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A CONCEPTUAL FRAMEWORK TO DESIGN SUSTAINABLE PENSION POLICY

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ABSTRACT: A conceptual framework to design sustainable pension policy is offered to tackle the interplays between different determinants from the perspective of economic policy and the concept of sustainable development. The investigation of the main socio-economic determinants presented in the literature resulted in the designing of a holistic conceptual framework, which is designed to support decision-makers and researchers who need to understand the determinants of specific policy programmes and their long-term socio-economic consequences. As a result, it helps to determine and design a sustainable pension policy. The sustainable framework emphasises the ideological background for the economic debates, historical paths plotted in the path-dependence 4S framework and the key arguments for and against the funded and unfunded pension schemes. The sustainable conceptual framework emphasises the multiple objectives of pension policy, resource flows and the capital formation debate in economics, as well as the global perspective of capital flows.

KEYWORDS: path-dependence 4S framework, sustainable pension policy framework, pension schemes, global economic perspective

Today's workers will have to save more, work longer, retire later, receive less generous benefits, and perhaps pay more taxes

J. Bongaarts (2004, p. 21)

Introduction

Uhlenberg (2009) and Clark and Spengler (1980) noticed changes in the population debate since ageing problems have been reported in the 1960s. Scientists mostly agreed with the view that the unprecedented qualities and functions of the changes (Mason & Lee, 2011a; Uhlenberg, 2009) are related to the post-war generation of baby boomers in Western societies (Kang, 2013; Lee, Donehower & Miller, 2011; Liu & Spiegiel, 2011; Abel, 2003; Bakshi & Chen, 1994; Mankiw & Weil, 1989).

Consequently, there have been raised not only economic debates about the costs of their pensions, but also ethical concerns about the responsibilities of the present generations (they are called Millennials – born in the years ranging from the 1980s to the early 2000s (Howe & Strauss, 1992) for their parents. For example, Tankersley characterised baby boomers in the subtitle of his article in The Washington Post: "They chewed up resources, ran up the debt and escaped responsibility" (Tankersley, 2015). On the contrary, some findings show that the generation of baby boomers secured wealth and substantial assets for their retirement and that they are prospering well (Keister & Deeb-Sossa, 2001; Sabelhaus & Manchester, 1995; Easterlin et al., 1990); moreover, they support their families even more than their parents did (Fingerman et al., 2012; Taylor & Krishnamurthy, 2005).

Easterlin and coauthors (1990) explained that the baby boomers significantly change their behaviour to achieve wealth responding to hard situations in the labour market. The authors indicated that they preferred unmarried couple's cohabitation, singlehood and a small number of children, as well as doubling up with others or coupling the mother's work with childbearing. Samuelson (2015), like Easterlin (1961), argued that a lack of a generational conflict between Millennials, hit hard by recessions, and baby boomers result from the job optimism of the former and rising wages since the baby boomers have been retiring. Millennials feel more vulnerable but remain optimistic about their situation (Taylor et al., 2012).

However, the generation of baby boomers only accentuated the adverse trends of the present socio-economic development, leading to a heated debate among scientists. They are only a part of complex changes, which have been initiated by industrial societies and historic developments. These circumstances revealed ideological biases and the needs for broader research perspectives in economics that include socio-biological and cultural settings.

The multifaceted character of the changes reveals controversies around pension reforms, social policy measures and potential economic costs. The economic debate includes interrelated factors such as fertility and mortality, migration, altruism and family values and pension schemes. Therefore, the debate is somewhat intertwined with investigations widely undertaken by sociologists, psychologists, biologists and medical and political scientists, as well as philosophers. The trans-disciplinary character of the changes enforces a need for a holistic framework, which interrelates the body of research.

Furthermore, the intergenerational nature of the ageing issues requires long-term perspectives (Schwarz et al., 2014), and it involves the problems of just resource distribution and sustainable development. The delayed impact of various demographic policy measures impedes evaluation and mitigation of potential negative effects. Moreover, the socio-economic situation can be dissimilar in the time when the policy results eventually occur, and the outcomes can only escalate the socio-economic problems; it is also diverse based on the national and cultural contexts (Holzmann, Hinz & Gersdorff, 2005; Schwarz et al., 2014).

This paper offers a multidisciplinary framework to tackle the interplays between different factors from the perspective of economic policy and the conception of sustainable development. It supports decision-makers and researchers who need to understand the determinants of specific policy programmes and their long-term socio-economic consequences. This study particularly includes political and socio-economic effects related to pension systems. Since the ageing debate provides a wide portfolio of relatively decisive results, the study offers a framework to tackle the disparities from a sustainable development perspective. Consequently, it helps to determine and design a sustainable pension policy.

The framework combines the key dimensions of pension policy discussed from the perspective of the economic debate. The primary issue is related to ideological biases in economics that have been accompanying disputes between economic schools since the beginning of the scientific discipline. The discussion often relates demographic changes to economic interventionism and the impact of social policy on economic growth.

Next, the paper reviews the key determinants of the pension policy revealed in the economic debates. It seeks to provide the main policy areas from the perspective of sustainable development. It starts from a path dependence approach, explaining the interdependence between demographic changes, pension schemes and economic settings, and the history-specific determinants for adoption of different pension schemes. In addition, a review of the economic impact of funded and unfunded (PAYG - Pay-as-You-Go) pension schemes is offered. Following the debate on path depend-

ence, the next subsections present basic findings in economics, which include resource flows between generations and the potential economic burdens of the working-age cohort, as well as savings and their role in physical capital formation. Finally, a global perspective is accepted to explain country-specific differences, which could potentially show the portfolio of pension policy measures aimed at the goals postulated in a pension system. The last sections present the sustainable framework for pension policy, as well as conclusions and recommendations for policy-makers.

Ideological biases and the sustainability approach

Clements, Eich and Gupta (2014) defined attributes of sustainability in the context of pension policy, pointing out: *"to current and future public pension spending as a share of GDP or primary spending. Too high a share could be considered unsustainable because it crowds out more productive government spending such as education or capital expenditure, or results in an increase in taxation (including on wages) to a level that is counterproductive to growth*" (p. 7). Furthermore, they discussed their perspective in detail, emphasising two characteristics of sustainability: 1) a long-term view; and 2) intergenerational horizontal (equal treating in similar circumstances, no redistribution usually needed) and vertical equities (treating according to individuals' needs, redistribution may occur). Equity was perceived from the perspective of basic human needs and equal distribution of burdens and benefits (Clements, Eich & Gupta, 2014). The United Nations Sustainable Development Goals also emphasise the postulates of healthy lives and well-being for everyone at all ages (United Nations, 2017). The intergenerational and global perspective usually invoked in the phrase "for all" presented in the definitions of the goals is to be also applied in the pension policy, including social, ecological and economic determinants of its application and, therefore, multiple objectives.

The economic research represents a wide range of models, discussions and policy recommendations, which tend to be contradictory in terms of a particular evaluation. For example, the impact of pension systems on savings and economic growth is often discussed. However, the neoclassical approach that unfunded pension schemes should be replaced by funded ones to secure savings and incomes – suggested, for example, by Feldstein (1974) and Bailliu and Reisen (1998) – is presently challenged in ample evidence (Fanti & Gori, 2012; Barr et al., 2010; Cesaratto, 2006; Barr, 2000; Mackenzie et al., 1997); the latter research posited country-specific situations, market imperfections and multiple objectives of pension systems.

Some primary sources of the disparities are associated with priorities set by researchers and politicians, as presented in the following quotation: *"It is important to remember that pensions are not only, or even primarily, about national saving. Indeed, the primary purpose of pensions is to ensure an adequate standard of post-retirement living for individuals, consistent with the resources available to society. A reform that jeopardizes this objective cannot be considered worthwhile, whatever its impact on national saving"* (Mackenzie, Gerson & Cuevas, 1997, p. 49). Thomson (1994) and Schwarz and coauthors (2014) similarly posited a variety of contradictory social objectives, and Willmore (1999) argued that privatisation of pension funds is related to economists' view on the role of the state. According to the accepted perspective, they can emphasise different problems, such as administrative costs, investment risks or savings. Therefore, World Bank researchers suggested four general features of retirement income: 1) adequateness (able to prevent old-age poverty); 2) affordability (within the financing capacity of individuals and society); 3) sustainability (financial stability over long periods of time); and 4) robustness (demographic, economic and political shock-resistance) (Holzmann et al., 2005).

There are also suggestions that the "baby boom issue" is a political argument in favour of economic liberalisation. For example, Mullan (2002) argued that the ageing debate understates the excess capacity to generate welfare within future economies. The future economic settings should dwarf the costs of the increasing old-age dependency ratio, even with a much slower growth rate, as there is an enormous number of jobless people. Gee (2002) added that the ageing debate, particularly with the emphasis on the costs of healthcare and pension schemes, is a part of neoliberal policies, which endorse individualistic approaches and discourage commitments to risk-sharing or common goods. She recalled studies that show a lack of correlation between the paces of healthcare spending growth and population ageing. The study also pointed to an inaccurate measure of dependency ratios, which ignore unwaged labour of pensioners (such as caregiving for family members) and dependent people in the working-age cohort (such as disabled people).

Finally, the concept of capital accumulation invoked in the neoclassical perception of economic growth tends to be considered as a goal itself, not as a means to achieve social goals, which are disputable and contingent upon their contexts. The studies of the Chicago School presented by Mincer (1958), and particularly Becker (Becker, 2007; Becker et al., 1990; Becker, 1983; Becker, 1960), suggest that the accumulation of human capital is at least as important as the accumulation of physical capital. The accumulation of the former is particularly important in knowledge-based economies and social

development. The Organisation for Economic Co-Operation and Development (OECD) reports that: *"knowledge, as embodied in human beings (as "human capital") and in technology, has always been central to economic development. But only over the last few years has its relative importance been recognised, just as that importance is growing"* (OECD, 1996, p. 9). Therefore, the evaluations of the accumulation of physical capital are balanced with the different social and economic mechanisms of the accumulation of human capital in terms of quality, as well.

Despite the present well-being of baby boomers, their retirement security can be affected by many factors, such as financial market stability, government policy on the pension system and the accessibility of healthcare services (Clark et al., 2004). The ideological content and the different perspectives of socio-economic interactions explain some inconclusiveness in the findings presented in the ageing debate. Research methodology, policy recommendations and decision-making reflect the conceptual content.

The determinants of pension policy – an overview of the literature

The ideological perspective in this paper is framed by the sustainable development approach. This section presents the review of the key determinants of pension policy related to the history-specific conditions, intergenerational resource flows and the issue of capital formation, which is vigorously discussed in the economic debate. The determinants are completed with the capital flows from the perspective of the global economy, which is postulated in the concept of sustainable development.

1. A path dependence outlook and pension schemes

There is a clear assumption in most research that in a given time, a working-age cohort is crucial for economic growth, although the condition of the present cohort is determined by the behaviour of previous generations. The path dependence approach is particularly utilised to explain demographic changes and pension schemes (Lee & Mason, 2011a; Holzmann et al., 2005; Mullan, 2002; Becker et al., 1990). The research alternates the economic perspective presented in the growth models that assumed population changes to be exogenous, like in the Solow-Swam model. The works by Becker (1960), starting from the 1960s, particularly contributed to these changes, since the quality-quantity model has been proposed to explain investments in human capital. The issues so far typically abandoned in neoclassical research, such

as fertility, have been investigated in the economic models of growth as endogenous factors (Becker et al., 1990).

The seminal work of Becker and coauthors (1990) explains economic differences between the distinctive parts of the world, positing two equilibriums resulting from, inter alia, investments in human capital. The undeveloped economies ("Malthusian" equilibrium) characterise scarce human capital, large families (high fertility), low investments in human capital per child (education, healthcare and so on) and stagnation. The rates of return on human capital investments (i.e. quality) are relatively lower than those on children (i.e. quantity) because of the low stock of human capital. They assumed that the increase in the rates is positively related to the growth of the stock. The economies are trapped in a vicious circle of an undeveloped state. In turn, the economies on the path of development ("development" equilibrium) triggered by accidents and good fortune characterise the developed steady-state with a high stock of human (as well as physical) capital and lower fertility. The authors emphasise the role of accidental events in path origination.

The discourse in line with the path dependence approach also assumes that historically established PAYG pension schemes are inadequate since the baby boomers' cohorts in developed countries from the 1950s and 1960s have been entering their retirement (Bovenberg, 2008). There is a consensus on reform of the schemes and pension policy, although the dispute on the economic and social impact of funded and unfunded pension schemes is ongoing (table 1). The prevailing view is that a pillar structure of both schemes at the same time is needed, combined with some other policy measures, such as increasing the working-age period and changing retirement benefits.

PAYG schemes are widely criticised, although they exist in many countries (Pallares-Miralles et al., 2012). Kuné (2001) noticed two determinants of the schemes launching after the Second World War: the advantageous ratio of workers to pensioners and the ability to benefit regulation to adjust to price and wage changes. Additionally, it should be also remarked that in the post-war time in many countries, the retirement cohorts were deprived of funds (incomes and assets) (Schwarz et al., 2014). However, there is neither political and social commitment nor fiscal and economic support for switching PAYG schemes (unfunded) into funded ones in the near future (Bloom, Canning & Fink, 2010; Apps, Rees & Wood, 2007; Gugushvili, 2007; Sinn, 2004; Bongaarts, 2004; Barr, 2000; Samuelson, 1958), although, for example, European economies exhibit a sizable gap between pension reserve funds and their implicit pension liabilities (Schwarz et al., 2014). Instead, a mixture of the schemes has been postulated (Schwarz et al., 2014; Barr et al.,

Table 1. The advantages and disadvantages of funded and unfunded pension schemes

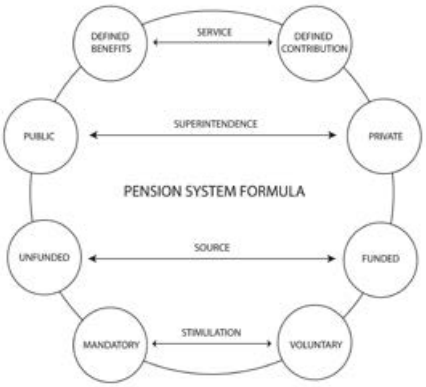
	FUNDED	UNFUNDED
dependence on demographic parameters	lower	higher distorting variables: • ineffective and closed domestic financial markets, • diminishing value of assets as pensioners will attempt to sell them to proportionally fewer workers.
rates of return	higher Aaron rule: "If the rate of growth is unaffected, the effective rate of return on premiums paid for such social insurance will exceed the marginal rate of time preference, and, consequently, people in the active labour force would willingly forego some current consumption in order to obtain such returns" (Aaron, 1966, p. 374).	lower Aaron rule: "if the sum of the rates of growth of per capita wages and of the population exceeds the rate of interest, and if the rate of interest equals the marginal rate of time preference and the marginal rate of transformation of present into future goods […] will improve the welfare position of each person" (Aaron, 1966, p. 374)
saving impact	positive in most evidence • life-cycle theory, • Solow growth model.	negative in most evidence distorting variables: • bequest and precautionary motives, rules of thumb and cognitive abilities, • the increase in pension saving can result in a decrease in non-pension savings, • opposite to Ricardian equivalence, the private sector does not fully offset the changes in public savings, • imperfect information (and a lack of financial literacy to understanding high portfolio of financial products), uncertainty about life expectancy, short-sighted contributors, • an increase in savings reduces capital gains (assets value) – this results in investments until the investments are planned (investment demand also depends upon expected rate of profit).
fiscal liabilities	higher	lower
behavioural incentives	higher impose greater discipline on pension policy formulation, although: • impose investment risks on workers, • difficulties of risk assessment: longevity, the value of pensions in each period of retirement.	lower
opportunistic behaviour	lower	higher
economic growth	higher	lower • a funded defined-contribution scheme funds invested in an expanded supply of the government paper increase public debt, just like an unfunded nonfinancial defined-contribution scheme, • the same mandatory contribution rate in a new funded scheme and payroll tax rate in an old unfunded do not affect disposable incomes.

	FUNDED	UNFUNDED
contribution costs	lower	higher
poverty reduction	lower	higher disability pensions, unemployment and low earning people support, survivors' benefits
income redistribution	lower	higher
investment strategy	hazardous private savings create supplementary retirement income for pensioners; they are related to the expected retirement age and retirement income anticipated from social security	secure public savings secure reserves to sustain social security systems; they are dependent on the anticipated availability of a state for paying pensions
administrative costs	higher (including marketing cost, transaction cost)	lower
government credibility	lower	higher
intergenerational justice	according to one's works	according to one's needs
vulnerability to inflation	higher	lower
politicisation	lower	higher
solidarity	lower	higher

Source: author's work based on Schwarz et al., 2014; Pieńkowski, 2013; Bloom et al., 2010; Holzmann et al., 2005; Orszag & Stiglitz, 2001; Hemming, 1999; Taulbee, 1999; Page, 1998; Willmore, 1998; Mackenzie et al., 1997; Aaron, 1966; Lesnoy & Leimer, 1985; Barro, 1978; Keynes, 1964; Kalecki, 1951.

2010; Holzmann et al., 2005; The World Bank, 1994). The investigations widely presented in many studies reveal the complexity of the issue and the necessity to impose concomitantly a wide variety of policy measures.

A pension system can be structured in a path-dependence framework as a combination of formulae developed in four dimensions, that is, a *4S path-dependence framework*, as follows: 1) *Service*; 2) *Superintendence*; 3) *Source*; and 4) *Stimulation.* All the combinations have been occurring worldwide, although some arrangements have been typically evolving as suggested in figure 1. For example, Pallares-Miralles and colleagues (2012) estimated that 65 percent of all national mandatory pension schemes, mostly unfunded, calculate benefits based on pensionable earnings (defined benefits), and over 70 percent of all national mandatory schemes are managed by public sectors.



- defined benefits – benefits determined by pensionable earnings,
- defined contributions – benefits determined by assets accumulated,
- funded – benefits from accumulated funds,
- unfunded – benefits from current revenue,
- public – managed by public sectors,
- private – managed by private organisations (companies),
- mandatory – obligatory participation, and
- voluntary – optional participation

Figure 1. The 4S framework for the designing of pension systems. The arrows mark only extreme formulae; however, there are achievable intermediate solutions, such as notional defined contribution in the service dimension (benefits determined by contributions in funded schemes)

Source: author's work.

The vigorous discussion among economists about funded and unfunded pension schemes led to a wide portfolio of studies addressing the problems as presented in figure 1. The analysis presents the prevailing view as well as distorting variables and theoretical assumptions. The economic view related to investment returns from pension assets, saving rates, economic growth, administrative costs and behavioural issues has additionally been completed with social goals posited in the debate. The issues presented in table 1 are reviewed in the following sections of the paper.

2. Economic stages of human activity and resource flows

Humans go through several distinct stages of economic and social activity (Clark & Spengler, 1980). The economic view recognises three main stages, distinguished due to the occupation criterion defined in terms of age. However, it should be clearly noted that the classification is for statistical purposes and does not reflect the economic reality, as has been mentioned above in the critique by Gee (2002). Moreover, it varies across different cultures and time periods. Since the industrial revolution originated in the eighteenth century, there has been a substantial change in view. For example, the latest pension reforms have legally increased the working-age period, such as the reform in 2013 in Poland to the age of 67 from the age of 60 for women and 65 for men (Góra, 2013), although the new regulation brought back in the previous limits (i.e. 60 and 65).

In turn, the social reforms and economic policy since the industrial revolution have significantly changed the labour force structure because of the

participation of young people and women in the labour market. For example, the Parliament of the United Kingdom passed the Factory Act in 1819 in the cotton industry that set the minimum working age at 9 (Harrison & Hutchins, 2013). The share of cotton mill workers under the age of 18 had been estimated at 75 percent in 1788, and it was reduced by over 30 percent in the fifteen years following the Factory Act (Galbi, 1997). However, the participation of children under the age of 15 in labour markets even today occurs in some developing economies (Ray, 2000).

Table 2. The basic view of the economic stages of human development (ranks: 1 – highest, 3 – lowest)

	Pre-working age	Working-age	Retirement age
Occupation	education	work	leisure
Dependency	+	-	+/-
Income	-	+	-/+
Saving rate	-	+	-
Political power	-	+	+
Total net transfer ranks	1 (+)	3 (-)	2 (+)
Private net transfer ranks	1 (+)	3 (-)	2 (-)
Consumption ranks	3	1	2

Source: author's work.

The present economic approaches indicate three stages, which can be characterised as follows (table 2):

- pre-working age (up to 14, 17 or 19 years old),
- working age (15, 18 or 20 to 65-67 years old), and
- retirement age (over 65-67 years old).

Table 2 shows the main characteristics of the cohorts. It is clear that the members of the youngest cohort assigned to education engage in consumption behaviours despite a lack of income and savings. The findings based on statistical estimations indicate that in most countries, they are the largest beneficiaries of public transfers, although private net transfers vary in different countries. These people are notable economically and politically dependent.

In contrast, retirement turns into leisure time – but pensioners hold political power, although their economic dependency is affected by several factors, such as pension schemes or saving behaviour. It is assumed that they can obtain incomes from assets; however, they can be highly dependent on

public or private transfers, as shown in abundant evidence also presented in this study. The longest stage is characterised by productive work and savings in the working-age cohort.

The life cycle model originally proposed by Modigliani (1966) assumes that the savings of a household result from the preferences of its members to smooth lifetime consumption regardless of their income fluctuations. The idealised reality presented in the model is then considerably modified with the findings of behavioural economics and challenged by market imperfections. In light of a wealth of evidence, consumers can be divided into the following groups: 1) forward-looking or wealth-constrained; 2) backwards-looking or liquidity-constrained. The former as stated in the life cycle model, while the latter are mostly sensitive to current income (McMorrow & Roeger, 2004). There is a variety of factors supporting the contrary behaviour to that presented in the life cycle model, such as precautionary or bequest motives, cognitive qualities (myopia, inertia, loss aversion) or liquidity constraints resulting from market imperfections (Beznoska & Ochmann, 2012). All the variables can considerably change the ideal picture presented in the model, and the socio-economic policy should take into account all the factors.

Lee and Mason (2011a) pointed to country-specific trends and dissimilarities. They analysed the dependency settings in different types of societies. A few contemporary hunter-gatherer societies, which prevailed during the most extensive period of human social evolution, were compared with both poor and well-developed societies, which predominate in the modern world; the poor societies, such as Nigeria or India, were usually placed between the extremes of hunter-gatherer societies and well-developed societies. The study reveals that together with economic progress, consumption rises with age (generally because of publicly provided healthcare); incomes start later and decline to nearly zero among the elderly, and the incomes increase domination of public over private transfers. Private transfers in almost all the societies were downward (from old to young), as well as total (private and public) net transfers, although the projected changes in the population structures of some rich countries for 2050 can reverse the direction of the transfers (i.e. more resources will flow upward from young to old). Nevertheless, there were notable variations, which suggest a multifactorial phenomenon reflecting the distinctive variability of policy measures, culture-specific values and demographic profiles. Willmore (1998), supporting the above study on downward patterns in many societies, argued that economic development is secondary to cultural patterns which influence the direction and amount of transfer flows (i.e. whether children are economic liabilities for downward flows or economic assets for upward ones).

According to the role of the working-age cohort in economic performance, Macunovich (2012), referring to Keynes's work (1937), argues that economic slowdowns partially resulted from demographic changes. A decrease in demand is related to the shrinking cohort of young people aged 15-24, which generates a demand for goods and services associated with the formation of new households. This cohort's demand significantly influences total consumption expenditure and consequently producers' investment. The expanded production capacity in response to the rising demand for new households exceeds the demand brought about by the shrinking cohorts of successive generations, leading to bankruptcies and economic slowdowns. It results in fluctuations in GDP per capita, current account balance and gross capital formation.

3. Capital formation

The role of working-age cohort consumption sparks a much more vigorous and inconclusive debate on economic growth. The research can be classified into three main strands: 1) the effect of pension schemes (or more generally social security) on savings and economic growth (physical capital formation), which predominantly began with the considerable work by Feldstein (1974); 2) the role of human capital and its alterations on economic growth, mostly developed in the work of Becker (Becker et al., 1990; Becker, 1960); and 3) the behavioural determinants of economic performance linked to discounting, savings' motivations and cognitive qualities, mostly developed by behavioural scientists such as Thaler and Sunstein (2009) and Kahneman and Tversky (2000).

The most indecisive debate centres around the effect of social security on savings and economic growth. The prominent time series data research conducted in the 1970s with the US data by Feldstein (1974), and with contrary evidence by Munnell (1974), Barro (1978), Darby (1979) and Esposito (1978) concluded with two possible suppositions: 1) a methodological problem of the effect of isolation, or 2) a lack of influence on savings. Similarly, Lesnoy and Leimer (1985) concluded their review of later research at the beginning of the 1980s, emphasising the methodological problem with the time series data. An interesting review presented by the US Congressional Budget Office in 1998 showed that one dollar of social security wealth decreases other assets up to 50 cents, although the estimation ranged from 0 to 50 cents (Page, 1998). In addition, Pfau's (2005) investigation with extended data series and a new approach to time series methodology confirmed a decline in savings by 50 percent, as posited in Feldstein's (1974) study.

The only partial private savings offset to a public sector deficit, contrary to Ricardian equivalence theory, is presented in numerous studies (McMorrow & Roeger, 2004). Masson and colleagues (1998) posited in their review that an increase in government expenditures may limit resource accessibility for private sectors and subsequently may reduce private savings, irrespective of whether the expenditures affect the government's deficit. They also estimated an offset averaging 75 percent, especially if related to the deficit resulting from an increase of public expenditures, not lower taxation. However, the study indicated a variety of factors which influenced savings, such as age structure and GDP growth or, with less robust effects, interest rate and terms of trade; it also suggested some persistent country-specific traits.

The non-equivalence is usually explained by various distorting variables, such as bequest and precautionary motives, behavioural proficiencies, information asymmetry and other market conditions (Schwarz et al., 2014; McConnell, 2013; Holzmann et al., 2005; McMorrow and Roeger, 2004; Willmore, 1998). For example, World Bank researchers, as well as International Monetary Fund scientists, suggested that increased pension savings may have a negative effect on non-pension savings and may eventually limit capital formation following the replacement of unfunded pension systems with funded ones (Schwarz et al., 2014; Mackenzie et al., 1997). Mackenzie and colleagues (1997) theorised that the same mandatory contribution rate in a new funded scheme and payroll tax rate in an old, unfunded scheme does not affect disposable incomes. The pension savings of the new scheme offset the government deficit, leaving the national savings rate unaffected.

The World Bank's study by Schwarz and coauthors (2014) presented evidence in European economies on relatively independent savings behaviour, regardless of the introduction of mandatory funded schemes. The results have been explained by the debt financing of the transitional deficit in the successive periods of the reforms. The research also suggested that the positive responsiveness of the capital markets to the new assets can only be established with proactive public policy; similar problems with ineffective and closed domestic financial markets were reported Holzmann and colleagues (2005) and Bebczuk and Musalem (2009). Moreover, Holzmann and colleagues (2005), taking into account the condition of financial markets, argued that if the pension savings from funded defined-contribution schemes lent to a government (for example, invested in the government paper) increased fiscal deficit and hence public debt, they may be treated as unfunded, non-financial, defined-contribution schemes. Therefore, the impact on public debt should be the criterion for the funded (if they do not affect the debt) and unfunded sources of pension financing.

Finally, the potential increase in savings resulting, for example, from pension system reforms, would have varying impact on economic growth. For example, the increase may lead to capital depreciation because of a lower interest rate and consequently affect the asset gains of pensioners (Mason & Lee, 2011a; Hemming, 1999). Because investments are not driven exclusively by interest rate variances, it would not contribute to economic growth. Works by Keynes (1964) and Kalecki (1951) posited other determinants of investment, such as past investment decisions, expected profitability and uncertainty. However, the interest rate changes, savings and capital flows should also be discussed from the perspective of the global market and relationships between countries, which vary in economic and demographic conditions.

4. The global economy perspective

The potential increase in savings resulting from the pension reforms has to be also interrelated to the economic impact of demographic changes. The hypothesis originally stipulated in the asset meltdown debate since 1989 by Mankiw and Weil (1989) has been challenged in many simulations and studies, although the issue has not been clearly resolved. The general idea in line with the original study implies that a positive shift in the supply of assets generated by the dis-savings of the growing cohort of pensioners (e.g. baby boomers) with proportionally fewer workers will lead to a substantial drop of their prices. New research has presented new models and evidence since the original study (Huynh et al., 2006; Brooks, 2000; Schieber & Shoven, 1996; Bakshi & Chen, 1994).

Such research includes the seminal work of Poterba (2001), Börsch-Supan and colleagues (2006) and Schich (2009). For example, Börsch-Supan and colleagues, taking into account international disparities, argued that it should be analysed in relation to direct and indirect effects, as well as levels and trends. The direct effect assumes unrestricted capital mobility between countries with different demographic conditions, equalising the rates of return to capital worldwide. The processes are indirectly accentuated by the dissimilar pension systems in varying countries and their impact on private savings (funded or unfunded). The dimension of levels and trends describes initial settings and a time path in an economy, respectively. The simulation in the study suggests that the open-world economy will stimulate capital flows and alleviate the ageing population problems, such as asset-price meltdown resulting from dis-saving. However, the unfunded pension systems and a lack of pension reforms can substantially hamper the positive effects.

A schematic model of the global economy showing the above concept is presented in figure 2. This is a simple presentation that additionally includes human capital flows and the mitigation of population ageing examined in

migration research. The model lacks ample behavioural, economic, social, political and cultural variables discussed in numerous research studies. However, it explains the economic assumptions and some findings presented in the ageing debate, such as those presented by Börsch-Supan and coauthors (2006).

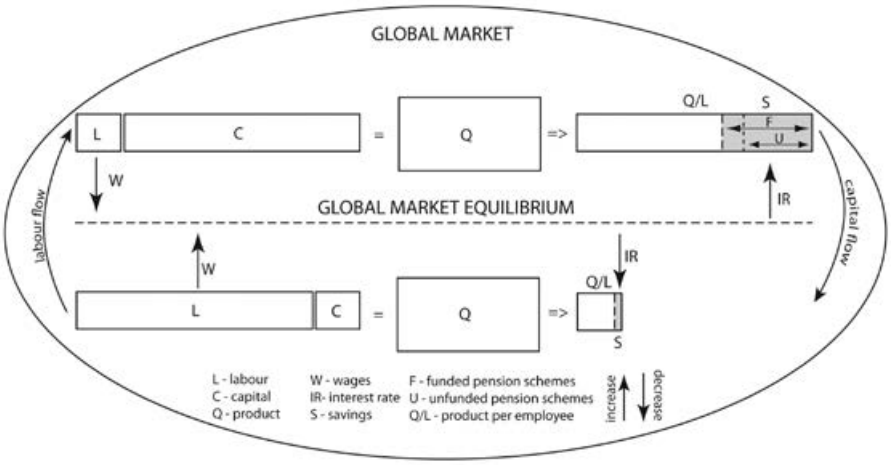


Figure 2. A schematic model of capital flows in the global economy

Source: author's work.

This scheme pictures capital flows (physical capital and human capital) between two economies with different capital-to-labour ratios. The savings rate is smaller in the economy with the lower capital intensity, and consequently, lower labour productivity (in terms of product per employee). The lower supply in physical capital in the economy induces a higher interest rate than in the economy with greater savings. The differences between saving rates and relative interest rates induce physical capital outflows from the latter economy, eventually equalising both interest rates. At the same time, the lower supply in labour in the highly capital-intensive economy generates higher wages, and the labour (human capital) inflow from the economy with higher labour supply eventually equalises wages. The outflow of the physical capital from the above economy is also balanced by the inflow of human capital. Funded pension schemes induce higher savings rates than unfunded ones in both economies.

The findings prevailing in the asset-price meltdown debate, such as those presented in the OECD review (Schich, 2009), predict a decline in the price of assets, although it will be mitigated by many factors, and the rapid decline in the financial asset prices is particularly questionable. However, at the same time, the author suggests that the volatile global financial markets can trigger

unpredictable effects due to the demographic changes, as the recent financial crises shows. The study partially confirmed findings presented by Mankiw and Weil (1989) due to non-financial assets, which are exposed to a higher risk. The author posited that the extended demographic changes and forward-looking financial markets are the key mitigation factors for the demographic changes in the financial markets.

A sustainable pension system framework

A pension budget, similarly to the concept of generational economy developed by Mason and Lee (2011b), remains in the mutual dependencies of four main economic processes: produce; consume; share, and save resources. Pension systems, regardless of the way of financing their savings, are understood as deferred consumption. In the unfunded schemes, the taxes paid for the present generation entitle the taxpayers to future consumption as pensioners; and private pension savings (in funded schemes) lent to a government can have similar macroeconomic effects as the unfunded schemes. Public spending (share), from the macroeconomic point of view, is consumption, which similarly to private consumption can be deferred or spent on different areas according to the government's political priorities (table 1).

Private consumption decreases according to the growth in both public consumption and the rate of savings. Pension funds can be financed from private savings or/and public expenditures. Due to the fact that the socio-economic systems are imperfect and, for example, opportunistic behaviour as well as unemployment, the systems need to secure socio-economic development according to the political priorities (including such priorities as equality in the distribution of wealth). The political priorities shape public expenditure patterns.

The pension measures can be classified into four interrelated groups in accordance with the way in which they affect socio-economic systems. The measures are aimed at the following issues: 1) private consumption and savings of working groups; 2) consumption of pensioners; 3) public consumption, and 4) social values (figure 3). The measures in the first group determine the disposable income of households. Pension savings, such as private funds or public funds based on taxes, are determined by a number of socio-economic factors, presented in table 3. However, the increase in the consumption level and savings rate according to technological advances and economic growth corresponds with the development of human capital quality and the "development" equilibrium.

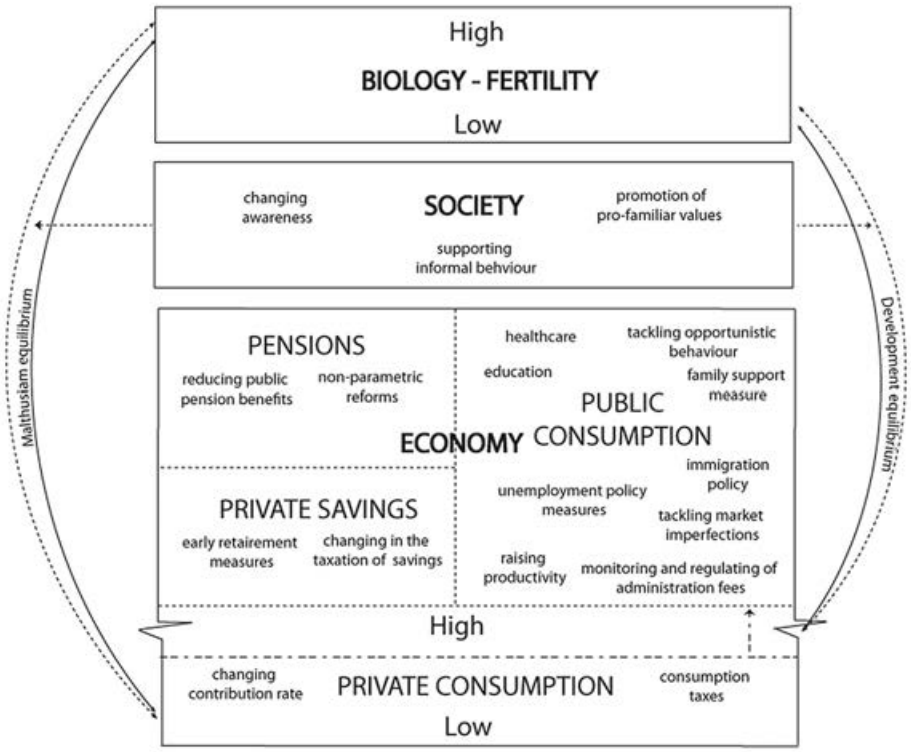


Figure 3. A sustainable pension policy framework from a macroeconomic perspective
Source: author's work.

The lower fertility resulting from these changes can be modified by the social system values (e.g. pro-family values) and – relatedly – priorities in public expenditures (e.g. pro-family support measures). Healthcare programmes increase fertility, although they are also costly investments in quality; moreover, technological progress increases the cost of healthcare, extending the range of possible diseases that can be treated (Apps, Rees & Wood, 2007). Social values are related to the directions and quantity of private transfers, substantially modifying informal support for pensioners and children. The forms of the informal support dominate in the societies with a "Malthusian" equilibrium; in the developed countries, public transfers dominate.

Table 3. Pension reform measures

POLICY MEASURES
SOCIAL SYSTEM
Changing awareness toward: • older workers, • health practices that increase health spending (e.g. poor nutrition, sedentary life style, risky behaviour promoted such as those presented in many internet footages, rely on medical treatment at the cost of preventing behaviour, which requires behavioural changes, etc.), • pension systems funds. Cons: *"individual attitudes toward retirement are less influential than societal norms of the 'right time to retire"* (Schwarz et al., 2014, p. 255).
Promotion of pro-family values.
Support informal behaviour toward intra-family or intergenerational financial and non-financial helping practices.
PUBLIC CONSUMPTION
Higher fertility policy: • family-support measures (subsidised childcare, reduced taxes for families with children and paid parental leave); Cons: • *"when the birth rate falls, there are fewer young workers to support old pensioners but they also need less income"* (Fanti and Gori, 2012, p. 960), • difficulties for women in labour markets, increase social care spending.
Unemployment policy: • re-design workplaces for elderly and disabled people, • creation of job places, • tackling an informal economy, • creating job opportunities for people with disabilities. *"Workers of different generations are not substitutes for each other, and there is evidence that increasing the employment of older workers does not increase youth unemployment […] When mixed-age teams work together, older workers are able to mentor younger workers, increasing the productivity of the whole work team"* (Schwarz et al., 2014, p. 260-261); *"older workers can remain productive throughout long working lives and are not necessarily less productive than younger workers. While certain physical abilities do decline, other capacities are enhanced by experience"* (Schwarz et al., 2014, p. 261). Cons: • increases completion of labour markets and reduces wages.
Tackling market imperfections • financial markets, inflation, • behavioural obstacles (e.g. myopia), • monopoly, etc.
Tackling opportunistic behaviour – monitoring and controlling benefit distribution.
Monitoring and regulating of administration fees • restricting fee levels, • restricting choices of changing funds, • clearinghouse, • blind accounts.

Raising productivity
Immigration policy including return migrants and their benefits based on the work abroad. Cons: • problematic for social, economic and cultural reasons.
PENSIONS
Non-parametric reforms – systemic changes in pension schemes (e.g. defined benefits vs. defined contributions).
Self-adjusting mechanisms (indexation rules tied with economic and demographic parameters such as inflation, growth etc.), **Reducing public pension benefits:** Reducing indexation of benefits (f. e. increasing the number of years used to calculation benefits), lowering accrual rate (the rate of benefit per year of service), Reducing post-retirement indexation of pensions (relative to inflation), Changing the formula to the calculation of retirement benefits, Reducing replacement rate (the level of pensions in retirement relative to earnings when working), Reducing inheritability provisions (i.e. widows' and widowers' pensions), Reducing indexation of earnings, Increasing taxes on benefits, Increasing tax receipts, Decreasing minimum pension.
PRIVATE SAVINGS
Early retirement measures: Reducing the penalty on continued work at older ages, Removing incentives to early retirement, Increasing working-age period, Rising pension tax rate, Means testing (reducing the number of people eligible to benefits).
Changing in the taxation of savings – the double taxation on savings (pension benefits and savings) should be avoided, as should the lack of taxation, as higher-income individuals profit excessively in the latter case.
PRIVATE CONSUMPTION
Changing contribution rate Cons: *"while reducing contribution rates did improve the functioning of the labour markets and improve labour competitiveness, the increases in formalisation were not sufficient to offset the decline in revenue from existing contributors"* (Schwarz et al., 2014, p. 254).
Consumption taxes *"consumption taxes allow for better intergenerational burden-sharing as they affect all cohorts, while labour taxes again affect only younger cohorts"* (Schwarz et al., 2014, p. 261).

Source: author's work based on Schwarz et al., 2014; Bloom et al., 2010; Hirschman, 2007; Schwarz, 2006; Holzmann et al., 2005; Bongaarts, 2004; Jackson, 2003; Fanti & Gori, 2012; Gruber & Wise, 2002; Hemming, 1999.

The third group is related to direct regulations of pension schemes within a given budget. For example, changes in the indexation of earning or a replacement rate affect public spending budgets and pensioners' consump-

tion levels. A fully funded pension system can be treated as private savings; however, it is vulnerable to both socio-economic (such as inflation or changes in the taxation of benefits and savings) and behavioural (e.g. difficulties in risk assessments) settings (figure 3). The latter requires a form of paternalism to secure pensioners regardless of a socio-economic system (Thaler & Sunstein, 2009).

Finally, the last group of measures shape public spending patterns. They are responsible for the way in which goods and services are provided (e.g. social programs as well as education and healthcare, which can be financed from public expenditures). They also provide services to tackle market imperfections and shape social behaviour.

Conclusions and recommendations

The problem of sustainable pension policy is multifaceted and related to both socio-cultural and economic transformations, as well as related to the transformations historically determined pension systems. The contemporary information society and the knowledge-based economy characterise the computerisation of production and the increase of investments in the quality of human capital. This is associated with the development of secular rational values that are less related to religion, traditional family values and authority (World Values Survey, 05-01-2016). These changes are unprecedented phenomena, such as the ageing population related to such changes.

Certain socio-economic conditions facilitated the PAYG schemes in the past, although their effectiveness is limited to certain strictly designed socio-economic settings, same as their opposite extreme so (i.e. funded schemes). The contemporary pace of socio-economic changes requires more reliable and resistant schemes to various changes in the long term. Nevertheless, the development level determines them and the system of values dominated in particular countries. For example, societies with individualistic ethics and liberal economies favour voluntary and funded systems.

However, the claims that funded schemes solely solve all the problems related to population ageing are unjustified in light of the many socio-economic and behavioural analyses. Their efficiency is hampered by market imperfections (including financial speculations identified in the global crisis in 2008 and behavioural obstacles) and the cyclical character of economic growth. The schemes are a part of social policy goals related to such issues as poverty-combating programmes and the level of social security, which are also the key postulates of the sustainable development goals.

The debate on pension systems revealed the inadequacy of socio-economic institutions to react to the challenges of a changing world. Moreover, the inconclusiveness of much research suggests a multifactor phenomenon and requires policy specifically fitted to a particular country which takes into account the following parameters: the level of economic growth; human capital and savings rates; the efficiency and stability of financial markets; socio-economic policy patterns and the level of market interventionism; and the demographic structure and trends, including migration policy, the system of cultural values, and socio-economic settings such as unemployment, labour law and possibilities to employ people with disabilities and old-age workers. The framework offered in this paper shows the holistic sustainable development approach from the perspective of global economic relationships between production factors, multiple socio-economic objectives and the fairness criteria postulated in the UN Sustainable Development Goals. The specific socio-economic conditions of particular countries should be balanced with the postulates offering a sustainable and long-term intergenerational pension system that is resilient to both cyclical fluctuations and sudden shocks; and it should meet the postulates of intergenerational horizontal and vertical equities referred to in the debates on justice and sustainable development.

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