The sustainability factor of the
social-security system
from an actuarial point of view[*]

The recently-passed Law 23/2013 of 23 December on the Sustainability Factor and the Revaluation Index in the Social Security Pensions System (Ley 23/2013, de 23 de diciembre, reguladora del Factor de Sostenibilidad y del Índice de Revalorización del Sistema de Pensiones de la Seguridad Social) introduces the sustainability factor into Spain's public pension system.

An analysis of this factor calls for a critical and thorough approach based on actuarial techniques but without losing sight of other essential goals like fairness, insofar as this is compatible with ruling social-security principles and the ongoing drive of seeking long-term, commitment-meeting solvency. We believe the time has come for our social welfare model to accept the actuarial approach as an inestimable aid in the decision-making process and a priority outlook in its analysis and development. This article presents a set of reflections on the Sustainability factor and the Revaluation index for Pensions in Spain, taking in other alternatives that correct some of its sources of uncertainty, and finishes up with some comments on the new social environment and complementary welfare schemes.

MARÍA BEGOÑA GOSÁLBEZ RAULL,
ALICIA DE LAS HERAS CAMINO
and DANIEL HERNÁNDEZ GONZÁLEZ
ACTUARIES
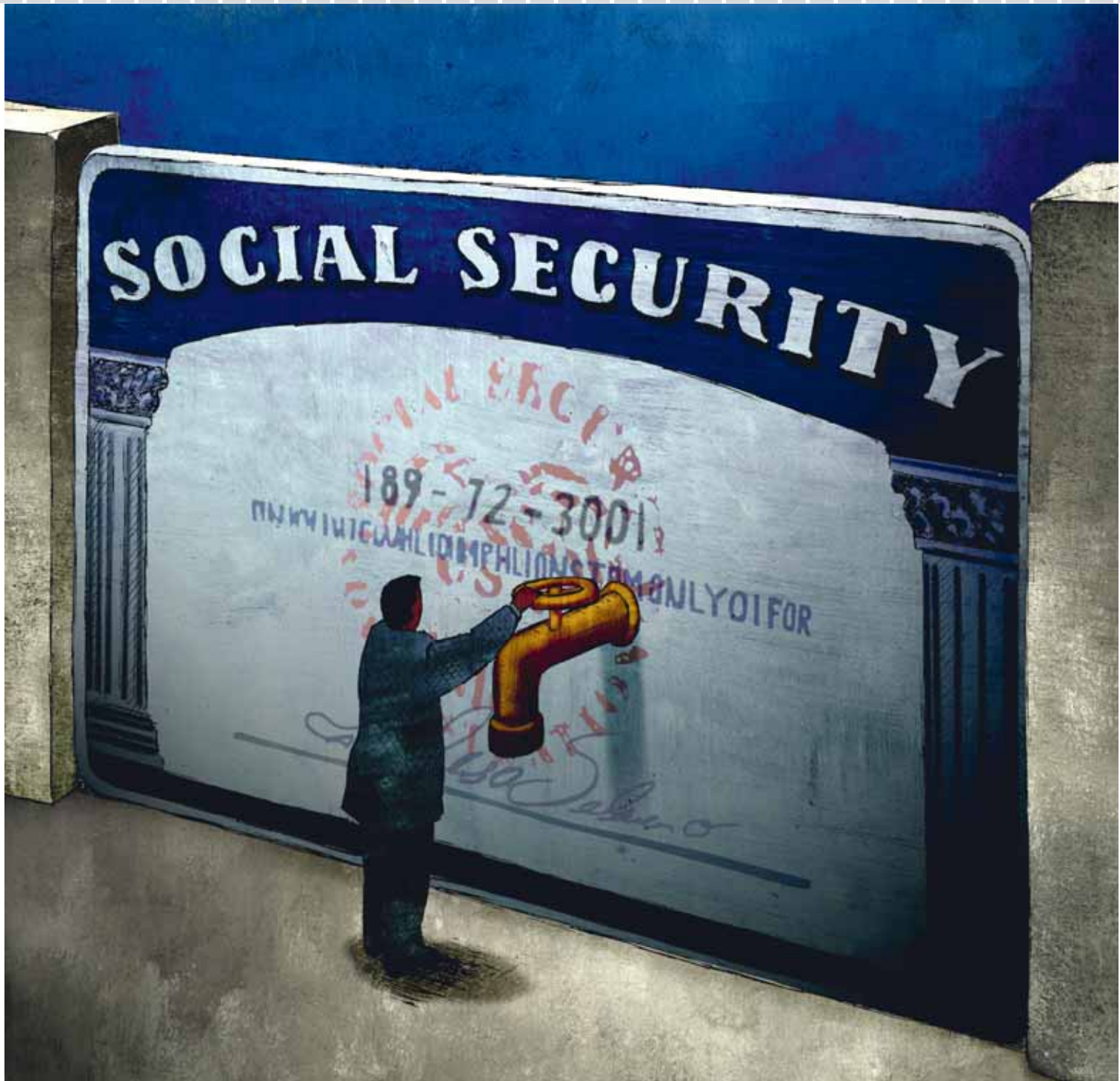
WHY A SUSTAINABILITY FACTOR?

Economic-financial pressures and population forecasts have fuelled a search for and adoption of corrective measures in welfare systems to ensure their mid- and long-term solvency and stability; a key feature in this endeavour is what has come to be known as the sustainability factor.

Spain's social-security pension expenditure increased by 87.43% from 2001 to 2012 while revenue grew by only 22.63%. Deficits were the inevitable result, and the reserve fund had to be dipped into to keep things ticking over. Uncertainties about the public welfare model stem not only from demographic and economic factors but also structural flaws such as the proven unfairness between sums paid in and benefits received and the lack of any long-term outlook. This has spawned a series of reforms, such as the *Ley 27/2011 de 1 de Agosto* (Law 27/2011 of

1 August), which, under the aegis and pressure of European recommendations, included in its article eight the need of bringing in a sustainability factor, setting up for this purpose a committee of experts or think tank which issued its report on 7 June 2013. This whole process culminated with the Law 23/2013 of 23 December on the Sustainability Factor and the Revaluation Index in the Social-Security Pensions System (*Ley 23/2013, de 23 de diciembre, Reguladora del Factor de Sostenibilidad y del Índice de Revalorización del Sistema de Pensiones de la Seguridad Social*).

WHAT IS A SUSTAINABILITY FACTOR?

A sustainability factor is an adjustment mechanism for bringing system-defining pension parameters into line with the ongoing trend of different socioeconomic or demographic variables. In our opinion it should be applied mainly to lifelong benefits. Herein lies one of the main conceptual differences of our proposal from other authors; we consider that the sustainability factor should be applied not only to retirement pensions but also to all benefits with a mid- and long-term outlook,

otherwise the resulting system would be inefficient and would also generate inequalities among the beneficiaries of the public pension system. The main aim of the factor is to contribute towards the solvency of the first welfare pillar, the compulsory pay-as-you-go state pension, but it could also favour other purposes such as the search for intergenerational equity or limitation of political risk.

THE COMMITTEE OF EXPERTS' PROPOSAL

The Committee of Experts proposed a dual system based on an intergenerational equity factor (*factor de equidad intergeneracional*: FEI) and an Annual Growth Factor (*factor de revalorización anual*: FRA). The FEI is applied solely to pay-as-you go retirement pensions; it acts on the initial pension as an endogenous life-expectancy parameter (e_x) working as an adjustment variable, setting a reference age (x=65 años) and a reference year ($t \in [2014, 2019]$). For each of the calculation years ($t+s$) this then produces the following equation:

$$FEI_{x,t+s} = \frac{e_{x,t}}{e_{x,t+s}}$$

Figure 1. General scheme of the sustainability factor
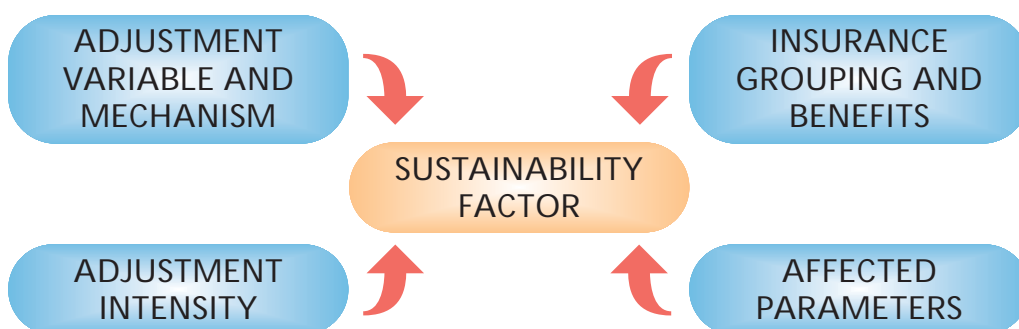
The aim of the FEI is to search for intergenerational equity, obviating a situation in which individuals with the same characteristics and the same pay-in structure receive different overall benefits due to the life-expectancy trend, i.e., it cancels out variations of this factor in the benefit flow.

The FRA, for its part, seeks a revenue-expenditure balance throughout the whole economic cycle, applying to all pension-appreciation operations a formula based on moving averages means and the use of past values (certain) and future values (estimates).

$$FRA = \overline{g}_{I,t+1} - \overline{g}_{P,t+1} - \overline{g}_{s,t+1} + \alpha \cdot \left(\frac{I_t^G - G_t^G}{G_t^G} \right)$$

$\overline{g}_{I,t+1}$ Revenue growth rate. Moving arithmetic mean

$\overline{g}_{P,t+1}$ Growth rate in the number of pensions. Moving arithmetic mean

$\overline{g}_{s,t+1}$ Increase in the average pension due to the replacement effect. Moving arithmetic mean

α Speed at which budget imbalances in the system are corrected

I_t^G System revenue. Moving geometric mean

G_t^G System expenditure. Moving geometric mean

THE GOVERNMENT OF SPAIN'S PROPOSAL

Spain's government has mooted a sustainability factor (*factor de sostenibilidad*: FS) that retains the intergenerational-equity actuarial approach and some basic characteristics of the FEI, to be applied to

the initial pay-as-you go pension as from 2019 and with a reference age of 67.

$$FS_t = FS_{t-1} \cdot e_{67}^* \quad , \quad FS_{2018} = 1$$

$$e_{67}^* = \underbrace{\left(\frac{e_{67,2012}}{e_{67,2017}} \right)^{\frac{1}{5}}}_{2019-2023} \cdots \underbrace{\left(\frac{e_{67,2017}}{e_{67,2022}} \right)^{\frac{1}{5}}}_{2024-2028} \cdots \underbrace{\left(\frac{e_{67,2022}}{e_{67,2027}} \right)^{\frac{1}{5}}}_{2029-2033} \cdots$$

As well as the failure to deal with lifelong benefits, one of the main criticisms we would level at the FEI and the FS is that they propose a fixed reference age, 65 and 67 respectively. This does not chime in with the actual situation of the benefits system and generates inefficiencies in practice. Firstly, the social security system allows pay-as-you go pension take up at different ages; secondly, the public welfare system includes other benefits looking to the mid- and long-term, whose opt-in age is not linked to the beneficiary's biometric age. An adjustment is therefore needed to allow for this age of entry. Graph 1 shows a comparison of FEI and FS amounts; if the current life-expectancy trend holds,

Graph 1. Comparison between sustainability factors
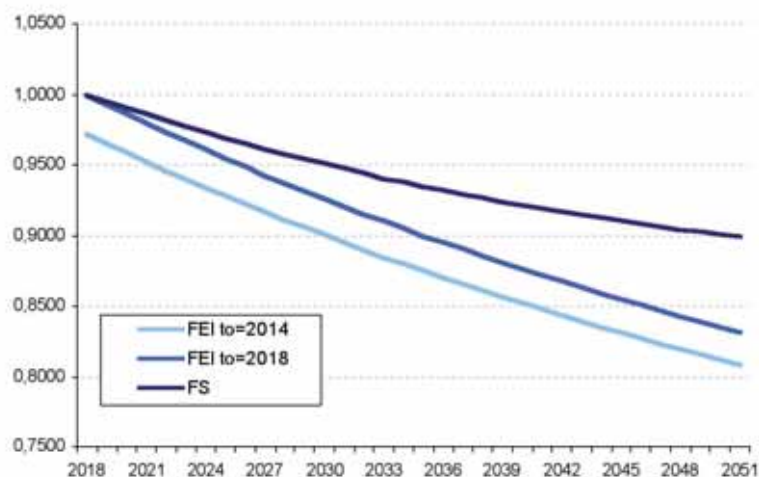
Source: Drawn up by the authors from forecast tables of the National Statistics Institute (INE 2012-2051) and Social Security

there would be falls in the initial pay-as-you go retirement pension in comparison to situations in which this factor is not applied.

A second pension appreciation arrangement takes the Revaluation Index for Pensions (*Índice de Revalorización de las Pensiones*: IRP) as its benchmark rather than the Consumer Price Index (*Índice de Precios al Consumo*: IPC). The IRP has the same mathematical expression as the FRA and is to be applied as from 2014. An improvement in the case of the IRP is a better fit and more precision in terms of the revenue and expenditure to taken into account in the calculation, although the latter still includes estimates (5 years before and 5 years after year t); this decision we do not agree with. Maximum and minimum limits are expressly established so that $IRP \in [0,25\%, \Delta\nabla IPC + 0,50\%]$, these limits are not symmetrical with the variation in the Consumer Price Index; from the technical point of view the value of these limits has not been properly justified; a fairer

alternative would be to use symmetrical limits so that $IRP \in [X\text{-}\alpha, X+\alpha]$ and $X = \Delta\nabla IPC$.

The government's proposal also quantifies the value of *alpha*, reflecting the speed at which budget imbalances in the system are corrected, indicating that it will fall into the interval [0.25, 0.33]. Its initial value is 0.25, revisable every five years, though the grounds for this choice are not properly accounted for either.

In our opinion, and in light of its component variables, the IRP is likely to dip below the legal lower limit in coming years, so the annual appreciation of pensions in the short term will be 0.25%.

VALUATION OF SUSTAINABILITY FACTORS AND ALTERNATIVES

Application of a sustainability factor in the broadest sense (FS + IRP), which we understand to be constitutional, would not

necessarily guarantee the solvency of the model since it would act mainly on a part of the costs only, though it would undoubtedly be conducive to said solvency. The sustainability factor is certainly not a sufficient condition for achieving this end; neither is it a necessary condition, however (the true necessary conditions would be its effects), since other mechanisms could stand in for the same purpose.

The sustainability factor does not break with the current conceptual social-security model, and its enforcement, however it may be designed, would call for absolute transparency in sources, calculations, estimates and developments; moreover, the methodology employed and results obtained must be kept rigorously available to the general public at all times. This requirement has already been breached; no public statement has been made of the auxiliary sums or the final IRP data giving rise to the 0.25% appreciation in 2014.

We uphold a sustainability factor (FS) applied to all lifelong benefits, duly adjusted to the age of entry and the group of reference, with as many life-expectancy variables as there are guaranteed benefits, taking different values according to the possible ages of benefit takeup. The technical argument of this proposal is based on an actuarial approach that seeks a greater actuarial fairness between generations and between benefits. For each benefit (*prestación*) *p* we would have:

$$FS^p = \frac{e_{j,t}^p}{e_{j,t+s}^p} \ \text{or} \ FS^p = \frac{1+e_{j,t}^p}{1+e_{j,t+s}^p} \ \text{or} \ FS_t^p = FS_{t-1}^p \cdot e_t^{*p}$$

Hence the defence of a benefit-adapted life table. This alternative allows adaptation of life expectancy to the age corresponding to the coming into force of the benefit at each moment. In cases of early and late retirement, however, recourse might be made to the sustainability factor corresponding to the general retirement age; prima facie, this would benefit late retirements and harden the conditions of early retirements.

Assessment of the numerical results has shown that, following the hypotheses laid down for each option, the FS adjustment is smoother than the FEI adjustment, i.e., impinging less on the initial pension but also on solvency, albeit with different results when supported in both cases by the INE's population forecasts. Both alternatives show lower values at higher entry ages, i.e., a lower value of the initial pension; this affects each benefit in a different way. Witness the fact that, according to the Continuous Work History Sample (*Muestra Continua de Vidas Laborales*) of 2011, the average retirement takeup age was lower than 65 but higher than 67 for widowhood pensions, while the average age for permanent disability was close to 53.

Another alternative we put forward draws on the previous work by Hernández (2011 and 2013); it depends on system generosity, using the individual generosity index as the adjustment variable. Its application as a sustainability factor meets the objectives of improving the relation between each individual's inputs and receipts as well as favouring system solvency and incorporating life expectancy into the denominator-determining benefit flow. This is an alternative of an individual, non-generational type. Thus, for a pay-as-you go retirement pensioner aged 67 with a generosity index of 0.6194, the applicable factor on the initial pension could be

0.9429, while for another with the same calculation hypothesis and an index of 0.8956 (lower generosity), the factor could be 0.9843.

As for the IRP, we have many qualms about its conception and we do not agree with the decision to use estimated future values in its calculations. Simpler tools, based only on social-security expenditure and revenue, could be used as an alternative. Finally, calculation of the actuarial balance is understood as *sine qua non* of the public protection pillar.

COMPLEMENTARY WELFARE SYSTEMS

It would be rash to hazard a guess now about whether or not the new public protection scenario will allow a greater development of complementary social welfare in Spain (whether in the number of participants or insureds, in the size of funds or mathematical provisions constituted or improved efficiency and coverage). Bearing in mind the greater constraints in public benefits for the same level of contribution, there may be some leeway for development in some population segments and coverages, although available individual income and competition from other saving or investment instruments throw this development into some doubt.

We uphold insurance as a welfare instrument; we advocate a greater ring-fencing effort to identify the true target client and adapt the system to his/her needs and to an ever-changing environment, and we support involvement to give efficient coverage where public action leaves loopholes, weighing up the socioeconomic

situation of the target groupings and paying special attention to the possible transition of public death- and survivor's-pensions and also the real level of coverage needs for long-term care.

In our opinion the complementary protection system must be absolutely voluntary for each individual, regardless of which particular pension-funding pillar it is grafted onto. This does not rule out making it obligatory for employers to set up a complementary coverage system for their workers, with these workers then being free to opt in or not.

Quite apart from fickle tax legislation, innovation is important; it is equally important for actuaries to be systematically involved in the development, control and consultancy as regards welfare tools. But the overriding need is for true transparency in all the different arrangements, especially in terms of expenditure. This transparency should go well beyond the small-print safeguard or simple communication of the estimated sum of contingencies covered. We are firmly in favour of the maximum enforcement of rights and we encourage freedom of action and choice by the individual. These are all essential mainstays for generating an all-round sense of trustworthiness and the development of complementary welfare systems in Spain.

CONCLUSIONS

The sustainability factor in the broadest sense has many positive features but also some glaring drawbacks. We share its guiding spirit and inclination towards a general actuarial approach but we do not agree with the system as actually

implemented, since it maintains a discriminatory treatment to the detriment of those who have paid in most to the social-security system throughout their working life. Worse still, it also falls down in terms of transparency right from the very start, failing to publicise properly the procedure used for arriving at the forecasting variables or even the final value.

This transparency should also be a lodestar of complementary welfare schemes, well beyond the reform trends followed up to now and necessarily developed into the future. This transparency will have to generate confidence in the system, assess how to ensure greater mobility of resources, avoiding bottlenecks, and defend the individual's freedom of action without eschewing the possible advantages of an obligatory complementary system for employers – but not for employees – always providing the management is completely transparent and efficient from the actuarial point of view, guarantor of a future welfare system more beneficial to its participants. ∎

THE SUSTAINABILITY FACTOR IN THE BROADEST SENSE HAS MANY POSITIVE FEATURES BUT ALSO SOME GLARING DRAWBACKS

BIBLIOGRAPHY

—HERAS, A. de las, M.B. GOSÁLBEZ y D. HERNÁNDEZ. «Enfoque actuarial para la implantación del factor de sostenibilidad en el sistema público de pensiones en España: nuevos retos para los sistemas complementarios». Madrid: FUNDACIÓN MAPFRE, 2014.

—HERAS, A de las. «El factor de sostenibilidad en la Seguridad Social española. Un análisis de la propuesta del comité de expertos y la decisión adoptada por el Gobierno». *Revista CEF (Trabajo y Seguridad Social)* openly available. www.laboral-social.com/ factor-sostenibilidad-seguridad-social-espanola-analisis-critico.html [Consulted: January 6th 2014].

—DE LAS HERAS, A. «El factor de sostenibilidad y el diseño de los actuales sistemas públicos de pensiones». *Revista de la Red de Expertos Iberoamericanos en Seguridad Social*, 9 (2011). p. 10-13.

—HERNÁNDEZ, D. «La generosidad como herramienta de información individual de los sistemas de seguridad social». *Anales del Instituto de Actuarios Españoles*. (November 2013). p. 177-198.

● «La prestación contributiva de jubilación en la Seguridad Social. La generosidad del sistema y su reforma en base a la transformación de las fuentes de financiación». In: Madrid: (june 2011). *Ubicumque sint. In Memoriam. Gregorio González Gómez y Juan Andrés González González*. III Congreso Ibérico de Actuarios. Congreso Internacional.

—HOYO, A. «El factor de sostenibilidad del sistema público de pensiones y su entrada en vigor: el factor de equidad intergeneracional ajustado a la edad de acceso a la jubilación». *Economía Española y Protección Social*, nº 6. (2014).

—MENEU, R; J.E. DEVESA; M. DEVESA; I. DOMÍNGUEZ; A. NAGORE y B. ENCINAS. «El factor de sostenibilidad: diseños alternativos y valoración financiero-actuarial de sus efectos sobre los parámetros del sistema». *Economía Española y Protección Social*, nº 5, (2013). p. 63-96.

—VARIOUS AUTHORS. «Informe del comité de expertos sobre el factor de sostenibilidad del sistema público de pensiones y votos particulares emitidos al respecto». (June 7th 2013).