 4	**1412**	**11**	– the assessment of the quantitative impact of SCR on (re)insurance groups' balance sheets, including diversification effects and transferability of own funds; – the inclusion of simplifications for the calculations of SCR and the technical provisions as well as the use of undertaking specific parameters; – the design and calibration of the MCR; – the comparability of the standard formula and (partial or full) internal models for the calculation of the solvency requirements.	Potential decrease/increase in solvency requirement relative to the standard formula: – 72% of the respondents who gave an estimate said that there would be a decrease in SCR; – 18% assumed that with internal model the SCR would increase; – the larger respondents expected more than 20% decrease in SCR. With respect to solvency levels, the vast majority (98,8%) of undertakings will be able to meet the MCR. – captives were most affected by the MCR: approximately 7% of the participating captives do not meet the MCR. Overall, almost 11% of the participants do not meet the SCR under QIS4; Large undertakings (13.2%) and non-life undertakings (11,2%) would be most affected by this. Also a significant number of captives (28,3%) would not meet the SCR tested in QIS4.
QIS 5	**2520**	**15**	to estimate participation of solo undertakings and groups; – the calibration of the standard formula: – groups calculations; – internal model; – complexity.	QIS5 showed that the financial position of the European insurance and reinsurance sector, compared to the SCR stipulated in the Solvency II Directive, remained strong. The own funds of the related undertakings included in a group cannot all be considered available to cover the group SCR. Solo undertakings which were part of groups for the most part declared that they would be using internal models developed at group level.

Source: Insurance Supervisory Commission of Lithuania, analysis by the authors.

The foremost general conclusions were that the best estimate plus risk margin tends to be less than the provisions on current bases, and that the risk margins tend to be small, for most undertakings and classes of business. By comparison, for non-linked life the future bonuses seem to have a much larger impact on the required provisions than the risk margin in most countries, and for non-life the effect of discounting is relatively large for some classes of business.

Table 1 shows: in total, 514 undertakings from 23 countries participated in QIS2. CEIOPS recognizes QIS2 was intended to be an initial and tentative step towards the „final" Solvency capital requirement (SCR), minimal capital requirement (MCR) and valuation standards. Six insurance undertakings from Lithuania participated in QIS2 also: two life insurance and four non-life insurance undertakings. The market share of the respondents from these 23 countries was generally above 50% (CEIOPS, 2007).

The Table 2 below gives the percentage of respondents that completed the various parts of QIS2.

Table 2. Technical provisions and solvency requirements

Total gross provisions (% of total respondents)	**Life**	**Non-life**
Best estimate	77	82
75th percentile	54	71
SST cost of capital	40	24
MCR calculation	73	82
SCR placeholder calculation	78	80
Interest rate risk	66	66
Equity risk	54	56
Property risk	47	50
Currency risk	36	34
Life longevity risk	41	–
Life morbidity risk	14	–
Life disability risk	25	–
Life lapse risk	50	–
Non-life premium risk with undertaking specific factors	–	64

Source: Consultative Paper 20 published on www.ceiops.org (2007).

3. Findings of the results of QIS1 with QIS2, QIS3

In many respects the findings were similar as in the earlier QIS1 exercise. Technical provisions remain the main challenge for most undertakings. Resource issues were again severe. In addition in relation to the SCR, some specific data problems were observed, e.g. it was often difficult for undertakings to provide relevant and reliable data for historical combined ratios over the last 15 years for homogeneous lines of non-life insurance business. QIS2 was about testing a possible methodology, so that the results may not accurately represent the underlying risks, and may not correspond to a 99.5% confidence interval over a one year horizon. The SCR based on QIS2 calculations uses the placeholder for those risk modules where more than one option is given, and for some of these risks the difference in outcome between the placeholder and alternative options is substantial. The correlations between the risk modules were not set by CEIOPS but were chosen by the participants or their national regulator based only on some general guidance from CEIOPS. Using the QIS2 methodology and parameters, the technical provisions generally decrease and the capital requirements increase, but the available capital also increases. Overall, the ratio of available capital to required capital decreases for most life participants in eleven national markets, but remains above 100%. In another six the ratio increases for most life undertakings. For a number of life undertakings the placeholder SCR is near to or even less than zero. For non-life, the ratio of available capital to required capital decreases for most respondents in 16 national markets, while one supervisor reports mixed results. For two national markets half of the participants ended up with a ratio of less than 100%.

For thirteen national markets all or the majority of the respondents had an MCR which was less than 75% of the placeholder SCR. Four national supervisors reported a substantial number of participants with an MCR/SCR ratio of more than 75%. In some of these countries this is expected profit/loss, which can reduce the SCR but not the MCR. This was generally considered to be problematic.

There is some evidence that, using the QIS2 methodology and parameters, small undertakings and mutuals may be affected more than large undertakings and proprietary undertakings. This holds even more for mono line non-life undertakings and with-profit undertakings. Discounting in non-life has a significant impact on the solvency ratio.
Table 1 shows that a substantial number of European undertakings participated in the third quantitative impact study (QIS3). Both the number of insurers and the number of participating countries increased in comparison to the preceding QIS3. In total, 28 out of 30 EEA member countries participated in the study. Among them there were 11 insurance undertakings from Lithuania: 3 life insurance and 8 non-life insurance undertakings. The total number of solo company respondents was 1027. All 24 countries which participated in QIS2 reported rising number of participants in QIS3. 330 of these 1027 undertakings were in the life sector and 511 in the non-life segment. Only 28 entities were classified as pure reinsurers. There were 187 large undertakings that submitted their data. Among all respondents there have been 251 mutuals and 56 health undertakings. Small insurance firms showed a strong interest to participate in QIS3: compared with QIS2, the number of small undertakings that took part in the study considerably increased by 172%, so the participation far more than doubled. The share of small insurers in the overall number of participants rose from 30% to 41%. The outcomes of QIS3 showed that the solvency ratio on average substantially increased.

In QIS3 for the first time a particular emphasis was put on ***insurance groups***: in total 16 countries provided input on insurance group‘s to the study. Under QIS3 the data were analyzed at two different levels, which to some extent overlap due to their use both by the national supervisors and the central database: on the one side, there was the data collection and analysis by the corresponding group supervisor who could contribute his specific knowledge about the respective groups. On the other side, there was the central database where those groups that agreed to do so were compiled. The participating groups were categorized according to size class and type of group in order to structure the assessment for QIS3. Group types, which were allocated to four different types with capital requirements as the basis of separation, are presented in the Table 3 below:

Table 3. Group types under capital requirements

Groups	Capital requirements
Cross sector groups	More than 20% of the total capital requirement for non- insurance activities.
International groups	More than 20% of the total insurance capital requirement for non EEA activities (assessed with local rules)
European groups	More than 20% of the total insurance capital requirement for non-national activities
National groups	Groups that do not fall within the above categories

Source: CEIOPS, Solvency II – QIS3 Report www.ceiops.org (2007).

The size class of a group was determined on the gross written premiums of its consolidated business and presented in Table 4:

Table 4. Size classes of group participants

Size class	Gross written premiums (million €)
large	> 10 000
medium	1 000 – 10 000
small	< 1 000

Source: CEIOPS, Solvency II – QIS3 Report www.ceiops.org (2007).

Overall, 51 groups submitted quantitative data, half of them were belonging to the medium size category. Also 13 large groups and 11 small groups participated. Two thirds of the respondents belonged to national groups; nine groups were evaluated as European and seven as international. Only one group was recognized as a cross sector group.

Table 5 below gives information on the groups' domiciles. The respondents' European market share can be assumed to be well above 20%.

QIS3 assessment analysis noted that for groups no general conclusions could be made, because of their different business structures or diverse nature as the variations between the different groups were too high. Problems that emerged at the group level, such as negative life MCR, difficulties in assignment of eligible capital, emerge at solo

level according Solvency II – QIS3 Report. Different bases of consolidation were another example that could induce questionable results. One obvious error is a „sum of solo“' figure that is lower than its „consolidated“ counterpart or the respective group SCR figure. It was interesting that all groups which were classified as „European" had all their business within the European Economic Area (EEA). The „national" groups in the sample had an average exposure to non-EEA countries of 8.1%. This result was due to two national groups with a share of 15.8% and 16.6% respectively. In most cases there were large variations in the results, so to make any conclusion or interpretation was difficult.

Table 5. Number of groups (respondents)

Group supervisor	Total number of groups (respondents)
Denmark	6
Finland	2
France	13
Germany	8
Iceland	1
Italy	5
Norway	2
Poland	2
Slovenia	1
UK	11
EEA wide	**51**

Source**:** Solvency II – QIS3 Report www.ceiops.org (2007).

Fig. 1 represents the entire sample: according Solvency II – QIS3 Report, the majority of groups had a surplus of capital between 75% and 125%, i.e. for these groups there were no significant changes with respect to Solvency I because 100% means unchanged surplus with respect to Solvency I. Nonetheless, there is a non-negligible number of outliers in both directions. The approximately 50 percent of all groups whose Solvency II surplus is less than 75 per cent of the Solvency I surplus are a matter of concern. Nonetheless, these data have to be taken with caution due to the different level of integration of Solvency I in national regulations and for the subsequent arguments:

- it was noticeable, that for groups that were more engaged in the life business, capital requirements generally decrease;
- for those groups, which were mainly in the non-life business, capital requirements generally increase.

Due to differences in the eligibility of assets in Solvency I and Solvency II, an increase in capital requirements does not necessarily require a decrease in available capital surplus.

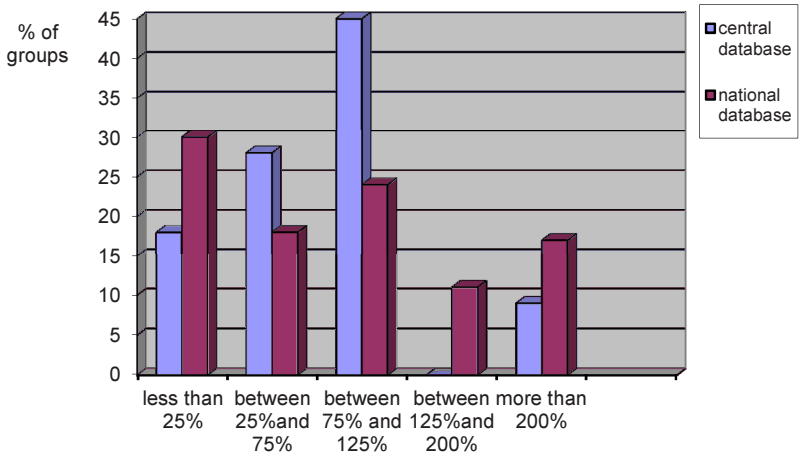

Fig. 1. Evolution of available capital surplus. Source: Solvency II – QIS3 Report www.ceiops.org (2007)

Comparison of the distribution of group SCR according to the different alternatives (in the QIS3 Technical Specifications, i.e. whole aggregation, „as if solo“ and „sum of solo“ respectively) is presented in Fig. 2 below.

Fig. 2 shows that in any case, almost all dots are above 100 per cent, meaning that there is hardly any group whose capital available insufficiently covers the capital requirements. Hence, most groups have a capital surplus available. Assuming a virtual 45 degree line, the comparison of available capital under the whole aggregation approach and the „sum of solo“ method shows that whole aggregation in many cases delivers considerably lower results. However, given the fact that all dots are closer to the regression line also implies that there are hardly any distortions between the two different approaches, such that neither group in the sample is particularly advantaged or disadvantaged under a regime change. The comparison of whole aggregation and group „as if solo“ shows that the differences were almost negligible, i.e. all dots lie close to the identity line, with „as if solo“ results being slightly lower. This is mainly due to the particular design of the whole aggregation method in the QIS3 Technical Specifications. The available capital under the Solvency II regime was in most cases considerably lower than under Solvency I, a result that is consistent with those in Fig. 1.

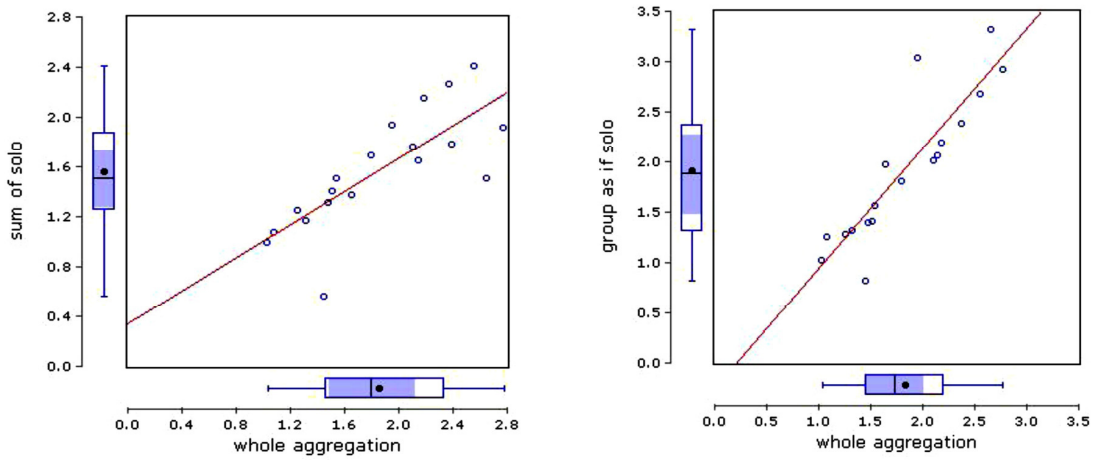

Fig. 2. Available capital to alternative group SCR.
Source: QIS3 Insurance Supervisory Commission of Lithuania (2010)

After having a review of some QIS3 examples the financial impact of the proposed approach can be summarized (QIS3):

- there is no significant overall change in terms of neither composition nor size of the balance sheet when comparing Solvency I with Solvency II at an European level, however there may be national variations;
- technical provisions – best estimate plus risk margin – tend to decrease vis-à-vis the current technical provisions because the implicit prudence that exists in the current regime is removed, thereby increasing the available capital. The average ratio of Solvency II provisions compared to Solvency I provisions varied more between countries in the non-life sector (70%–100%, with significant variations in the different lines of business) than in the life sector (90%–102%);
- as for the MCR, the vast majority of firms (98%) would not need to raise additional capital to meet it;
- the QIS3 SCR solvency ratio, i.e. the ratio of the available capital (own funds) to the SCR capital requirement, was lower for most participating undertakings than the current solvency ratio. In the non- life sector, most undertakings show a decrease in their solvency ratios based on the QIS3 calculations; in the life sector, the results are more ambiguous, with an increase or decrease of the solvency ratio, depending on the Member States. This was consistent with the general philosophy of Solvency II, which took risks into account more explicitly than the current framework.

- the Solvency II regime does not require extra capital in the European insurance market as a whole. However, there will be a redistribution process as a consequence of introducing a risk oriented system where capital requirements will be in line with the risks assumed by the undertaking and the way in which they are managed and controlled. In 30% of undertakings, the available surplus (i.e. the excess of available capital over the SCR) would increase by more than 50%, whereas in 34% of undertakings the available surplus would decrease by more than 50%. In addition, 16% of undertakings would have to raise capital to meet their SCR.

In general, the calculated QIS3 solvency ratio for most participating undertakings was lower than the Solvency I solvency ratio. The technical provisions tend to decrease vis-à-vis the provisions on current bases as the implicit prudence is removed. The capital requirements on the other hand tend to increase. The financial impact of Solvency II cannot be estimated by simply comparing the calculated SCR with the Solvency I capital requirement. This is because not only the capital requirement but also the calculated technical provisions may change. Therefore, to make a reasonable estimate of the financial impact of the QIS3 calculation, the SCR is compared with the so-called „effective“ Solvency I capital requirement. This latter figure is defined as the Solvency I capital requirement plus the difference between the Solvency I provisions and the QIS3 provisions.

On the whole, most life participants across all participating jurisdictions have calculated a QIS3 solvency ratio in excess of 100%. However, participating life insurers generally show a decrease in their solvency ratios in several jurisdictions, though in some countries the results are more ambiguous or there is an increase in solvency. The latter seems to be the case especially for life undertakings writing substantial with profit business. In the case of with profit business, negative MCRs are occasionally observed. As for life undertakings, most non-life undertakings show a decrease in their solvency ratios based on the QIS3 calculations. However, compared with life participants, there seem to be more non-life undertakings with a calculated solvency ratio of less than 100%.

4. The results of QIS4 and QIS5

CEIOPS has run the QIS4 exercise from April to July 2008. In its Call for Advice, the European Commission has set out a target participation rate of 25% of solo undertakings and 60% of cross-border groups. The participation target has been largely met and all 30 EEA member countries were represented in QIS4. In total 1412 companies have participated, compared to 1027 in QIS3. From QIS3 to QIS4, the participation rate increased by 37%. 11 insurance undertakings from Lithuania participated in QIS4: 5 life insurance and 6 non-life insurance undertakings. The number of small undertakings that took part in the study increased by 58%. The participation rate for medium size undertakings increased by 25% for large undertakings by 18%. Also in absolute terms significantly more small undertakings participated in QIS4, with a total of 667 small undertakings, compared to 522 medium companies and 220 large undertakings. In total, 111 groups from 16 EEA countries plus Switzerland participated in the group part of the QIS4 study. This figure included more than 60% of cross-border groups and a significant number of mutual groups.

Under QIS4, the composition of the assets and liabilities does not changed considerably, but was characterized by a relative decrease in the amount of insurance liabilities compared to an increase in eligible capital and capital requirements. Capital requirements will also rise as a result of this explicit risk assessment and an increase in the availability of capital has been noted. Nevertheless, the differences in the value of assets and liabilities between QIS4 and current balance sheet varied considerably between countries, with the main differences arising in those countries using a different method than market value (e.g. historic cost).

With respect to solvency levels, the vast majority (98,8%) of undertakings will be able to meet the MCR as tested in QIS4. The results of potential decrease or increase in solvency requirement relative to the standard formula were following:

- 72% of the respondents who gave an estimate said that there would be a decrease in SCR;
- 18% assumed that with internal model the SCR would increase;
- the larger the respondent was the higher expectations were of more than a 20% decrease in SCR.

Results of QIS4 showed that almost 11% of the participants do not meet the SCR under QIS4, compared to 16% under QIS3. Large undertakings (13,2%) and non-life undertakings (11,2%) would be most affected by this in future. Not meeting the SCR does not necessarily imply having to raise capital upon the introduction of Solvency II for a number of reasons. In particular, undertakings can anticipate the introduction of Solvency II or, for example in the case of entities forming part of a group, they can reallocate own funds between entities. In absolute amounts the aggregated capital surplus of participating undertakings remains fairly stable, with a reported aggregate decrease of 3%. For the European insurance industry as a whole, no additional capital is needed.

CEIOPS organized QIS5 in August – November of 2010 and published a report on the results by the end of April 2011. In order to ensure that comprehensive information is received regarding the suitability and practicality of the technical specifications the EU Commission believed that it is important that small and medium sized insurance and reinsurance undertakings could take part in the QIS5 (www.ceiops.eu/QIS5). Most of insurance groups under the scope of the Solvency II directive participated in QIS5, in order to ensure that comprehensive information on the quantitative impact on insurance and reinsurance groups' solvency balance sheets could be gathered. QIS5 showed that the financial position of the European insurance and reinsurance sector, compared to the SCR stipulated in the Solvency II Directive, remained strong. 90% of insurance companies registered in Lithuania participated in QIS5, study showed that capital requirements for insurers of Lithuania increased by 2 times.

5. Conclusions

In the quantitative impact studies organized by CEIOPS have participated more and more European insurance companies: beginning from 312 in QIS1 and at last finished 2520 in QIS5. Insurance undertakings of Lithuania began participation from the quantitative impact study QIS2. The analysis of the quantitative impact assessments showed that for the European insurance industry as a whole the capital requirements under the Solvency II regime in most cases was considerably lower than under Solvency I and, no additional capital is needed. Using internal models the life underwriting risk charges exceeded the corresponding risk module of the SCR by a significant amount. For non-life underwriting risk, the internal models generally gave lower outcomes than the placeholder SCR for credit risks – almost all gave higher values for credit risk than the SCR. The QIS analysis also enhanced to identify for Lithuanian insurance undertakings the areas that need to be strengthened in order to compete successfully in European insurance market: QIS2 noted that the MCR in life undertakings will consist 60% of the SCR and in non-life undertakings – 47% of the SCR.

According QIS3 the solvency ratio on average substantially increased. Technical provisions were reported lower than the current technical provisions on average. For most participants, the decrease ranged from 0% to 20%. On average, the SCR was reported 2,7 times higher than the Solvency I capital requirement. Meeting the MCR was no problem for the vast majority of insurance undertakings: only 2% of firms would have to rise additional capital to meet the MCR, small undertakings had a higher chance than large firms not to meet the MCR: 16% of firms do not meet the SCR under QIS3. For life insurance companies registered in Lithuania SCR would increase 4,5 times, while for the non-life insurance companies – 2 times. Meanwhile QIS3 noted that from assessment of groups results no general conclusions could be made, because of their different business structures or diverse nature as the variations between the different groups were too high. But it was noticeable that capital requirements generally decreased for groups engaged more in the life business, and for non-life business - increased.

Summarizing QIS4 results of decrease/increase in solvency requirement was relative to the standard formula: 72% of the respondents who gave an estimate said that there would be a decrease in SCR; 18% assumed that with internal model the SCR would increase; the larger respondents were expected more than 20% decrease in SCR. Overall, almost 11% of the participants do not met the SCR under QIS4. Large undertakings (13,2%) and non-life undertakings (11,2%) would be most affected by this. Also a significant number of captives (28,3%) would not meet the SCR tested in QIS4. Total participating insurance solvency ratio showed how much the company's equity capital is greater than the capital necessary to cover all the risks to which the company is facing, for life insurance companies would decrease from 2,8 to 2 and for the non-life insurance companies would be reduced from 2,3 to 2,1. QIS4 for Lithuanian insurance companies showed that the capital requirements for life insurance companies increased 4 times, and for non-life insurance companies were 1,7 times higher.

QIS5 showed that the financial position of the European insurance and reinsurance sector, compared to the SCR stipulated in the Solvency II Directive, remained strong. The own funds of the related undertakings included in a group cannot all be considered available to cover the group SCR. Solo undertakings which were part of groups for the most part declared that they would be using internal models developed at group level. In QIS5 insurance companies had to assess a much greater risk that could lead to unexpected losses. As a result capital requirements for Lithuanian insurers increased by 2 times.

In summary can be said that the quantitative impact studies showed that the number of Lithuanian companies would be forced to adjust their risk profile to comply with the Solvency II capital requirements if they would like in future successfully compete in the EU insurance market.

Additionally implementation of Solvency II directive will need integrated internal risk control and enterprise risk management systems which must be promoted and regularly challenged and examined. A risk management function will be essential to ensure effective internal risk governance of insurance undertakings. Sustainable asset and liability management will be a core component of sound risk management in insurance sector. Liquidity management must be stronger as a complement to capital adequacy and more attention must be given to supervision of big insurance groups.

References

Buckham, D. (2011). Executive's guide to Solvency II., New Jersey: John Wiley&Sons, Inc. Hoboka, 196.

Chen, R., & Wong, K. A. (2004). The determinants of financial health of Asian insurance companies. *Journal of Risk and Insurance, 71(3),* 469–500. http://dx.doi.org/10.1111/j.0022-4367.2004.00099.x

Clipici, E. (2012). Solvency II – The New EU Solvency Regime on the Insurance Market. *Scientific Bulletin - Economic Sciences, 11(2).* Romania: University of Pitesti, 112.

Eling, M., & Pankoke, D. (2013). Basic risk, procyclicality, and systemic risk in the Solvency II equity risk module. *Working papers on risk management and insurance (128),* 1–37.

GDV (2013). The positions of German insurers 2013: Solvency II. Berlin: German Insurance Association, 14-16. Available online at: http://www.gdv.de/wp-content/uploads/2013/05/GDV_Positions_of_german_insurers_2013.pdf.

European Commission (2013). Proposal for a Directive of the European Parliament and of the Council amending Directive 2009/138/EC on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) as regards the dates of transposition and application and the date of repeal of certain Directives. Available online at: http://ec.europa.eu/internal_market.

Linder, U., & Ronkainen, V. (2004). Solvency II: Towards a new insurance supervisory system in EU. *Scandinavian actuarial Journal 6,* 462–474. http://dx.doi.org/10.1080/03461230410000574

Schubert, T., & Grieÿmann, G. (2007). German proposal for a standard approach for Solvency II. *Geneva Papers on Risk and Insurance-Issues and Practice 32 (1),* 133–150. http://dx.doi.org/10.1057/palgrave.gpp.2510116

Lihuanian Bank. Insurance supervision. Available online at: http://www.lb.lt/mokumas_ii_reikalavimu_kiekybines_itakos_studijos.

Sandstrom, A. (2010). Handbook for actuaries and risk managers: theory and practice. Stuart School of Business. Illinois, Chicago: CRC Press USA, 993. http://dx.doi.org/10.1201/b10338

O'Donovan, G. (2011). Solvency II - stakeholder communications and change. Farnham: Gower Publishing Company, 167.

Pitselis, G. (2009). Solvency supervision based on a total balance sheet approach. *Journal of Computational and Applied Mathematics, 233,* 83–96. http://dx.doi.org/10.1016/j.cam.2009.07.031

Pitt, D. (2006). Regression quantile analysis of claim termination rates for income protection insurance. University of Melbourne Centre for Actuarial Studies Working paper. Series No. 135.

CEIOPS (2008). Report on its fourth Quantitative Impact Study (QIS4) for Solvency II. Available online at: http://www.ceiops.com.

CEIOPS (2007). CEIOPS' Report on third Quantitative Impact Study (QIS3) for Solvency II. Public Report/ November 2007. Available online at: http://www.gcactuaries.org/documents/ceiops_qis3_report.pdf.

CEIOPS (2006). Quantitative Impact Study 2. Available online at: http://www.ceiops.com.

CEIOPS (2006). QIS1 Summary Report (Sanitized version)-FS-01/06 17 March 2006. Available online at: http://ec.europa.eu/internal_market/insurance/docs/solvency/impactassess/annex-c04_en.pdf.

Commitee Europien des Assurances (2007). Consequences of Solvency II for Insurers. Available online at: http://www.ec.europa.eu/internal_market/insurance/docs/solvency.

EIOPA (2013). Consultation Paper on the Proposal for Guidelines on the System of Governance. Available online at: http://eiopa.europa.eu/consultations/consultation-papers/2013-closed-consultations/march-2013/guidelines-on-preparing-for-solvency-ii/index.html.

Lloyds (2013). Solvency II – a new set of regulatory requirements for the European insurance industry. Quantitative impact studies. Available online at: http://www.lloyds.com/the-market/operating-at-lloyds/solvency-ii.

The Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II). *Official Journal L 335, 17 (12),* 0001–0155.

Zuydam, M. (2013). Finding value in Solvency II. Available online at: http://www.sumactuaries.co.uk.