

A low-angle photograph of a sailboat's mast and sails against a clear blue sky. The sun is low on the horizon, creating a warm, golden glow that filters through the white sails. The dark blue hull of the boat is visible in the lower-left corner, and the dark blue ocean with white-capped waves is in the foreground. The overall mood is serene and majestic.

Fundación **MAPFRE**

**INSURANCE SOLVENCY
REGULATION SYSTEMS**

MAPFRE Economic Research

Insurance solvency regulation systems

**An analysis of progress toward risk-
based regulations**

This study was prepared by the MAPFRE Economic Research.
Publication rights have been granted to Fundación MAPFRE.

Partial reproduction of the information contained
in this study is permitted so long as the source is cited.

© Cover image: Thinkstock

© Of the texts:
MAPFRE Economic Research
Carretera de Pozuelo, 52 - Edificio 1
28222 Majadahonda Madrid Spain
servicio.estudios@mapfre.com

© Of this edition:
2018, Fundación MAPFRE
Paseo de Recoletos 23. 28004 Madrid
www.fundacionmapfre.org
Tel.: +34 91 602 5221

January, 2018.

ISBN: 978-84-9844-673-9

National Legal Deposit Number: M-2065-2018

MAPFRE Economic Research

Manuel Aguilera Verduzco

General Manager

avmanue@mapfre.com

Ricardo González García

Director of Analysis, Sectorial Research and Regulation

ggricar@mapfre.com

Gonzalo de Cadenas Santiago

Director of Macroeconomics and Financial Analysis

gcaden1@mapfre.com

Begoña González García

bgonza2@mapfre.com

Isabel Carrasco Carrascal

icarra@mapfre.com

José Brito Correia

jbrito@mapfre.com

Fernando Mateo Calle

macafee@mapfre.com

Rafael Izquierdo Carrasco

rafaizq@mapfre.com

Eduardo García Castro

gcedua1@mapfre.com

Johannes Rojas Díaz

Mónica Lisset Velásquez Roldán

José Manuel Díaz Lominchar

Monika Kukuneshoska

Laura Pérez González

Lidia Román Ventura

Contents

Presentation	9
Introduction	11
Executive Summary	13
1. Conceptual Framework	19
1.1. Regulation and market failures in the financial system.	19
1.2. Instruments for intervening in financial markets.	20
1.3. Trends in insurance activity regulations.	22
2. Focus of the analysis performed	27
2.1. Characteristics of the analysis.	27
2.2. Proximity index to risk-based regulation.	30
3. Analysis by regions	33
3.1. United States	33
3.2. Latin America.	36
3.3. Asia Pacific.	41
3.4. European Union.	42
3.5. Global regulation: the international capital standard (ICS).	43
4. Global vision of regulatory progress	47
4.1. Progress toward risk-based regulation.	47
4.2. Preconditions and risks.	48

5. Synthesis and conclusions	57
5.1. Regulation of financial institutions and markets.....	57
5.2. Regulation in the field of insurance.....	58
5.3. Current context.....	58
5.4. Preconditions for risk-based regulation: in conclusion.....	64
Index of tables, charts and boxes	69
References	71

Presentation

Fundación MAPFRE is a non-profit organization created in 1975. Its main objective is to promote the well-being of society and citizens and to improve people's economic, social and cultural conditions, especially among the most disadvantaged. Among its objectives are supporting and disseminating insurance and social protection knowledge and culture; to fulfill this objective, it performs different activities ranging from familiarizing schools with insurance and publishing technical reports on current affairs.

In Spanish, the etymology of solvency, –a recurring theme in the media–, can be traced to a now defunct verb. *solver*, the semantic field of which ranges from resolving a query to finding a solution for a problem. The Dictionary of the Real Academy of the Spanish Language, in the corresponding synonym, accepts this interpretation before going on to offer a more regulatory definition: to have no debts, the ability of repaying them or qualities that define solvent bodies. However, for the purposes of the study at hand, we believe the most appropriate definition would be that of the *MAPFRE Insurance Dictionary* which textually states that solvency, in terms of insurance companies, is the ability to meet all payment commitments through the series of resources that constitute their equity or assets.

Most large-scale global economic crises have started due to a financial imbalance that has ended up affecting the real economy. The most recent large-scale crisis, caused by the bankruptcy of Lehman Brothers and the consequences of which can still be felt to this day, was not far removed from this reality, nor was the 1929 stock market crash. At the time, and with the benefit of hindsight, there were practically no prudential regulation mechanisms in place; the reaction to the 2008 crisis was somewhat different and involved assessing whether regulation mechanisms were sufficient or whether they should be adjusted to prevent another possible economic crisis in the future.

In the insurance industry, regulation represents a crucial aspect and to this end, when MAPFRE Economic Research proposed this topic, we didn't hesitate for a second in terms of its relevance, as insurance plays a role in both capital and risk management and, therefore, must anticipate, prevent and alleviate any negative economic consequences. Furthermore, the topic is by no means foreign to us. As part of our Notebooks series, we recently published two directly related articles: *Solvency II implications for Spanish occupational pensions*, in 2015, and last year *Copula theory. Introduction and applications to Solvency II*.

Fundación MAPFRE will always be on hand to drive these types of studies that the specialized public both anticipates and appreciates, and that helps us to fulfill one of our foundational purposes.

Fundación MAPFRE

Introduction

Financial activities maintain close ties with practically all areas of economic operation, meaning that the adequate performance of financial markets is of interest not just to those directly involved in this sector, but also to society as a whole. The risk protection and compensation process undertaken by the insurance industry supports the different sectors of the real economy, providing stability and continuity to the economic process, stimulating and facilitating the undertaking of different activities and sales transactions, providing stability to personal and household income and, in a broader sense, supports the generation of capital via the savings-investment process. Thus, given the importance of preserving the adequate functioning of insurance markets, they are subject to regulatory frameworks that seek to contribute to the industry preserving sound finance and solvency parameters.

Against this backdrop, this study analyzes, based on a review of a series of international regulatory models, the development and adjustment process generated by insurance regulations toward risk-based regulations and the preconditions and risks that this progress represents. Based on the evidence gathered, the report emphasizes the premise that the implementation of risk-based regulations requires compliance with a series of institutional and market preconditions in order to ensure its effectiveness and to bring benefits for the functioning of the insurance market.

The existence of this series of institutional and market preconditions that facilitate effective and efficient risk management appears to be dependent upon the further development of this type of regulatory model in the different markets, especially emerging markets. Progress toward risk-based regulations is an element that can stimulate the growth of the supply and, therefore, increase the participation of insurance in the economy, in that it allows for a more efficient allocation of the capital, and creates incentives for more professional management of insurance companies based on considerations and parameters of a technical nature. However, for this regulatory progress to achieve its purpose, it must take place parallel to the development of technical capacities in both the industry and the regulators, as well as the creation of the necessary market infrastructure for its adequate implementation.

MAPFRE Economic Research

Executive Summary

Insurance companies fulfill a dual purpose in the economy. Firstly, as an instrument for the pooling of risks, the insurance industry prevents or mitigates the economic consequences of the impact of certain insurable events and, secondly, as an institutional investor it collaborates in the generation of capital via the medium and long-term investment and savings management process. Thus, insurance activities involve receiving and managing financial resources; as a result it is one of the activities subject to prudential supervision on a global scale without exception, as is the case of activities performed by other financial institutions.

Financial regulations have evolved significantly over the years, in particular over the course of the past two decades, in line with the process of economic and financial globalization. This regulatory process has been led by banking regulators who, via the Basel Committee on Banking Supervision, introduced, at the end of the 1980s, what would become the first prudential global risk-based regulatory framework (the Basel Accord, *subsequently* referred to as Basel I). This first accord was quickly adopted as an international standard that would later be implemented by practically all economies on the planet. Thus, Basel I was succeeded by other adjustments to the global framework of banking regulations introduced by Basel II (2004) and Basel III (2010), all of which have developed and fine tuned risk measurements as an essential factor in the determination of capital burdens and incorporated additional pillars to quantitative requirements (strengthening of market governance and discipline) to help maintain the solvency and integrity of the banking system.

The financial crises at the end of the 20th century and start of the 21st century served as

a reminder to the international financial community that globalization was not just a phenomenon that led to interdependence between the world's different economies to catalyze their productive capacities, rather this interdependence meant that financial crises affecting domestic markets had the potential to affect the international financial system. This was confirmed by the financial crises in Mexico (1994), Asia (1997), Russia (1998), Argentina (1999) and Turkey (2001). Without overlooking the most recent financial crises resulting from the bankruptcy of Lehman Brothers in the U.S. (2008) and the subsequent sovereign debt crises in Europe (2012).

The response of international financial institutions to these circumstances was to roll out an expansive process to standardize financial supervision practices and regulations, as a way of establishing minimum levels of oversight and control that would reduce the possibility of critical situations affecting local financial systems and, as a result of growing globalization, the effects of these situations being felt by the international financial system. The effect of this strategy was a call for organizations that comprise financial supervisors (the Basel Committee on Banking Supervision, the International Organization of Securities Commissions and the International Association of Insurance Supervisors) to make more explicit progress in the definition of regulatory and supervisory standards that might be adopted by their members.

Concerning insurance companies, which represent one of the main institutional investors worldwide, the development of prudential regulations has followed a different path to the one taken by credit and securities companies, although in recent years it has had to converge with conceptual elements

common to the rest of the financial system. Despite insurance industry regulations having traditionally been limited to domestic markets, currently, they are undergoing a regulatory homogenization process.

Regulatory progress concerning insurance markets has been structured around three important axes. The first consisted of the International Association of Insurance Supervisors (IAIS) starting to prepare the regulation and supervision principles and standards. The second, regionally and in terms of the main markets, was the decision to modernize existing solvency regulation systems. And the third, the definition and establishment of macro-prudential oversight measures to limit the potential systemic effects resulting from insurance activities and, thus, contribute to maintaining financial stability worldwide.

These new insurance solvency frameworks tend, in turn, to be structured around three basic principles. First, the establishment of capital charges according to the individual risk profile of each company, creating a pro-competition incentive to the extent that better risk management translates into lower capital requirements and, consequently, a competitive position in the market. Second, a strong push for more rigorous governing that equally emphasizes risk identification, measurement and management. And third, greater transparency and information disclosure to the market.

However, the development of regulations in the insurance industry is taking place progressively and asymmetrically by countries and regions. Section 3 of the study analyzes, for a sample of countries and world regions considered representative, the progress toward a purely risk-based regulatory system, to which end a specific metric has been employed to perform this comparison, known as the "proximity index toward a risk-based regulation" (I-RBR).

The first step on the road to standardizing solvency requirements was taken on the European Economic Community insurance market in the 1970s, with the adoption of

Directives to create the solvency margin system (dubbed *subsequently* Solvency I) for Non-Life (1973) and Life (1979) activities. The same occurred in the United States, the world's other major insurance market, with the Risk-Based Capital (RBC) system at the start of the 1990s.

The adoption of Solvency I and RBC type models served and continues to serve as a reference point in terms of regulatory progress for the world's other insurance markets, in particularly in emerging markets. However, this progress has not always been made applying the methodologies that served as a basis for building them, which has resulted in the implementation of rules that could have involved, under certain market conditions, the underestimation or overestimation of capital needs for these markets.

In 2016, the European Union took a definitive step following the entry into force of Solvency II, one of the most advanced risk-based solvency regulatory capital systems, alongside the Swiss Solvency Test, which seek to adapt capital requirements to the risk profile of each insurance company and its groups. Thus, an efficient allocation of capital is sought, within confidence levels considered adequate for the protection of policyholders.

In turn, in the United States, since the beginning of the 1990s, the National Association of Insurance Commissioners (NAIC) has been developing a standard method for calculating the minimum capital deemed necessary to support the undertakings of insurance companies, based on their size and risk profile, known as Risk-Based Capital (RBC) method, which is currently being revised by the Solvency Modernization Initiative (SMI). This system is defined by not being a standardized system, as the regulatory powers of the different States are decentralized. In their corresponding legal systems, States can include the model acts drawn up by the NAIC. Currently, some States have adopted them with amendments that do not affect the RBC calculation designed by the NAIC; therefore, it could be said that it generally applies to the insurance market in the United States.

In Latin America, although some markets like Mexico and Brazil have made significant progress in the regulatory adjustment process, generally speaking, there is still progress to be made on the regional level for the implementation of risk-based regulatory solvency capital calculation models, especially with regard to the pillar of quantitative requirements. It is worth noting that in countries with relatively small markets, steps have been taken to implement the governance requirements, dividing functions as part of which the risk function plays a significant role in the management of insurance companies, which, in any case, must be looked upon positively.

In Asia Pacific, Australia and Japan, two mature and developed insurance markets, progress with regulations is at a more advanced stage. Of the two, Australia is closer to implementing a risk-based regulatory system. Nonetheless, Japan has taken significant steps in terms of handling insurance and financing risks. At present, Japan's regulatory and supervisory authorities are in the process of developing aspects that require further improvement, performing field tests to assess the impact of their introduction, with a particular focus on the effects caused by long-term low-interest rates.

Furthermore, the sample of Asia Pacific region markets analyzed includes three emerging markets: the Philippines, Indonesia and Turkey. The Philippines and Indonesia have made progress in the handling of financial risks and those deriving from insurance obligations, maintaining, nonetheless, limits in terms of assets in which insurers can invest and a strict system concerning the authorization of new products. Finally, Turkey has the system that most closely mirrors Solvency I type systems, although some progress can be seen in relation to the handling of financial risks.

Worldwide, the International Association of Insurance Supervisors (IAIS) is working on creating harmonized solvency supervision frameworks, both for global systemically important insurers (GSIs) and internationally active insurance groups (IAIGs) with a view to creating a common supervision framework

(known as "ComFrame"), which includes, as one of its key elements, an international standard for calculating risk-based regulatory capital and market-adjusted assessments (International Capital Standard, ICS).

Section 4 of the study contains an overview of the status of regulatory progress and the preconditions and risks that this progress represents. One of the main ideas that can be drawn is that the implementation of risk-based regulations requires a series of institutional and market preconditions in order to ensure its effectiveness and to bring benefits for the functioning of the insurance market. In terms of institutional preconditions, this entails not just technical and organizational demands for the different market participants, but also a supervision body and an appropriately structured and efficient supervision process that satisfies the needs and requirements of a risk-based regulation system.

Concerning quantitative requirements, firstly insurance companies must have statistical information that makes it possible to model the risks that quantitative requirements entail. Risk measurements employ intensive statistical techniques (stochastic modeling) in terms of the use of information. The same goes for qualitative requirements, as part of which appropriate risk management by insurance companies is supported by the ability to employ this type of quantitative analysis technique. As a result, a first indispensable precondition for the application of a risk-based regulatory system consists of there being (in the form of a public good available to all market participants) sufficient, reliable, appropriate and homogeneous information concerning insurance operations, which makes it possible to model inherent financial and technical (underwriting) risks. In addition, this information must comprise a sufficiently far-reaching and detailed series and be generated from continuous bases.

Secondly, trained, knowledgeable and skilled professionals must be available to undertake risk modeling work (actuaries, mathematicians and, in general, professionals with skills in the field of quantitative techniques) on continuous bases. These professional profiles will be required both by

the supervisory body and the insurance industry and demand for them may increase insofar as, on the one hand, this type of measurements are performed internally as part of the operations of institutions and, on the other, the market grows and evolves. Furthermore, the market itself may require this type of professional profile to perform parallel functions (external auditing, consultancy, external analysis, etc.).

Thirdly, efficient financial markets are required whose development makes it possible to undertake efficient asset-liability management (ALM), which represents one of the essential activities in the risk management process. This process consists of matching terms, duration and interests rates among the obligations deriving from insurance policies and the investments of insurance companies with an appropriate approach to credit risk management. To this end, having adequate knowledge of the characteristics of the company's technical liabilities is insufficient; efficient financial markets are also required whose level of development makes it possible to retain investment instruments that provide for an efficient ALM process.

Fourthly, and linked to the preceding precondition, it is essential that the guidelines framework does not establish limits (other than rationale of insurance activity regulations) relating to the acquisition of financial assets available on financial markets (for example, financial assets in foreign currency). The presence of this type of limitation in specific markets would impede or significantly hinder the ALM process and, as a result, the adequate implementation of risk-based regulations.

And finally, legal barriers to reinsurance operations must be removed, as applicable, in such a way that it is possible to adequately disperse and mitigate technical risks so that, by pooling other risks on the international stage, their potential impact on the insurance company that directly assumed them can be mitigated.

In terms of governance requirements, progress made implementing this type of

regulatory model requires the development of a organizational and business culture to a certain extent, insofar as governing bodies are able to formally and genuinely act as a driving force in the management of companies, structured around an appropriate risk management strategy. Therefore, the adaptation process is by no means a quick process; rather, it involves, in most cases, an organizational adaptation and maturation process that makes it possible to internalize regulatory standards. This process must be based on solid basis in the medium term, as demonstrated by the mature regulatory systems developed in this connection.

In terms of products and competition, the absence of legal limitations is an essential pre-requisite (the logical limitations of a prudent approach to solvency management aside) so that companies can adjust the pricing of their products, in terms of essential tools that, on the one hand, protect the financial position and solvency of companies in the event that specific financing and underwriting risks arise and, on the other, facilitate a reaction in light of competition on the market.

Finally, in terms of the disclosure to the market, assessment mechanisms must be in place that make it possible for the market discipline mechanism to work effectively. Risk-based regulation models seek to complement elements of regulatory discipline that impose quantitative requirements and implicit self-discipline as part of the process for consolidating governance, catalyzing the concept of market discipline through greater disclosure of information. Although it is true that for this mechanism to operate, more information must be disclosed by companies to the market, this condition does not suffice. Mechanisms are also required on the market that allow for this information to be subject to assessment.

The existence of this series of institutional and market preconditions that facilitate effective and efficient risk management appears to be dependent upon the further development and speed of this type of regulatory model in the different markets. Making progress on

implementing this type of regulatory system without these pre-requisites being met may limit the benefits of it being implemented and, under certain conditions, even lead to undesired effects compromising market operations.

Although it is true that risk-based regulatory models, by trying to align prudential regulatory objectives with incentives to create an environment that encourages competition, structured around efficient risk management, may enhance the performance of insurance markets, these models are more complex and require the implementation and development of a new institutional and market structure that, as a result, entail long-lasting design, implementation and internalization processes. Therefore, particularly in terms of emerging markets, the first phase for implementing risk-based regulations involves developing these institutional and market pre-requisites, which entails embarking upon a medium-term task, coordinated between financial authorities and the insurance industry. Ideally, the development of these pre-requisites and the implementation of risk-based regulatory standards would progress at an equal pace, thus ensuring that regulatory systems are mature and stable.

In conclusion, the progress toward risk-based regulations is an element that can stimulate the growth of the supply and, therefore, increase the participation of insurance in the economy, in that it allows for a more efficient allocation of the capital, and creates incentives for more professional management of insurance entities based on considerations and parameters of a technical nature. However, this regulatory progress can greatly contribute to the goal of developing the market, when it is carried out gradually and in parallel to the development of technical capacities of both the industry and regulators, as well as to the creation of the necessary market infrastructure for its proper implementation. Otherwise, regulatory progress (which would be difficult to comply with) could lead to unwanted consequences, such as the establishment of barriers to entry for certain business lines, or an inefficient allocation of resources, which ultimately would negatively impact the penetration levels of the respective insurance markets.

1. Conceptual Framework

1.1 Market failures and regulation in the financial system

The insurance industry and economic performance

Financial activities maintain close ties with practically all areas of economic operation, meaning that the adequate performance of financial markets is of interest not just to those directly involved in this sector, but also to society as a whole (public interest). This assertion can clearly be applied to the insurance industry, insofar as it represents one of the components of the financial system.

Furthermore, the process of protection and compensation of risks carried out by the insurance industry supports the functioning of the different industries of the real economy (primary activities, industry and services) through the wide variety of third-party liability insurance and against damages. Similarly, insurance provides stability and continuity to the economic process in the face of the occurrence of catastrophic events, helping the economy to normalize its operation in relatively short periods. Insurance also stimulates and makes it possible to carry out multiple activities and sales transactions, both domestic and foreign trade. From the point of view of families, the insurance activities provide stability to personal and family income through the protection and compensation offered by life, accident, health, home and automobile insurance.

Additionally, in the performance of one of the essential functions of insurance in the economy, this industry supports the process of savings/investment. Through life insurance with a savings component (both Life-risk and Life-investment), the insurance industry contributes to the creation of internal savings

in the economy as part of its role as an institutional investor, and to the process of generating capital. The insurance industry is one of the main institutional investors on a global level; a function which not only channels savings toward financing productive activities, but also (due to the characteristics of its business model) provides the economic system with an element of non-cyclical stabilization.

Thus, its influence on the functioning of the insurance industry (and the financial system as a whole) can have an impact on the level of efficiency with which the different related economic activities are performed. Thus, given the importance of preserving the adequate functioning of financial markets (and insurance markets in particular) in terms of their inherent public interest, they are subject to regulatory frameworks that seek to contribute to the industry preserving sound finance and solvency parameters.

The bases of prudential regulation

Generally speaking, it is accepted that financial markets (including the insurance markets) are subject to what are known as market failures. In other words, circumstances in which the allocation of resources via pure market mechanisms may be inefficient under specific conditions. When these failures become apparent, States become involved in financial markets to prevent distortions that may affect the efficient of general economic functions.

In the case of the financial markets, market failures tend to be associated with three main aspects: (i) the concept of asymmetric information; (ii) the possible existence of market power and (iii) the generation of negative externalities.

In the first case, the economic concept of asymmetric information occurs when information retained by buyers or sellers is somehow deficient, whether because it is incomplete or because it is inaccurate. Generally speaking, it is considered that clients of financial institutions have incomplete information in terms of the products they wish to acquire and the financial conditions of the institutions offering these products. This leads to a situation of asymmetry in the information that both parties retain; this may lead to the inefficient assignment of resources from the general perspective of the economy, as it means that consumers are unable to differentiate between the characteristics of the products being offered and the financial resilience of the corresponding institutions.

In the second case, potential market power occurs when the seller (or the buyer, as applicable) may wield significant control over market prices given its size or operating conditions. This can be traced to the absence of a competitive market (caused by excess concentration) or the presence of practices that restrict or limit competition. Furthermore, the issue of market power may be exacerbated if, on the grounds of public interest, the government sets up access barriers or subjects products to price controls.

Finally, in the third case, negative externalities occur when costs (which are not in return for services) are imposed on others, which can be seen when a company goes bankrupt and is forced to abandon the market. Given the nature of the role of financial institutions, bankruptcy involves costs not only for the institution's shareholders (who lose the capital they invested), but also for its clients (who may lose part of their equity managed by the institution), and in a wider sense, costs associated with the systemic impact of financial activities in terms of product/income for the real economy in general.

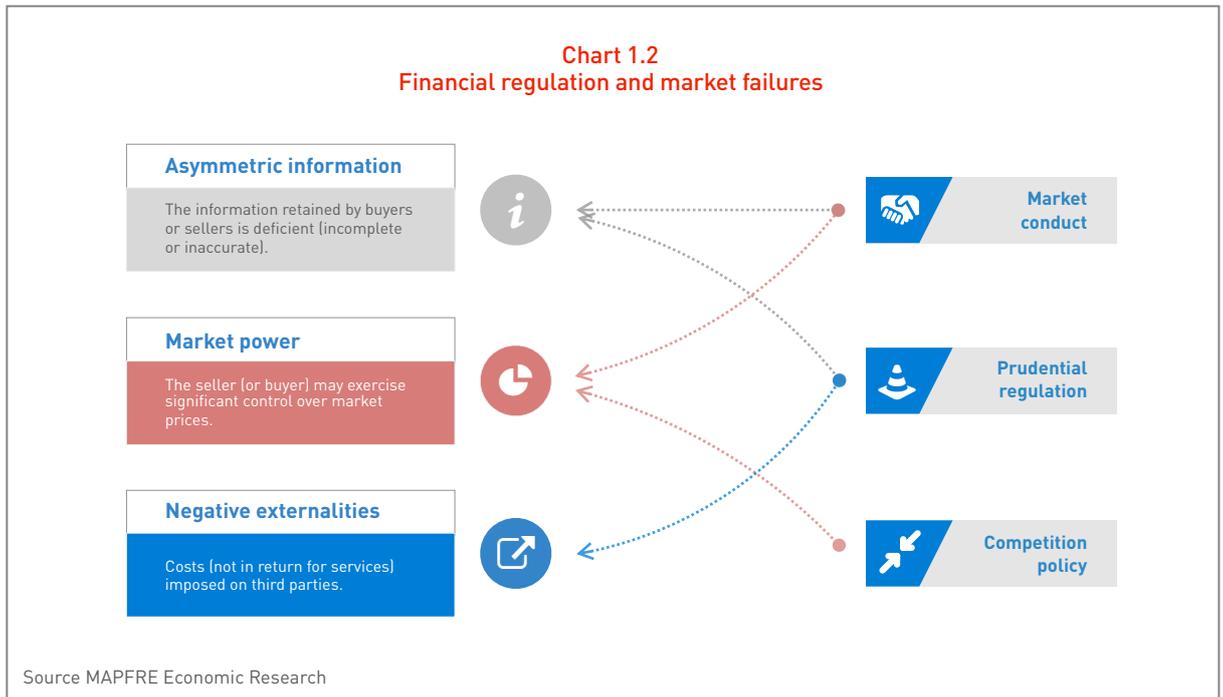
1.2 Tools for intervening in financial markets

To face these market failures in the financial systems, governments tend to use three public policy instruments: (i) regulation of market conduct; (ii) policy of economic competition, and (iii) prudential finance regulations. Regulations to control market conduct seek to regulate the behaviour of intermediaries at finance companies and their agents with their consumers. Competition policies, usually reflected in anti-monopoly laws and standards, seek to prevent certain conduct demonstrated by financial institutions that have a significant impact on competition. And finally, prudential regulation seeks to control and monitor the financial conditions and solvency of financial institutions with a view to reducing the likelihood of bankruptcy.

Asymmetric information

To face the problem of asymmetric information, essentially two public policy instruments are available. On one hand, regulations to control market conduct and, on the other, specific prudential regulation elements (see Chart 1.2).

Furthermore, market conduct control regulations have traditionally emphasized the increase in transparency towards the market by financial institutions in order to increase the amount of information available to the consumers of financial products. This type of measure underscores the precision, completeness, appropriateness and relevancy of information provided to the market, both in terms of products themselves (to facilitate well-informed decisions) and the financial position of institutions and the conglomerates they form part of (levels of disclosure). The goal is for information to be accessible not just for supervisors to use, but so that it is also available to other market participants (ratings agencies, intermediaries, auditors, financial analysts and the public in general).



Additionally, from the perspective of prudential regulation instruments, the greater disclosure of information to the market (to tackle the issue of information asymmetry) forms part of all modern prudential systems (third pillar).

In addition to the desired effect of disclosing information on the market discipline mechanism, prudential regulation also represents a key aspect in limiting the effect of contagion among financial institutions experiencing difficulties. In other words, the risk that financial difficulties experienced by one member of a conglomerate adversely affect the stability of the group as a whole or the market (in the form of a negative externality), whether psychologically (loss of confidence in other companies that form part of the conglomerate) or intra-group contagion (receivables between companies in the same group, cross shareholdings and capital pyramiding, purchase or sale of securities or guarantees granted between group companies).

Market power

To address the issue of market power, public policy instruments that are typically employed include the regulation of market conduct and, more notably, economic competition policy, reflected in the implementation of the so-called anti-monopoly laws.

Greater transparency toward the market represents a powerful tool for limiting the existence and spread of practices that limit competition, as it provides consumers with information about the different options available on the market. However, the greater disclosure of information tends to be backed up by the implementation of anti-monopoly laws. This series of measures (that transcend the financial system's framework and are usually applied to a series of activities in an economy) serves, generally speaking, to prevent anti-competitive behavior between different economic stakeholders, punishing conduct such as price collusion, market share agreements and exclusive agreements, among others.

Negative externalities

Finally, the issue of negative externalities constitutes, without doubt, the market failure that accounts for the largest part of public policy measures concerning financial markets. To overcome these negative externalities, prudential regulation is used.

Given the nature of this potential market failure, prudential regulations focus on establishing measures to preserve the solvency of financial institutions, with a view to limiting the likelihood that they go bankrupt or abandon the market, which could trigger a series of negative effects to the detriment of consumers and, in a broader sense, general economic functionality. To this end, prudential regulation standards are typically rooted in a series of quantitative requirements imposed on financial companies (reserves and capital), linked to the risk levels assumed by the different companies, under different technical parameters.

Additionally, prudential regulation emphasizes two other aspects that seek to reduce the likelihood of a company facing issues in terms of its financial position and solvency. The first is structured around the strength of governance at institutions, under the principle that the more solid and properly applied self-governance rules to which internal operations at companies are subject, the lower the likelihood of bankruptcy. Therefore, corporate governance standards address a range of ideas, from the responsibilities of governing bodies and the probity and competence of direct managers at companies (fit & proper), to the definition of key functions (risk management, control and auditing) that the company must perform, in addition to general parameters for doing so. And the second, has to do with raising the disclosure of information to the market, as a way to stimulate the functioning of the market discipline mechanism, that is ultimately another factor that incentivizes the appropriate management of the companies.

It is worth noting that prudential regulation takes on specific characteristics when its objectives must be performed looking not only at financial companies independently, but also at conglomerates (financial or hybrid) with which, as applicable, they are related. In these instances, issues in terms of the functions of management bodies, fitness and propriety tests to which direct managers are subject, the prevention of regulatory arbitration, potential conflicts of interest, the transfer of the risk of bankruptcy, the possible mixture of investment portfolios, intra-group operations outside market parameters, tied sales (subject to conditions or as part of packages) and even the promotion of systemic risk, usually entail the adoption of additional regulatory standards.

1.3 Trends in insurance activity regulation

The dynamics of financial regulation

Financial regulation has evolved significantly in recent years, in particular over the course of the past two decades, in line with the process of economic and financial globalization. Without doubt, this regulatory process has been led by banking regulators who, via the Basel Committee on Banking Supervision (BCBS), introduced, at the end of the 1980s, what would become the first prudential global risk-based regulatory framework (the so-called Basel Accord, subsequently referred to as Basel I). This initial agreement, although adopted by the governors of the central banks of the main developed economies (Germany, Belgium, Canada, Spain, the U.S., France, Italy, Japan, Luxembourg, the Netherlands, the United Kingdom, Sweden and Switzerland) would soon be adopted as an international standard that was implemented by practically all the economies on Earth. Basel I was succeeded by other adjustments to the global framework of banking regulation introduced by Basel II (2004) and Basel III (2010), all of which have developed and fine tuned risk measurements as an essential factor in the

determination of capital burdens and incorporated additional pillars to quantitative requirements (strengthening of market governance and discipline) to help maintain the solvency and integrity of the banking system.

Concerning insurance activities, the development of prudential regulation has followed a different path, which, however, in recent years has had to converge with conceptual elements common to the rest of the financial system. Despite insurance industry regulation having traditionally been limited to domestic markets, the real-life circumstances of global markets called for progress to be made toward regulatory homogeneity.

The first step on the road to standardizing solvency requirements was taken on the European Economic Community insurance market in the 1970s, with the adoption of Directives to create the solvency margin system (dubbed subsequently Solvency I) for Non-Life (1973) and Life (1979) activities. The same occurred in the United States, the world's other major insurance market, with the Risk-Based Capital (RBC) system at the start of the 1990s. The National Association of Insurance Commissioners (NAIC), the figure responsible for coordinating the regulatory system at a State-level throughout the U.S., developed this method to measure the minimum capital charge required by insurance companies to support their activities, based on their size and risk profile.

Both models made progress toward the harmonization of prudential regulation in the corresponding geographical regions and, in this connection, started to serve as a reference point for regulatory progress for the world's other insurance markets. Nonetheless, it must be noted that the uptake of Solvency I and RBC models in other markets (particularly in emerging markets) has not always been made applying the methodologies that served as a basis for building them; rather, often the risk factors resulting from the original designs are used, which has resulted in the implementation of rules that could have involved, under certain market conditions, the underestimation or overestimation of capital needs for said markets.

Standardization and harmonization of insurance regulation

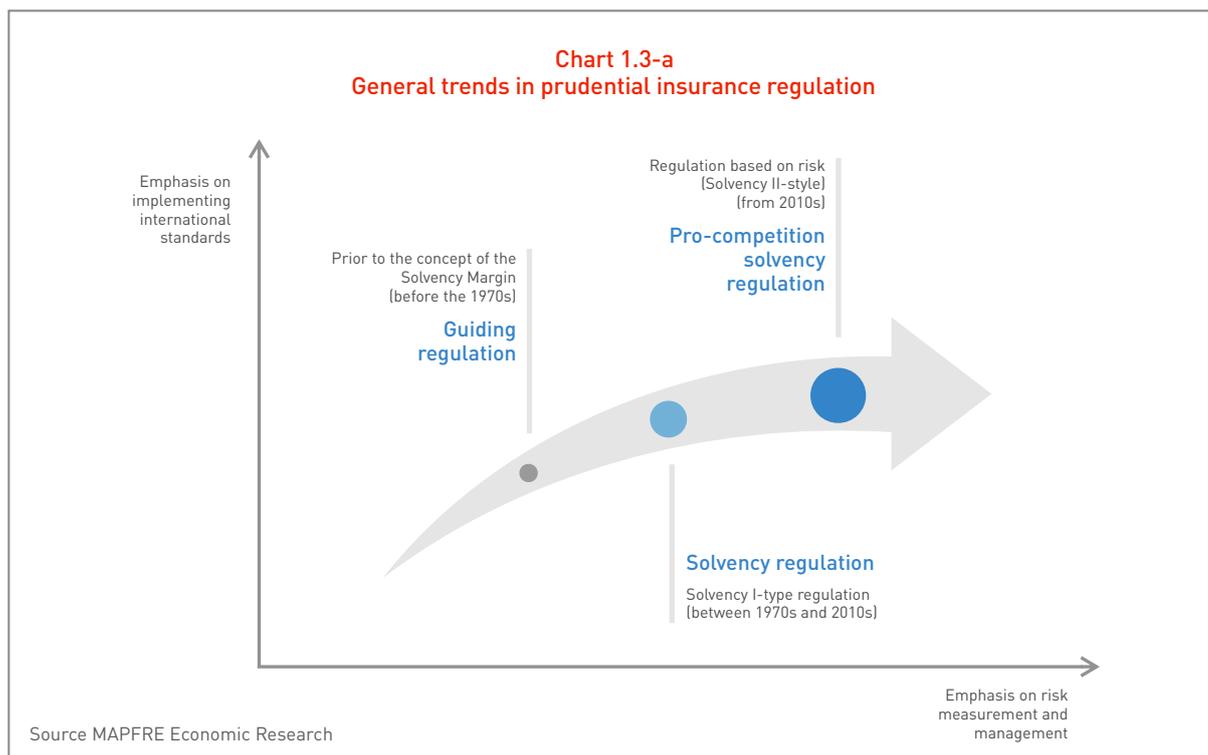
The financial crises at the end of the 20th century and the start of the 21st century served as a reminder for the international financial community that globalization was not merely a phenomenon that had led to interdependence between the world's economies to strengthen their production capacity, rather that this interdependence could also result in domestic financial crises spreading to the international financial system. This was confirmed by the financial crises in Mexico (1994), Asia (1997), Russia (1998), Argentina (1999) and Turkey (2001).

The response of international financial institutions to these circumstances was to roll out an expansive process to standardize financial supervision practices and regulations, as a way of establishing minimum levels of oversight and control that would reduce the possibility of critical situations affecting local financial systems and, as a result of growing globalization, the effects of these situations being felt by the international financial system.

The effect of this strategy was a call for organizations that comprise financial supervisors (the Basel Committee on Banking Supervision, the International Organization of Securities Commissions and the International Association of Insurance Supervisors) to make more explicit progress in the definition of regulatory and supervisory standards that might be adopted by their members.

In terms of the field of insurance, this global initiative has been structured around three important pillars. The first consisted of the International Association of Insurance Supervisors (IAIS) starting to prepare the regulation and supervision principles and standards, which have gradually been implemented by member countries of the standard-setter organization.

The second, regionally and in terms of the main markets, was the decision to modernize existing solvency regulation systems. Against this backdrop, work began on the European Solvency II project, the Solvency Modernization Initiative (SMI) at the NAIC in the U.S. and the



development of the Swiss Solvency Test by the finance authorities in Switzerland, among others.

The third, linked to the 2008 financial crisis following the bankruptcy of Lehman Brothers in the U.S. and the subsequent sovereign debt crisis in the EU, was the definition of macro-prudential oversight measures to limit any potential systemic impact resulting from insurance activities and, thus, contribute to maintaining global financial stability. In this context, the project to establish the International Capital Standard (ICS) by the IAIS was embarked upon; this risk-based capital sufficiency measure will initially apply to Internationally Active Insurance Groups (IAIG) and Global Systemically Important Insurers (G-SIIs), and will subsequently be rolled out to individual companies under the different national regulations and become a genuine global capital standard (similar to the way in which Basel III applies to banking activities internationally).

Thus, in recent decades, insurance regulation has moved from regulations that serve merely as guidelines based on general technical definitions and with a particular focus on local phenomena (prior to the creation of the first solvency margin models in Europe), firstly

toward solvency regulations structured both around the European Economic Community's solvency margin (Solvency I) and the risk-based capital (RBC) system in the United States (between 1970 and 2010), before heading toward a solvency regulation of a more pro-competition nature, supported by models (like Solvency II) under which, on the one hand, capital charges are more closely associated with the specific risk levels of each insurance company and, on the other, that complement qualitative capital requirements and technical provisions, with more solid governance and higher levels of information being disclosed to the market, which for the purposes of this study, shall be called "risk-based regulation" (see Chart 1.3-a).

Currently, most of the world's insurance markets are immersed in a continuous regulatory adjustment processes, which are still structured around the three aforementioned scopes: the regulatory standardization and oversight practice process; the modernization of solvency systems toward risk-based models and progress establishing a global solvency system (similar to the system employed in the banking sector), which contributes to maintaining global financial stability.

Chart 1.3-b
General components of the risk-based regulatory frameworks for insurance



Source MAPFRE Economic Research

These new solvency models toward which the world's different markets are headed, seek to address four essential elements (see Chart 1.3-b). Firstly, a series of quantitative requirements in terms of capital requirements, technical provisions, investments and reinsurance that guarantee the financial position of insurance companies. Secondly, a series of governance rules that seek a more professional level of management (structured around risks), at companies, on the understanding that this factor helps to limit the likelihood of a firm going bankrupt. Thirdly, prudential regulatory standards that may affect competition and innovation and, therefore, the efficiency of the market, such as those applicable to products that may be sent

out to market and the corresponding structure and price conditions. And finally, a series of rules concerning transparency and information disclosure to the market, which seek to enhance the functionality of the market discipline mechanism as an additional element for encouraging management of companies that helps to reduce the likelihood of insolvency.

This study explores these aspects in more depth, based on the analysis of the regulatory frameworks applied in different parts of the world (USA, Latin America, Asia Pacific and the European Union), in addition to global initiatives in this connection.

2. Focus of the analysis performed

2.1 Characteristics of the analysis

As mentioned above, financial activities, in general, and insurance activities, specifically, are subject to international regulatory and supervisory frameworks, which are intended to ensure that these companies preserve their solvency and, to that extent, can honor their commitments to the public and contribute to the adequate functioning of the economy and the stability of the financial system. Using the prudential mechanisms set out in regulatory frameworks, the goal is to mitigate the effect of asymmetric information (which occurs when the financial users' information is deficient, incomplete and imprecise) and the negative externalities (which implies, in situations of bankruptcy of a company, imposing costs on consumers who are not compensated with respective services).

Although prudential regulation of financial activities serves the purpose of protecting public interest in the dimension of compensation of these market failures (and more recently also contributing to global financial stability), the application of the regulatory measures implies a certain degree of "interference" with the operation of the market, and consequently can have an effect on the behavior of the participants and, ultimately, on creating a supply of financial services. Against this backdrop, in recent decades, the prudential regulations in the financial system (and those applicable to the insurance industry) have been subject to constant adjustment process, the common denominator being the progress toward risk-based schemes that seek to align the incentives of participants in a pro-competition environment, providing stimuli to obtain comparative advantages depending on the quality of risk management.

Thus, risk-based solvency capital systems, by adapting capital requirements to the risk profile of each company, seek to efficiently assign capital within confidence levels considered

appropriate to protect policyholders. In fact, strictly speaking, treating all insurers the same, regardless of their risk profile, would amount to an intervention that goes against the principle of competition and would not only entail a potential entry barrier for specific businesses, but also the inefficient allocation of resources.

As mentioned above, the insurance industry has seen significant progress in the last decade regarding regulatory systems that tend to converge on three basic principles. First, the establishment of capital charges according to the individual risk profile of each company, creating the aforementioned pro-competition incentive to the extent that better risk management translates into lower capital requirements and, consequently, a competitive position in the market. Second, a strong push for more rigorous governing that equally emphasizes risk identification, measurement and management. And thirdly, greater transparency and disclosure of information to the market, in order to expand the mechanisms that allow a more effective operation of the so-called "market discipline"; i.e., the process by which the market rewards the best managed companies.

For the purposes of this study, we have analyzed the prudential regulations applicable to insurance companies and their groups in different countries worldwide. With a view to systematizing the analysis, a total of twenty-three relevant factors have been taken into consideration, which are typical of the different solvency regulation systems and which are apparent, to greater or lesser extents, depending on their development toward purely risk-based systems. The list of factors considered can be consulted in Table 2.1.

The regulatory elements identified have been divided into three groups (see Table 2.1). In the first group (Group A), elements that are typically closer to a prudential regulation, less

sensitive to the particular risk profile of each insuring company (Solvency I-style) are included. The second group (Group B), contains regulatory elements that introduce a higher complexity and closeness to capital models based on risks that represent movement toward that type of prudential regulation model (transition elements). And the third group (Group C), includes the regulatory elements of greater technical complexity, such as internal risk modeling, dependencies between risks and stress tests, which require a high computational load and a high degree of technical specialization—characteristic of a more sophisticated solvency capital risk-based system.

In the most simple systems (Solvency I-style), the determinant factor of mandatory solvency capital is normally determined by the risk of underwriting, with a system based on one or several factors applied to figures that are considered representative of the level of exposure to insurer risk such as premiums, the claims ratio in Non-Life insurance or mathematic provisions in Life insurance. This requirement is accompanied by a series of additional rules on governance and investments to limit market and credit risks, introducing specific regulatory limits for diversification and dispersion, as well as a classification of assets (closed list mode) considered fit to cover the obligations derived

Table 2.1
Elements considers to assess local regulations

Group	Regulatory evaluation elements	
A	1	Limits on investments: list of suitable assets
A	2	Limits on investments: percentage of diversification
A	3	Life and Non-Life Underwriting Risks, not disaggregated
A	4	Prudential interest rate in mathematical provisions
A	5	Authorization / prior registration of policies or technical bases
B	6	Market valuation of assets
B	7	Valuation of technical provisions: best estimate and risk margin
B	8	Reinsurance regulation - counterparty risk
B	9	Underwriting risk by homogenous groups
B	10	Financial Risk
B	11	Risk of mismatch (<i>mismatching</i>)
B	12	Operational risk
B	13	Market transparency - risk profile
B	14	Governance requirements: key functions/risks
B	15	Risk analysis of specific operations at group level (without capital requirement)
C	16	Explicit risk measures and dependencies between risks
C	17	Internal Risk Models
C	18	Stress tests - Dynamic solvency - ORSA
C	19	Market valuation without asset exceptions
C	20	Discount of provisions with risk-free rates without adjustments
C	21	Governance requirements: full integration of risk functions
C	22	Market transparency - complete breakdown of risk components
C	23	Risk-based regulatory capital at group level (with group capital requirement)

Source MAPFRE Economic Research

from the insurance contracts. Furthermore, these systems are characterized as they introduce prudential elements in the assessments of an insurer's assets and liabilities and strict standards in terms of authorizing the launch of new products onto the market.

For their part, more evolved systems in terms of the process of change toward a purely risk-based prudential regulation system (Solvency II-style) are characterized as the number of risk factors considered as part of prudential regulation is greater and more complex scenario simulation techniques are introduced for calculating specific capital charges due to underwriting, market and credit risks, considering the dependencies between risks, the use of internal models and the calculation of regulatory solvency capital at group level, among other aspects. These systems tend to include explicit risk measurement measures, with a pre-defined time horizon and level of confidence, such as Value at Risk or tail Value at Risk, which would be applicable both to the calculation of capital using standard formulas, as the factors or scenarios applicable under this measure are calibrated, or employing internal models.

In terms of shareholders' equity permitted to cover the capital requirements, more modern systems follow a comprehensive approach to economically assess the surplus considering the total balance sheet ("total balance sheet approach") as part of which assets and liabilities (and, as a result, the surplus) are subject to a market-consistent measurement; in terms of obligations deriving from insurance contracts, this is reflected in a calculation based on the best estimate and risk margin, which seeks to align the assessment with the hypothetical transfer price between independent parties. In addition, this provides insurance companies with the option of issuing hybrid financing instruments that can be used (subject to certain limits) to strengthen their solvency position, and whose consideration depends on the degree to which permitted losses are

absorbed in situations in which regulatory capital requirements are not met and/or in the event of insolvency (quality of capital instruments, or "tiering").

Prudential margins are not considered in asset and liability assessments under these systems, insofar as these margins are considered exclusively for the purposes of calculating regulatory capital, with a specific metric (VaR, tail VaR) and not when calculating shareholders' equity permitted.

Finally, the most modern systems are characterized as they do not impose limits on the list of assets in which insurance companies can invest beyond the general "prudent person" principle (the only limit tends to refer to the use of derivatives speculatively), nor regulatory requirements to spread investments; these aspects must be controlled in the framework of their own investment policies (bearing in mind that investments that entail greater risk require greater capital charges), and, in a broader sense, as part of the company's risk management process.

Furthermore, these regulatory systems extend risk analysis not only to the estimate of quantitative requirements, but also to functions related to governance (specifically concerning risk management) and transparency toward the market. In this connection, specific functions are defined for the board of directors at companies, emphasizing the need to develop a comprehensive risk management function.

Furthermore, these solvency systems tend not to establish requirements to be met prior to the launch of new insurance products onto the market, notwithstanding possible control measures applied at a later date by supervisory bodies. As is the case with investments, products that involve larger risk elements, assumed by insurance companies, will entail larger capital charges.

Finally, the most modern risk-based regulatory systems establish rules concerning transparency toward regulators and the market, as part of which the risk profile of companies and their groups are revealed (with a high level breakdown) in addition to advanced risk control elements that encompass all levels at the organization and include forecasts and prospective scenario analyzes, based on the business plans approved by the governing bodies and at shareholders' meetings. The foregoing is applied as a prerequisite for encouraging the most efficient functioning of the market discipline mechanism.

However, it is worth noting that between these two types, there are regulatory systems that, although they are based on Solvency I-style standards, have incorporated transit measures to move toward a system based essentially on risk assessment and measurement, more rigorous governance and higher levels of disclosure of information to the market.

2.2 Proximity index toward a risk-based regulation

Instrumentally speaking, in order to have a uniform metric that makes it possible to compare the status of the progress of regulatory frameworks analyzed toward systems based primarily on risk, an ad-hoc index has been constructed. The proximity index toward a risk-based regulation (I-RBR) seeks to identify the level of progress made by the different regulatory frameworks in terms of their shift from a basic risk-based regulation (Solvency I) toward a regulation focused on the more accurate management and measurement of risks, the strength of the governance approach at companies and a system for greater transparency and information disclosure to the market (Solvency II).

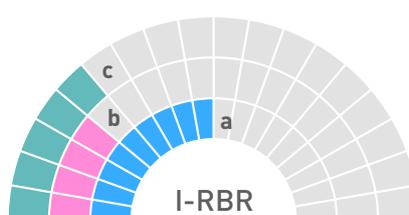
It is important to note that the I-RBR does not seek to rate the effectiveness or quality of market regulation or the effectiveness of supervision tasks, but rather to measure the transition process from regulatory

frameworks to risk-based regulations, both for purposes of establishing capital charges and to consolidate better management of capital, based on the terms established in the corresponding regulations.

In creating the I-RBR, a series of elements have been defined that characterize a system of prudential regulation, which have been valued in a particular way for each one of the analyzed markets and which have been divided into three groups (see Table 2.1). When analyzing the framework of each market's prudential regulation, these elements were evaluated on a scale of 0 to 10, depending on their characteristics and the degree of implementation in their respective regulations. For the purpose of constructing the index, a specific weight has been assigned to the joint evaluation of each group of elements. Firstly, Solvency I systems were considered to incorporate basic elements of prudential regulation that, to a certain extent, try to limit different sources of risk, so that the elements of Group A have been assigned a

Chart 2.2
Proximity index to a risk-based regulation (I-RBR): construction method

- Regulation based on pure risk (Solvency II-style)
- Transition regulation toward pure risk
- Regulation based on basic risk (Solvency I-style)



$$I-RBR = a(p_a) + b(p_b) + c(p_c)$$

where:

- a: evaluation of Group A elements
- p_a: weighting of Group A elements
- b: evaluation of Group B elements
- p_b: weighting of Group B elements
- c: evaluation of Group C elements
- p_c: weighting of Group C elements

Source MAPFRE Economic Research

weight of 0.3. Then, a weight of 0.6 has been assigned to the evaluation of the elements moving toward regulations based on Solvency II-style risk (Group B). Lastly, the weight is 1 for those factors that are considered determinants of the proximity to a Solvency II-style system or a pure risk-based capital system (Group C).

In this way, the I-RBR is constructed as the weighted sum of the valuation of that set of elements, and adopts a value of 10 when it is a regulatory system that is perfectly aligned to the measurement of pure risks (see Chart 2.2).

3. Analysis by regions

Based on the conceptual framework proposed, in addition to the characteristics of the analysis undertaken using the calculation of the proximity index to a risk-based regulation (I-RBR) described above, below is an analysis of the regulatory frameworks applied in different parts of the world (USA, Latin America, Asia Pacific and the European Union and, finally, the system being developed to create an international capital standard by the International Association of Insurance Supervisors) with a view comparing their progress toward pure risk-based regulations (hereinafter, risk-based regulations).

3.1 United States

This prudential regulation system applicable to insurance companies in the U.S. is defined by not being a standardized system, as regulatory powers of the different States are decentralized. However, State supervisors are organized under a national entity, the National Association of Insurance Commissioners (NAIC), which produces and publishes support documents used by State supervisors in their monitoring of insurance companies. These documents adopt the "Model Act" and instruction manuals that constitute guidelines with standards encompassing all aspects of the supervision framework, both in terms of quantitative requirements and governance system requirements, supervision procedures and the transparency of information before regulators and the market.

In their corresponding legal systems, States can include the model acts produced by the NAIC. Various States opt to incorporate them into their legislation without substantial changes; however, nor is it strange to see cases in which significant amendments are made. In turn, these model acts make

reference to the instructions that the NAIC draws up in the form of manuals and once adopted by the States, they become binding. These manuals are accessible and highly detailed, meaning that the system is highly predictable.

In terms of quantitative requirements, since the beginning of the 1990s, the NAIC has been developing a standard method for calculating the minimum capital deemed necessary to support the undertakings insurance companies, based on their size and risk profile, known as Risk-Based Capital (RBC) method. At present, a total of thirty-three States have decided to incorporate it into their corresponding legal systems without substantial amendments. For the rest of the States, the casuistry is diverse and the RBC method has been partially incorporated with certain changes, or versions that do not fully fall into line with the most recent versions drawn up by NAIC apply. In any case, these amendments tend not to reflect NAIC instructions on the RBC calculation, rather other aspects of the model act; therefore, it could be said that the RBC calculation designed by the NAIC generally applies to the insurance market in the United States.

However, to obtain a comprehensive overview of the quantitative requirements applicable to the regulation of this market, all aspects involved in the construction of the solvency ratio must be analyzed, both in terms of capital requirements (RBC) and establishing the capital held by the insurance company to cover these requirements (Total Adjusted Capital). The ratio resulting from comparing shareholders' equity permitted with regulatory capital requirements is used to establish the level of intervention that, as applicable, is needed to overcome potential difficulties or, in the worst case, insolvency.

When establishing the capital or shareholders' equity permitted, particular importance is placed on the valuations of assets and liabilities. The model act of the NAIC establishing the criteria for valuing assets is the "Investment of Insurers Model Act – Defined Limits Version"¹. This model act refers to the accounting valuation that insurance companies must undertake in line with the accounting criteria and valuation standards published by the NAIC, including its manual of accounting practices and procedures, the manual for valuing marketable securities or the instructions for drawing up annual financial statements, among others.

In terms of the valuation of liabilities, most States have assumed the "Standard Valuation Law"², which contains the accounting standard for valuing obligations deriving from insurance contracts in the United States and applies from 2017 onwards to the underwriting of new businesses. This standard is complemented by the "Standard Nonforfeiture Law for Life Insurance"³ and the "Standard Nonforfeiture Law for Individual Deferred Annuities"⁴. These model acts in turn make reference to the instructions contained in the NAIC valuation manual⁵.

This system for valuing reserves corresponding to insurance contracts introduces a new valuation method based on more modern principles, with cash flows projections and stochastic calculations applying to optional life insurance products, among others. It is yet to be adopted only in the states of Alaska, Massachusetts and New York (in addition to Puerto Rico), where the previous standard for valuing technical provisions remains in force⁶. The new standard only applies to the accounting of insurance obligations resulting from new business underwritten since its entry into force; therefore, portfolios assessed using the old valuation standards shall remain valid until their maturity. In these cases, interest rates and mortality tables are defined as the minimum prudential standard.

In terms of qualitative requirements, they are based on the "Risk management and Own Risk and Solvency Assessment Model Act" produced by the NAIC⁷, which has been adopted practically everywhere in the U.S.

Furthermore, in terms of the supervision of these aspects, the NAIC prepares support manuals for supervisory bodies which represent an important aid when valuing the sufficient ability of an infrastructure to effectively implement and control a risk-based prudential regulation system⁸. These manuals are available to the public; therefore, both supervisory bodies and insurance companies are aware of them.

The model designed by the NAIC in terms of limits applicable to investments, for the purposes of analyzing this study, is also worth particular mention, principally set out in two model acts, the "Investment of Insurers Model Act – Defined Limits Version"⁹ and the "Investment of Insurers Model Act – Defined Standard Version"¹⁰. This system is rounded off with the "Investments in medium and lower grade obligations Model Regulation"¹¹ and the "Derivative Instruments Model Regulation"¹². Various States have adopted these model acts with significant amendments in terms of the percentages applicable and the list of admissible assets, but all set out specific limits.

Finally, in terms of the necessary requirements for launching new products, the corresponding provisions are based on the "Interstate Insurance Product Regulation Compact"¹³ for life insurance, the "Property and Casualty sales rate and policy form Model Act"¹⁴ for damage insurance, the "Health policy rate and form filling Model Act"¹⁵ for health insurance and the "Product Filing Review" manual¹⁶ produced by the NAIC. Some significant changes have been made by States in their adoption of these model acts, particularly in terms of damage and health insurance; however, all contain prerequisites concerning new products to be launched by insurance companies.

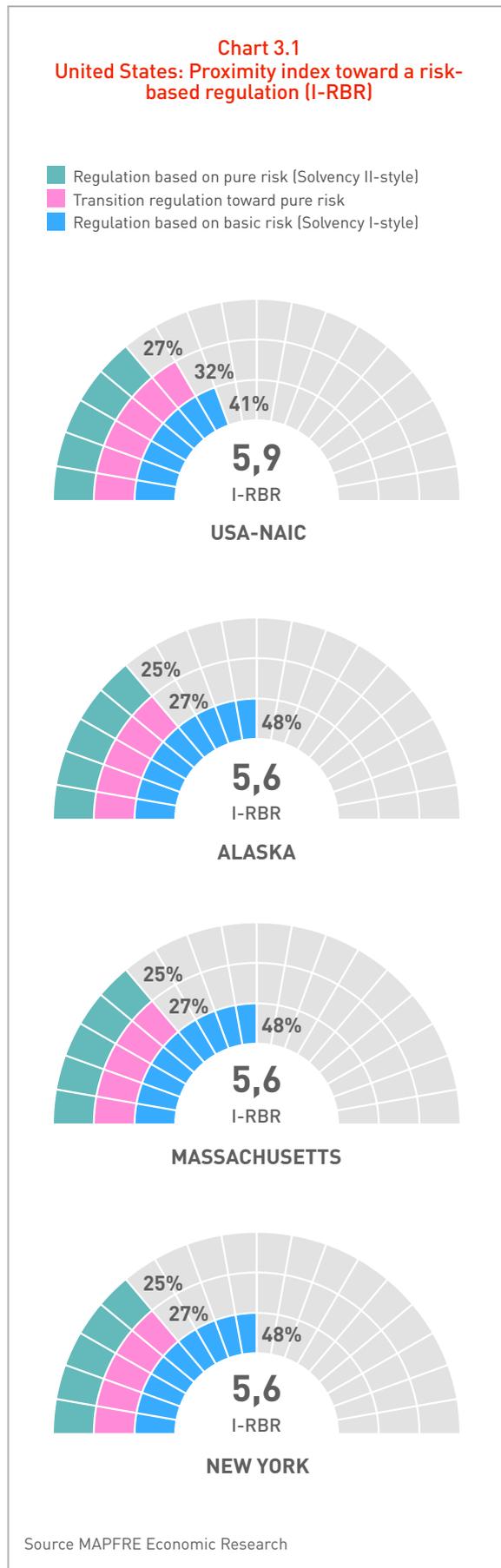
In defining the regulatory system for the U.S. insurance market pursuant to the proximity index toward a risk-based regulation proposed in the preceding chapter, it is essential to distinguish between the States that follow the system designed by the NAIC (Risk Based Capital) from those that contain specific features that significantly distance States from the aforementioned standard.

According to the most recent information available, the RBC has been implemented without significant changes in States with a high premium volume, as is the case of California, Florida, Illinois, Pennsylvania, Ohio, North Carolina, Virginia, Colorado or Maryland, among others (in total, thirty-three States). Others with high premium volumes have adopted them with specific features introducing elements that distance them, to a greater or lesser extent, from the original version of this system, as in the case of Texas, New York, New Jersey, Michigan, Georgia and Massachusetts, among others.

However, these specific features tend not to affect the calculation of quantitative requirements; therefore, for the purposes of the method employed in this study, they are insufficient for establishing a unique rating. The only element identified that introduces a different method of treatment refers to the valuation of obligations deriving from insurance contracts. In this regard, Alaska, Massachusetts and New York have failed to apply the new valuation standard set out in the most recent "Standard Valuation Law" published by the NAIC, with the preceding valuation standards still in force.

Concerning limits applicable to investments, although several States have adopted the standard NAIC system with significant changes, limits do apply; therefore, for the purposes of the analysis of the degree of proximity to a risk-based regulation, they shall be considered equally.

Finally, in terms of the requirements for launching new products, the life insurance standard has been adopted by most States, with the exception of the District of Colombia, Florida, Indiana and Vermont, and in terms of damage and health insurance, a large number of States have incorporated specific features but not enough to be considered separately.



Based on the foregoing, Chart 3.1 shows the proximity index toward a risk-based regulation (I-RBR) applicable in the States with similar treatment (US-NAIC) and separately, the index that applies to Alaska, Massachusetts and New York, which is somewhat lower on account of the fact that they have yet to adopt the most recent version of the valuation standard applicable to the technical provisions of the NAIC.

3.2 Latin America

In most Latin American countries analyzed¹⁷ regulatory solvency systems, Solvency I-style, remain in force, as part of which the determinant factor of the mandatory capital requirement is determined by the underwriting risk, with a system based on one or several factors applied on figures that are considered representative of the level of exposure to insurer risk, such as premiums, claims ratio (for Non-Life insurance) or mathematical provisions and/or risk capital (for Life insurance). In order to control other risks, such as financial risks, other additional rules on governance and investments have been introduced to limit market and credit risks, introducing specific regulatory limits for diversification and dispersion, as well as a classification of assets (closed list mode) considered fit to cover the obligations derived from the insurance contracts. Furthermore, most regulations in Latin America are characterized by the fact that they introduce prudential elements in the valuation of insurance assets and liabilities and envision, as is the case with all prudential regulations, a series of supervision measures designed to correct problems detected in a timely manner (see Box 3.2).

Generally speaking, it can be concluded that there is still a long way to go regionally in terms of the implementation of risk-based regulatory solvency capital calculation models, especially with regard to the pillar of quantitative requirements. In this connection, progress can be seen in terms of certain regulations introducing capital charges to include financial risk requirements, without considering the effects of risk diversification, which may result in an increase in capital requirements beyond what would be the case

when comprehensively implementing a purely risk-based system, which seeks to efficiently assign capital within confidence levels considered appropriate to protect policyholders.

In any case, consideration must be given to potential difficulties associated with complying with a purely risk based prudential regulation on the part of insurance companies and supervisory bodies, given the nature of the markets in question, as it would be difficult to implement an appropriate and sufficiently strong infrastructure for fully implementing these systems (this aspect is addressed in chapter four of this study). In this connection, it is worth noting that in countries with relatively small markets, steps have been taken to implement the governance requirements, dividing functions as part of which the risk function plays a significant role in the management of insurance companies, which, in any case, must be looked upon positively.

Chart 3.2-a
Latin America: summary of the index of proximity to a risk-based regulation (I-RBR)

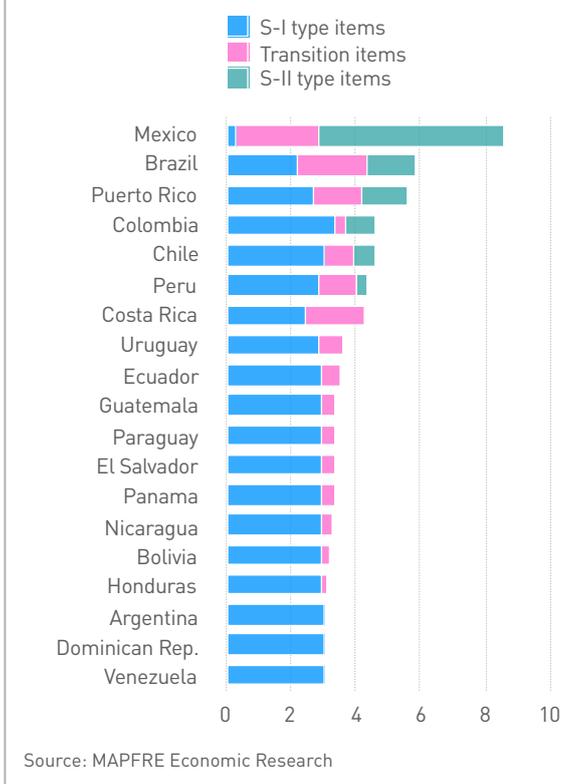


Chart 3.2-b
Latin America: Proximity index toward a risk-based regulation (I-RBR)

- Regulation based on pure risk (Solvency II-style)
- Transition regulation toward pure risk
- Regulation based on basic risk (Solvency I-style)

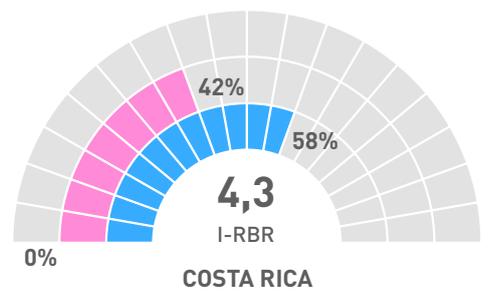
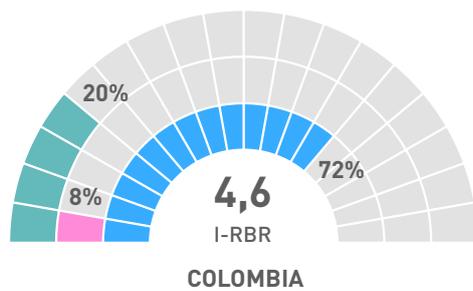
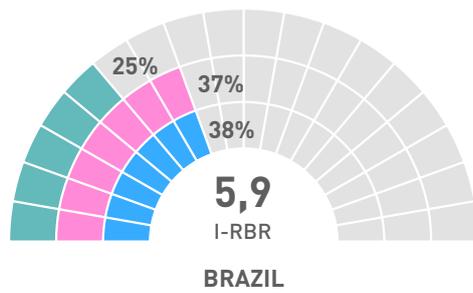
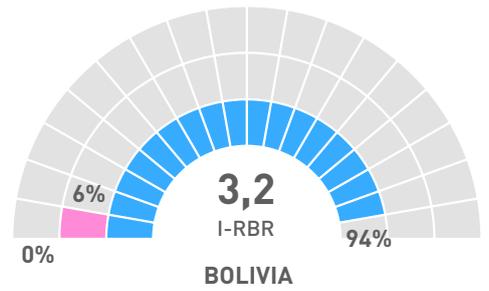
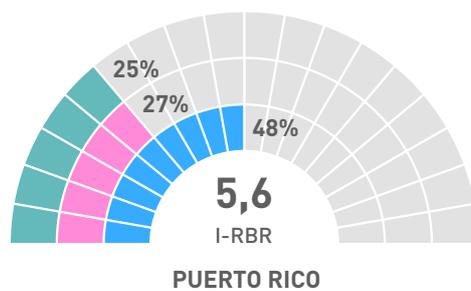
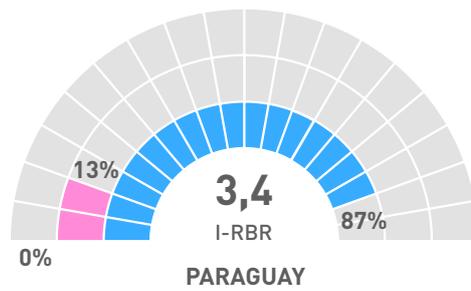
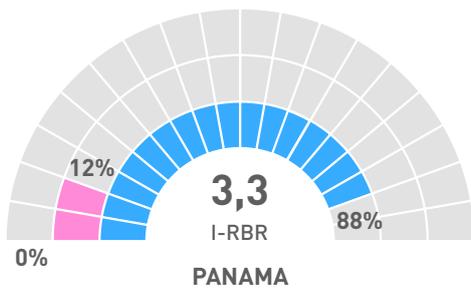
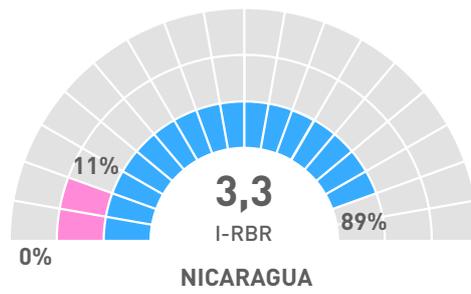
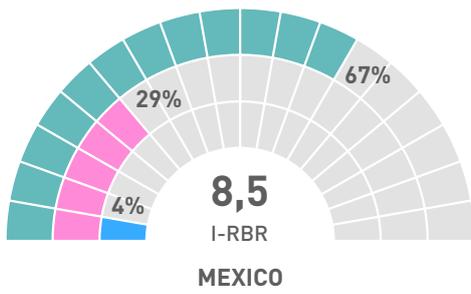
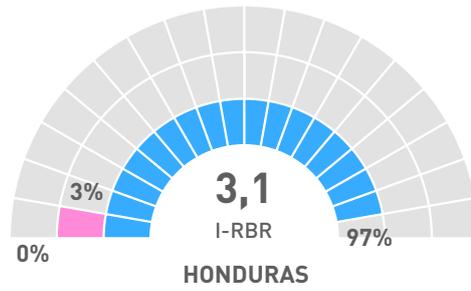
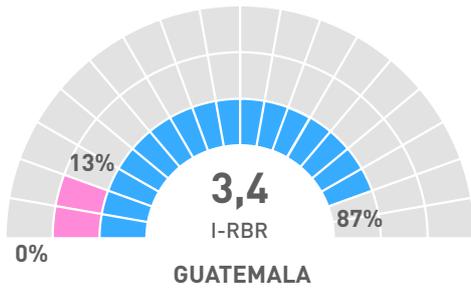
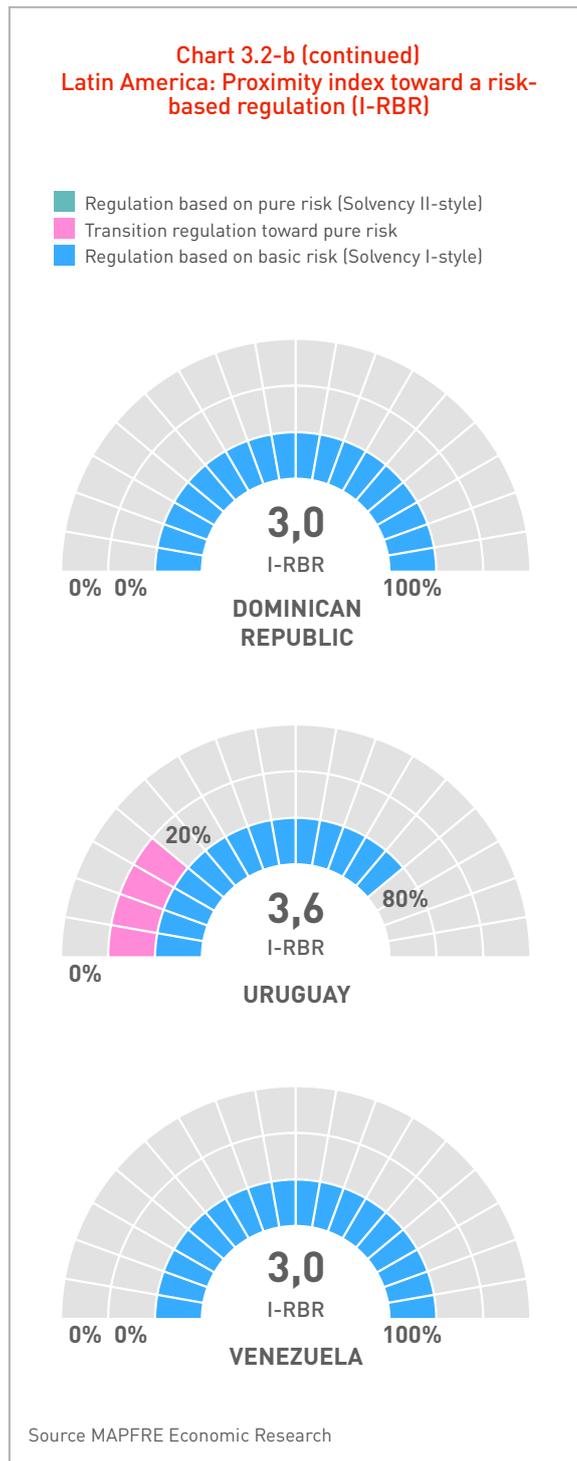


Chart 3.2-b (continued)
Latin America: Proximity index toward a risk-based regulation (I-RBR)

- Regulation based on pure risk (Solvency II-style)
- Transition regulation toward pure risk
- Regulation based on basic risk (Solvency I-style)





Under the analysis criteria of the regulatory measures formally implemented as a basis for calculating the proximity index to a risk-based regulation (I-RBR) applicable to countries in this region, insurance markets in Latin

American can be divided into three groups (see Chart 3.2-a).

The first group would consist of three insurance markets (Argentina, Dominican Republic and Venezuela), which have regulatory systems that essentially maintain the characteristics of the Solvency I-style systems, although no implanted measures have been identified that suggest a transition to risk-based systems. The composition of the I-RBR for each market can be consulted in Chart 3.2-b).

The second group would consist of ten markets (Costa Rica, Uruguay, Ecuador, Guatemala, Paraguay, El Salvador, Panama, Nicaragua, Bolivia and Honduras). Although they maintain a regulation based on a Solvency I model, they have progressed gradually and with different levels of depth, in the implementation of measures of transition toward risk-based regulation.

Lastly, a third group would be made up of six markets (Mexico, Brazil, Puerto Rico, Colombia, Chile and Peru), which, in addition to different degrees of progress in transitional measures toward risk-based regulation, have already implemented (also at different degrees of depth) measures that are fully consistent with Solvency II-style risk-based regulations. Furthermore, Mexico and Brazil have obtained the provisional declaration of equivalence to the Solvency II system by the European Commission for a ten-year period.

Finally, based on figures at year-end 2016, markets that maintain Solvency I-style regulation (Group 1) accounted for 13.5 percent of total insurance premiums in the region in 2016. On the other hand, the markets that, with Solvency I-style systems, have introduced transitional regulatory measures (Group 2) had 5.5 percent of regional premiums that year. And finally, the markets that have made the most progress in the regulatory transition process (Group 3) accounted for 81 percent of insurance premiums in Latin America in 2016.

Box 3.2
Main supervisory measures considered
in the regulation of insurance activity

Main supervisory measures
• Normal <i>off-site</i> supervision actions (indicator monitoring).
• General <i>on-site</i> revision (inspection visit under general revision parameters).
• Specific <i>on-site</i> revision (inspection visit under revision parameters for specific aspects).
• Meeting with general manager or management staff at the insurance company
• Meeting with the company's external auditors.
• Meeting with actuaries or those responsible for the design of technical notes for insurance products.
• Meeting with actuaries or those responsible for assessing technical provisions.
• Meeting with the company's internal auditor.
• Meeting with the company's audit committee.
• Meeting with those responsible for the risk area or unit at the company.
• Meeting with the company's board of directors.
• Amendment of the frequency with which technical and financial information is submitted to the supervisory body (less frequent than set out for companies not experiencing difficulties).
• Imposition of capital add-ons in line with changes to the risk profile.
• Request for a recovery plan (correcting irregularities) from the insurance company).
• Enforcement, as applicable, of sanctions on the company, directors or board members.
• Initiation, as applicable, of the process for reporting crimes.
• Imposition of a short-term financing plan on the company to restore its solvency.
• Limitation for registering or authorizing new insurance products.
• Suspension or limitation on the payment of dividends to the company's shareholders.
• Limitation on the free disposal of assets.
• Suspension or limitation on the payment of bonuses to the company's directors.
• Decrease in issuing or retaining premiums and/or acceptance of reinsurance operations at levels compatible with the company's equity resources.
• Transfer of the company's technical risk portfolio or start of actions to assess the feasibility of a merger with another company.
• Instruction for the company to inform the parties it insures that it has failed to comply with the recovery plan in the terms agreed with the supervisory body.
• Request for an ex ante settlement plan from the company.
• Moratorium on policy redemption rights.
• Restructuring of technical liabilities (adjustment to benefits of insured parties).
• Report, as applicable, to other financial regulators (local or foreign) of the problems faced by the company.
• Report to the competent authorities about the potential breach of other regulations to which the company is subject (for example, tax, data protection, etc).
• Replacement of the company's directors.
• Takeover of the company and replacement of its governing bodies.
• Withdrawal of its authorization to operate and winding up of the company.

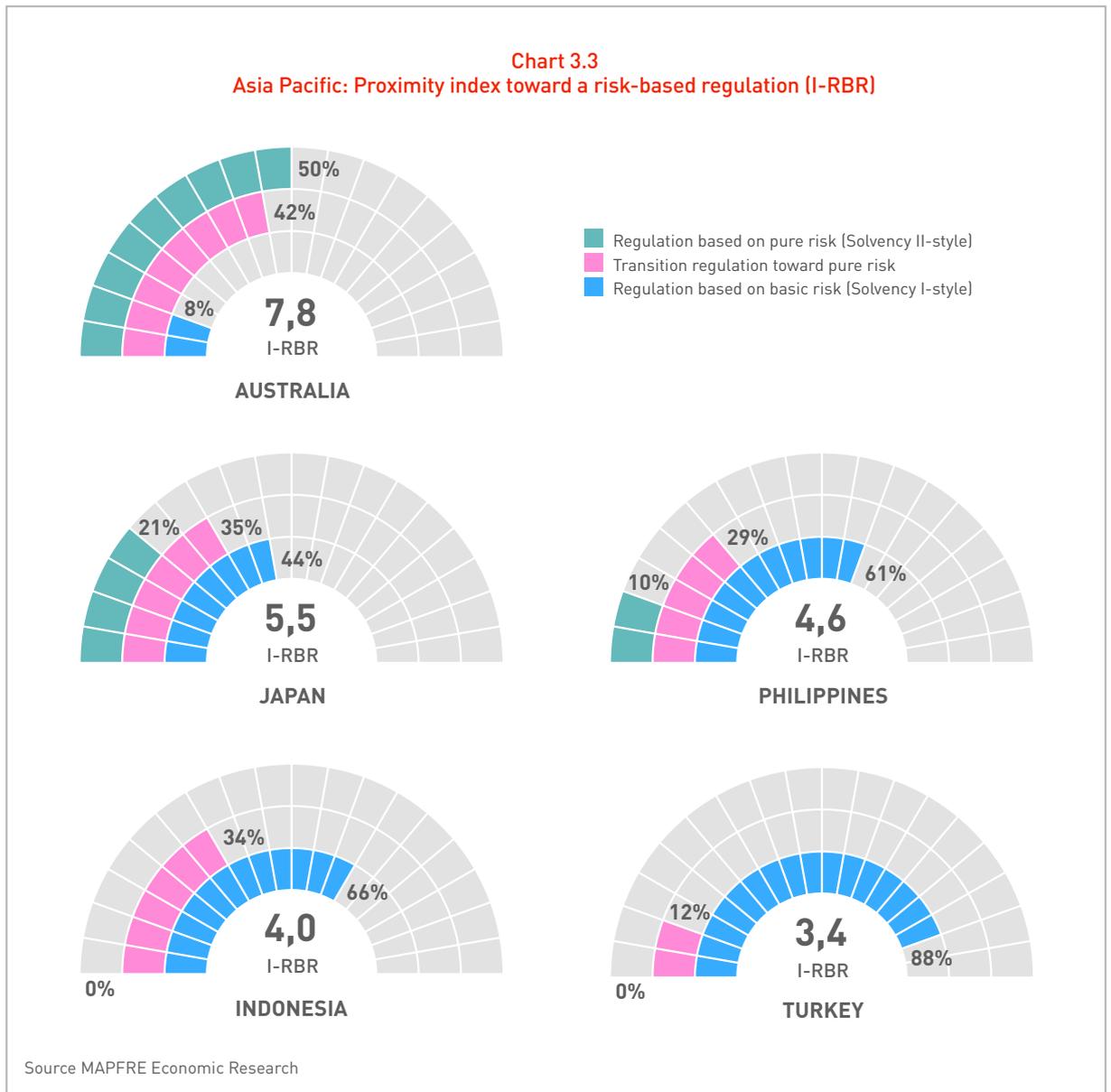
3.3 Asia Pacific

For the purposes of analyzing this geographic area, a representative sample of markets that have made differing levels of progress toward a risk-based regulation and market valuations has been used, including Australia, Japan, the Philippines, Indonesia and Turkey.

Furthermore, Australia and Japan are two mature and developed insurance markets. Australia is the country¹⁸ that has progressed most in terms of its proximity to a risk-based regulatory system, having obtained the provisional equivalence to the Solvency II

system from the European Commission for a ten-year period.

In the case of Japan,¹⁹ significant steps have been taken in terms of handling insurance and financing risks and it has also obtained the temporary equivalence to Solvency II, albeit for a five-year period, during which time the circumstances shall be reassessed based on the progress made (in the case of reinsurance and group supervision, this equivalence has been granted for a ten-year period). Currently, Japan's regulatory and supervisory authorities are in the process of developing the aspects that require further improvement, in particular in terms of the market assessment of obligations deriving from insurance contracts



and, in short, the calculation of available capital following an integrated proposal for calculating the surplus based on the total balance and valuations that are consistent with the market. In this connection, they are in the process of performing field tests to assess the impact of their introduction, with a particular focus on the effects caused by long-term low-interest rates.

Furthermore, the sample of this region's markets includes three emerging markets: the Philippines, Indonesia and Turkey. Philippines²⁰, which follows a system similar to that of the RBC in the U.S., and Indonesia²¹ have made significant progress in the handling of financial risks and those deriving from insurance obligations, maintaining, nonetheless, limits in terms of assets in which insurers can invest and a strict system concerning the authorization of new products. Finally, Turkey²² has the system that most closely mirrors Solvency I type systems, although some progress can be seen in relation to the handling of financial risks.

In any case, we must also take into account the possible difficulties associated with both insurance companies' and supervisory authorities' compliance with the respective risk-based prudential regulations when, due to the characteristics of their markets, it is difficult for them to have an adequate and suitable infrastructure in the short-term for the integrated implementation of these systems. Although some of the markets analyzed in this region are relatively small at the moment, they have great potential for growth; therefore, the steps taken must be regarded positively, as they bring them closer to a risk-based regulation, albeit gradually.

Finally, Chart 3.3 demonstrates the level and make-up of the I-RBR for each of the markets analyzed in this region, clearly showing the progress made in terms of the regulatory adjustment in Australia, and to a lesser extent Japan.

3.4 European Union

The prudential regulation system applicable to insurance companies, reinsurance companies and their groups in the European Union (Solvency II) is defined by being a highly harmonized system, with comprehensive regulation including all of the main aspects of the system under a Directive that Member States have had to transpose into their domestic laws and a community development provision concerning quantitative requirements and other aspects via regulations and technical implementation standards that directly apply to Member States with no need for transposition²³. Furthermore, the European Insurance and Occupational Pensions Authority (EIOPA) is involved in the supervision of internationally active groups and produces guidelines to apply to specific aspects of the system, with additional oversight functions in terms of financial stability, among others.

The prudential solvency supervision framework in force in the European Union is structured around three pillars. The first pillar focuses on the quantitative requirements established by the standards for calculating the solvency ratio, which is obtained by dividing the admissible own funds by the obligatory risk-based solvency capital (SCR), which is calibrated based on a one-year risk value and to a confidence level of 99.5 percent. When calculating the admissible own funds, a comprehensive approach is used for assessing the surplus against the total balance and valuations that are consistent with the market ("total balance sheet approach"), sensitive to the quality of the shareholders' equity considered ("tiering"). A poor ratio would result in the adoption of measures by supervisors. There is also a second level of intervention concerning a different scope, minimum capital requirement (MCR), which is calculated on a quarterly basis; when it is breached, more urgent and severe measures must be adopted by supervisors. The second pillar corresponds to governance

requirements, including the risk function and the supervision process. The third pillar addresses transparency before regulators and the market as an element for encouraging the most efficient functioning of the market discipline mechanism.

This system is characterized by the mandatory calculation of capital requirements both separately and group wide. The capital charges are adapted to the risk profile of insurance companies, reinsurance companies and their groups, considering the benefits of diversification and facilitating the use of total and partial internal modes, subject to authorization from supervisors.

Under the Solvency II system, no categories or quantitative limits are defined for investments, with the exception of the ban on using speculative derivatives. Otherwise, the principle of prudence applies to investments, with higher capital charges for higher risk levels.

Finally, no prior authorization or notice is required to launch new products, notwithstanding possible control measure that may be applied subsequently by supervisors, under the principle that risk management as

part of the governance function at companies feeds the traditional product review/approval mechanisms.

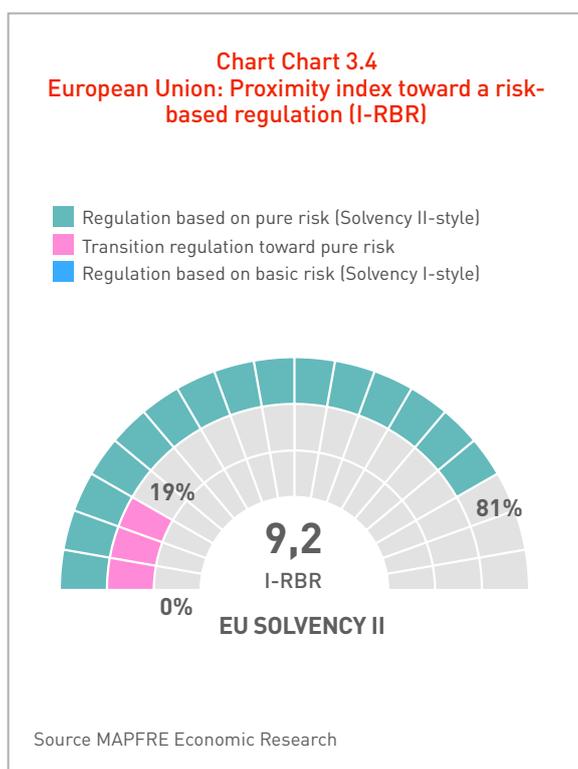
The result of the I-RBR estimate for the European Union and its structure can be seen in Chart 3.4. Based on the comparison of this index with the estimate for the other regions analyzed, Solvency II currently represents the most advanced risk-based international regulatory model.

3.5 Global regulation: the international capital standard (ICS)

The International Association of Insurance Supervisors (IAIS), in its capacity as an international organization responsible for establishing insurance regulation and supervision standards and contributing to financial stability, has been working on the production of harmonized frameworks for the supervision of solvency, both for Global Systemically Important Insurers (GSIs) and non-systemic internationally active insurance groups, (IAIGs).

In this connection, the IAIS seeks to produce a shared framework for the supervision of IAIGs (known as "ComFrame"), one of the key elements of which is an international standard for calculating risk-based regulatory capital and market-adjusted valuations (International Capital Standard, ICS), applicable worldwide. The essential objective is for this global capital standard to be applied to IAIGs with a minimum volume of international activities and in jurisdictions that choose to adopt it. To this end, the criteria used to define IAIGs are as follows: (i) that they have at least 50,000 million Dollars in assets or 10,000 million Dollars in premiums; (ii) that they undertake activities in at least three jurisdictions, and (iii) that at least 10 percent of the premiums are underwritten outside the original jurisdiction. Furthermore, it is anticipated that this standard will also apply to systemic insurance groups, albeit subject to certain additional requirements.

Work in terms of the quantitative requirements under ICS are at an advanced stage and, at the beginning of November 2017, the Executive Committee of the IAIS reached an agreement



on the path for coming to a consensus on the final standard (ICS, Version 2.0). The adoption of ICS Version 2.0 is scheduled for the end of 2019 and has been structured around ICS Version 1.0²⁴, which still contains certain options that are to be subject to a field analysis, before a final decision is taken. Once adopted, implementation will be undertaken in two phases: an initial five-year monitoring phase, followed by an implementation phase. The updated time line for the ICS preparation process can be consulted in Chart 3.5-a.

It is important to highlight the announcement made by the Executive Committee of the IAIS belonging to the United States with regard to the development of an aggregate calculation of group capital in this country, which, based on the data gathered during the monitoring phase, would enable the analysis of whether the calculation would provide results comparable with the ICS.²⁵

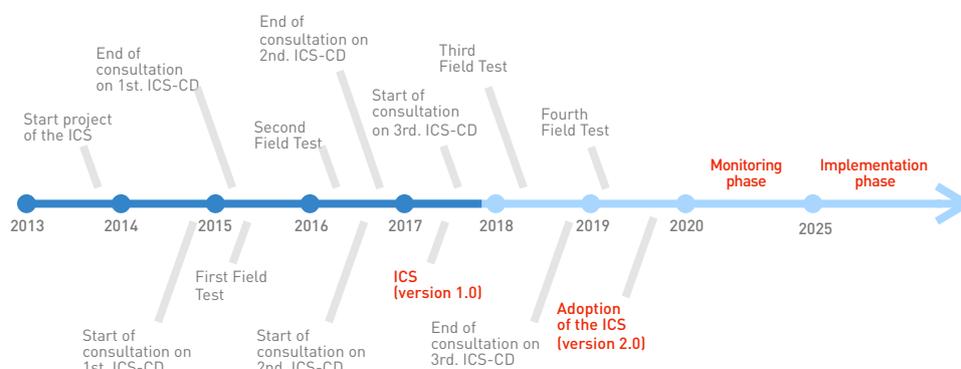
From a methodological perspective, the system designed by the IAIS for the ICS is a similar to one defined for the purposes of this study as a prudential regulation system based on risk and market valuations; nonetheless, it contains certain elements that distance it from what would otherwise be considered a purely risk-based system, as is the case of other systems subject to analysis. The main pillars around which the ICS is structured justify these deviations, as on the one hand they seek to minimize the risk that the regulation may

cause pro-cyclical reactions under given circumstances and, on the other, they pursue an appropriate balance between sensitivity to risk and the simplicity of the system.

The current version of the system (ICS Version 1.0) contains certain options that must be subject to field work before a final decision is taken. One important aspect that remains open is concerning the valuation of assets and liabilities, with two options still on the table: the “Market-Adjusted Valuation approach” and the “GAAP with Adjustments”. The main difference can be traced to the fact that both methods are based on the discounted cash flows method in terms of the valuation of obligations arising from insurance contracts. This may give rise to material differences that would direct more than one toward a purely risk-based regulation system; however, definitive conclusions mustn't be drawn at this stage of the process and therefore, they are not presented as separate options. Other elements that may give rise to differences, although on a smaller scale, are the definition and limits of insurance contracts.

Furthermore, qualitative requirements in terms of appropriate risk management and supervision procedures are also considered in the model designed by the IAIS, based on the ICS principles (ICS Principle 6) and under the so-called ComFrame or common framework for the supervisions of IAIGs, of which the ICS forms part.

Chart 3.5-a
ICS time line for the IAIS



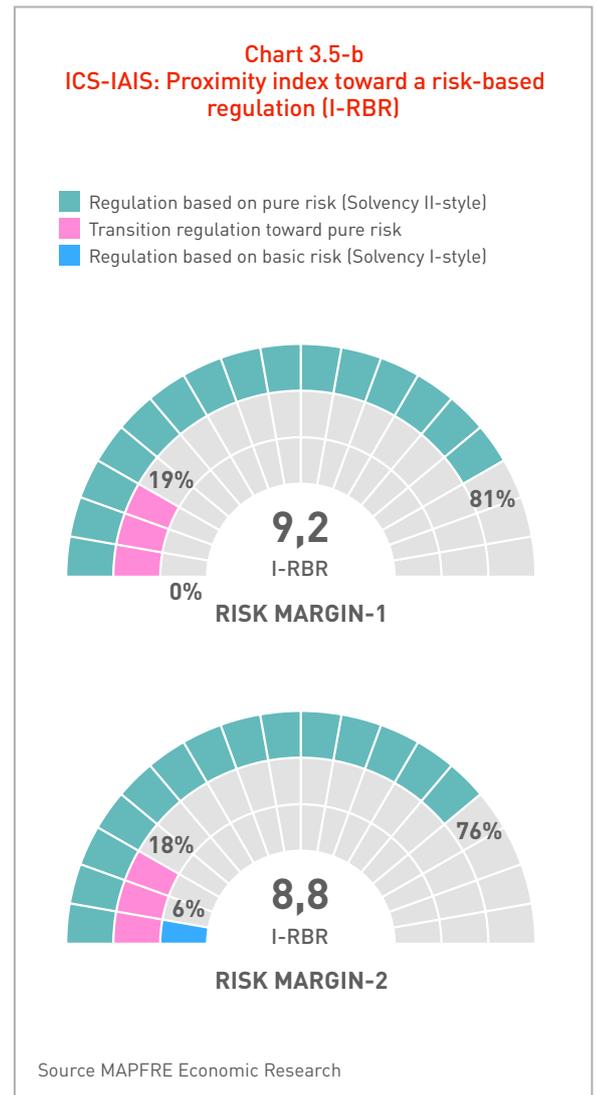
Source MAPFRE Economic Research (based on IAIS information)

Finally, the ICS must be transparent before supervisors and the market, particularly in terms of the transparency of the final results (ICS Principle 9), with a view to encouraging the functioning of the market discipline mechanism and in line with the structure of a risk-based regulatory system.

Therefore, in the current ICS development phase, it is still not possible to speak of a single system, as several options are on the table that could lead to different results in terms of the level of proximity to a risk-based regulation system and pure market valuations, as has been defined in the conceptual framework of this study.

However, of the different options still under consideration, the one applicable for the purposes of calculating the I-RBR for the case of the ICS is the mathematical provisions risk margin, given that of the two options considered, one of them (Risk Margin-1) seeks to align the valuation of insurance obligations with a transfer price, whilst the other (Risk Margin-2) involves introducing a prudency margin in the valuation of these obligations. This second option introduces a specific feature that would distance it from the purely risk-based regulation model, which does not consider prudential margins in valuations. The prudential margin in the design of a pure model is considered exclusively when calculating regulatory capital, applying a specific metric (VaR over 1 year and 99.5 percent confidence, in the case of the ICS), and not when calculating the admissible own funds following an integrated economic valuation under the “total balance sheet approach”.

For this reason, in order to obtain an idea of which ICS consists of in its current version (ICS Version 1.0) in terms of the I-RBR, the decision has been taken to value the index



separately for each of these two options for calculating the risk margin (see Chart 3.5-b). As can be seen in this valuation, the ICS of the IAIS, generally speaking, is similar (in either mode) to the most advanced international regulatory systems that have been addressed in this study.

4. Global vision of regulatory progress

4.1 Progress toward risk-based regulations

Based on the analysis of the different regulation models and their development over time, the first conclusions that can be drawn is that prudential risk-based solvency regulations have not always been in force.

Insurance companies fulfill a dual purpose in the economy. Firstly, as a necessary instrument for the pooling of risks that prevents or mitigates the economic consequences of the impact of certain insurable events and, secondly, as an institutional investor collaborating in the medium and long-term investment and savings management process.

Insurance activities involve receiving and managing financial resources; as a result it is one of the activities subject to prudential supervision on a global scale without exception, as is the case of activities performed by other financial institutions. However, institutions organized to cover these needs were the first to appear, before, after a series of coverage shortcomings, it was decided that these activities should be subject to prudential regulation.

The introduction of regulations in the insurance industry has occurred progressively and asymmetrically between countries and regions, initially imposing static requirements for the purposes of market access, with fixed capital requirements for access, before evolving toward dynamic capital requirements that consider the size and volume of the business undertaken by companies and, more recently, their risk profile.

This more recent development is still being shaped and its degree of maturity differs in the different geographic areas, depending on the

size of the corresponding market and, structurally speaking, the willingness of the industry and market and institutional infrastructure supervisors to implement more modern models.

Regulatory systems with static capital requirements have gradually evolved toward dynamic models in most of the insurance markets analyzed. However, in most cases, certain static requirements have remained as an absolute minimum that must be fulfilled and, in some cases, still apply to smaller insurance companies that, based on the size of their balance sheet or volume of operations, are not of the size required for dynamic requirements to apply.

As part of this development, the role performed by the Solvency I system is worth note; this is one of the systems that has been enforced for longest and most generally throughout the world, introduced in European Union countries in the 1970s. As indicated above, under Solvency I-style systems, the most important factor in determining the mandatory solvency requirement is underwriting risk, using a system based on one or more factors applied to figures considered representative of the insurer's exposure to risk (premiums and claims ratio for Non-Life insurance and mathematical provisions and/or risk capital for Life insurance).

In order to control other risks, (such as financial risks), this type of system introduces other additional rules on governance and investments to limit market and credit risks, introducing specific regulatory limits for diversification and dispersion, as well as a classification of assets (closed list mode) considered fit to cover the obligations derived from the insurance contracts.

Likewise, Solvency I-style systems are characterized as they introduce prudential elements in the assessments of an insurer's assets and liabilities, in addition to strict standards in terms of authorization and/or notifications to supervisory bodies prior to the launch of new products onto the market.

As part of this asymmetric development, the most advanced risk-based solvency capital systems seek to adapt the capital requirements to the risk profile of each company. Thus, an efficient allocation of capital is sought, within confidence levels considered adequate for the protection of policyholders. One of the basic concepts behind these regulatory systems is anchored in the fact that treating all insurers equally, regardless of their risk profile, may not only pose a potential barrier to entry for certain businesses and an inefficient allocation of resources, which may adversely affect market development.

Furthermore, these new, more modern cut-off systems are characterized by different elements: a high number of risk factors; the introduction of more complex scenario simulation techniques for calculating specific capital charges due to market, credit and underwriting risks; the consideration the dependencies between risks; the use of internal models; and the calculation of regulatory solvency at group level, among other aspects.

An important aspect of prudential regulatory systems concerns the measurement of assets and liabilities. More modern regulation systems (as is the case of Solvency II) tend to sever the link to valuations that appear in the financial statements of insurance companies and their groups, replacing them with valuations that are consistent with the market. Traditional accounting measurements tend to be undertaken for reasons not necessarily linked to solvency valuations, including elements concerning the principle of accounting prudence that makes it more difficult to establish their economic value. In line with the new regulatory systems and with

a view to avoiding calculation overlaps and improving transparency in terms of the level of risk assumed by insurance companies, the element of prudence must be considered exclusively when calculating the capital requirements with the metric and level of confidence ultimately used, such as "VaR" or "tail VaR", among others, and not as part of the measurement of assets and liabilities (and, as a result, the surplus).

As discussed below, one of the factors that most influences the degree of progress toward risk-based regulations, is the difficulty associated with developing an appropriate and efficient infrastructure for its implementation. Thus, parallel to the development of these institutional and market preconditions, a considerable number of jurisdictions have been introducing qualitative elements related to the risk management and internal calculation requirements at companies, under the concepts of Own Risk and Solvency Assessment or Enterprise Risk-Management.

4.2 Preconditions and risks

As addressed in the first section of this study, progress toward risk-based regulations offers the advantage of aligning regulatory rules with an environment that is pro-competition, offering an advantage on the market (in the form of lower capital charges) to participants applying a strong risk management strategy. Thus, risk-based models and the way in which they are managed (identified, measured, mitigated and spread) align prudential regulation objectives (which seek to protect the financial conditions and solvency of insurance companies) with incentives to encourage competition in the market.

However, progress toward risk-based models (Solvency I-style) toward more sophisticated risk-based regulation models (Solvency II-style) involves not only the determination by the supervisor, but, structurally speaking, that a series of preconditions are met so that the regulatory adjustment process offers benefits to market operations (greater efficiency and

competition), stability and integrity in the insurance industry and the financial system and, ultimately, policyholders. In a broad sense, this series of preconditions can be considered the development or both the institutional and market infrastructure required so that the different elements that form part of this guidelines framework can operate in harmony and, insofar as possible, generate the positive effects desired.

4.2.1 Institutional preconditions

The adoption of risk-based regulations entails not just technical and organizational demands for the different market participants, but also a supervision body and an appropriately structured and efficient supervision process that satisfies the needs and requirements of a risk-based regulation system. One parameter concerning the way in which this institutional precondition should be addressed is covered by two of the Insurance Core Principles (ICP)²⁶ produced by the International Association of Insurance Supervisors (IAIS), a global organization tasked with establishing standards for the supervision of insurance markets.

On the one hand, Core Principle 1 (Objectives, powers and responsibilities of the Supervisor) provides, among other aspects, that the main objective of supervision tasks must be to promote the preservation of a fair, safe and stable insurance industry to the benefit and in the protection of policyholders; legislation must clearly define the authority responsible for insurance supervision; legislation must also clearly define the objectives of insurance supervision, in addition to the mandate and responsibilities of the supervisory body, granting it sufficient power to undertake the process, such as the capacity to issue regulations and enforce them whether by administrative activities or immediate actions.

Additionally, Core Principle 2 (Supervisor) establishes more precise aspects concerning the scope of operations undertaken by the body responsible for supervising the insurance market. They include:

- The governance structure of the supervisor, which must be clearly defined, including internal procedures to ensure the integrity of its undertakings, highlighting the fact that lines of command must be structured in such a way that these undertakings can be performed immediately in the event of an emergency.
- The need for explicit procedures in terms of the appointment and removal of the head of the supervisor and, as applicable, members of its governing body, stressing that in the event of removal, the grounds for doing so must be made public.
- The institutional relationship between the supervisor and the executive and judicial branches of the government must be clearly defined and transparent.
- The supervisor and its staff must be free from any undue political, government or insurance industry interference in the performance of their duties; it is worth particular note that the supervisor must be financed in such a way that does not compromise its independence and it must be able to allocate its resources in line with its mandate and objectives, in addition to the perceived risks.
- Regulatory requirements are clear and transparent, and the supervisor applies them consistently considering the nature, scale and complexity of insurance companies with mechanisms also in place to appeal its decisions.
- The supervisor and its staff must uphold the confidentiality of the information in their possession as part of the supervision process.
- The supervisor has appropriate and sufficient human and financial resources to perform its functions.

As can be seen from this series of requirements, having a supervision framework and a duly constituted and efficient supervisor (in terms of the applicable international standards) represents one of the most important institutional preconditions, as under risk-based models, the supervisor must have both the technical capacities required and a flexible and efficient operating system that makes it possible to react accordingly when faced with situations in which supervised companies come up against risk environments that significantly affect them and that may place market stability and integrity and ultimately, policyholders, at risk.

4.2.2 Market preconditions

Furthermore, there are also a series of preconditions for the implementation and appropriate functioning of a risk-based guidelines framework that in essence focuses on the insurance companies that must adhere to it and the insurance market as a whole. These preconditions can be grouped together

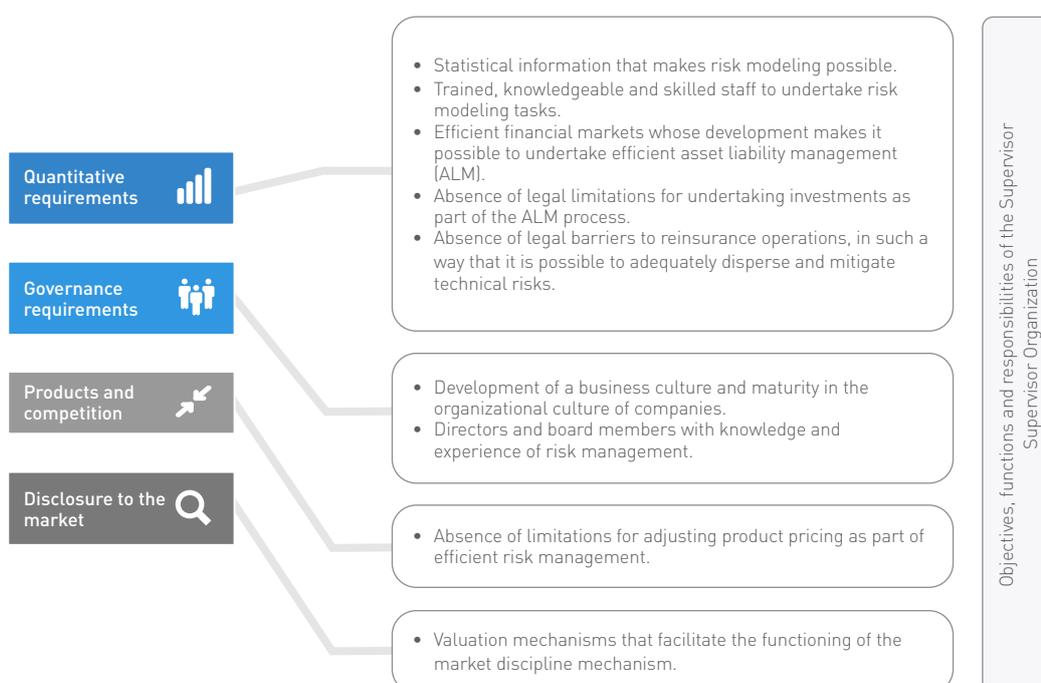
according to the general components of risk-based regulatory frameworks shown in Chart 1.3-b: quantitative requirements, governance requirements, products and competition and market disclosure (see Chart 4.2-a).

4.2.2.1 Quantitative requirements

Statistical information that makes risk modeling possible

In terms of quantitative requirements, risk-based regulations place particular emphasis on the accurate measurement of risks (technical and financial) by the insurance company subject to supervision, and on their dependency, as a way of establishing both technical provisions and capital charges required. These measurements employ intensive statistical techniques (stochastic modeling) in terms of the use of information. The same occurs with qualitative requirements, as part of which appropriate risk management by insurance companies is supported by the ability to employ this type of

Chart 4.2-a
Summary of institutional and market preconditions associated with the implementation of risk-based regulations (Solvency II-style)



Source MAPFRE Economic Research

supported by the ability to employ this type of quantitative analysis technique.

As a result, an indispensable precondition for the application of a risk-based regulatory system consists of there being (in the form of a public good available to all market participants) sufficient, reliable, appropriate and homogeneous information concerning insurance operations, which makes it possible to model inherent financial and technical (underwriting) risks. Furthermore, this information must comprise a sufficiently far-reaching and detailed series and be generated from continuous bases.

Trained, knowledgeable and skilled staff to undertake risk modeling tasks

Risk modeling as a basis for establishing the technical provisions and capital charges, in addition to supporting the development of an appropriate risk management strategy by insurance companies, entails having trained, knowledgeable and skilled human resources.

This need involves the labor market (and, as a result, the education system in the country) being capable of generating professionals with such profiles (actuaries, mathematicians and, in general, professionals with skills in the field of quantitative techniques) on continuous bases.

These professional profiles will be required both by the supervisory body and the insurance industry and demand for them may increase insofar as, on the one hand, this type of measurements are performed internally as part of the operations of institutions and, on the other, the market grows and evolves. Furthermore, the market itself may require this type of professional profile to perform parallel functions (external auditing, consultancy, external analysis, etc.).

Efficient financial markets whose development makes it possible to undertake efficient asset liability management (ALM)

One of the essential characteristics resulting from risk-based regulation is the need for

insurance companies to enforce an appropriate approach to risk management. Given the nature of the insurance business model, one of the essential activities in the risk management process is asset-liability management (ALM).

This process consists of matching terms, duration and interests rates among the obligations deriving from insurance policies and the investments of insurance companies. To this end, having adequate knowledge of the characteristics of the company's technical liabilities is insufficient; efficient financial markets are also required whose level of development makes it possible to retain investment instruments that provide for an efficient ALM process.

Within this scope, the absence of a sufficiently developed financial market may significantly hinder or impede this process, which is key to adequate risk management.

Absence of legal limitations for undertaking investments as part of the ALM process

In addition to the aforementioned precondition, the ALM process involves the need for the guidelines framework not establishing limits (other than rationale of insurance activity regulations) relating to the acquisition of financial assets available on financial markets (e.g. financial assets in foreign currency). The presence of this type of limitation would impede or significantly hinder the ALM process and, as a result, the adequate implementation of risk-based regulations.

Absence of legal barriers to reinsurance operations, in such a way that it is possible to adequately disperse and mitigate technical risks

In this connection, the risk management process resulting from this new type of guidelines framework involves, in terms of technical (underwriting) risks, the need for appropriately transferring risks so that, by pooling other risks on the international stage, their potential impact on the insurance company that directly assumed them can be mitigated.

To this end, it is essential that there are no legal barriers (rational insurance activity regulation aside) that hinder or limit reinsurance operations with international companies so that it is possible to efficiently disperse and mitigate risks.

4.2.2.2 Governance requirements

Development of a business culture and maturity in the organizational culture of companies

The development of a more solid governance structure represents one of the key and most complex aspects of implementing risk-based regulatory systems. The main reason is that, unlike aspects linked to quantitative requirements for which the determining factor concerns the availability of information and the use of appropriate quantitative techniques, governance touches on aspects related to the organizational culture of companies and, in a broader sense, the development of a business culture in the insurance market in question. Therefore, the process of enhancing governance at insurance companies does not solely entail defining a guidelines framework that clearly establishes these responsibilities, rather their development and maturity in their operating environment.

Thus, making progress on implementing this type of regulatory model requires the development of this organizational and business culture to a certain extent, insofar as governing bodies are able to formally and genuinely act as a driving force in the management of companies, structured around an appropriate risk management strategy. Therefore, the adaptation process is by no means a quick process; rather, it involves, in most cases, an organizational adaptation and maturation process that makes it possible to internalize regulatory standards. This process must be based on solid basis in the medium term, as demonstrated by the mature regulatory systems developed in this connection.

Directors and board members with knowledge and experience of risk management

As mentioned previously as a precondition in terms of quantitative requirements, (modeling risk as a basis for establishing technical provisions and capital charges), risk management from the governance perspective of insurance companies involves the need for directors and board members with knowledge and experience not only of the insurance industry, but of technical and financial risk management. Thus, to fulfill this condition, the comment concerning the need for the labor market to produce executive-level professionals with these profiles is applicable.

4.2.2.3 Products and competition

Absence of limitations for adjusting product pricing as part of efficient risk management

As mentioned previously, one of the main features of risk-based regulatory systems is that they try to align prudential regulation objectives (preservation of the financial position and solvency of companies) with incentives for encouraging competition as a way of increasing market efficiency and thus benefiting policyholders.

Against this backdrop, an essential precondition for the appropriate enforcement of these regulatory systems is linked to the absence of legal limitations (beyond those rationally expected of solvency regulations) for companies to make adjustments to the pricing of their products, insofar as this is one of the essential tools for, on the one hand, protecting the financial position and solvency of companies in the event that certain financial and underwriting risks occur and, on the other, to react in light of competition on the market.

4.2.2.4 Market disclosure

Valuation mechanisms that facilitate the functioning of the market discipline mechanism

As proposed as part of the conceptual framework of this study, risk-based regulation models seek to complement elements of regulatory discipline that impose quantitative requirements and implicit self-discipline as part of the process for consolidating governance, catalyzing the concept of market discipline through greater disclosure of information.

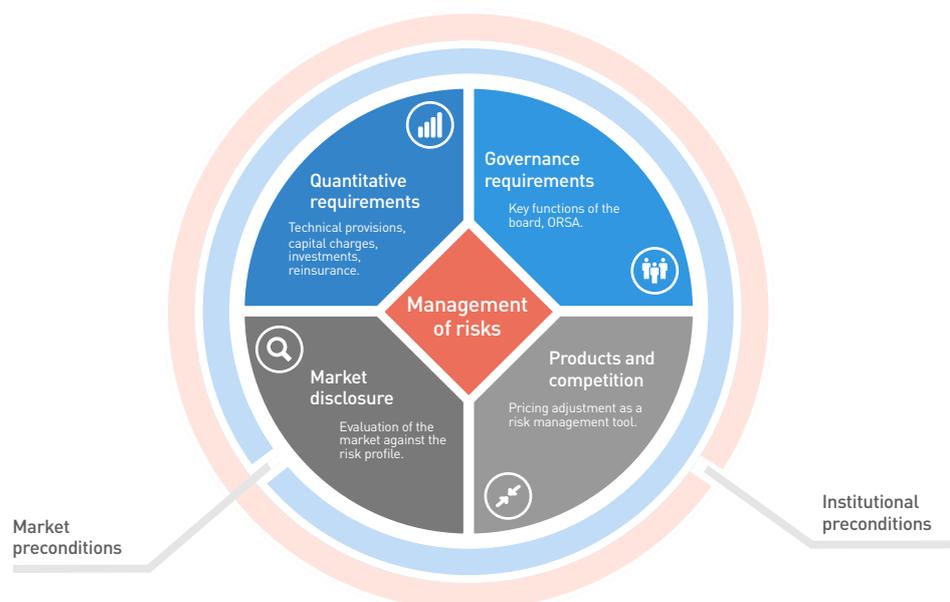
Although it is true that for this mechanism to operate, more information must be disclosed by companies to the market, this condition does not suffice. Mechanisms are also required on the market that allow for this information to be subject to assessment. Economic theory proposes a range of mechanisms, from the trading of shares on the stock market by insurance companies or issuing debt instruments (as part of which the price of shares or debt serves as an indicator

of the perceived financial strength and solvency of companies), through to the existence of rating agencies that perform systematic assessments on companies in the industry or financial analysts who use the information disclosed by companies to generate an analysis of the market on continuous bases.

4.2.3 Progress toward risk-based regulation models

Chart 4.2-b readdresses the traditional presentation of risk-based regulatory models, placing risk management at the center of this type of regulatory system as the factor responsible for defining the essential aspects of the different rules. In terms of quantitative requirements, risk management serves as the basis for defining the technical provisions and capital charges required, in addition to the investment and reinsurance policy. In terms of governance requirements, risk management is at the heart of the functions performed by the board or directors' and management at the company. In terms of products and

Chart 4.2-b
General layout of a risk-based regulatory model and the corresponding preconditions



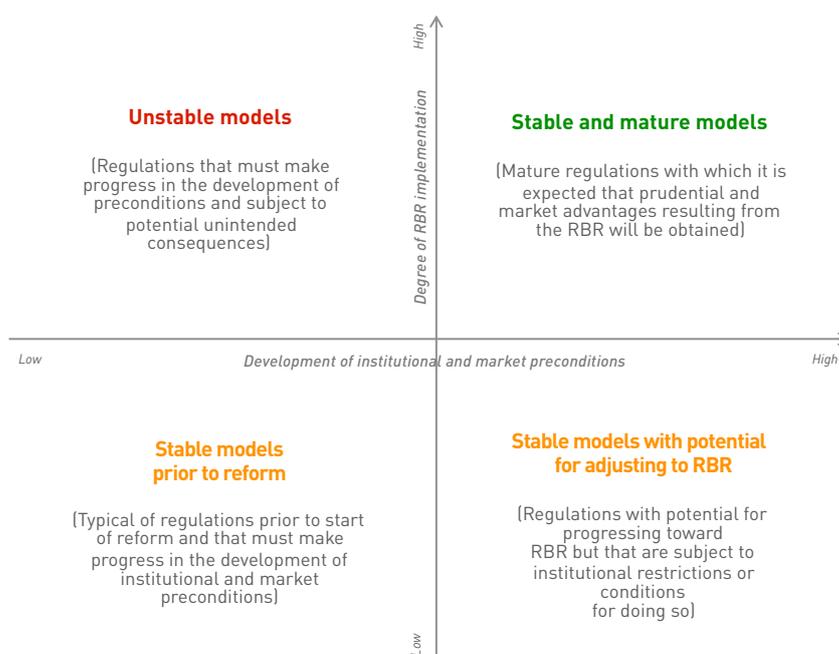
Source MAPFRE Economic Research

competition, risk management is responsible for defining the characteristics of the products on offer, their pricing and their impact on market competition. Also, concerning the disclosure of information to the market, risk management plays a pivotal role in its measurement of how companies are performing. The foregoing is subject to the existence of both institutional and market preconditions that allow for risk-based regulations to be implemented effectively and efficiently. In fact, it could be asserted that the existence of preconditions that facilitate effective and efficient risk management is dependent upon the further development and speed of this type of regulatory model in the different markets. On the contrary, making progress on implementing this type of regulatory system without these pre-requisites being met may limit the benefits of it being implemented and, under certain conditions, even lead to undesired effects compromising market operations.

In summary, although it is true that risk-based regulatory models, by trying to align prudential regulatory objectives with incentives to create an environment that encourages competition, structured around efficient risk management, may enhance the performance of insurance markets, these models are more complex and require the implementation and development of a new institutional and market structure that, as a result, entail long-lasting design, implementation and internalization processes. Therefore, particularly in terms of emerging markets, the first phase for implementing risk-based regulations entails the development of these institutional and market conditions, which involves coordination work in the medium term between financial authorities and the insurance industry.

With a view to schematizing the different starting points for rolling out risk-based regulations, Chart 4.2-c displays a classification based on this concept that combines, on the one hand, the development

Chart 4.2-c
Classification of regulatory models based on the development of institutional and market preconditions and the degree of implementation of risk-based regulations (RBR)



Source MAPFRE Economic Research

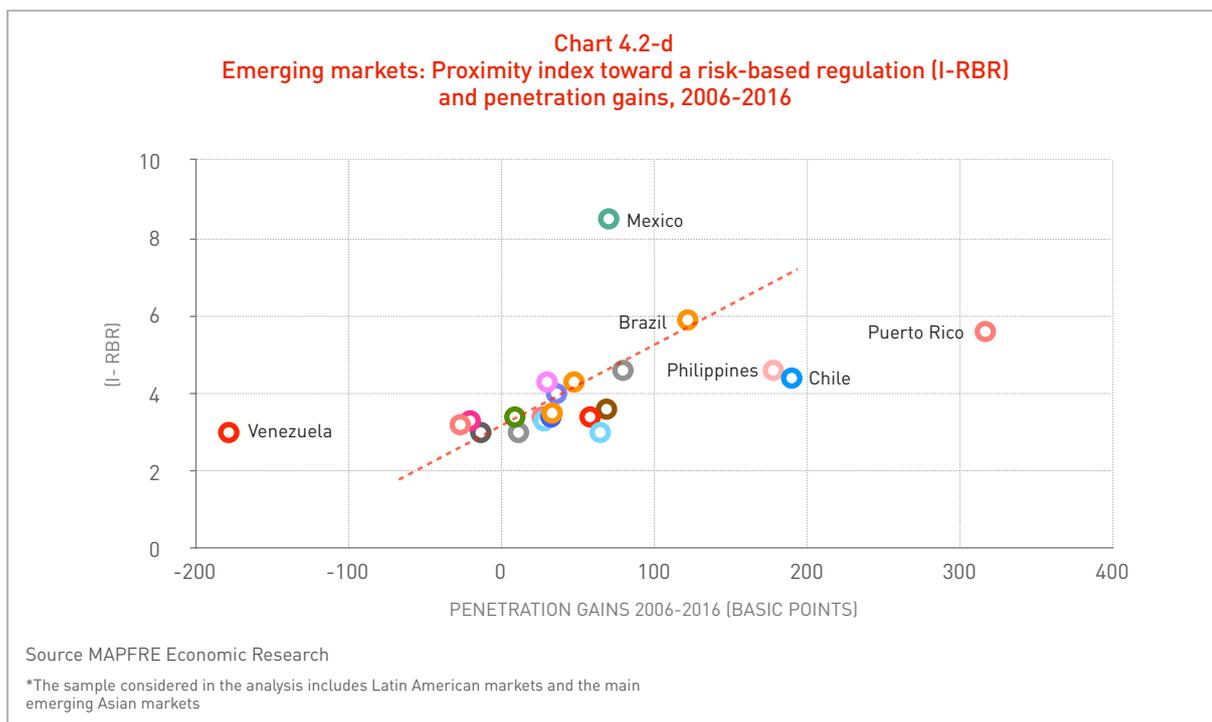
of institutional and market preconditions required for the appropriate implementation of risk-based regulations and, on the other, the degree to which this type of regulatory rules have been implemented.

Based on this chart, ideally, the development of these preconditions and the implementation of risk-based regulatory standards would progress at an equal pace, thus ensuring that regulatory systems are mature and stable (top right quadrant). A further two situations, also considered stable, can be seen in the lower left and right quadrants. The first case shows markets at stages prior to regulatory reform, where the necessary institutional and market preconditions have not yet been developed and progress has not been made on implementing risk-based regulations either. The second case shows markets where preconditions have been developed sufficiently, but where (on institutional grounds) progress is yet to be made on implementing purely risk-based regulations, although the right conditions are in place.

The only example of unstable regulatory models is shown in the top left quadrant of Chart 4.2-c. This case involves regulations with which progress has been made in terms of implementing risk-based regulations, but

for which the institutional and market preconditions have not been developed sufficiently. Therefore, in these situations the effectiveness of regulatory rules is limited due to deficient institutional and market structure and the implementation of risk-based regulations, under certain conditions, could lead to unintended consequences that limit or affect market performance.

Finally, it is worth noting that there seems to be a relationship between the degree of progress in the regulatory transition process described, and the gain in terms of index of penetration (premiums/GDP) of those markets. Analyzed for the last decade (2006-2016), the emerging insurance markets that have progressed the most in the regulatory transition process²⁷ are also among those that registered the highest penetration gains in that period (see Chart 4.2-d). Without being able to draw final conclusions in terms of the direct functional relationship between progress with the regulatory transition process and the increase in insurance penetration, the analysis undertaken seems to confirm that the progress in designing and implementing more risk-adjusted regulatory frameworks, and therefore, in line with a pro-competition view of the market, is one of the factors that can contribute to its development.



In short, progress toward risk-based regulations is an element that can stimulate the growth of the supply and, therefore, increase the participation of insurance in the economy, in that it allows for a more efficient allocation of the capital, and creates incentives for more professional management of insurance companies based on considerations and parameters of a technical nature. However, this regulatory progress can greatly contribute to the goal of developing the market, when it is carried out gradually and in

parallel to the development of technical capacities of both the industry and regulators, as well as to the creation of the necessary market infrastructure for its proper implementation. Otherwise, regulatory progress (which would be difficult to comply with) could lead to unwanted consequences, such as the establishment of barriers to entry for certain business lines, or an inefficient allocation of resources, which ultimately would negatively impact the penetration levels of the respective insurance markets.

5. Synthesis and conclusions

5.1 Regulation of financial institutions and markets

From a conceptual perspective, the prudential regulation of financial activities fulfills the purpose of safeguarding public interest in terms of the compensation of specific market failures (asymmetric information, market power and the creation of negative external effects). In this scope, the use of regulatory measures, insofar as they involve a certain level of “interference” with market operations, may have an impact on the behavior of participants and, as a result, the generation of supply and demand for financial services.

Over recent decades, the prudential regulations in the financial system (and those applicable to the insurance industry) have been subject to constant adjustment process, the common denominator being the progress toward risk-based schemes that seek to align public interest objectives with the creation of comparative advantages (in a pro-competition environment) depending on the quality of risk management.

Thus, financial regulations have evolved in line with the process of economic and financial globalization. Without doubt, this regulatory process has been led by banking regulators who, via the Basel Committee on Banking Supervision (BCBS), introduced, at the end of the 1980s, what would become the first prudential global risk-based regulatory framework (the so-called Basel Accord, subsequently referred to as Basel I). This initial agreement, although adopted by the governors of the central banks of the main developed economies (Germany, Belgium, Canada, Spain, the U.S., France, Italy, Japan, Luxembourg, the Netherlands, the United Kingdom, Sweden and Switzerland) would soon be adopted as an international standard that was implemented by practically all the economic on Earth.

Basel I was succeeded by other adjustments to the global framework of banking regulations introduced by Basel II (2004) and Basel III (2010), all of which have developed and fine tuned risk measurements as an essential factor in the determination of capital charges and incorporated additional pillars to quantitative requirements (strengthening of market governance and discipline) to help maintain the solvency and integrity of the banking system.

The financial crises at the end of the 20th century and start of the 21st century served as a reminder to the international financial community that globalization was not just a phenomenon that led to interdependence between the world's different economies to catalyze their productive capacities, rather this interdependence meant that financial crises affecting domestic markets had the potential to affect the international financial system. This was confirmed by the financial crises in Mexico (1994), Asia (1997), Russia (1998), Argentina (1999) and Turkey (2001).

The response of international financial institutions to these circumstances was to roll out an expansive process to standardize supervision practices and regulations, as a way of establishing minimum levels of oversight and control that would reduce the possibility of critical situations affecting local financial systems and, as a result of growing globalization, the effects of these situations being felt by the international financial system.

The effect of this strategy was a call for organizations that comprise financial supervisors (the Basel Committee on Banking Supervision, the International Organization of Securities Commissions and the International Association of Insurance Supervisors) to make more explicit progress in the definition of regulatory and supervision standards that might be adopted by their members.

5.2. Regulation in the field of insurance

Insurance companies fulfill a dual purpose in the economy. Firstly, as a necessary instrument for the pooling of risks that prevents or mitigates the economic consequences of the impact of certain insurable events and, secondly, as an institutional investor collaborating in the medium and long-term investment and savings management process. These activities involve receiving and managing financial resources; as a result it is one of the activities subject to prudential supervision on a global scale without exception, as is the case of activities performed by other financial institutions.

Concerning insurance companies, which represent one of the main institutional investors worldwide, the development of prudential regulations has followed a different path to the one taken by credit and securities companies, although in recent years it has had to converge with conceptual elements common to the rest of the financial system. Despite insurance industry regulations having traditionally been limited to domestic markets, currently, they are undergoing a regulatory homogenization process.

This global trend has been expressed in three ways. The first consisted of the International Association of Insurance Supervisors (IAIS) starting to prepare the regulation and supervision principles and standards, which have gradually been implemented by member countries of the organization standard-setter organization.

The second, regionally and in terms of the main markets, was the decision to modernize existing solvency regulation systems. Against this backdrop, work began on the European Solvency II project, the Solvency Modernization Initiative (SMI) at the NAIC in the U.S. and the development of the Swiss Solvency Test by the finance authorities in Switzerland, among others.

The third, linked to the 2008 financial crisis following the bankruptcy of Lehman Brothers in the U.S. and the subsequent 2012 sovereign debt crisis in the EU, was the decision in terms of the need for establishing macro-prudential oversight measures to limit any potential systemic impact resulting from insurance activities and, thus, contribute to maintaining global financial stability.

In this context, the project to establish the International Capital Standard (ICS) by the IAIS was embarked upon; this risk-based capital sufficiency measure will initially apply to Internationally Active Insurance Groups (IAIG) and Global Systemically Important Insurers (G-SIIs), and will subsequently be rolled out to individual institutions under the different national regulations and become a genuine global capital standard (similar to the way in which Basel III applies to banking activities internationally).

5.3. Current context

Currently, most of the world's insurance markets are immersed in a continuous regulatory adjustment processes, which are still structured around the three aforementioned scopes: the regulatory standardization and oversight practice process; the modernization of solvency systems toward risk-based models and progress establishing a global solvency system (similar to the system employed in the banking sector), which contributes to maintaining global financial stability.

These new solvency models toward which the world's different markets are headed, tend to converge around three basic principles. First, the establishment of capital charges according to the individual risk profile of each company, creating the pro-competition incentive to the extent that better risk management translates into lower capital requirements and, consequently, a competitive position in the market. Second, a strong push for more rigorous governing that equally emphasizes risk identification, measurement and management. And thirdly, greater transparency and disclosure of information to

the market, in order to expand the mechanisms that allow a more effective operation of the so-called “market discipline”; i.e., the process by which the market rewards the best managed companies.

However, the development of regulations in the insurance industry is taking place progressively and asymmetrically by countries and regions, initially imposing static requirements for the purposes of market access, with fixed capital requirements for access, before evolving toward dynamic capital requirements that consider the size and volume of the business undertaken by companies and, more recently, their risk profile.

The main insurance markets: European Union and United States

The first step on the road to standardizing solvency requirements was taken on the European Economic Community insurance market in the 1970s, with the adoption of Directives to create the solvency margin system (dubbed subsequently Solvency I) for Non-Life (1973) and Life (1979) activities. The same occurred in the United States, the world's other major insurance market, with the Risk-Based Capital (RBC) system at the start of the 1990s.

European Union

As part of this development, the role performed by the Solvency I system is worth note; this is one of the systems that has been enforced for longest and most generally throughout the world. Under this system, which still applies in some markets, the most important factor in determining the mandatory solvency requirement is underwriting risk, using a system based on one or more factors applied to figures considered representative of the insurer's exposure to risk (premiums and claims ratio for Non-Life insurance and mathematical provisions and/or risk capital for Life insurance).

In order to control other risks, (such as financial risks), this type of system introduces other additional rules on governance and investments to limit market and credit risks, introducing specific regulatory limits for

diversification and dispersion, as well as a classification of assets (closed list mode) considered fit to cover the obligations derived from the insurance contracts.

Likewise, Solvency I-style systems are characterized as they introduce prudential elements in the assessments of an insurer's assets and liabilities, in addition to strict standards in terms of authorization and/or notifications to supervisory bodies prior to the launch of new products onto the market.

The adoption of Solvency I and RBC type models served and continues to serve as a reference point in terms of regulatory progress for the world's other insurance markets (particularly in emerging markets), has not always been made applying the methodologies that served as a basis for building them; rather, often the risk factors resulting from the original designs are used, which has resulted in the implementation of rules that could have involved, under certain market conditions, the underestimation or overestimation of capital needs for said markets.

In 2016, the European Union took a definitive step following the entry into force of Solvency II, one of the most advanced risk-based solvency regulatory capital systems, alongside the Swiss Solvency Test, which seek to adapt capital requirements to the risk profile of each insurance company and its groups. Thus, an efficient allocation of capital is sought, within confidence levels considered adequate for the protection of policyholders.

This new system applicable in the European Union is characterized by the fact that it introduces maximum harmonization, with a detailed regulation of the main aspects of the system, under the Solvency II Directive that Member States have had to transpose into their domestic legal systems and an implementing regulation for quantitative requirements and other aspects via regulations and technical implementation standards that directly apply to Member States with no need for transposition. Furthermore, the European Insurance and Occupational Pensions Authority (EIOPA) is involved in the supervision of internationally American groups and produces guidelines to apply to specific

aspects of the system, with additional oversight functions in terms of financial stability, among others.

These new, more modern cut-off systems are characterized by different elements: a high number of risk factors; the introduction of more complex scenario simulation techniques for calculating specific capital charges due to market, credit and underwriting risks; the consideration of dependencies between risks; the use of internal models; and the calculation of regulatory solvency capital at group level, among other aspects. They reinforce regulations concerning quantitative requirements as part of which risk management at all levels represents a key element, in addition to regulations concerning risk-based supervision and transparency toward and of supervisors and toward the market.

These systems tend to sever the link to valuations that appear in the financial statements of insurance companies and their groups, replacing them with valuations that are consistent with the market. The purpose of traditional accounting measurements is not always aligned to solvency measurements, including elements concerning the principle of accounting prudence that makes it more difficult to establish their economic value. In line with the new regulatory systems and with a view to avoiding calculation overlaps and improving transparency in terms of the level of risk assumed by insurance companies, the element of prudence must be considered exclusively when calculating the capital requirements with the metric and level of confidence ultimately used, such as "VaR" or "tail VaR" among others, and not as part of the measurement of assets and liabilities (and, as a result, the surplus).

Under the Solvency II system, no categories or quantitative limits are defined for investments, with the exception of the ban on using speculative derivatives. Otherwise, the principle of prudence applies to investments, with higher capital charges for higher risk levels. Finally, to launch new insurance products, the supervisor does not need to provide authorization or receive notice in advance, notwithstanding potential a posteriori control, under the principle that the

development of risk management as part of the governance of companies feeds the traditional product review/approval mechanisms.

United States

In the United States, the National Association of Insurance Commissioners has been developing a standard method for calculating the minimum capital deemed necessary to support the undertakings insurance companies since the beginning of the 1990s, based on their size and risk profile, known as Risk-Based Capital (RBC) method. Currently it is being revised by the Solvency Modernization Initiative (SMI), headed by the NAIC.

This system is defined by not being a standardized system, as the regulatory powers of the different States are decentralized. However, the NAIC produces and publishes support documents for the supervision of insurance companies by State supervisors, who have the power for performing this function. These documents adopt the "Model Act" and instruction manuals that constitute guidelines with standards encompassing all aspects of the supervision framework, both in terms of quantitative requirements and governance system requirements, supervision procedures and the transparency of information before regulators and the market.

In their corresponding legal systems, States can include the model acts produced by the NAIC. Various States opt to incorporate them into their legislation without substantial changes; however, nor is it strange to see cases in which significant amendments are made. In turn, these model acts make reference to the instructions that the NAIC draws up in the form of manuals and once adopted by the States, they become binding. These manuals are accessible and highly detailed, meaning that the system is highly predictable, which cannot be said of any other system to date.

At present, a total of thirty-three States have decided to incorporate the RBC model into their corresponding legal systems without substantial amendments. Otherwise, the specific circumstances are somewhat different and it has been partially incorporated subject

to certain changes or versions that do not fully fall into line with the most recent versions drawn up by the NAIC apply. In any case, these amendments tend not to reflect NAIC instructions on the RBC calculation, rather other aspects of the model act; therefore, it could be said that the RBC calculation designed by the NAIC generally applies to the insurance market in the United States.

However, to obtain a comprehensive overview of the quantitative requirements applicable to the regulation of this market, all aspects involved in the construction of the solvency ratio must be analyzed, both in terms of capital requirements (RBC) and establishing the capital held by the insurance company to cover these requirements (Total Adjusted Capital). The ratio resulting from comparing shareholders' equity permitted with regulatory capital requirements is used to establish the level of intervention that, as applicable, is needed to overcome potential difficulties or, in the worst case, insolvency.

When establishing the capital or shareholders' equity permitted, particular importance is placed on the valuations of assets and liabilities. In terms of the valuation of liabilities, most States have adopted the "Standard Valuation Law, which contains the accounts standard for valuing obligations resulting from insurance contracts in the United States, applicable from 2017 onwards to the underwriting of new business.

This system for valuing reserves corresponding to insurance contracts introduces a new valuation method based on more modern principles, with cash flows projections and stochastic calculations applying to optional life insurance products, among others. It is yet to be adopted only in the states of Alaska, Massachusetts and New York (in addition to Puerto Rico), where the previous standard for valuing technical provisions remains in force. This introduces a significant specific feature in these States, which have made less progress in evolving toward a prudential risk-based regulation system.

In terms of qualitative requirements, they are based on the "Risk management and Own Risk and Solvency Assessment Model Act" produced by the NAIC, which has been adopted practically everywhere in the U.S.

Furthermore, in terms of the supervision of these aspects, the NAIC prepares support manuals for supervisory bodies which represent an important aid for valuing the sufficient ability of an infrastructure to effectively implement and control a risk-based prudential regulation system. These manuals are available to the public; therefore, both supervisory bodies and insurance companies are aware of them.

The model designed by the NAIC includes limits applicable to investments and pre-requisites for launching new products. All States without exception apply regulatory limits on investments and pre-requisites for launching new products, following the NAIC's model or subject to their own adaptations.

Other markets

Latin America

In most Latin American countries analyzed, regulatory solvency systems, Solvency I-style, remain in force, as part of which the determinant factor of mandatory solvency is underwriting risk, using a system based on one or more factors applied to figures considered representative of the insurer's exposure to risk, such as premiums and claims ratio (for Non-Life insurance) and mathematical provisions and/or risk capital (for Life insurance). In order to control other risks, such as financial risks, other additional rules on governance and investments have been introduced to limit market and credit risks, introducing specific regulatory limits for diversification and dispersion, as well as a classification of assets (closed list mode) considered fit to cover the obligations derived from the insurance contracts. Likewise, most regulations in the Latin American region are characterized by introducing prudential elements in measuring assets and liabilities.

Generally speaking, it can be concluded that there is still a long way to go regionally in terms of the implementation of risk-based regulatory solvency capital calculation models, especially with regard to the pillar of quantitative requirements. In this connection, progress can be seen in terms of certain regulations introducing capital charges to include financial risk requirements, without considering the effects of risk diversification, which may result in an increase in capital requirements beyond what would be the case when comprehensively implementing a purely risk-based system.

In any case, we must also take into account the possible difficulties associated with both insurance companies' and supervisory authorities' compliance with the respective risk-based prudential regulations when, due to the characteristics of their markets, it is difficult for them to have an adequate and suitable infrastructure for the integrated implementation of these systems. In this connection, it is worth noting that in countries with relatively small markets, steps have been taken to implement the governance requirements, dividing functions as part of which the risk function plays a significant role in the management of insurance companies, which, in any case, must be looked upon positively.

Under the criterion for analyzing formally implemented regulatory measures, the insurance markets in Latin America can be classified into three groups. The first group would consist of three insurance markets (Argentina, Dominican Republic and Venezuela), which have regulatory systems that essentially maintain the characteristics of the Solvency I-style systems, although no implanted measures have been identified that suggest a transition to risk-based systems.

The second group would consist of ten markets (Costa Rica, Uruguay, Ecuador, Guatemala, Paraguay, El Salvador, Panama, Nicaragua, Bolivia and Honduras). Although they maintain a regulation based on a Solvency I model, they have progressed gradually and with different levels of depth, in the

implementation of measures of transition toward risk-based regulation.

Lastly, a third group would be made up of six markets (Mexico, Brazil, Puerto Rico, Colombia, Chile and Peru), which, in addition to different degrees of progress in transitional measures toward risk-based regulation, have already implemented (also at different degrees of depth) measures that are fully consistent with Solvency II-style risk-based regulations. Furthermore, Mexico and Brazil have obtained the provisional declaration of equivalence to the Solvency II system by the European Commission for a ten-year period.

Asia Pacific

In the Asia Pacific region, Australia and Japan, two mature and developed insurance markets, have shown a greater degree of progress with their regulations. Australia has progressed most in terms of its proximity to a risk-based regulatory system, having obtained the provisional equivalence to the Solvency II system from the European Commission for a ten-year period.

Nonetheless, Japan has taken significant steps in terms of handling insurance and financing risks, and it has also obtained the temporary equivalence to Solvency II, albeit for a five-year period, during which time the circumstances shall be reassessed based on the progress made (in the case of reinsurance and group supervision, this equivalence has been granted for a ten-year period). At present, regulatory and supervisory authorities are in the process of developing the aspects that require further improvement, in particular in terms of the market assessment of obligations deriving from insurance contracts and, in short, the calculation of available capital following an integrated proposal for calculating the surplus based on the total balance and valuations that are consistent with the market. In this connection, they are in the process of performing field tests to assess the impact of their introduction, with a particular focus on the effects caused by long-term low-interest rates.

Furthermore, the sample of Asia Pacific region markets analyzed includes three emerging markets: the Philippines, Indonesia and Turkey. Philippines (which follows a system similar to RBC in the U.S.) and Indonesia have made significant progress in the handling of financial risks and those deriving from insurance obligations, maintaining, nonetheless, limits in terms of assets in which insurers can invest and a strict system concerning the authorization of new products. Finally, Turkey has the system that most closely mirrors Solvency I type systems, although some progress can be seen in relation to the handling of financial risks.

In any case, and as mentioned in the case of Latin America, consideration must be given to potential difficulties associated with complying with a purely risk based prudential regulation on the part of insurance companies and supervisory bodies, given the nature of the markets in question, as it would be difficult to implement an appropriate and sufficient infrastructure for the comprehensive implementation of these systems. Although some of the markets analyzed in this region are relatively small at the moment, they have great potential for growth; therefore, the steps taken must be regarded positively, as they bring them closer to a risk-based regulation, albeit gradually.

The global capital standard

The International Association of Insurance Supervisors (IAIS), in its capacity as an international organization responsible for establishing insurance regulation and supervision standards and contributing to financial stability, has been working on the production of harmonized frameworks for the supervision of solvency, both for Global Systemically Important Insurers (IAIGs) and non-systemic internationally active insurance groups (IAIGs).

In this connection, the IAIS seeks to produce a shared framework for the supervision of IAIGs (known as “ComFrame”), one of the key elements of which is an international standard for calculating risk-based regulatory capital and market-adjusted valuations (International Capital Standard, ICS), applicable worldwide. The essential objective is for this global capital

standard to be applied to IAIGs with a minimum volume of international activities and in jurisdictions that choose to adopt it. To this end, the criteria used to define IAIGs are as follows: (i) that they have at least 50,000 million Dollars in assets or 10,000 million Dollars in premiums; (ii) that they undertake activities in at least three jurisdictions, and (iii) that at least 10 percent of the premiums are underwritten outside the original jurisdiction. Furthermore, it is anticipated that this standard will also apply to systemic insurance groups, albeit subject to certain additional requirements.

Work in terms of the quantitative requirements under ICS are at an advanced stage and, in November 2017, the Executive Committee of the IAIS reached an agreement on the path for coming to a consensus on the final standard (ICS, Version 2.0). The adoption of ICS Version 2.0 is anticipated for the end of 2019 and has been drawn up based on ICS Version 1.0, which still has some options which will be subject to field analysis before taking a final decision. Once adopted, implementation will be undertaken in two phases: an initial five-year monitoring phase, followed by an implementation phase.

From a methodological perspective, the system designed by the IAIS for the ICS is a similar to one defined for the purposes of this study as a prudential regulation system based on risk and market valuations; nonetheless, it contains certain elements that distance it from what would otherwise be considered a purely risk-based system, as is the case of other systems subject to analysis. The main pillars around which the ICS is structured justify these deviations, as on the one hand they seek to minimize the risk that the regulation may cause pro-cyclical reactions under given circumstances and, on the other, they pursue an appropriate balance between sensitivity to risk and the simplicity of the system.

The current version of the system (ICS Version 1.0) contains certain options that must be subject to field work before a final decision is taken. One important aspect that remains open is concerning the valuation of assets and liabilities, with two options still on the table: the “Market-Adjusted Valuation approach” and the “GAAP with Adjustments”. The main

difference can be traced to the fact that both methods are based on the discounted cash flows method in terms of the valuation of obligations arising from insurance contracts. This may give rise to material differences that would direct more than one toward a purely risk-based regulation system; however, definitive conclusions mustn't be drawn at this stage of the process. Other elements that may give rise to differences, although on a smaller scale, are the definition and limits of insurance contracts.

Of the different options still under consideration, the one applicable for the purposes of calculating the I-RBR for the case of the ICS is the mathematical provisions risk margin, given that of the two options considered, one of them (Risk Margin-1) seeks to align the valuation of insurance obligations with a transfer price, whilst the other (Risk Margin-2) involves introducing a prudency margin in the valuation of these obligations. This second option introduces a specific feature that would distance it from the purely risk-based regulation model, which does not consider prudential margins in valuations. The prudential margin in the design of a pure model is considered exclusively when calculating regulatory capital, applying a specific metric (VaR over 1 year and 99.5 percent confidence, in the case of the ICS), and not when calculating the shareholders' equity permitted following an integrated economic valuation under the "total balance sheet approach". In any case, generally speaking, the ICS is similar (in either mode) to the most advanced international regulatory systems that have been addressed in this study.

Furthermore, qualitative requirements in terms of appropriate risk management and supervision procedures are also considered in the model designed by the IAIS, based on the ICS principles (ICS Principle 6) and under the ComFrame or shared framework for the supervisions of IAIGs, of which the ICS forms part.

Finally, the ICS must be transparent before supervisors and the market, particularly in terms of the transparency of the final results (ICS Principle 9), with a view to encouraging the functioning of the market discipline

mechanism and in line with the structure of a risk-based regulatory system.

Chart 5.3 shows the value and breakdown of the proximity index toward a risk-based regulation (I-RBR) calculated based on the analysis performed on each of the regulatory models considered as part of this study.

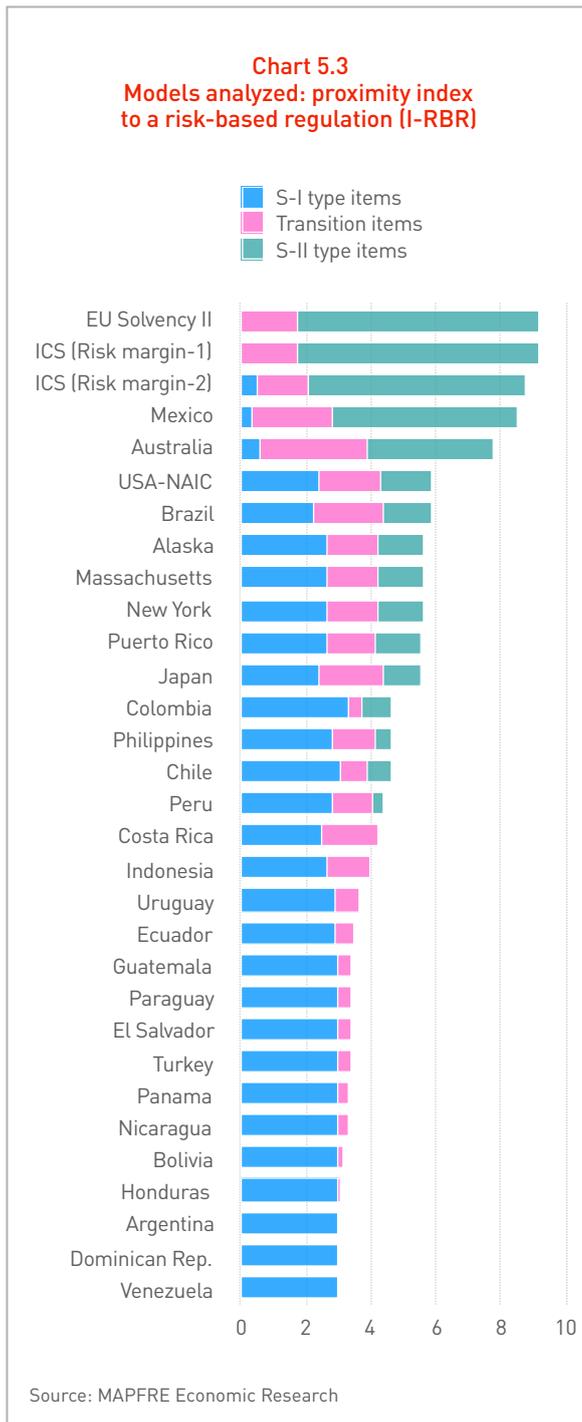
5.4. Preconditions for a risk-based regulation: in conclusion

Institutional and market preconditions

The implementation of risk-based regulations requires a series of institutional and market preconditions. In terms of institutional preconditions, this entails not just technical and organizational demands for the different market participants, but also a supervisory body and an appropriately structured and efficient supervision process that satisfies the needs and requirements of a risk-based regulation system.

Furthermore, from perspective of the market infrastructure, there are also a series of preconditions for guaranteeing the adequate implementation of a risk-based regulatory framework; preconditions concerning quantitative requirements, governance requirements, products, competition and market disclosure, associated with risk-based regulations.

Concerning quantitative requirements, firstly insurance companies must have statistical information that makes it possible to model the risks that quantitative requirements entail. Risk measurements employ intensive statistical techniques (stochastic modeling) in terms of the use of information. The same occurs with qualitative requirements, as part of which appropriate risk management by insurance companies is supported by the ability to employ this type of quantitative analysis technique. As a result, a first indispensable precondition for the application of a risk-based regulatory system consists of there being (in the form of a public good available to all market participants) sufficient, reliable, appropriate and homogeneous



information concerning insurance operations, which makes it possible to model inherent financial and technical (underwriting) risks. Furthermore, this information must comprise a sufficiently far-reaching and detailed series and be generated from continuous bases.

Secondly, trained, knowledgeable and skills professionals must be available to undertake risk modeling work (actuaries, mathematicians and, in general, professionals with skills in the field of quantitative techniques) on continuous bases. These professional profiles will be required both by the supervisory body and the insurance industry and demand for them may increase insofar as, on the one hand, this type of measurements are performed internally as part of the operations of institutions and, on the other, the market grows and evolves. Furthermore, the market itself may require this type of professional profile to perform parallel functions (external auditing, consultancy, external analysis, etc.).

Thirdly, efficient financial markets are required whose development makes it possible to undertake efficient asset liability management(ALM), which represents one of the essential activities in the risk management process. This process consists of matching terms, duration and interests rates among the obligations deriving from insurance policies and the investments of insurance companies. To this end, having adequate knowledge of the characteristics of the company's technical liabilities is insufficient; efficient financial markets are also required whose level of development makes it possible to retain investment instruments that provide for an efficient ALM process.

Fourthly, and linked to the preceding precondition, it is essential that the guidelines framework does not establish limits (other than rationale of insurance activity regulations) relating to the acquisition of financial assets available on financial markets (for example, financial assets in foreign currency). The presence of this type of limitation would impede or significantly hinder the ALM process and, as a result, the adequate implementation of risk-based regulations.

And finally, legal barriers to reinsurance operations must be removed, as applicable, in such a way that it is possible to adequately disperse and mitigate technical risks so that, by pooling other risks on the international

stage, their potential impact on the insurance company that directly assumed them can be mitigated.

In terms of governance requirements, progress made implementing this type of regulatory model requires the development of a organizational and business culture to a certain extent, insofar as governing bodies are able to formally and genuinely act as a driving force in the management of companies, structured around an appropriate risk management strategy. Therefore, the adaptation process is by no means a quick process; rather, it involves, in most cases, an organizational adaptation and maturation process that makes it possible to internalize regulatory standards. This process must be based on solid basis in the medium term, as demonstrated by the mature regulatory systems developed in this connection.

In terms of products and competition, the absence of legal limitations is an essential pre-requisite (the logical limitations of a prudent approach to solvency management aside) so that companies can adjust the pricing of their products, in terms of essential tools that, on the one hand, protect the financial position and solvency of companies in the event that specific financing and underwriting risks arise and, on the other, facilitate a reaction in light of competition on the market.

Finally, in terms of the disclosure to the market, assessment mechanisms must be in place that make it possible for the market discipline mechanism to work effectively. Risk-based regulation models seek to complement elements of regulatory discipline that impose quantitative requirements and implicit self-discipline as part of the process for consolidating governance, catalyzing the concept of market discipline through greater disclosure of information. Although it is true that for this mechanism to operate, more information must be disclosed by companies to the market, this condition does not suffice. Mechanisms are also required on the market that allow for this information to be subject to assessment.

Progress toward solid and balanced regulations

The existence of institutional and market preconditions that facilitate effective and efficient risk management is dependent upon the further development and speed of this type of regulatory model in the different markets. Making progress on implementing this type of regulatory system without these pre-requisites being met may limit the benefits of it being implemented and, under certain conditions, even lead to undesired effects compromising market operations.

Although it is true that risk-based regulatory models, by trying to align prudential regulatory objectives with incentives to create an environment that encourages competition, structured around efficient risk management, may enhance the performance of insurance markets, these models are more complex and require the implementation and development of a new institutional and market structure that, as a result, entail long-lasting design, implementation and internalization processes. Therefore, particularly in terms of emerging markets, the first phase for implementing risk-based regulations entails the development of these institutional and market conditions, which involves coordination work in the medium term between financial authorities and the insurance industry. Ideally, the development of these pre-requisites and the implementation of risk-based regulatory standards would progress at an equal pace, thus ensuring that regulatory systems are mature and stable.

In conclusion, the progress toward risk-based regulations is an element that can stimulate the growth of the supply and, therefore, increase the participation of insurance in the economy, in that it allows for a more efficient allocation of the capital, and creates incentives for more professional management of insurance entities based on considerations and parameters of a technical nature.

However, this regulatory progress can greatly contribute to the goal of developing the market, when it is carried out gradually and in parallel to the development of technical capacities of both the industry and regulators, as well as to the creation of the necessary market infrastructure for its proper implementation. Otherwise, regulatory progress (which would be difficult to comply with) could lead to unwanted consequences, such as the establishment of barriers to entry for certain business lines, or an inefficient allocation of resources, which ultimately would negatively impact the penetration levels of the respective insurance markets.

Index of tables, charts and boxes

Tables

Table 2.1	Elements considers to assess local regulations	28
-----------	--	----

Charts

Chart 1.2	Financial regulation and market failures	21
Chart 1.3-a	General trends in prudential insurance regulation	24
Chart 1.3-b	General components of regulatory frameworks based on insurance risks	25
Chart 2.2	Proximity index toward a risk-based regulation (I-RBR): construction method	30
Chart 3.1	United States: Proximity index toward a risk-based regulation (I-RBR)	35
Chart 3.2-a	Latin America: summary of Proximity index toward a risk-based regulation (I-RBR)	36
Chart 3.2-b	Latin America: Proximity index toward a risk-based regulation (I-RBR)	37
Chart 3.3	Asia Pacific: Proximity index toward a risk-based regulation (I-RBR)	41
Chart 3.4	European Union: Proximity index toward a risk-based regulation (I-RBR)	43
Chart 3.5-a	ICS time line for the IAIS	44
Chart 3.5-b	ICS-IAIS: Proximity index toward a risk-based regulation (I-RBR)	45
Chart 4.2-a	Summary of institutional and market preconditions associated with the implementation of risk-based regulations (Solvency II-style)	50
Chart 4.2-b	General layout of a risk-based regulatory model and the corresponding preconditions	53
Chart 4.2-c	Classification of regulatory models based on the development of institutional and market preconditions and the level of implementation of risk-based regulations (RBR)	54
Chart 4.2-d	Emerging markets: Proximity index to a risk-based regulation (I-RBR) and penetrations gains, 2006-2016	55
Chart 5.3	Models analyzed: proximity index to a risk-based regulation (I-RBR)	65

Boxes

Box 3.2	Main supervision measures considered in the regulation activity regulations.	40
---------	---	----

References

- 1/ <http://www.naic.org/store/free/MDL-280.pdf>
- 2/ <http://www.naic.org/store/free/MDL-820.pdf>
- 3/ <http://www.naic.org/store/free/MDL-820.pdf>
- 4/ <http://www.naic.org/store/free/MDL-805.pdf>
- 5/ http://www.naic.org/documents/committees_a_latf_related_valuation_manual_noapf_160829.pdf
- 6/ <http://www.naic.org/store/free/MDL-820.pdf> and <http://www.naic.org/store/free/MDL-808.pdf> (see the list of states which appear at the end of the “Standard Valuation Law”, updated to the second quarter of 2017).
- 7/ <http://www.naic.org/store/free/MDL-505.pdf>
- 8/ http://www.naic.org/prod_serv/FAH-ZU-16-01.pdf and http://www.naic.org/prod_serv/FAH-ZU-16-02.pdf
- 9/ <http://www.naic.org/store/free/MDL-280.pdf>
- 10/ <http://www.naic.org/store/free/MDL-283.pdf>
- 11/ <http://www.naic.org/store/free/MDL-283.pdf>
- 12/ <http://www.naic.org/store/free/MDL-282.pdf>
- 13/ <http://www.naic.org/store/free/MDL-692.pdf>
- 14/ <http://www.naic.org/store/free/MDL-777.pdf>
- 15/ <http://www.naic.org/store/free/MDL-165.pdf>
- 16/ http://www.naic.org/documents/prod_serv_marketreg_pfr_hdb.pdf
- 17/ See: MAPFRE Economic Research, *Elements for insurance expansion in Latin America: an analysis of the determining factors of insurance penetration levels*, Madrid, Fundación MAPFRE, October 2017, p. 41-48. Some values of the Proximity index toward a risk-based regulation (I-RBR) in this study vary compared to those reported in the aforementioned report, in line with recent changes to regulations (Costa Rica) or following reconsiderations based on an analysis of additional elements included in the corresponding regulatory frameworks (Puerto Rico), which has been incorporated into this new calculation of the index.
- 18 <http://www.apra.gov.au/Pages/default.aspx>
- 19/ <http://www.fsa.go.jp/en/>
- 20/ <https://www.insurance.gov.ph/>
- 21/ <http://www.ojk.go.id/en/Default.aspx>
- 22/ <http://www.treasury.gov.tr/en-US/Stat-List?mid=745&cid=15&nm=687>
- 23/ https://ec.europa.eu/info/business-economy-euro/banking-and-finance/insurance-and-pensions/risk-management-and-supervision-insurance-companies-solvency-2_en
- 24/ ICS Version 1.0: <https://www.iaisweb.org/page/supervisory-material/insurance-capital-standard//file/67651/ics-version-10-for-extended-field-testing>
- Technical specifications ICS Version 1.0: <https://www.iaisweb.org/page/supervisory-material/insurance-capital-standard//file/67655/public-2017-field-testing-technical-specifications>
- 25/ <https://www.iaisweb.org/news/press-release-iais-announces-unified-path-to-convergence-on-ics-version-20>
- 26/ <https://www.iaisweb.org/page/supervisory-material/insurance-core-principles//file/70028/all-adopted-icps-updated-november-2017>
- 27/ The sample in the analysis reflected in Chart 4.2-d includes all Latin American markets and the main emerging Asian markets.

DISCLAIMER

This document was prepared by MAPFRE Economic Research solely for informational purposes. It does not reflect the views of MAPFRE or Fundación MAPFRE. The document presents and compiles data, views and estimates available at the time of preparation, which were either directly produced by MAPFRE Economic Research or obtained and produced using data sources considered to be trustworthy, but which have not been independently verified by MAPFRE Economic Research. Accordingly, MAPFRE and Fundación MAPFRE expressly decline any liability with regard to accuracy, integrity or correctness.

The estimates contained in this document have been prepared using generally accepted methodologies and should be considered only as forecasts or projections, insofar as results obtained from historical data, whether positive or negative, cannot be considered a guarantee of future performance. Likewise, this document and the contents herein are subject to changes depending on variables such as the economic environment and market performance. In this regard, MAPFRE and Fundación MAPFRE accept no liability for the updating of content or providing related warnings.

This document and its contents do not constitute, in any way, an offer, invitation or request to purchase, invest or disinvest financial instruments or assets. Neither this document nor its content may form part of any contract, commitment or any other type of decision. With respect to investment in financial assets related to the economic variables analyzed in this document, the readers of this study must be aware that under no circumstances should they base their investment decisions on the information contained in this document. The individuals or institutions offering investment products to potential investors are legally obliged to provide the necessary information for making informed investment decisions. On the basis of the above, MAPFRE and Fundación MAPFRE expressly decline any liability for losses or damages, direct or indirect, that might arise from use of this document or its contents for such purposes.

The content of this document is protected by intellectual property laws. The information provided in this study may be reproduced in part, provided the source is acknowledged.



DOCUMENTATION CENTER

All our publications at your fingertips

Free access to our catalog specialized in:

- Insurance
- Risk management
- Prevention



FM Fundación **MAPFRE**

Documentation Center

www.fundacionmapfre.org/documentacion

Fundación
MAPFRE

www.fundacionmapfre.org

Paseo de Recoletos, 23
28004 Madrid

Fundación **MAPFRE**

www.fundacionmapfre.org

Paseo de Recoletos, 23
28004 Madrid