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**Why Insurance Regulation is
Crucial for Long-term Investment
and Economic Growth**

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Why insurance regulation is crucial for long-term investment and economic growth

Dario FOCARELLI¹

ABSTRACT

This paper focuses on the role of insurers as providers of funds for long-term investment in the real economy, with an examination of the European market. The thesis is that financial regulation, and prudential insurance regulation in particular, crucially affects insurers' investment behavior and therefore their contribution to financial stability and economic growth, which for many reasons will be increasing in the near future. Accordingly, careful assessment of the effects of Solvency II on the insurance industry is required, bearing in mind the regulatory review planned for 2018.

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1. Insurance and economic growth

There is a broad consensus in economic literature on the positive correlation between financial development and economic growth (see among others King and Levine, 1993, and Levine and Zervos, 1998). In particular, a causal nexus running from financial development to economic growth has been highlighted by Rajan and Zingales (1998). More recently, however, Cecchetti and Kharroubi (2012) have argued, on the basis of a sample of advanced and emerging economies, that the level of financial development is a positive factor only up to a certain point, beyond which it actually becomes an obstacle to growth.

The literature on the relationship between insurance development and growth is less extensive. In general, the insurance sector tends to be larger in mature economies, but there is no clear, unidirectional causation (ESRB, 2015). There is ample evidence that the ratio of insurance premiums to GDP and per capita premium payments are higher in the affluent countries (see, most recently, Outreville, 2013). In fact, these economies show a

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premiums/GDP ratio ten times as high as the other economies and per capita premium payments a hundred times as large as those in poor countries.

Recent works have made some advances in seeking to establish the causal nexus between insurance and economic growth. Ward and Zurbruegg (2000) study the correlation between GDP and the growth of the insurance industry in nine OECD countries (Australia, Austria, Canada, France, Italy, Japan, Switzerland, the United Kingdom and the United States), concluding that insurance is a cause (as defined by Granger) of GDP only in some countries (of which Italy is one). Arena (2008) maintains that both life and non-life insurance have a positive causal impact on economic growth. But while for life insurance this result obtains only in the developed countries, for non-life insurance the relationship holds for both high-income and developing countries.

As regards life insurance, Lee et al. (2013) show evidence consistent with the hypothesis of co-integration of GDP and life premiums. They find that a 10-percent increase in life insurance premiums in real terms is correlated with real GDP growth of 0.6 percent.

Apart from the empirical evidence, there is a broad consensus that insurance contributes significantly to economic growth and development in a variety of ways:

- It facilitates economic transactions thanks to risk transfer and indemnification.
- It encourages risk management and the promotion of safe practices.
- It encourages stable and sustainable saving and pension provisions.
- It promotes financial stability through long-term investment.

This paper focuses on the very last point, namely the role of insurers as providers of funds for long-term investment in the real economy, with an examination of the European market. The thesis is that financial regulation, and prudential insurance regulation in particular, crucially affects insurers' investment behavior and therefore their contribution to financial stability and economic growth, which for many reasons will hopefully be increasing in the near future. Accordingly, careful assessment of the effects of Solvency II on the insurance industry is required, bearing in mind the regulatory review planned for 2018.

More specifically, the second section of this paper details the size and composition of European insurance investment, the short-term outlook and the allocational choices that insurers are called on to make, in a period marked by the intention of European policy-

makers to increase the flow of long-term investment. The third section reviews the literature to determine whether insurance companies' investment helps to foster financial market stability and hence economic growth. The fourth section covers the effects of accounting standards and supervisory rules on insurers' asset allocation, with special reference to investment in equities. In conclusion, I propose some considerations relating to the revision, in 2018, of the Solvency II prudential regime that went into force in January after fifteen years of discussion and negotiation.

2. The magnitude of insurance investment and its potential to foster economic growth in Europe

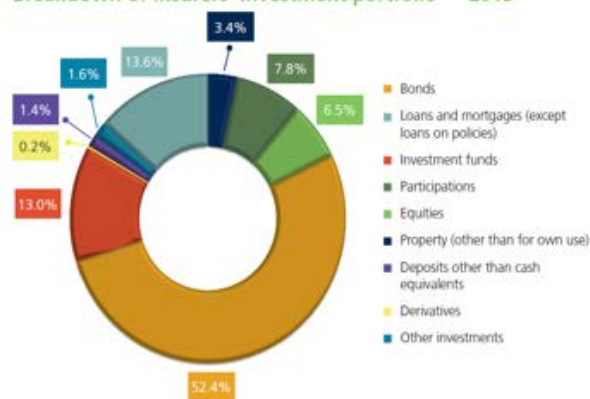
Insurance companies are the largest institutional investors in the European economy, with €10 trillion worth of assets under management (“Key Facts”, Insurance Europe, 2015).

INVESTMENT PORTFOLIO OF EUROPEAN INSURERS

Evolution of insurers' investment portfolio (at constant exchange rates) — 2004–2014 (€bn)



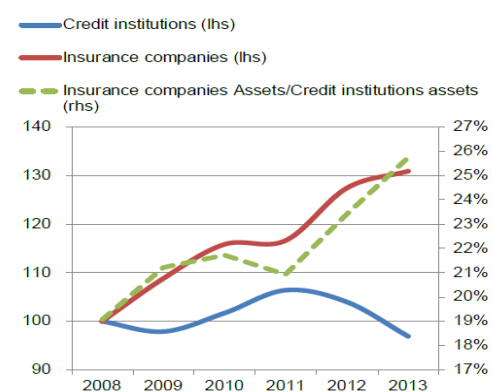
Breakdown of insurers' investment portfolio — 2013



Source: Insurance Europe.

The investment portfolio of EU insurers is equivalent to 63 percent of the Union's GDP and accounts for over half of all institutional investment in Europe, including 24 percent of government debt and 21 percent of corporate bonds, not mention a vast array of other investments across the continent. The largest component in insurers' investment portfolio is bonds (52.4%); the other main asset classes are shares and equity participations (16.3%), loans and mortgages (13.6%), and investment funds (13%). However, according to ESRB (2015) the non-financial sector (households and non-financial corporations) represents a marginal portion of insurers' total assets (7%).

Chart 1
Growth of total assets of insurers compared with banks in the euro area (2008 indexed at 100)



Source: ECB and European Commission

Over the past ten years, the volume of investment has grown by around 50%, notwithstanding the financial crisis. More important, since the crisis insurers' assets have grown steadily, filling some of the vacuum left by deleveraging banks (ESRB, 2015).

Maintaining the flow premium income is crucial for insurance companies' investment capacity. Premium growth in the life insurance sector is expected to remain fairly solid in the advanced economies in 2015 and to accelerate

in the emerging markets. The outlook for non-life insurance business in the advanced markets is less encouraging. In spite of significant recent growth, the evidence is that there is still a very substantial protection gap in many countries. For example, total global underinsurance of property risks is estimated at \$221 billion (Swiss Re, 2015), and the global protection gap in life insurance protection at \$86 trillion, or 116% of world GDP (Geneva Association, 2014). Thus, there is enormous potential for the further expansion of insurance markets, which are far from saturated, especially in the emerging economies. If the insurance industry is to continue to grow, insurers must succeed in narrowing these protection shortfalls.

The insurance industry, especially in Europe, has very significant investment potential, which needs to be matched with suitable long-term assets. At the same time, Europe's current unsatisfactory growth performance points to the need for long-term investments that can foster economic recovery. A number of initiatives have been undertaken in recent years to encourage long-term investment in the real economy. The year following the release of the European Commission's Green Paper in 2013, the ambitious Juncker Plan for investment and the European Fund for Strategic Investments (EFSI) were launched (European Commission, 2013; European Commission 2014).

These initiatives have helped to spur the interest of insurance companies in new investment instruments. The interest of insurers stems from their need for greater diversification of asset allocation, higher returns in the persistent low-interest-rate environment, and a better match of assets with long-term liabilities. The European insurance industry is accordingly interested in investment in the asset classes that can

have an immediate impact on growth, such as infrastructure (debt, equity), securitizations and credit.

Converting the industry's potential capacity into actual investments will require a combination of measures and actions. First and most important, it is vital that the regulatory framework be consistent with insurers' "natural" propensity for investment with a long-term horizon. I will discuss this issue in the next sections. However, it is useful to anticipate here that a number of corrections to the Solvency II regulations would seem both desirable and feasible in the short term. In particular:

a) Treatment of securitizations

The final version of the Delegated Regulation on Solvency II (Delegated Regulation (EU) 2015/35, of the Commission, of 1 October 2014) made significant improvements, such as by lowering the calibration for "high quality" securitizations (Type I) by comparison with previous drafts. Further, the EC Proposal for simple, transparent and standardized securitizations (STS) contains a number of additional positive elements (e.g. the inclusion of junior tranches within the scope of STS). However, the current Solvency II calibrations still need to be reduced further in order to reflect the true risks (e.g. capital charges against securitizations of residential loans must be capped at the level charged to the underlying loan pool).

b) Treatment of infrastructures

No specific treatment for infrastructures was envisaged in Delegated Regulation (EU) 2015/35. However, the new Capital Market Union Action Plan provides for several amendments to the Delegated Regulation implementing Solvency II. According to the Plan a new asset category, namely "Qualifying infrastructure investments", has been introduced. It would institute specific treatment for the calculation of the solvency capital requirement (reduced charges for both equity and bonds) and it would modify the risk management requirements. However, the criteria used by EIOPA should prove to be effective in a real-world scenario.

Finally, the European Commission has asked EIOPA for further advice on the treatment of infrastructure corporates; EIOPA then published a consultation paper (EIOPA, 2016) to identify and calibrate other infrastructure investment risk categories (i.e. infrastructure corporates). Strong concerns about EIOPA's approach to the calibration of the capital requirements remain, as it could fail to capture the whole market spectrum, thus not reflecting the real risks characterizing these investments (Insurance Europe, 2016).

More broadly, it is essential to improve both the supply of and access to suitable assets, insofar as insurers must have available a sufficient supply of products that match the risk/return criteria of their liabilities. In particular, insurers are attracted to instruments characterized by high issuer quality, returns that can enable them to meet their obligations

to policyholders, an adequate guarantee framework, and product standardization and portfolio transparency.

Insurers are interested in infrastructure investments, for example, for such features as long duration, low correlation with other asset classes, higher returns than “traditional” investments, and their particular source of default risk (primarily physical/technical factors). In particular, they are interested in infrastructure investments with stable and predictable cash flows and low correlation with financial market movements.

In the medium and long term, the appetite for private credit instruments will be fuelled substantially by decreasing exposure to sovereign bonds and increasing insurance industry liabilities. However, lending on a large scale is a radically different business from insurance, so it is crucial that a more efficient market for private credit risk be established.

3. Do insurers’ investments stabilize financial markets and the economy?

For insurers, investing is an integral part of the business model. It is driven by the nature of insurance liabilities and the need to match them on the asset side. Insurers — life insurers in particular — are a prime source of long-term investment because the amount of payments they will have to make to policyholders over any given period of time can be estimated with reasonable accuracy. What is more, even during economic downturns most policyholders continue to pay their premiums. This regular flow of premium income enables insurers to buy undervalued assets at a time when many other market players are forced to sell. That is, insurers are able to keep investing when others withdraw from the market, so that they may have a counter-cyclical and stabilizing effect on financial markets and the economy.

Recent evidence from the 2008 financial crisis supports this hypothesis. Manconi et al. (2012), in an examination of the US corporate bond market, find that at the onset of the financial crisis insurance companies traded relatively little and were modest net purchasers. Also, they acted as strategic liquidity providers, offsetting the bond sales of mutual funds.

In another study, based on a unique, confidential security-level dataset provided by Deutsche Bundesbank, Timmer (2016) finds that from 2005 to 2014 insurance companies

and pension funds bought debt securities that were trading at a discount and sold securities that were trading at a premium, stabilizing the market by responding counter-cyclically to price changes.² This result reinforces the tentative evidence of Paulson and Rosen (2016), on the basis of US data from the 2008 financial crisis, that life insurers absorbed liquidity risk by purchasing less liquid bonds. However, this study did not find any increase in bond purchases by insurers during the crisis.

On the other hand, ESRB (2015) finds some evidence, admittedly limited to just a couple of studies, of procyclical investment behavior by insurers. The first study cited is Bank of England (2014), which finds some “evidence of procyclical shifts in asset allocation in the UK following the dot.com crash of the early 2000s, and to a lesser extent during the recent financial crisis”. But this conclusion has to be qualified in view of the “important structural shifts in asset allocation [that occurred] during this period, which make identifying procyclical behaviour more difficult.” In particular, the study finds that British insurance companies “have undertaken a structural shift in asset allocation over the past 15 or so years, reducing their holdings of UK equities, largely in favour of fixed income instruments. This process, widely considered ‘de-risking’, has at least in part been a response to a variety of regulatory, valuation and accounting changes that have happened during this period”.

The second study cited is Bijlsma and Vermeulen (2015). These authors find that at the height of the European sovereign debt crisis Dutch insurance companies engaged in procyclical investment, disposing of southern and subsequently investing in northern European (not Dutch) assets. However, the authors also note that “the effect disappears after ECB Chairman Draghi's mid-2012 speech,” an observation suggesting that this period was characterized by a very special risk – namely the break-up of the euro area.

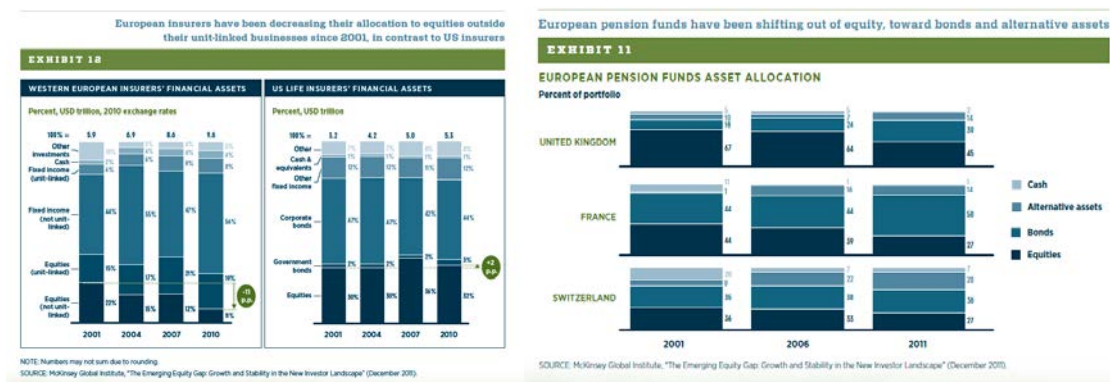
All in all, then, a review of the literature reveals basic consensus on insurers’ ability to work a stabilizing effect on financial markets and the economy, albeit with two important qualifications. One, mentioned in IMF (2016), among other studies, relates to the current, prolonged period of low interest rates, which represents a serious challenge to life insurers’ business model in the major advanced economies, threatening to touch

² Timmer also finds that unlike insurance companies and pension funds, investment funds and banks may accentuate price dynamics. This result confirms previous evidence. For example, using data on cross-border lending both Cetorelli and Goldberg (2011) and De Haas and Van Horen (2013) report a sharp contraction in cross-border lending during the financial crisis, while mutual funds generated large procyclical asset reallocations (Raddatz and Schmukler, 2012) as a result of net redemptions of investors’ units.

off a “search for yield” as the guaranteed rates of return on insurers’ long-term liabilities exceed the yields of the available “safe” assets³. The second qualification, interrelated with the macroeconomic contest, reflects the decisive importance of the regulatory framework in conjunction with accounting rules in shaping the behavior of insurance companies. Since both Solvency II and IFRS Phase II are dramatically altering the playing field for European insurers, closer analysis of their indirect effects on financial stability and the economy is vital. A helpful watchword could well be that it is crucial that the regulatory framework not be an impediment to insurers’ investing for the long term. With no claim to exhaustiveness, given the complexity of the issue, the following section is intended to shed light on this point.

4. How does insurance regulation affect investment decisions and the economy?

Good regulation is important for a healthy industry (Insurance Europe and Oliver Wyman, 2013). Insurers’ investment strategies and behavior are now liable to be affected by a series of regulatory changes, notably involving prudential rules (Solvency II), accounting standards (IFRS 9 and IFRS 4) and the treatment of derivatives (EMIR).



A very simple case can show how insurance regulations are crucial. According to the Group of 30 (2013), the proportion of equity investment in total assets fell dramatically for both European pension funds and insurance companies between 2001 and 2010. There were a variety of causal factors, but one was regulatory developments that may have discouraged riskier, long-term investments.

³ The impact of persistently low interest rates on insurance investment and financial conditions has become a burning issue for managers and insurance supervisors alike (Antolin, 2011; Kablau and Weiß, 2011; Swisse Re, 2012; Berends et al, 2013; EIOPA, 2013; Berdin and Gründl, 2014)

It is particularly striking to see that over this period European insurers cut their allocation to equities by 11 percentage points (equivalent to more than €1 trillion in current value, given that total assets currently amount to almost €10 trillion). A very simple question arises: Why, in these same years, did the portion of equities in US insurance portfolios hold almost constant at about the same level registered in Europe at the beginning of the century?

The “de-risking” in Europe began as an internal risk management approach – encouraged and to some extent forced by regulations – after the collapse in 2000 of Equitable Life, a UK company that had accumulated a disproportionate amount of equities in respect of guaranteed fixed returns to policyholders and was unable to cope with the bursting of the dot.com bubble. The trend culminated with the adoption of both the fair value (market price) accounting approach and a one-year value-at-risk (VAR) horizon for assessing the capital requirements under Solvency II, the new regulatory framework for the solvency requirements for all European insurers. Solvency II goes into force officially in 2016, but European insurance companies have been incorporating it in their asset allocation decisions at least since 2005. On the other side of the Atlantic, the prevailing accounting standard is still historical cost (book value), while the prudential system can safely be described as a lighter risk-based system that has undergone only minor modifications in recent years.

Careful research would be required in order to quantify the actual impact of the changing regulatory framework on European insurers’ investment strategies. In any case, though, there is no neglecting the hypothesis that the change played a role in the divergent propensities for equity investment of US and European companies.⁴

Looking ahead, a still more important consideration is this: “Because equity does a better job than debt of sharing risk between borrowers and lenders, and — because it is perpetual — is better able to support long-term investment projects, this transition away from equity holding by ICPFs – insurance companies and pension funds – may leave the system as a whole with poorer risk-sharing and weaker long-term investment. More

⁴ Bank of England (2014) made a similar argument: “In the longer term, UK insurance companies and pension funds have undertaken a structural shift in asset allocation over the past 15 or so years, reducing their holdings of UK equities, largely in favour of fixed income instruments. This process, widely considered ‘de-risking’, has at least in part been a response to a variety of regulatory, valuation and accounting changes that have happened during this period.”

broadly, it is possible that the combination of factors that drive the asset allocation decisions of ICPFs may lead to outcomes that are suboptimal from the perspective of financial stability (through procyclicality) and long-term investment and economic growth (through an unwillingness to bear risk). Ultimately this may lead to worse outcomes for individual policyholders as well” (Bank of England, 2014).

The implications of these issues are enormously far-reaching, and policy prescription will obviously have to be founded on high quality research. The next section is devoted to one specific point: how we should prepare for the 2018 Solvency II review, bearing in mind that this complex regulatory system, though it went operational only months ago, has already begun to spur important changes in the market.

5. Solvency II: Some thoughts for the 2018 review

Support for the move to the risk-based framework for solvency capital requirements continues to be strong in Europe, and rightly so. There is broad consensus on its advantages: transparency, the general alignment with internal risk management, and the ability to capture the impact both of embedded options and guarantees and of asset/liability mismatch. On the other hand, there are concerns that the market-value approach, coupled with the one-year VAR horizon, may result in an overestimation of the market risk that insurers face, especially in relation to long-term business.

Specifically, it is argued that this regulatory framework may jeopardize European insurers’ capacity for long-term investment, thereby undercutting their ability to avoid procyclical conduct (Persaud, 2015). This is because using market values to assess available capital may overstate the companies’ balance-sheet exposure to short-term market volatility and so create a disincentive for investment in illiquid, long-term, risky assets such as equity, property, infrastructure, securitizations and bonds.⁵

In addition, there is concern over the potentially excessive capital burden on long-term life insurance products with smoothing, yield guarantees and profit sharing. Such products have constituted the largest part of the industry’s total balance sheet and have been very popular throughout Europe, providing millions of policyholders with access to balanced funds (often including a mix of government bonds, corporate bonds, shares and

⁵ Blackrock, 2012; Horing, 2012; J.P. Morgan Asset management, 2010; Sverinson and Yermo, 2012.

property) that can yield more than the inflation rate over the long term while still protecting them from the risks of timing mismatch inherent in the market.

From a purely methodological point of view, these concerns dovetail with a point made in discussions in the United States, namely that a risk-based regulatory framework might well induce procyclical behavior (fire sales and extraordinary pricing) in the insurance industry. In particular, Ellul et al. (2011) find that the insurance companies that are relatively more constrained by regulation are, on average, more likely to sell off downgraded bonds. In addition, Merrill et al. (2014) show that during the crisis the insurance companies that were more capital-constrained owing to operating losses (uncorrelated with the credit quality of their residential mortgage-backed securities) recognized greater fair value losses and sold off comparable RMBS at much lower prices than other insurers. In short, this evidence jibes with the hypothesis that risk-sensitive capital requirements and mark-to-market accounting, jointly, can prompt fire sales of distressed securities by capital-constrained financial institutions. Finally, Koijen and Yogo (2015) find that during the financial crisis life insurers sold long-term policies at deep discounts relative to their actuarial value. This extraordinary pricing behavior was a response to financial and product market frictions, interacting with the statutory reserve regulation permitting them to post far less than one dollar in reserves for each dollar of future insurance liability.

At the same time, however, return to the standard of historical cost is no panacea, not only because that standard does not incentivate sound risk management but also because “to improve their capital positions, insurers using the historical cost accounting disproportionately resort to gains trading, selectively selling their corporate and government bond holdings with the highest unrealized gains. This trading behavior transmits shocks across otherwise unrelated markets” (Ellul et al., 2015).

In finalizing the draft of Solvency II, a number of corrections were made in order to enable the market value approach to better reflect the long-term nature of insurance business and allow insurers to continue to offer long-term guarantees backed by maturity-matched investments. These corrections include provision for matching adjustments to the risk-free rate for discounting long-term liabilities with no surrounding option, adjustment to the risk-free rate to discount liabilities in a situation of financial market distress (known as a “volatility adjustment”), and the possibility of an extension of the recovery deadline for undertakings that breaching the solvency capital requirement.

The design of these corrections was the product of significant political discussion and compromise, and the proposed adjustments are piecemeal in structure and subject to severe uncertainties over calibration. Therefore, the concerns over their effectiveness have hardly been alleviated. Some observers see the adjustments not as legitimate improvements to better reflect the true risks and economics of the business but as aberrations, deviations from the ideal pure market approach (Ayadi et al., 2012). But the “purity” of the market approach is now being seriously questioned, and not only by practitioners. When markets are illiquid and trading friction is substantial, financial assets may temporarily trade well below fundamental values (Duffie, 2010). More generally, in one analyst’s words, “Previously, we thought returns were unpredictable... [Now the evidence shows that] high prices, relative to dividends, have reliably preceded many years of poor returns. Low prices have preceded high returns. This pattern of predictability is pervasive across markets ... For bonds, much variation in credit spreads over time and across firms or categories signals returns, not default probabilities. ... Incorporating discount-rate variation affects finance applications, including portfolio theory, accounting, cost of capital, capital structure, compensation, and macroeconomics” (Cochrane, 2011).

Looking ahead to the review of Solvency II that will be conducted in 2018, and possibly in an even longer-term perspective, to my mind it is indispensable to consider how these advances in the theory of finance can be incorporated into prudential supervisory rules. The objective has been well stated by the Bank of England: “Industry, policymakers and consumer groups all have a role in ensuring that long-term savings products provide the combination of security, affordability, risk-sharing and flexibility that is appropriate to the long-term interests of individuals” (Bank of England, 2014).

Methodologically, as I see it there are two principal areas for consideration and analysis. First, the existence of mean reversion in financial variables requires serious reconsideration of the choice of the one-year horizon for VAR calibration. In particular, there is substantial evidence that asset risk for equity and property investments diminishes as the holding period lengthens: “equity returns show more volatility and tail risk at short horizons than at long horizons” (Mladina, 2014).

Second, and more generally, it is essential to find a way to take proper account of the fact that insurance companies are in a position to tolerate moments of extreme volatility, as is shown by the evidence set out in section 3, above. This is because investment

decisions in insurance are driven by the liability structure. The main insight of the asset–liability management (ALM) school is that investment risk in the insurance sector can be managed only when liabilities are factored in. What is more, insurance companies draw on a range of sources of liquidity (cash flow from new premiums, dividends, rent and interest payments, redemption of maturing bonds, cash reserves, and property rentals). This means that even when liabilities mature, insurers enjoy some flexibility in deciding whether or not to sell the countervailing assets, if they can pay claims in cash. More substantial intertemporal smoothing of the variables used in calculating the capital requirements would appear to be indispensable, starting with the so-called “equity dampener”, which in the view of many analysts simply does not work. In any case, it should at least have to be shown, using real-world cases, that the corrections made with a view to improving the regulations are functional.

6. Conclusions

The issue of the regulatory impact on long-term investment by institutional investors deserves continuing attention. Our understanding of the matter would benefit substantially from academic research and discussion, hopefully helping policy makers not only to avoid introducing fresh obstacles but also to institute rules that facilitate investment in equity and other long-term assets. Additional academic input is needed to enhance the general awareness of how effective the long-term business model of the insurance industry can be in reducing market risk, and hence the extent to which the current mark-to-market regulations may be overestimating the market risks bearing on insurers. Input is also needed on ways to enable the market-consistent framework to better capture and measure true risk exposures and, consequently, the related solvency requirements.

REFERENCES

- Arena M. (2008), “Does Insurance Market Activity Promote Economic Growth? A Cross-Country Study for Industrialized and Developing Countries”, *Journal of Risk and Insurance*, Volume 75, Issue 4, pp. 921–946.
- Antolin P., Schich S. and Yermo J. (2011), *The Economic Impact of Protracted Low Interest Rates on Pensions Funds and Insurance Companies*, OECD - Organisation for Economic Co-Operation and Development.

- Ayadi, Rym, Jon Danielsson, Roger J. A. Laeven, Antoon A. J. Pelsser, Enrico C. Perotti & Mario V. Wüthrich (2012), "[Countercyclical regulation in Solvency II: Merits and flaws](#)", VoxEU.org.
- Bank of England and the Procyclicality Working Group (2014), "Procyclicality and structural trends in investment allocation by insurance companies and pension funds: A Discussion Paper by the Bank of England and the Procyclicality Working Group", available at <http://www.bankofengland.co.uk/publications/Documents/news/2014/dp310714.pdf>
- Blackrock (2012), *Balacing Risk, Return and Capital Requirements; the Effect of Solvency II on Asset Allocation and Investment Strategy*, Economist Intelligence Unit.
- Berdin E. and Gründl H. (2014), "The Effects of a Low Interest Rate Environment on Life Insurers", ICIR Working Paper Series, n. 15/14, ICIR-International Center for Insurance Regulation.
- Berends K., McMenamin R., Plestis T. and Rosen R.J. (2013), *The Sensitivity of Life Insurance Firms to Interest Rate Changes*, Economic Perspectives, FED – Federal Reserve Bank of Chicago.
- Bijlsma, M and Vermeulen, R (2015), 'Insurance companies' trading behaviour during the European sovereign debt crisis: flight home or flight to quality?', De Nederlandsche Bank Working Paper No. 468.
- Cecchetti, S.G. and Kharroubi, E. (2012), "Reassessing the Impact of Finance on Growth", BIS Working Paper Series, No. 381.
- Cetorelli, N. and Goldberg, L. S. (2011), "Global banks and international shock transmission: Evidence from the crisis", IMF Economic Review 59: 41_76.
- Cochrane, J.H. (2011), "Presidential Address: Discount Rates", *The Journal of Finance*, Volume 66, Issue 4, pages 1047–1108.
- De Haas, R. and Van Horen, N. (2013), "Running for the exit ? International bank lending during a financial crisis", *Review of Financial Studies* 26(1): 244_285.
- Duffie, D. (2010), "Presidential address: Asset price dynamics with slow-moving capital", *Journal of Finance* 65, 1237-1267.
- EIOPA (2013), "Opinion of the European Insurance and Occupational Pensions Authority of 28 February 2013 on Supervisory response to a prolonged low interest rate environment", EIOPA-BoS-12/110.
- EIOPA (2016) "Consultation Paper No. CP_16_005 on the request to EIOPA for further technical advice on the identification and calibration of other infrastructure investment risk categories i.e. infrastructure corporates"
- Ellul, Andrew, Chotibhak Jotikasthira, and Christian T. Lundblad, (2011) "Regulatory Pressure and Fire Sales in the Corporate Bond Market," *Journal of Financial Economics*, 101 (3), 596–620.
- Ellul, A., C. Jotikasthira, C. Lundblad, and Y. Wang (2015), "Is Historical Cost Accounting a Panacea? Market Stress, Incentive Distortions, and Gains Trading", *The Journal of Finance*, Volume 70, Issue 6, pp. 2489–2538.

- ESRB (2015), *Report on systemic risks in the EU insurance sector*.
- European Commission (2013), *Green Paper. Long-Term Financing of the European Economy*.
- European Commission (2014), “Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank. An investment Plan for Europe”, COM (2014) 903 FINAL, Brussels.
- European Commission (2015), Regulation of the European Parliament and of the Council on the European Fund for Strategic Investments and Amending Regulations, (EU) No. 1291/2013 and (EU) No. 1316/2013, COM(2015) 11 Final, Strasbourg.
- Geneva Association (2014), “Global Insurance Protection Gap Assessment and Recommendations”, Report edited by Kai-Uwe Schanz and Shaun Wang.
- Group of 30 [G30] (2013), “Long-term finance and economic growth”. G30: Washington DC. http://www.group30.org/images/PDF/Long-term_Finance_lo-res.pdf.
- Horing, D. (2012), “Will Solvency II Market Risk Requirements Bite? The Impact of Solvency II on Insurers’ Asset Allocation”, in: *The Geneva Papers*, July 2012.
- IMF (2016), GLOBAL FINANCIAL STABILITY REPORT (GFSR) Potent Policies for a Successful Normalization, Chapter 3: The Insurance Sector—Trends and Systemic Risk Implications.
- Insurance Europe (2015), European Insurance in Figures dataset (2013), Statistics, No. 50.
- Insurance Europe (2016), *Response to EIOPA consultation on the identification and calibration of infrastructure corporates*, Position Paper
- Insurance Europe and Oliver Wyman (2013), *Funding the Future. Insurers’ Role as Institutional Investors*.
- J.P. Morgan Asset Management (2010), *Solvency II: a Briefing for the Chief Investment Officer*.
- Kablau A. and Weiß M. (2011), “Gauging the Impact of a Low-Interest Rate Environment on German Life Insurers”, Discussion Paper, *Banking and Financial Studies*, No. 2, Deutsche Bundesbank.
- King, R.G. and Levine, R. (1993), “Finance and Growth: Schumpeter Might Be Right”, *Quarterly Journal of Economics*, 108(3), pp. 717-737.
- Koijen, Ralph S. J., and Motohiro Yogo (2015), "The Cost of Financial Frictions for Life Insurers", *American Economic Review*, 105(1): 445-75.
- Levine, R. and Zervos, S. (1998), “Stock markets, banks, and economic growth”, *American Economic Review*, 88(3), pp. 537-558
- Lee, Chien-Chiang, Chi-Chuan Lee and Yi-Bin Chiu (2013), “The link between life insurance activities and economic growth: Some new evidence”, *Journal of International Money and Finance*, Volume 32, February 2013, Pages 405–427

- Manconi, A., M. Massa, and L. Zhang (2016), “Bondholder Concentration and Credit Risk: Evidence from a Natural Experiment”, *Review of Finance* (forthcoming).
- Merrill, Craig B., Nadauld, Taylor, Stulz, René M., and Sherlund, Shane M. (2014), “Were There Fire Sales in the RMBS Market?” (May 6), Charles A. Dice Center Working Paper No. 2014-09; Fisher College of Business Working Paper No. 2014-03-09.
- Mladina, P. (2014), “Dynamic Asset Allocation with Horizon Risk: Revisiting Glide Path Construction”, in *The Journal of Wealth Management*, Vol 16, No 4.
- Paulson, Anna L. and Rosen, Richard J. (2016) “The Life Insurance Industry and Systemic Risk: A Bond Market Perspective”. FRB of Chicago Working Paper No. WP-2016-4. Available at SSRN:<http://ssrn.com/abstract=2775585>
- Persaud, Avinash, (2015), “How Not to Regulate Insurance Markets: The Risks and Dangers of Solvency II” (April 14, 2015).
<http://ssrn.com/abstract=2644158> or <http://dx.doi.org/10.2139/ssrn.2644158>
- Outreville, J.F. (2013) “The Relationship Between Insurance and Economic Development: 85 Empirical Papers for a Review of the Literature”, *Risk Management and Insurance Review*, Volume 16, Issue 1, pp. 71–122.
- Raddatz, C. and Schmukler, S. (2012), “On the international transmission of shocks: Micro-evidence from mutual fund portfolios”, *Journal of International Economics* 88(2): 357-374.
- Rajan, R.G. and Zingales, L. (1998), “Financial Dependence and Growth”, *American Economic Review*, 88(3), pp. 559-86.
- Sverinson, C. and Yermo, J. (2012), “The Effect of Solvency Regulations and Accounting Standards on Long-Term Investing”, OECD Working Papers on Finance, Insurance and Private Pensions, No. 30, OECD - Organisation for Economic Co-operation and Development.
- Timmer, Y. (2016), “Cyclical investment behavior across financial institutions”, Discussion Paper Deutsche Bundesbank No 08
- Swiss Re (2012), “Facing the Interest Rate Challenge”, *Sigma*, No. 4.
- Swiss Re (2015), “Underinsurance of property risk: closing the gap”, *Sigma*, No. 5.
- Ward, D. and Zurbrugg, R. (2000), “Does Insurance promote economic growth – evidence from OECD Countries”, *The Journal of Risk and Insurance* 67(4) pp. 489-506.