The Four Pillars Newsletter
Research on Insurance, Retirement and Social Security

Published in The Four Pillars Newsletter No. 51, September 2012

The Holistic View: Why All Four Pillars Need to Work in Concert[1]

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1. The world of finance and the real world

The relationship between the financial world and the world of the real economy has been both admired and cursed, with the cursing becoming more common recently. The financial world encompasses two areas:

- the question of how the funds needed for economic projects are provided and channelled and,
- the question of how the results of economic activity are distributed.

The credit crisis of 2008 was preceded by waves of what was widely perceived as great financial innovation in the housing market in the United States. According to the proponents of that view, finance was making a contribution to the real economy by making it possible for the previously excluded poor to be able to afford the American Dream of owning a house. Following the credit crisis debacle, opponents of that financial innovation presented it as mismanagement at best, and fraud at worst. In that view, finance destroyed economic value. Of course, these two "before and after" views are directly contradictory: the method of financing housing can destroy value or add value, but not do both at the same time. Whatever the view, it is important to note that while we decide about the financial structure of an economic endeavour at its beginning, its value will be revealed later on, when the effects in the real economy become known.

The design of a retirement system is not unlike the design of other parts of economic systems. We decide about the funding upfront, and after some time we experience economic consequences. The four pillars of pension planning—the compulsory pay-as-you-go state pension, the supplementary occupational pension, individual savings (personal pension and assets and life insurance) and the flexible extension of work-life, mainly on a part-time basis—are all a result of legal and institutional design, including the finance part in the first three, that are given to every generation as they enter the labour force. But the real economic consequences of that design, including the finance part, become fully visible later on, when the generation enters the retirement years.

In the chapter "The financial crisis: impact on the four pillars of old age protection" of *The Geneva Report No. 6: Addressing the Challenge of Global Ageing—Funding Issues and Insurance Solutions* we discussed the theoretical foundations of the Four Pillars Framework and pointed out that the recent credit crisis and the subsequent sovereign debt crisis have affected all four pillars in a negative fashion. We have also suggested possible ways to improve the current situation. In this chapter, we suggest that an institutional design in which the four pillars work in concert is likely to deliver better real economic results, while designs that pit these four entities against each other are likely to cause imbalance and weakness in the real economy.

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[1] Chapter 8 of The Geneva Report N° 6—*Addressing the Challenge of Global Ageing—Funding Issues and Insurance Solutions,* The Geneva Association, June 2012.

We should not assume that retirement systems are immune to producing negative impacts on the real economy and cannot play a similarly devastating role to that of the housing market in the U.S. We must therefore create a four pillars system whose design and financial structure has a positive impact on the real economy.

2. Greece: bump in the road or "we are all Greek now"?

As of early 2012, the country of Greece was in the headlines of the economic news worldwide (*The New York Times*, 2012). After months of negotiation, eurozone finance ministers approved the second bailout package for Greece in exchange for austerity measures under strict conditions imposed on that country. When the Greek parliament was debating the austerity deal, tens of thousands of protesters demonstrated in Athens, expressing extreme frustration with the fact that the people were forced to pay for past financial dealings that compromised their jobs, livelihoods and future. The financial side was seen by them as robbing the real economy.

The Government of Greece, on the other hand, found itself in the impossible position of having to meet financial obligations with shrinking revenues, and seeing its financial obligations increasing in size because the increased riskiness of Greek government debt resulted in dramatically higher interest rates on new borrowing. The "world of finance" in Greece affected its real economy in a highly negative fashion.

It is common to assume that, since Greece is a small country on the periphery of the world's great economies, its problems can and will be addressed if enough resources are mustered. However, we would like to propose that the problems of Greece in early 2012 are not unlike the problems that even the most developed economies might encounter in the future. And since retirement systems and policies are largely affected by what occurs in the world of finance, we should ensure that the impact of that world on the real economy is a positive one as opposed to the consequences of the developments in Greece. What happened in Greece, as we see it, was an unbalanced expansion of the first pillar of retirement systems which removed incentives for the building of the other three pillars as well as entrepreneurial activity.

For people employed in the financial sector of an economy, finance often seems to be the highest, noblest calling, something akin to being the captain of an economic ship. For many poor people, far removed from the global markets and only engaged on the ground with the real economy, finance often seems like a sordid gambling house that forces everyone to participate and randomly throws numerous victims out of their homes during economic turmoil. Those victims are prone also to fall prey to ideologies promising a dream world where money will be easily available thanks to the efforts of a new type of political leader, who abolishes the artificial world of financial shenanigans and lets ordinary working people keep the fruits of their labour.

Alas, no such world exists. Every real economy comes with a conceptual finance economy. And the two always affect each other. The question of the relationship between the "finance" and "real" aspects of a business has, of course, appeared in theoretical financial literature. It is addressed in the Modigliani-Miller Theorem (Modigliani and Miller, 1958). This work, which covers most aspects of modern finance, shows that under specific conditions the value of a firm is generally invariant with respect to the leverage policy, or the method of financing of the firm.

The general thrust of the theorem (Stiglitz, 1974; Braouezec, 2008) is that in the absence of taxes, bankruptcy costs or agency costs, the value of a firm is fundamentally determined by its earnings, not by the way it is financed. Of course, the theorem is presented in a vacuum, because in the real world, taxes do matter; bankruptcy is relevant because even the remotest possibility of it occurring raises the cost of doing business and obtaining capital; and, most importantly, agency costs (i.e. arising from resources being managed and/or used by people other than their owners), are quite substantial.

This confirms that finance matters in the real world. And this can manifest itself in ways that often seem to defy common sense. Why is there increasing social unrest in Greece? There could be, as there always is in politics, an aspect of political opportunism to the protests, but we would venture that political opportunism alone cannot generate the level of frustration and despair one sees in Greece today. People are protesting about layoffs, higher fees and taxes because the unemployment rate exceeding 20 per cent and tight labour markets prevent many of them from earning income. Not only would they like their government to ease their economic suffering rather than add to it, they also blame the government for causing their pain in the first place.

Why then is the government imposing austerity measures on the already impoverished and often unemployed population? Because the government's tax revenues have been sharply reduced by low employment and low profits, while a shrinking economy further reduces value-added tax receipts (and, as some critics point out, there exist serious deficiencies in collection of taxes in Greece, as well). Furthermore, it has to spend more on social spending and on the cost of debt. The government is trapped in the same downward spiral as its citizens.

A government's financial problems translate into real economic problems for the people—and these, in turn, further exacerbate government's financial woes. Notably, private financial institutions in Greece are not part of a solution to this problem, as illustrated by massive cash withdrawals from the Greek banking system. Private financial systems exist, from the macro-economic perspective, in order to deliver capital from savers to efficient uses of it in the business sector; the Greeks, however, do not trust their financial institutions with their deposits, so even the first step of this crucial economic process is prevented from happening.

Retirement systems are most commonly analysed from a financial perspective, especially if viewed by institutions such as banks and insurance companies. The view of social science scholars, on the other hand, considers solely the social costs often removed from market realities. The painful story of the current economic situation in Greece illustrates this important principle: The conceptual world of finance and the social world of human needs collide in the real economy, and the objective of public policy, as well as the work of the private insurance industry, is to replace that collision with harmony.

One could argue that the key problem in Greece is chronic overspending by its government. But that is merely the symptom of a greater disease: the government of Greece has attempted to take on all four pillars of the retirement system (with an unhealthy emphasis on the first pillar), and many other parts of the economy as well. The government is therefore doing too much, and such an imbalance does too little to meet the people's needs. The proper balance of the four pillars system needs to be restored.

Nassim Taleb (2012) points out that modern financial systems, especially because of interactions between large investment banks and governments and the "too big to fail" concept, have created a situation where the financial system and banks have become more vulnerable in a crisis situation. What the world needs, according to Taleb, is what he defines as "antifragility", i.e. a financial system that becomes stronger and more stable in response to a crisis. The problem of a feedback loop between financial institutions that increases global financial risks is currently under scrutiny under the banner of systemic risk, but we suggest that the other feedback loop between the world of finance and the real economy is the one that matters the most.

The financial system should—and can—become a source of antifragility for the economy, and the private insurance industry is a key player in this mission. The Geneva Association (2010) points out that systemic risk does not originate from core insurance functions of insurance firms. In fact, insurance firms acted as pillars of stability during the Great Depression in the United States—as promoters of antifragility, using Taleb's terminology (Ciment, 2001; Black and Skipper, 1982; and Porterfield, 1956).

As we have already discussed previously, the recent financial crisis has weakened all four pillars in areas related to the real economy. We should seek to build a system in which the four pillars work in harmony, because such an interrelation would have a stabilising effect on the real economy. When proposing reforms of retirement systems, we should therefore ask the following two questions:

- What is the impact of the financial aspects of the reform on the performance and incentives of the real economy?
- How do changes in one of the four pillars impact the other three, and what are the resulting effects on the real economy?

The design of a retirement system is a part of the financial system and the general institutional and legal design of the economy. Its results will not be judged, however, by its financial parameters or actuarial balances, but by the performance of the real economy at the time when retirement benefits are paid. Real goods and services will have to be provided to the retirees in the future economy at a time when they will no longer have the opportunity to redesign their retirement plans. The private insurance industry will also be held responsible for those results.

3. The four pillars are not separate from one another, they serve the same purpose

As the industrialised world prepares for the impact of the ageing of its citizens and the projected effects of large generations retiring, many steps have been already taken to address this issue. Whitehouse *et al.* (2009) provided an overview of pension reforms worldwide over roughly the last quarter of a century. Their paper describes reform packages that have taken place in 38 industrialised economies, some of them involving incremental changes to existing provision, others an overhaul of the entire retirement income system.

The changes had various objectives:

Firstly, improved coverage of the pension system, especially of voluntary private pensions, was a common goal. This meant that a larger percentage of the population was brought into the market-based retirement system, in which they could participate in mapping their future. Of course, this change provided better incentives for work and savings, with a positive impact on the real economy.

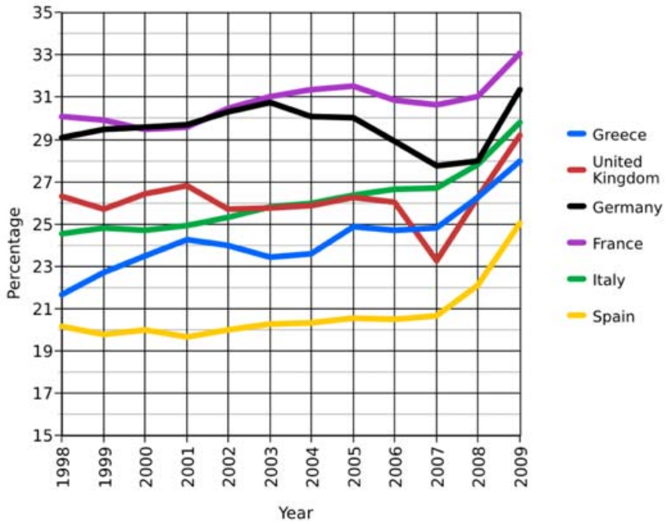
Secondly, some reforms focused on improving the adequacy of retirement benefits to combat old-age poverty. It should be noted that while seeing the results of one's work is a motivator for work, there are exceptions to that rule. One such exception is when the situation appears hopeless: if working hard means remaining in poverty regardless of one's efforts, incentives for work disappear. If instituted carefully, reforms that alleviate poverty can have a positive impact on the real economy by improving incentives for work and by greater inclusion of all groups of a society in its economic system.

Thirdly, the pressure of population ageing and the maturing of pension schemes meant that concerns for fiscal sustainability of public pensions, expressed through reductions in future benefits, were common. Often, the improvements to long-term finances are to be achieved by encouraging people to work longer, increasing pension eligibility ages and adjusting pension incentives to retire. Overall, such reforms have resulted in more efficient labour markets, again with a positive impact on the real economy.

Finally, some reforms focused on streamlining the administration of retirement income provisions and improving the security of benefits in the face of different risks and uncertainties. These efficiencies should also help real economic performance.

The crisis that started in 2008 revealed many problems. One such vulnerability was the dire state of public finances in many countries. Greece is an extreme case but social spending increased as a percentage of GDP in all developed economies during the growth period preceding the crisis, so that when the crisis hit and the perceived need for social spending became an absolute necessity, many countries found themselves in a highly vulnerable state of public finances. We present below the history of expenditures for social protection in six key European countries as a percentage of their GDP, based on data from Eurostat (2012).

Expenditures for social protection as a percentage of GDP



Clearly there was an increasing trend in those expenditures even before the crisis, and the crisis exacerbated that trend. Economic performance has recovered, at least somewhat, in 2010 and 2011, but the impact of that improvement on social spending is not yet known as of this writing (Freysson, 2011).

If the real economy is performing well, the first pillar of social security may be very important for the poor but it is only a part of the picture for the rest of the society. Also, a growing economy should provide an opportunity for employment to grow, the ranks of the poor to shrink and for employer-sponsored pension coverage to assume greater significance. Furthermore, under conditions of economic growth, most people should be able to save and invest. Additionally, a growing economy improves the stability of financial institutions and expands the size of the private insurance industry. This means that there are ample opportunities for the second and third pillars to play their roles. And an improved labour market helps strengthen the fourth pillar: continued employment of silver workers, i.e. the elderly in general, and retirees in particular, who should be able to continue working part-time and still make a contribution to the society and to their own well-being.

If, however, during the expansion, social protection expenditures expand by as much as 3 per cent of GDP as they did in Greece, and then the recession forces another increase of 3 per cent, as in Greece and possibly other countries, the public sector crowds out the private sector by expanding greatly in response to the crisis. In addition to any financial impact of public sector spending, increased uncertainty may reduce or stop private investment and even, in extreme cases, cause private disinvestment, with the resulting contraction of the economy, and very painful real economy adjustments, as well as negative feedback for public finances.

Insurance is a “superior” good (or, more precisely, service). The demand for private insurance will tend to grow faster than the incomes of consumers of insurance (if their incomes grow) and often also falls faster than their incomes fall. The job of the first pillar is, in a sense, to provide balance in this situation. In a time of crisis it is natural for the first pillar and all social expenditures in general to play a greater role in the economy and in the retirement systems in general; but during a period of economic growth, we can expect the institutional private-sector parts of the second and third pillars (i.e. private pension plans and private insurance firms) to grow faster than the economy. If the first pillar attempts to match that growth or even exceed it, it will find itself overextended during any future crisis. Proper balance between the four pillars is restored only if the first pillar plays a smaller, more tempered role in times of growth and allows other pillars to take over.

What about the balance of the second pillar with regard to the other pillars? The second pillar provides pension benefits based on the record of employment and is tied to the history of employment with one employer. As such, it promotes long-term careers and the building of human capital of employees by employers. It also provides incentives for employees to build the value of their human capital and to pursue long-term employment goals. These are very valuable incentives for both the employer and the employee, and they contribute to the stability of the overall economy. Let us also note that employment-based benefits lower the needs for social security payouts, while the permanent nature of employment provides funds for the employee’s personal savings. Finally, long-term accumulation of human capital provides skills and experience for continued employment after retirement.

It should be noted, however, that many traditional defined benefit plans capped benefits at a certain maximum, preventing the accrual of additional benefits beyond a specified number of service years. That design effectively punishes continued full-time employment afterwards and is a punitive feature targeting the fourth pillar. Its continued existence in private pension plans is unjustified. Furthermore, the last quarter-century has brought about a substantial decline in private defined benefit plans, and an increase in the relative importance of defined contribution plans, especially in the United States. But defined benefit plans are more effective in providing retirement security and stability. Given the uncertainties of the next quarter-century, the commitment to such security and stability for employee benefits should be re-examined.

The third pillar—private savings—is where private consumers and financial institutions interact. The recent credit crisis has also brought about great uncertainties and reservations concerning financial institutions. We have already pointed out that the role of financial institutions, including insurance firms, is to create a situation where finance facilitates the real economy instead of impeding it. In a well-balanced free market system this is achieved merely by providing competitive rate of return, but this picture may be too simplified for the reality of many competing interests, and global competition. High returns may also be realised by rent-seeking or by pursuing public sector subsidies or bailouts. While such practices might benefit individual firms pursuing them, they are likely to result in lower economic growth, lower employment and the subpar investment results of other firms.

Furthermore, many consumers have lost trust in the fairness of both the political process and financial institutions. Lack of trust lowers economic growth. Trust can be viewed as an economic lubricant, reducing the cost of transactions, enabling new forms of cooperation and furthering business activities, employment and prosperity. Hence, a significant body of research suggests that a higher level of social trust is positively correlated with economic development (Knack and Keefer, 1997, Zak and Knack, 2001, also Fukuyama, 1996).

Public policy decision-makers often argue that they prevent this type of outcome, and that governments serve their citizens with dedication and integrity. We should hope that to be the case, but Public Choice Theory (Tullock, 2008) warns us otherwise, especially with its concerns about regulatory capture. And the effects of those negative public choice effects may be even greater than we tend to estimate, as the distrust of banking institutions generated by the recent economic crisis shows us. The insurance industry must adhere to the highest ethical standards in order to earn and keep the public trust.

The shattering of public trust also calls for a serious re-examination and revitalisation of the regulatory framework. The crisis has already brought about major changes in financial regulation, e.g. the Dodd-Frank Act of 2010 in the United States. A major thrust of any new framework should be the rebuilding of public trust with stable and viable social security systems and regulators who can make financial institutions reliable and trustworthy.

Much has been written about the importance of the third pillar for economic growth. A high savings rate is sometimes prescribed as a panacea for all economic ills. On the other hand, Keynesian policy perspective argues that excessive savings are the cause of painful prolonged recessions in capitalist economies. It should be noted, however, that the Keynesian argument is rooted in a proposition that excessive savings are a manifestation of underinvestment, resulting from fear, uncertainty or lack of trust in future economic prospects.

If consumers and firms act this way, this is an indication that they lack faith in the protection provided by the other two pillars. They can’t risk committing their savings because social security benefits may not be available in the future, financial institutions may become insolvent or labour markets will be too right and too rigid to meet their needs. In such a situation, the innovative investment of private savings may actually be the best way to start the process of healing the economy.

Public policy decision-makers and the private insurance industry should encourage such developments by removing barriers to entrepreneurial innovation. After all, in the midst of a prolonged slump in business investment since 2008, Apple Computer was able to attain record profitability by creating innovative products, which are bought without hesitation by consumers who are otherwise very careful with their money.

Of course, a private savings pool is created by the individual decisions of consumers who must look to their savings and continued work to provide for themselves in retirement if the political process and financial institutions fail them. Liedtke (2001) points out that the ageing challenge facing those individual consumers (and retirement systems in general) is somewhat misnamed by its sole reference to ageing. We have witnessed great increases in longevity in the 20th century, from life expectancies of just under 50 in 1900 to around 80 in 2000. And those increases in longevity are continuing unabated.

On the other hand, during the 20th century we have also witnessed the expansion of universal education and lengthening of the education process. In 1900, retirement age of 65 was way beyond the life expectancy of a newborn, but it was also often close to 50 years after the age at which many workers entered the labour force. Now we live in a world in which many workers enter the labour force as late as 25, and we could reasonably argue that by the logic of the late 19th century their normal retirement age should be close to 75.

But we do not live in the 19th century. Increased productivity and the general economic prosperity of Western Europe, Japan and North America following World War II allowed many people with advanced degrees, high productivity skills and greatly improved working conditions to retire as early as 55 even though they did not join the labour force until the age of 25. Now we are beginning to realise that this was a temporary luxury afforded by the coincidence of a large generation of baby boomers joining the work force and large parts of the world (e.g. the communist bloc, the Middle East and Africa) pursuing ill-advised economic policies resulting in no growth and lack of competitiveness. The current world of global competition and ageing of the developed world looks dramatically different.

It is often argued that the main private retirement product, life annuity, provides insurance against living too long. Liedtke (2001) points out that the key measure of the challenge of retirement is measuring the time that remains in terms of years of productive work, not just living years. That time interval is uncertain because it ends at some undetermined date in the future. Together with the information about one's productivity, it provides us with the value of our human capital, i.e. the present value of all future income that one can generate through remainder of one's life. Workers must, of course, manage their financial capital, which derives from the value of their social security benefits and of the future income they will receive from pension and private insurance contracts and the value of future income provided by other savings and investment. But they must also manage their human capital.

The human capital value of a silver worker is in fact equivalent to the fourth pillar value for that worker. It is determined not just by skills, education and character of the worker but is also influenced by public policy, the employment practices of employers and the overall labour market. Workers face a lot of risk in deciding how to utilise their human capital. By far the greater risk is the timing of their decision to exit the labour force. Life annuity is not just a protection against living too long, it is also a protection against foolishly leaving the labour force too early. When is "too early" for this purpose? One could argue (somewhat one-dimensionally, on a purely economic basis) that it means any time when the human capital value is still positive. Or one could say that "too early" means that the human capital value exceeds the utility of leisure in retirement.

The decision about timing of the exit from the labour force is difficult enough because such a calculation is immensely complex. But it is additionally complicated by the fact that the decision to exit the labour force may not be voluntary and it is often difficult or outright impossible to reverse, even if the worker is healthy. A worker who exits the labour force for a long time loses skills and contact with newly developed technology, as well as with work practices and procedures.

Let us stress this again: the decision to exit the labour force is extremely risky and it is perceived as such by most workers. Private insurance industry should consider all possible methods in helping people manage that risk. Innovative approaches have already been developed in disability insurance, where insurers may be willing to finance training and education if it results in return to work, even part-time. Silver workers looking for an opportunity to re-join the work force can also be helped by education and training, or simply by being offered opportunities for part-time work with their insurance company.

Public policies and employment practices can also greatly affect the riskiness of exiting the labour force and the value of human capital. If workers cannot retire gradually but must instead switch from full employment to no employment, their human capital value is forcibly reduced by the entire future part-time income stream. In some cases, especially for poorer workers, this could amount to more than the entire wealth of the worker. One could hardly imagine anyone running for public office on the platform of taking several hundred thousand dollars from every poor worker without benefitting anybody else. That is, however, the implication of forcing elderly workers to retire fully.

We should also note that such policies have secondary effects, as retirees who suffer such a fate often reduce consumption upon retirement and resulting drop in aggregate demand could ultimately cause the jobs left behind for younger workers to disappear. The net result is greater social security expenditures (and we should include the cost of lower tax revenues due to reduced employment and unemployment benefits), lower rates of return for pensions and insurance firms investment portfolios due to lower economic growth and greater social costs.

In a simplified world, disregarding any non-economic factors, workers should retire only if their human capital value drops to zero. If their income from work is not sufficient for their needs, they should enjoy easy access to their personal savings and investments and to their pension and insurance benefits. If those are not enough, they should be able to tap social security benefits. This ideal world is hard to bring about because, among other reasons, it assumes no agency costs, no abuse of social security benefits, no mismanagement and no fraud on behalf of financial institutions. But it may be a world worth considering because it assumes that workers utilises their human capital to the fullest.

Conclusion

In the debate on technical and financial issues pertaining to retirement systems, we should never lose sight of the fact that the financial world shadows the real economic world. The retirement system exists for the purpose of serving the needs and dreams of retirees, and is a part of the overall economy. We argue that the system should fully utilise all four pillars in that function, because in a well-designed retirement system the four pillars work in harmony to support the real economy and silver workers.

References

Black, K.J. and Skipper, H.D. (1982) *Life insurance*, 10th Edition Englewood Cliffs, NJ: Prentice Hall.
Braouezec, Y. (2008) "Modigliani-Miller Theorem", in Rama Cont (ed.) *Encyclopedia of Quantitative Finance*, Wiley.
Ciment, J. (2001) *Encyclopedia of the Great Depression and the New Deal*, Volume 1, Sharpe Reference.
Eurostat (2012) *Expenditures On Social Protection as a Percentage of GDP*.*
Freysson, L. (2011) General Government Expenditure Trends 2005-2010: EU countries compared, *Eurostat, Statistics in Focus*, 42/2011.*
Fukuyama, F. (1996) *Trust: The Social Virtues and the Creation of Prosperity*, Clearwater: Touchstone Books.
Knack, S. and Keefer, P. (1997) "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation", *Quarterly Journal of Economics,* 112(4), 1251-1288.
Liedtke, P.M. (2001) "The Future of Active Global Ageing: Challenges and Responses", *The Geneva Papers on Risk and Insurance—Issues and Practice,* 26(3), 410-417.*
Modigliani, F., and Miller, M. (1958) "The Cost of Capital, Corporation Finance, and the Theory of Investment", *American Economic Review*, 261-297.
Porterfield, J.T.S. (1956) *Life insurance stocks as investments*, Stanford, CA: Stanford University Graduate School of Business.
Rogers, J. (2012) "For boomers, it's a new era of 'work til you drop'", Associated Press, 20 February.*
Stiglitz, J. (1974) "On the Irrelevance of Corporate Financial Policy", *American Economic Review*, 66, 851-866.
Taleb, N. (2012) *Taleb on Antifragility*, podcast at Econtalk.org, hosted by Russ Roberts, 16 January.*
The Geneva Association (2010) *Systemic Risk in Insurance: An Analysis of Insurance and Financial Stability*, Special Report of The Geneva Association Systemic Risk Working Group, March, Geneva: The Geneva Association.*
The New York Times (2012) "Country Profile: Greece", 20 February.*
Tullock, G. (2008) "Public Choice", *The New Palgrave Dictionary of Economics*, 2nd Edition, Basington, U.K.: Palgrave.
Whitehouse, E., D'Addio, A., Chomik, R. and Reilly, A. (2009) "Two Decades of Pension Reform: What has been Achieved and What Remains to be Done?" *The Geneva Papers on Risk and Insurance—Issues and Practice* 34(4), 515-535.
Zak, P. J., and Knack, S. (2001) "Trust and growth," *Economic Journal*, 111, 295-321.

*This article was published by **The Geneva Association** (The International Association for the Study of Insurance Economics). Articles, documents and recent publications of the Association can be found on its website, at www.genevaassociation.org*