

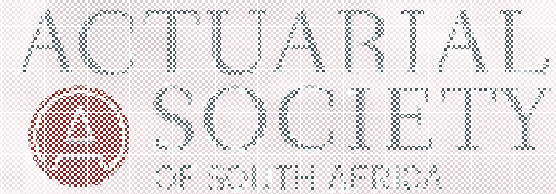


Risk based capital

Ashleigh Theophanides

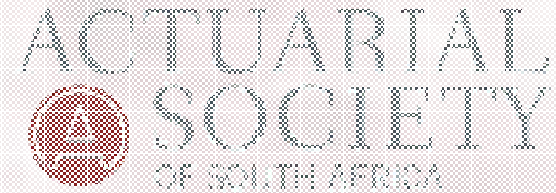
Actuarial and Insurance Solutions at Deloitte

Agenda



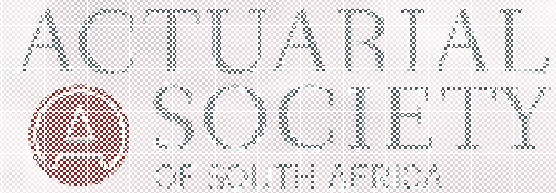
1. Introduction
2. Capital measures in the financial services sector in SA
3. Application of RBC globally
4. Overview of RBC methodology
5. Results
6. Conclusion

Introduction



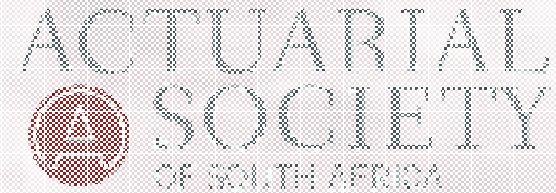
- We have performed a risk-based capital ('RBC') assessment at the financial year ended 31 December 2008 for a sample of South African medical schemes.
- The purpose of this exercise is to compare the current regulatory requirement of 25% of gross contributions against the minimum level of capital that *should* be held by schemes, based on a risk-based capital approach.
- It is important to note that this paper does not intend to present a RBC methodology or framework for South African medical schemes.

Introduction



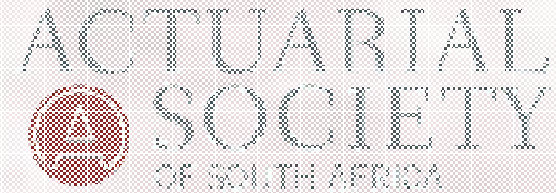
- The intention is to use a sample of medical schemes and illustrate how the application of a RBC framework can assist in understanding medical scheme capital requirements which allows for underlying risks.
- Further work is required in developing a solvency framework for South African medical schemes.
- The RBC methodology that has been applied is based on the Financial Conditional Reporting ('FCR') framework currently being considered by the Financial Services Board (FSB) in the Short-Term Insurance sector.

Financial services sector in SA



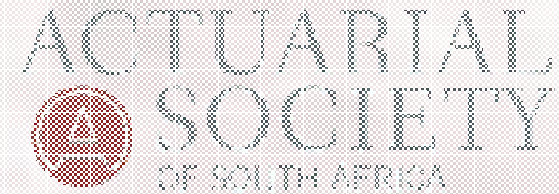
- The financial services sector in South Africa is moving towards capital assessments that allows for the level of risk to which an entity is exposed.
- The banking sector has implemented Basel II, a risk-based capital ('RBC') requirement based on three pillars:
 - Minimum capital requirements,
 - Supervisory review process and
 - Market discipline.

Financial services sector in SA



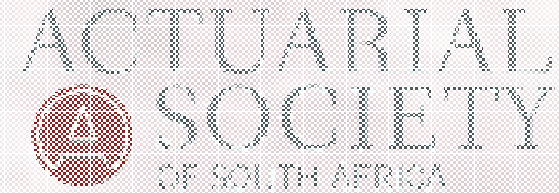
- The Life Insurance industry applies a Capital Adequacy Requirement which is calibrated to a 95% confidence level over a 10 year time horizon.
- The European Union is in the process of implementing the Solvency II framework. Solvency II is also a RBC framework that will be applied to both long-term and short-term insurance business.
- Early adoption of some of the components underlying the Solvency II framework has already occurred within the South African Life Insurance industry in anticipation of Solvency II.

Financial services sector in SA



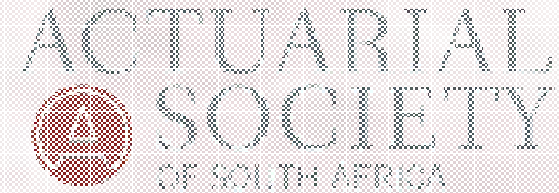
- The Financial Service Board (FSB) is in the process of developing a Financial Condition Reporting (FCR) regime within the Short Term Insurance industry.
- FCR is a RBC framework that aims to improve risk management and to align the solvency requirement with international regulatory approaches.

Financial services sector in SA



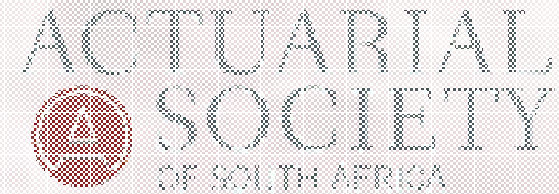
- Medical schemes are required to hold capital of 25% of gross contributions.
- The Act therefore allows for a fixed ratio approach.
- The Council for Medical Schemes commented in their discussion paper “Review of Factors that Influence Financial Soundness of Medical Schemes” that it is necessary to undertake a study of the RBC approach prior to it being considered as a methodology on which to assess the regulatory capital requirements within medical schemes.

Financial services sector in SA



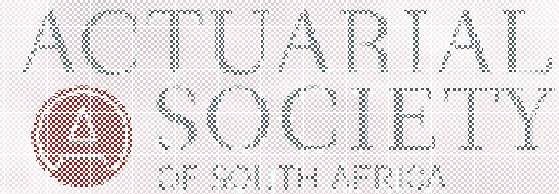
- Kendal and McLeod have conducted some initial work considering the capital requirements of the SA medical schemes industry when applying both the Australian and the US RBC systems.
- Their analysis established that:
 - Small and medium sized schemes are required to hold a larger proportion of contributions as capital requirements than large schemes.
 - Restricted schemes are required to hold a larger percentage of contributions as capital requirements than open schemes.
 - Overall the USA RBC system requires registered schemes to hold significantly less than 25% of gross contributions as reserves (i.e. 11.2%).
 - The Australian system based on the capital adequacy reserve would overall require registered schemes to hold capital in excess of 25% of gross contributions (i.e. 28.3%).

Risk based capital Overview



- A RBC framework attempts to incorporate the main risks.
- A RBC system therefore aims to encourage low capitalised entities to reduce risk and therefore reduce the probability of insolvency.
- A RBC approach is considered to be an enhancement to the fixed ratio approach. One of the major advantages of using a RBC approach over a fixed ratio approach is that a RBC approach attempts to capture relevant risks and is based on the actual data of the scheme.
- A fixed ratio approach is however far simpler to apply and easier to understand. A RBC approach also requires more data, as well as systems and models to generate the estimates of capital required.

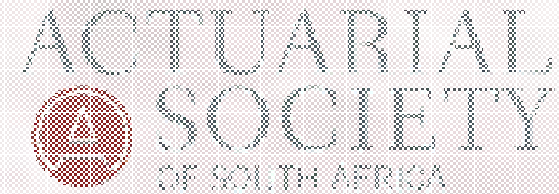
Use of RBC globally



- The following countries have introduced RBC approaches:
 - Australia
 - Finland
 - Japan
 - Singapore
 - Sweden
 - Switzerland
 - United Kingdom
 - United States of America
 - Solvency II in European Union

Use of RBC globally

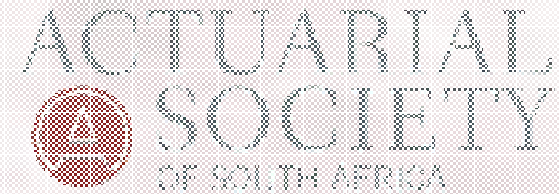
US RBC system



- The National Association of Insurance Commissioners (NAIC) has developed a RBC system for the Insurance industry in the USA.
- “The stated overall purpose of the NAIC RBC approach is to establish more meaningful minimum standards of capital adequacy related to an insurer’s risk of insolvency ...”
- The total capital requirement is based on statutory minimum capital, surplus requirements and RBC requirements.
- The minimum required solvency margin is the statutory minimum capital and a surplus requirement. Intervention is triggered if the company’s level of capital drops below this required level.

Use of RBC globally

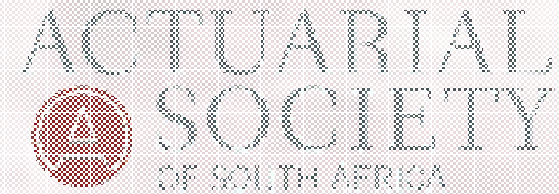
US RBC system



- The RBC solvency requirement determines the level of capital required based on the size and risk profile of the company.
- The principle underlying the RBC system is to set capital requirements by considering the main risks faced by insurers.
- The RBC approach identifies the following main risk categories:
 - Affiliate insurers and other off-balance sheet risk
 - Asset risk
 - Underwriting risk
 - Claims risk
 - Credit risk
 - Other Business risk

Use of RBC globally

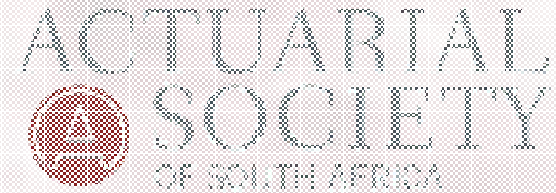
US RBC system



- A covariance adjustment is calculated to take account of the correlation between the various types of risks. The total required level of capital derived in this way is referred to as the Authorised Control Level Risk Based Capital.
- The ratio of the actual level of capital to the RBC requirement is used to determine the financial health of an insurer.
- The NAIC RBC system can be separated into two main components:
 - RBC formula, that when applied to a company needs to be compared to the company's actual capital level.
 - Intervention requirements based on the ratio of RBC capital calculation to the actual level of capital. These intervention requirements incorporate a company action level (CAL) as well as varying regulatory action levels.

Use of RBC globally

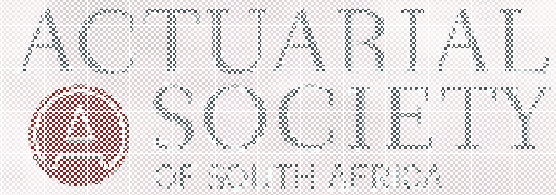
US RBC system



- The NAIC system therefore set out specific actions that are required to be taken by either the insurer or the regulator depending on the ratio of actual level of capital to the RBC requirement.
- If the ratio is between 35% and 50% the regulator may take control of the insurer, however if this ratio drops below this level the regulator is required to place the insurer under control.

Use of RBC globally

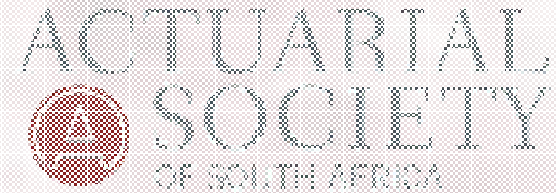
Australian system



- Under the supervision of the Australian Prudential Regulatory Authority (APRA), Australia is currently reforming its prudential rules.
- The RBC methodology used in the Australian insurance industry allows for three main risks:
 - insurance risk,
 - investment risk and
 - concentration risk.
- A margin requirement is required for each risk, with the total risk capital requirement based on the sum of the three risks; there is no allowance for a covariant adjustment.

Use of RBC globally

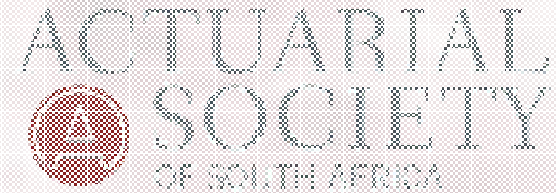
Australian system



- The three main risks are as follows:
 - The insurance risk component corresponds to the underwriting risk within the American RBC system.
 - Investment risk corresponds to asset risk within the American system,
 - Concentration risk allows for capital requirement to cover a catastrophic event.
- Insurers are allowed either to hold capital based on the results from their own internal model or based on the prescribed method.
- Internal models must be approved by the Regulator.

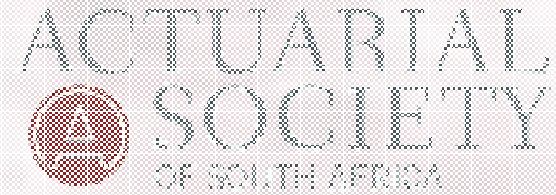
Use of RBC globally

UK system



- The United Kingdom has applied the Individual Capital Adequacy Standard ('ICAS') approach under the regulation of the Financial Services Authority ('FSA').
- The ICAS framework considers three levels of capital.
 - Regulatory requirement to hold a minimum amount of capital.
 - Management have their own expectation of the risk-based capital required to support the business.
 - The link between the regulatory capital and management's capital assessment is determined by the Internal Capital Assessment ('ICA') to be calculated by each firm based upon its individual risks.
- These are calculated using models which include stress testing and the use of economic models (i.e. a risk-based capital approach).

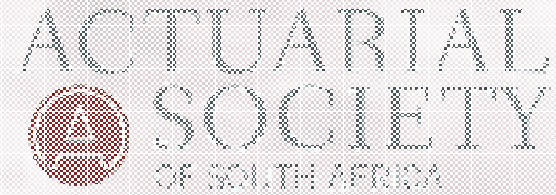
Use of RBC globally UK system



- The main risks considered by the ICAS framework include:
 - Insurance risk
 - Operational risk
 - Strategic considerations.
- The UK has introduced the ICAS approach as a pre-empt introduction of the Solvency II framework.

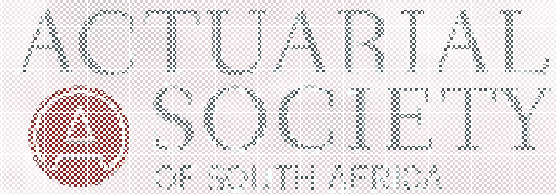
Use of RBC globally

Solvency II



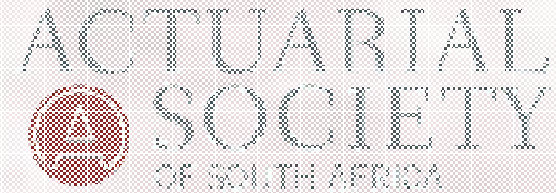
- The European Union is looking at the adoption of the Solvency II Framework. Solvency II introduces an economic risk based capital approach to insurance supervision in the European Union.
- Solvency II aims to protect policyholders against the financial ruin of insurance institutions.
- The framework underlying Solvency II is based on three pillars:
 - Pillar 1: Asset and liability valuation standards, minimum capital requirement and solvency capital requirement. Quantitative requirements of an insurer would relate to the amount of capital the insurer should hold (referred to as Economic Capital);
 - Pillar 2: Supervisory Review process. Governance to ensure that the risk management process is effectively in place; and
 - Pillar 3: The disclosure requirements.

Use of RBC globally Solvency II



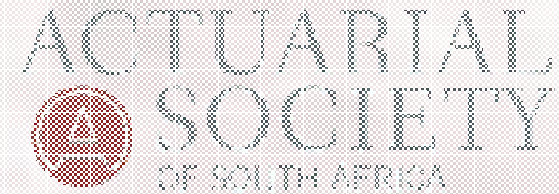
- The framework directive was finalised in 2007. Implementation is likely to be in 2012.

Overview of methodology



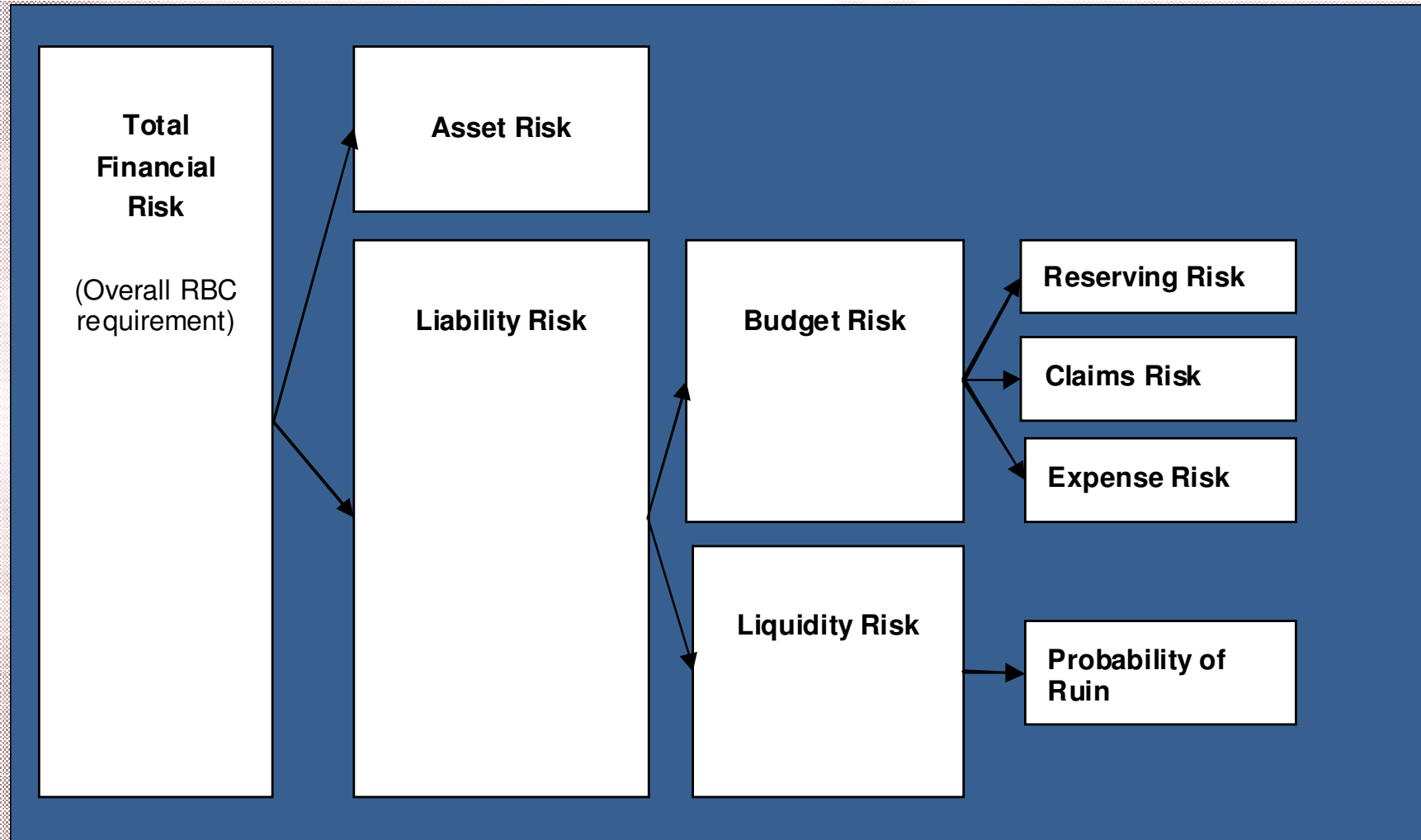
- We have based our methodology on the Deloitte & Touche (2005) report to the Financial Services Board . We have however used a slightly modified approach which is more relevant to the South African medical scheme industry.
- Some broad similarities between the FCR approach and the methodology that has been applied are:
 - We have applied a value at risk (VaR) approach in determining capital requirements;
 - Capital requirements are set on the basis of a one year time horizon;
 - Capital has been set at a 99.5% level of sufficiency;
 - A total balance sheet approach where risk in both assets and liabilities are considered (although the asset risks for medical schemes are lower due to the Regulations guiding investments).

Overview of methodology

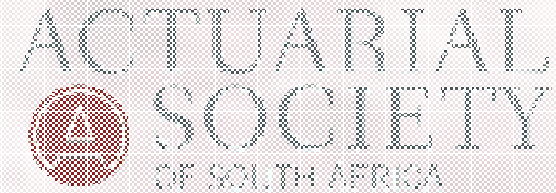


Region	Risk measure	Use of Models	Time horizon	Confidence Level
United States of America	Unspecified		1 year	95%
Australia (proposed)	VaR	Internal models are allowed	1 year	99.5%
Japan	VaR		Mostly year 1	99.5%
United Kingdom	VaR	Regulator uses reliance testing	1 year	99.5%
Switzerland	Tail VaR		1 year	99.5%
Sweden	N/A		1 year	99.5%
Finland	N/A		1 year	99%
European Union	VaR		1 year	99.5%
Deloitte Methodology	VaR		1 year	99.5%

Overview of methodology



Overview of methodology



- Two main areas of risk:
 - asset risk and
 - liability risk.
- Asset risk is important but may be less of a concern for medical schemes. This is due to the investment limitations set-out in Regulation 30 of the Medical Scheme's Act (1998). For this analysis, we do not model the impact of asset risk.
- Although this is a factor which needs to be addressed in future regulation, this paper focuses on the liability side where the major work needs to be concentrated as investment policies are conservative.

Overview of methodology

Total capital required

- The covariance effects (diversification and correlation) between the asset capital charge and the liability capital charge.

$$TCR = \sqrt{\left(\frac{ACC}{g_1}\right)^2 + \left(\frac{LCC}{g_2}\right)^2}$$

ACC = Asset Capital Charge

LCC = Liability Capital Charge

g1= Grossing-up factor on asset charge

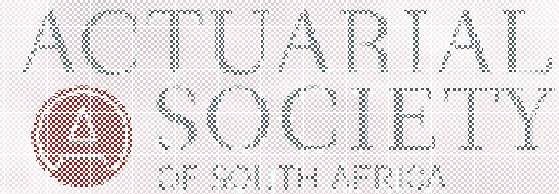
g2= Grossing-up factor on liability charge

TCR = Total Capital Required

- Applies heuristic rule of summing the squares of the two capital charges and taking the square root .
- Allows for the fact that a scheme is not likely to experience a worst-case asset event and worst-case liability event at the same time.

Overview of methodology

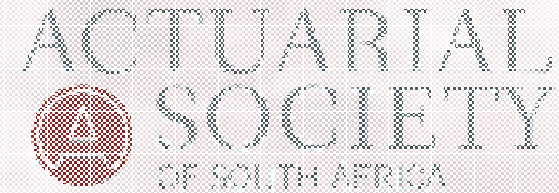
Liability risk



- Liability risk
 - Budget risk
 - Liquidity risk
- Budget risk: This risk component sets the overall capital required by a scheme for unanticipated future deviations from budgeted experience.
- The three main elements of uncertainty considered relate to:
 - Claims;
 - Expenses; and
 - The reserve development from prior underwriting years, i.e. reserves held for incurred but not reported claims.

Overview of methodology

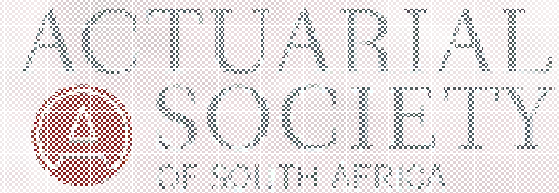
Budget risk



- The aim of the budget risk component is to quantify the capital required as a result of expectations not being met.
- An alternative is to view the budget risk as a pricing risk. The budget risk is determined over a period of 12 months.
- We used a bootstrapping method to determine a distribution of the IBNR reserves. Basic reserving methods such as the “Chain-ladder” method and the “Bornheutter-Ferguson” method only give point estimates of the reserve.
- Bootstrapping provides a distribution of the reserves. Bootstrapping enables us to determine the level of reserves required for specified sufficiency levels.

Overview of methodology

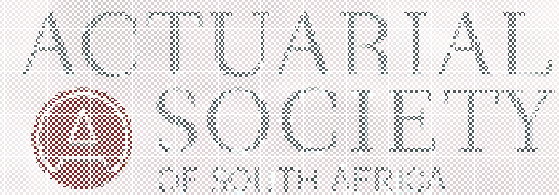
Budget risk



- Claims risk is the risk that budgeted claims for the year are higher than expected.
- The claims budget risk element has been calibrated from data points of actual versus budgeted claims from budgets since 2005.
- We then fitted a normal distribution to each scheme's data. Also considered the gamma and lognormal distributions.
- Uncertainty regarding budgeted expenses has been allowed for in a similar manner as for claims.

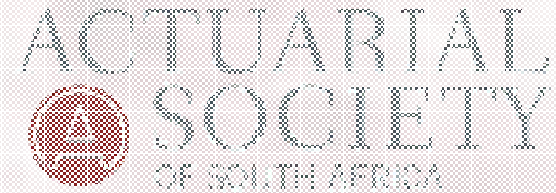
Overview of methodology

Liquidity risk



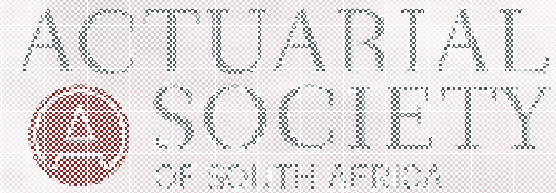
- Liquidity risk is the risk that monthly outflows from the medical scheme will severely jeopardise the solvency position of the scheme.
- We have therefore modelled the requirement that a scheme must have positive funds throughout the year.

Results



- We performed a separate valuation for each participating medical scheme.
- Our analysis has been based on 29 medical schemes, (the “industry”), covering 4,403,977 beneficiaries. This equates to approximately 57% of covered beneficiaries in South Africa.
- The overall “industry” solvency position is determined by weighting the scheme specific solvency ratios by the number of beneficiaries.
- The results are presented as a percentage of gross contributions.

Results



Scheme Name
Anglo Medical Scheme
Anglovaal Group Medical Scheme
Bankmed
Building & Construction Industry Medical Aid Fund (BCIMA)
Built Environment Professional Associations Medical Scheme (BEPMED)
Bestmed Medical Scheme
Bonitas Medical Fund
Chartered Accountants (SA) Medical Aid Fund (CAMAF)
Compcare Wellness Medical Scheme
Discovery Health Medical Scheme
Edcon Medical Aid Scheme

Results

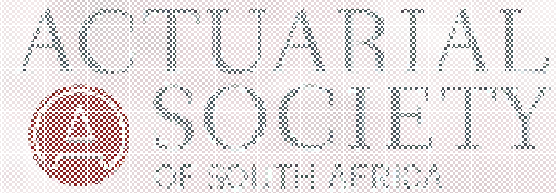
Scheme Name
Government Employees Medical Scheme
Good Hope Medical Aid Society
Grintek Electronics Medical Aid Scheme
IBM (SA) Medical Scheme
La-Health Medical Scheme
Lonmin Medical Scheme *
Medihelp
Mmed*
Moremed Medical Scheme*
Nampak (SA) Medical Scheme
Nedgroup Medical Aid Scheme

Results

Scheme Name
Pick & Pay Medical Scheme
South African Police Service Medical Scheme (POLMED)
Quantum Medical Aid Society
Retail Medical Scheme
Spectramed
Thebemed
Tiger Brands Medical Scheme
Topmed Medical Scheme
Tsogo Sun Group Medical Scheme
University of Kwa-Zulu Natal Medical Scheme*
Umed*
Wooltru Healthcare Fund

Results

Budget risk (undiversified)



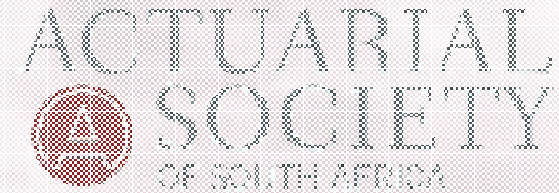
- We have assumed independence between the various components.

Percentile	Reserving (Stand alone capital)	Claims (Stand alone capital)	Expenses (Stand alone capital)	Total budget risk (Undiversified)
98.0%	1.33%	9.00%	0.88%	11.20%
99.0%	1.64%	9.96%	1.04%	12.64%
99.5%	1.94%	10.81%	1.17%	13.92%

Total budget risk (undiversified)				
99.5% sufficiency level	Reserving (Stand alone capital)	Claims (Stand alone capital)	Expenses (Stand alone capital)	Total budget risk (Undiversified)
	13.97%	77.64%	8.39%	100.00%

Results

Budget risk



- The diversified budget risk value represents a more realistic valuation of the overall budget risk compared to the undiversified risk.

Percentile	Total budget risk (Diversified)
98.0%	8.82%
99.0%	9.84%
99.5%	10.79%

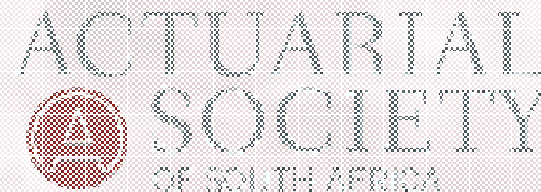
Results

Liquidity risk

Percentile	Liquidity risk (Protection against complete ruin)
98.0%	0.27%
99.0%	0.30%
99.5%	0.33%

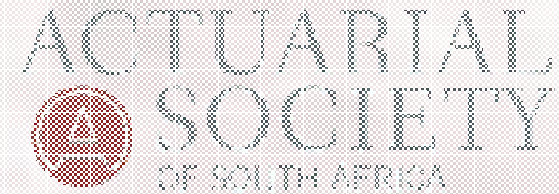
Results

Liability risk



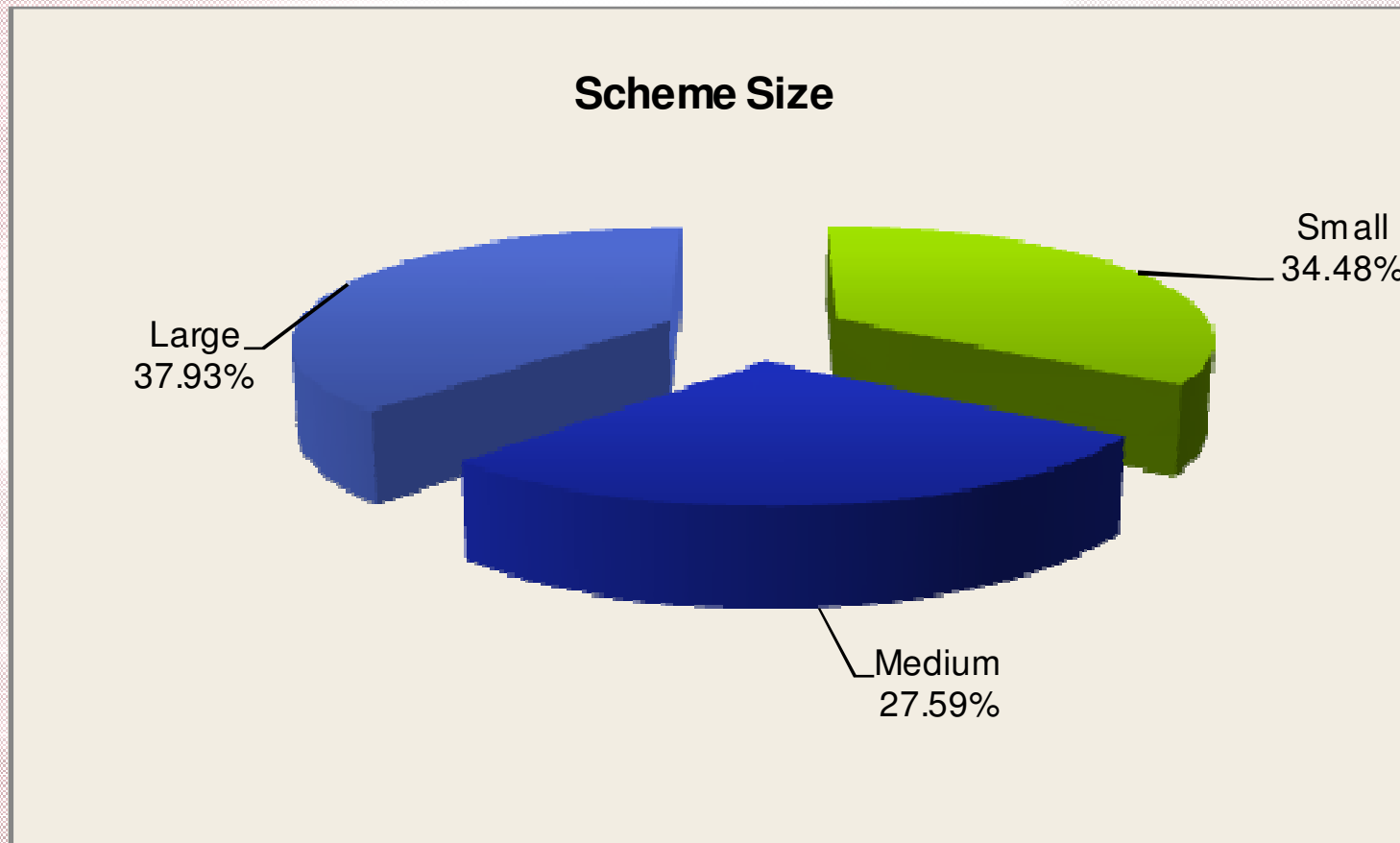
Percentile	Budget risk	Liquidity risk (Protection against Ruin)	Overall liability risk
98.0%	8.82%	0.27%	9.09%
99.0%	9.84%	0.30%	10.14%
99.5%	10.79%	0.33%	11.12%

Results

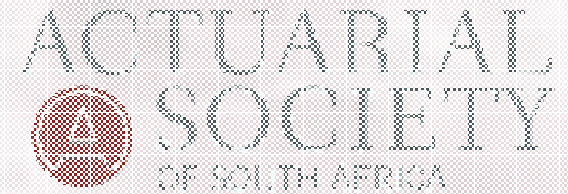


- Based on the Council for Medical Schemes definition of size of scheme:
 - Large: more than 30,000 beneficiaries
 - Medium: more than 6,000 principal members
 - Small: less than 6,000 principal members

Results



Results

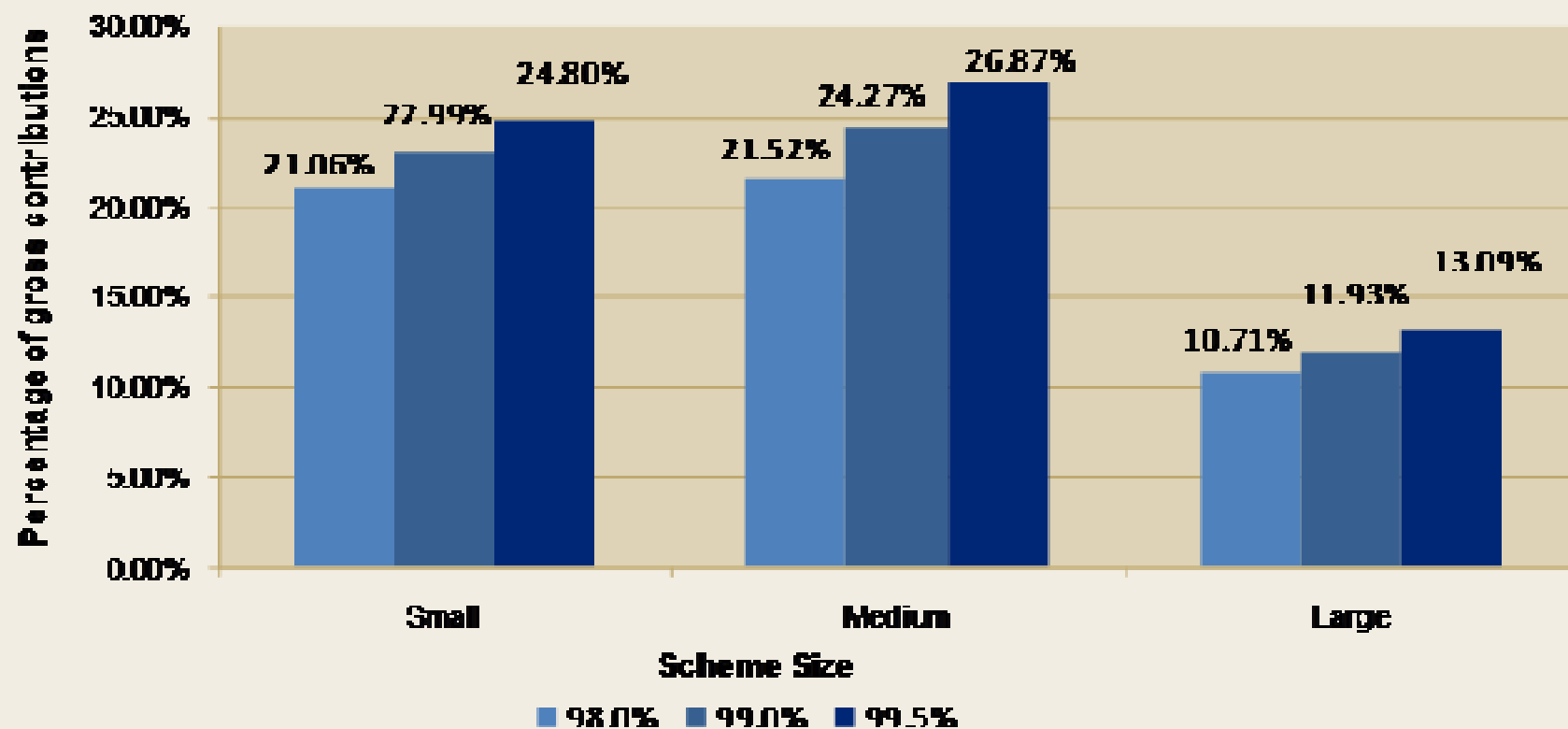


Size of Scheme	Industry Categorized by Size	
	Survey	Industry
Small	34.48%	29.51%
Medium	27.59%	26.23%
Large	37.93%	44.26%

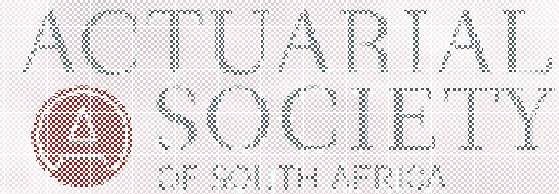
Results

Liability risk

Financial risk with protection against ruin at various sufficiency levels by scheme size



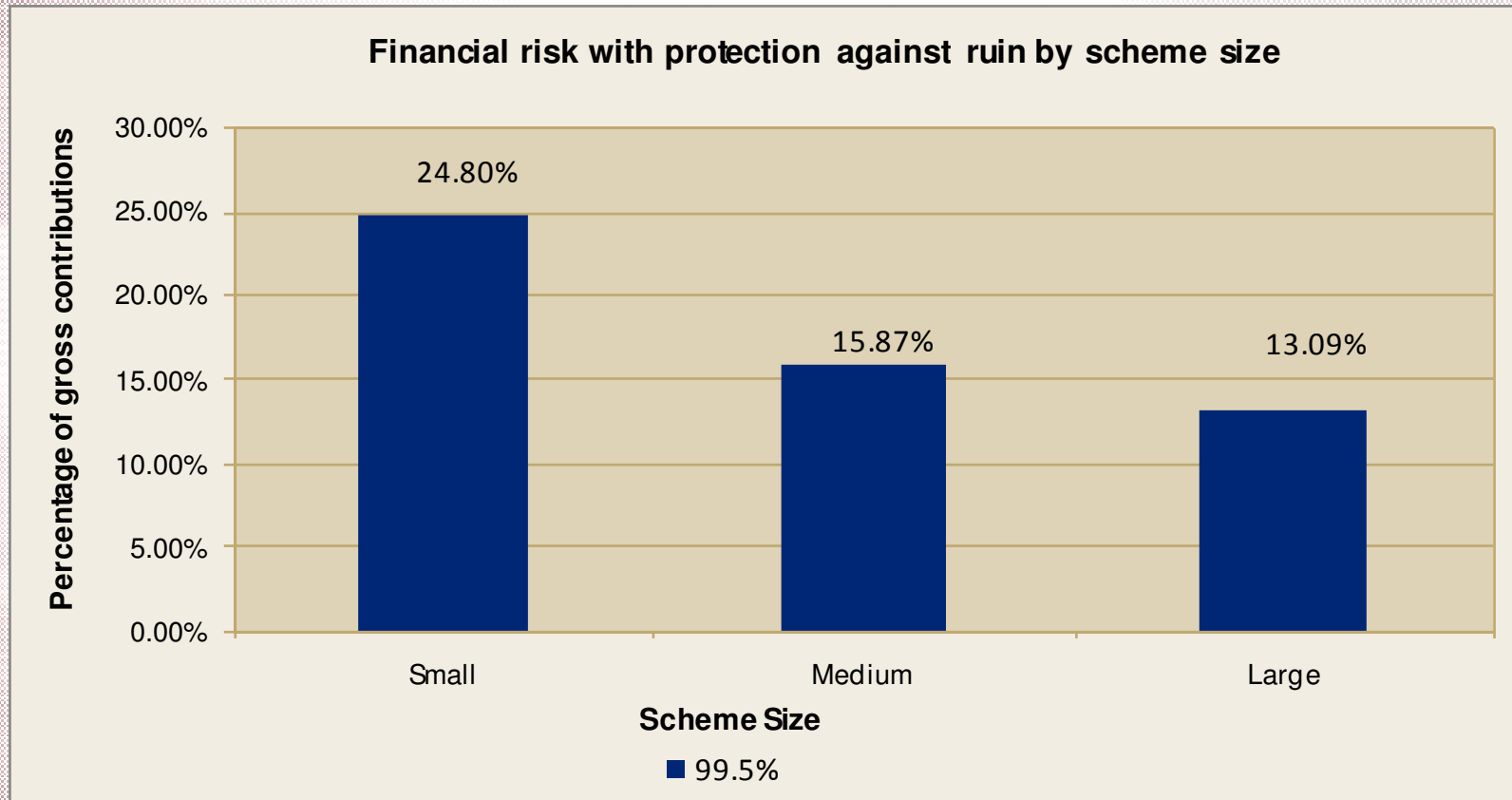
Results



- Overall at a 99.5% sufficiency level, the solvency requirement for small-sized schemes is 24.8%, whereas for medium-sized schemes the solvency requirement is slightly higher at 26.87%. Large schemes have a much lower capital requirement of 13.09% of contributions.
- One of the medium-sized scheme's solvency requirement is very high and is therefore distorting the overall solvency requirement for medium-sized schemes.

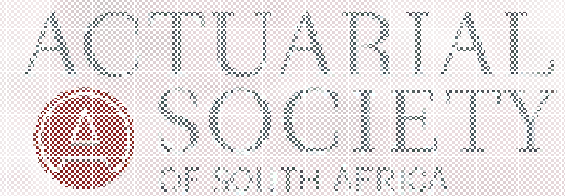
Results

Liability risk



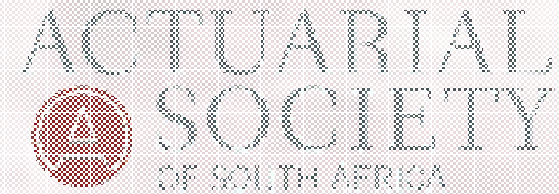
Results

Liability risk



	Financial Risk with protection against Ruin	
	Open	Restricted
98.0%	10.79%	11.23%
99.0%	11.95%	12.60%
99.5%	13.11%	13.79%

Results



- Overall both small and medium schemes require a level of capital that is very close to the 25% regulatory requirement.
- If we again remove the scheme that is distorting the medium-sized schemes results, the average capital requirement for medium-sized and large-sized schemes are significantly lower than the 25% requirement.

Results

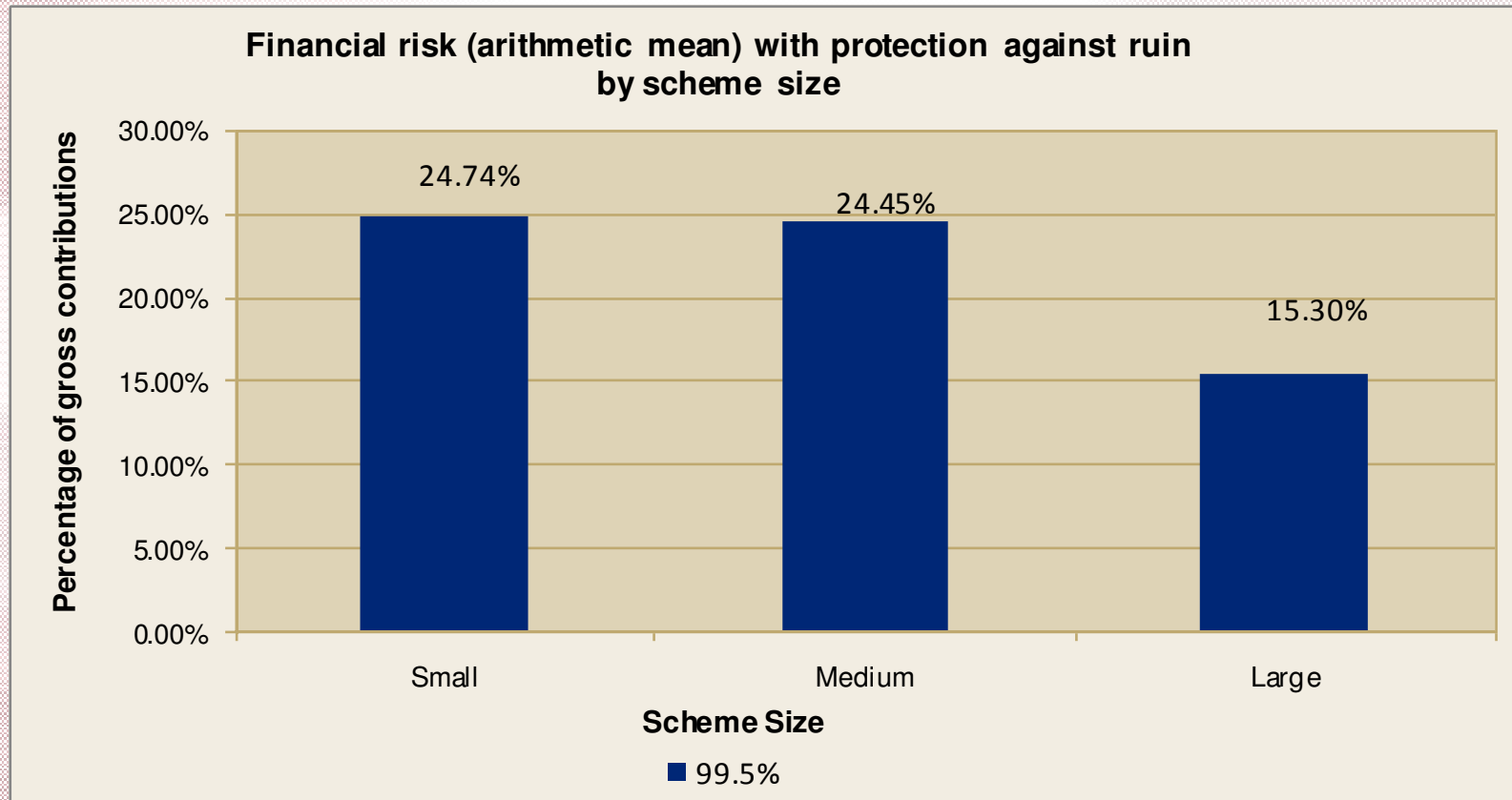
- Given that large schemes require lower levels of capital, it is clear that the average level of capital required to protect schemes against ruin calculated as the arithmetic mean is higher at 21.08%.

99.5% sufficiency level	Weighted mean	Arithmetic mean
Financial Risk	11.12%	21.08%

- The arithmetic average is 9.96% higher than the weighted average required level of capital.

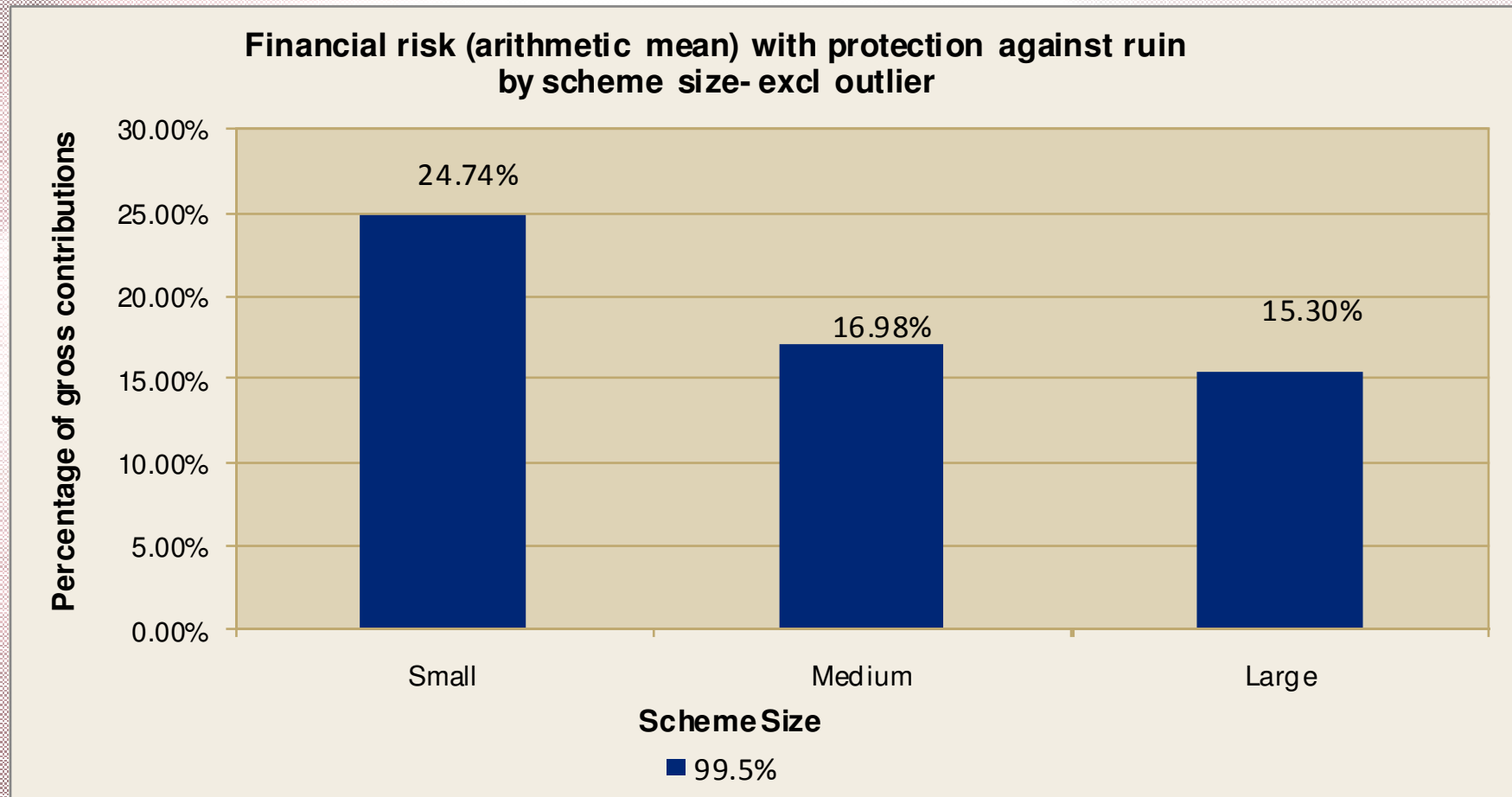
Results

Liability risk

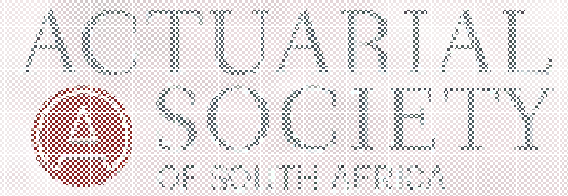


Results

Liability risk



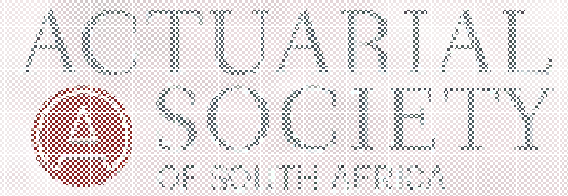
Results



	>25%
Small	5
Medium	1
Large	0

	Solvency %
%	38.88%
excl Outlier	31.31%

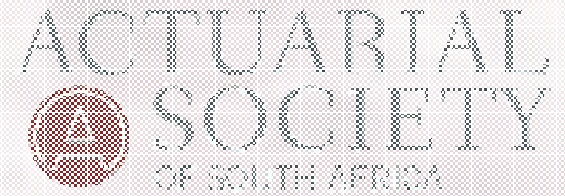
Results



	>22.5%
Small	7
Medium	2
Large	0

	Solvency %
%	33.95%
excl Outlier	28.60%

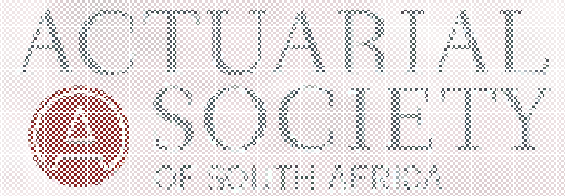
Results



	>20%
Small	7
Medium	4
Large	2

	Solvency %
%	29.93%
excl Outlier	26.03%

Results



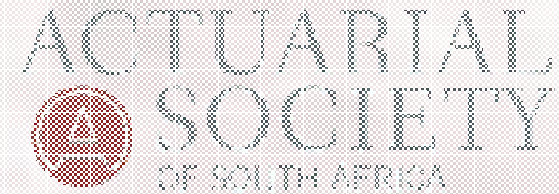
	<20%
Small	3
Medium	4
Large	9

	Solvency %
%	13.89%

Conclusion

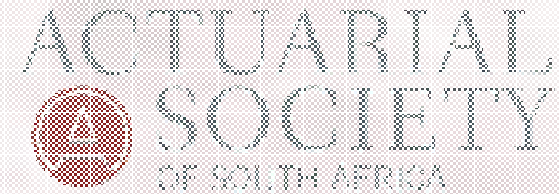
- The financial services industry in South Africa is moving towards determining capital requirements by applying solvency methodologies that consider the underlying risks faced by entities.
- The medical scheme industry has made little progress in researching and developing a risk-based capital ('RBC') framework for South Africa.
- Many regulatory authorities internationally have also developed RBC frameworks for health insurance products.

Conclusion



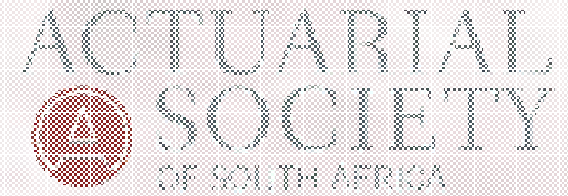
- A solvency assessment framework is more than just determining the level of capital that is required. The supervisory review and disclosure aspects of the solvency framework are just as important.
- A three pillared approach has been incorporated within both the Basel II and Solvency II frameworks as a means to allow for all three components.
- Both the South African Life and Short-Term insurance industries are in the process of preparing itself for the implementation of Solvency II.

Conclusion



- We therefore believe that it is important that the medical scheme industry embarks on further research in the development of a solvency assessment framework.
- This assessment should consider at least the following:
 - A detailed literature review of the strengths and weaknesses of the various solvency methodologies currently applied within different countries.
 - Consideration of the context in which the methodology is applied.

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