VOLUME 76 | NUMBER 3

JULY–SEPTEMBER 2023

International Social Security Review

ISSN 0020-871X

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- Improving the protection of migrant workers with work histories in the European Union and Ibero-America: Enhancing the coordination of international social security instruments
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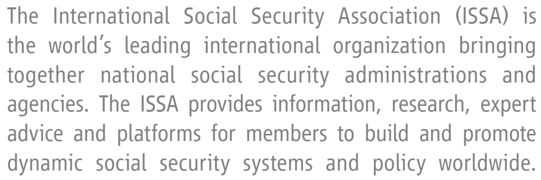

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INTERNATIONAL SOCIAL SECURITY REVIEW, (Print ISSN: 0020-871X; Online ISSN: 1468-246X), is published quarterly. Postmaster: Send all address changes to *International Social Security Review*, Wiley Periodicals LLC, C/O The Sheridan Press, PO Box 465, Hanover, PA 17331 USA.

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Digital social security accounts for platform workers: The case of Estonia's entrepreneur account

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Abstract Advancements in technology enable new opportunities for creating digital social security accounts, but the effectiveness of these to solve the accessibility and eligibility issues facing platform workers has not been assessed fully in the literature. The potential of digital social security accounts lies in their ability to consider the possible different streams of income of atypical workers and to improve the effective access of these workers to social security. Tax and social security offices can now exchange information on the income of platform workers in real time, which offers the promise of formalizing the previously informal casual work relationships of the self-employed. This article explores the case of the Estonian entrepreneur account as a digital hybrid solution for improving the effective access to social security of platform workers. Digital portable accounts create the conditions for the structural improvement required to respond adequately to meet the changing social security needs of atypical workers. However, this also requires that the policy design be thought through carefully, to avoid digital portable accounts being simply a digital facilitator of outdated solutions.

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This article was supported by the Estonian Research Council grant PRG1125.

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Keywords social security planning, coverage, gaps in coverage, self-employed, atypical work, platform workers, labour market, Estonia

Introduction

The focus of this article is placed on the effective access to social security of people performing tasks via digital labour platforms (hereafter, platforms), who are classified as self-employed workers or platform workers, and the potential of digital social security accounts to improve this access. The article follows the definition of a platform worker proposed by Schoukens, Barrio and Montebovi (2018, p. 223):

> "Platform workers can be defined as persons selected online from a pool of workers through the intermediation of a platform to perform personally on-demand short-term tasks for different persons or companies in exchange for income".

While some classifications of platform work also include professionals such as IT architects working on creating and developing platforms (see, for example, Vallas and Schor, 2020), we exclude this specific category as those workers are mostly employees of the platform company. We also exclude the category of online content creators and influencers (also discussed by Vallas and Schor, 2020), as their remuneration is not mediated by the platform.

A two-part argument supports the idea of seeking alternative solutions for improving the social security of platform workers. First, the income security and key motivation of workers active in platform work varies among workers. Ravenelle (2019) finds that while some platform workers thrive, others struggle. While some engage in platform work arrangements voluntarily, and do so to earn extra income, for others it may represent a last-resort option (Dunn, 2020). For others still, such work may even be viewed as a hobby. At the same time, access to satisfactory levels of social security coverage for platform workers may depend on also having other income from standard employment. The higher the share of personal income that a worker earns from platform work, the lower the level of social protection they experience (Forde et al., 2017). It can thus be expected that those who choose to engage in platform work out of need are also those who risk having gaps in their social security coverage, albeit that this depends on the national characteristics of social security schemes for self-employed workers (Behrendt, Nguyen and Rani, 2019). Nevertheless, even in cases where income for platform work constitutes only a minor share of workers'

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income, the social security system should be able to identify, quantify and combine workers' different income sources (Schoukens and Weber, 2020).

Second, from the perspective of the state social security budget, new solutions are needed to create a level playing field for contributions payable from different forms of employment. Platform workers are mostly considered to be, and thus are classified as, independent (own account) contractors who operate in legal forms of work understood as self-employment, rather than being an employed worker (Forde et al., 2017). Platforms do not pay work-based contributions, and instead transfer the burden for insuring against risk to the platform workers. The misclassification of platform workers as own-account workers rather than as employees has led to the "demutualization of risk" in labour markets (De Stefano, 2016). Milanez and Bratta (2019) show that the choice between different forms of work contract is encouraged by parallel differences in how contracted work is taxed, which creates unevenness in the labour market between traditional enterprises and digital platforms, and this has led to a vast uptake of the independent contractor form. Enterprises may equally be using platform-mediated independent contractors, instead of employees, to gain from the leveraged tax position.

In the long run, the lower levels of tax paid by the platforms could be seen as free riding on the state social security system (Behrendt, Nguyen and Rani, 2019). It may also constitute a "potentially significant financial burden for wider society if left unresolved" (Forde et al., 2017), as governments may have to spend more to compensate for the potential income insecurity and inadequate levels of social insurance protection of these workers (Adams and Deakin, 2014). Some scholars argue that digital connectivity, changing habits and the reorganization of work will pave the way for platform work to spread and to become an important work form (Huws et al., 2017; Kenney and Zysman, 2019). Following this argument, the issue of the taxation of platform work, as well as how workers' social security contribution records should be managed, will become increasingly important for the State.

Platform work becoming an additional or even the primary source of income for an increasing number of people necessitates the reconfiguration of social security systems, especially regarding the collection of contributions from those engaged in atypical forms of work. In this regard, it is important to look at solutions that can collect and manage the contributory income of platform workers through portable social security accounts. Creating such accounts has been proposed on multiple occasions in discussions of platform work (Codagnone, Abadie and Biagi, 2016; Berg, 2015). Following a comparative study of 35 European countries, Spasova et al. (2017, p. 15) found that the main reforms introduced so far have targeted the "transferability of social rights between statuses and integration of different sources of earnings into an individual account".

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Individual social security accounts allow rights to be attached to an individual rather than to an employment relationship. In this way "workers' benefits are not tied to any particular job or company; they own their own benefits" (Rolf, Clark and Bryant, 2016, p. 3). Furthermore, individual accounts allow for a more flexible and customized use of funds accumulated, such as withdrawing these for educational purposes or during a time of crisis (OECD, 2018). The Activity account (*Compte personnel d'activité – CPA*) in France is one example of this. In Latvia, the social security system operates based on the individual accumulation of rights (Spasova et al., 2017). Of course, the adoption of individual accounts brings risks, not least that these hinder the fundamental objective of social security systems to redistribute income and share risk across a wide risk pool.

The proposal of individual social security accounts is part of a wider discussion on the portability of social security rights that emerged around 2015 (Codagnone, Abadie and Biagi, 2016). These reforms are in line with suggestions by the World Economic Forum (2017) proposing the creation of portable health and pension plans to include workers in atypical work, but with the solution designed so that the risks would still be shared by workers, employers and the State. The European Commission's high-level expert group recently similarly proposed creating a Digital Single Window to improve access to social security for Europeans in non-standard forms of employment (European Commission, 2019). Simply put, benefit portability in the context of platform work means creating "individual security accounts to protect the worker as they move from gig to gig" (Berg, 2015, p. 544). The many policy pointers and the emerging academic literature suggest that the rise of the "digital welfare state" (as coined by Alston, 2019) will lead to a wider exploration of digital account solutions in the sphere of social security provision.

The entrepreneur account, established in 2019 in Estonia, is one example of such a digital account. It offers a novel way of combining business income from different sources in a private bank account. All the income received is automatically taxed at a flat rate tax of 20 per cent, or 40 per cent for higher income earners, which represents a combined social security contribution and income tax. Entrepreneur account holders may be eligible for coverage for health insurance, maternity benefits and pensions, depending on the amount of tax they have paid.

This article analyses the entrepreneur account as a digital tool for tax administration that offers portable social security coverage for platform workers. The central research question is: What are the advantages and disadvantages of the entrepreneur account as a digital tool for offering access to social security for platform workers? The article uses interviews with policy makers and account users in Estonia and analyses the relevant literature and policy documents.

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The aim is to contribute to the discussion on digitalization as a way of improving social security coverage in an evolving world of work. Much of the current literature focuses on legal aspects of atypical work (*ISSR*, 2021) or considers policy design (*ISSR*, 2019). However, as e-government technologies evolve, it is worth adopting an interdisciplinary approach to seek alternative solutions.

The article proceeds as follows. First, the social security coverage challenges facing platform workers are discussed together with potential solutions and their implications for the future of the welfare state. We then address the case study of the entrepreneur account in Estonia, before presenting a discussion of the findings and final conclusions.

Platform work: One facet of a new era of challenges for social security systems

The social security coverage challenges for those in platform-mediated work

European social security systems face issues concerned with the legal as well as effective coverage of the self-employed (Spasova et al., 2017). Schemes for the self-employed are often voluntary, which has resulted in lower-income groups being more likely to opt out of the social security system (Eichhorst et al., 2013; Matsaganis et al., 2016). A survey of 1,200 platform economy workers in eight European Union (EU) countries (Forde et al., 2017) revealed that health care insurance was the most easily available form of social security for platform workers, while access to other types of social insurance, such as benefits for sickness, disability, old age, maternity, caregiving, unemployment and housing, were mostly lacking.

Even though developed economies may have a high level of statutory access to social security for atypical workers, the level of effective access is often limited by the contributory nature of the social insurance schemes used, wherein the achievement of only the minimal necessary accrual of contributions would result in a lower benefit level (Spasova et al., 2017). Eligibility criteria, which are difficult to fulfil because of the nature of self-employment, are the main reason why effective access is limited (Spasova et al., 2017; Schoukens, 2020). For many platform workers, insufficient income or unstable patterns of income act as primary barriers to effective access to social security (Berg, 2015). Consequently, those with low or unstable incomes working in atypical jobs may not satisfy the qualifying conditions for contributory benefits but may have statutory access to means-tested benefits if they satisfy the qualifying conditions for these (Matsaganis et al., 2016).

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A social security policy resilient to atypical work

In the face of large-scale societal and economic disruptions – be this the emergence of platform work or the job losses caused by the COVID–19 crisis – European welfare states are confronted by existential questions concerning the nature of future welfare provision (European Commission, 2023). One emerging question is how to provide adequate social security for platform workers. Of importance, what differentiates platform workers from other atypical and self-employed workers is the fact that their income from work mediated through digital platforms is traceable because of the digital nature of transactions (OECD, 2018). Consequently, types of self-employed work that may often have been conducted informally can now be rendered easily visible and formalized, thus offering the possibility to improve effective access to and the adequacy of social security coverage for these workers.

An option to improve the social security of platform workers is to make legislative changes to the classification of workers (Behrendt, Nguyen and Rani, 2019), by creating an intermediate legal category (De Stefano, 2016; Erikson and Rosin, 2018). Such proposals have not gained much ground however, as they still offer employers the ability to opt for less expensive contractual arrangements for the employment relationship that leave the vulnerability of self-employed workers unaddressed (Aloisi, 2022).

Another possible approach to make contributory social security systems more accessible would be to make eligibility criteria less strict. There is also a widening debate on the decoupling of social protection from employment, which would mean sharing risks more between all workers and employers with the aim of enhancing the level of protection (Behrendt, Nguyen and Rani, 2019). Also under discussion is a universal human rights-based approach to social security. Where social security is tied to a specific employment contract, the benefit entitlements earned can be easily lost at the end of the contract period (Kuddo, Robalino and Weber, 2015), and so a move away from the productivist or work-related approach towards a universal human rights-based approach is deemed worthy of consideration, as called for by Alfers, Lund and Moussié (2017) in a discussion on informal and precarious work. The human-rights-based approach also underpins the concept of Social Protection Floors proposed by the International Labour Organization (ILO), with Floors anchored on the goals of universality, adequacy, portability, transparency and risk sharing (Behrendt, Nguyen and Rani, 2019).

All the suggestions for how to move towards a more universalist approach acknowledge that different pathways exist. These suggestions, however, also recognize the need not to undermine work-related social protection, i.e., the social rights of working people acquired over many decades (Behrendt, Nguyen

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and Rani, 2019; Alfers, Lund and Moussié, 2017). Moreover, as Behrendt and Nguyen (2018) point out, depending on the country, the discussion on decoupling social protection from employment must remain cognizant of the many ways in which employment rights may link separately with different kinds of social rights delivered by different national social security schemes.

Another approach to tackle the insecurity faced by the increasing number of atypical workers who are left "at the margin of social insurance" is to adopt collective insurance models that are not based on employment (Eichhorst, Hemerijck and Scalise, 2020, p. 29). Private insurance models that increase the portability of benefits for the self-employed, such as multiemployer plans and group insurance, offer one approach (see Rolf, Clark and Bryant, 2016 for a historical overview). For this approach, the outcome depends on how the model is set up and who assumes the risk. Critics argue that private insurance schemes may create more challenges than answers as regards addressing questions of inequality and gender gaps, especially for low-income workers (Alfers, Lund and Moussié, 2017; Behrendt, Nguyen and Rani, 2019). Nevertheless, there are already examples of digital work platforms that offer private insurance options for platform workers, such as Grab in Singapore, which automatically transfers voluntary social security contributions to the Government (Freudenberg, 2019). Where private insurers offer schemes as direct alternatives to public social security, these should be closely monitored for their accessibility and adequacy, to ensure that they do not result in an additional social cost burden for society in the future (Freudenberg, 2019).

Finally, some scholars believe that the challenges of income insecurity and the heterogeneity of atypical work forms are too complex to tackle using the traditional welfare system approach. Rather, they argue that entirely new approaches are needed. Universal Basic Income (UBI), for example, has been suggested as a possible solution (see the overview in Balliester and Elsheikhi, 2018). Largely on the grounds of the projected high cost (Tanner, 2015), UBI proposals remain at the experimental stage. Proponents of the UBI approach, as well as others (see Joyce et al., 2019), argue that social policy interventions should be aimed at the thorny question of insecure work more broadly, rather than targeting the social protection needs of platform workers specifically.

Digitalization and the future of the welfare state

"What can be digitized will be digitized – sooner or later" (in Campbell and Hanschitz, 2018, referring to the Shumpeterian understanding of disruptions in the economy). Digital solutions have not only changed the way enterprises

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operate and people work, but they have also provided governments with a set of tools for creating solutions to support public service delivery. However, the role of digitalization in solving the ever-pressing challenges of social security have only been discussed to a limited extent. Largely omitted is the potential of digital technologies not only to make the operations of the pre-digital system more efficient but to "design new disruptive digital systems" (Campbell and Hanschitz, 2018, p. 2). Specifically, innovation in digitalization could help to improve the coverage of platform workers through novel financing and administration approaches (Behrendt, Nguyen and Rani, 2019).

Three ways that digitalization can help address the social security challenges of platform workers can be identified. These are i) the digital recording of economic transactions that are easily traceable by public authorities; ii) the collection of income information concerning a growing number of platform workers, so reducing the administrative burden for the State; and iii) a reduced administrative burden for platform workers (Freudenberg, 2019).

The digitalization of tax administration is one potential avenue for improving the effective social security coverage of platform workers and holds the promise of being able to "reduce bureaucratic hurdles" faced by the self-employed (Campbell and Hanschitz, 2018, p. 6). This could function primarily through the automatic reporting of income to both tax and social security administrations, lessen the burden of consulting tax consultants and reduce the risk of non-compliance in a complicated taxation system.

The International Monetary Fund (IMF) considers that electronic fiscal devices (EFDs), such as online tax account systems and electronic registers, could be a tool for improving tax compliance (Casey and Castro, 2015). The advantages of EFDs lie in the ability to collect tax contributions automatically based on a just-in-time principle. Furthermore, less complicated tax administration could potentially increase income from taxes without raising taxes (Campell and Hanschitz, 2018).

An example of digital disruption in tax administration is to tie electronic accounting systems to online tax accounts, as was done in Austria in 2012 with the automatic deduction of taxes from stock exchange gains (Campbell and Hanschitz, 2018). Some initial developments have also been made in the domain of platform work, as in Uruguay, which has adopted a phone app that gathers information about the social insurance contributions of ride sharers (Freudenberg, 2019). Another example covers ride sharers in Estonia, for whom the Tax and Customs Board has developed a simplified solution for sharing information on income with the tax authorities that automatically includes the results in the driver's annual tax declaration (Freudenberg, 2019). However, because participation in information sharing is voluntary, the number of drivers reporting their income has remained low. A further example is offered by Chile,

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where the electronic invoices of self-employed workers are automatically taxed at 10 per cent (Freudenberg, 2019).

While digitalization offers new ways to administer aspects that support social security programmes, digitalization is not sufficient to address all challenges. The simple act of digitalizing tax administration with EFDs or of creating separate digital solutions to facilitate income reporting by platform workers does not solve the structural issues concerning access to social security that are caused by insufficient income levels or unstable patterns of income. The potential for combining digital accounts with the portability of social security rights thus deserves further analysis, which is the aim of this article.

Methodology

This article is based on qualitative research from a case study analysis of the Estonian entrepreneur account. The case study approach was chosen as it allows a holistic analysis of the subject matter while taking account of the country context (Yin, 2015). The entrepreneur account is a novel solution, and so numerous data sources were used to complete the case study in the form of newspaper articles, policy documents, legal acts as well as earlier published studies. Furthermore, 13 semi-structured interviews were conducted to complement the document and literature analysis (see Appendix, Table A.1). The interviewees were chosen to represent different viewpoints about the solution. Accordingly, to gain insights into real-life experience with the entrepreneur account, the purposive sample of interviewees included policy makers who had been involved in setting up the account solution, entrepreneur account users, and two platform representatives. The interviews took place from late 2019 to early 2021 and sought to capture the evolution of perceptions concerning the account and its use. The interviews lasted from 30 to 90 minutes, depending on the interviewee and their experience. Prior to 2020, the interviews were conducted in person in Estonian (with responses translated into English by the author), and thereafter various digital communications tools were used.

Estonia's entrepreneur account

In this section, we offer a brief overview of the Estonian social security system from the perspective of platform workers, then describe the design logic of the entrepreneur account, before discussing the technological solution the entrepreneur account offers. Finally, the effectiveness and outcomes of the entrepreneur account are analysed.

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The Estonian social security system from the perspective of platform workers

The design of the Estonian social security system revolves around standard employment relationships. Employees gain rights to health insurance and pensions from their social tax contribution, which is 33 per cent of their work income and is paid by the employer, with 20 per cent directed towards state pension insurance and 13 per cent towards state health insurance.[1] A minimum threshold for the social tax contribution has been set by law and is obligatory even for part-time work. The threshold is 33 per cent of the minimum wage. In 2023, the monthly minimum wage rate for the standard employment relationship is 654 euros (EUR) and the equivalent social security contribution is EUR 215.82 per month. Paying this minimum contribution each month guarantees the employee access to health insurance. Employers are additionally expected to pay 1 per cent of wages for the unemployment insurance of the employee. There are numerous exceptions that alleviate the tax burden for specific groups. In some cases, the social security payment is made by the State, or the employer is permitted to make reduced payments, and the social insurance payment for students, non-working parents of young children, the unemployed and some other groups is, for example, provided by the State without monthly tax payments. As forms of work have extended beyond the standard employment relationship, so the relationship between work income and social security contributions is no longer as straightforward as it was previously. While the social security tax must be paid by those who hold self-employed status (*Füüsilisest isikust ettevõtja* in Estonian – hereafter, FIE), most independent contractors choose to work through their own company, where the two dominant models of income declaration are i) to declare only a minimum income and use the rest of the income for investment, business expenses or dividends, or ii) to take earned income out as dividends, paying income tax of only 20 per cent. The increase in self-employment or own-account work as an independent contractor thus means, in effect, that participation by these workers in social security schemes is often voluntary and may result in substantially lower social security payments than those made by workers in employment with a similar level of income.

A survey of platform workers conducted in Estonia in 2021 revealed that about 7 per cent of the working-age population engages in platform work regularly (Vallistu and Piirits, 2021). Almost half of this group works up to 10 hours a week, while 21 per cent work for 25–40 hours a week, and 7 per cent work more than 40 hours a week. The social background of platform workers is very

1. See Republic of Estonia Tax and Customs Board, Income and Social Taxes.

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heterogeneous as is the combination of both platform and non-platform work tasks undertaken.

The novelty and heterogeneity of platform work, the different legal forms used, and the lack of data on platform workers mean that platform work has remained largely under-discussed in Estonia. The first legislative changes concerning platform workers were enacted in 2017 and were meant to even out the playing field between the taxi industry and rideshare drivers by putting in place a system of permissions and required insurance.[2] Prior to this, the Estonian Tax and Customs Board had created an information exchange platform allowing direct reporting of income data from the ridesharing applications of Uber and Taxify (now Bolt). However, as the reporting was voluntary, only 69 people declared their income in 2016 and 319 people in 2017.[3]

As is the case in other countries, platform workers in Estonia are mostly considered to be self-employed but may choose the legal classification under which they operate. The main options for those working on digital platforms are to:

- Register as an employee with a standard employment contract.
- Register as an employee with a more flexible VÕS contract (*Võlaõigusseaduslik leping*) under the law of obligations.
- Register their own private limited company and employ themselves or pay dividends.
- Take casual payments and submit an annual tax declaration with a 20 per cent tax payment.
- Open an entrepreneur account.

The term "self-employment" is thus ambiguous in Estonia. It could mean the specific self-employment status (FIE), but it can also refer to a wider set of employment statuses ranging from an own-account entrepreneur working through a limited liability company to a person undertaking employment contracts under the Law of Obligations Act[4] as VÕS-contracts. Although EU comparative studies, such as Spasova et al. (2017), find that access to social protection for the self-employed appears relatively strong in Estonia, with full access to health care, sickness benefits, old-age benefits and others, the real picture is much more fractured. Although platform workers could theoretically choose between the statuses listed above, their actual status depends on both the platform's recommendation and their personal choice. Social security contributions in Estonia are effectively voluntary, which makes it possible for the self-employed, including platform workers, to opt out of the system. This issue has mainly been discussed in the context of the social

2. See the changes made in the Public Transport Act.
3. According to information provided by the Tax and Customs Board. See Äripäev, 29 May 2017 (in Estonian).
4. See the full text of the Law of Obligations Act.

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security of the creative self-employed in Estonia (Koppel et al., 2021), but it also extends to other categories of the self-employed. The need for continuous income heightens the risk of losing access to health insurance during periods of low income or vulnerability, such as when the person cannot work because of poor health. It also infers the need for earnings during vacation periods.

The formal logic of the entrepreneur account

The entrepreneur account functions like a regular bank account, with the difference being that all the income is taxed automatically, as the social security payments of 20 per cent and business tax income are transferred to the accounts of the Estonian Tax and Customs Board. The account can be offered by any credit institution operating in the European Economic Area. Any individual with an Estonian personal identification code is permitted to open an entrepreneur account, and this includes e-residents who are mostly not Estonian citizens. People cannot have the dual roles of having an entrepreneur account and self-employed status (FIE), nor can they be liable for valued-added tax for a similar area of activity. Having an entrepreneur account is considered an activity on the labour market regardless of whether it produces income, meaning that a person cannot be simultaneously registered as unemployed and have an account.

The tax to be paid on income (known as the business tax) is deducted from the entrepreneur account as soon as a payment is received. The tax paid is considered as entrepreneurial income earned by a natural person. As of July 2023, annual income of up to EUR 25,000 is taxed at a flat rate of 20 per cent, and income greater than EUR 25,000 but less than EUR 40,000 is taxed at 40 per cent. Similarly, a graduated tax applies to the income of registered companies, but this does not apply to regular employees. All who earn above EUR 40,000 must register a private limited company to conduct their business. The tax rate is favourable for entrepreneur account holders when compared to the regular 20 per cent income tax and the 33 per cent social security contribution. An additional tax of 20 per cent is added when services are provided to a legal person, as this equalises the total tax burden with that of the standard employment relationship.

The idea of the entrepreneur account (*Ettevõtluskonto*) was initiated by the Ministry of Finance of Estonia in the period 2015–2016. Once the Ministry had outlined the initial idea, the Tax and Customs Board became involved in applying it to the existing administrative and technological framework. On 19 June 2017, the Act on Simplified Taxation of Entrepreneurial Income (*Ettevõtlustulu lihtsustatud maksustamise seadus* – ELMS) was passed,[5] allowing natural persons to open an entrepreneur account to receive payments for selling goods or services.

5. See the Act on Simplified Taxation of Entrepreneurial Income (in Estonian).

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The solution does not bring in any additional revenues for the banks and is a voluntary service. After having become available on 1 January 2019, only one bank, LHV, has since offered the entrepreneur account service.

Following its introduction, the number of entrepreneur account users has increased steadily; on average, 182 new accounts have opened per month, representing monthly growth of 7 per cent, according to data from the Tax and Customs Board. In February 2022, there were 6,908 active accounts. A total of 129,792 transactions had been made by February 2022 for a total value of EUR 17,740,087. The volume of transactions has also increased steadily, with the monthly average number of transactions for the period January 2021 to February 2022 reaching 5,865. The monthly value of transactions has increased from an average of EUR 350,873 a month in 2020 to EUR 819,233 a month since the beginning of 2021.

The business tax collected from the entrepreneur income is meant to function similarly to the social security contributions paid as part of the standard employment contract. It is divided in three parts, with 20/55 of the business tax accounted as income tax, 33/55 as a social security payment, and 2/55 as a mandatory pension contribution. To receive access to health insurance, the monthly social security tax payment must be equal to or greater than the minimum threshold set according to the minimum wage. In 2023, a monthly income of EUR 1,798.50 would be required for the social security contribution to the entrepreneur account to exceed the required minimum social security payment of EUR 215.82.

The entrepreneur account: An administrative and technological solution

The entrepreneur account offers a hybrid solution that functions through cooperation between state registries and bank services. IT developments have been put into place by the Tax and Customs Board as well as the one bank involved. The account user mainly communicates directly with the bank. When opening the account, the person gives the bank permission to deduct the amount of business tax from all the payments received, and to transfer this money to the Estonian Tax and Customs Board. As such, a well-functioning e-banking system is a vital requirement.

Once an entrepreneur account has been opened, the account holder is registered in the employment register managed by the Tax and Customs Board. The main function of the register is to help in determining the person's rights and access to social guarantees, such as health insurance and unemployment insurance.[6] There is no need to declare business tax activity separately, as it is automatically

6. For more information, see the Employment register public website.

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included in the person's annual tax declaration, which is automatically pre-filled by the Tax and Customs Board. Account holders can view their related payments and access an overview of their account on the Tax and Custom's Board self-service portal. If an individual entrepreneur account contract is terminated, the person's profile is also removed from the employment register.

Results: The entrepreneur account and accessibility to and eligibility for social security

When first established, the main purpose of the entrepreneur account was to provide a legal procedure for people receiving informal payments to declare their income (Interviews 1 and 3). The main issue it helped address was the heavy bureaucratic burden associated with hiring an employee or operating as a self-employed person (Interview 1).

The account is considered well suited to the needs of own-account workers and small-scale entrepreneurs who operate without substantial expenses, as expenses cannot be deducted. Interview responses revealed that the account should work well for some occupations, including babysitters, builders, odd-job workers, handicraft workers and hairdressers, among others. In contrast, the entrepreneur account is deemed less well suited for rideshare drivers, who must bear the important expenses of fuel and car rental. Those interviewees who were account holders indicated that their main motivation was to be able to operate legally with a low level of bureaucracy (Interviews 4, 6, 7 and 10) and with a lighter tax burden (Interviews 9 and 11). To facilitate organizing cross-border work was another reason mentioned (Interviews 7 and 8). In the interviewee sample, only one entrepreneur account holder expressed that it offered a way to gain access to health insurance. This reasoning did not apply to the others, as their monthly income was less than the necessary threshold.

While the account was created with the needs of informal workers to the fore, over time it has come to be understood that it could also address some issues specific to the situation of platform workers:

> "We understood that the entrepreneur account is very suitable for platform work. You just open the bank account, associate all your income with it and that's it" (Interview 1).

Indeed, it has become a default solution for platform workers operating through multiple local platforms, such as CareMate, which provides personal care services for the disabled and the elderly. It is considered a flexible way for people to organize their work while retaining legitimacy in the eyes of their clients:

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> "When developing our prototype (of the digital platform), we were amazed by this solution. It would prevent us from doing anything that was illegal, and the public sector would also be more willing to receive our services" (Interview 5).

Despite these expressed views, platform owners cannot oblige platform workers to register under an entrepreneur account. As stated, because they are considered independent contractors, platform workers have a free choice regarding how to organize and declare their income (Interviews 5 and 13).

As regards platform workers' need for improved social security coverage, especially health insurance, there are three important characteristics of the entrepreneur account that platform workers should consider: portability, accessibility and eligibility.

Portability. The key characteristic of the entrepreneur account is that it creates portable social security that is not tied to an employment relationship. However, the principle of portable social security already existed before the entrepreneur account was introduced. Access to health insurance in Estonia is determined by work-related taxes paid from various sources. Automatic registries allow different work income and business income to be considered when calculating a person's social security status, irrespective of their legal position and the types of contracts they work under. If a person has multiple work contracts and an entrepreneur account, then their chance of receiving health insurance increases. If it is assumed, however, that payments are only received on the entrepreneur account, the threshold is currently too high for many people because the monthly income required for the minimum social security contribution is, de facto, higher due to the lower tax rate applied to accounts.[7]

Accessibility. A lack of income is the first obstacle to accessible health insurance for platform workers using the entrepreneur account, as it turns theoretical legal accessibility into effective non-accessibility. The holder of the entrepreneur account will receive access to health insurance when the business tax they pay – as the equivalent of the social tax – is equal to or greater than the minimum amount required within a standard employment contract. However, as the tax rate of the entrepreneur account is lower than the rate of the social tax, the person needs to have a higher level of monthly income to be eligible for health insurance. For standard employment, the taxable income level in 2023 was a

7. The Estonian platform work survey (Vallistu and Piirits, 2021) reports that the average monthly income from platform work amounts to EUR 1,017.

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minimum of EUR 654 per month, on which a further EUR 215.82 is paid towards social security contributions, while the equivalent social security contribution from the entrepreneur account is made when the person's income is equal to or greater than EUR 1,798.50. For a comparison, Statistics Estonia states that the average gross monthly wage in Estonia in March 2023 was EUR 1,810.[8]

> "Health insurance is probably not the main reason for creating the account. It would appear that there is only a very small percentage among those with accounts who earn enough to be able to contribute to the insurance" (Interview 8).

The other major obstacle to accessing social security is the irregular nature of income from platform work and self-employment in general. The payments towards social security from income received on an entrepreneur account are contributed each month. One interviewee described a case where their client was late with a monthly payment, consequently they lost their health insurance coverage during that month, which coincided with an unexpected and costly bill for health care (Interview 7).

The importance of accessibility was acknowledged from the outset and the idea of permitting account holders to make additional payments to reach the minimum threshold was considered, as was informing them about the risk of losing health insurance in the following month in the absence of a payment (Interview 1).

> "I get my payments quarterly, but the health insurance requires payments once a month" (Interview 7).

As the threshold for receiving health insurance is so high (i.e., a monthly income of EUR 1,798.50 in 2023), it was suggested that there could be an option of voluntary social security payments for those using the account, but this idea was deemed too complicated and not initially included in the design of the system (Interview 8).

Eligibility. The other important obstacle to improved access to social protection for platform workers is their eligibility for only some social security benefits. Entrepreneur account holders make contributions towards health insurance, pension insurance and maternity benefits, but they are not covered for other risks such as unemployment.

8. See Statistics Estonia.

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> "I am insured against unemployment as long as I also work at my full-time job. If I want to extend my self-employed activities, it does not seem right that I do not have the right to receive unemployment payments" (Interview 4).

As stated, the fact of having an entrepreneur account is considered to represent labour-market activity. Holders of an entrepreneur account who wish to register as unemployed cannot do so until they have closed their account (Interview 12). In this regard, the design of the entrepreneur account is incompatible with the wider design of unemployment policy in Estonia, which encourages at least a low level of work activity.[9]

Discussion

Achieving effective access to social security is not simply a legal matter. Low levels of coverage and structural changes in the labour market are heightening uncertainty among a growing number of workers (Feitsma and Whitehead, 2019). The expansion of platform work, in the sense of work mediated through a platform, poses challenges to social security systems. For some platform workers it is associated with high levels of precariousness, in general with irregular and low levels of income. At the same time, the digital nature of transactions and the potential for enhanced data exchange within the state administrative system could enable the development of novel solutions to enhance the effective social security coverage of platform workers.

Typically, welfare states are slow to change and path-dependent, suggesting that incremental change may be the only way forward. In addition to policy and legislative reforms, developments in digitalization and e-government infrastructure with automatic data exchange are key enablers to develop solutions to tackle knotty policy problems. One way to improve the effective social security of platform workers is the creation of portable social security rights using digital accounts which recognize platform workers' different streams of income. As such, portable accounts should improve the effective social security coverage of platform workers, even if major legislative reforms are not undertaken.

By adopting the entrepreneur account system in 2019, Estonia has moved the development of digital social security account solutions beyond the drawing board and into practice. The account is set up as a regular bank account, and a flat rate tax of 20 per cent, or 40 per cent for higher-income earners, is deducted

9. Since 2020, Estonia has adopted an approach whereby an unemployed person can work temporarily while looking for permanent employment. Up to eight work days per month are allowed. For more information, see Services and Benefits.

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automatically from the person's business income received and transferred to the Tax and Customs Board. This tax consists of a social security tax payment and an income tax payment. Although it was designed for use by all own-account workers, it is of interest as a possible solution that could be suitable for platform workers.

The Estonian case highlights the central question of whether digital and portable social security accounts are truly adapted to meet the social security needs of platform workers, or whether they simply facilitate the operations of existing administrative systems.

A first finding of this case study is that policy design matters. The entrepreneur account provides social security coverage under the principles of a standard employment relationship. In terms of the social security provision it offers, the account may be helpful for some workers, but it does not solve the structural issues of social security coverage for platform workers. Platform work is heterogeneous, but the entrepreneur account is a suitable solution only for platform workers with stable and higher levels of regular income. In particular, the income threshold for access to health insurance poses serious potential obstacles for those platform workers whose income typically remains lower than the average wage in Estonia. Of course, the principle of taking all income streams into account when determining access to health insurance should improve the effective coverage of some atypical workers using the entrepreneur account, as well as other workers in legal work forms. Nevertheless, access to social security is hindered by the requirement for the stable monthly payment of contributions. This inflexibility in contribution requirement is at odds with the flexible nature and fluctuating income patterns of platform work. Such inflexibility in the requirement for a continual income flow also constrains platform workers when they have a need for sick leave or, indeed, a vacation. Accordingly, Estonia should consider developing the design of the entrepreneur account further, allowing for voluntary additional payments, or to link access to health insurance to the payment of at least a minimum level of contributions over a longer period to reduce the risk of potential gaps in access resulting from fluctuating monthly income. A final point to consider is the question of the eligibility to claim certain benefits. Although the entrepreneur account provides access to health insurance, pensions and maternity benefits, it is not compatible, for example, with the receipt of unemployment benefits. Therefore, instead of requiring the account to be closed during the period of unemployment, as is currently the case, a person's unemployed status could be tied to a low- or non-existent income flow to the account. Given these existing design features, the entrepreneur account cannot address the precarity that confronts workers with low and fluctuating incomes, including platform workers.

Second, the technology underpinning the entrepreneur account plays a crucial role in the Estonian case. The entrepreneur account is a digital solution that came into being largely because of the existing digital infrastructure of the State, strong

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e-banking provision, the IT capabilities of the Tax and Customs Board, and the high levels of trust that citizens have in e-government. The automatic data exchange permits transactions between the Tax and Customs Board and the bank, allowing for the "zero-bureaucracy" experience of its users. The more that countries come to embed their social security solutions in e-government environments, the more these contextual factors will influence the nature of the solution.

As more countries move to address their social security challenges by means of digital solutions, the case of Estonia's entrepreneur account can act to spotlight the risks of pursuing digitalization without considering the underlying needs for structural change in the administrative system. In the Estonian case, digitalization has become a tool to facilitate the solutions that already exist, without creating the disruption needed to respond to emerging challenges.

Conclusion and future research

Governments must address increasing complexity in the forms of work found in national labour markets and, consequently, in the challenges these present for workers to contribute and have adequate access to social security. Increasingly, the tendency is to apply digital solutions to improve compliance in tax and contribution payments among various types of workers. The article has analysed the degree to which the Estonian entrepreneur account, as a digital solution, corresponds to the need to extend access to social security coverage for platform workers. The main contribution of the article has been to demonstrate the relevance of policy design in setting up novel digital solutions. The article shows that while an innovative solution for facilitating tax and contribution payments as well as receiving social security benefits may work well for some of its users, embedding that solution in the historic social security system hinders it in reaching its professed aims. As such, the solution remains merely a facilitator rather than becoming a disruptor of the existing system.

While this study offers a first glimpse of how the entrepreneur account can be used as a social security solution for platform workers, further research could benefit from having access to more precise data on platform workers and insights from the platform workers who use the account. Any similar account-based solutions developed should be analysed to develop further the role of digital solutions in social security systems.

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Appendix

Table A.1. *Overview of interviews*

Interview No.	Interviewee organization/position	Notes/Audio recordings/Transcripts
1	Ministry of Finance	Yes/Yes/Yes
2	Bank representative	Yes/Yes/Yes
3	Tax and Customs Board	Yes/Yes/Yes
4	Account user	Yes/Yes/Yes
5	Platform representative	Yes/Yes/Yes
6	Account user	Yes/Yes/Yes
7	Account user	Yes/Yes/Yes
8	Account user	Yes/Yes/Yes
9	Account user	Yes/Yes/No
10	Account user	Yes/Yes/Yes
11	Account user	Yes/Yes/No
12	Unemployment Insurance Fund	Yes/Yes/Yes
13	Platform representative	Yes/Yes/Yes

Source: Author's elaboration.

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Improving the protection of migrant workers with work histories in the European Union and Ibero-America: Enhancing the coordination of international social security instruments

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Abstract Migration affects almost every nation, emphasizing the need to guarantee social security rights for all migrants and their families. This article focuses on the rights of workers who migrate between the countries of the European Union (EU) and the Ibero-American community. In the EU, social security systems are increasingly coordinated through Regulation No. 883/2004 and its Implementing Regulation No. 987/2009. In the Ibero-American community, coordination is sought through the Ibero-American Social Security Convention. Despite convergence between these two international instruments, coordination is still lacking between them. This article presents a comparative analysis to articulate the necessary mechanisms to guarantee coordination, to respect the social security rights of migrant workers. We focus on the cooperation and coordination between regional as well as national systems, specifically looking at the need for and aims of a rapprochement between these two major international coordination instruments to provide greater EU-Ibero-American

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This research has been conducted with the support of the Programme for the Training of Research Staff of the University of Deusto, Bibao, Spain.

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cooperation. Finally, the importance of promoting greater international cooperation in social security policy and administration is highlighted, to engender the adequate protection of the rights as well as the free movement of migrant workers.

Keywords migrant worker, social security administration, ILO Convention, social security legislation, European Union, Latin America, international

Introduction

Globalization, cooperation and integration between States feed the constant and growing mobility of people between countries, particularly within regional common market and economic integration spaces. Migration dynamics have greatly impacted the labour force and raised challenges for migrant workers' enrolment and participation in different social security systems and the transnational portability of their contributions and benefits. Although migration is an economic and social imperative for many people and for the viability of many national economies, the reasons for making such a decision are varied. Regardless, each State must have systems that protect the human and labour rights, including the right to social security, of its citizens, nationals and foreigners (Chaves, 2020, p. 52).

Currently, across the Member countries of the Organisation for Economic Co-operation and Development (OECD), 13 per cent of populations and a higher proportion of workforces are foreign born – in other words, they are international migrants. These figures are higher for Western European countries, including Portugal and Spain, while the proportions of foreign-born workers are substantial and growing in most Latin American and Caribbean countries.

The development and opening of markets lead to a rapprochement of the borders of economic, legal and social relations. It is therefore essential that migrants can enter the labour market of the destination country and receive equal treatment, not least because enterprises increasingly have a transnational presence requiring a workforce around the world (D'Addioy and Cavalleri, 2014, pp. 346–349). Of course, workers shape their work histories through employment and this may also shape their retirement benefits after having worked in different countries. This infers i) that they have full rights to join and contribute to the social security system in each country, ii) that contributions

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and benefits are transferable and iii) that there are regional and international standards and mechanisms that recognize and accumulate contributions in those different countries. It is therefore imperative to strengthen national and international/regional legal systems concerning the right to social security (Vinci, Gassmann and Mohnen, 2022), to provide certainty and the protection of economic, social and cultural human rights (Esponda, 2018, pp. 65–72).

Social security is defined as a universal human right in the Conventions and Recommendations of the International Labour Organization (ILO) and in United Nations (UN) legal instruments. The ILO considers social security to be the protection that a society ensures to its individuals through a series of public measures, such as social insurance, social assistance or social assistance and universal systems (ILO, 2000, p. 29).[1]

Migrant workers face three main risks that may violate the continuity of their social rights (Hunt and Wallace, 2006, pp. 96–98): i) loss or absence of coverage in their country of origin; ii) lack of access to affiliation and participation in the social security systems of the countries of employment (Mesa-Lago, Cruz Saco and Gil, 2021) and iii) lack of portability of contributions and benefits accrued when migrating to another country or to their country of origin.

Given the lack of social and labour protection in which workers may find themselves when migrating, together with the dynamism of the migratory phenomenon in recent decades, the social rights of migrants and their families must be guaranteed through the articulation of legal mechanisms regulating the coordination of social security systems in different States. To this end, the international coordination instruments implemented in the European Union (EU) and Ibero-America[2] deserve attention regarding their ambition to contribute as part of the solution to this challenge (Camacho, 2013, pp. 200–202).

In the remainder of this article, we set out an overview and provide a comparative analysis of international social security instruments in the EU and Ibero-America. We then discuss the challenges of improving cooperation and coordination between regional and national systems, specifically looking at the need for greater EU–Ibero-American cooperation. Finally, we offer conclusions concerning the need for greater international cooperation in social security policy and administration and for protecting the rights of migrant workers.

1. The ILO Social Security (Minimum Standards) Convention, 1952 (No. 102) (ILO, 1952) defines nine branches of social security, namely: medical care; illness; unemployment; old-age, invalidity and survivors' pensions; occupational accidents and diseases; family benefits and maternity.
2. Ibero-America refers to the countries or territories region in the Americas where Spanish or Portuguese are predominant languages.

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International instruments: The EU and Ibero-America

To contextualize the comparative analysis, we first offer a brief review of the social security regulation of migrant workers at the international level.

At the international level, there has been a constant concern to establish mechanisms that allow migrant workers, and their families, to enjoy social security benefits on the same terms as national workers. The absence of adequate protection has negative socioeconomic repercussions, not only for migrants but for the host community, including an adverse impact on income security, poverty, inequality and social integration (ILO, 2021).

In this context, the keystones for ensuring protection are the following international instruments: i) International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (UN, 1990); ii) ILO Migration for Employment Convention (Revised), 1949 (No. 97) (ILO, 1949a), and ILO Migration for Employment Recommendation (Revised), 1949 (No. 86) (ILO, 1949b); and iii) Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143) (ILO, 1975a) and Migrant Workers Recommendation, 1975 (No. 151) (ILO, 1975b).

As pointed out by Taran and Geronimi (2003, p. 16), these instruments, together, provide a definition and are an ethical-legal basis for national policies in relation to migrant workers and their families. Also, they are tools to encourage States to adopt and improve national legislation according to these regulations.

In addition to these instruments, which provide the general framework, the EU and Ibero-American instruments which are our focus, derive from the principles and parameters established in other specific ILO Conventions related to social security.

The Equal Treatment (Accidents at Work) Convention, 1925 (No. 19) (ILO, 1925), and the Equal Treatment (Social Security) Convention, 1962 (No. 118) (ILO, 1962), establish provisions enshrining the principle of reciprocity in relation to social security benefits for migrant workers and ensuring equal treatment with nationals.

Likewise, the Social Security (Minimum Standards) Convention, 1952 (No. 102) (ILO, 1952), prescribes special anti-discrimination clauses. Furthermore, the Maintenance of Social Security Rights Convention, 1982 (No. 157) (ILO, 1982), and the Maintenance of Social Security Rights Recommendation, 1983 (No. 167) (ILO, 1983), constitute an international system for the maintenance of rights acquired and rights in the process of being acquired by workers to ensure the preservation of benefits acquired abroad, through bilateral or multilateral mechanisms.

The Social Protection Floors Recommendation, 2012 (No. 202) (ILO, 2012), provides guidelines for establishing and maintaining social security floors and for

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implementing social protection floors as part of strategies to extend social security to higher levels for as many people as possible, as guided by ILO social security standards.

Additionally, at its International Labour Conference (92nd Session) (ILC, 2004, p. 88), the ILO noted that it is particularly important for migrant workers to: i) have the same access to coverage and the same right to benefits as nationals; ii) retain rights acquired on leaving the country (including the export of benefits); iii) be able to accumulate rights acquired in different countries. In this way, the various international standards of the ILO seek to respond to migrants in relation to these three aspects.

Indeed, it is important to review the existing mechanisms for coordinating social security systems, since they are the means of achieving continuity in social security benefits. With this aim, the process of genesis of two specific international instruments governing the EU and Ibero-America in the coordination of social security standards will be reviewed below. Both seek to safeguard the rights acquired or rights in the process of being acquired by migrant workers to achieve the continuity of their social benefits through the principle of coordination.

European Union (EU)

In the EU, the coordination of social security legislation is enforced through Regulation No. 883/2004 of the European Parliament[3] and of the Council of the EU on the Coordination of Social Security Systems and its Implementing Regulation No. 987/2009.[4] Through the principle of coordination, this Regulation aims to safeguard the acquired and in-process social security rights of migrant workers, ensuring freedom of movement and equal treatment. However, the incompatibility between some national systems has been and continues to be a challenge, as it restricts coordination.

The existing EU rules are long-standing and have been repeatedly adapted, developed, and improved. The first historical antecedents date back to Regulation 3/58 of 25 September 1958 on social security for migrants and its implementing instrument, Regulation 4/58 of 3 December 1959. Both corresponded to the European Coal and Steel Community, whose purpose was to guarantee the social protection of coal and steel workers who moved to other countries. These Regulations were in force from 1 January 1959 until 1 October 1972, when two other Regulations replaced them. The first was Council Regulation 1408/71 of 14 June 1971 on applying social security schemes to employed or self-employed persons and their families moving within the Community. The second was

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Council Regulation 574/72 of 21 March 1972, laying down detailed rules for applying Regulation 1408/71.

Several factors meant that these regulations were, in practice, too extensive and difficult to understand when trying to adjust to new realities owing to their successive and frequent reform. Therefore, updating to simplify the system became unavoidable to achieve effective freedom of movement in the EU. At the Edinburgh Council in 1992, the revision and simplification of these rules was enhanced through the 1997 Communication entitled "*Action plan for the free movement of workers*" (see Weiler, 1998); this European Commission Communication emphasized the urgent need to modernize the rules for coordinating social security systems.[5]

In 1998, the EU Council presented a proposal for a Regulation to overcome those needs. That proposal was the basis for the current Regulations 883/2004 and 987/2009 of the European Parliament and the Council. These Regulations replace the old Regulations 1408/71 and 574/72, as of 1 May 2010. Without prejudice to Article 90 of Regulation 883/2004, Article 90 repeals Regulation 1408/71 from the date of application, providing that the latter will remain in force and preserve its legal effects for certain acts.

Since the coordination and integration guaranteed by these rules are a model of good legal practices, it is essential to study the EU's international instruments. Their detail and scope of application deliver continuity to the social security benefits of different Welfare State models within the EU. They also allow any person who wishes to exercise their right to free movement and residence not to be discriminated against.

Ibero-America

While the proportion of international migrants varies considerably between different parts of the world, migration in Latin America and the Caribbean (LAC) has become a concern for different governments. According to data from the United Nations Department of Economic and Social Affairs (UNDESA, 2020) migration patterns in the LAC region have witnessed unprecedented changes between 2010 and 2020; the total number of migrants in LAC grew from 34.6 million in 2010 to 42.0 million in 2020. The most radical change observed concerns the destination of migrants – across the decade, migration within the LAC region experienced a dramatic increase of 83.2 per cent, from 5.3 million to 11.3 million.

Indeed, these dynamics of migration have had a high impact on the workforce, as well as on the different social security systems. Migrants have become a major

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challenge for governments and host communities while presenting an enormous opportunity for the development of the region, especially for labour markets. For this reason, the Ibero-American community has promoted different efforts to provide continuity to social security benefits for migrants from the American continent. Highlighting the regional instrument of the Ibero-American Social Security Agreement (*Convenio Multilateral Iberoamericano de Seguridad Social* – CMISS) that was created by the Ibero-American Social Security Organization (*Organización Iberoamericana de Seguridad Social* – OISS). This mechanism is the closest and most similar international instrument to EU Regulations and is currently effectively applied in 15 states.

Its genesis goes back to various international pacts of a bilateral and multilateral nature. The Ibero-American Social Security Agreement (1978), signed in Quito, Ecuador, is noteworthy as a multilateral agreement that required adherents to sign a supplementary Implementation Agreement to produce legal effects between the two countries – which in practice slowed down its implementation. Likewise, there are historical precedents in the signing of bilateral agreements between the countries of the Ibero-American community, as well as multilateral agreements, such as the Multilateral Agreement on Social Security of MERCOSUR (in effect since 2008); Decision 456 of the Andean Community approving the Andean Social Security Instrument; and European Regulations 1408/71 and 574/72 (now Regulations 883/2004 and 987/2009).

Representatives at the Fifth Ibero-American Conference of Ministers and Heads of Social Security, held in September 2005 in Segovia, Spain, agreed to begin the process of drawing up a Multilateral Agreement of the Ibero-American Community. This would allow a single instrument to coordinate national pension legislation, guaranteeing the rights of migrant workers and their families with full legal certainty. Following this Conference, the decision to draft a Multilateral Agreement on Social Security was raised by the OISS at the XV Ibero-American Summit of Heads of State and Government held the same year in Salamanca, Spain. The delegates decided to "initiate the process of drafting an Ibero-American Social Security Convention to guarantee the social security rights of migrant workers and their families" (SEGIB, 2005, p. 5).

To build this instrument, the content of the agreement was widely debated and negotiated for months through numerous exchanges of documents with the technical services of State parties. The elaboration process was complex since, unlike EU Member States, these States were not politically or economically linked by any mandate. The task of unifying and integrating countries was, thus, more challenging as it came on account of each State's voluntary acts, e.g., the Declarations of the Summits and Conferences to reach this objective.

The OISS created the "Preliminary Draft of the Ibero-American Agreement on Social Security. Preliminary aspects", which was sent to the Ibero-American

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countries between March and July 2006. Each State revised the document and shared its comments and suggestions, which were reflected in four drafts. Finally, the Draft of the Ibero-American Multilateral Security Agreement was approved at the Sixth Ministerial Conference, held in Iquique, Chile, in July 2007. The approved project was submitted to the XVII Ibero-American Summit in Santiago de Chile in November 2007, where it was approved and signed by 12 countries (Argentina, the Plurinational State of Bolivia, Brazil, Chile, Costa Rica, El Salvador, Spain, Paraguay, Peru, Portugal, Uruguay and Venezuela). On 26 November 2008, Colombia and Ecuador joined the agreement, and the Dominican Republic became a signatory on 7 October 2011, arriving at the current 15 State signatories of the CMISS.

Thus, in a relatively short period, by 10 November 2007, the first phase for the implementation of the CMISS was completed, and the negotiation phase of its Implementation Agreement began. To this end, five drafts were prepared and submitted to the State Parties for observations and suggestions, and the text of the CMISS Implementation Agreement was agreed upon at the Seventh Ibero-American Conference of Ministers and Heads of Social Security in September 2009.

Consequently, the process of the creation of the CMISS was expeditious, despite involving a great deal of legal work and coordination between States and the OISS. Tangible results were achieved in less than two years following the decision to undertake the project, which is very rapid compared with the process for the development of other instruments for the coordination of social security legislation.

Comparative analysis of international instruments

Having set out the main characteristics of the international instruments for the coordination of security systems used in the EU and Ibero-America, we will apply a comparative methodology to analyse both instruments. The aim is to achieve an all-encompassing view of the legal framework that facilitates the continuity of acquired or in-process social rights of migrant workers and their families, regardless of the country in which they have worked. To this end, the following subsections discuss the identified criteria.

Coordination technique

The primary objective pursued by the international instruments under consideration is to establish rules and principles for coordinating social security legislation. Although geographical areas are different, these always converge in

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their purpose. In this sense, the rules on coordination are part of the framework of the free movement of persons and should therefore aim to improve people's standard of living and conditions of employment (Del Sol and Rocca, 2017, pp. 143–144).

The coordination technique is based on maintaining each State's competencies without repealing, modifying or replacing the national laws prevailing in each country. Thus, each State preserves its legislative autonomy. As explained by Martínez, the coordination of social security systems "favours the respect and enforceability of social benefits, in addition to distributing the burdens among the different national regimes" (Martínez, 2017, p. 182). In this regard, doctrinal coordination means to establish mechanisms through which social security systems in different countries can work together to jointly achieve agreed goals – in particular, to ensure that migrant workers and their family members have as comprehensive and ongoing protection as possible – while, at the same time, maintaining and respecting the definitions and rules of each system separately (Hirose, Nikac and Tamagno, 2011, p. 24).

Therefore, coordination allows two or more pieces of legislation to communicate with each other, creating an indispensable legal bridge between the different social security schemes (Sánchez-Rodas, 2011, p. 205). The purpose of coordination is to structure and articulate procedures that ensure equal treatment for migrant workers and their families with country nationals, safeguarding their rights or expectations of social rights and granting them the possibility of invoking these within the framework of another national system.

Arellano emphasizes that "each country retains its autonomy in the way it is going to protect but, to protect the migrant, connection points will be created" (Arellano, 2015a, p. 50). Consequently, it is through the coordination of social security systems that we can set the criteria to connect national legislation so that the social rights of migrant workers are not violated due to their place of residence (Domínguez, 2020, p. 5).

Key principles underpin the rules for the coordination of social security systems by the international instruments under consideration in the present study. While the number of principles can vary according to the literature, the doctrine agrees on the following inspiring principles (Arellano, 2015b, pp. 77–80):

Single applicable legislation. Migrant workers and their families shall be subject to single legislation regardless of the countries in which they have worked. The general rule is to apply the social security legislation of the State party in whose territory the activity, dependent or non-dependent, is taking place. The principle *lex locis laboris* is pursued. The inclusion of this principle avoids, on the one hand, disputes that

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would involve the simultaneous concurrence of several applicable national laws; and, on the other hand, the lack of applicable legislation, thus providing legal instruments with legal certainty.

Equal treatment. It is an inherent pillar of coordination since its application avoids discrimination based on nationality, ensuring that migrant workers are subject to the legislation of the host State under the same conditions as native workers. The ILO Equality of Treatment (Social Security) Convention, 1962 (No. 118) (ILO, 1962), on equal treatment of nationals and foreigners in matters of social security, establishes the rule of equal treatment in access to benefits regardless of residence.[6]

Totalization of periods. Each State must consider those periods completed not only in its territory but also in other countries, considering the periods completed by the migrant in each State, including or adding the periods of contribution, residence or affiliation to obtain the benefit. In this way, access, conservation and, where appropriate, the recovery of the rights of persons or their successors in title who have been subject to the legislation of different States is favoured.

Export of benefits. This ensures that benefits payable under the legislation of one or more States are not reduced, suspended, modified, withheld, withdrawn or confiscated because the recipient takes up residence in a State other than that in which the paying institution is situated. Therefore, workers and their families are protected against the damages they may suffer from moving to another country, fully guaranteeing the acquired rights and those to be acquired. Consequently, this principle supposes a guarantee of intangibility and full perception of the benefits caused (García, 2016, pp. 70–71).

Maturity

The state of maturity of both international instruments is different. The CMISS, in application since 2011, is a recent legal text whose origin is based on regulating the social benefits that will be coordinated. A *contrario sensu*, the EU Regulations have a long significance that aims to improve coordination rules.

6. Article 4: “As far as benefits are concerned, equal treatment shall be guaranteed without condition of residence”. (ILO, 1962).

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The CMISS is the first international instrument at the Ibero-American level that protects the rights of migrant workers and their families concerning cash benefits, through the coordination of national legislation on pensions. The drafting of this instrument is an achievement for the Ibero-American community. On the one hand, it contributes to avoiding the loss of rights acquired or in the process of being acquired. On the other hand, it instils a sense of belonging and constitutes an unprecedented approach to citizenship in the Ibero-American region. Indeed, the CMISS is original as it is a new text with no predecessors. As Jiménez asserts, it is a pioneering experience since, for the first time, a social security agreement is reached in a space in which no prior political association facilitates the legal substrate that could support it (Jiménez, 2010, p. 375).

By contrast, there is a solid and vast experience in the coordination of social security systems in the EU, where there are several historical legal antecedents, unlike in the Ibero-American community. Therefore, current regulations aim to improve the rules of social security coordination, seeking clarity and simplifying regulations.

In García Viña's view (García, 2006), the goal of Regulation 883/2004 is to rationalize the concepts, rules and procedures for coordinating Member States' social security systems. To this end, it contemplates various changes to its predecessor (Regulation 1408/71). It highlights the improvement of beneficiaries' rights by extending material and personal scope, and the provisions apply to all Member States' nationals and not only to those who are part of the labour force. Equally, it reviews the extension to early retirement and changes in unemployment. The general principles of equal treatment and the export of benefits are strengthened too. The principle of good administration is also introduced to implement more efficient procedures, strengthen cooperation and to streamline the exchange of information between the different administrations (García, 2006, pp. 65–66).

Sources of law

The difference in the sources of law of both international instruments regarding the diversity of the sources that originated these must be emphasized.

European regulations are unilateral acts that correspond to rules of secondary law from the EU institutions, which enjoy normative primacy and direct effectiveness. In this respect, regulations constitute – by their binding nature and effectiveness – an instrument for the unification of rules imposing a single right on States. Consequently, as Martínez argues, because the regulation prevails over the legal systems of each Member State, its compliance is immediate by all

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national authorities, without the need for prior incorporation into national legal systems (Martínez, 2017, pp. 197–198).

In contrast, the CMISS is a legal norm of an international nature with a multilateral character. In this sense, doctrine defines an international treaty as a “written agreement between two or more subjects of international law intended to produce legal effects between the parties according to the norms of international law, whatever the denomination it receives” (Remiro, 2010, p. 183). The Vienna Convention prescribes in Article 11 that the consent of a State to be bound by a treaty may be expressed by signature, exchange of instruments constituting a treaty, ratification, acceptance, approval or accession, or in any other manner that may have been agreed. In turn, Article 2(b) defines ratification, acceptance, approval and accession, as the case may be, as the international act by which a State establishes its consent to be internationally bound by a treaty (UN, 1969).

Therefore, an international agreement will constitute a source of law of a State to the extent that a procedure for signing and its subsequent ratification is complied with. However, each State must officially publish and integrate it into its internal legal system for its correct application and execution. Consequently, this legal norm of an international nature will only be binding and compulsory for the States that ratify it, unlike what happens with the European Union Regulations.

This significant difference in the entry into force of both instruments is due to the lack of a legal entity binding the Ibero-American community, as is the case in the EU. Therefore, the enforcement of the CMISS will be subject to the internal procedures of each State party, which makes its effective application uncertain.

Geographical scope of application

The geographical scope of these two international agreements and the protection they offer is different, as is the number of States they cover. The CMISS entered into force on 1 May 2011, the first day of the third month following the date of the seventh deposit of the Instrument of Ratification made by the Plurinational State of Bolivia (hereafter, Bolivia). Currently, the CMISS has 15 signatories among the Ibero-American countries, which according to signature order, are: Argentina (10/11/2007); Bolivia (10/11/2007); Brazil (10/11/2007); Chile (10/11/2007); Costa Rica (10/11/2007); El Salvador (10/11/2007); Spain (10/11/2007); Paraguay (10/11/2007); Peru (10/11/2007); Portugal (10/11/2007); Uruguay (10/11/2007); Venezuela (10/11/2007); Ecuador (07/04/2008); Colombia (26/11/2008); and the Dominican Republic (07/10/2011).[7]

7. For information concerning the signatories, see OISS *Estado de situación* (in Spanish).

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However, this international instrument is only effectively applicable in 12 of these countries. Costa Rica is still pending parliamentary ratification. The situation in Colombia and Venezuela is similar because, although both have ratified the Convention – Colombia on 15 July 2021, and Venezuela on 16 February 2009 – they have not yet deposited the Instrument of Ratification with the Ibero-American General Secretariat (SEGIB) of the OISS. In addition to the pending procedures, signing the Agreement on the Application of the CMISS would be lacking for its correct application and effectiveness in these three nations.

For their part, Regulations 883/04 and 987/09 have been applied since 1 May 2010 to the EU Member States, which are: Austria, Belgium, Bulgaria, Czechia, Croatia, Cyprus (01/07/2013), Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden (and United Kingdom[8]). Furthermore, these Regulations are applicable in relation to the European Economic Area (EEA) member countries, adding Iceland, Liechtenstein and Norway (01/06/2012) to the list. They also apply to relations with Switzerland (01/04/2012).

The United Kingdom's particular position in this matter should be noted. As of 1 January 2021, European Regulations continue to apply in Member States' relations with the United Kingdom under the Agreement on the Withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community, of 31 January 2020, to persons who, on 31 December 2020, were in an EU–United Kingdom cross-border situation; in particular: (a) EU nationals who on that date were subject to United Kingdom law, or were not subject to United Kingdom law but were residing or working in the United Kingdom, as well as the members of their families; (b) United Kingdom nationals who on that date were subject to the legislation of one or more Member States or those who resided or worked in the territory of one of them, as well as the members of their families; (c) third-country nationals, refugees, and stateless persons who were in one of the situations before 31 December 2020. The Regulations also apply when the interested person had completed insurance periods in either a Member State or the United Kingdom before 31 December 2020.

For situations arising from 1 January 2021 between one or more EU Member States and the United Kingdom, the Protocol on Social Security Coordination to the Agreement on Trade and Cooperation between the European Union and the European Atomic Energy Community shall provisionally apply on the one side and the United Kingdom of Great Britain and Northern Ireland, on the other side, pending ratification by the European Parliament.

8. The United Kingdom ceased to be an EU Member State on 1 February 2020.

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Certainly, both the international instruments under discussion are fundamental pillars that allow the free movement of workers within their geographical territories, which consider the needs of access and equal treatment.

While the CMISS regulates countries belonging to the Ibero-American community, European Regulations have a spatial application that corresponds to the EU Member States, the EEA countries, Switzerland, and the particular situation of the United Kingdom. When comparing the regulated countries, it is to be remarked that both pacts cover the geographical territories of Spain and Portugal, as they are countries that are part of the EU and the Ibero-American Community. Indeed, the membership of these two countries leads to a broad scope of application of the instruments for the protection of the social rights of migrant workers and members of their families. Their application in these two countries achieves continuity of social security benefits on both continents, thus, breaking down traditional national boundaries and thereby contributing to legal integration and cooperation between States.

Formal aspects

Concerning the structure and drafting of both international instruments, specific characteristics can be distinguished. The text of the CMISS is written in two languages, Spanish and Portuguese, following the official languages of the countries that constitute the Ibero-American space. Its normative structure is arranged in 35 articles, which are grouped into six titles and five annexes. Likewise, this Convention for its application consists of an Implementation Agreement, which contains 38 provisions ordered in five titles and five annexes.

Regulation No. 883/2004 consists of 91 provisions distributed in six titles and eleven annexes. Likewise, its Implementing Regulation No. 987/2009 has 97 provisions segmented into five titles and five annexes. As regards language, both Regulations are available in multiple languages.

Regarding the length and normative distribution, the wording structure is similar both in the organization of their provisions (articles, titles and annexes) and in the topics addressed. Indeed, an analysis of the precepts of both texts shows that many of their articles are analogous in form and substance. In this regard, in Sánchez-Rodas' opinion, the quality of the CMISS far exceeds that of Regulation 883/2004. Despite the efforts made by the EU to simplify its rules, this Regulation remains cumbersome; contrary to what happens with the CMISS, which is characterized by its clarity and conciseness, which, according to the author, will facilitate its application by legal operators (Sánchez-Rodas, 2011, p. 206).

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In this aspect, it is understood, as is logical, that those who drafted the CMISS had the EU Regulations as a reference; since, as analysed in the historical background, the technique of the coordination of social security legislation in Community Law consists of an extensive and fruitful trajectory that dates to Regulation 3 of 1958, and, therefore, its application has a considerable track record.

Protected subjects

Both instruments delimit the scope of application of their rules in a similar way in their articles. We presume that those who drafted the CMISS used the EU Regulations as a reference since both include the term “person” instead of “worker”. This constitutes an innovative advance of the current Regulation in contrast to its predecessors; it is the result of a long jurisprudential and doctrinal debate through which it was concluded that for the Regulations, the fundamental element is that a person is or has been subject to a coordinated social security scheme. Sánchez-Rodas argues that what justifies the application of the Regulations is the submission to coordinated social security legislation of a Member State and that according to the jurisprudence of the Court of Justice of the EU, “a person has the status of a person protected by the Regulations for being insured, even if only against one contingency, under a coordinated social security scheme” (Sánchez-Rodas, 2011, p. 213).

The Regulation adds the requirement that beneficiaries must be nationals, limiting the personal scope to citizens of an EU Member State, of an EEA State Party, Switzerland, to stateless persons or refugees residing in one of the EU Member States, in a State Party to the EEA or Switzerland, as well as their family members and survivors. Under Regulation 1231/2010, Regulations 883/2004 and 987/2009 also apply to third-country nationals and their family members, but they must prove the legality of their residence in a Member State of the European Union.

The issue of nationality is not mentioned in the CMISS. Therefore, one can conclude that its application extends not only to citizens of the signatory States but also foreigners who are third State nationals, refugees, and stateless persons who are or have been subject to the legislation of one or more of the State parties. It should also be considered as a prerequisite that such migrant workers are in a legal situation, an issue that is fundamental to be protected by the contributory social security schemes of the States in which the CMISS applies. Consequently, and as López and Martin report, for the Regulations and the CMISS, the nationality requirement is not considered for its effective application,

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but it is necessary that the protected subjects hold the status of migrants in a regular or legal situation (López and Martín, 2016, p. 27).

Covered benefits

Both instruments circumscribe their material scope in their respective Article 3, through a list of covered benefits. However, the material field of the Regulations is much broader than the CMISS.

The CMISS provides for cash benefits for those in conditions of disability; old age; survivorship; and occupational accidents and diseases. For their part, the EU Regulations provide for: sickness benefits; assimilated maternity and paternity; disability; old age; survivorship; accidents at work and occupational disease; unemployment; early retirement; death grants; and family benefits.

Consequently, when contrasting both instruments, the Regulation evidences a broader and more complete basket of benefits than the limited coverage of the CMISS. The latter only contemplates two social contingencies, versus the nine branches of social security protected by European Regulations. This better meets the needs of subjects of law and is consistent with the ILO Social Security Minimum Standards (ILO, 1952). Similarly, the protection provided by the Regulations is more comprehensive for migrant workers and their families, since they cover a greater number of people by territorial area.

In addition, the benefits covered by the CMISS only apply to contributory, general and special social security schemes. By contrast, the Regulation coordinates both contributory and non-contributory benefits. Likewise, the contingencies coordinated by the CMISS only constitute replacement income, limiting their scope only to cash benefits. This question differs from the material scope of the Regulations, which covers financial benefits but also benefits in kind.

Discussion and conclusions

The approach on which the EU Regulations and the CMISS are based has managed to overcome bilateralism as a legal mechanism for solving the problems of continuity of social security rights acquired or in the process of being acquired by migrant workers and their families. In fact, bilateralism has become obsolete given the regional integration of States in different spheres, the phenomenon of globalization and migratory dynamics that move away from the classical concepts of stability and fixity in the new country of employment.

In this sense, the international instruments analysed have managed to give the coordination of social security benefits a multilateral context based on political, social, legal and economic integration, in addition to considering belonging to a

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culture or identity. However, this new approach has shown signs of inadequacy since it fails to regulate the variety of situations in which workers develop their professional careers on the American and European continents.

This situation means that if workers migrate to other continents or countries that are not covered by the Regulations or by the CMISS, they will not have protection unless a bilateral agreement between countries is applied. In any case, this is a weak, limited and fickle solution (Maldonado, 2019, pp. 128–130). Therefore, it is important to begin to reflect on appropriate legal mechanisms capable of overcoming the territorial and personal limitations of these international coordination instruments, enhancing their internationalization, a process which refers to the external dimension of coordination rules (López and Martin, 2017, pp. 187–188).

There is currently a strong trend towards the implementation of regional coordination mechanisms that allow greater social security integration. In Latin America, the coordination mechanisms present in MERCOSUR, CARICOM and the Andean Community stand out. In Africa, the CIPRES Multilateral Agreement on Social Security, which, although it has not yet entered into force due to a lack of ratifications, is a step forward for the region. The South African Development Community (SADC) is also considering the adoption of a coordination instrument (Arellano, 2025a, pp. 83–86).

The Gulf Cooperation Council (GCC) has adopted a unified Law on Insurance to extend the protection of Gulf Cooperation Council citizens working outside their countries and in any of the member States of the Council. However, it does not have the characteristics of a coordination mechanism that allows the continuity of the coverage of workers in this region (Hirose, Nikac and Tamagno, 2011, p. 55). Finally, in Asia and Oceania there are no regional agreements, but the unilateral initiatives of Philippines are remarkable;[9] likewise, in the Eurasian Economic Union (EAEU), work is afoot concerning the coordination of social security.

The OISS exemplifies the problem to be addressed: a Bolivian national has a career providing services in France for 6 years and then in Bolivia and Spain for 7 years each. The Bolivian national wishes to retire in Spain, where the local legislation requires 15 years of employment as a minimum period to be entitled to a retirement pension. According to the instruments analysed, the contribution periods carried out in France and Spain may be totalled (13 years) under the EU Regulations, while the working periods in the Bolivia and Spain would add up to 14 years through the CMISS. However, the Spanish Administration does not

9. This is relevant because there are no regional coordination mechanisms on the Asian continent, and the unilateral mechanisms, although limited, are a first step in the creation of more complex regional instruments for the coordination of social security legislation.

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allow the multiple calculations of insurance periods (France, Spain, Bolivia) since it understands that these are two separate, independent, and incommunicado instruments that do not allow interrelation and interconnection. Therefore, the worker, originally from Bolivia, will not be able to prove their right to access a retirement pension in Spain. The same result would occur if the interested party was French or Spanish (OISS, 2013; see also Hirose, Nikac and Tamagno, 2011, p. 55).

In this sense, the OISS proposes an exercise to open both instruments to make them more permeable, initiating a process of fusion and communication that allows greater protection for migrant workers on both sides of the Atlantic. To this end, it supports a number of proposals. The first consists of a technical-political meeting between the European Commission and the OISS to deepen the external dimension of the coordination rules. The second is based on extending the field of application of the CMISS to EU Member States that request it; it is proposed to open the Convention, unlike the EU Regulation, given that the first has greater flexibility as it is not based on the free movement of workers and does not depend on, or is subordinated to, political economic or regional structures. A third proposal that objectively is the best to solve the problem raised in this research, is the elaboration of an ad hoc "Social Security Convention" that binds the EU and the OISS. This is an alternative that is difficult to accept and execute for political rather than technical reasons since, as has been studied, the Regulations and the CMISS are homologate and quasi-interchangeable instruments, which would be the perfect substrate for the new Convention (Hirose, Nikac and Tamagno, 2011, pp. 40–47).

After analysing the most significant criteria of the two international coordination instruments, we conclude that both are more similar than dissimilar, albeit that the Regulations cover a greater number of social security branches and a broader field of application. Each, in its scope, constitutes a fundamental element for protecting the social rights of migrant workers and their families. It is also true that both cannot cover all cases or guarantee full protection of social contingencies to migrant workers since their application is geographically limited to the areas of the EU or Ibero-America. This fact reduces their efficiency because each instrument is applied separately, and they only converge in the countries of Spain and Portugal (Guardiancich and Natali, 2012, pp. 302–304).

In this regard, the importance of bilateral and multilateral agreements (Holzmann, 2016a, pp. 23–28) in coordinating social security legislation is unquestionable. However, these have not managed to reach their full potential (OEA and CISS, 2015, p. 19). It is, therefore, necessary to warn of the danger of considering these two instruments as watertight vessels without any interrelation (Holzmann, 2016b, pp. 30–32). Europe and Ibero-America share the concern for

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the social protection of migrant workers and their families, agreeing on their points of view, approaches, positions and general principles. It is, therefore, necessary to examine objectively the mutual needs and common interests that could lead to a rapprochement between the two major international coordination instruments that have been analysed, aiming to bring social security systems closer and provide greater EU-Ibero-American cooperation. The objective is for cooperation that creates ties and eliminates geographical borders, to move towards flexible coordination of social security that covers the rights of migrant workers and their families effectively, regardless of the country of residence.

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The limits of parametric reforms in sustaining the Algerian retirement system in a context of population ageing

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Abstract Accelerated population ageing in Algeria threatens the financial sustainability of its pay-as-you-go retirement system. Reform is a necessity, with options ranging from simple parametric reforms to important systemic changes. Prior to undertaking systemic reforms, it is worthwhile to investigate whether parametric reforms can place the system on a financially sustainable footing. In this article, we used a multi-scenario analysis that crosses the possible reform actions with possible socioeconomic scenarios. The results show that when using the most favourable scenarios, the financial balance of the Algerian system will remain negative in the short and long term. Implementing major parametric reforms can only help reduce the deficit and make it stable over time. Thereafter, systemic reforms will have to be implemented.

Keywords pension scheme, retirement, pay as you go system, actuarial, method of financing, demographic aspect, Algeria

Introduction

One main objective of pension systems is to alleviate poverty among the elderly (Bovenberg and van Ewijk, 2012) by allowing for income smoothing over the life

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course (Grech, 2018). Within any financing mechanism, it is essential to maintain financial sustainability to keep poverty alleviation objectives on target for as long as possible (Holzmann et al., 2008). In pay-as-you-go (PAYG) pension systems, contributions made by current affiliated workers finance the retirement of current retirees (Börsch-Supan, 2016). Thus, the financial balance of the retirement system relies on the ratio of contributors to retirees (Fall, 2014). This explains why population ageing poses a real threat to the financial sustainability of PAYG systems – these systems are much easier to sustain financially with young and growing populations than in a context of stable or declining populations (World Bank, 2005).

The demographic transition referred to as population ageing, which is systematically driven by a spectacular decline in fertility and improvement in life expectancy (Bongaarts, 2009), results in the elderly population representing an increasing share of the total population compared to the working-age population (Mirkin and Weinberger, 2000; Lee, 2003). In Europe and North America, the demographic transition began in the late nineteenth century and is now nearly complete. It began much later and is still underway in Asia, Latin America, and Africa. Despite the time lag, the pace of the demographic transition in developing economies appears to be more rapid than that experienced in developed economies (He et al., 2016). The stage reached by each country in the demographic transition cycle has a significant impact on its pension system architecture and reform needs.

The 1990s witnessed an intensive wave of pension reforms worldwide, often motivated and assisted by the World Bank (World Bank, 1994). Reform efforts varied. Some comprised of moves to enlarge the role of the funded component at the expense of the PAYG pillar (Bijlsma et al., 2018), either moving from a single pillar to a multi-pillar system (e.g., the case of the Baltic countries; see Schiff et al., 2001) or shifting from a PAYG to a fully funded system (e.g., the case of Mexico; see Sales-Sarrapy, 1998). In other cases, reforms consisted of adjustments to the parameters of the existing PAYG system, usually prioritizing changes to the retirement age, replacement rate and contribution rate.

Aside from the demographic transition, the degree of maturity of a national retirement system is also important. In newly implemented systems, there are systematically many more contributors than retirees (Kit, 2015), because it takes years or decades for the first contributors to retire. At such early maturity stages, financial imbalances are far from being observed, but this does not imply long-term sustainability. As the system matures, the number of retires increases constantly relative to the number of contributors, and population ageing-related issues begin to emerge.

The greatest challenge when designing a pension reform is to seek to make the duration of its positive effects as long-lasting as possible before further reform is

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required. Owing to inadequate reform design, weak implication analysis, or unexpected change in the operational environment, a succession of parametric reforms within a short time frame can occur (Carone et al., 2016) or may even lead to reform reversals (Grech, 2018), as was the case in Eastern Europe (Polakowski and Hagemejer, 2018; Szikra, 2018; Wilson Sokhey, 2017) and Latin America (Bertranou et al., 2018). Indeed, of a total of 30 countries that moved to fully/partially funded systems during the period 1981 to the late 2000s (Holzmann, 2013), 18 of these introduced subsequent reform reversals (Ortiz et al., 2018).

Besides reforms – and especially systemic reforms – having high transition costs, reforms reversals are also costly (Baksa et al., 2020). Thus, before deciding upon the nature of a reform to adopt, the sustainability of the current pension system must be assessed regarding uncertainty in the operational environment. In some cases, maintaining financial sustainability requires a small number of parametric adjustments, while in other cases, more comprehensive reform is necessary.

Despite the importance of the issue, few academic papers have been dedicated to a rigorous assessment of the financial sustainability of the Algerian retirement system in a context of population ageing (e.g., Mendil, 2020; Salhi, 2021). Flici and Planchet (2020) projected the financial balance of the Algerian retirement system up to 2070 and found that the deficit will exceed 60 per cent of the value of retirement expenditure in 2040, rising to 80 per cent in 2050. Consequently, these projections suggest it will be impossible to retain the current system design, and fundamental reforms are required. However, these results were based on a single scenario approach, with a number of assumptions: life expectancy will maintain its historical path of improvement; the global fertility rate will fall slightly to 2.5 children per woman by 2070; the recent trend in the evolution of salaries will continue; and levels of economic activity, employment, and social security enrolment will remain constant.

The disadvantage of a single scenario approach is that the findings are only reliable if all the environment variables evolve in accordance with the defined scenarios. Given that this concerns long-run projections, any minor change in any one of the variables may distort all the calculations and results. In the literature, most pension sustainability assessment methodologies are single scenarios. Only a few studies propose a comparison of a limited number of scenarios for reform actions (e.g., Wang et al., 2019). While single scenario approaches can support decision making for pension reforms, they may omit a wide range of possible evolutions in the operational environment that will lead to poor decision making if the assumptions prove inaccurate.

In this article, we aim at evaluating the financial sustainability of the Algerian retirement system for salaried workers using a multi-scenario

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framework. First, an overview of the Algerian retirement system is presented, and its sustainability discussed. We then present the methodology and data. A main objective consists of crossing different combinations of reform actions with scenarios concerning the future evolution of the operational environment. For each possible scenario, the financial balance of the retirement system will be projected until 2070. Next, the possible combinations of reform actions that may lead to a favourable financial balance are defined, as are the favourable operational environment conditions. Following a discussion of our findings, concluding comments are presented.

Overview of the Algerian retirement system and its sustainability

In Algeria, the public retirement system uses a PAYG financing mechanism. The system is composed of three schemes: one for military personnel, one for senior public officials, and one for insured workers. The scheme for insured workers comprises two sub-schemes: one for salaried workers and one for self-employed workers. The first sub-scheme, covering almost 90 per cent of workers, is the subject of this article. In this scheme, the age of retirement is age 60 for men and age 55 for women. The first pension benefit (FPB) is calculated based on the duration of contribution (n); with 32 years as the maximum, an annuitization rate of 2.5%, and the final wage corresponding to the average of the last five years' salary (W^*). This gives the following formula:

$$FPB = n * 2.5\% * W^*$$

Pension benefits are increased annually indexed to inflation. Workers' contributions to the retirement system are paid as a part of their contribution to social security, which represents 34.5 per cent of the monthly salary; the part allotted to retirement is 18.75 per cent.

During the last several decades in Algeria, population ageing has not been a major preoccupation. From the 1970s to the mid-2010s, the ratio of the working-age population to the population of retirement age varied at a level higher than 7 (Flici and Kouaouci, 2021). With a relatively young and stable population, the sustainability of the Algerian retirement system in these recent decades was threatened more by issues related to system maturity. Consequently, the ratio of retirees to contributors was growing much faster than the ratio of the elderly population to the working-age population. The resulting financial imbalances were addressed by repeatedly adjusting the retirement system contribution rate. From a contribution rate of 5 per cent in 1985, it rose to 11 per cent in 1990, 16 per cent in 2000, 17.25 per cent in 2006 and 18.75 per cent in 2016 (Flici and

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Planchet, 2020). Also in 2016, the option of early retirement was removed; it had first been introduced in the mid-1990s to mitigate the labour market effects of an economic crisis. Following the persistent negative financial balance of the National Retirement Fund (*Caisse nationale des rétraites* – CNR) during the last decade, the necessity of implementing rigorous pension reforms gained importance in public debates. The challenge of population ageing was now part of this debate. Starting in 2022, the ratio of the working-age population to the population of retirement age fell for the first time below the value of 6. It is expected to reach a value of 3.45 by 2040 (ONS, 2019) and continue its decrease and stagnate around 2.7 from 2051 onwards (Flici, 2020). The negative effect of this projected transformation of the population age structure on the balance of contributors to retirees and, consequently, on the financial sustainability of the Algerian retirement system is clear.

Method

Two types of variables are used to assess the sustainability of the Algerian retirement system. The first type is operational environment indicators, such as population, employment, salaried employment, social security enrolment, salary growth, and contribution collection. The second type of variables consists of pension system parameters. These variables include the contribution rate for retirement, the retirement age, the number of years used to calculate the base wage, the annuitization rate, and the annual pension revaluation rate.

Financial sustainability assessment methodology

A retirement plan is financially sustainable if annual income exceeds annual expenses, and both exhibit similar long-term trends. In this article, we use a cohort-based calculation approach. On the one hand, all people of working age are taken as potential contributors to the retirement system with a probability, allowing us to estimate the average expected duration of contribution (EDC) for each cohort reaching the average retirement age. On the other hand, all persons who reach the average retirement age are considered as retirees who receive an averaged first pension benefit calculated using the average EDC and the average final wage. The resulting incomes and outcomes are then totalled by year over the projection period.

Estimating total incomes

Total incomes are determined by contributions made by the affiliated workers. Each person from the global population is assigned an age-specific probability of

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contribution[1] (ASPC), which takes into account employment rates (ERs), salaried employment rates (SERs), and affiliation rates of salaried workers (ARSWs). Thus, we write:

$$ASPC^s_{xt} = ER^s_{xt} * SER^s_{xt} * ARSW^s_{xt} = \frac{CP^s_{xt}}{P^s_{xt}} \quad (1)$$

With x referring to age; t to calendar years and s to sex. ASPCs can also be estimated by the ratio of the contributing population (CP) to the working-age population (P). The contribution for retirement (CR) made by the population aged x at year t is calculated by:

$$CR^s_{xt} = \mathrm{P}^s_{xt} * ASPC^s_{xt} * 12 * W^s_{xt} * CRR_t$$

W denotes the monthly average wage and CRR is the contribution rate for retirement.

Total retirement incomes (TRI) for a given year t are calculated by adding the contributions made by all cohorts during that year. This can be written as follows:

$$TRI_t = 12 * CRR_t * CF * \left(\sum_{x=18}^{xrm-1} P^m_{xt} * ASPC^m_{xt} * W^m_{xt} + \sum_{x=18}^{xrf-1} P^f_{xt} * ASPC^f_{xt} * W^f_{xt} \right)$$

m, f, xrm, and xrf refer to males, females, and their respective retirement ages. CF is the collection factor, which represents the proportion of the theoretical contributions actually paid. This may include unpaid contributions and periods of unpaid leave. According to the regulation, 6 months of contributions during a calendar year count as a full contributed year.

Estimating total expenses

Estimating total retirement expenses requires two pieces of information: the number of retirees and the average pension benefit. We calculated the EDC as defined by Flici and Planchet (2020) using ASCPs. In this case, the concept is applied to a cohort-based case rather than a year-based case. As a result, the EDC is calculated for each cohort by adding the ASPCs throughout the working career. For a cohort retiring at age xr in year t, we write:

1. In reality, ASPC is a rate rather than a probability. However, we use the term “contribution probability” here to prevent confusion with “contribution rate”, which relates to the share of wage paid as a contribution.

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$$EDC_{xr,t} = \sum_{k=xr-18}^{1} ASPC_{xr-k,t-k}$$

The EDC combined with the average annual wage during the last '*g*' years and the annuitization rate anr_t give the average first pension benefit. We write:

$$FPB^{s}_{xr,t} = anr_t * EDC^{s}_{xr,t} * \frac{1}{g} \sum_{k=g}^{1} 12 * W^{s}_{xr-k,t-k}$$

The average pension benefits are then upgraded annually using an annual revaluation rate (*rev*). This leads to:

$$PB^{s}_{xr+n,t+n} = FPB^{s}_{xr,t} * (1 + rev_t)^n$$

Aside from the annual revaluation of pensions, other subsidies are provided for small pensions. Hence, the real revaluation rate, referred to here as *rev*, is much higher than the official one.

Estimating the total direct pension benefits (TDPB) is derived by multiplying the average pension benefit at a given age x and time t by the corresponding population. We write:

$$TDPB^{s}_{x,t} = PB^{s}_{xt} * P^{s}_{xt}$$

Summing by age and sex, we obtain the evolution of the TDPB by year:

$$TDPB_t = \sum_{x=xrm}^{109} PB^{m}_{xt} * P^{m}_{xt} + \sum_{x=xrf}^{109} PB^{f}_{xt} * P^{f}_{xt}$$

With 110 years assumed to be an ultimate surviving age.

In addition to DPBs, total pension benefits (TPBs) comprise survivors' pension benefits (SPBs). In this article, we considered the proportion of the total survivors' pension benefits (TSPB%) in the TDPB to be constant. Also, the total retirement expenses (TREs) include administration fees taken as a constant percentage of the TPB, noted '*adm%*'. We write:

$$TRE_t = (1 + adm\%) * (1 + TSPB\%) * \left(\sum_{x=xrm}^{109} PB^{m}_{xt} * P^{m}_{xt} + \sum_{x=xrf}^{109} PB^{f}_{xt} * P^{f}_{xt} \right)$$

The financial balance (FB) of the retirement system is calculated as follows:

$$FB_t = TRI_t - TRE_t$$

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To make it easier to analyse the evolution of the income-expense balance under each scenario while taking into account the erosion of money over time, we based our analysis on the incomes-to-expenses ratio (IER), which is calculated as follows:

$$IER_t = TRI_t / TRE_t$$

Comparing incomes to expenses in relative instead of absolute terms is supposed to provide a relevant analysis of the importance of the deficit over time without using any discount rate to compare financial flows at different projection horizons. A given value of a ratio will have the same interpretation at any time point. For example, a value of 0.5 will mean that retirement incomes cover only half of retirement expenses.

The multi-scenario approach

The total number of scenarios is obtained by combining the possible scenarios of the two groups of variables: environment variables and system variables (Table 1). Except for the variable Population, which is considered in 15 different scenarios, all the other variables are considered in three scenarios. Also, the annual revaluation rate of pension benefits is indexed on annual salary growth. Changes in the operational environment variables are assumed to be gradual from 2020 to 2070. The values presented in Table 1 are those expected for 2070. As regards the system variables, the changes are supposed to be applied starting from 2020.

Different scenarios of reform actions to reduce the deficit were defined. The findings of Flici and Planchet (2020) suggest that the current system parameters would lead to a permanent deficit. The aim of the different scenarios is to assess whether there are some reform actions that may lead to a better outcome. As concerns the operational environment variables, the scenarios were defined as follows: a central scenario (scenario 1, except for Population for which the central scenario is labelled 8) inspired from current levels or recent evolution; a pessimistic scenario; and an optimistic scenario. The total number of scenarios to be evaluated is (15*3^9 = 295,243), including (3^4 = 81) possible sets of reform actions.

Data

The proposed calculation method enables an easy transition from the contribution phase to the payment phase and to project retirement incomes and expenses without having accurate estimates of the number of contributors and retirees.

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Table 1. *Scenarios definition*

		Environment variables		System variables	
Population		15 scenarios combining 5 scenarios for fertility and 3 for life expectancy		*Retirement age*	
				Men	Women
				Age 60	Age 57
				Age 63	Age 60
				Age 65	Age 62
Employment rates		*Men*	*Women*	*Annuitization rate*	
	1	61%	14.8%	2.5%	
	2	50%	10%	2.25%	
	3	80%	40%	2%	
Salaried employment rates		*Men*	*Women*	*Reference wage duration*	
	1	65.8%	79.6%	5 years	
	2	50%	65%	10 years	
	3	80%	85%	12 years	
Affiliation rates of salaried employees		*Men*	*Women*	*Contribution rate for retirement*	
		65.1%	91.9%	18.75%	
		60%	70%	20%	
		80%	95%	22%	
Salaries annual growth	1	5%		*Pensions annual revaluation rates (real rate instead of the official rate)*	
	2	9%		Same as the salaries annual growth rate	
	3	3%			
Collection factor	1	87.9%			
	2	80%			
	3	95%			

Source: Author's elaboration.

Indeed, as the values for the variables of population structure, employment, and social security affiliation are changing, predicting the number of retirees in the future cannot simply be done by extrapolating trends. The number of retirees within a given cohort depends on the cohort's contribution history, and its estimation cannot be accurate without microdata about contribution. Thus, when data is not sufficiently detailed, our calculation method is expected to produce globally good-quality projections of retirement incomes and expenses. However, its implementation requires a large amount of data history and

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projections. A population projection, a salary surface and a surface of ASPCs,[2] from the date of first entry into the labour market to 2070, are all required. For a first entry into the labour market set at age 18, the contribution history of a cohort retiring at age 60 in 2020 must be traced back to 1978. Similarly, a cohort aged 100 in 2020 should have retired in 1980 at age 60 and first entered the labour market in 1938. For the first retiring cohort, we set the surviving age limit at 100 years, gradually rising to 110 years.

Making complete surfaces for salaries and for the probability of contribution at detailed ages, ranging from age 18 to the retirement age for the years from 1938 to 2070, is challenging. Algeria gained independence in 1962, and there is no data on employment, social security, or salaries for the colonial period. Furthermore, data from the post-independence era is not always disaggregated by gender and age. Salary data is much less available and detailed.

Our strategy was to build salary and ASPCs surfaces using a two-component method based on two vectors: a time trend and an age pattern. The time trend was defined as the time evolution of a summary indicator (i.e., average wage, global probability of contribution), whereas the age pattern was deduced from the age structures of wages and probabilities of contribution by age based on the most recent data available. By assuming that the age patterns remain constant over the observation and projection periods, estimating complete surfaces involves extrapolating the time trend to the future (while estimating missing data in the historical series), and combining it with the age pattern.

Population projections

For this study, we use the multi-scenario population projections of Flici (2020), which are extended to 2070. The official projections of Algeria, published by the Office for National Statistics (ONS), are based on a single scenario, and extended to 2040. The projections used here combine three scenarios for life expectancy and five scenarios of fertility, corresponding to global fertility rates of 1.5, 2.1, 2.5, 3.0, and 3.5 children per woman by 2070, respectively.[3] According to the projections, the ratio of working-age people (aged 15–59) to people at retirement age, which was slightly above 6 in 2020, will decrease significantly to stand at around 2.8 in 2070 according to the central scenario. The other scenarios give a value varying from 2.2 to 3.4.

2. The term “surface” refers to a matrix presenting ages in rows and years in columns. The term surface is used commonly for 2D and 3D plots.
3. This article is supplemented by an online Appendix developed by the author and made available to readers (see Supporting Information). See Appendix, Figures A.1 and A.2

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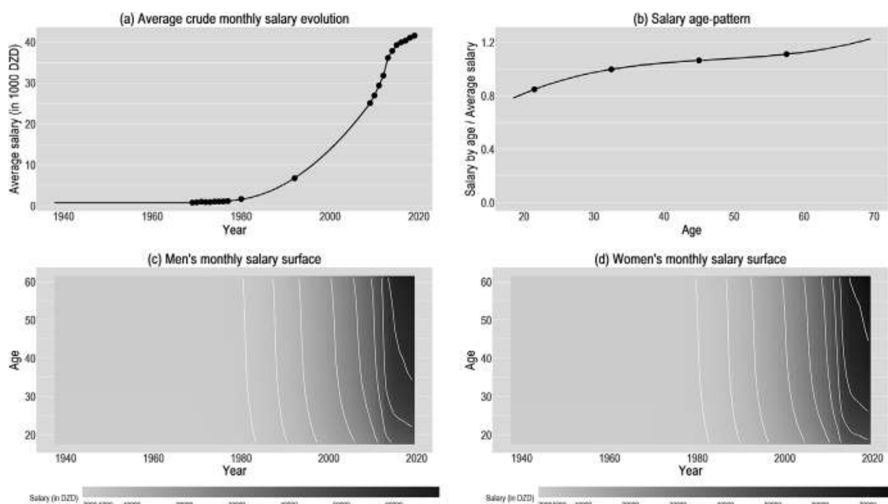
Salary surface

The surface of the average salary at age x, time t, and sex s, denoted by $W^s_{x,t}$ was estimated using the product of two vectors: W^s_t, which reflects the evolution of the average salary, and Z^s_x, taken as an age pattern, and estimated by: $Z^s_x = W^s_{x,t_ref}/Y^s_{t_ref}$ with *t_ref* referring to the reference year.

Data about the average net wage for the years 1969–1977, 1980, 1992, and 2009–2019 were retrieved from different editions of the statistical yearbook of Algeria published by the *Office national des statistiques* (ONS). Missing data were estimated using a polynomial fit (Figure 1, panel a).

The age-pattern of salaries (Figure 1, panel b) was taken from the ONS survey on household revenues of 2011 (ONS, 2014). The survey shows that women's net salaries are 20 per cent higher than those of men. Also, contributable salaries are higher than average net salaries by 4 per cent for men and 13 per cent for women. We assume these ratios remain constant in the future. Crude salaries were estimated from net salaries. The complete surfaces of men's and women's salaries are shown in Figure 1, panel c and panel d, respectively.

Figure 1. *Time evolution, age pattern, and salary surfaces for men and women*



Note: Colour figure can be viewed at wileyonlinelibrary.com.
Sources: Estimated using ONS data, various editions of Statistical Yearbook of Algeria and ONS survey on household revenues of 2011.

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The surface of age-specific probabilities of contribution

Considering a reference year (t_ref =2014), we calculated the age-pattern of contribution (APC) by: $APC^s_{t_ref} = log\left(ASPC^s_{x,\, t_ref}\right)/log\left(PC^s_{t_ref}\right)$ whereas the time component was set to be the global probability of contribution (PC) as a salaried worker, which combines the global employment rate (ER), the global salaried employment rate (SER), and the global affiliation rate of salaried workers (ARSW). We can write this as: $PC^s_t = ER^s_t * SER^s_t * ARSW^s_t$. Then, the surface of the ASCPs was estimated as follows:

$$ASPC^s_{x,\, t} = PC^s_t * exp\left(APC^s_{t_ref} * log\left(PC^s_{t_ref}\right)\right)/PC^s_{t_ref}$$

Data on employment by sex, type (self-employment and salaried employment), by sector (public, private) was compiled from various ONS publications (ONS, 1992; 2012; 2016; 2019) and spans the years 1966, 1977, 1987, 1989–1992, 1997, 1998, 2000–2003, 2008, 2014 and 2019. Male and female employment rates were calculated and fitted separately using linear functions. Male employment rates were retropolated to 1938 using the estimated linear function. Salaried employment data were collected for 1966, 1977, 1987, 1992, 1997, 2005, 2008, 2014, and 2019 for the global population and for 1982, 1984,1990–1992,1996, 2001, 2004–2006, and 2008–2019 by gender. Using these data, we estimated the time evolution of the global probability of contribution to retirement as a salaried worker for men and women (Figure 2, panel a).

The age pattern (Figure 2, panel b) was estimated using the employment rates by age, the salaried employment rates by ages, and the global affiliation rate of salaried workers. The workforce survey of 2014 (ONS, 2016) provided the first two indicators for males and females by five age groups. No age detailed data is provided for salaried workers' affiliation. Hence, we assumed that the affiliation rates of salaried workers are constant with age.

The combination of the surface of ASPCs of salaried workers with the global population numbers should provide an estimate of the number of contributors to Algeria's CNR. Compared to the administrative data for the number of contributors to social security who are salaried workers, it turned out that the ONS data resulted in underestimating the population of contributors by 16 per cent in 2018, which corresponds to the most recent data available. Thus, we applied a correction factor to the ASPCs to equalize the number of contributors observed in 2018. Results are shown in Figure 2 panel c and panel d, for men and women, respectively.

Figure 2 reveals the importance of the gender gap in terms of the ASPCs of salaried workers. This gap is mainly due to the gap in terms of activity. Men

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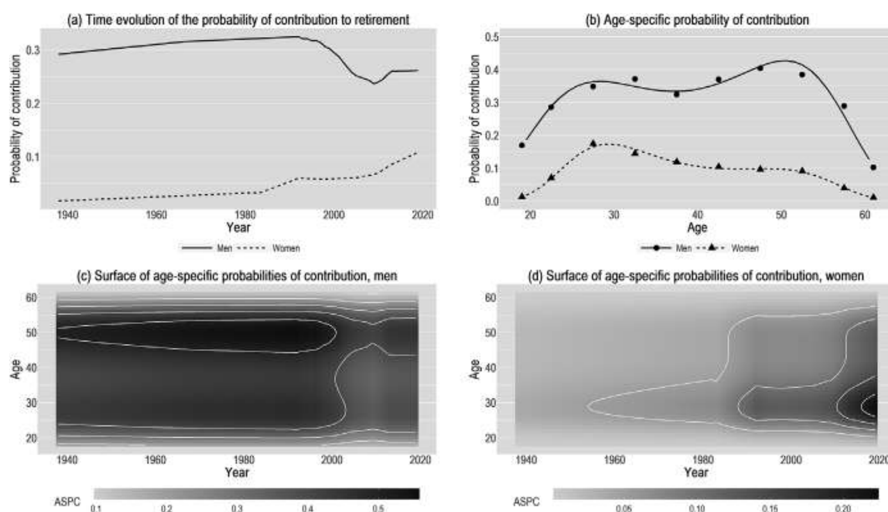
Figure 2. *Time evolution, age pattern, and age-specific probabilities of contribution to retirement as a salaried worker, for men and women*



Note: Colour figure can be viewed at wileyonlinelibrary.com.
Sources: Estimated using ONS data, various editions of ONS annual series on labour and unemployment; Hammouda (2006); and ONS workforce survey of 2014.

aged 45–55 were just over 50 per cent likely to be affiliated to social security as compared to salaried workers in the period from the early 1970s to the mid-1990s. Towards the mid-2000s, these probabilities of contribution fell to nearly 40 per cent, but in 2011 they returned to relatively higher levels. For women, it is only towards the late 1990s that women aged 30–40 have seen their contribution probability surpassing 10 per cent; only in very recent years has this moved beyond 15 per cent.

Results and discussion

Figure 3 shows the expected evolution of the income-to-expense ratio of the Algerian retirement system up to 2070 under various scenarios combining environment changes and potential reform actions. The central scenario is represented by a bold black line and corresponds to population scenario number 8 associated with a fertility rate falling slightly from 3.1 children per woman in 2020 to 2.5 by 2070 and a medium scenario about life expectancy evolution while all the remaining environmental variables are constant or follow the same trend while no reform actions are taken. According to this scenario, the retirement income-to-expense ratio will fall from around 50 per cent in 2020 to

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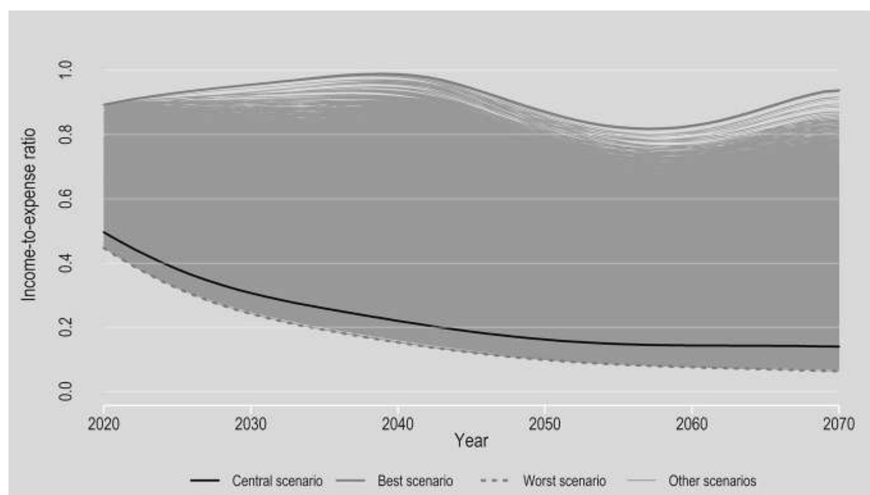
Figure 3. *Projected income-to-expense ratio of the retirement system*



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Source: Author's elaboration.

less than 20 per cent in 2043 before stabilizing at 14–15 per cent from 2054 onward. This means that retirement incomes, which currently cover half of retirement expenses, will only cover a fifth of expenses in 2042.

In the best-case scenario (with slow population ageing (high fertility and low life expectancy); high employment; high salaried employment; high affiliation to social security; low wage growth; a postponed average retirement age of age 65 (men) and age 62 (women); a lowered annuitization rate to 2 per cent (instead of 2.5 per cent); an expanded final wage base period to 12 years instead of 5 years; and a high collection factor and increased contribution rate) the income-to-expense ratio will increase from nearly 90 per cent in 2020 to nearly 99 per cent in 2039, then decrease to 81.8 per cent in 2057 only to increase again to nearly 94 per cent by 2070.

According to the worst-case scenario, depicted in Figure 3 with a dotted grey line, which corresponds to the worst-case expected evolution of the environment (with no change in the retirement parameters), the income-to-expense ratio is expected to fall from nearly 45 per cent in 2020 to less than 20 per cent in 2035 and below 10 per cent beginning in 2050.

These findings indicate that a combination of favourable environmental evolution and major parametric reform will help keep the income-to-expense ratio above 80 per cent. In which case, the gap can be made up by public subsidies. The best scenario that we can expect under the current system design is deficit stability across time at a relatively acceptable level. However, such a vision

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will only be realizable if major reforms are implemented. Even in the most favourable environment evolution, if no reforms are introduced this will constrain future retirement incomes to remain below 50 per cent of retirement expenses.

Figure 4 shows that if no reform action is taken, the income-to-expense ratio in 2020 will range from 45 per cent to 53 per cent. In 2050, the most favourable environmental change will result in an income-to-expense ratio of 42.5 per cent compared to less than 10 per cent in the less favourable conditions. Similarly, the maximum share of total expenses that retirement incomes can cover in 2070 will not exceed 48 per cent.

Although major reforms are required, they cannot guarantee that the retirement system's deficit will be stabilized in the event of the unfavourable evolution of the operational environment. Owing to environmental uncertainty, the same reform action can result in dramatically different outcomes. Similarly, two distinct reform scenarios can result in comparable or even reversed levels of future deficit. However, introducing major reforms will improve the chances of stabilizing the deficit at acceptable levels if the environment improves, as opposed to not introducing any reforms or imposing only minor reforms.

Figure 5 depicts this type of situation clearly. Result shows that implementing minor reforms, with slight changes in one or more of the retirement parameters, will result in an income-to-expense ratio ranging from 58–68 per cent in 2020,

Figure 4. *Projected income-to-expense ratio of the retirement system – No reforms context*

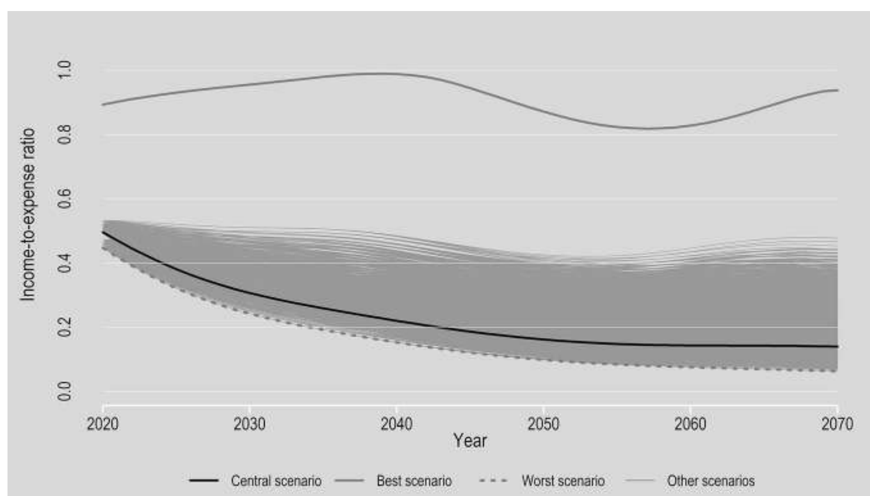

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Figure 5. *Projected income-to-expense ratio of the retirement system – in a favourable environment with various reform levels*

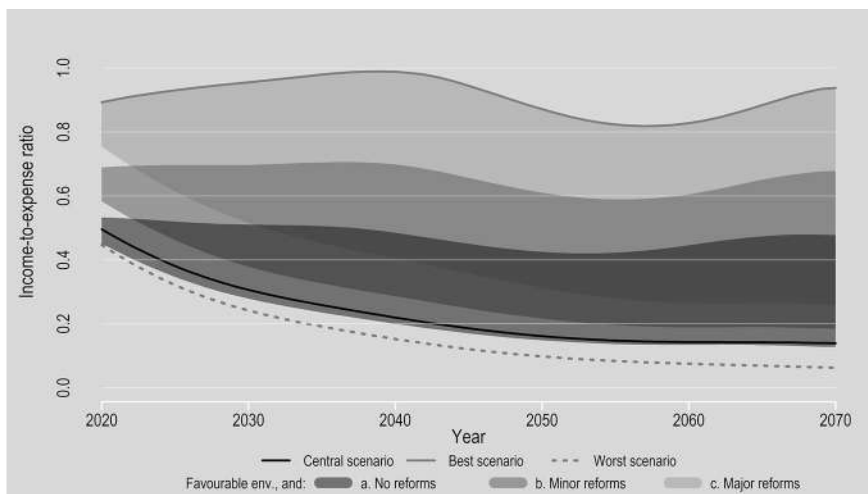

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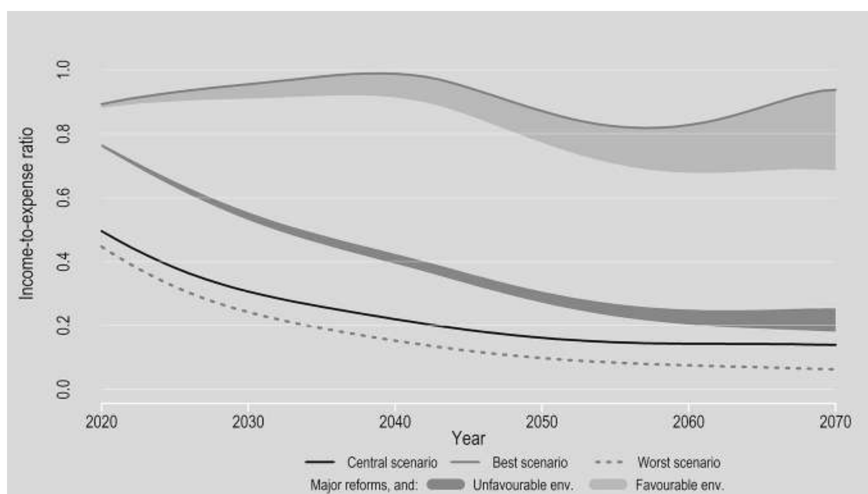
Figure 6. *Projected income-to-expense ratio of the retirement system – major reform combined with various environments*



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but passing to 22–70 per cent in 2050 and 18–69 per cent in 2070. If major parametric reforms are implemented, such as raising the retirement age to age 65 (men) and age 62 (women), increasing the retirement contribution rates to 22 per cent instead of 18.75 per cent, extending the period used to calculate the final wage to 12 years instead of 5 years currently, and lowering the annuitization rate to 2 per cent instead of 2.5 per cent, the income-to-expense ratio can be improved to 31–99 per cent in 2050 and 26–89 per cent in 2070. In contrast, not introducing reforms, even if the environment evolves favourably, will result in an income-to-expense ratio of less than 48.5 per cent in 2050 and less than 53 per cent in 2070.

However, environmental changes have a significant impact on the financial balance of Algeria's retirement system. Figure 6 shows that, even with major reforms, the income-to-expense ratio is expected to fall to near the baseline scenario under unfavourable environmental conditions beginning in 2050. The only way to achieve a stable income-to-expense ratio evolving close to one is if major parametric reforms are accompanied by a favourable environment with a high employment rate, higher levels of social security coverage, and low inflation.

Conclusion

Maintaining the financial sustainability of retirement systems is a critical step towards fighting old-age poverty. As is the case for many developing economies, Algeria is experiencing an increase in the proportion of elderly people in the total population as fertility rates fall and longevity improves. Flici and Planchet (2020) investigated the financial sustainability of Algeria's retirement system for salaried workers and demonstrated the importance of population ageing effects. Their work, however, was based on a single scenario. In this article, we aimed to investigate the same issue using a multi-scenario approach. In addition to assuming five fertility evolution scenarios and three mortality scenarios, other factors – employment rates, salaried employment rates, affiliation to social security, collection factor, and wage evolution – were considered with regard to a central, optimistic, and pessimist scenario of future evolution. Besides, retirement system parameters, such as the retirement age, the period used to calculate the final wage, the annuitization rate, and contribution rates, were considered following the three scenarios of no reform, minor reforms, and major parametric reforms.

Based on the results, the financial balance of Algeria's retirement system for salaried workers is expected to remain negative over the projected horizon regardless of environmental conditions or reform actions. The significance of population ageing derives from the fact that the ratio of people of working age to those in retirement age is the only variable that cannot be assumed to increase in the future. According to the baseline scenario, this ratio is expected to fall from 6

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in 2021 to 2.7 in 2051; and to around 3 following the most favourable scenario. Thus, all of the reform actions and the environmental evolution scenarios studied here aim to reduce the future deficit caused by population ageing. What appears certain is that parametric reforms of any kind will not be sufficient to close the financial deficit in Algeria's retirement system both in the short and long run.

However, the size of the deficit can be controlled if major reforms are implemented, and if the operational environment improves. Nevertheless, given that further reductions in retirement generosity appear infeasible, it will be necessary to seek complementary resources to finance the remaining deficit. If the annuitization rate is reduced to 2 per cent, a replacement rate of 80 per cent will require 40 years of contributions instead of the current 32 years. To adopt reforms that go further, the scenarios investigated here may risk encouraging evasion in paying social security contributions, which would increase the deficit further. Yet, it is obvious that major parametric reforms must be implemented immediately. As an alternative solution, the financial burden on the PAYG system can be reduced. The maximum contributable salaries as well as the maximum pension levels can be capped, because those who pay the highest contributions will receive the highest benefits. A complementary retirement fund could be established to provide the possibility to enable higher-earning employees to contribute more to receive higher benefits. The issue of such an alternative should be explored in a separate paper.

One of the main limitations of this article is the assumption that all the variables will follow regular trends from the base year to the projection horizon. In reality, the trends of employment rates, salaried employment rates, affiliation rates, and salary growth rates can be erratic, with ups and downs and varying rates of evolution. This may have a minor impact on the assessment results. However, the interaction between the different variables was not taken into account in this study. Salary evolution, for example, can affect employment rates and vice versa. Furthermore, increasing contribution rates may cause a decrease in affiliation rates among salaried workers. All these interactions between variables as well as the effect of the reform actions on the operational environment should be the focus of future research.

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Check for updates

The expected impact of the 2019 Brazilian pension reform on survivors' pensions

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Abstract This study analyses the expected changes in survivors' pensions resulting from the permanent rules of the 2019 pension reform in Brazil. Actuarial annuities are used for representative worker profiles. The dispersion in the replacement rate values decreases, except for the highest income level. The rates needed to finance survivors' pensions decrease relatively more than do the rates for old-age pensions. The internal rates of return significantly decrease. There is a heterogeneous change in the distributive aspects of the pension system. The reform shall affect the adequacy and intragenerational equity of old-age and survivors' pensions.

Keywords social security reform, pension scheme, survivors benefits, risk of survivors, retirement, Brazil

Introduction

Since the 1990s, several countries have enacted pension system reforms. Brazil is no exception. Since 1995, all governments in Brazil have implemented or tried to implement pension reforms, a topic of great importance on the country's political and economic agenda. However, it was only after the period in office of the Dilma

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Luís Eduardo Afonso thanks the National Council for Scientific and Technological Development (CNPq, Brazil) for the financial support, through the Research Productivity Scholarship – Level 2.
The authors thank both reviewers for their careful analysis, which helped improve the article. Any remaining errors are the responsibility of the authors.

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Rousseff administration (2011–2016) that survivors' pensions began to receive more attention. Law 13,135 of 2015 tightened the eligibility criteria and reduced the duration of survivors' pensions. In 2016, under the government of Michel Temer (2016–2018), the issue was referred to the National Congress for a reform proposal that, among other measures, aimed to condition the pension amount to the number of dependants. However, that reform was not voted on.

In 2019, in the first year of Jair Bolsonaro's administration, Constitutional Amendment (CA) 103/2019 was approved. The amendment was centred on the growing deficit, which was putting the financial sustainability of pension schemes at risk. This reform radically altered the Brazilian pension system by establishing profound changes in the General Social Security Regime for private sector workers (*Regime Geral de Previdência Social* – RGPS) and the Pension Regime for Government Workers (*Regime Próprio de Previdência Social* – RPPS). According to the government's fiscal projections, the reduction in expenditures for the 10-year period, 2020 to 2029, was expected to be about 1,237 billion Brazilian Reals (BRL). An even more significant decrease is expected for the following years, after the end of the transition period. The reform has imposed changes in the contribution rates, eligibility conditions, and formula for calculating benefits; imposed a minimum age in the RGPS; and attempted to standardize pensions in the public and private sectors.

This study analyses projected effects caused by the change in rules for survivors' pensions under the RGPS. The motivation for this comes from the weight of expenditures for this benefit. According to official government data, RGPS spending in 2015 and 2020 was BRL 436 billion and BRL 664 billion, respectively. This is equivalent to approximately 7.27 per cent and 8.72 per cent of the GDP of each period. The payment of survivors' pensions stands out because within RGPS expenditures, survivors' pensions accounted for 21 per cent in 2015 and 20.02 per cent in 2020. However, in relation to GDP, the expenditure on these benefits has increased, from 1.53 per cent to 1.75 per cent in the period cited.

Comparative data from the International Monetary Fund (IMF, 2022) show that, in 2020, Brazil spent 2.66 per cent of its GDP on survivors' benefits, compared to 0.59 per cent in Argentina and 0.20 per cent in Spain. It is also important to emphasize the gender dimension of survivors' pensions. In December 2021, of a total of 7.71 million beneficiaries, 6.34 million (more than 82 per cent) were women. As shown by Costanzi (2019), the high expenditure on survivors' pensions in Brazil is related to factors such as eligibility criteria, the formula for calculating benefits and the duration of benefits.

These factors influence the relationship (and possible trade-offs) between the sustainability of the pension system and the adequacy of social security benefits (Alonso-Fernandez et al., 2018; Mattil (ch. 2), 2006; Brimblecombe, 2013).

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Adequacy is related to the capacity of the pension system to replace income after retirement (Brown and Ip, 2000). Another relevant aspect is intragenerational equity, which can be defined, based on the work of Schokkaert et al. (2020), as the redistribution of resources made by the pension system among individuals of the same generation. Both are important dimensions of analysis but were not properly addressed in discussions of the 2019 reform. Thus, it is important to analyse reform impacts through adequacy indicators, particularly those that consider all periods in receipt of benefits, including survivors' benefits.

With the use of an actuarial model, the main individual pension indicators are calculated under two conditions: the "old situation" (which was in force before the adoption of the 2019 reform) and the "current situation", which became effective in 2020. This approach is based on evidence that pension reforms impact workers of different profiles differently, as pointed out by Schwarz (2006). This was observed in countries such as the People's Republic of China (Zhu and Walker, 2018), Spain (Díaz-Gimenez and Díaz-Saavedra, 2017), Japan (Lee, Ogawa and Matsukura, 2016) and Germany (Engels, Geyer and Haan 2017).

Conceptual aspects and the empirical literature

Although the literature on pension systems is broad, with their objectives and typology well defined (Barr and Diamond, 2006), survivors' pensions occupy only a relatively small space. In general, the development of survivors' pensions emerged as a means to reduce poverty among widows (Turner, 1988). Such benefit programmes were conceived when women were assigned the role of caring for their children and performing domestic activities, without entering the labour market. Thus, they were financially dependent on their husbands. Over time, survivors' pensions began to be integrated into broader social protection policy actions (Tibaudín, 1987).

Following the argument of James (2009), there are five reasons that explain the existence of survivors' pensions: i) market failure on the demand side, originating from myopia by the insured, which can lead to acquisition below the optimal and/or underestimation of the probabilities of death; ii) to function as a kind of coinsurance due to the economies of scale associated with the family unit; iii) market failure on the supply side, if risk protection products are not supplied by the market; iv) to reduce inequalities and distortions, which can derive from the design of social security systems; and v) insertion in the labour market as well as heterogeneous and constantly changing demographic aspects. These reasons are, in large part, linked to the objectives of social security systems to promote redistribution (Liebman, 2002). The argument is reinforced by

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Gustman and Steinmeier (2001), who state that the analyses of the distributive aspects of social security should include the family unit and not the individual.

A relevant portion of the literature on social security is linked to reforms. For example, between 2009 and 2015, all Member countries of the Organisation for Economic Co-operation and Development (OECD) underwent some type of reform (OECD, 2015). Such changes have been mainly due to the pressures generated by population ageing. In Latin America, demographic change has generated a trend of increased spending (Acosta-Ormaechea, Espinosa-Vega and Wachs, 2017; Figliuoli et al., 2018). This global phenomenon generates long-term effects, directly impacting social security systems (Stauner, 2008; Chomik, Piggot and Yan, 2019).

An essential element in social security expenditures is survivors' pensions. For this reason, many countries, including Brazil, are reformulating their pension rules by implementing reforms (OECD, 2018). As shown by Ansiliero, Constanzi and Pereira (2014), the Brazilian legislation on survivors' pensions before the 2019 reform was less restrictive than that observed in other countries, which contributed to the high expenses associated with this benefit.

In the international literature, few studies address survivors' pensions: see Myers, Burkhauser and Holden (1987), Turner (1988), and Diebold, Moulton and Scott (2017) for the United States of America; Cifre (2013) for Spain; and Jousten and Lefebvre (2019) for Belgium. In Brazil, the literature focused on survivors' pensions is very limited indeed.

One study was conducted by Freire and Afonso (2015), who analysed various combinations of age differences between spouses and the presence of children. Their results show that the required rates are, in general, much higher than the effective rates, thus serving as one of the causes of the high levels of expenditure associated with the Brazilian pension system. Perhaps the most solid contribution to the national literature has been made by Gouveia, Souza and Rêgo (2018). Using a model with multiple decrements, the authors studied the impacts that would have occurred if the 2016 reform proposal had been approved. One of the main results is that the reform would have reduced the required contribution rates (i.e., the fair rate that balances the expected contribution flow to benefit expenditure) to lower levels than the effective rates (i.e., the contributory effort of the worker), particularly for women. Costanzi, Ansiliero and Bichara (2017) show that the Brazilian rules in force for survivors' pensions until 2014, in addition to not considering changes in the labour market, discouraged female participation in the labour market. Finally, Afonso (2021) finds some evidence (with data prior to the 2019 reform) that survivors' pensions do not change the progressivity of the old-age pensions provided by the RGPS.

To the best of our knowledge, no study has explored the expected individual impacts of changes to Brazil's reversionary type of survivors' pensions

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(i.e., changes to the way in which survivors' pensions, originally calculated on the basis of the deceased's contribution record, will now be calculated), resulting from the 2019 pension reform. Specifically, little is known about changes in the adequacy and intragenerational equity of Brazil's survivors' pensions. This is the gap explored in this article.

Brazil's 2019 pension reform: Main aspects

The 2019 reform altered the contribution rates, the eligibility conditions, the retirement age, and the formula for calculating old-age benefits as well as the reversion (i.e., pension entitlement paid to the survivor based on the deceased's contribution record) to spouses. The "old situation" is defined here as the set of rules that were in force until 2019, and the "current situation" is defined as the set of rules in force since 2020. In the old situation, there were two types of old-age benefits in the RGPS. In the first type, age retirement (*AR*), workers could retire by age, at 60 (women) and 65 (men) years. There was a requirement for 15 years of contributions. Normally, this benefit was received by workers who had spent most of their working life outside the formal labour market. In the second type, length of contribution retirement (*LOCR*), which is the focus of this study, workers could retire after 30 years (women) and 35 years (men) of contributions. There was no minimum age requirement. In this case, the value of benefit V_o was given by multiplying the retirement factor f (Equation 2) by the mean of the 80 per cent highest contribution wages M_1 after July 1994 (Equation 1). The contribution wage corresponds to the maximum value at which the employee's contributions are calculated. The value of the survivor benefit received by the beneficiary(ies) was equal to the value of the old-age pension.

$$V_o = f.M_1 \tag{1}$$

$$f = \frac{TC.\alpha}{LE}\left(1 + \frac{Ag + CP.\alpha}{100}\right) \tag{2}$$

In Equation (2), *CP* represents the contributory period, *LE* represents the expected life expectancy of the insured person at the time of retirement, given by the mortality table for both sexes published by the Brazilian Institute of Geography and Statistics (IBGE) at age *Ag*, and α corresponds to the contribution rate, which is assigned a fixed value of 0.31 by the Government. For women, five years are added to the contributory period in the calculation of the retirement factor. In 2015, the criteria for applying the factor were changed, with

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the inclusion of Progressive rule 85/95. This made the factor mandatory only for those whose sum of age and duration of contributions at the date of retirement was not equal to at least 85 (women) and 95 (men). The term "Progressive" describes the fact the sum increases 1 point every two years, up to 2026. For individuals who met the requirement, the inclusion of the factor was optional, which made the rule always advantageous to the worker.

In the current situation, after the 2019 reform, after the transition period, *LOCR* and *AR* ceased to exist. There began to be only one type of benefit: Programmed retirement. The eligibility conditions consider the minimum age and minimum contributory period: for women, 62 years of age and 15 years of contribution, and for men, 65 years of age and 20 years of contribution. The value for the old-age benefit of women V_{NF} and men V_{NM} is now given by 60 per cent of the average M_2 of the contribution wages of the worker, plus an accrual rate of 2 per cent for each year of contribution in addition to the minimum contributory period, as described in Equations (3) and (4), respectively.

$$V_{NF} = (60\% + 2\%.(CP - 15)).M_2 \tag{3}$$

$$V_{NM} = (60\% + 2\%.(CP - 20)).M_2 \tag{4}$$

The calculation of the survivors' pension was also modified by the pension reform. In the old situation, the reversion (i.e., the percentage of the deceased spouse's pension entitlement paid to the survivor) was 100 per cent. In the current situation, this value corresponds to 60 per cent of the old-age benefit, plus 10 per cent for each additional dependant, up to the maximum limit of 100 per cent of the old-age benefit, in the case of five dependants. The duration of the survivors' pension, conditional on the age of the beneficiary, was not changed, maintaining the conditions in force since 2015. Table 1 presents a summary of the rules in the old and the current situation.

Methodology

This section describes the model for the calculation of actuarial annuities used to compute the pension indicators for the old-age and survivors' pensions of the RGPS in the old and current situation. First, the calculation of income and contributions is presented. Subsequently, the calculation of benefits is addressed. Then, the indicators and the assumptions are presented. Whenever possible, we use the actuarial notation as presented in the textbook by Bowers Jr et al. (1997).

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Table 1. *Summary of the rules for survivors' pensions for the RGPS (old and current situation)*

Conditions	Age of the beneficiary(ies) at the insured's date of death	Duration of benefit	Value of survivors' pensions	
			Old situation	Current situation
Worker made less than 18 contributions or marriage/stable relationship has not lasted at least 2 years	Any age	4 months	100% of old-age pension, regardless of the number of beneficiaries	60% of old-age pension (one dependant), plus 10% per additional dependant, up to a maximum of 100% (five dependants)
Worker made 18 contributions or more before death and marriage/stable relationship lasted at least 2 years	Younger than 22 years	3 years		
	Between 22 and 27 years	6 years		
	Between 28 and 30 years	10 years		
	Between 31 and 41 years	15 years		
	Between 42 and 44 years	20 years		
	45 years or older	Lifetime		

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The model

Suppose the representative individual begins work (and contributes to social security) at age x and receives an initial income W_x. We assume that the income increases steadily at a real annual rate w throughout the contributory period. Thus, the value of W after working $n-1$ years, when retirement occurs, is expressed in Equation (5).

$$W_{x+n-1} = W_x.(1+w)^{n-1} \tag{5}$$

This individual contributes until the date of retirement. At each period, the value of the pension system contribution for employed workers is given by multiplying the contribution rate c, which varies according to the salary range, by the salary. Additionally, there is a 20 per cent rate that is paid by the employer. At the beginning of the working life, when the income is W_x, the contribution is C_x. When the worker is $x + n - 1$ years old, the contribution C_{x+n-1} is expressed by Equation (6).

$$C_{x+n-1} = W_{x+n-1}.(c + 20\%) \tag{6}$$

Both income and contribution flows can be expressed through an immediate increasing temporary annuity, given by Equation (7).

$$\ddot{a}_{x:\overline{n|}} = \sum_{k=0}^{n-1} v^k . {}_kp_x \tag{7}$$

In the equation, v^k represents the financial discount factor, which is associated with an interest rate i and k periods, defined as $v^k = \frac{1}{(1+i)^k}$. Given that these flows are conditional on the survival of the worker, they are weighted by the probability of death, which is represented by the term ${}_kp_x$, also known as the biometric factor. The term ${}_kp_x$ corresponds to the probability of an individual of age x surviving until age $x+k$. The symbol n represents the duration of the flow, in this case, the contributory period. Finally, the double dot denotes that the flow occurs at the beginning of each period.

By combining Equations (5) and (6) with (7), it is possible to calculate the present value of income (*PVI*) and the present value of contributions (*PVC*) of an individual who entered the labour market at the initial age of x years and who will retire at $x+n$ years of age, after making n contributions. Such computations are described in Equations (8) and (9), respectively.

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$$PVI = \sum_{k=0}^{n-1} W_{x+k} . v^k \cdot {}_kp_x \tag{8}$$

$$PVC = \sum_{k=0}^{n-1} C_{x+k} . v^k \cdot {}_kp_x \tag{9}$$

Social security benefits: Old-age and survivors' pensions

After n years in the labour market, the individual retires, receiving a lifetime benefit of V_{x+n}. Thus, this benefit has a deferment period of n years in relation to entry into the labour market. The present value of old-age pension (*PVO*) can be obtained combining the annuity described in Equation (10) and the value of the old-age pension V_{x+n+k}, as expressed in Equation (11).

$${}_{n|}\ddot{a}_x = \sum_{k=0}^{\omega-x-n} v^{n+k} \cdot {}_{n+k}p_x \tag{10}$$

$$PVO = \sum_{k=0}^{\omega-x-n} V_{x+n+k} . v^{n+k} \cdot {}_{n+k}p_x \tag{11}$$

Survivors' pensions are paid to dependants after the death of the insured. The value can be written using, initially, a deferred reversionary annuity,[1] given by Equation (12). In this case, in addition to the financial discount, it should be weighted by the probability of death of the worker $\left({}_kq_x\right)$ and the probability of the survival of the beneficiary of age y $\left({}_kp_y\right)$.

$${}_{n|}\ddot{a}_{x|y} = \sum_{k=0}^{\omega-x-n} v^{n+k} \cdot {}_{n+k}p_y \cdot {}_{n+k}q_x \tag{12}$$

To calculate the present value of the survivors' pension (*PVS*), the percentage of retirement reversion (i.e., the percentage of the deceased spouse's pension entitlement) payable to the spouse β is defined. The flow of the expected values of the pension benefit is expressed by Equation (13).

$$PVS = \beta . \sum_{k=0}^{\omega-x-n} V_{x+k+n} . v^{n+k} \cdot {}_{n+k}p_y \cdot {}_{n+k}q_x \tag{13}$$

Pension indicators

Four individual pension indicators were calculated. These indicators are widely used (Freudenberg and Toscani, 2019; Geanakoplos, Mitchell and Zeldes, 1999;

1. A deferred reversionary annuity is the actuarial term used for an annuity paid when a surviving spouse receives a guaranteed lifetime income after the insured spouse dies.

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OECD, 2021). With these indicators, it is possible to analyse the adequacy and intragenerational equity of social security benefits (Domonkos and Simonovits, 2017; Shuls and Tipping, 2020).

The first indicator is the replacement rate (*RR*). As indicated by Leimer (1995), this is a measure of adequacy. Its calculation is obtained by the ratio between V_n (i.e., the value of the first old-age benefit received by the individual, at time n) and the last job remuneration prior to retirement W_{n-1} in percentage terms, as evidenced in Equation (14).

$$RR = \frac{V_n}{W_{n-1}}.100 \tag{14}$$

The following three indicators consider income flows, contributions and benefits. They are, therefore, "money's worth indicators" (Geanakoplos, Mitchell and Zeldes, 1999). The internal rate of return (*IRR*) corresponds to the discount rate that equates the present values of the flows of the contributions of the working period (PVC_2) and the old-age and survivors' pensions (PVO_2+PVS_2) (Equation (15)).

$$PVC_2 = PVOS = PVO_2 + PVS_2$$
$$\sum_{k=0}^{n-1} C_{x+k}\cdot\left(\frac{1}{1+IRR}\right)^{k}\cdot {}_kp_x = \sum_{k=0}^{\omega-x-n} V_{x+n+k}\cdot\left(\frac{1}{1+IRR}\right)^{n+k}\cdot {}_{n+k}p_x$$
$$+\beta.\sum_{k=0}^{\omega-x-n} V_{x+n+k}\cdot\left(\frac{1}{1+IRR}\right)^{n+k}\cdot {}_{n+k}p_y\cdot {}_{n+k}q_x \tag{15}$$

The third indicator is the required contribution rate (*ReqRate*), presented in Equation (16). It measures what should be the fair rate that balances the expected flows of benefits (the sum of old-age and survivors' pensions) and contributions, such that *PVOS* is equal to *PVI*.

$$ReqRate = \frac{PVOS}{PVI} \tag{16}$$

The fourth and last indicator is the effective rate (*ER*). It is given by the relationship between the present values of contributions and income over the work period of the worker, as shown in Equation (17). It can be used to analyse the contributory effort of the worker. If the value of *ER* is equal to that of *ReqRate*, then the total of the contributions paid made were adequate to defray the benefits. If *ER* is lower (higher) than *ReqRate*, then the expected value of the contributions is lower (higher) than would be expected to pay for the expected benefits.

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$$ER = \frac{PVC}{PVI} \quad (17)$$

Assumptions

To use the representative individual method, hypothetical income, retirement, and survivors' pension profiles are constructed based on observable attributes. This is a common approach in studies on social security (Forteza and Ourens, 2009; OECD, 2021). Based on the relevant literature and some features of the Brazilian economy, the following assumptions were adopted:

- Age of entry into the labour market: 20 years;
- Initial income: 1, 2 and 3 times the minimum wage (MW) in force on the date of this study, equivalent to BRL 1,100;
- Income growth rate: 2 per cent per year;
- Discount rate: 2 per cent per year;
- Contribution wage and rates: for the old situation, the values defined in 2019, corrected annually until the beginning of 2021 (our reference date) by the National Consumer Price Index (INPC), Brazil's official inflation index, were used. For the current situation, the values in force since January 2021 were used. Table 2 presents this information;
- We updated the values of the values of the Progressive Rule 85/95 to the beginning of 2021. For this reason, the rule values used in our calculations, are 87 for women and 97 for men. Motivated by the change in the values, from this part of the article, we start to mention the Rule 87/97.
- Mortality tables: Official IBGE 2019 tables by sex, extrapolated by the Secretariat of Social Security of the Ministry of Labour and Social Security of Brazil, for ages over 80 years;

Table 2. *Contribution wages and rates – Old and current situations*

Situation	Contribution salary (BRL)	Contribution rate (%)
Old	Up to 1,930.04	8
	1,930.05 to 3,216.78	9
	3,216.79 to 6,433.56	11
Current	Up to 1,100.00	7.5
	1,100.01 to 2,203.48	9
	2,203.49 to 3,305.22	12
	3,305.23 to 6,433.57	14

Source: Authors' elaboration.

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- Contributory density: equal to 1; it is considered that the person did not stop contributing from the moment he or she entered the labour market until retirement;
- Only urban salaried workers are considered; teachers are excluded (because the eligibility conditions for retirement for this group are somewhat different);
- For the old situation, only the length of contribution retirement (*LOCR*) is considered;
- All the monetary flows were calculated on an annual basis;
- The representative worker is a man whose survivors' pension is reverted to his wife, who is five years younger;
- The only dependant is the spouse; that is, there is no reversion (survivors' pension) for children. This choice is justified by the fact that in more usual family arrangements, the difference in the age of children in relation to that of their parents at the date of their retirement causes the former to not satisfy the eligibility criteria for survivors' pensions.
- According to the RGPS rules, the value of the survivors' pension cannot be less than one minimum wage. We made this adjustment when necessary.

Results

In this section, we present the results for the four individual pension indicators, based on the rules that were in force until 2019 (old situation) and the rules in effect from 2020 (current situation).

Tables 3 and 4 report the *RR* values for men and women for the old and current situations, respectively. For this purpose, different values for income (in multiples

Table 3. *RR (%) by sex, initial income, and contributory period (CP) (old situation)*

Initial income (MW)	Sex	CP(years)	Retirement age(years)	RR (%)	Retirement factor
1	F/M	30/35	50/55	45.48/52.30	0.57/0.67
1	F/M	42/45	62/65	89.38/95.26	1.22/1.32
1	F/M	47/50	67/70	119.74/129.79	1.69/1.86
3	F/M	30/35	50/55	45.48/52.23	0.57/0.67
3	F/M	42/45	62/65	86.92/90.89	1.22/1.32
3	F/M	47/50	67/70	112.69/119.29	1.69/1.86
5	F/M	30/35	50/55	36.51/39.46	0.57/0.67
5	F/M	42/45	62/65	61.92/63.29	1.22/1.32
5	F/M	47/50	67/70	77.81/80.86	1.69/1.86

Source: Authors' elaboration.

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Table 4. *RR (%) by sex, initial income, and contributory period (CP) (current situation)*

Initial income (MW)	Sex	CP(years)	Retirement age(years)	RR (%)
1	F/M	42/45	62/65	77.51/72.91
1	F/M	47/50	67/70	80.82/76.29
1	F/M	50/53	70/73	82.65/78.16
3	F/M	42/45	62/65	75.68/70.06
3	F/M	47/50	67/70	76.72/70.96
3	F/M	50/53	70/73	72.43/68.25
5	F/M	42/45	62/65	50.92/47.98
5	F/M	47/50	67/70	46.12/43.46
5	F/M	50/53	70/73	43.46/40.95

Source: Authors' elaboration.

of minimum wages – *MW*), contributory period (*CP*) and retirement age were assigned. Multiples of *MW* were chosen because this is the ceiling for social security contributions and benefits in Brazil, in addition to being an important index in the labour market. The values for the social security factor are also presented in the last column.

Both tables are divided into three blocks according to initial income. In each block, there are three retirement ages, for women and men. The first line of each block for the old situation presents the minimum eligibility condition for receiving the old-age pension by contributory period (*CP*). In this case, the assumptions about retirement age (and age when contributions commenced) were based on the data described by Silva Filho and Sidone (2022). The ages for the second line of the old situation and the first line of the current situation (62/65) were chosen to allow immediate comparisons with the results before and after the reform. The last line for the current situation represents an extension of the contributory period (*CP*) of the second line, which is also done in the second and third lines for the current situation.

The *RR* values (presented as the ratio, in percentage terms, between the first benefit and the last salary) decrease in the current situation compared with those in the old situation. This reduction can be observed, for example, when comparing the second row of Table 3 with the first row of Table 4. The *RR* decreased from 89.38 per cent and 95.26 per cent to 77.51 per cent and 72.91 per cent, respectively. This represents a reduction of approximately 12 and 22 percentage points in relation to the legislation prior to the reform in Brazil. Several reasons explain this result. In the old situation, in the analysed

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case, men and women were able to meet the requirement of Rule 87/97 (see *Assumptions*). As the retirement factor is higher than the unit for both (last column of Table 3), their benefit wage is higher than the average of the contribution wages. The effect of Rule 87/97 is clear when comparing the first row of each block in Table 3 with the other two rows, both in the *RR* values and in the value of the retirement factor. An example is the *TR* value for a woman with an initial income of three times the minimum wage, who contributed for 30 years (45.48 per cent), and a woman who contributed for 42 years (86.92 per cent). Only the second meets the criteria of Rule 87/97 (retirement age + $CP \geq 87$, with factor > 1); therefore, its value is much higher.

It is also evident in the old situation that *RR* increases when the contributory period (*CP*) increases, mainly due to the increase in the factor. For the highest initial income, the reduced *RR* values are explained by the benefits being limited to the ceiling of the pension scheme.

In the current situation, there is a decrease in the *RR*, which become more homogeneous among the different profiles. This implies a reduction in compliance with the adequacy principle. This fact is mainly associated with the new formula for calculating the benefit. However, the decline is not uniform. The decrease is greater for women, a finding that should indicate a reduction in the old-age benefits. There is a greater reduction for individuals with a higher income who stay longer in the labour market, a profile that is not common. This provides evidence that the reform has unequal distributive impacts, based on the characteristics of the workers. Notably, *RR* is not affected by any assumption about survivors' pensions, as this indicator considers only the values at the date of retirement when the old-age pension is first paid, and the last salary of the working period.

Next, the results for two indicators are presented: required contribution rate (*ReqRate*) and effective rate (*ER*) in the old situation (Table 5) and in the current situation (Table 6). As survivors' pensions imply an extension of the period of receipt of old-age benefits, the required rates for old-age benefits ($ReqRate_{OA}$) and for survivors' pensions ($ReqRate_{S}$) were calculated separately. The term $ReqRate_{T}$ represents the sum of these two indicators. As the required rate is a money's worth ratio indicator and the reform increased the minimum retirement age and changed the value of survivors' pensions, the breakdown of the rates seeks to capture whether the pension reform had different impacts on these benefits. The significant values found for the necessary rate for survivors' pensions show how important it is to include this benefit when analysing pension schemes.

As seen in Tables 5 and 6, there is a reduction in $ReqRate_{T}$. In this case, there are two effects in opposite directions. The first effect is that the older the individual is, the shorter the period for receiving benefits (old-age and survivors' pensions). The

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Table 5. *ReqRate (%) by sex, initial income, and contributory period (CP). Reversion of survivors' pensions for females. Age difference between men and women equal to 5 years (old situation)*

Initial income (MW)	Sex worker/ beneficiary	CP (years)	Retirement age (years)	ReqRateOA (%)	ReqRateS (%)	ReqRateO (%)	ER (%)
1	M/F	35	55	27.95	10.20	38.14	28.18
1	M/F	45	65	30.79	14.51	45.30	28.34
1	M/F	50	70	32.43	17.31	49.74	28.39
3	M/F	35	55	27.91	10.18	38.09	30.98
3	M/F	45	65	25.85	12.18	38.03	30.25
3	M/F	50	70	18.10	9.66	27.76	29.71
5	M/F	35	55	21.08	7.69	28.78	25.71
5	M/F	45	65	15.51	7,31	22.82	23.89
5	M/F	50	70	10.86	5.80	16.65	23.12

Source: Authors' elaboration.

Table 6. *ReqRate (%) by sex, initial income, and contributory period (CP). Reversion of survivors' pensions for females. Age difference between men and women equal to 5 years (current situation)*

Initial income (MW)	Sex worker/ beneficiary	CP (years)	Retirement age (years)	ReqRateOA (%)	ReqRateS (%)	ReqRateO (%)	ER (%)
1	M/F	45	65	23.57	6.66	30.23	29.54
1	M/F	50	70	19.06	6.11	25.17	29.74
1	M/F	53	73	16.71	5.72	22.43	29.83
3	M/F	45	65	22.65	6.40	29.05	33.13
3	M/F	50	70	17.73	5,68	23.41	32.54
3	M/F	53	73	14.59	5.00	19.59	32.19
5	M/F	45	65	15.51	4.38	19.89	26.21
5	M/F	50	70	10.86	3.48	14.34	25.36
5	M/F	53	73	8.76	3.00	11.75	24.91

Source: Authors' elaboration.

second effect is related to income at the time of retirement. The longer the contributory period (*CP*), the higher is the income (given the premise of steady income growth), which leads to an increase in old-age benefits, especially

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in the old situation when the retirement factor and Rule 87/97 were in force. As the magnitude of the first effect is greater than that of the second, the required rate decreases.

An important change occurs in the relationship between the required and effective rates. In the old situation, in most cases, $ReqRate_T$ was superior to *ER*. This evidences that for the profiles analysed, the principle of actuarial justice (Queisser and Whitehouse, 2006) was not obeyed. The expected present value of the benefits received was higher than the contributions made to finance these.

In the current situation, this situation is reversed. The *ER* values increase slightly (which was expected, given the slight increase in the contribution rates to the pension system), but these values become higher than the $ReqRate_T$ values, with a single exception. The significant decrease in $ReqRate_T$ values lead to three conclusions: i) reform adjustments occur through a reduction in expenditures on old-age and survivors' pensions; ii) the reform achieved its equilibrium objectives, at least for the analysed benefits; and iii) the formula for calculating the benefits, with a constant accrual rate, is the main determinant for the decrease in $ReqRate_T$ with age and contributory period. This decrease is significant. For example, in the combination of a contributory period (*CP*) of 45 years and retirement at 65 years, the required rate decreases from 45.30 per cent to 30.23 per cent.

In addition to the reduction, a noteworthy finding is the change in the composition of the contribution rates. There is a decrease in the portion to pay for old-age pensions in relation to the portion needed to pay for survivors' pensions. An example is the results in the second row of Table 5 and the first row of Table 6. In the first case, the required rate for survivors' pensions

Table 7. *IRR (%) by sex, initial income, and contributory period (CP). Reversion of survivors' pensions for females. Age difference between men and women equal to 5 years (old situation)*

Initial income (MW)	Sex worker/beneficiary	CP (years)	Retirement age (years)	IRR (%)
1	M/F	35	55	0.65
1	M/F	45	65	0,96
1	M/F	50	70	1.12
3	M/F	35	55	0.43
3	M/F	45	65	0.45
3	M/F	50	70	-0.13
5	M/F	35	55	0.22
5	M/F	45	65	-0.08
5	M/F	50	70	-0.57

Source: Authors' elaboration.

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Table 8. *IRR (%) by sex, initial income, and contributory period (CP). Reversion of survivors' pensions for females and age difference between men and women equal to 5 years (current situation)*

Initial income (MW)	Sex worker/beneficiary	CP (years)	Retirement age (years)	IRR (%)
1	M/F	45	65	0.05
1	M/F	50	70	-0.35
1	M/F	53	73	-0.59
3	M/F	45	65	-0.28
3	M/F	50	70	-0.67
3	M/F	53	73	-0,98
5	M/F	45	65	-0.55
5	M/F	50	70	-1,08
5	M/F	53	73	-1.39

Source: Authors' elaboration.

(14.51 per cent) represented 32.03 per cent of the 45.30 per cent of the total required rate. After the reform, these values change to 6.66 per cent, 22.03 per cent and 30.23 per cent, respectively. Similar behaviour is observed for the other cases. The rates required to finance old-age pensions have decreased more significantly than those needed to pay for survivors' pensions. This is evidence that a sizable portion of the adjustment occurs due to changes in survivors' pensions rules.

Tables 7 and 8 provide the results for the fourth indicator, internal rate of return (*IRR*), considering the flows of contributions and benefits (old-age and survivors' pensions). The *IRR* values, presented in real yearly terms, are lower for longer contributory periods, and the same happens for higher income values. This occurs before and after the reform, and the values in the current situation are substantially lower than those in the old situation. The results for the old situation are slightly lower than those reported by Afonso and Zylberstajn (2019). Conversely, the negative values found in the current situation are aligned with the findings of Afonso and Carvalho (2021). This shows that the increase in the contributory period, given by the reform, together with the shorter period of receipt of benefits, strongly affects the *IRR*.

Conclusions and observations

The 2019 pension reform in Brazil was primarily motivated by the need to reduce aggregated spending and associated deficits. However, little attention was paid to

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individual impacts: workers with distinctive characteristics and heterogeneous aspects of insertion into the labour market were affected differently. Based on this fact, this study has sought to analyse the expected effects on survivors' pensions of the reform of the national pension scheme, the RGPS. The analysis focused on profiles of representative individuals, analysing aspects related to the adequacy and intragenerational equity of survivors' pensions. We used an actuarial methodology to compute the individual pension indicators.

The *RR* values should become more homogeneous. However, the changes in this indicator were quite heterogeneous. This is a crucial aspect, because *RR* is an indicator directly associated with the progressivity and distributive aspects of old-age benefits. A huge portion of the heterogeneous change is caused, in the old situation, by the retirement factor, whose formula has nonlinearities (due to life expectancy in the denominator of the old-age benefit calculation rule), and the discontinuities originating from Rule 87/97. The formula for calculating the benefit value in the current situation, with a constant accrual rate, is the main reason the *RR* values have become more homogeneous (except for higher income levels, due to the benefit ceiling).

Subsequently, we calculated the required rates (separated for the old-age and survivors' pensions), the effective rates, and the internal rates of return. As survivors' pensions represent an extension of the period of receipt of benefits by the spouse, their incorporation in the model does not affect indicators such as *RR* values but affects money-worth indicators such as *ReqRate* and *IRR*.

The reform greatly reduces the total required rates (about a third less than its previous values, for the individuals analysed). Equally important, it changed the composition of this indicator, with the required rates to finance survivors' pensions becoming a smaller portion in relation to the rates to finance old-age pensions. The reason is that the reversion (initial payment) to the spouse should occur at an older age, when the probabilities of death of the spouse are higher. Additionally, in general, $ReqRate_T$s, under the conditions of the old situation, are superior to the corresponding *ER*s. This indicates an imbalance between the likely cost of contributory benefits and the value of the contributions paid. Conversely, the reform promoted the opposite effect, that is, $ReqRate_T$s became lower than the effective rate. For *IRRs*, the values also decreased after the reform, with several negative values.

Taken together, these results indicate that the reform, analysed using individual indicators for old-age and survivors' pensions, met the objectives of reducing previously observed inequalities. The new survivors' rule, with a reversion of less than 100 per cent, seems to have played an important and, so far, little recognized role. The permanent rules of the reform will likely have the desired result of reducing the deficit in the RGPS, the Government's main goal. However, this is expected to occur at the expense of reducing the progressivity of

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old-age and survivors' pensions. That is, there should be an increase in intragenerational equity, as the differences in the individual indicators must be reduced.

We are led to conclude that the reform represents a paradigm shift in the social protection structure in Brazil. Based on the terms described by Mattil (2006, ch. 2), adequacy was sacrificed to give more emphasis to sustainability.

Finally, it is important to mention that our study has some limitations. First, we analysed only two benefit programmes. Further research, with a focus on temporary and permanent disability benefits, could produce a more in-depth picture of the adequacy and equity aspects of the entire Brazilian pension system, with the rules in force after 2019. Second, our results may have been affected by the choices made about the representative individuals, especially the age difference between spouses. Different profiles may produce other outcomes. Third, we did not consider the several transition rules that have accompanied this reform. The distributive aspects during the transition period may be relevant, and different from the long-run outcomes. Fourth, we did not incorporate the expected increase in longevity for future generations, which may increase the period of receipt of benefits, with effects on the calculated pension indicators. Fifth, a more realistic assessment of the unequal contribution densities during the working life, as well as a non-deterministic framework, could be incorporated by future research. Sixth, and finally, different economic assumptions (i.e., interest rates and salary growth rates) could also produce different results.

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Check for updates

Pension financialization and collective risk sharing in Canada and Finland

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Abstract This article contributes to the debate concerning pension financialization and how countries are adapting their pension systems to respond to demographic ageing. We do so by examining the statutory pension systems of Canada and Finland, which diverge interestingly from current international trends. The Canadian and Finnish public pension schemes reflect two tendencies often associated with pension financialization: an increasing reliance on financial markets and an investment policy with a diversified asset allocation. However, unlike in many other countries, this has not resulted in heightened individual risks in old-age income security caused by a shift from defined benefit to defined contribution pensions – an otherwise common trend internationally.

Keywords pension scheme, social security scheme, social security financing, social insurance, privatization, investment policy, Canada, Finland

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The authors thank the participants of the panel “Nordic pension policies adapting between sustainability and adequacy” (Nordic ESPAnet 2019, Helsinki, Finland) and the stream “Reforming pension systems” (ESPAnet 2019, Stockholm, Sweden) for their comments and suggestions, as they do Susan Kuivalainen, Antti Mielonen, Mikko Sankala, Mika Vidlund and Niko Väänänen as well as the anonymous reviewers. The study was supported by the Academy of Finland under Grant number 283447 and Grant number 312624. The authors declare that they have no conflicts of interest.

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Introduction

Since the 1990s, influential international organizations have raised concerns regarding the "old-age crisis", as many public pension systems have faced an unsustainable combination of a growing number of retirees with increasing life expectancy and diminishing workforces. The World Bank (1994), OECD (1998, 2000), and European Commission (1999, 2012) have published reports on the desired policies needed to avert the assumed "crisis". These reports urge lightening the burden of public pay-as-you-go (PAYG) pension schemes[1] and increasing the role of private or public pre-funded retirement saving arrangements. In line with the proposals of these organizations, several countries have sought to reform their pension systems so that their public PAYG pension schemes would account for a smaller share of their citizens' retirement incomes than was previously the case (see, for example, Clark and Whiteside, 2003; Ebbinghaus, 2011).

This development is an important part of a more general phenomenon, referred to as "pension financialization". Pension financialization is often associated with three tendencies (van der Zwan, 2017). First, an increasing role for capital funding in the financing of pensions and, thus, the dependence of pensioners' livelihoods on financial markets, which follows the shift from PAYG financing towards pre-funding. Second, a shift in the investment policy of pension investors away from fixed-income assets (such as government and corporate bonds) that generate predictable and "safe" returns, and a move towards more diverse and higher risk investments including corporate equities and other asset classes with fluctuating returns.

The third tendency is the shift from defined benefit (DB) pensions to defined contribution (DC) pensions. In the latter, the contribution rate is fixed and the value of pension income is variable, as it is substantially determined by the investment returns from financial markets, rather than defined in advance according to a certain accrual formula as in DB pensions. There are two important consequences of this third tendency. First, a transfer of risk from contributors (current employers and employees) to beneficiaries (pensioners). Second, a shift of risk from the collective to the individual, as DC plans are often personal and individualized and may also include the possibility for contributors to make investment decisions. In addition to individual investment risks, DC plans also often increase individual inflation risks, career break risks (for example, if parental leave or unemployment decreases the insured's pension

1. Public pay-as-you-go (PAYG) pension schemes are financed by contributions from current contributors (often both employers and workers), not by the past contributions of current beneficiaries. In a pure PAYG system, no funds are accumulated.

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benefits) and longevity risks (if benefits are paid as a lump sum instead of periodic payments across the remaining life course). By contrast, public DB pension systems typically share the above-mentioned risks collectively, with an emphasis on providing secure pensions for all workers.

These changes in the realm of pensions can be understood as part of a much broader shift from industrial capitalism towards financialized capitalism (van der Zwan, 2014): the shift towards the financialization of everyday life, and a move towards greater individual risk bearing, and dependence on financial markets to meet basic income needs. Previous research has drawn attention to the increasing uncertainty and individualization of risks as an outcome of pension financialization (Berry, 2016; Langley, 2004; Natali, 2018; Wiß, 2019). This move has also been conceptualized as a partial shift from thrift and collective insurance towards individual investment (Langley, 2008) or, from a more general point of view, towards individualization of financial risks and the responsibilization of citizens (Berry, 2015). There has been increasing discussion on how this "risk shift" has created a new kind of economic insecurity (see, for example, Hacker, 2006). However, as van der Zwan (2014) asserts, the emphasis in the literature has often been on developments in the United States of America and the United Kingdom. For this reason, there is a need for research on diversity in relation to financialization internationally.

The present article aims to contribute to the discussion on international diversity concerning approaches to pension financialization by examining two relatively different statutory pension systems in Canada and Finland. The two countries diverge in surprisingly parallel ways from what are deemed to be global trends of individualization and privatization. The article explores how the entwinement of financial markets and social security has occurred in recent developments in Canada and Finland and, importantly, has shaped current arrangements wherein the role of public DB pensions has remained strong, and the significance of private occupational pensions has not increased. The focus of the article is on the consequences of pension financialization, not the politics of pension policy or the triggers for reforms.

The recent developments in the Canadian and Finnish public pension schemes offer clear examples of the first two mentioned tendencies associated with pension financialization; that is, an increasing reliance on financial markets and diversified asset allocation, including proliferating investments placed in equities. However, as we will discuss, Canada and Finland both depart from the third, apparently international, tendency: in both countries, recently introduced forms of financialization have not resulted in the utilization of mandatory or quasi-mandatory DC pensions or a significant increase in occupational DC plans. In other words, a greater burden of risk has not been transferred to individuals.

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The literature on pension financialization has largely focused on the increasing role of pre-funded private pensions, with the emphasis placed on the ongoing shift from DB pensions to DC plans (see, for example, Hassel, Naczyk and Wiß, 2019; Bridgen and Meyer, 2005; Langley, 2004; Schmähl, 2007). However, as this article will show, a study of financialization as regards public DB pensions provides a more diverse view of the phenomenon. Utilizing the illustrative cases of Canada and Finland, the article engages with the debate about the possibilities of the notions of collective risk sharing and solidarity articulating with some forms of financialization (see van der Zwan, 2014). Several studies have highlighted the possibilities of combining financialization, social protection and collective risk sharing by regulating private pre-funded occupational pensions (see Anderson, 2019; Bridgen, 2019a; Frericks, 2013; Pavolini and Seeleib-Kaiser, 2018; Van der Zwan, 2017). Nevertheless, Canada and Finland represent a different kind of interaction between financial markets and collective risk sharing than these other cases, partly because the interaction is taking place within public pension schemes and with only partial pre-funding. In general, the processes described in this article can be situated as part of a broader trend towards the financialization of the State, usually referring to the change in the management of public debt and assets. The trend towards the financialization of the State requires further investigation, especially because it is not a mere technical matter, but might have significant political and distributive consequences (see Schwan, Trampusch and Fastenrath, 2021).

By exploring the situation in Canada and Finland, the article shows how increasing reliance on financial markets to provide for pensioners' income security is not necessarily connected to privatization or the individualization of risks; instead, financializing public pension systems can be combined with, and may even help to consolidate, comprehensive statutory risk sharing, nationwide social insurance and solidarity. At the same time, however, collective risks might increase significantly. The main contribution of the article is to help better understand the relationship between pension financialization and the scope of possibilities that exist for statutory collective risk sharing. The analysis is based on academic, governmental, and other expert literature – including actuarial reports and long-term projections – on the Canadian and Finnish pension schemes.

The structure of the article is as follows. In the next section, we present the most important characteristics of public pension schemes and the history of partial pre-funding in Canada and Finland. We then elaborate on the extent to which the three common tendencies associated with pension financialization apply to these two countries by examining the increasing role of pre-funding, the shift in investment policies, and the resilience of the statutory DB pension schemes and collective risk sharing in the context of financialization.

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Pension systems in Canada and Finland

The Canadian and Finnish statutory public pension systems share certain common elements, even though there are also substantial differences (Table 1). First, both schemes include a guaranteed minimum pension: Old Age Security (OAS) and Guaranteed Income Supplement (GIS) in Canada and the national pension (*Kansaneläke*) and guarantee pension (*Takuueläke*) in Finland. Second, both national schemes have also included an earnings-related tier since the 1960s – the Canada Pension Plan (CPP) and the earnings-related (*Työeläke*) pension system in Finland[2] – for adult employees and entrepreneurs, currently providing career-average defined benefit (DB) pensions.[3] In Canada, one of its ten provinces, Quebec, has its own separate public pension plan (Quebec Pension Plan – QPP), but it is very similar to the CPP.

The main differences between the schemes in Canada and Finland relate to the contribution and benefit levels (see Table 1), especially for those with higher incomes. The Finnish pension system is almost completely based on first pillar public pensions, the replacement rates[4] are similar at all wage levels (OECD, 2021), and there is no ceiling for the level of the statutory pension. Therefore, the significance of supplementary pensions has remained marginal, with only about 10 per cent of employees covered by private occupational pensions (Vidlund et al., 2016). By contrast, in the Canadian two pillar system, the importance of second pillar occupational plans has been crucial due to the rather modest replacement rates of public pensions, especially among persons with higher income. The CPP operates with a pension ceiling. However, the percentage of Canadian employees with a traditional occupational pension plan (Registered Pension Plan – RPP), has been decreasing since the end of the 1970s, especially

2. The earnings-related pension system in Finland consists of two main schemes: the statutory schemes for private-sector and public-sector employees. The benefits of these schemes are very similar. However, there are differences in the share and technique of pre-funding in financing the pensions in different sectors (private, municipal, state). The pensions for self-employed workers are not partially pre-funded, and the principles of financing and benefits differ from the employees' pension schemes. This article focuses on the statutory pension schemes for private- and public-sector employees, unless otherwise stated.

3. Career average DB pensions are based on an average of the insured's salary throughout the working career, not on final salary before retirement.

4. We use here, and in Table 1, theoretical future net pension replacement rates. This concept is defined as the individual net pension entitlement divided by net pre-retirement earnings, taking into account personal income taxes and social security contributions paid by workers and pensioners. The concept assumes a full career in the private sector starting at age 22 in 2020 until reaching the country-specific retirement age. The replacement rates are often calculated for a low (0.5 of average), average (1) and high-wage (2) earners (OECD, 2021).

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Table 1. *Key features of Canadian and Finnish public pension schemes*

	Canada	Finland
Public pension schemes	Residence-based minimum (OAS and GIS) and earnings-related (CPP/QPP) pension schemes	Residence-based minimum (national and guarantee) and earnings-related pension schemes
Benefits in all public pension schemes	Old-age, disability, and survivors' pensions	Old-age, disability, and survivors' pensions
Coverage of the public earnings-related schemes	Virtually all adult employees and self-employed persons	Virtually all adult employees and self-employed persons
Benefit type and calculation (earnings-related)	Career-average DB pensions	Career-average DB pensions
Projected theoretical net replacement rate for an *average-wage earner* in 2063/2066 (% of individual net earnings)	46.4 (2063 at age 65)	63.2 (2066 at age 68)
Projected theoretical net replacement rate for a *low-wage earner* (0.5 of average) in 2063/2066 (% of individual net earnings)	62.0 (2063 at age 65)	63.8 (2066 at age 68)
Pension ceiling	Maximum pensionable earnings based on average salary	No ceiling to contributions, pensionable earnings, or benefits
Financing of the public earnings-related schemes	Mostly PAYG, partial pre-funding, financed mainly by employers, employees and self-employed as well as investments	Mostly PAYG, partial pre-funding, financed by employers, employees and self-employed as well as investments
Public pension spending in 2020, % of GDP	4.8	11.8
Contribution rate in 2023	11.9	24.8
Assets in the public pension system in 2020, % of GDP	25.8	94.4
Projected funding ratio* in 2025 and 2075, %	25.5 and 31.3 in base CPP and at least 100 in additional CPP	30.6 and 36.4 (in the statutory scheme for private-sector employees)
Management of pension funds	CPP Investment Board	Pension insurers
Pension policy making	Federal government and ten provincial and three territorial governments	Central employer and employee organizations and the government

Note: *Funding ratio is the ratio of assets and liabilities that in a partially pre-funded scheme illustrates the significance of pre-funding in relation to PAYG financing.
Sources: OSFI (2019); Finnish Centre for Pensions (2023); OECD (2021); Office of the Chief Actuary (2007); Tikanmäki et al. (2019).

in the private sector. RPP coverage is currently about 37 per cent among all employees and about 22 per cent for private-sector employees (Drolet and Morissette, 2014; Statistics Canada, 2021).

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Whereas most statutory first pillar schemes are completely PAYG financed, sometimes including a small reserve fund, the Canadian and Finnish schemes are exceptional in that the earnings-related statutory schemes are partially pre-funded. As we show in the next section (see also Table 1), the pre-funded part is significant in both countries. There are only a few other countries where public pension systems have significant funds set aside to support their financing, such as Sweden and Norway, but an essential difference compared to Canada and Finland is that these public schemes are no longer DB schemes. Canadian and Finnish schemes also differ significantly from publicly managed national provident funds or state regulated private funds that often seek to provide mandatory "retirement savings" on a DC basis rather than providing DB "pensions".

The policy-making process concerning earnings-related pensions is institutionally different in Canada and Finland, but in both countries an importance is accorded to seeking consensus. In Canada's federal system, a consensus must be found between its ten provincial and three territorial governments and the Canadian federal government (Little, 2008). In the Finnish case, the statutory earnings-related scheme is governed, and reforms are mainly planned, by central employee and employer organizations, instead of parliamentary politicians. There is a strong requirement to build consensus between the country's labour market organizations (Kangas, 2006; Kangas, Lundberg and Ploug, 2010).

These characteristics of national pension policy making appear to have had important effects on the significant role of pre-funding in the Canadian and Finnish public pension systems. In Finland, the decision to create a partially pre-funded scheme[5] in the 1960s was based on the imitation of private pension insurance financing models, as this was seen as a reasonable option among experts and offered a means of compromise between employee and employer organizations. An important factor behind the agreement, which would see employers financing the scheme, was the ruling that permits employers to borrow back two-thirds of pre-funded contributions as cheap long-term "premium loans". This alleviated the employers' burden of payment. It also became an important part of corporate finance as well as of pension insurers' investment policy in Finland until the beginning of the 1990s – prior to the liberalization of the capital markets in the early 1990s, a source of long-term financial capital had been lacking (McCarthy, Sorsa and van der Zwan, 2016; Dixon and Sorsa, 2009). In Canada, the idea of pre-funding was attractive for the Canadian provinces, as the funds could be used to boost the provincial economies (Little, 2008). Starting from the late 1960s, the assets from the QPP fund came to be invested in equities and real estate to

5. The statutory scheme for private-sector employees was based on partial pre-funding from the outset, but the schemes for public-sector (municipal and state) employees began to accumulate funds much later, in the 1980s (Kangas, 2006).

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support economic growth in Quebec, whereas CPP assets were lent to the provinces (Béland, 2006). However, until the 1990s, pre-funding in the CPP was marginal, the scheme was very close to a pure PAYG system, and the small reserve fund only covered about two years of benefits (Little, 2008).

While both schemes have remained predominantly PAYG, the operational significance of pre-funding, international financial markets, and investment returns have increased since the 1990s and will continue to increase. In the following sections we explore the unique combination of financialization and social security within the statutory pensions systems of Canada and Finland, by elaborating on the actualization in both countries of the three discussed tendencies related to pension financialization.

Pension financialization and the resilience of statutory DB pensions in Canada

Increasing reliance on partial pre-funding

In the early 1990s, the Canada Pension Plan (CPP) faced a financing crisis with actuarial projections suggesting that its revenues would prove insufficient to pay all pension benefits (Béland, 2006). As the existing fund was small, increasing the pre-funded element emerged as one of the major instruments to avoid an otherwise inevitable and steep increase in the contribution rate, an outcome made likely by the opposition of Quebec in particular, as well as two other provinces, to large benefit cuts (Myles and Pierson, 2001, p. 320). Thus, the federal and provincial governments solved the problems of financial sustainability by opting to increase pre-funding (Little, 2008). From the end of the 1980s and during the 1990s, the total contribution rate started to rise gradually from the original 3.6 per cent. To alleviate the future financing challenge, in the late 1990s and early 2000s, the combined total contributions of Canadian workers and their employers to the CPP increased from 5.85 per cent to 9.9 per cent (Béland and Weaver, 2019). The purpose of this pre-emptive rise in contributions was to make the scheme financially sustainable in the long term and promote intergenerational equity so that contributions would not grow much more steeply for future younger generations.

However, the biggest step was taken in 2016, when federal, provincial, and territorial politicians reached an agreement to significantly enhance the future benefit levels provided by the CPP by utilizing full pre-funding for the, so called, "additional CPP". In other words, under this system, all enhancements to earnings-related public pensions should be fully pre-funded so that every generation pays their own additional CPP benefits collectively. Henceforth, total

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CPP pensions would consist of a partially pre-funded base CPP and a fully pre-funded additional CPP.

In Canada, the public first pillar (CPP) pension assets equated to 26 per cent of GDP in 2020 (Finnish Centre for Pensions, 2023; see Table 1). However, in the coming decades, CPP funds will grow much faster than previously, especially because the new additional CPP is fully pre-funded. All CPP assets are projected to increase more than tenfold in the next three decades (OSFI, 2019, pp. 34–36 and pp. 51–52).

The funding ratio (the ratio of assets and liabilities) of the base CPP has been increasing since 1997, when it was below 10 per cent, and is projected to rise to over 25 per cent by 2025 and to 31 per cent by 2075 (Office of the Chief Actuary, 2007, pp. 21–24; see Table 1). In the additional CPP, the funding ratio is at least 100 per cent (OSFI, 2019, p. 179). Furthermore, the share of investment income from total revenues (contributions and investment income) will grow significantly (Office of the Chief Actuary, 2021, p. 13). In the base CPP, the ratio of net investment income and contributions is expected to be 45 per cent in 2025 and 67 per cent in 2065 (see OSFI, 2019, p. 39). To sum up, the increasing significance of pre-funding may be understood as the first expression of the financialization of Canada's statutory pension scheme.

The shift in the investment policy: Towards new kinds of asset classes

In Canada, a major financing reform was enacted in 1997 that made a more yield-seeking and riskier investment policy and a new kind of asset allocation possible for the CPP. Following the reform, the Canadian public pension system has actively started to invest in corporate equities with the aim to secure the sustainability of the scheme through higher investment returns.

An essential part of the 1997 reform was the establishment of an independent Canada Pension Plan Investment Board (CPPIB), which started to manage professionally the investments, at arm's length from the government. The CPPIB followed the example of the QPP's investment board, which has invested in equities since the late 1960s (Béland, 2006). The change in the asset allocation was rapid. In 1997, 100 per cent of CPP funds were invested in fixed-income government bonds. In 2007, the share of equities had risen to 65 per cent, while the share of fixed-income assets had dropped to 25 per cent. Following the 2008 financial crisis, the share of CPP funds invested in equities has decreased slightly, sitting at 53 per cent in 2020, while the share placed in real estate (11.3 per cent) and infrastructure (8.6) per cent has increased (CPP Investments, 2020a;

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CPP Investments, 2020b). Overall, the drop in the share placed in equities has not been radical, when compared with, for example, the efforts of private pension funds in the United Kingdom to de-risk their asset mix after the financial crisis (see Gelepithis, 2019).

All in all, this development in investment policy in Canada provides the second expression of the increasing financialization of the statutory pension scheme. The key take-home point is that Canada has increasingly utilized collective risk taking in the financial markets, without increasing the individual risks faced by beneficiaries. Simultaneously, this has apparently enabled a somewhat exceptional enhancement of public pension benefits. Next, we elaborate on the resilience of DB pensions and collective risk sharing in the context of financialization. In turn, we highlight collective uncertainty related to, first, increased collective risk taking and, second, current actuarial calculations.

Enhancement of public pensions instead of coverage extension by occupational plans

In Canada, the public pension scheme has been relatively resilient over the decades (Béland, 2006; Béland and Myles, 2005; Lain, Vickerstaff and Loretto, 2013). However, the decision in 2016 to extensively enhance the CPP by using full pre-funding in the additional CPP was an exceptional development. Contributions increased gradually from 9.9 per cent to 11.9 per cent between 2019 and 2023. The theoretical net replacement rate of the public schemes (including the CPP and OAS) for a full career average-wage earner is projected to increase significantly to over 46 per cent (and to 62 per cent for a full career low-wage earner) by the 2060s (OECD, 2021; see Table 1). In several publications, the Government of Canada (2021, 2022) unambiguously promises that the CPP replacement rate will increase, due to the additional CPP, from 25 per cent to 33 per cent of average work earnings received after 2019, which in most cases is topped up by the OAS. In addition, the ceiling for pensionable earnings will rise above the level of average earnings by 14 per cent by 2025, leading to higher maximum pensions. As the additional CPP is fully pre-funded, the realization of the enhancement due to this new element will take time to materialize and will have little effect on current benefits.

Although reversals of public pension retrenchment in liberal welfare states may occur (see Bridgen, 2019b), in general, the development of pension policy in Canada has not followed the long-term trend seen in other liberal welfare states – i.e., a diminishing reliance on public earnings-related pensions and the increasing importance of private occupational arrangements. Despite the decreasing coverage of occupational pensions in Canada, the government has

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not made private occupational pensions more encompassing by regulation. Instead, Canada has significantly enhanced public statutory pensions by means of financialization.

By contrast, Australia, Ireland, New Zealand and the United Kingdom, as well as some states in the United States of America, have all introduced the regulatory extension of private pension coverage (Gelepithis, 2018; Moss, 2019). In 2012, the United Kingdom introduced "auto-enrolment" (with a possibility to opt out) to widen the coverage of occupational pensions and, in 2016, the United Kingdom statutory earnings-related pension system was completely abolished and transformed into a flat-rate basic pension scheme. In the United States of America, there is no federal level auto-enrolment regulation, but some states are using auto-enrolment in their retirement plans, which are offered to workers who are not covered by company schemes (Cometto, 2019).

There are important differences between the enhancement of the DB federal CPP compared to the mandatory extension of private pensions, although both approaches utilize pre-funding and financialization. These differences are significant in terms of solidarity and risk sharing: who bears the risks and how? Internationally, occupational pre-funded pensions are increasingly DC plans, which shift investment risks, inflation risks, career break risks, and often also longevity risks to individuals. This is not the case for the Canadian public pension scheme.

Yet even though the risks are not individualized, the Canadian system cannot avoid the collective uncertainty related to investment risks, economic and demographic development, and actuarial projections. For this reason, specific regulations exist for situations when the system may be faced with a financially unsustainable position (Government of Canada, 2021). If the base CPP is anticipated to be in a deficit position according to long-term actuarial projections, the regulated adjustment options aim to share the risk between contributors and beneficiaries by increasing the contribution rate and weakening the price indexation of current pensions. In the case of the fully pre-funded additional CPP, there are automatic adjustments defined in the legislation to be used when finance ministers cannot reach agreement on the response. If the additional CPP is shown to be in a deficit position, adjustments will be shared sequentially between beneficiaries and contributors by first weakening the indexation of current and future benefits and reducing the value of future new benefits within a certain limit (max. 5 per cent). If such measures are insufficient to restore the financial sustainability of the additional CPP, the last possible option is to increase contribution rates.

The details of these adjustments are important for the resilience of collective DB pensions in Canada. First, the nominal value of the current benefits cannot be

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reduced. Second, the possible reduction of future pensions is limited and defined strictly in advance. Third, the options to increase contributions and to decrease indexation are defined as equal options to maintain the sustainability of the base CPP. Moreover, for the fully pre-funded additional CPP, the option to increase contributions is not ruled out. In other words, while there may be some uncertainties, the risks are limited and exist only at the collective level within and between generations.

Pension financialization and the resilience of statutory DB pensions in Finland

Increasing reliance on partial pre-funding

In Finland, there has not been such a rapid shift towards the importance of pre-funding as in Canada. This is because the role of pre-funding was already significant from the outset, following the introduction of the statutory scheme for private-sector employees.[6] The pension funds have grown steadily since the 1960s and the value of their assets represented about 20 per cent of GDP by the end of the 1980s. At the turn of the 1990s, the value of pension funds expanded further because the statutory earnings-related schemes for public-sector employees, which were initially financed completely on a PAYG basis, started to accumulate substantial assets (Kangas, 2006). Among countries with notable public pension funds, Finland has the highest share of public first pillar pension assets in relation to GDP (94 per cent in 2020) that cannot be used for other public expenditures (Finnish Centre for Pensions, 2023; see Table 1).

The funding ratio (the ratio of assets and liabilities) in Finland was over 30 per cent across the period 2000–2020 and is projected to remain relatively stable until the 2040s but to grow to 36 per cent by 2075 (Tikanmäki et al., 2019, p. 66; see also Table 1). As in Canada, the share of investment income from total revenues (contributions and investment income) will increase significantly in the coming decades (Tikanmäki et al., 2019, p. 65). In the Finnish public pension scheme for private-sector employees, the ratio of investment income and contributions is expected to be 34 per cent in 2025 and 47 per cent in 2065 (see Tikanmäki et al., 2019, p. 65).

6. In the 1960s, a majority of total contributions were pre-funded. After that, the share of pre-funding gradually stabilized at the present level, which is equal to about a fifth of contributions. The total contribution rate was about 5 per cent during the 1960s and increased to 12 per cent by 1977 and to about 24 per cent by the end of the 1990s.

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The shift in the investment policy: Towards new kinds of asset classes

As was the case in Canada, a major financing reform also took place in Finland in 1997 that made an investment policy with a higher risk profile and new kinds of asset allocation possible for pension insurers. The reform became possible after a gradual normative shift in the ways of thinking concerning public pension funds' investment policies (Dixon and Sorsa, 2009). In Finland, this shift had already commenced at the end of the 1980s when credit markets were liberalized and the traditional investment policy of pension insurers began to attract criticism for low investment returns (Kangas, 2006). During the first decades of the scheme's operation, Finnish pension insurers' investment policy had been stipulated to prioritize investment in the national economy, but by the end of the 1990s the investment policy had shifted because of a move towards independent and professional management.

The development in Finland has some unique features, but the trend is relatively similar to that seen in Canada. In Finland in the mid-1990s, the share of equities was not zero as it was for the CPP, but around 10 per cent (Kangas, 2006). At that time, government bonds were the most important investment instruments in the public pension scheme. Then, similarly to the CPP's investment practices, after the reform in 1997, the share of equities started to increase as the pension insurers began following international portfolio management paradigms which saw them transform into professional global investors (Dixon and Sorsa, 2009; Koivurinne and Vaittinen, 2020, p. 54). Despite the financial crisis in 2008, the growth of the share of equities in investment portfolios in Finland has continued. In 2020, the share of equities in the private-sector employees' statutory scheme was 42 per cent and slightly below 50 per cent for the public-sector employees' statutory scheme (Tela, 2020).

Maintenance of public pensions instead of coverage extension by occupational plans

Similar to the Canadian case, the statutory earnings-related pension scheme in Finland has remained relatively stable and economically sustainable with the help of increasing contribution rates and partial pre-funding as well as the shift in the asset mix of pension funds. Although there has been gradual retrenchment since the 1990s and some of the key characteristics of the system have changed (see Kangas, Lundberg and Ploug, 2010), the theoretical net replacement rate is projected to remain quite stable and near the average level for Organisation for Economic Co-operation and Development (OECD) Member countries for full-career average-wage earners (above 63 per cent) (OECD, 2021; see Table 1).

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Despite the changes to the system and increasing financialization, the basic features of comprehensive collective risk sharing among all employees and entrepreneurs have not declined. Importantly, the adjustments have not reduced pension benefits to a degree that this could have been instrumentalized as an engine of privatization by significantly increasing the demand for private arrangements.

The pension model in Finland remains different to those of other Nordic and most North-western European countries, in which the role of second pillar occupational pensions is significant. The development in Finland has also avoided the "risk shifts" from the collective to the individual that have taken place, for example, in Germany and the United Kingdom (Ebbinghaus, 2019; Pavolini and Seeleib-Kaiser, 2018; Wiß, 2019). In the 2000s and at the beginning of the 2010s, there were some indications of the growing importance of private occupational and personal pension solutions in Finland (Kangas and Luna, 2011). Currently, however, the tendency toward the multipillarization, privatization and individualization of pension security, as witnessed in many other countries, is not discernible in Finland. The number of new occupational pension policies grew until 2012 but has since fallen in almost every year (Finance Finland, 2019; Financial Supervisory Authority, 2018). All in all, the importance of private pensions, whether occupational or personal, has remained limited.

Collective quasi-mandatory occupational schemes negotiated between trade unions and employer organizations, especially in Denmark, Sweden and the Netherlands, have been able to combine social interests with private pre-funded pensions and better limit the shift towards individual risk bearing than in Germany or the Anglophone countries (Anderson, 2019; Hassel, Naczyk and Wiß, 2019; Pavolini and Seeleib-Kaiser, 2018). There are, nevertheless, two important differences between the earnings-related scheme in Finland, which is based on one public pillar, and the above-mentioned collectively bargained occupational pensions in two pillar systems. The first difference relates to the coverage and limits of insurance solidarity (Lehtonen and Liukko, 2015). The quasi-mandatory occupational schemes in most countries cover most employees (often over 90 per cent), but a small minority of employees as well as entrepreneurs are excluded, unlike in the public scheme in Finland. Second, pre-funded occupational pensions, common in the Nordic countries other than Finland, include more individual risks than the Finnish partially pre-funded public scheme, and these risks are increasing due to the gradual shift toward DC plans with individual investment choice (Anderson, 2015, 2019).

As in Canada, in Finland the uncertainty related to population ageing, economic development and investment returns is being managed collectively without increasing individual risks. This collective uncertainty is managed by automatic adjustment mechanisms and separate decisions. Whereas in Canada the adjustments will be deployed only if the actuarial projections show that

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the schemes will be in deficit, in the Finnish case increasing longevity is already taken into account in two ways. The first is the automatic linkage of retirement age and life expectancy. The second way is a benefit reduction, if the insured person does not work long enough, according to the "life expectancy coefficient", which is calculated for each age cohort (currently, a maximum 5.34 per cent for a person born in 1960) (Andersen, 2021). In the case of financial unsustainability due to low birth rates, employment rates and investment returns, it is only possible to increase contributions, weaken the indexation of benefits, and reduce not-yet-accrued future benefits by a separate decision.

In sum, from the point of view of the DB character of the public pension scheme, there are three features in Finland which are quite similar to those in Canada: first, the nominal benefits of current pensioners cannot decrease; second, the possible reductions of benefits are limited and defined in advance (except for possible indexation changes in Finland); and third, increasing the contribution rate is not ruled out as an option in the event of financial challenges. In other words, although both the financial market and demographic risks have increased, these risks are collectively shared and, to some extent, adjustment mechanisms are predefined in legislation.

Conclusion: Financial markets supporting statutory risk sharing

In this article, we have examined recent developments in the Canadian and Finnish public pension schemes in relation to three tendencies that are commonly associated with pension financialization (see van der Zwan, 2017, Table 2). The increasing significance of partial pre-funding in the Canadian and Finnish pension schemes clearly reflects the first tendency as it has increased the schemes' reliance on financial markets, even though they remain mainly PAYG financed. Second, financialization has been strengthened as more funds have been invested in diverse asset classes with a strong emphasis on riskier corporate equities instead of more predictable fixed-income assets. As a result, the

Table 2. *Three main trends of pension financialization, Canada and Finland*

Pension financialization trends	Canada	Finland
Increasing reliance on pre-funding	Yes	Yes
Shift in the asset allocation toward equities	Yes	Yes
Individualization of risks	No	No

Source: Authors' elaboration.

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collective investment returns have improved, which has increased the significance of pre-funding in the financing of the public pension schemes.

However, these traits of financialization in the Canadian and Finnish public pension schemes have not been followed by a shift from a DB to a DC pension system. Instead, by making the financial situation of the schemes more stable, the utilization of financial markets has supported the maintenance of statutory collective risk sharing through career average DB pension schemes. The main advantage of partial pre-funding in public pension systems compared to pure PAYG systems is the fact that the utilization of financial markets and investment returns can make the system more sustainable, both financially and socially. This makes higher benefit income and/or lower contributions possible in the long term, even though investment risks do increase forms of uncertainty at the collective level.

The key issue here is that there is no transfer of risk from the collective to the individual in these countries. This is so even in Canada, where the share of individual DC plans is slowly increasing in the context of a declining role for workplace pensions. Instead, we have shown that the increasing role of pre-funding and higher risk investments at the collective level within public schemes can help to sustain risk sharing without individual investment risk, inflation risk, longevity risk, or risks related to labour market position (e.g., job changes, unemployment, or lack of workplace pensions). This is often not the case in private occupational schemes that increasingly engender these forms of individual risk.

It is important to note that the literature on pension financialization suggests that the increasing individualization of risk as a third tendency does not necessarily happen in tandem or at the same pace as the other two tendencies. However, the aim of the article is not to claim that the developments in Canada and Finland are completely unforeseen. Instead, the objective is to offer a critical appraisal of superficial interpretations of pension financialization, often based on United States of America and United Kingdom examples, in which these tendencies are intertwined. The aim of the article is to strengthen understanding of the varieties of pension financialization through the unique examples of Canada and Finland and to illustrate the varying possibilities for solidarity and collective risk sharing within pension financialization.

The absence of heightened individual risk in the Canadian and Finnish public pension schemes cannot be attributed to the fact that the schemes are only partially pre-funded and mainly PAYG. Risks could be individualized in the pre-funded part of the scheme if it were decided to do so. This is the case in Sweden, for example, where a small part of the insured's statutory DC pension permits individual investment risk. Moreover, although the pension schemes are predominantly PAYG in Canada and Finland, they are not underwritten by the State in the event of financial problems. This holds true for the CPP in Canada

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and the statutory earnings-related pension scheme for private-sector employees in Finland. If other adjustment mechanisms are insufficient to secure the financing of pensions, the only option is to increase the contributions paid by employers and employees.

Related to the above-mentioned tendencies, pension financialization is often associated with the privatization of old-age pension systems. However, the privatization of pensions is not a significant trend in Canada and Finland: the role of private workplace plans is decreasing in Canada and remains marginal in Finland. Instead, the utilization of financial markets has supported the economic sustainability of the public schemes, which are clearly more inclusive than voluntary or quasi-mandatory private occupational schemes. This makes the Canadian case different from other liberal political economies, where the emphasis has recently been placed on trying to increase the coverage of private DC occupational pensions through auto-enrolment regulations. As regards the nearest reference group for Finland, the Finnish case is different from all other Nordic and most North-western European countries, where the role of occupational pensions is significant. Moreover, in many of these countries the significance of individual or collective DC pensions is currently increasing or will be increasing in the future, as in the case of the Netherlands (Sorsa and van der Zwan, 2022).

Possible reasons behind the unique developments in Canada and Finland seem to be related to the specific institutional legacies of the pension policy-making system and the financing of schemes. First, as Kangas, Lundberg and Ploug (2010) and Béland and Weaver (2019) have shown, institutional legacies, particularly the need to achieve consensus between those who participate in pension policy making, were important in the incremental reforms that maintained the financial and social sustainability of public pension systems in Canada and Finland during the 1990s. The same institutional feature might have been an important factor behind the latest reforms in the 2010s as well. Second, the historical legacy of partial pre-funding, combined with the professionalization of pension investment (see also Gelepithis, 2019; Golka and van der Zwan, 2022), might have made it easier to increasingly utilize financial markets in public pension financing to generate better returns, which then made the enhancement or maintenance of collective DB pensions financially possible.

Finally, it is important to underline that even though individual risks are not increasing in the Canadian and Finnish systems, there is collective uncertainty about future pension provision related to population ageing, economic development and investment returns as well as actuarial long-term projections, which are all crucial elements of partially pre-funded pension systems. There may also be potential negative consequences related to the uncertainty of financial markets in the long term, which are difficult to anticipate and make provisions for in actuarial calculations. The Canadian and Finnish systems

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appear to be relatively sustainable in the long run due to their shift to financialization. However, their intertwinement with financial markets increases certain kinds of risks as well as alters the spectrum of risks that confront the schemes. Importantly, despite the collective approach in both cases, the financial market risks they face are different in nature to the risks related to population ageing and employment faced by PAYG systems.

To sum up, in contrast to the common developments highlighted in the literature on pension financialization, we have shown that the increasing role of financial markets in providing old-age income security does not necessarily have to lead to the privatization of pensions or shift the allocation of risk from the collective towards the individual. More generally, we have emphasized that the recent developments in Canada and Finland can be understood as constituting a particular form of interaction between financialization and statutory insurance and solidarity. This type of interaction has not been discussed to any great extent in the literature on social security.

From country to country, the article supports the conclusion (see e.g., Hassel, Naczyk and Wiß, 2019; van der Zwan, 2017) that there is a great deal of variation in these processes. However, in contrast to previous research that has largely focused on private arrangements, we have highlighted the entwinement of financial markets with public DB pensions. In such schemes, old-age income increasingly relies on financial markets, but does so only at the collective level. The article stresses that even though there are risks related to financial markets, financialization is not necessarily a threat to comprehensive collective pension security. However, the long-term effects and possible benefits and challenges of pension financialization need further study.

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BOOK REVIEW

Hwang, Gyu-Jin. **Building markets: Distributional consequences of social policy in East Asia**. Northampton, MA, Elgar, 2022. 236 pp. ISBN 9781789901078.

In the later part of the twentieth century, the increased influence of neoliberalism, individualism and market-oriented policies led to a decline of Welfare State policies and reduced government intervention in the economy in North and South America and even in some European countries. Simultaneously, in East Asia, state-sponsored and supported industrial policies led to rapid economic growth and sizeable reductions in poverty. Contrary to the neoliberal logic, these state-capitalist policies were successfully implemented not in opposition to, but with the cooperation and support of the private sector. In the case of the Republic of Korea (hereafter, South Korea), for instance, the state demonstrated bureaucratic capacity and the ability to cooperate with the private sector to expand exports, collect taxes, create employment, and reduce poverty. In brief, the choice of an export-oriented industrial strategy, which has been widely analysed and deemed a very successful policy, led to increased employment and poverty reduction as well as the growth of a state-led private sector. What has not been as widely analysed are the social policies that have been implemented in the region and the book reviewed here fills an important gap by analysing some of those policies in the context of East Asia.

Gyu-Jin Hwang's book addresses the nature and impact of selected social policies in five East Asian countries: Japan, South Korea, Taiwan (China), Singapore, and Hong Kong (China).[1] The selected policies are cash transfers, health, education, housing, and family policies. What is central to the book's argument is that contrary to the neoliberal canon, the social policies implemented in these countries aimed at supporting capitalism and capitalist development. As noted by the author, while social policies were not an intrinsic element of the first iteration of the industrial policy design, they became central to support the export-oriented industrial policies by building domestic markets at a later stage. In the words of Hwang, "Social insurance institutions in East Asia … were not necessarily founded on the premise that they were to protect workers from the market … [but] they were to commodify rather than de-commodify labour because it was not the brutality of capitalism that was the problem. Rather it was the lack of capitalism that was the problem. In other words, social programmes were to protect workers from the common contingencies or risks that would prevent them from earning an income out of the labour market, not to detach them from the labour market" (pp. 7–8). Thus, as opposed to the prevailing neoliberal/market logic, Japan, South Korea, Taiwan (China), Singapore, and Hong Kong (China), have used social policies to enhance capital accumulation and

1. Different to the book under review, the ISSR follows United Nations practice in referring to Hong Kong (China) and Taiwan (China).

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the continuous growth of the capitalist economy. It was not the abundance of fiscal resources that led to the establishment of social policy, as has been traditionally assumed by social policy experts, it was resource scarcity that drove social policy expansion (p. 48).

This very well-organized book approaches the implementation of social policy in East Asia both from a policy and a country perspective. Following the introductory chapters on “Building markets” (Chapter 2) and “The strategy for growth” (Chapter 3), the author dedicates the following five chapters to how cash transfers, health care, education, housing, and family policies are designed and implemented in the five countries. The intersectional analysis of policy and country studies provides the reader with a brief but full picture of when, how, and at what cost were policies implemented, as well as their socioeconomic impact. While there was no coherence in the timing or in the nature of the policies pursued in the region, their ultimate motive has been capital accumulation with some redistributive components.

Having set up a clear analytical framework for the volume, Hwang provides us with some interesting messages regarding the nature and impact of policies. First, is the distinction to be made between policies that provide services and policies that involve cash transfers. As shown in the book, there is a clear preference for service provisions, such as health and education as opposed to cash allowances. This preference for service provisions contrasts with the United States’ approach to social policy, where neither services nor transfers are seen as particularly acceptable, and with Western European countries, where policies are focused both on service provisions and cash transfers.

Second, the East Asian countries exhibit a relatively low level of social spending, except for Japan. The data shows that while average social expenditure of Member countries of the Organisation for Economic Co-operation and Development (OECD) reached about 21 per cent of GDP in 2015, spending in South Korea and Taiwan (China) was in the 10 per cent range, it was 6 per cent in Singapore and only 2.7 per cent in Hong Kong (China). Only Japan surpassed the OECD average at about 23 per cent (p. 44). What these countries are doing with this low-level spending leads us to analyse the nature and redistributive impact of their policies.

Thus, a third question is how this low spending affects the nature of the policies. The region shows a strong preference for highly targeted cash transfers and fairly universal education and health services. The highly targeted cash transfers are designed to ensure that benefits go only to those in dire need, to those facing factors beyond their control. Additionally, there is also a preference for contributory policies. Within this framework, however, there is a great deal of variety among the countries, with Japan being home to the most generous policies and Singapore favouring more targeted and temporary policies. Eligibility issues are common to all the countries.

From the standpoint of impact, it is notable that because most of the resources are spent on services available to the entire society, i.e., health care and education, this means that those in the upper-income brackets receive a much larger share of the social benefits than those in the lower-income brackets (p. 42). Thus, the redistributive impact of the policies is reduced and, in fact, appear to be contributing to increasing inequality. While the East Asian countries, overall, are still less unequal than countries in other continents, levels of inequality are rising, as is the fear of fractured societies. The question here is to what extent future social policy makers will be willing to address the question of rising inequality and what role will be accorded to social policy in that scenario. Would these policy makers be able or willing to switch the emphasis away from services to cash transfers to address the question of inequality? In the meantime, the hope has been that

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both health care and education would serve as a vehicle for social mobility. However, social mobility has been hindered by recessive economies and pandemics and, as we discuss below, education is not equally accessed by the rich and the poor.

In contrast to the more limited access to cash transfers, the countries analysed in this volume have developed wide ranging education and health care systems. It is well known that secondary students from this region perform at the highest international levels, work long hours, operate in very competitive environments, and have sought the support of an ancillary private tutoring industry. Thus, while both economically advantaged and disadvantaged students have access to good quality primary and secondary education, the same is not true of tertiary education. Limited access to tertiary education has made the entrance process very competitive and has led to the appearance of a burgeoning private tutoring industry. The affordability of private tutors has widened the existing economic gaps and has given those in the upper income brackets a clear advantage.

East Asia has a remarkable story to tell when it comes to health care because, as a region, it spends less than the Western countries, but it has equal or better health care outcomes. This success story is made even more remarkable if one considers where these countries were in the 1960s and where they are now. For instance, in the 1960s, except for Japan, the countries in East Asia had high percentage infant mortality rates, but now they are performing better than Germany or France. It is not possible in this book review to provide even a condensed analysis of the five health care systems; suffice to say, out-of-pocket health spending is the norm. Additionally, the private share of health care revenue is rather high, and both the public and private medical sectors coexist and complement each other. In practice, health care is heavily subsidized. Consequently, with or without private insurance, people can access the care they need and there are effective built-in mechanisms that ensure the efficient use of resources.

The capitalist aims of social policies are clearly seen in the analysis of housing policies. Governments saw these as essential not only to satisfy housing needs, but as an effective tool to foster economic growth because of the construction sector's powerful spill overs. Interestingly, as noted by Hwang, all five countries have an oversupply of housing. Moreover, housing ownership and the ideal of achieving a home-owner society have had more positive redistributive effects, via wealth accumulation, than the other policies discussed here. Singapore offers the most interesting case: it allocates the largest share of public spending to housing and has satisfied the housing needs of the entire population.

The decline in fertility and changes in family structure are underpinning family policies in the region. Policies implemented in this area focus on offsetting the cost of child rearing through family allowances and subsidies, improving the life-work balance through parental leave policies, and attempting to achieve a more equitable distribution of opportunities through access to early education. While there is a large degree of variation in the extent of the family benefits provided, in East Asia – in contrast to the United States where there is great resistance to family policies – these policies tend to be viewed as a matter of national survival and as a very effective tool to address population dynamics and labour force decline (p. 169).

The book raises important questions regarding the goals and nature of social policies. First, is the essential question regarding the main objectives of social policies: can social policies sustain and enhance capitalist development while also improving the lives of those most affected by the inequalities that are intrinsically associated with capitalism? The East Asian experience is certainly mixed, but, in many ways, it is better than the neoliberal or market approach with which the readers

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of this journal are very familiar. As confirmed by Hwang, economic policies in East Asia have at least succeeded in achieving massive poverty reduction. The second concerns the choice that countries make between the provision of services and cash transfers. While the East Asian experience clearly shows a preference for service provision over cash transfers, countries should aim at providing both. This is so because their roles are quite different and there is unequal access to services and, consequently, social mobility is not equally distributed.

Similarly important is to determine the pros and cons of targeted versus universal policies. Given that East Asian policies have been aimed at supporting capitalism, they have had to be targeted both in terms of the type of policy chosen and the recipients of the policies. However, if we assume that the purpose of social policies goes above and beyond supporting capitalism then universal policies, or at least some form of targeted universalism, will have a much broader impact. Additionally, targeted policies, which are also the policies preferred in the United States, require large bureaucracies to implement and are arbitrary by nature. It is possible that a broader set of policies based on a universal approach would serve the needs of capitalist societies better, especially when confronted by economic downturns.

Lastly, as posed by the author in the conclusion, have social policies in East Asia redistributed opportunity instead of directly pursuing the egalitarian goals of redistributing income and risk? (p. 181). It would seem there is a contradiction here because, as previously noted, the expectation that education policy will promote more egalitarian societies via social mobility appears to be undermined but the highly competitive nature of the education system. That is why Hwang concludes that “East Asian economies have built a strong economy by diverting social means to achieve economic ends. It is now time that economic means served social ends” (p. 181). One wishes that this could be done not only in East Asia, but elsewhere in this very unequal world.

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