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## Reserves and Solvency of the Life Insurance Companies that Sell Annuities

By Gonzalo Edwards Guzmán and Guillermo Martinez Barros

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## 1 INTRODUCTION

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This chapter describes the main risks faced by life insurance companies that sell annuities, how those risks are addressed, the continuous oversight and monitoring by various institutions and authorities, and some of the regulatory changes that have been proposed to incorporate advances occurring at the global level in the area of supervision.

The main conclusion of this analysis is that the work that has been carried out in Chile by the supervisory bodies, rating agencies, and external auditors over the last 30 years has been adequate to guarantee favorable results and the due payment of the assumed liabilities.

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## 2 ANNUITY PENSION CALCULATION

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When a life insurance company receives a “pension query” for an annuity through the online Pension Consultations and Offers System (*Sistema de Consultas y Ofertas de Montos de Pensión*, or SCOMP), it must decide how much to offer the potential annuitant, with the amount expressed in UFS (*unidades de fomento*, an inflation-indexed unit of account used in Chile).

To do so, the insurance company takes into account the amount of money available in the individual’s pension savings account maintained by a pension fund administrator (PFA), the individual’s life expectancy, potential beneficiaries (spouse, children under 24 years of age, etc.), the rates at which the company can invest the funds, the company’s capital requirements, and the expected profits from providing the annuity.

Once all of these factors have been considered, the company offers a pension amount that implicitly includes what is known as the sales rate. This is the rate of return on the funds that the company offers to the potential annuitant. It is the rate that makes the expected flows from the pension payments, calculated using the official mortality tables, equal to the present value of the single premium, or the amount of money that the retiree pays for the annuity.

If, in calculating the amount of the pension to offer, the company considers that the official mortality tables do not accurately reflect the expected mortality of the person in question, it can use its own tables to calculate the pension payments and the official mortality tables to estimate future reserves. The sales rate that must be reported, however, is the rate derived according to the official tables, so as to maintain comparability among companies.

### 3 RISKS BORNE BY THE INSURER

On guaranteeing lifetime pension payments, the company assumes two fundamental risks:

1. Longevity risk is the risk that the person in question will live longer than expected. This risk should not have a large effect on the company to the extent that some annuitants live longer than expected and others live less long. However, there is the risk that life expectancy could improve over time. If that happens, the companies will have to pay more pensions than initially forecast. In Chile, the official mortality tables incorporate these improvements through the use of dynamic tables, but even so, the fact that they are revised every five years implies that the future is unknown and unknowable in terms of mortality and life expectancy. At the same time, the revision of the official tables constitutes a regulatory risk, to the extent that it requires a corresponding revision of reserves. Consequently, the official tables must reflect the actual life expectancy of the annuitant population as accurately as possible.

2. Investment risk is the risk that the premium, or the money received in exchange for assuming certain risks, will not yield the return necessary to pay the total commitment. If, on receiving the single premium, the company does not invest in fixed-income instruments that guarantee that it will have sufficient funds on the date of each future payment (which is called matching cash inflows and cash outflows), it is incurring a risk that the premium (or cash surplus) will be reinvested at lower-than-expected rates. Moreover, it is impossible to ensure that flows are completely matched, since mortality is never known with certainty and, therefore, neither are future pension payments. This means that investment risk is real and can be quite large.

#### OTHER RISKS

In addition to the two main risks described above, there are other risks that must be taken into account, although they are usually less relevant: (i) operational risk, stemming from flaws in control systems, computer systems, fraud, law suits, etc.; (ii) risks associated with management costs and the volume of operations; and (iii) credit risk, associated with the possibility that some fraction of the company's investments will not be paid fully and on time at maturity.

In sum, with an annuity, the insurer is committed to pay a pension under all circumstances and for the life of the annuitant (and his or her beneficiaries).

Whatever problems the company may face in the future or changes in the key variables underlying the quote, it must still meet its liability with the insured.

The technical or mathematical reserves are thus the monetary quantification of the present value of the commitments assumed by the insurer with its annuitants.

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## 4 RESERVE CALCULATION

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How does a life insurance company calculate its reserves?

Once the offer is accepted and the individual's pension determined, the company takes on a liability based on the lifetime commitment made to the annuitant, whether directly to the retiree or to any of his or her beneficiaries. This means that the company must constitute reserves to back the liability.

To do so, the company must again discount the flows, this time not by the sales rate, which, as mentioned above, implies a present value equal to the single premium, but rather with the reserve rate, which is typically lower than, or at most equal to, the sales rate. To calculate reserves, the insurer also uses, in addition to the reserve rate, the official mortality (or longevity) tables issued by the supervisory authority, namely, the Superintendency of Securities and Insurance (svs) in conjunction with the Superintendency of Pensions.

This means that the reserves are typically higher than the single premium. In accounting terms, the company has acquired a liability that is greater than the amount received from the annuitant, which forces the company to contribute capital. This actuarial loss is currently around 10% of the premium received for an annuity.<sup>54</sup>

Reserve requirements, which are typically greater than the amount of the single premium, exist to ensure that the company will have the necessary funds to pay the pensions.

The reserve rate is conservative (low) due to the risks assumed by the company when it commits to paying a pension as long as the annuitant or any beneficiary is alive or, in the case of nondisabled children, until the age of 24 years. The life expectancy of a man who retires at age 65 is around 20 years (until age 85); for a woman who retires at age 60 (the normal retirement age for women in Chile), it is 29 years.

54 Recent regulatory changes would imply accounting losses on the order of 2 to 4%.



## 5 DETERMINATION OF THE RESERVE RATE

The reserve rate is the rate imposed by the Superintendency of Securities and Insurance (svs) to determine the accounting value of the liabilities deriving from annuities sold by a life insurance company. Together with the legal limit on an insurance company's accounting debt ratio, the reserve rate determines the amount of funds (or equity) that shareholders have to contribute when they sell an annuity. A "low" reserve rate forces shareholders to pay in more capital, which raises the cost of generating an annuity and reduces the pension promised by the company in exchange for a given cash price.

The reason why the reserve rate is set by the authority and is not freely determined by each company is that, left free, some companies could opt to use a high reserve rate in order to reduce their accounting liability, avoid making a capital contribution as collateral for issuing a new policy, and generate short-term accounting profits. If that were to happen, there would be a significant risk to annuitants (the buyers of the policy) that the company's investments would not be sufficient to pay their pensions. The risk of default would thus be higher.

It should be noted that supervision practice is not the same in all countries. In Anglo-Saxon countries, for example, the supervision of insurance companies rests strongly on the work of mathematical actuaries, who play an important professional role in declaring the sufficiency or insufficiency of the insurer's technical reserves, while the supervisory authority does not establish the assumptions to be used to calculate the technical reserves (mortality tables, interest rates, etc.). In contrast, in Chile, as in many countries in the region, it is the supervisory authority that sets the (conservative) criteria for calculating the reserves.

The reserve rate on each policy is set by the svs and is in effect for the full duration of the policy. It is equivalent to the lower of either the sales rate described above or the equivalent cost rate, which is determined in accordance with svs instructions.<sup>55</sup>

<sup>55</sup> See General Regulation N° 374 of 13 January 2015, issued by the Superintendency of Securities and Insurance (svs).

Summarized Balance Sheet, Life Insurance Companies, December 2014. Millions of Ch\$

Company	Total assets	Fixed-income instruments	Variable-income instruments	Real estate investments (1)	Total liabilities	Total equity
ACE	17.321	11.455	0	0.015	8.800	8.521
BANCHILE	97.007	76.427	2.147	0.748	75.111	21.896
BBVA	167.471	144.837	0	0	130.987	36.484
BCI	190.080	133.662	15.204	14.737	155.469	34.611
BICE	2,587.583	1,236.276	378.636	741.254	2,333.837	253.746
BNP	139.573	109.290	0	2.652	101.235	38.338
BTG PACTUAL	3.738	3.625	0	0	0.255	3.483
CAMARA	87.152	53.355	12.985	0	61.826	25.326
CHILENA CONSOLIDADA	1,684.759	1,118.974	113.880	356.749	1,560.263	124.496
CLC	6.300	5.017	0	0.168	3.435	2.865
CN LIFE	611.275	356.723	121.647	100.807	538.314	72.961
COLMENA	3.030	2.911	0	0	0.199	2.831
CONSORCIO NACIONAL	4,321.578	1,998.339	1,004.307	1,040.392	3,909.567	412.012
CORPSEGUROS	2,128.337	1,289.195	386.514	376.250	1,955.841	172.496
CORPVIDA	2,592.360	1,375.642	552.069	550.449	2,449.507	142.853
CRUZ BLANCA VIDA	4.425	3.459	0	0	1.686	2.739
EUROAMERICA	1,037.847	708.346	175.134	106.425	975.729	62.118
HUELEN	4.506	4.453	0	0.011	0.875	3.632
ITAU	52.203	47.440	0	0	16.907	35.296
MAGALLANES VIDA	5.382	4.223	0	1	2.618	2.763
MAPFRE	38.549	28.854	0	4.664	34.335	4.213
METLIFE	3,988.455	1,964.311	516.642	1,290.000	3,712.148	276.307
MUT DE CARABINEROS	223.907	169.104	0.403	52.901	124.776	99.131
MUT. EJERC. Y AVIAC.	134.135	121.483	4.346	4.787	37.143	96.992
MUTUAL DE SEGUROS	228.142	191.075	5.900	18.549	95.090	133.052
OHIO	640.164	405.389	35.593	183.330	591.064	49.100
PENTA	1,807.702	850.809	396.645	497.112	1,683.837	123.866
PRINCIPAL	2,613.572	1,293.738	286.707	975.716	2,465.721	147.851
RENTA NACIONAL	640.952	375.064	27.031	218.800	599.603	41.350
RIGEL	59.409	23.519	1.387	0.080	42.529	16.880
RSA VIDA	8.792	6.346	0	0	3.787	5.005
SECURITY PREVISION	2,042.607	1,197.669	357.535	420.293	1,882.856	159.750
SURA	982.574	732.554	135.949	75.313	915.424	67.150
ZURICH SANTANDER	202.797	163.615	5.149	15.428	147.873	54.924

Source: FECU, December 2014

(1) Includes Mortgage bonds, endorsable mortgage loans, real estate investment properties, and leasing accounts receivable; excludes properties for personal use.

The equivalent cost rate is calculated based on a vector of discount rates issued monthly by the svcs. This vector is the result of adding an excess return above the risk-free return to the real risk-free interest rate term structure, or the real zero curve.

Given this discount rate vector, the present value of the flows is calculated, to then calculate a flat rate that returns the same present value.

Finally, if the reserve rate is set too low, the sales rate will also be low, even when the expected yield rates are high. This occurs because the difference between the sales rate and the reserve rate is what determines the initial capital contribution from the company's shareholders.

## 6 INSURANCE COMPANY PROFITS

If an insurance company receives a single premium that is less than its liabilities (the technical reserves it has to constitute), and if it must also absorb a commercial loss in the form of sales commissions (currently around 2% of the premium received on selling an annuity), one might wonder how the company balances its accounts. This is done through the equity contribution from the company's shareholders. The next question, then, is how the company generates any profits. The answer is that over the life of the annuity contract, the company invests the premium in assets that, at least in theory, earn more than the sales rate; that is, there is a positive differential, or spread, between the investment return and the interest rate guaranteed to the annuitant. Thus, the company first receives the single premium from the annuitant and the equity contribution from shareholders, to offset the liability (reserves) taken on when the policy enters into effect, and subsequently earns a spread between the yield or income from the investments and the sales interest rate promised to the annuitant.

The other source of income is the release of reserves, which occurs concurrently with the payment of the pensions. Over time, the company gradually releases reserves as it extinguishes the liability of future payments. If annuitants' mortality rate is in line with the assumptions behind the technical reserves, then the combined effect of pension payments and the release of reserves equals an annual cost equivalent to the interest rate with which the reserves were constituted.

For example, when an annuity is in the deferred phase of the policy (that is, when the annuitant is not receiving a pension), there are no pension payments, and thus no reserves are released. Consequently, the reserves grow at the rate of an annual financial cost equal to the interest rate with which the reserves were calculated, if there are no changes in the assumed mortality of annuitants and beneficiaries. When the annuity is in the payment phase, the combined effect of the expense from pension payments and the income from the release of technical reserves is also more or less equivalent to the annual financial cost equal to the interest rate with which the reserves were calculated, again assuming that there are no changes in the estimated mortality of annuitants and beneficiaries.

Other costs include the means of payment of the pension and the policy administration costs.

The insurance company thus generates profits from the spread between the return on investments and the interest rate guaranteed to its annuitants, which

should be sufficient to cover all the operating costs. Any negative change in investment returns or positive adjustment to expected longevity will translate into lower profits (or even a loss) for the insurer.

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## **7 CAPITAL REQUIREMENTS**

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In addition to the capital requirement generated at the start of a policy, deriving from the fact that the sales rate is typically higher than the reserve rate and also from the associated commercial loss, the regulations establish that the company's debt-equity ratio cannot exceed 20:1 at any time.

There is also a general regulatory guideline associated with the capital requirement through the solvency margin, but in the case of annuity products, it does not operate as an additional capital restriction.

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## 8 RISK EQUITY AND NET OR ADJUSTED EQUITY

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As a measure of the equity position of the various insurers, the SVS and rating agencies compare the company's net equity and its risk equity, which is the minimum equity requirement for a given company.

Net or adjusted equity is the company's book equity less all assets that are not effective investments, that is, that have no real capacity to generate income flows. The higher the ratio of real adjusted equity to risk equity, the greater the company's solvency.<sup>56</sup>

The following table summarizes the equity position of several insurance companies as of December 2014, based on net equity over risk equity. The higher the ratio, the more solvent the insurer.

<sup>56</sup> See SVS General Regulation No. 323 of 25 November 2011.

COMPANY	Net equity / Risk equity
ACE	2.91
BANCHILE	1.36
BBVA	3.42
BCI	1.30
BICE	1.96
BPN	1.11
BTG PACTUAL	1.52
CAMARA	1.48
CHILENA CONSOLIDADA	1.59
CLC	1.29
CN LIFE	2.19
COLMENA	1.26
CONSORCIO NACIONAL	1.23
CORPSEGUROS	1.51
CORPVIDA	1.16
CRUZ BLANCA VIDA	1.22
EUROAMERICA	1.38
HUELEN	1.61
ITAU	15.85
MAGALLANES VIDA	1.25
MAPFRE	1.81
METLIFE	1.41
OHIO	1.60
PENTA	1.47
PRINCIPAL	1.13
RENTA NACIONAL	1.41
RIGEL	3.90
RSA VIDA	1.85
SECURITY PREVISION	1.57
SURA	1.99
ZURICH SANTANDER	4.00
TOTAL	1.50

*Source: svS.*

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## 9 LONGEVITY RISK

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As mentioned earlier, there are three types of longevity risk. The first has to do with the fact that individual people do not always achieve the life expectancy of their cohort. If the company has a large number of annuitants or pensioners, this risk should not be very large relative to the premiums obtained, since the law of large numbers would apply: the deviations of some people would be offset by the deviations in the opposite direction of other people, so the expected outcome would be realized for the group as a whole. However, if the company has very few policies, the deviations might not fully offset each other, and the losses in the case of negative deviations could be large.

The second type of mortality risk has to do with the differences in mortality between different types of groups or annuitants. The life expectancy of one group is not necessarily the same as other groups. For example, people with a higher income or socioeconomic level have a longer life expectancy than people with a lower income or socioeconomic level. This means that the longevity of a higher socioeconomic group could vary significantly from the national mortality table. Even if the company has a very large number of policies, the deviations of the different annuitants may not fully offset each other on average, because the mortality tables simply are not applicable to that specific group of annuitants.

The third type of mortality risk can be very high, as it has to do with the possibility that the population as a whole will not realize the expected future longevity. If there are unexpected improvements in people's longevity, the company will incur larger pension payouts than expected in the future, generating losses. While the possibility of improved longevity is incorporated into the official tables, to the extent that they are dynamic, it is not possible to know today how life expectancy will evolve in the future. Therefore, the tables are revised around every five years, and successive revisions could lead to new increases in the life expectancy of annuitants.



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## 10 INVESTMENT RISK

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With annuities, the most common source of investment risk lies in the impossibility of having a perfect match between assets (investments) and liabilities (pension payments) from the beginning, which would guarantee that the inflows will always be identical to the outflows. Although companies use fixed-income instruments with different maturities, assets typically have a shorter average duration than liabilities (reserves) and will thus have to be reinvested in the future at short- and medium-term interest rates that are unknown at the time the annuity is sold. Whereas liabilities have a known implicit rate (the sales rate), assets do not have a known rate for the same duration as the corresponding liabilities. In other words, if the assets have to be reinvested at a lower rate, the company would incur significant losses.

This risk responds to a maturity mismatch between assets and liabilities. There is also a parallel risk in terms of the currency in which assets and liabilities are denominated, called currency-mismatch risk. However, there is ample availability of financial securities issued in UFs or in the currency or index in which the annuity liabilities are expressed, so insurers are usually fully hedged against currency mismatch risk.

Another investment risk derives from the need to invest reserves and equity in risky assets, that is, assets that are not zero risk, as could be the case with government securities. This gives rise to the credit risk associated with the company's investments, that is, the possibility that some fraction of the investments will not be paid fully and on time at maturity (the probability of default).

Market risk (that is, changes in the value of investments due to market factors as opposed to the default risk of a particular issuer) and liquidity risk are present in any type of investment, but they are not very significant in the annuity business because the liabilities are very long term, irrevocable, and without any salvage value.

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## 11 MATCHING AND ASSET ADEQUACY ANALYSIS

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In the area of annuity pensions, the svS applies two tests that are very useful for visualizing the different realities of the companies that operate in this line of business. Both tests aim to measure the extent of the reinvestment and longevity risk facing a given insurer. The better the match between the asset and liability flows deriving from annuity policies, the lower the reinvestment or interest rate risk faced by insurer. Based on the committed values expected to be received (investment flows) and the committed values expected to be paid (pension flows), the svS carries out stress tests using different assumptions on market conditions for future investments, as well as different longevity scenarios for the annuitants. For the former, the committed flows are adjusted to reflect the call risk or default risk of security issuers; for the latter, adjustment factors are applied to the life expectancy of annuitants. This allows the svS to establish a risk-based ranking of the different companies and to be aware of their potential capital needs, that is, the need for additional assets to meet their assumed liabilities.

A summary indicator of the degree of certainty that an insurer will be able to meet its assumed liabilities is the reinvestment rate required for that purpose. Using data on the assets and liabilities of each company, the required reinvestment rate reflects the average interest rate at which a given insurer must reinvest initial cash surpluses in order to cover all assumed liabilities, in particular for future years in which outflows exceed inflows from current financial instruments: the higher the required reinvestment rate, the greater the risk that the insurer will not be able to meet all its liabilities. The following table summarizes the position of several insurance companies as of December 2014 in terms of their required reinvestment rates. When the required reinvestment rate is lower than the long-term interest rate prevailing in the market, the insurer is less likely to face difficulties meeting liabilities.

REINVESTMENT RATE FROM THE  
COMPANY ASSET ADEQUACY ANALYSIS (%) (\*)

BBVA	-0.75%
Bci	0.99%
Bice	1.82%
Caja Reaseguradora	-0.32%
Chilena Consolidada	1.22%
CN Life	2.36%
Consorcio Nacional	1.50%
CorpSeguros	1.80%
Corpvida	1.05%
Euroamérica	2.16%
Mapfre	0.77%
Metlife (**)	0.94%
Ohio National	0.16%
Penta	1.71%
Principal	0.65%
Renta Nacional	2.73%
Security Previsión	1.86%
Sura	-0.84%

(\*) The reinvestment IRR that makes the net present value of the asset and liability flows equal to zero.

(\*\*) Metlife and Interamericana.

(\*\*\*) Security Previsión and Cruz del Sur.

*Source: SVS.*

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## 12 INSURANCE COMPANY RISK RATING

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By law, insurance companies must be rated by at least two different independent rating agencies, which analyze the company's liabilities with a focus on the probability of default. The rating categories are as follows, **from lower to higher credit risk**: AAA, AA, A, BBB, BB, B, C, D, and E.

In their analysis, rating agencies take into account various aspects of the company: the composition, diversification/concentration, and quality of the investment portfolio (there are credit ratings for the different components of the investment portfolio); asset-liability matching; asset adequacy analysis; re-insurance and other measures of risk-mitigation techniques; the ratio of net equity to risk equity; the owners' willingness and ability to contribute fresh capital; the quality of corporate governance; the composition and experience of the board of directors; the professional capacity, experience, and history of management; the credit rating of the parent company (in the case of international insurers); the degree of commitment by the controlling shareholders to protect and defend the company and the brand in the market; the company's debt-equity ratio; etc.

In principle, the credit rating of each insurance company is revised monthly, but if there is any significant change in the market, corporate ownership, or the owners' situation, the rating agency will revise its rating without waiting for the next scheduled monthly review. Additionally, the rating agency must meet with the company's management twice a year.

The following table presents the credit rating of different life insurance companies, as listed in the Insurance Market Financial Report for December 2014, published by the svS.

Company	First rating	Second rating
ACE	A+ Feller-Rate	A+ Humphreys
BANCHILE	AA Feller-Rate	AA International Credit Rating
BBVA	AA- Feller-Rate	AA- International Credit Rating
BCI	AA Feller-Rate	AA International Credit Rating
BICE	AA+ Feller-Rate	AA+ International Credit Rating
BPN	AA Feller-Rate	AA International Credit Rating
BTG PACTUAL	No rating	No rating
CAMARA	A+ Feller-Rate	A+ International Credit Rating
CHILENA CONSOLIDADA	AA+ Feller-Rate	AA+ International Credit Rating
CLC	A Feller-Rate	A Fitch Chile
CN LIFE	AA Feller-Rate	AA+ Fitch Chile
COLMENA	Ei Fitch Chile	Ei Humphreys
CONSORCIO NACIONAL	AA+ Fitch Chile	AA+ International Credit Rating
CORPSEGUROS	AA- Feller-Rate	AA- International Credit Rating
CORPVIDA	AA- Feller-Rate	AA International Credit Rating
CRUZ BLANCA VIDA	Ei Fitch Chile	Ei Humphreys
EUROAMERICA	AA- Humphreys	AA- International Credit Rating
HUELEN	BBB Feller-Rate	BBB Humphreys
ITAU	A+ Feller-Rate	AA- Fitch Chile
MAGALLANES VIDA	A- Feller-Rate	A+ Fitch Chile
MAPFRE	A+ Feller-Rate	A Humphreys
METLIFE	AA+ Fitch Chile	AA+ International Credit Rating
OHIO	AA Fitch Chile	AA+ International Credit Rating
PENTA	AA Humphreys	AA International Credit Rating
PRINCIPAL	AA Feller-Rate	AA Fitch Chile
RENTA NACIONAL	BBB Fitch Chile	BBB+ Humphreys
RIGEL	A Feller-Rate	A- Fitch Chile
RSA VIDA	A- Feller-Rate	AA- Fitch Chile
SECURITY PREVISION	AA- Fitch Chile	AA International Credit Rating
SURA	AA Feller-Rate	AA Fitch Chile
ZURICH SANTANDER	AA Feller-Rate	AA International Credit Rating

Source: svS.

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## 13 EXTERNAL AUDITING

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The insurance companies are also required to contract external auditing services from an audit company that is duly registered in the Registry of External Audit Companies maintained by the svcs. The external auditor provides an independent opinion on whether the financial statements reflect, with a reasonable degree of assurance, the financial position of the insurer.

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## 14 RISK-BASED SUPERVISION AND RISK-BASED CAPITAL

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The Superintendency of Securities and Insurance has announced to the market that it will implement a new supervision model for insurance companies, called risk-based supervision, which includes a risk-based capital requirement. This supervision model and minimum capital requirement are based on international experience and recommendations, in particular from the Organization for Economic Cooperation and Development (OECD). It follows the Solvency II approach of the European Union, which is currently in the implementation phase.

The new supervision model is based on three pillars:

- a. Pillar I, Regulatory requirements: Establishes quantitative minimum solvency requirements, including a new risk-sensitive capital requirement that encompasses both assets and liabilities (and also includes a new investment regime and a new approach to the valuation of assets and liabilities);
- b. Pillar II, Supervision: Complements the quantitative minimum solvency requirements with a qualitative focus based on risk assessment, including an evaluation of the company's risk management system (preventive approach); and
- c. Pillar III, Reporting and disclosure: Establishes transparency requirements.

Some of the changes contemplated in the new supervision model require changes to the insurance law (D.F.L. 251), while others do not.

Under Pillar I, the minimum equity requirement as a function of the insurer's debt level will be replaced by a minimum risk-based capital requirement, which applies factors associated with technical risks, market risks, and operational risks. This new capital requirement will incorporate both asset (investment) risks—namely, market, credit, and interest rate risk—and liability risks, as well as correlations between the different risks. In addition to establishing a standard model for determining risk-based capital, the regulation will allow the use of internal models developed by the insurance company.

The risk-based capital requirement will be equivalent to the amount of capital necessary to face potential losses that the company could suffer in a given period of time, estimated at a given confidence level. For example, the European Union uses a one-year horizon and a 99.5% confidence level. The new risk-based capital requirement could be higher or lower than the current capital requirement, depending on the individual company's mix of assets and liabilities. Consequently, the svS has indicated that the application of the rule is not likely to produce any single general impact.

Pillar II aims to provide a qualitative assessment of an insurance company's solvency, in order to capture risks that are not covered by the quantitative requirements, evaluate the quality of corporate risk management systems, and stimulate the adoption of risk monitoring, assessment, and mitigation systems. The svS could impose risk-mitigation measures on the insurance companies.

In relation to the annuity business, the svS has proposed that the risk principles to be included in the quantification of the risk-based capital measure must include longevity and interest rate (reinvestment) risk, and that a specific capital requirement methodology must be developed for these risks (as well as for disability and survivor's insurance). For example, in terms of longevity risk, the svS has proposed the possibility of using stress tests where the risk factors include the mortality rate (qx) and improvements in longevity (AAx). The authority apparently also has the intention of continuing to use asset adequacy analysis (AAA) as a way to quantify interest rate (reinvestment) risk, perhaps incorporating it as a capital requirement instead of requiring an additional reserve, as is the practice today.

With regard to longevity risk, the svS has proposed an exercise where the mortality improvement risk factors are increased to double the levels currently in use in its mortality tables.

The svS has stated that the new capital requirement must take into account

the hedging mechanisms that insurers can use to mitigate some risks (reinsurance, derivatives, longevity swaps, etc.).

The draft bill to modify D.F.L. 251 stipulates that the risk-based capital calculation will be determined via executive decree, which must be passed and published in a period of not less than 24 months and not more than 48 months from the publication date of the law. It will then enter into force on the first day of the thirteenth month following publication in the *Official Gazette*, that is, three to five years after the publication of the law.



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## 15 CONCLUSIONS

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In Chile, insurance companies, in particular those that sell annuities, are subject to continuous scrutiny and monitoring by several institutions and authorities.

They are directly supervised by the Superintendency of Securities and Insurance (svs) and are also monitored by a qualified external auditor and two rating agencies. Other supervisory bodies, such as the Superintendency of Pensions, play a complementary role (for example, in setting the mortality tables issued jointly by both superintendencies, which the insurers must use to constitute technical reserves for their annuity contracts).

The insurance market in Chile is highly solvent and has good credit ratings. The companies have higher equity than required by the regulator, operate at a solid technical and professional level, and have good reinsurance contracts. They have always successfully faced large natural disasters (earthquakes, floods), as well as economic disasters such as the various financial crises of the past 30 years.

If the svs has any motivation to modify the Insurance Law, establishing a risk-based supervision and risk-based capital requirements, it stems from a desire to keep up-to-date with global advances in the area of supervision (Basel II). It should be clear, however, that at least in the area of annuity supervision, the work carried out in Chile by the supervisory bodies, the rating agencies, and the external auditors has anticipated many of the innovations and regulations at the global level. Given the state of insurance supervision in Chile, there is little new to be introduced through a risk-based supervision model, and there is little that the international experience can offer as an “innovation” to Chile: in the area of annuity supervision, the supervision models and tools would have to change very little relative to the current situation in order to converge with international trends.

Given the social significance and consequences of life annuities, most of the effort in supervising and monitoring the insurance companies over the last 30 years has been concentrated in this area. This is evident in the favorable results of supervision and the equity position of the insurers.