

International Social Security Review

-
- ▶ Has the redistributive effect of social transfers and taxes changed over time across countries?
-
- ▶ The effects on intra-generational inequality of introducing a funded pension scheme: A microsimulation analysis for Estonia
-
- ▶ Access to social protection among people with disabilities: Evidence from Viet Nam
-
- ▶ Inequity in access to the Argentinian pension system (1994–2017)
-
- ▶ The impact of international migration on the public pension system: The case of Portugal
-



Editorial Board

Chairperson

Julien **Damon**, Sciences Po, Paris, Ecole nationale supérieure de sécurité sociale, France

Vice Chairperson

Wouter **van Ginneken**, Independent Consultant, Geneva, Switzerland

Members

Willem **Adema**, Organisation for Economic Co-operation and Development, Paris, France

Christina **Behrendt**, International Labour Office, Geneva, Switzerland

Simon **Brimblecombe**, International Social Security Association, Geneva, Switzerland

Katja **Hujo**, United Nations Research Institute for Social Development, Geneva, Switzerland

Dominique **La Salle**, International Social Security Association, Geneva, Switzerland

Editor

Roddy **McKinnon**, International Social Security Association, Geneva, Switzerland

Editorial Assistant

Frédérique **Bocquet**, International Social Security Association, Geneva, Switzerland

Advisory Board

Mukul G. **Asher**, National University of Singapore, Singapore

Nicholas **Barr**, London School of Economics and Political Science, United Kingdom

Armando **Barrientos**, Brooks World Poverty Institute, University of Manchester, United Kingdom

Ulrich **Becker**, Max Planck Institute for Social Law and Social Policy, Munich, Germany

Bernard H. **Casey**, Institute for Employment Research, University of Warwick, United Kingdom

Chantal **Euzéby**, Université Pierre-Mendès-France, Grenoble, France

Neil **Gilbert**, University of California, Berkeley, United States

Ana M. **Guillén**, University of Oviedo, Spain

Krzysztof **Hagemejer**, University of Warsaw, Poland

Edwin **Kaseke**, School of Social Work, University of Zimbabwe, Harare

Felicia **Knaul**, University of Miami, Coral Gables, United States

Milko **Matijascic**, Instituto de Pesquisa Econômica Aplicada, Brasília, Brazil

Carmelo **Mesa-Lago**, University of Pittsburgh, United States

Einar **Overbye**, Faculty of Business, Public Administration and Social Work, Oslo University College, Norway

Xizhe **Peng**, School of Social Development and Public Policy, Fudan University, Shanghai, China

Niels **Ploug**, Danish National Centre for Social Research, Copenhagen, Denmark

Winfried **Schmähl**, University of Bremen, Germany

Dong-Myeon **Shin**, Kyung Hee University, Seoul, Republic of Korea

R. K. A. **Subrahmanya**, Social Security Association of India, Bangalore, India

Noriyuki **Takayama**, Research Institute for Policies on Pension and Aging, Tokyo, Japan

Vivienne **Taylor**, University of Cape Town, South Africa

Publisher: *International Social Security Review* is published by John Wiley & Sons Ltd, 9600 Garsington Road, Oxford OX4 2DQ, UK. Tel: +44 (0) 1865 776868, Fax: +44 (0) 1865 714591.

The opinions expressed in signed articles are the responsibility of their authors and do not necessarily reflect those of the ISSA or of the governments of countries of which they may be nationals. The designations employed in the publication, which are in conformity with ILO and United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the ISSA concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

Data Protection Policy

By submitting a manuscript to, or reviewing a submitted manuscript for, the *International Social Security Review* (ISSR), your name, email address, and affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The ISSR and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security, integrity, and privacy of the personal data collected and processed. You can learn more at <https://authorservices.wiley.com/statements/data-protection-policy.html>.

First published in 1948, the *International Social Security Review* is the world's major international quarterly publication in the field of social security. Articles by leading academics and social security experts around the world present international comparisons and in-depth discussions of topical questions as well as studies of social security systems in different countries, and there are regular reviews of the latest publications in its field.

The journal is published by Wiley-Blackwell on behalf of the International Social Security Association (ISSA). The ISSA is the world's leading international organization bringing together national social security administrations and agencies. The ISSA provides information, research, expert advice and platforms for members to build and promote dynamic social security systems and policy.

This journal is available online at Wiley Online Library. Visit wileyonlinelibrary.com to search the articles and register for table of contents email alerts.

Notes for contributors

1. Articles for the *International Social Security Review* will be examined by the Editorial Board. Contributions will be considered in the light of the overall programme of the *Review* and of their interest to an international readership, and will be selected on the basis of anonymous (double-blinded) peer review. Full contact details must be provided for each author, and the author for correspondence identified.

2. Authors are strongly advised to consult one or more recent issues of the *Review* before submitting manuscripts for publication.

3. Manuscripts may be submitted in English, French, German or Spanish (those translated from another language should be accompanied by a copy of the original). *Necessary translation costs of accepted articles are met by the journal.*

4. Contributions should be accompanied by a statement that they have not already been published, and that, if accepted for publication in the *Review*, they will not be submitted for publication elsewhere without the agreement of the Editor of the *Review*.

5. Articles are accepted for publication on the understanding that they are subject to editorial revision and that the right of publication in any form or language is reserved by the ISSA.

6. The preferred length of manuscripts is 5,000 to 7,500 words. They may be submitted by email to the following address: issareview@ilo.org.

7. An abstract of about 100 words, plus five keywords, should be enclosed with all manuscripts.

8. For note references, authors should use the "Footnotes" (not "Endnotes") function of the word-processing application.

9. Bibliographical references may be included in such footnotes or, preferably, compiled in a separate bibliography in the alphabetical order of the authors' surnames, with references in the text following the "author-date" system, e.g. "(Benayoun, 2007)". In either case they should include at least the following information: author's name and initials; date of publication; title (for articles, title in "quotes" plus title of periodical); place of publication and publisher (unnecessary for articles). Titles should always be given in the original language, with translation in parentheses where relevant.

10. Tables and figures should each be numbered consecutively through out the article. For tables, authors should use the "Table" (not "Graph") function of the word-processing application. Sources should be mentioned and the data on which figures are based should be provided. Tables and figures should be sent as a separate, and editable, electronic file (e.g. excel for tables) and/or typed on separate sheets.

11. Authors are reminded that they must observe the usual rules and practices regarding the reproduction of copy right material in their articles.

12. Copyright Transfer Agreement (CTA) — If your paper is accepted, the author identified as the formal corresponding author for the paper will receive an email prompting them to login into Author Services; where via the Wiley Author Licensing Service (WALS) they will be able to complete the license agreement on behalf of all authors on the paper.

13. Manuscripts and editorial correspondence should be addressed to: The Editor, *International Social Security Review*, Case postale 1, CH-1211 Geneva 22, Switzerland (issareview@ilo.org).

www.issa.int

The International Social Security Association (ISSA) is the world's leading international organization bringing together national social security administrations and agencies. The ISSA provides information, research, expert advice and platforms for members to build and promote dynamic social security systems and policy worldwide.

View this journal online at
Wiley Online Library
wileyonlinelibrary.com/journal/issr

International Social Security Review

Has the redistributive effect of social transfers and taxes changed over time across countries? <i>Koen Caminada, Kees Goudswaard, Chen Wang and Jinxian Wang</i>	3
The effects on intra-generational inequality of introducing a funded pension scheme: A microsimulation analysis for Estonia <i>Magnus Piirits and Andres Võrk</i>	33
Access to social protection among people with disabilities: Evidence from Viet Nam <i>Lena M. Banks, Matthew Walsham, Hoang Van Minh, Doan Thi Thuy Duong, Tran Thu Ngan, Vu Quynh Mai, Karl Blanchet and Hannah Kuper</i>	59
Inequity in access to the Argentinian pension system (1994–2017) <i>Milva Geri, Mariana de Santis and Nebel Moscoso</i>	83
The impact of international migration on the public pension system: The case of Portugal <i>José Alves, Daniela Craveiro, Maria Teresa Medeiros Garcia and Paula Albuquerque</i>	107
Book review	129
Acknowledgements	133

Information for subscribers. *International Social Security Review* is published in 4 issues per year. Institutional subscription prices for 2019 are: Print & Online: US\$597 (US), US\$695 (Rest of World), €455 (Europe), £359 (UK). Prices are exclusive of tax. Asia-Pacific GST, Canadian GST/HST and European VAT will be applied at the appropriate rates. For more information on current tax rates, please go to <https://onlinelibrary.wiley.com/library-info/products/price-lists/payment>. The price includes online access to the current and all online backfiles to January 1st 2015, where available. For other pricing options, including access information and terms and conditions, please visit <https://onlinelibrary.wiley.com/library-info/products/price-lists>. Terms of use can be found here: <https://onlinelibrary.wiley.com/terms-and-conditions>

Delivery Terms and Legal Title. Where the subscription price includes print issues and delivery is to the recipient's address, delivery terms are **Delivered at Place (DAP)**; the recipient is responsible for paying any import duty or taxes. Title to all issues transfers Free of Board (FOB) our shipping point, freight prepaid. We will endeavour to fulfil claims for missing or damaged copies within six months of publication, within our reasonable discretion and subject to availability.

Copyright and Copying (in any format). Copyright © 2019 International Social Security Association. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the prior permission in writing from the copyright holder. Authorization to copy items for internal and personal use is granted by the copyright holder for libraries and other users registered with their local Reproduction Rights Organisation (RRO), e.g. Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, USA (www.copyright.com), provided the appropriate fee is paid directly to the RRO. This consent does not extend to other kinds of copying such as copying for general distribution, for advertising or promotional purposes, for republication, for creating new collective works or for resale. Permissions for such reuse can be obtained using the RightsLink "Request Permissions" link on Wiley Online Library. Special requests should be addressed to: permissions@wiley.com

Back issues: Single issues from current and recent volumes are available at the current single issue price from cs-journals@wiley.com. Earlier issues may be obtained from Periodicals Service Company, 351 Fairview Avenue – Ste 300, Hudson, NY 12534, USA. Tel: +1 518 822-9300, Fax: +1 518 822-9305, Email: psc@periodicals.com.

Journal Customer Services: For ordering information, claims and any enquiry concerning your journal subscription please go to <https://hub.wiley.com/community/support/onlinelibrary> or contact your nearest office.

Americas: Email: cs-journals@wiley.com; Tel: +1 781 388 8598 or +1 800 835 6770 (toll free in the USA & Canada).

Europe, Middle East and Africa: Email: cs-journals@wiley.com; Tel: +44 (0) 1865 778315.

Asia Pacific: Email: cs-journals@wiley.com; Tel: +65 6511 8000.

Japan: For Japanese speaking support, Email: cs-japan@wiley.com.

Visit our Online Customer Help available in 7 languages at <https://hub.wiley.com/community/support/onlinelibrary>

Production Editor: Sherry Ganace (email: issr@wiley.com).

Advertising: Joe Adams (email: jadams@wiley.com)

Abstracting and Indexing Services. The Journal is indexed by ABI/INFORM Collection (ProQuest); Abstracts in Social Gerontology (EBSCO Publishing); Academic Search (EBSCO Publishing); Academic Search Alumni Edition (EBSCO Publishing); Academic Search Premier (EBSCO Publishing); AgeLine Database (EBSCO Publishing); Business Premium Collection (ProQuest); Criminal Justice Collection (GALE Cengage); Emerging Sources Citation Index (Clarivate Analytics); Proquest Business Collection (ProQuest); ProQuest Central (ProQuest); ProQuest Politics Collection (ProQuest); Social Science Premium Collection (ProQuest); Social Work Abstracts (NASW Press); Web of Science (Clarivate Analytics).

View this journal online at wileyonlinelibrary.com/journal/issr

Printed in Singapore by C.O.S. Printers Pte Ltd.

Wiley's Corporate Citizenship initiative seeks to address the environmental, social, economic, and ethical challenges faced in our business and which are important to our diverse stakeholder groups. Since launching the initiative, we have focused on sharing our content with those in need, enhancing community philanthropy, reducing our carbon impact, creating global guidelines and best practices for paper use, establishing a vendor code of ethics, and engaging our colleagues and other stakeholders in our efforts. Follow our progress at www.wiley.com/go/citizenship.

Wiley is a founding member of the UN-backed HINARI, AGORA, and OARE initiatives. They are now collectively known as Research4Life, making online scientific content available free or at nominal cost to researchers in developing countries. Please visit Wiley's Content Access – Corporate Citizenship site: <http://www.wiley.com/WileyCDA/Section/id-390082.html>

Disclaimer. The Publisher, the International Social Security Association and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher, the International Social Security Association and Editors, neither does the publication of advertisements constitute any endorsement by the Publisher, the International Social Security Association and Editors of the products advertised.

International Social Security Review accepts articles for Open Access publication. Please visit <https://authorservices.wiley.com/author-resources/Journal-Authors/open-access/onlineopen.html> for further information about OnlineOpen.

INTERNATIONAL SOCIAL SECURITY REVIEW, (Print ISSN: 0020-871X; Online ISSN: 1468-246X), is published quarterly. US mailing agent: Mercury Media Processing, LLC, 1850 Elizabeth Avenue, Suite #C, Rahway, NJ 07065 USA. Periodical postage paid at Rahway, NJ. Postmaster: Send all address changes to *International Social Security Review*, John Wiley & Sons Inc., C/O The Sheridan Press, PO Box 465, Hanover, PA 17331 USA.

Has the redistributive effect of social transfers and taxes changed over time across countries?

*Koen Caminada**, *Kees Goudswaard**,
*Chen Wang*** and *Jinxian Wang**

*Leiden University, the Netherlands;

**Shanghai University of Finance and Economics, China

Abstract In most Member countries of the Organisation for Economic Co-operation Development (OECD), the income gap between rich and poor has widened over the past decades. This article analyses whether and to what extent income taxes and social transfers have contributed to this trend. Has the redistributive impact of different social programmes changed over time? We use microdata from the LIS Cross National Data Center in Luxembourg for the period 1982–2014 and study both the total population and the working-age population. In contrast to the results of some other studies, especially by the OECD, we do not find that redistribution has declined. Tax-benefit systems around 2013 are more effective at reducing income inequality compared to the mid-1980s

Addresses for correspondence: Koen Caminada, Economics Department, Leiden University, P.O. Box 9520, 2300RA Leiden, Netherlands; email: c.l.j.caminada@law.leidenuniv.nl. Kees Goudswaard, Economics Department, Leiden University, P.O. Box 9520, 2300RA Leiden, Netherlands; email: k.p.goudswaard@law.leidenuniv.nl; Chen Wang, Institute of Finance and Economics, Shanghai University of Finance and Economics, 777 Guoding Rd, 200433, Shanghai, China; email wang.chen@mail.shufe.edu.cn. Jinxian Wang, Business School, Central South University, Lushan South Road 932, 410083, Changsha, China; email: wangjinxian@csu.edu.cn.

Koen Caminada and Kees Goudswaard are affiliated with Netspar (Network for Studies on Pensions, Aging and Retirement). Chen Wang and Jinxian Wang are affiliated with Leiden University. This study is part of the research programme Reform of Social Legislation of Leiden University, the Netherlands. The financial supports of Instituut Gak and Shanghai Pujiang Program (17PJC045) are gratefully acknowledged. The authors thank the LIS Cross-National Data Center in Luxembourg for permission to post the Budget Incidence Fiscal Redistribution Dataset on Income Inequality on the Leiden University website (Leiden Law School / Economics / Data).

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

and the mid-1990s, especially among the total population. Changes in social programmes are not a driver of greater income inequality across the countries included in this study.

Keywords welfare state, cash benefit, income redistribution, taxation, OECD

Introduction

The overall tendency over the past two or three decades has been for an increase in income inequality in the large majority of wealthy nations. In Member countries of the Organisation for Economic Co-operation Development (OECD), from the mid-1980s, greater inequality in primary income¹ has driven the widening of the income gap between rich and poor (OECD, 2008, 2011, 2015). Several explanations of income inequality have been introduced (Atkinson, 2015; Piketty, 2014). One of the main driving forces behind disposable income distribution is the reduction of inequality through the tax-transfer system (Atkinson and Brandolini, 2001; Smeeding, 2004). The overall redistributive effect can be divided into redistribution by transfers and by income taxes, but can also be detailed more specifically (Ferrarini and Nelson, 2003; Jesuit and Mahler, 2010, 2017; Wang, Caminada and Goudswaard, 2012). In the middle of the first decade of this millennium, the average redistributive effect achieved by public cash transfers was twice as large as that achieved through household taxes. Regardless, the example of the United States is noteworthy for achieving a greater part of its redistribution through taxes (OECD, 2008 and 2011; Whiteford, 2010; Wang and Caminada, 2011; Wang, Caminada and Goudswaard, 2012). As the tax-transfer system has only been able to offset a part of the rise in primary income inequality over the last 25 years, disposable income (i.e. income after income taxes and social benefits) has also become more unequal in many countries.

This article examines in detail the observed changes in the redistributive effects of social transfers and income taxes (including social contributions) for households. The extensive literature on “welfare state retrenchment” that has emerged over the last decades seems to imply that welfare states have become less redistributive. The OECD concludes that redistribution has in recent years

1. Primary income can be defined as income from work and capital and net transfers from other households. See: <www.oecd.org/els/soc/IDD-ToR.pdf>.

decreased in a majority of countries (Causa and Hermansen, 2017). Other studies, to the contrary, show that most welfare states became more redistributive in the 1980s and 1990s (Kenworthy and Pontusson, 2005; Wang, Caminada and Goudswaard, 2014). Welfare states have not compensated completely for the higher inequality in primary income among households, but most have done so to some degree. By and large, welfare states have worked the way they were designed to work. It is markets – not redistribution policies – that have become more inegalitarian. It is worth noting that, because tax-benefit systems are generally progressive, one could expect higher primary income inequality to lead automatically to more redistribution, even without policy actions (Immervoll and Richardson, 2011).

The growing interest in national and cross-national differences in earnings and income inequality has produced a wide range of studies. An important development has been the launching of the LIS Cross-National Data Center in Luxembourg (LIS), through which microdata-sets from various countries have been “harmonized”.² Consequently, it is possible to study income inequality across countries and years (see Atkinson, Rainwater and Smeeding, 1995). However, the improvement in methods of measurement and in empirical knowledge sits in contrast with the lack of insight into the causes of changes in equality over time.³ This should perhaps not come as a surprise, as the distribution of income in a country is the outcome of numerous decisions made over time by households, enterprises, organizations and the public sector (Gottschalk and Smeeding, 2000). For many countries, important forces behind growing disposable income inequality are the growth of inequality of earned primary income, demographic changes, changes in household size and composition, and other endogenous factors. The evolution of income inequality is not simply the product of common economic forces: it also represents the impact of institutions and national policies (Atkinson, 2000).

Our analysis of the level and the evolution of income distribution and fiscal redistribution uses LIS data on income in a standardized way across countries and over time. We focus here on the effect of several social transfers and income taxes (including social contributions) in redistributing income, and we analyse trends for the period 1982–2014 with the most recent data. We use the traditional budget incidence approach – despite some methodological problems that we will address – to study the combined effects of income taxes and transfers on income (re)distribution. The distribution of primary income is compared with the distribution of income after taxes and after social transfers.

2. LIS Cross-National Data Center. 2017. Luxembourg Income, *LIS Key Figures* and *LIS Database*, Luxembourg <www.lisproject.org>.

3. The OECD (OECD, 2008, 2011 and 2015) summarizes trends and driving factors in income distribution and poverty based on the responses to a harmonized questionnaire of OECD Member countries (i.e. distribution indicators derived from national micro-economic data).

The change in summary measures of inequality between pre- and post-government income represents direct government redistribution.

In this article, we elaborate on the work of Mahler and Jesuit (2006) and Wang, Caminada and Goudswaard (2014). We offer a user-friendly dataset, the *Leiden LIS budget incidence fiscal redistribution dataset on income inequality* (Wang and Caminada, 2017). A new database was asked for, because the LIS staff implemented a major database template revision. Most components of this revised template have been applied, retroactively, to all earlier waves of the microdata. The revised template increases comparability both over time and cross-nationally. The updated dataset covers all 47 LIS-countries and a longer period (1967–2014).

The remainder of the article is organized as follows. First, we summarize the literature on the redistributive effect of taxes and transfers in LIS countries. We then present our research method and our empirical results before offering conclusions.

Income inequality and the redistributive effects of taxes and transfers across countries

The relationship between income inequality and redistribution in a cross-country perspective is far from transparent (Lambert, Nesbakken and Thoresen, 2010). The main reason for this stems from differences in measurement strategies. Indeed, with three distributions involved (pre-tax-transfer income, post-tax-transfer income, and the tax-benefit system), and with different inequality measures to sum up these distributions, it is unsurprising that the literature offers a plethora of research methods and empirical results. We shall briefly review a number of studies, restricting ourselves to the Gini-based literature and its application, which is by far the most prevalent.

Several studies analyse income distribution across countries, indicating that the role of social policy (taxes and transfers) is important in the magnitude of income redistribution.⁴ Kenworthy and Pontusson (2005) examined the trend in primary income inequality and redistribution in OECD countries in the 1980s and 1990s, indicating that redistribution increased in most countries. Welfare state policies compensated for the rise in primary income inequality across countries.

A recent study by the OECD (Causa and Hermansen, 2017) using data up to 2014 concludes that redistribution through income taxes and cash transfers cushions income inequality among the working-age population on average by slightly more than one quarter in OECD countries (see also Immervoll and Richardson, 2011). In all countries, cash transfers account for the largest part of

4. Among others, Atkinson (2003), Atkinson and Brandolini (2001), Brandolini and Smeeding (2007), and Smeeding (2004).

redistribution and taxes for a smaller part. Social security contributions have weak regressive effects in a number of countries. However, the OECD study also finds that redistribution has declined on average and in the majority of the countries since the mid-1990s, especially between the mid-1990s and the mid-2000s. In particular, in some Nordic countries redistribution has reduced substantially. The decline in total redistribution is attributable mainly to transfers, with taxes playing a less important role.

Bargain et al. (2017) analyse the impact on inequality of the reform of tax-benefit programmes in response to the Great Recession, using microsimulation and household surveys. For the first stage of the crisis, they find that policy responses contributed to stabilizing or even decreasing inequality in the United Kingdom, France and Ireland. In Germany, policy effects on inequality were small. In the later stage of the crisis, policy reforms had mixed effects. During this period, tax-benefit changes increased inequality, especially in Ireland.

Most studies focus on overall redistribution; others have examined in more detail the impact of income components on overall inequality (Shorrocks, 1983; Lerman and Yitzhaki, 1985; Jenkins, 1995; Breen, García-Peñalosa and Orgiazzi, 2008). These suggest that income taxes and social benefits are important to reduce household income inequality. Plotnick (1984) calculates the redistributive impact of cash transfers in the United States in 1967 and in 1974. Caminada and Goudswaard (2001) performed a budget incidence analysis for the Netherlands to investigate the effect of transfers and taxes in 1981, 1991 and 1997. Ferrarini and Nelson (2003) focus on the effects of taxation and social insurance in ten countries around 1995, analysing inter- and intra- country comparisons of income (re)distribution. Mahler and Jesuit (2006) divide government redistribution into several components: the redistributive effects from unemployment benefits, from pensions, and from taxes. They applied their empirical exercise for 13 countries with LIS-data around the years 1999/2000. Caminada, Goudswaard and Wang (2012) and Wang, Caminada and Goudswaard (2012 and 2014) updated and extended the analyses of Mahler and Jesuit (2006) by taking into account many more benefits and taxes, and applied a budget incidence analysis to a wider range of 36 countries with LIS data up to around 2004. They conclude that transfers account for 75 per cent of redistribution, while direct taxes account for 25 per cent. More than half of the total redistribution owing to transfers comes from pension benefits, although the redistributive character of pension benefits varies across countries. Unemployment benefits are the second most important programme in terms of redistribution, but their redistributive impact is only one fifth of the effect of pension benefits. Another finding of Mahler and Jesuit (2006) is that redistribution relates more strongly to the size of social benefits than to the extent to which benefits target lower income groups (targeting efficiency). Studies that

apply tax-benefit instruments sequentially suggest that the redistributive effect of transfers is much more important than taxes (e.g. Immervoll et al., 2005; Mahler and Jesuit, 2006; Wang, Caminada and Goudswaard, 2012, 2014).

A number of studies use the EUROMOD microsimulation model for the European Union⁵ to analyse the distributional impact of transfers and taxes. De Agostini et al. (2014) analyse tax-benefit policy reforms implemented since the Great Recession. They find that the changes in direct taxes, pensions and cash benefits have had, broadly, inequality reducing effects, except in Germany. However, after including VAT, the policy package appears to have been more regressive. Hills et al. (2014) point out that most of the structural policy changes, especially those introduced in the 2007–2011 period of the crisis, had inequality increasing effects. Avram, Levy and Sutherland (2014) analyse different types of policies in reducing income disparities. They conclude that pension benefits and direct taxes have the strongest impact on redistribution, despite the low progressivity of these programmes in some countries. Thus, the size of the programmes matters more than their targeting on lower income groups. As suggested by Figari and Paulus (2015), the overall redistributive effect of the tax-benefit systems depends heavily on the income concept concerned. They introduce an extended income concept, which also includes indirect taxes, imputed rent and in-kind benefits. Applying this concept to three European countries (Belgium, Greece and the United Kingdom), they find that differences in redistribution across countries become smaller.

Research method

Measuring the redistributive effects of income taxes and social transfers

The standard method to calculate the impact of social transfers on income inequality is the statutory or budget incidence analysis (Musgrave, Case and Leonard, 1974). Through comparing pre-tax-transfer income inequality and post-tax-transfer income inequality, the redistributive effect of taxes and income transfers can be assessed (OECD, 2008, p. 98). Redistribution is simply the difference between primary income inequality and disposable income inequality. In this type of analysis, income inequality is measured by the Gini index. However, there are several indicators of income inequality, and these do not always tell the same story (see Atkinson, Rainwater and Smeeding, 1995).

There is a critical literature on budget incidence analyses; see Smolensky, Hoyt and Danziger (1987) for a critical assessment of efforts to measure budget

5. See <www.euromod.ac.uk>.

incidence. For example, analyses on budget incidence ignore the important issue of behavioural responses, and tax/transfer shifting in particular. Both the generosity and efficiency of the tax-transfer system may influence the level of pre-tax-transfer income inequality. However, models that include all behavioural links are beyond the scope of existing empirical work (Gottschalk and Smeeding, 2000). Therefore, researchers have restricted themselves largely to accounting exercises that decompose changes in overall inequality into a set of components (see Kristjánsson, 2011; Fuest, Niehues and Peichl, 2010; Paul, 2004). The criticisms leave the stylized conclusions of budget incidence analyses intact.

To assess the partial effects of specific social benefits and taxes on overall redistribution, we apply a sequential accounting decomposition technique to the Gini. It should be noted, however, that this procedure is somewhat arbitrary since the choice of benchmark income affects the outcome. Applying the redistribution from, say, taxes on gross income rather than primary income alters the outcome to some extent. Since taxes are levied on gross income (primary income plus social benefits), the redistributive effects may be underestimated. Nevertheless, the logic of this decomposition of the Gini is that taxes are applied to gross income and benefits to primary income. This approach has been, among others, advocated by Kakwani (1986).

Our sequential accounting decomposition approach of income inequality follows studies by Mahler and Jesuit (2006), Kristjánsson (2011) and Kammer, Niehues and Peichl (2012), with inequality indices accounted sequentially in order to determine the effective distributional impact of different income sources. Other techniques of the decomposition of the Gini coefficient by income source are found in the literature as well,⁶ but the sequential accounting approach is the most straightforward.

Disentangling inequality by income source could be affected by the ordering effect. For example, the partial redistributive effect of a specific social transfer will be highest (smallest) when computed as the first (last) social programme. The order of the calculations affects the results. We correct for this as follows: we first consider every specific social transfer as the first programme to be added to primary income and then the last programme following all other transfer programmes. Consequently, we get two results for the Gini. When we take the mean of the decomposition results across countries, the sum of all partial redistributive effects amount to (a little) over 100 per cent due to missing observations. We rescaled the redistributive effects of each programme by applying an adjustment factor to correct for this effect; see Caminada et al. (2017) for details.

6. See, for example, Lerman and Yitzhaki (1985), Stark, Taylor and Yitzhaki (1986), Kim (2000), Creedy and van de Ven (2001).

Data

LIS is the largest available income database of harmonized microdata collected from 47 countries in Europe, North America, Latin America, Africa, Asia, and Australasia spanning five decades. LIS data are available for ten waves, centred on 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2004, 2007 and 2010. However, not every country is represented in every wave and some countries include more than one year in a single wave. Harmonized into a common framework, LIS datasets contain household- and person-level data on labour income, capital income, social security and private transfers, income taxes and contributions, demography, employment, and expenditures (Ravallion, 2015). The LIS database allows scholars to access the microdata, so that income inequality measures and fiscal redistribution (and the partial effect per social programme) can be derived consistently from the underlying data at the individual and household level. LIS microdata seem to be the best available data for describing how income inequality and the redistributive effects of income taxes and social transfers vary across countries and over time (Nolan and Marx, 2009; Smeeding and Latner, 2015; Nieuwenhuis, Munzi and Gornick, 2016). We apply a cross-national analysis using comparable income surveys for all countries of LIS from 1982–2014. From nearly 300 variables in the dataset, we choose those related to household income (all kinds of income sources), total number of persons in a household and household weight (in order to correct sample bias or non-sampling errors) to measure income inequality and the redistributive effect across countries. In line with LIS convention and the work of Mahler and Jesuit (2006) and Wang and Caminada (2011), we have eliminated observations with a zero or a missing value of disposable income from LIS data. Household weights are applied for the calculation of Gini coefficients.

Country-comparative and trend analyses of income distribution based on LIS gross/net datasets should be undertaken with caution. LIS provides gross income data in most countries and years while providing income data that are net of (income) taxes in others. Of the 293 LIS datasets available at the time of writing, 194 are classified as gross, 84 as net and 15 as “mixed”.⁷

Choice of income unit

Conventionally, studies have used household income per capita to adjust total incomes according to the number of persons in the household. In the last decades, equivalence scales have come to be widely used in the literature on income distribution (Figini, 1998). An equivalence scale is a function that

7. See Documentation Guide in Wang and Caminada (2017).

calculates adjusted income from income and a vector of household characteristics. Equivalence scale elasticity for the LIS database is set around 0.5. This implies that in order to have an equivalent income of 100, a household of two persons must have an income of 140 to have equivalent incomes. Put alternatively, a one-person household must have 70 per cent of the total income of a two-person household to have equivalent income. However, it has been shown that the choice of equivalence scales affects international comparisons of income inequality to a wide extent. Alternatively, adjustment methods would definitely affect the ranking of countries, although the broad pattern remains the same (Atkinson, Rainwater and Smeeding, 1995, p. 52).

Focus on total population – including public pension schemes

Unlike most existing studies, this study focuses both on the total population and on the non-elderly population (those aged 18–64). Restricting the analysis to the non-elderly would avoid some of the problems inherent to comparisons of incomes between people who are at different stages in their lives. For instance, an essential function of old-age pensions is to redistribute inter-temporally over the life cycle; in this case, a focus on the non-elderly helps to understand the most important elements of interpersonal redistribution. However, we believe that the largest government transfer programme, public pensions, cannot be excluded from our analysis. Public pension plans are generally seen as part of the safety net, generating large antipoverty effects. Thus, state old-age pension benefits will be included in our analysis on redistribution. Clearly, countries differ in the public versus private provision of their pensions (OECD, 2008, p. 120). Occupational and private pensions are not redistributive programmes per se; although they too have a significant effect on redistribution when pre-tax-transfer inequality and post-tax-transfer inequality are measured at one moment in time, particularly among the elderly (Been et al., 2017). In this study, we pragmatically follow the LIS Household Income Variables List: occupational and private pensions are earmarked and treated as social security transfers (see also Jesuit and Mahler, 2017).

Trends in the distribution of primary and disposable income in LIS countries

Inequality across countries 1982–2013

This section presents cross-national comparisons of primary and disposable income inequality across countries over time. We selected 15 countries with at

least three data points (around 1985, 1997 and 2010 or later). Moreover, we selected countries for which full information is available on the whole trajectory from primary income to disposable income. The changes in inequality levels are illustrated by the Gini coefficients. In order to give a general idea, we cluster the countries around 1985, 1997, and 2010 or later respectively, showing the average trends of inequality and redistribution. We show country profiles for all 15 LIS countries in Figure 1.

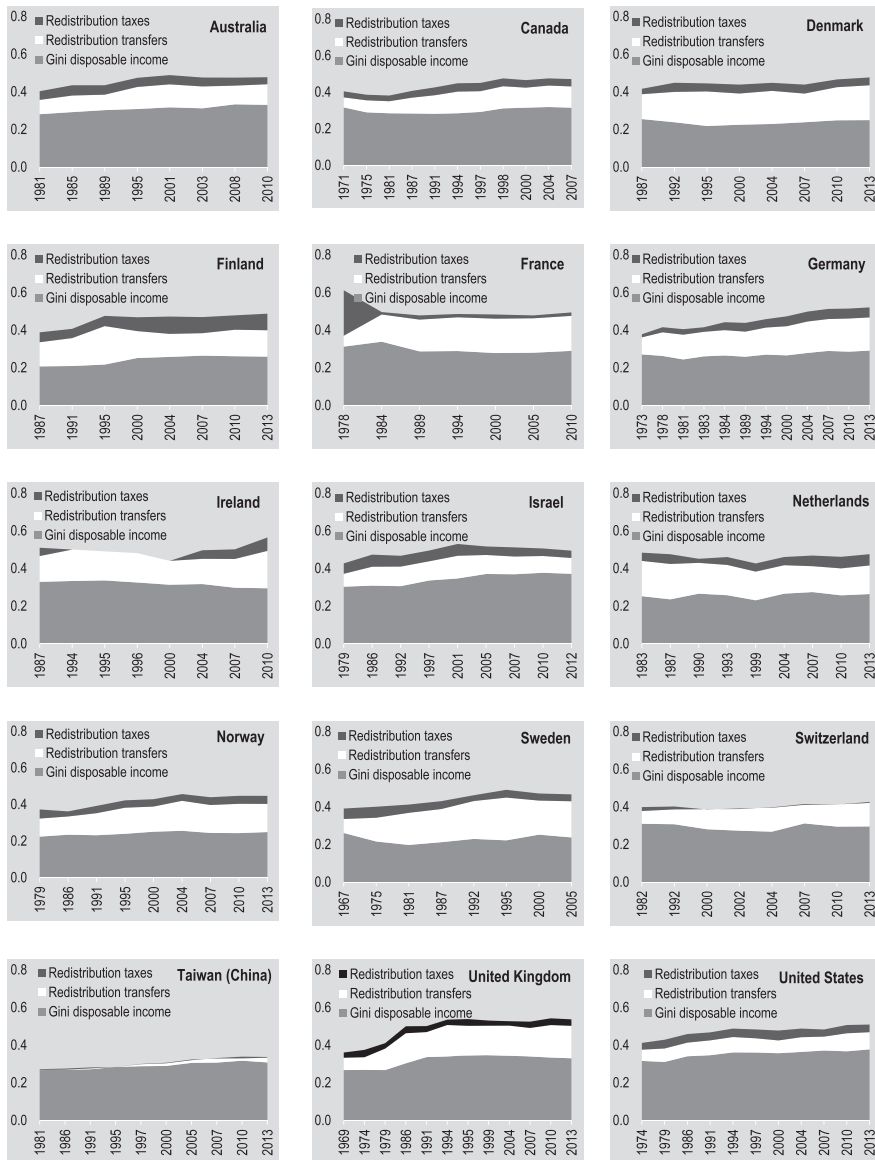
Table 1 shows the 15-country average trend of primary income and disposable income inequality from 1985 to 2014. This table highlights some significant differences across periods in a general way. When the total population is taken into account, income inequality increased markedly on average. This increase was stronger during 1997–2014 compared to 1985–1997. The widening of income gaps was driven by rising inequality in the distribution of primary income, which was partly offset by social transfers and income taxes and social security contributions. In the second decade, primary income inequality and disposable income inequality rose, more or less, in parallel.

We show that inequality of primary income has increased by 11 per cent over a 25-year period on average for the countries shown. This is a substantial increase over a relatively short period. Though primary income inequality has been a main driver of inequality trends in disposable incomes, the effect of fiscal redistribution remains to be determined. Between 1982 and 2013, redistribution systems compensated 63 per cent of the increase in primary income inequality. Primary income inequality rose by about 0.048 on average, while redistribution rose 0.030. Income taxes and social transfers reduced income inequality by about 38 per cent around 2013; this is slightly higher than in the mid-1980s (35 per cent). If we look at the working-age population only, the trends are similar: rising primary income inequality and a slightly lower increase in disposable income inequality. Fiscal redistribution among the working-age population has also increased, but to a lesser extent than among the total population.

Country-specific results are also presented in Table 1. Tax-benefit systems in Ireland, Germany, Sweden, Finland and Denmark achieve the greatest reduction in inequality, lowering the Gini value by 22.5 points or more around 2013. The smallest redistributive effect is seen in Taiwan (China), Israel, Switzerland, the United States and Australia (less than 15 points).

Through the entire period, disposable income inequality increased significantly in Israel and Finland, whereas it decreased in France, Ireland, Switzerland and Denmark. In the period around 1985–1997, higher disposable income inequality was mainly “caused” by higher primary income inequality (although primary income inequality declined in Israel and Sweden). In this period, government redistribution has offset the widening of income gaps through public cash transfers and household taxes either in full (e.g. Denmark, France, Ireland, the Netherlands

Figure 1. Trends in income inequality and fiscal redistribution in 15 LIS countries



Source: Wang and Caminada (2017) database based on LIS.

and Switzerland) or in part (in all others; see Figure 1). On average across countries, disposable income inequality hardly changed (+0.001). Cross-country variance has widened since the mid-1990s. Primary income inequality increased

Has the redistributive effect of social transfers and taxes changed?

Table 1. Trends in Gini indices of primary income and disposable income and fiscal redistribution, 1982–2013

A. Total population	Gini primary income				Gini disposable income				Fiscal redistribution						
	around 1985	around 1997	around 2013	change 85-13	%	around 1985	around 1997	around 2013	change 85-13	%	around 1985	around 1997	around 2013	change 85-13	%
Australia (85-95-10)	0.434	0.474	0.477	0.043	10	0.292	0.308	0.330	0.039	13	0.143	0.166	0.147	0.004	3
Canada (87-97-10)	0.407	0.450	0.481	0.074	18	0.283	0.291	0.317	0.034	12	0.124	0.158	0.164	0.040	33
Denmark (87-95-13)	0.416	0.444	0.476	0.060	14	0.255	0.218	0.249	-0.005	-2	0.161	0.227	0.226	0.065	41
Finland (87-95-13)	0.388	0.475	0.487	0.099	26	0.207	0.216	0.259	0.052	25	0.181	0.259	0.228	0.047	26
France (84-94-10)	0.496	0.486	0.494	-0.002	0	0.338	0.288	0.289	-0.049	-14	0.168	0.197	0.204	0.047	30
Germany (84-94-13)	0.442	0.458	0.520	0.079	18	0.265	0.270	0.291	0.026	10	0.177	0.188	0.229	0.052	30
Ireland (87-96-10)	0.510	0.481	0.564	0.055	11	0.328	0.325	0.294	-0.034	-10	0.181	0.156	0.270	0.089	49
Israel (86-97-12)	0.473	0.495	0.494	0.021	4	0.309	0.336	0.371	0.063	20	0.165	0.159	0.123	-0.042	-26
Netherlands (83-99-13)	0.483	0.426	0.475	-0.008	-2	0.252	0.231	0.284	0.011	5	0.231	0.196	0.212	-0.019	-8
Norway (86-95-13)	0.362	0.422	0.446	0.085	23	0.234	0.239	0.248	0.015	6	0.128	0.183	0.198	0.070	55
Sweden (87-95-05)	0.429	0.490	0.466	0.036	8	0.212	0.221	0.237	0.025	12	0.218	0.268	0.229	0.011	5
Switzerland (82-00-13)	0.398	0.385	0.425	0.027	7	0.309	0.280	0.295	-0.014	-5	0.089	0.105	0.130	0.041	46
Taiwan (China) (86-97-13)	0.275	0.300	0.333	0.058	21	0.269	0.287	0.308	0.039	15	0.007	0.012	0.025	0.019	285
United Kingdom (86-99-13)	0.500	0.530	0.537	0.037	7	0.303	0.346	0.330	0.027	9	0.166	0.184	0.207	0.010	5
United States (86-97-13)	0.459	0.483	0.509	0.050	11	0.340	0.360	0.377	0.037	11	0.118	0.123	0.132	0.014	12
Mean-15	0.431	0.453	0.479	0.048	11	0.280	0.281	0.297	0.018	6	0.152	0.172	0.182	0.030	20

(Continued)

Table 1. Trends in Gini indices of primary income and disposable income and fiscal redistribution, 1982–2013 - Continued

	Gini primary income			Gini disposable income			Fiscal redistribution								
	around 1985	around 1997	around 2013	around 1985	around 1997	around 2013	around 1985	around 1997	around 2013	change 85-13	% change 85-13				
B. Working-age population															
Australia (85-95-10)	0.390	0.422	0.414	0.025	6	0.279	0.299	0.313	0.034	12	0.111	0.123	0.102	-0.009	-8
Canada (87-97-10)	0.369	0.403	0.432	0.063	17	0.280	0.293	0.322	0.042	15	0.090	0.110	0.110	0.020	23
Denmark (87-95-13)	0.349	0.377	0.402	0.053	15	0.238	0.209	0.250	0.012	5	0.112	0.168	0.153	0.041	36
Finland (87-95-13)	0.342	0.430	0.408	0.066	19	0.203	0.222	0.260	0.057	28	0.139	0.207	0.148	0.009	6
France (84-94-10)	0.459	0.430	0.437	-0.021	-5	0.341	0.292	0.294	-0.047	-14	0.117	0.138	0.143	0.026	22
Germany (84-94-13)	0.361	0.377	0.419	0.058	16	0.254	0.267	0.296	0.042	16	0.107	0.109	0.123	0.016	15
Ireland (87-96-10)	0.503	0.436	0.517	0.014	3	0.346	0.316	0.294	-0.052	-15	0.157	0.120	0.224	0.067	42
Israel (86-97-12)	0.440	0.456	0.458	0.018	4	0.302	0.330	0.359	0.057	19	0.137	0.126	0.099	-0.039	-28
Netherlands (83-99-13)	0.442	0.359	0.407	-0.035	-8	0.249	0.230	0.272	0.023	9	0.193	0.129	0.134	-0.059	-30
Norway (86-95-13)	0.290	0.348	0.391	0.100	35	0.221	0.234	0.258	0.037	17	0.070	0.114	0.133	0.063	90
Sweden (87-95-05)	0.350	0.424	0.391	0.041	12	0.215	0.242	0.235	0.020	9	0.135	0.181	0.156	0.021	16
Switzerland (82-00-13)	0.340	0.328	0.346	0.006	2	0.304	0.279	0.285	-0.019	-6	0.036	0.048	0.061	0.025	71
Taiwan (China) (86-97-13)	0.276	0.287	0.308	0.032	11	0.270	0.282	0.296	0.026	10	0.007	0.005	0.012	0.005	82
United Kingdom (86-99-13)	0.434	0.457	0.459	0.026	6	0.289	0.339	0.335	0.036	12	0.134	0.118	0.124	-0.011	-8
United States (86-97-13)	0.413	0.434	0.464	0.051	12	0.329	0.351	0.374	0.045	14	0.084	0.083	0.090	0.006	7
Mean-15	0.384	0.398	0.417	0.033	9	0.275	0.279	0.296	0.021	8	0.109	0.119	0.121	0.012	11

Notes: Ireland 1996: income data net of income taxes (marked italic). Sweden is included although latest data year available is 2005.

Source: Wang and Caminada (2017) database based on LIS, and own calculations.

in nearly all countries (with Israel and Sweden as exceptions), markedly so in Ireland, Germany, the Netherlands and Switzerland. Disposable income inequality increased in all countries except for Ireland and the United Kingdom. On average, only 37 per cent of the rise in income inequality was offset by redistribution through taxes and transfers in the period 1997–2013 (which compares with 93 per cent for 1985–1997).

Fiscal redistribution rose in 11 of our 15 countries in the period 1985–1997 and in nine countries in the period around 1997–2013. Moreover, since 1983 fiscal redistribution has risen in nearly all countries, with Israel and the Netherlands as exceptions.

Table 2 summarizes the results for trends in redistribution among the working-age population and the total population for 15 countries with full tax and benefit information for around 1985, around 1995 and around 2013. Since the mid-1980s, and again since the mid-1990s, fiscal redistribution has increased

Table 2. Trends in fiscal redistribution among working-age and total population, 1982–2013

	Total population			Working-age population		
	Gini primary income	Gini disposable income	Fiscal redistribution	Gini primary income	Gini disposable income	Fiscal redistribution
Around 1985	0.431	0.280	0.152	0.384	0.275	0.109
Around 1997	0.453	0.281	0.172	0.398	0.279	0.119
Around 2013	0.479	0.297	0.182	0.417	0.296	0.121
Change 1985–2013	0.048	0.018	+0.030	0.033	0.021	+0.012
Change 1985–1997	0.022	0.002	+0.020	0.014	0.004	+0.010
Change 1997–2013	0.026	0.016	+0.010	0.019	0.017	+0.002
	Share of rise inequality primary income offset by fiscal redistribution			Share of rise inequality primary income offset by fiscal redistribution		
1985–2013	63%			37%		
1985–1997	93%			73%		
1997–2013	37%			10%		

Notes: Selected countries: Australia, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Netherlands, Norway, Sweden, Switzerland, Taiwan (China), United Kingdom and United States.

Source: Wang and Caminada (2017) database based on LIS, and own calculations.

on average in the 15 countries considered. This is the case, both, when the working-age population and the total population is taken into consideration. This diverges from the results found by Causa and Hermansen (2017), who conclude that across OECD countries redistribution through taxes and transfers has declined over the last two decades. In our case, we find that benefit systems in the mid-2000s are even more effective at reducing inequality compared to the mid-1990s, although the difference is very small when only the working-age population is taken into account. Therefore, our results suggest that the claim that reduced redistribution is a main driver of widening income gaps since the mid-1990s overstates the situation. Further, Table 2 also shows that the *share* of the rise in primary income inequality that has been offset by fiscal redistribution has declined since the mid-1990s, both among the total population and among the working-age population.

Redistributive effect of taxes and transfers 1982–2013

Table 3 highlights that the trend of overall redistribution is mainly caused by social transfers. From the mid-1980s to the mid-1990s, total redistribution increased, driven by the stronger redistributive effect of transfers. In the decade from the mid-1990s to around 2013, hardly any change was observed in overall redistribution. The average total redistribution increased by 0.030 points in the 15 LIS countries from around 1985 to around 2013.

Figure 1 illustrates the trends of overall tax and transfers redistribution for each of the 15 LIS countries. From the mid-1980s to around 2013, total redistribution increased in all countries except Israel and the Netherlands. The additional redistribution of social transfers drove this. Tax systems became less redistributive in seven of the countries: Australia, Israel, Sweden, Switzerland, Taiwan (China), the United Kingdom and the United States.

From the mid-1990s to around 2013, the patterns of redistribution across countries are more diverse, both in overall redistribution and in tax and transfers redistribution. During this period, total redistribution hardly changed or fell in all countries (with Ireland as the exception).

Inequality and fiscal redistribution before and after the Great Recession

This section examines the impact of the economic crisis that started in 2008 on income distribution and fiscal redistribution. In total, 23 countries for which there is full information on income and taxes for the years before the Great Recession (around 2006–2007) and for 2012 and after were selected. As shown in Table 4, primary income inequality has increased in all countries since around

Has the redistributive effect of social transfers and taxes changed?

Table 3. *Redistribution across 15 LIS countries, 1982–2013*

	Fiscal redistribution				Partial effects: Changes 1985-2013	
	Around 1985	Around 1997	Around 2013	Change 85-13	From transfers	From taxes
Australia (85-95-10)	0.143	0.166	0.147	0.004	0.021	-0.017
Canada (87-97-10)	0.124	0.158	0.164	0.040	0.038	0.002
Denmark (87-95-13)	0.161	0.227	0.226	0.065	0.053	0.013
Finland (87-95-13)	0.181	0.259	0.228	0.047	0.012	0.036
France (84-94-10)	0.158	0.197	0.204	0.047	0.042	0.005
Germany (84-94-13)	0.177	0.188	0.229	0.052	0.041	0.011
Ireland (87-96-10)	0.181	0.156	0.270	0.089	0.062	0.027
Israel (86-97-12)	0.165	0.159	0.123	-0.042	-0.016	-0.026
Netherlands (83-99-13)	0.231	0.196	0.212	-0.019	-0.035	0.016
Norway (86-95-13)	0.128	0.183	0.198	0.070	0.054	0.016
Sweden (87-95-05)	0.218	0.268	0.229	0.011	0.016	-0.005
Switzerland (82-00-13)	0.089	0.105	0.130	0.041	0.057	-0.016
Taiwan (China) (86-97-13)	0.007	0.012	0.025	0.019	0.028	-0.009
United Kingdom (86-99-13)	0.196	0.184	0.207	0.010	0.013	-0.003
United States (86-97-13)	0.118	0.123	0.132	0.014	0.019	-0.005
Mean-15	0.152	0.172	0.182	0.030	0.027	0.003

Source: Wang and Caminada (2017) database based on LIS, and own calculations.

Table 4. Trends in Gini indices of primary income and disposable income and fiscal redistribution, 2006–2014

	Gini primary income			Gini disposable income			Fiscal redistribution					
	Before crisis	After crisis	Change 07-13 %	Before crisis	After crisis	Change 07-13 %	Before crisis	After crisis	Change 07-13 %			
Austria 2007–2013	0.485	0.493	0.009	2	0.284	0.279	-0.005	-2	0.201	0.215	0.014	7
Brazil 2006–2013	0.558	0.542	-0.016	-3	0.487	0.450	-0.037	-8	0.071	0.093	0.021	30
Czech Republic 2007–2013	0.446	0.457	0.011	2	0.251	0.258	0.007	3	0.195	0.199	0.004	2
Denmark 2007–2013	0.438	0.476	0.038	9	0.238	0.249	0.011	5	0.200	0.226	0.027	13
Estonia 2007–2013	0.493	0.540	0.047	9	0.312	0.352	0.040	13	0.181	0.188	0.007	4
Finland 2007–2013	0.469	0.487	0.018	4	0.264	0.259	-0.005	-2	0.205	0.228	0.023	11
Germany 2007–2013	0.512	0.520	0.008	2	0.289	0.291	0.002	1	0.223	0.229	0.006	3
Greece 2007–2013	0.515	0.567	0.052	10	0.320	0.332	0.012	4	0.195	0.235	0.040	20
Guatemala 2006–2014	0.490	0.427	-0.063	-13	0.472	0.394	-0.078	-17	0.018	0.034	0.016	85
Israel 2007–2012	0.512	0.494	-0.018	-3	0.369	0.371	0.003	1	0.143	0.123	-0.020	-14
Korea, Rep. of 2006–2012	0.330	0.337	0.007	2	0.305	0.306	0.001	0	0.025	0.031	0.006	26
Luxembourg 2007–2013	0.456	0.475	0.020	4	0.276	0.283	0.007	3	0.180	0.192	0.012	7
Netherlands 2007–2013	0.468	0.475	0.007	2	0.274	0.264	-0.011	-4	0.194	0.212	0.018	9
Norway 2007–2013	0.439	0.446	0.008	2	0.244	0.248	0.005	2	0.195	0.198	0.003	1
Panama 2007–2013	0.516	0.514	-0.001	0	0.481	0.467	-0.014	-3	0.035	0.048	0.013	37

(Continued)

Table 4. Trends in Gini indices of primary income and disposable income and fiscal redistribution, 2006–2014 - Continued

	Gini primary income			Gini disposable income			Fiscal redistribution					
	Before crisis	After crisis	Change 07-13 %	Before crisis	After crisis	Change 07-13 %	Before crisis	After crisis	Change 07-13 %			
Peru 2007–2013	0.524	0.483	-0.041	-8	0.500	0.455	-0.045	-9	0.024	0.028	0.004	18
Poland 2007–2013	0.490	0.484	-0.006	-1	0.310	0.316	0.006	2	0.180	0.168	-0.012	-7
Slovakia 2007–2013	0.503	0.425	-0.078	-16	0.248	0.268	0.021	8	0.255	0.157	-0.099	-39
Spain 2007–2013	0.475	0.520	0.046	10	0.307	0.343	0.037	12	0.168	0.177	0.009	6
Switzerland 2007–2013	0.410	0.425	0.015	4	0.311	0.295	-0.016	-5	0.099	0.130	0.031	31
Taiwan (China) 2007–2013	0.329	0.333	0.004	1	0.307	0.308	0.001	0	0.022	0.025	0.003	15
United Kingdom 2007–2013	0.524	0.537	0.012	2	0.339	0.330	-0.009	-3	0.186	0.207	0.021	11
United States 2007–2013	0.483	0.509	0.027	6	0.371	0.377	0.006	2	0.111	0.132	0.020	18
Mean+23	0.472	0.477	0.005	1	0.329	0.326	-0.003	-1	0.144	0.151	0.007	5

Source: Wang and Caminada (2017) database based on LIS, and own calculations.

2007, except for Guatemala, Israel, Peru, Poland and Slovakia. However, the Gini for disposable income has decreased in a large number of countries, with a 1 per cent decrease on average. The most significant reduction in disposable income inequality (17 per cent) appears in Guatemala. Estonia and Spain, in contrast, are the countries with the largest increases in inequality of disposable income. We do not find that fiscal redistribution has been less effective since the Great Recession. On the contrary, the increase in fiscal redistribution has offset rising primary income inequality and led to more equal disposable income distribution.

On average, income inequality has decreased slightly and fiscal redistribution has risen since the Great Recession. The increase in fiscal redistribution comes mainly from social transfers while the redistributive effect of income taxes has been decreasing. Although all changes are rather small, our findings are not fully in line with the recent study by the OECD (Causa and Hermansen, 2017) that states that the economic recovery has not reduced income inequality, because redistribution has decreased recently in a majority of countries. However, both the OECD and this study find that fiscal redistribution dampened the increase in market income inequality since 2007, although there is a large variation across countries.

Programme size and targeting of transfers

Considering the programmes' redistributive effect of social benefits, a distinction can be made between programmes' size and the extent to which benefits are targeted toward low-income groups by means testing. Using LIS microdata, it is possible to calculate a measure of the average value of social transfers as a percentage of households' gross income: the larger the value, the greater the share of total income that is derived from transfers. It is also possible to calculate a summary index of the degree to which transfers are targeted toward low-income groups. To do so, we apply Kakwani's (1986) "index of concentration" to transfers. This index takes on the value of -1.0 if the poorest person receives all the transfer income, 0 if every person receives an equal share, and +1.0 if the richest person receives all the transfer income (cf. Korpi and Palme, 1998, p. 684). For the time series around 1985–2013, the figures for the size and target efficiency of social benefits are calculated for 15 LIS countries and are reported in Table 5.

There is considerable variance among countries in the average size of social benefits relative to total household income. For the mid-1980s, five countries (Denmark, France, the Netherlands, Sweden and the United Kingdom) achieve a high budget size of transfers (20 per cent or more), whereas it is low in Australia, Canada, Israel, Norway, Switzerland, Taiwan (China) and the United States (less

Has the redistributive effect of social transfers and taxes changed?

Table 5. Budget size and targeting efficiency across 15 LIS countries, 1982–2013

	Budget size (%)			Targeting			Change 85-13
	Around 1985	Around 2013	Change 85-13	Around 1985	Around 2013	Change 85-13	
Australia (1985–2010)	10.7	12.9	2.2	-0.340	-0.318	0.022	0.022
Canada (1987–2010)	12.8	18.2	5.4	-0.184	-0.066	0.119	0.119
Denmark (1987–2013)	20.5	23.6	3.0	-0.122	-0.199	-0.077	-0.077
Finland (1987–2013)	19.1	25.5	6.4	-0.150	-0.033	0.117	0.117
France (1984–2010)	23.0	29.1	6.1	0.026	0.082	0.056	0.056
Germany (1984–2013)	16.9	22.4	5.5	-0.250	-0.118	0.132	0.132
Ireland (1984–2010)	18.9	26.8	7.9	-0.149	-0.087	0.062	0.062
Israel (1986–2012)	14.6	14.8	0.2	-0.109	0.010	0.119	0.119
Netherlands (1983–2013)	29.0	22.2	-6.8	-0.003	-0.117	-0.114	-0.114
Norway (1986–2013)	14.0	23.2	9.2	-0.244	-0.064	0.180	0.180
Sweden (1986–2005)	27.6	28.1	0.4	-0.030	-0.074	-0.044	-0.044
Switzerland (1982–2013)	8.1	17.2	9.1	0.089	-0.144	-0.232	-0.232
Taiwan (China) (1986–2013)	0.5	9.9	9.4	0.048	0.077	0.029	0.029
United Kingdom (1986–2013)	21.9	21.7	-0.1	-0.138	-0.123	0.016	0.016
United States (1986–2013)	10.9	13.8	2.9	-0.207	-0.091	0.116	0.116
Mean – 15	16.6	20.6	4.1	-0.118	-0.084	0.033	0.033

Source: Wang and Caminada (2017) database based on LIS, and own calculations.

than 15 per cent). For around 2013, more countries achieve a high budget size (20 per cent or more), while Australia, Canada, Israel, Switzerland, Taiwan (China) and the United States still have budget sizes less than 15 per cent. Over time, social benefits' size increased in all countries, with the exception of the Netherlands.

Targeting efficiency is more diverse across countries. In the mid-1980s, cash benefits are targeted most to the poor in Australia and Germany, and are more universally distributed in Sweden, the Netherlands and France. Around 2013, Australia targeted more to the poor than other countries. Transfers were spread more universally in 11 out of our 15 countries. Generally speaking, transfers are less targeted to the poor and more universally distributed around 2013 than in earlier periods. Nevertheless, we observe social benefits to be targeted more to the poor over time in Switzerland, the Netherlands, Denmark and Sweden.

Decomposition of the redistributive effects of social transfers and income taxes over time

How have the redistributive effects of the different parts of welfare states altered over time and across countries? This section presents trends of detailed redistributive effects across a selection of LIS countries for which we have full information on taxes and benefits. For this, eight countries are selected based on two criteria: (i) the country has full tax/benefit information for at least three data points (around 1985, around 1997 and 2010 or later); (ii) the category "Other transfers" amounts to less than 20 per cent of total fiscal redistribution.

We calculate the following (partial) redistributive effects over time, based on the LIS household income components list: old-age/disability/survivor transfers, sickness transfers, family/children transfers, education transfers, unemployment transfers, housing transfers, general/food/medical assistance transfers, other social security transfers and income taxes and social security contributions. As explained before, we consider state old-age pension benefits as part of our analysis, because they are part of the safety net and generate significant reduction in poverty and income inequality. Also taken into account are occupational and private pensions.

To illustrate the idea of the decomposition from primary to disposable income inequality, Table 6 reports the trends of the redistributive effects of the different parts of tax-benefit systems averaged for eight LIS countries from the mid-1980s to around 2013.

The dominant pattern was one of increasing fiscal redistribution. Increasing fiscal redistribution came from old-age/disability/survivor benefits and, to a lesser extent, from unemployment benefits and housing benefits. Old age/disability/

Table 6. *Decomposition of disposable income inequality for eight countries 1982–2013: Averages by periods*

	Gini around 1985	Gini around 1995	Gini around 2013	Change 1985–2013
(a) Gini primary income	0.447	0.460	0.485	0.039
(b) Gini disposable income	0.289	0.286	0.310	0.021
Overall redistribution (a–b)	0.158	0.174	0.176	0.018
Transfers	75%	78%	78%	3%
Old-age/Disability/ Survivor transfers	47%	52%	56%	9%
Sickness transfers	1%	1%	0%	–1%
Family/Children transfers	7%	8%	7%	0%
Education transfers	6%	2%	1%	–5%
Unemployment transfers	5%	7%	6%	1%
Housing transfers	1%	3%	2%	2%
General/food/medical assistance transfers	2%	3%	3%	0%
Other transfers	7%	3%	2%	–5%
Income taxes and social security contributions	25%	22%	24%	–1%
Residual	0%	0%	–2%	–2%
Overall redistribution	100%	100%	100%	

Note: Selected countries: Australia, Finland, France, Germany, Israel, Netherlands, Switzerland and the United Kingdom.

Source: Wang and Caminada (2017) database based on LIS, and own calculations.

survivor benefits accounted for 47 per cent of total redistribution in the mid-1980s and for 58 per cent around 2013. Slightly less redistribution was generated by sickness benefits and income taxes. The share of education benefits in total redistribution declined more substantially, from 6 per cent around 1985 to only 1 per cent around 2013. Redistribution by other transfers has also fallen.

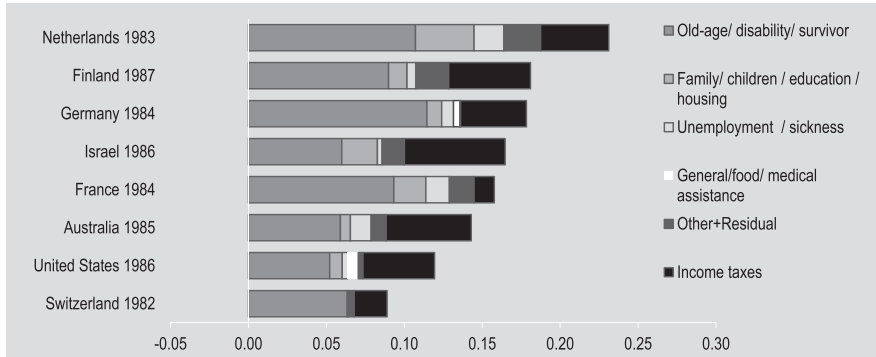
With respect to trends in the redistributive effects of several social programmes across countries, the results are diverse. Figure 2 presents how the fiscal redistribution of each social programme has changed over time across eight LIS countries. Countries are ranked in terms of fiscal redistribution, from highest to lowest.

Over time, the Netherlands dropped in our country ranking on redistribution from first place to third. Germany's ranking changed from third to first. Finland is ranked second, with relatively high levels of fiscal redistribution. At the bottom

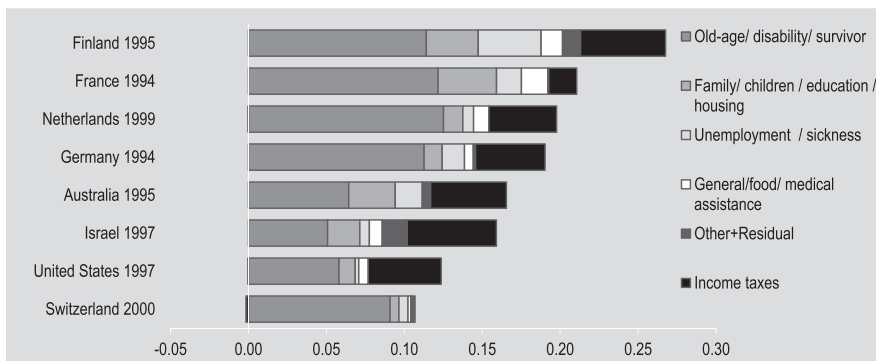
Has the redistributive effect of social transfers and taxes changed?

Figure 2. Decomposition of fiscal redistribution of social transfers and taxes in eight countries, 1982-2013

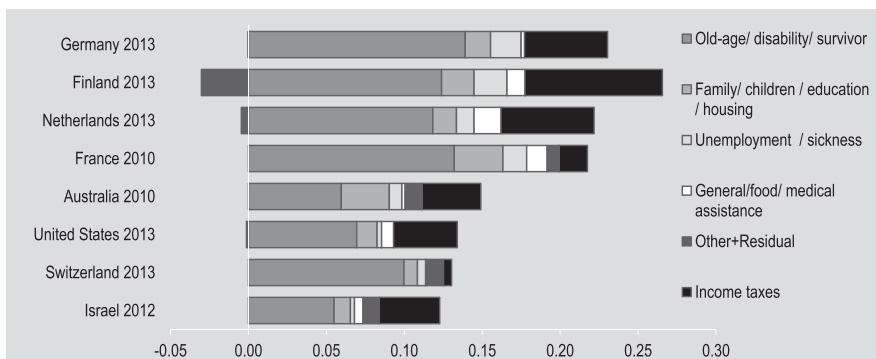
Panel A. Around 1985



Panel B. Around 1997



Panel C. Around 2013



Source: Wang and Caminada (2017) database based on LIS, and own calculations.

of the ranking, we find the United States, Switzerland and Israel, with the lowest levels of redistribution by social transfers and income taxes.

Old-age/disability/survivor benefits attribute most to redistribution in all countries around 2013 (35 per cent or more). From the mid-1980s to around 2013, the main pattern was the increasing contribution of these programmes to redistribution, except for Australia and Germany. Overall, old-age and survivor benefits account for 47 per cent of the total fiscal redistribution in our eight-country average for around 1985, and 56 per cent for around 2013.

The redistributive effect of benefits for family/children, education and housing varies across countries. Overall, these benefits account for 11 per cent of the total fiscal redistribution for our eight-country average in 2013; a decrease of 3 percentage points since 1985. The decrease comes mainly from education benefits.

The redistributive effect of unemployment compensation and sickness benefits decreased in half of the eight countries; namely Australia, France, the Netherlands and the United States. The overall contribution of unemployment and sickness benefits to total fiscal redistribution in our eight-country average was 6 per cent for around 1985 as well as for around 2013.

On average, income taxes attributed less to fiscal redistribution for the period 1985–2013 (25 per cent versus 24 per cent, in our eight-country average). However, cross-country differences are large. Income taxes became more progressive in Finland, France and the Netherlands – consistent with the trend towards greater primary-income inequalities, which, in itself, would increase taxation at the top end. However, tax progression declined in Australia, Germany, Israel, Switzerland and the United States.

Conclusions

We have investigated changes in income distribution over time and whether and to what extent social transfers and taxes have contributed to this trend, using the most recent micro household income data from the LIS Cross National Data Center in Luxembourg. We have provided trends of primary and disposable income inequality and of overall and disaggregated redistribution by social programmes in a comparative way, which offer an accurate and detailed picture of the redistribution of incomes through taxes and transfers across social welfare states.

We have applied a sequential budget incidence analysis for a selected group of 15 countries (with full tax/benefit information). Inequality of primary income has increased by 11 per cent over a 25-year period averaged for these countries. This is a substantial increase over a relatively short period. Primary-income inequality has been the main driver of inequality trends in disposable incomes.

However, fiscal redistribution compensated 63 per cent of the increase in primary-income inequality. In contrast to the results of other studies, especially by the OECD, we do not find that fiscal redistribution has declined. Tax-benefit systems around 2013 are more effective at reducing income inequality compared to the mid-1980s and the mid-1990s, especially when the total population is taken into account. As such, the claim that reduced redistribution is a main driver of widening income gaps appears to be overstated for the countries studied. Since the Great Recession, fiscal redistribution has increased.

Changes in redistribution can be related to changes in programme size or to changes in the targeting of benefits toward low-income groups. We find that programme size has increased in most countries, which contributed to fiscal redistribution. Moreover, in most countries, transfers for around 2013 are targeted less to the poor than in earlier periods, although there are some exceptions.

State old-age and survivors benefits (including disability schemes) attribute most to fiscal redistribution in the majority of countries; the main pattern was an increasing contribution of these programmes to redistribution in the period 1985–2013 (except for Germany and Finland). Overall, old-age and survivor benefits account for 47 per cent of the total fiscal redistribution in our eight-country average for around 1985, and 56 per cent for around 2013. Income taxes, on average, also attributed to fiscal redistribution in the period 1985–2013; 25 per cent (around 1985) versus 24 per cent (around 2013) in our eight-country average. Again, cross-country differences are large. Income taxes became more progressive in Finland and the Netherlands, but generated less fiscal redistribution in the United States, Australia and Israel. For some countries, the redistributive effect of benefits for family, children, education and housing is rather high and account for 15 per cent or more of the total fiscal redistribution, as in Australia and France. Overall, these benefits account for 11 per cent of the total fiscal redistribution among our country-average for around 2013, while it was 14 per cent for around 1985.

This empirical analysis does not show why benefits and income taxes have become more or less redistributive. It can be expected that, as primary income inequality rises, the tax-benefit systems will automatically have a more redistributive impact, because of the progressivity built into these systems. Yet, policy changes also will certainly explain a part of the changes in redistribution. Future research should shed some light on the impact of specific policy reforms in changing the redistributive effect of welfare states. To that end, we offer an Open Access Database allowing users to easily select income inequality variables and fiscal redistribution variables for (a group of) countries and/or specific data years for 47 countries in the period 1967–2014 (Wang and Caminada, 2017).

Bibliography

- Atkinson, A. B.** 2000. "The changing distribution of income: Evidence and explanation", in *German Economic Review*, Vol. 1, No. 1.
- Atkinson, A. B.** 2003. "Income inequality in OECD countries: Data and explanations", in *CESifo Economic Studies*, Vol. 49, No. 4.
- Atkinson, A. B.** 2015. *Inequality: What can be done*. Cambridge, MA, Harvard University Press.
- Atkinson, A. B.; Brandolini, A.** 2001. "Promise and pitfalls in the use of 'secondary' data-sets: Income inequality in OECD countries as a case study", in *Journal of Economic Literature*, Vol. 39, No. 3.
- Atkinson, A. B.; Rainwater, L.; Smeeding, T. M.** 1995. *Income distribution in OECD countries: Evidence from the Luxembourg Income Study* (OECD Social policy studies, No. 18). Paris, Organisation for Economic Co-operation and Development.
- Avram, S.; Levy, H.; Sutherland, H.** 2014. "Income redistribution in the European Union", in *IZA Journal of European Labor Studies*, Vol. 3, No. 22.
- Bargain, O. et al.** 2017. "Changes in income distributions and the role of tax-benefit policy during the Great Recession: An international perspective", in *Fiscal Studies*, Vol. 38, No. 4.
- Been, J. et al.** 2017. "Public/private pension mix, income inequality, and poverty among the elderly in Europe: An empirical analysis using new and revised OECD data", in *Social Policy & Administration*, Vol. 51, No. 7.
- Brandolini, A.; Smeeding, T. M.** 2007. "Inequality: International evidence", in S. N. Durlauf and L. E. Blume (eds), *The New Palgrave Dictionary of Economics*. Basingstoke, Palgrave Macmillan.
- Breen, R.; García-Peñalosa, C.; Orgiazzi, E.** 2008. *Factor components of inequality: Cross-country differences and time changes* (LIS Working paper series, No. 503). Luxembourg, Luxembourg Income Study.
- Caminada, K.; Goudswaard, K. P.** 2001. "International trends in income inequality and social policy", in *International Tax and Public Finance*, Vol. 8, No. 4.
- Caminada, K.; Goudswaard, K.; Wang, C.** 2012. *Disentangling income inequality and the redistributive effect of taxes and transfers in 20 LIS countries over time* (LIS Working paper series, No. 581). Luxembourg, Luxembourg Income Study.
- Caminada, K. et al.** 2017. *Income inequality and fiscal redistribution in 47 LIS-countries, 1967-2014* (LIS Working paper series, No. 724). Luxembourg, Luxembourg Income Study.
- Causa, O.; Hermansen, M.** 2017. *Income redistribution through taxes and transfers across OECD countries* (OECD Economics Department working paper, No. 1453). Paris, Organisation for Economic Co-operation and Development.
- Creedy, J.; Ven, J. van de.** 2001. "Decomposing redistributive effects of taxes and transfers in Australia: Annual and lifetime measures", in *Australian Economic Papers*, Vol. 40, No. 2.

- De Agostini, P. et al.** 2014. *The effect of tax-benefit changes on the income distribution in EU countries since the beginning of the economic crisis* (EUROMOD Working paper, No. EM9/14). Colchester, EUROMOD.
- Ferrarini, T.; Nelson, K.** 2003. "Taxation of social insurance and redistribution: A comparative analysis of ten welfare states", in *Journal of European Social Policy*, Vol. 13, No. 1.
- Figari, F.; Paulus, A.** 2015. "The distributional effects of taxes and transfers under alternative income concepts: The importance of three 'I's", in *Public Finance Review*, Vol. 43, No. 3.
- Figini, P.** 1998. *Inequality measures, equivalence scales and adjustment for household size and composition* (LIS Working paper series, No. 185). Luxembourg, Luxembourg Income Study.
- Fuest, C.; Niehues, J.; Peichl, A.** 2010. "The redistributive effects of tax benefit systems in the enlarged EU", in *Public Finance Review*, Vol. 38, No. 4.
- Gottschalk, P.; Smeeding, T. M.** 2000. "Empirical evidence on income inequality in industrialized countries", in A. B. Atkinson and F. Bourguignon (eds), *Handbook of income distribution*. Amsterdam, North-Holland.
- Hills, J. et al.** 2014. *A lost decade? Decomposing the effect of 2001-11 tax-benefit policy changes on the income distribution in EU countries* (ImPRovE Working paper, No. 14/03). Antwerp, ImPRovE.
- Immervoll, H. et al.** 2005. *Household incomes and redistribution in the European Union: Quantifying the equalising properties of taxes and benefits* (EUROMOD Working paper, No. EM9/05). Colchester, EUROMOD.
- Immervoll, H.; Richardson, L.** 2011. *Redistribution policy and inequality reduction in OECD countries: What has changed in two decades?* (OECD Social, Employment and Migration working paper, No. 122). Paris, Organisation for Economic Co-operation and Development.
- Jenkins, S. P.** 1995. "Accounting for inequality trends: Decomposition analyses for the UK, 1971–86", in *Economica*, Vol. 62, No. 245.
- Jesuit, D. K.; Mahler, V. A.** 2010. *Comparing government redistribution across countries: The problem of second-order effects* (LIS Working paper series, No. 546). Luxembourg, Luxembourg Income Study.
- Jesuit, D.; Mahler, V. A.** 2017. "Fiscal redistribution in comparative perspective: Recent evidence from the Luxembourg Income Study (LIS) Data Centre", in M. Buggeln, M. Daunton and A. Nützenadel (eds), *The political economy of public finance: Taxation, state spending and debt since the 1970s*. Cambridge, Cambridge University Press.
- Kakwani, N. C.** 1986. *Analyzing redistribution policies: A study using Australian data*. Cambridge, Cambridge University Press.
- Kammer, A.; Niehues, J.; Peichl, A.** 2012. "Welfare regimes and welfare state outcomes in Europe", in *Journal of European Social Policy*, Vol. 22, No. 5.

- Kenworthy, L.; Pontusson, J.** 2005. "Rising inequality and the politics of redistribution in affluent countries", in *Perspectives on Politics*, Vol. 3, No. 3.
- Kim, H.** 2000. "Anti-poverty effectiveness of taxes and income transfers in welfare states", in *International Social Security Review*, Vol. 53, No. 4.
- Korpi, W.; Palme, J.** 1998. "The paradox of redistribution and strategies of equality: Welfare state institutions, inequality, and poverty in the western countries", in *American Sociological Review*, Vol. 63, No. 5.
- Kristjánsson, A. S.** 2011. "Income redistribution in Iceland: Development and European comparisons", in *European Journal of Social Security*, Vol. 13, No. 4.
- Lambert, P. J.; Nesbakken, R.; Thoresen, T. O.** 2010. *On the meaning and measurement of redistribution in cross-country comparisons* (LIS Working paper series, No. 532). Luxembourg, Luxembourg Income Study.
- Lerman, R. I.; Yitzhaki, S.** 1985. "Income inequality effects by income source: A new approach and applications to the United States", in *The Review of Economics and Statistics*, Vol. 67, No. 1.
- Mahler, V. A.; Jesuit, D. K.** 2006. "Fiscal redistribution in the developed countries: New insights from the Luxembourg Income Study", in *Socio-Economic Review* Vol. 4, No. 3.
- Musgrave, R. A.; Case, K. E.; Leonard, H.** 1974. "The distribution of fiscal burdens and benefits", in *Public Finance Quarterly*, Vol. 2, No. 3.
- Nieuwenhuis, R.; Munzi, T.; Gornick, J. C.** 2016. "Comparative research with net and gross income data: An evaluation of two netting down procedures for the LIS Database", in *Review of Income and Wealth*, Vol. 63, No. 3.
- Nolan, B.; Marx, I.** 2009. "Economic inequality, poverty, and social exclusion", in W. Salverda, B. Nolan and T. M. Smeeding (eds), *The Oxford handbook of economic inequality*. Oxford, Oxford University Press.
- OECD.** 2008. *Growing unequal? Income distribution and poverty in OECD countries*. Paris, Organisation for Economic Co-operation and Development.
- OECD.** 2011. *Divided we stand: Why inequality keeps rising*. Paris, Organisation for Economic Co-operation and Development.
- OECD.** 2015. *In it together: Why less inequality benefits all*. Paris, Organisation for Economic Co-operation and Development.
- Paul, S.** 2004. "Income sources effects on inequality", in *Journal of Development Economics*, Vol. 73, No. 1
- Piketty, T.** 2014. *Capital in the twenty-first century*. Cambridge, MA, Harvard University Press.
- Plotnick, R.** 1984. "The redistributive impact of cash transfers", in *Public Finance Quarterly*, Vol. 12, No. 1.
- Ravallion, M.** 2015. "The Luxembourg Income Study", in *Journal of Economic Inequality*, Vol. 13, No. 4.
- Shorrocks, A. F.** 1983. "Ranking income distributions", in *Economica*, Vol. 50, No. 197.

- Smeeding, T. M.** 2004. "Twenty years of research in income inequality, poverty and redistribution in the developed world: Introduction and overview", in *Socio-Economic Review*, Vol. 2, No. 2.
- Smeeding, T.; Latner, J. P.** 2015. "PovcalNet, WDI and 'All the Ginis': A critical review", in *The Journal of Economic Inequality*, Vol. 13, No. 4.
- Smolensky, E.; Hoyt, W.; Danziger, S.** 1987. "A critical survey of efforts to measure budget incidence", in H. M. van de Kar and B. L. Wolfe (eds), *The relevance of public finance for policy-making* (Proceedings of the 41st International Institute of Public Finance Congress, Madrid, 1985). Detroit, MI, Wayne State University Press.
- Stark, O.; Taylor, J. E.; Yitzhaki, S.** 1986. "Remittances and inequality", in *The Economic Journal*, Vol. 96, No. 383.
- Wang, C.; Caminada, K.** 2011. *Disentangling income inequality and the redistributive effect of social transfers and taxes in 36 LIS countries* (LIS Working paper series, No. 567). Luxembourg, Luxembourg Income Study.
- Wang, J.; Caminada, K.** 2017. *Leiden LIS budget incidence fiscal redistribution dataset on income inequality* (Version 1, November 2017). Leiden, Leiden University – Department of Economics.
- Wang, C.; Caminada, K.; Goudswaard, K.** 2012. "The redistributive effect of social transfer programmes and taxes: A decomposition across countries", in *International Social Security Review*, Vol. 65, No. 3.
- Wang, C.; Caminada, K.; Goudswaard, K.** 2014. "Income distribution in 20 countries over time", in *International Journal of Social Welfare*, Vol. 23, No. 3.
- Whiteford, P.** 2010. "The Australian tax-transfer system: Architecture and outcomes", in *The Economic Record*, Vol. 86, No. 275.

The effects on intra-generational inequality of introducing a funded pension scheme: A microsimulation analysis for Estonia

Magnus Piirits and Andres Võrk

University of Tartu, Estonia

Abstract This article uses a single male cohort microsimulation model to analyse the intra-generational and distributional effects of a shift in Estonia from a defined benefit pay-as-you-go (PAYG) pension system to a multi-pillared system with a PAYG scheme with contribution-based insurance components and a funded pension scheme. We contribute to the literature on microsimulation by showing how introducing contribution-based insurance components and compulsory defined contribution (DC) schemes can increase pension inequality. Our results show that in the case of a high level of inequality in labour earnings and high long-term unemployment rates, such as in Estonia, the introduction of a very strong link between contributions and future benefits leads to considerably higher inequality in pension incomes as measured by the Gini coefficient. Simulation results for Estonia suggest that inequality in old-age pension incomes more than doubles when the reforms mature. In contrast, the inequality in replacement rates decreases.

33

Addresses for correspondence: Magnus Piirits, Praxis Centre for Policy Studies, Veski 35, 51005 Tartu, Estonia; email: magnus.piirits@praxis.ee. Andres Võrk, University of Tartu, Ülikooli 18, 50090 Tartu, Estonia; email: andres.vork@ut.ee.

Magnus Piirits is also associated with the University of Tartu, Tartu, Estonia. This article is supported by the MOPACT (Mobilising the POTential of ACTive aging) Programme of the EU Seventh Framework programme. The authors thank two anonymous reviewers and Elena Jarocińska, Theo Nijman, Mikk Medijainen and seminar participants at the 2016 Netspar conference for very helpful comments. We thank Evelin Jõgi for research assistance.

Keywords social security reform, pension scheme, old-age benefit, adequacy, Estonia

Introduction

Many developed countries are increasing individual responsibility for saving for retirement by shifting from defined benefit (DB) to defined contribution (DC) schemes or establishing mandatory funded pillars in response to the issue of an ageing population and growing pressure on government budgets. Orenstein (2011) summarizes several studies from more than thirty countries that fully or partially replaced their pay-as-you-go (PAYG) schemes with schemes based on individual, private pension savings accounts across 1981–2007. He concluded that although the 2007 financial crisis slowed the pace of this trend, it has not disappeared. Governments cannot afford generous pensions based on PAYG systems and, as a result, the role of DC schemes is increasing (van Vliet et al., 2012; OECD, 2014). For several European countries, the share of occupational and statutory funded pensions in the total replacement rate is expected to increase substantially between 2006 and 2046 (European Commission, 2010a, Fig. 10).

In the transition to DC schemes, several countries, including Estonia across the period 1998–2002, adopted the World Bank’s original three-pillar pension model (World Bank, 1994), each with its own variations. The three pillar strategy should ensure the sustainability of pension systems, as tightening the link between contributions and pension income should provide incentives to increase labour force participation and to extend labour market activity (Börsch-Supan, 2004; Lassila and Valkonen, 2017). Also, the shift to a partially funded system would be a low-risk strategy in a context of population ageing and low inflation (Disney, 1996). In addition, earnings-related formulas should reduce hidden redistribution (Boado-Penas and Vidal-Melià, 2012).

PAYG and DB pension systems usually involve redistribution within generations. Hence, any movement towards quasi-actuarial DC schemes will reduce such redistribution and affect levels of inequality arising from old-age pension income (Lindbeck and Persson, 2003). Also, high levels of public and social expenditures are associated with lower levels of income inequality and poverty (Smeeding and Williamson, 2001; Goudswaard and Caminada, 2010). Similar results are found in cross-sectional studies – income inequality among the elderly is lower, as a higher proportion of income is derived from public pension benefits (Brown and Prus, 2006; Weller, 2004; Fukawa, 2006). Time-series studies show the same result – a higher proportion of private pensions in pension income is associated with

increased income inequality among the elderly (Hughes and Stewart, 2004; Oshio and Shimizutani, 2005; Milligan, 2008; Schirle, 2009). In an initial study, van Vliet et al. (2012) found no empirical evidence suggesting that the shift from public to private pensions leads to higher inequality. However, the same authors conducted further analysis involving a larger number of countries and a wider timeframe incorporating revised data from the Organisation for Economic Co-operation and Development (OECD) and found results similar to other empirical findings, which opposed the results of their own earlier work. The change in results comes largely from the revised data (Been et al., 2016). Generally speaking, across countries to date, multi-pillar systems have been implemented that retain a strong first pillar (Fox and Palmer, 2001).

Intra-generational equity has two aspects. Horizontal equity requires individuals to have similar internal rates of return from the pension system. Vertical equity requires people with different characteristics to be treated differently (such as low-wage earners), in order to avoid poverty in old age (Clements, Eich and Gupta, 2014).

Several studies have analysed the potential effects of pension systems and their reforms on intra-generational inequality (see for example, Karayel, 2006; Lefèbvre, 2007; He, 2008; Bonenkamp, 2009; Klazar and Slintáková, 2012; van Vliet et al., 2012; Aubert, Duc and Ducoudré, 2013). To measure generational distribution and test for inequality in pensions, other studies have used Net Present Value and Expected Utility (Auerbach and Lee, 2011) as well as the individual Internal Rate of Return of different career patterns (Nisticò and Bevilacqua, 2013 and 2017). In this article, the Gini coefficient has been used to evaluate inequality in pensions, which has been done using the absolute size of pensions.

Estonia currently has one of the lowest income inequality rates among the elderly in Europe. According to Eurostat SILC data, the quintile share ratio among people in Estonia older than age 65 was 3.1; the EU-28 average was 3.9 (Eurostat, 2015). However, the low inequality of pensioners' income is subject to change, as the impacts of past reforms will gradually materialize. The key aim of this article is to assess the future inequality of pensions in the light of the reforms that link pension benefits more strongly to personal contributions.¹

We use a cohort microsimulation model to analyse the intra-generational distributional effects of the Estonian pension reforms across 1999–2009. These reforms entailed a shift from a DB PAYG system, with entitlement determined only by a length of pensionable service component, to a pillared pension system with contribution-based insurance components in the PAYG scheme and additional compulsory and voluntary funded DC pension schemes. We

1. We do not use women in this analysis. Adding women would require actual and simulated data on children, as taking parental leave to raise children affects pension rights.

demonstrate how introducing contribution-based insurance components and compulsory DC schemes increases pension inequality. We relied on micro-level population data of Estonian men born in 1980 ($n=10,286$) and we simulated the effect of the recent reforms on their pensions at the statutory retirement age in 2045. We compared the distribution of pensions for the PAYG scheme and the compulsory funded pension scheme, before and after the reforms.

Previously, the impact of the Estonian pension reforms has been analysed by the Estonian Ministry of Finance² and the Praxis Centre for Policy Studies (Aaviksoo et al., 2011) by using numerical calculations of a stylised person or by comparing the expected pensions of different age groups, but there are no studies analysing the intra-generational effects of these reforms. Currently there is no proper microsimulation model to analyse the future distribution of pensions in Estonia. Our current analysis is the first effort to fill this gap.

Given that differences in labour market activity/periods of unemployment and lifetime earnings now influence old-age pension income more than prior to the reform, we found that variation in old-age pension incomes has increased considerably. Consequently, if the average pension level remains unchanged, the risk of poverty among pensioners is likely to increase in future, especially for those with lower lifetime earnings and longer unemployment spells.

The rest of the article is organized as follows. In the next section, we introduce the Estonian pension system and describe the recent reforms. We then explain our data and simulation approach, before presenting results and some sensitivity tests. Concluding comments are then offered.

Overview of the Estonian pension system³

The Estonian pension system currently consists of three pillars: a state pension insurance scheme (a PAYG system providing defined benefits); a compulsory (if born in 1983 or after) funded pension scheme (defined contribution scheme); and a voluntary funded pension scheme (defined contribution scheme) (Table 1). The state pension insurance scheme provides protection against the risks of longevity, invalidity and survivorship using mainly employment-based old-age, work incapacity, and survivors' pensions. Also provided is a very small flat-rate residence-based national pension, the purpose of which is to guarantee a minimum income for those who are not entitled to the employment-based

2. For the Estonian Financial Supervision Authority's (*Finantsinspeksioon*) interactive pension calculator, see <www.minuraha.ee/kasulikud-abivahendid/?popup=pensionikalkulaator_tulevik>.

3. This section draws heavily on and uses extracts from the Estonian country profile published in European Commission (2010b); and Vörk and Paat-Ahi (2013).

Table 1. *Main pension reforms that shaped the Estonian old-age pension system*

State pension scheme (first pillar)	Time
Introducing a contribution-related element in the pension formula by linking the acquisition of new pension rights to social tax paid on behalf of the person	1999
Equalization of the pensionable age for men and women: at age 63 at age 65	Men 2001, women 2016 Both by 2026
Introduction of pension indexation: both pensions in payment as well as components determining the amounts of newly granted pensions. Index: 50% Consumer Price Index (CPI) + 50% increase of revenues of the pension insurance part of social tax	2002
Change in the indexation formula (20% CPI + 80% increase of revenues of the pension insurance part of social tax). Differential indexation of base component and pensionable service and insurance component	Implemented in 2008
Ad hoc changes in the pension indexation during the economic crisis	2009–2014
Compulsory funded pension scheme (second pillar)	
Introduction of compulsory funded pensions	2002
Window for voluntary joining for persons born between 1942–1982; the end year of the window depends on person's birth year	2002–2010
Additional contributions on behalf of those receiving parental benefit (2004–2012) or with children younger than age 3 (2013 onwards), paid by the general government	2004–2012 (1%) 2013 (4%)
Suspension of payments during the economic crisis and the following compensation mechanism	2009–2010 2014–2017
Voluntary funded pension scheme (third pillar)	
Legal framework for the scheme	1998
Changes in limits to tax-free contributions to the voluntary pension scheme Employers' contributions allowed	2012

Sources: Leppik (2006), European Commission (2010), Vörk and Paat-Ahi (2013).

pension. In addition to the general system of old-age pensions, there are rules for special pensions and other pensions provided with favourable conditions (e.g. pensions for police personnel, military personnel, judges, artists, miners, etc.).

The financing for pensions comes from the insurance share of the social tax (20 per cent), a payroll tax, and additional contributions paid by employees. If a person is a member of the compulsory funded scheme, part of the social tax (4 per cent) is transferred to the said scheme and each member contributes an additional 2 per cent from his or her gross wage. Additional voluntary contributions are payable to the voluntary pension scheme (third pillar).

First pillar

The coverage of the state pension insurance system is practically universal. Old-age pensions (P) (see equation 1) comprise of three components: the flat-rate base

amount (B), the pensionable length-of-service component (s), covering periods up to 1998, and the insurance component that is based on individual social tax payments to the state pension scheme ($\sum K$), covering periods from 1999 onwards. Each year, individual social tax payments are converted into points (K) based on a comparison with the average payment of the pension insurance part of the social tax. Both the length-of-service component and the points are multiplied by the cash value (V).

$$P_t = B_t + s \times V_t + \sum K \times V_t \quad (1)$$

The old-age pension is redistributive owing to the flat-rate base amount (B), which on 1 April 2013 comprised about 38 per cent of the average old-age pension. In addition, the length-of-service component (s) is strongly redistributive, but as this only takes into account employment periods up to 1998, its role is gradually diminishing for new pensioners. Redistribution is also achieved through crediting pension rights for some non-active periods (including periods caring for children and military service), either adding values to s when workers retire or by paying social tax (i.e. contributing to $\sum K$) on behalf of some socio-economic groups.

The base amount (B) and the cash value (V) of one year of pensionable service and the pension insurance coefficient are indexed annually. The pension index (PI) (see equation 2) is a weighted average of past consumer price indices (CPI) and past growth of social tax revenues (STR) to the pension insurance system (in a 20–80 proportion since 2008).

$$PI_t = 0.2 \times CPI_{t-1} + 0.8 \times STR_{t-1} \quad (2)$$

Until 2007, the weights in the formula were 50–50. Since 2008, a differential indexation of the flat-rate base component and the pensionable service/insurance component is applied. The index is 10 per cent higher for the base component (see equation 3) and 10 per cent lower for the cash value (V) (see equation 4) of one year of pensionable service and the pension insurance coefficient.

$$B_t = B_{t-1} \times [(PI_t - 1) \times 1.1 + 1] \quad (3)$$

$$V_t = V_{t-1} \times [(PI_t - 1) \times 0.9 + 1] \quad (4)$$

During the economic crisis across the period 2009–2013, there were a few ad hoc changes to the indexation of pensions. The changes allowed smoothing the value of nominal pensions during the crisis without having any long-term impact on the sustainability or adequacy of pensions.

Second pillar

The PAYG state pension insurance scheme is supplemented by a compulsory funded DC scheme, which was introduced in 2002 by diverting a portion of contributions from the statutory PAYG scheme⁴ into private funds and introducing additional contributions by employees. The contribution rate is 6 per cent of gross wages – the employee pays 2 per cent from the gross wage and the employer another 4 per cent (as part of the total 20 per cent pension insurance contribution). As a result, the insurance coefficient of the first pillar will be smaller. The value of the pension benefits depends on total contributions over the working career and the yields of the pension funds. The scheme covers the risk of longevity, but not disability.

Since two-thirds of the second pillar contributions come from pension insurance contributions, this reduces the amount of money directed to the PAYG scheme and, therefore, the necessary additional finances must come from other sources to cover PAYG scheme costs. During 2002–2008, the net annual transition costs in Estonia had been lower than the inflow of revenues to the second pillar due to high economic growth (Leppik and Võrk, 2008). Across a longer period (until 2012), the transition cost was 6.2 per cent of GDP, which in terms of pension system transition costs in the countries of Central and Eastern Europe (CEE) is average in size (Bielawska, Chłoń-Domińczak, and Stańko, 2017).

Participation in the scheme, which is managed by private fund managers, is mandatory for cohorts born in 1983 or later. Cohorts born in 1942–1982 had the option to join the scheme voluntarily. In 2010, the last cohorts, born in 1980–1982, had to make a choice whether to participate in the pension scheme. By the end of 2013, the scheme covered about 81 per cent of the population aged 18–63 and 60 per cent of participants had contributed. When scheme members reach the pension age, they can withdraw their accumulated assets. Currently, the accumulated assets are rather small, as the scheme is not yet mature.

At the end of 2014, the average gross old-age pension from the first and second pillars was about EUR 348 per month; the second pillar pension added only about 50 cents on average per month, as only 1 per cent of current old-age pensioners have pension insurance contracts with the funded pension scheme. The average combined pension of current pensioners affiliated to the first and second pillars was about EUR 412. The average gross old-age pension comprised about 34.6 per cent of the average gross wage of a full-time worker at the end of 2014. The average net replacement rate was 42.7 per cent.

4. This diverted portion is taken from the insurance component, as the length-of-service components were earned only until 1998.

Third pillar

The voluntary funded pension scheme currently plays a minor role in Estonia. Consequently, the third pillar is not addressed in this article. Voluntary funded pension contracts are entered into by acquiring pension fund units from fund managers or with life insurers as pension insurance. There are two types of pension insurance contracts: pension insurance with guaranteed interest and pension insurance with investment risk. The scheme had about 43,400 participants (6 per cent of those aged 18–62) with assets of about EUR 117 million (about 0.6 per cent of GDP) at the end of 2014. There were additionally about 64,000 contracts in the form of life insurance at the end of 2014.

Contributions to the voluntary pension scheme can be deducted from taxable income, up to a ceiling of 15 per cent of the employee's taxable income. The income tax rate on pension payments is also lower if conditions are fulfilled regarding investment duration and the investor's age at the time of withdrawal.

The structure of old-age pensions in the future

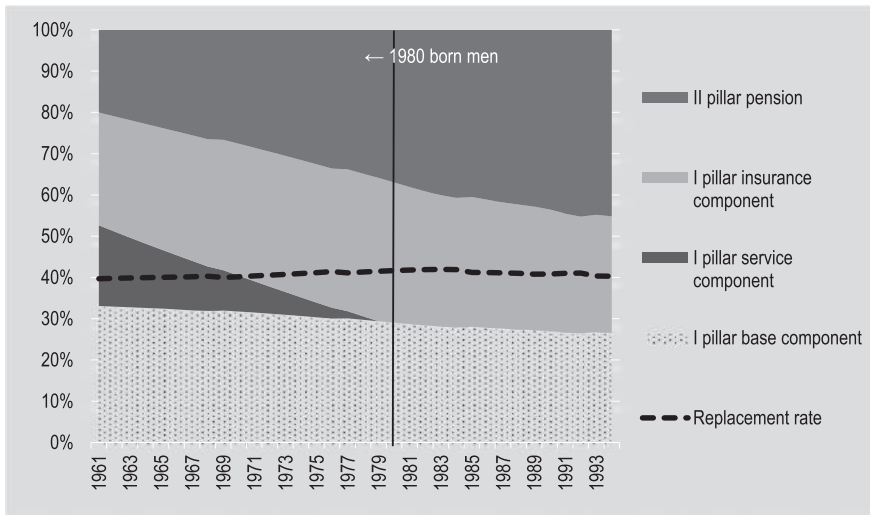
The structure of the old-age pension provided by the first and second pillars will change considerably for future retirees (Figure 1). For example, the cohort born in 1961 and retiring in 2026 at age 65 will receive 80 per cent of their old-age pension from the PAYG scheme (first pillar), which still includes a considerable part derived from the length of service component before 1999. Those in the cohort born in 1983 or after (i.e. the first cohort obliged to participate in the compulsory funded pension scheme) are expected to receive about 40 per cent of their pension from the funded (DC) pension scheme. In addition, on average about 30 per cent of their pensions depend on the insurance component of the PAYG scheme (which, on average, is the same for other cohorts). As a proportion of total pension income, old-age pension components that depend on individual contributions will therefore increase from 47 per cent in 2026 to 70 per cent in 2048 if the system remains unchanged. In our analysis, we use the cohort of men born in 1980. The replacement rate would be around 42 per cent for a worker from this cohort who has a career record of 44 years of full-time work with earnings equal to the average wage, with funded pensions constituting more than third (37 per cent) of the total pension.⁵

Data and simulation of reform scenarios

In our analysis, we use microlevel population data from the Estonian National Social Insurance Board of men born in 1980. The data consists of 10,286 men,

5. In addition to the state PAYG scheme and compulsory funded pension scheme, the voluntary pension scheme will further increase dependence for retirement income on individual contributions.

Figure 1. *The components of the old-age pension and theoretical replacement rate for people with different birth years*

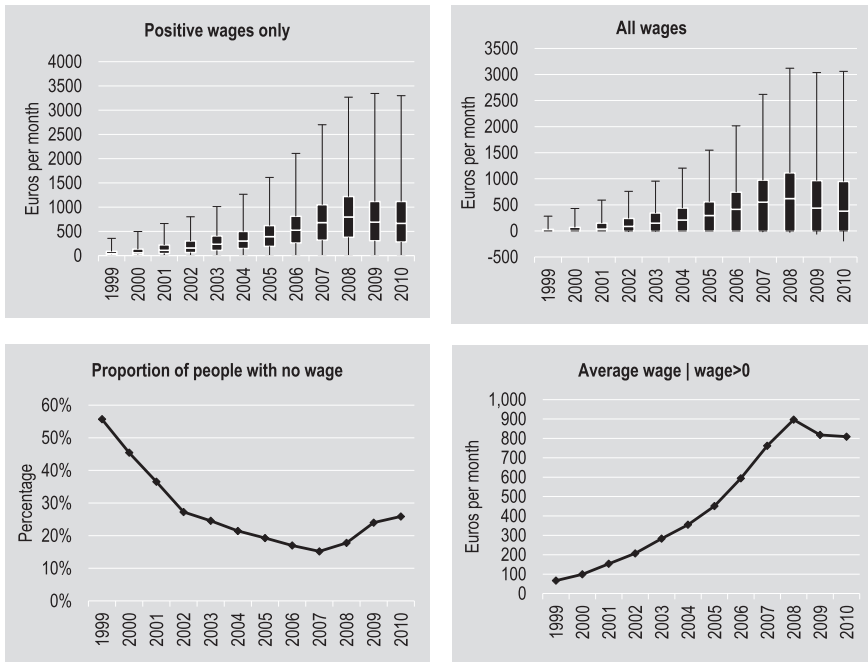


Note: The figure assumes a person employed at average wage for 44 years, retiring at the statutory pension age.
 Source: Praxis Centre for Policy Studies, details available from authors.

with information on their earnings across 1999–2010, and the date of joining the compulsory funded pension scheme (note that this cohort was able to choose whether to participate in the second pillar). The data also shows men’s temporary decisions regarding whether they continued to contribute to the funded pension scheme in 2010, when the government stopped transfers to the second pillar due to the financial crisis. While we can derive individual contributions to the first and second pillars in 2002–2010, we do not have data on individual choices of pension funds and, hence, their historical rate of returns and accumulated assets. In our calculations we used the average rate of return of the pension funds for 2002–2013 and assumed a constant real rate of return for all future individuals (2.5 per cent plus CPI). We also tested the sensitivity of our results with a lower real rate of return (0.5 per cent plus CPI).

Figure 2 describes the historical labour market characteristics of these men. By the age of 25, most had labour earnings. Still, even in 2007, at a time of economic boom, 15 per cent of men born in 1980 did not have any (declared) earnings in Estonia. For 2008–2010, the economic downturn caused an increase in unemployment and decreased average earnings. The wage distribution widened until 2007–08 and remained stable afterwards.

Figure 2. The development of the wage and its distribution for men born in 1980, euros per month (gross) except third graph



Note: Top 1% of observations are censored to give a better representation of the figure.

Source: Estonian National Social Insurance Board; authors' calculations.

We use two scenarios for future individual wages for years 2011–2045: (i) constant relative wage compared to the average wage, and (ii) wages following a random process derived from an age-dependent Markov transition matrix.

In the first case, future wages are predicted for each person as follows (see equation 5). For each person, the ratio between the individual five-year average (2006–2010) wage and economy-wide average wage is calculated and this ratio is assumed to be fixed for the forecasting period 2011–2045.

$$wage_{it} = \frac{\sum_{\tau=2006}^{2010} wage_{i\tau}}{\sum_{\tau=2006}^{2010} average\ wage_{\tau}} \times average\ wage_t \quad \text{if } t > 2010 \quad (5)$$

Effectively it means that wage distribution for that cohort is unchanged and is based on the most recent five years' data available. The estimates we acquired in this manner most likely overestimate pension inequality due to wage inequality,

given that in real life people move within the wage distribution. This approach will give us an upper bound of two simulations of the inequality in pensions.

The other approach was to allow people to change their positions within the wage distribution. In each age group, people have different transition probabilities between wage groups and different relative wages with respect to the national average. Transition probabilities are based on the first order Markov process that is derived from register data of all men aged 30–63 in years 2000–2008. We exclude the crisis years 2009–2010, as these were exceptional and we do not forecast any such crisis for the future.

In the second approach, we divide all wage data into 20 groups for each age $Q_{k,age}$ for each year: one group for unemployed people with no wages, and additionally 19 quintiles for positive wages (see equation 6). Then we estimate a matrix of annual transition probabilities $p_{jk,age}$ between these wage groups for each age averaged over the period 2000–2008. Consequently for the period 2011–2044 each person A_i in our cohort of men born in 1980 is randomly assigned to a wage group $Q_{k,age}$ depending on their previous wage group $Q_{j,age-1}$ (starting from the wage level of 2010) and estimated transition probabilities $p_{jk,age-1}$.

$$\Pr(A_{i,age} \in Q_{k,age}) = p_{jk,age-1} \quad \text{if } A_{i,age-1} \in Q_{j,age-1} \quad (6)$$

Note that for groups aged 63–65 we needed to extrapolate historical labour market transitions, as the pension age increases from the current age 63 to age 65 for the cohort born in 1980. We assumed that people's behaviour near retirement age in the future will be similar to behaviour observed in the past.

Simulating one group for unemployed people without wages is also the way we implicitly model unemployment for every age group. We do not distinguish between unemployment and inactivity; both are defined as situations with no labour earnings. Unemployed people do not collect any pension rights in Estonia and few men take childcare leave, which would give some pension rights when inactive. Hence, this simplification of equalizing unemployment and inactivity should not affect our main results much.⁶

Individual wages are then set equal to the product of the predicted economy-wide average wage times the 2000–2008 average of the median ratio of wages to the economy-wide average wage of all people who were in that particular wage group at the same age as our 1980 cohort (see equation 7).

6. Of course, giving pension rights to unemployed people would be a strategy to increase protection and reduce the risk of poverty among pensioners.

$$wage_{it} = average\ wage_t \times \frac{1}{9} \sum_{T=2000}^{2008} \left(median_{l \in Q_{k,age}} \left(\frac{wage_{l,T,age=T-1980}}{average\ wage_T} \right) \right)$$

if $A_{i,age=t-1980} \in Q_{k,age}, t > 2010$ (7)

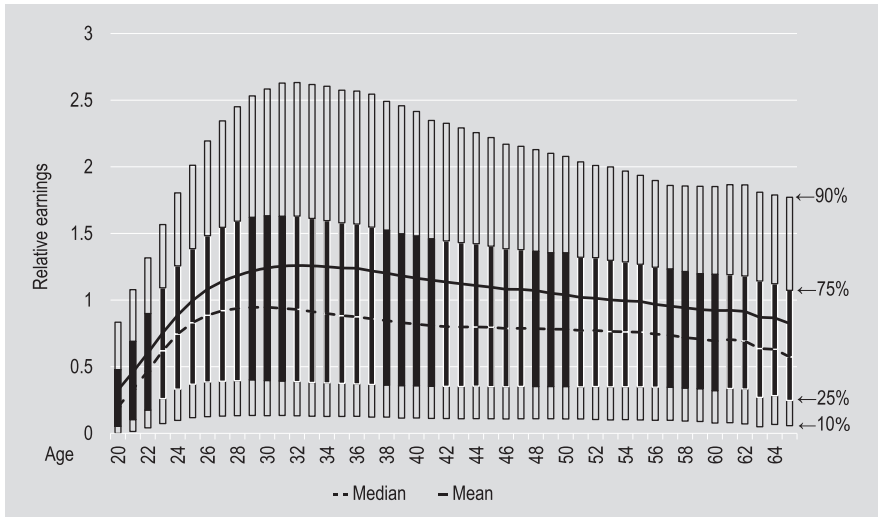
The relationship of age and wage distribution that was used to generate age-dependent wage groups is illustrated in Figure 3. The median relative wage level is highest around when people are aged in their 30s and then starts to decline. The average relative age peaks slightly later. In contrast, the 1st quartile is almost unchanged for those aged 25–62. This means that wages decline among our cohort and wage distribution becomes narrower.

In conclusion, we have two possible scenarios for the cohort born in 1980:

- holding their position unchanged in the relative wage distribution, which was estimated based on their own data for 2006–2010;
- allowing movements in the wage distribution, both via changing transition probabilities and changes in the wage groups depending on their age. The transition probabilities and wage distributions were estimated based on 2000–2008 data for all men in age group 30–63.

From the predicted wages we derive contributions that are used to calculate individualized insurance coefficients both to the state pension scheme (first pillar), and the mandatory funded pension scheme (second pillar).

Figure 3. Age-earnings profile, 2000–2008



Notes: Black area shows interquartile range, vertical lines indicate 10th and 90th percentiles; solid line connects means and dashed line medians. Data include zeroes for non-workers.

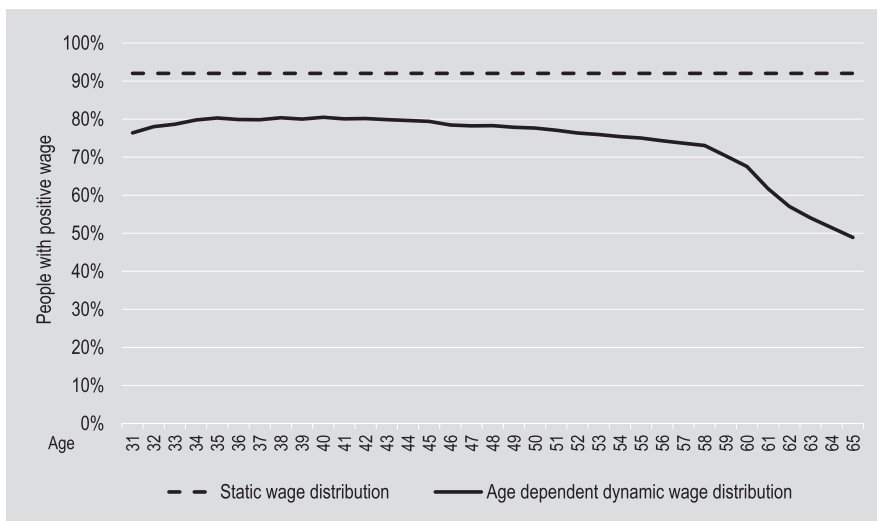
Source: Estonian National Social Insurance Board; authors' calculations.

The two different scenarios above lead to differences in the proportion of employed people over time. In the first scenario, more than 90 per cent of men are employed, though many will earn less than the minimum wage, for example, in part-time jobs. In the second scenario, employment rates decline with age, and more rapidly so nearer the retirement age, allowing for early retirement. The second approach introduces additional volatility in earnings, which most likely overestimates the volatility in wages, producing the lower bound of those two simulations in pension inequality (Figure 4).

We also model the effects of early retirement on pension size by “retiring” those people who had simulated labour earnings of zero up to three years before the statutory pension age (Table 2). According to the current legislation, it is possible to retire up to three years before the statutory retirement age, but in that case the old-age pension will be decreased for every month of early retirement by 0.4 per cent (i.e. retiring three years earlier means a 14.4 per cent lower pension) (Riigi Teataja, 2001). Currently, about a fifth of people take early retirement in Estonia. Although a tighter link between pensions and contributions is supposed to create an incentive for deferred retirement, we do not take this into account because it is rather marginal in Estonia (less than 1 per cent of all pensioners).

Finally, we assume that all men who are alive in 2010 will survive at least until retirement at the statutory pension age of 65 years in 2045. After that, they have average life expectancy based on Eurostat population forecasts, which for that

Figure 4. People with positive wage, with different wage scenarios



Source: Authors' calculations.

Table 2. Pension reduction in case of early retirement

Presence of simulated earnings before statutory pension age			Assigned early retirement and corresponding reduction in state pensions (the I pillar pensions)
3 years	2 years	1 year	
Yes	Yes	No	One year (12 x 0.4% = 4.8% reduction)
Yes	No	No	Two years (24 x 0.4% = 9.6% reduction)
No	No	No	Three years (36 x 0.4% = 14.4% reduction)
No	Yes	Yes	No early retirement
No/Yes	No	Yes	No early retirement

Source: Authors' calculations.

cohort is about 20 years after the statutory retirement age (65). Economy-wide average wage, inflation and social tax revenues, which all influence pensions from the first pillar and second pillar, are based on the official estimates of the Ministry of Finance in late 2013 (Structural Funds, 2013).⁷

Reform scenarios

We compare the distribution of simulated old-age pensions under four different reform scenarios (Table 3), which all reflect various reform phases in the Estonian pension system. The first scenario is the situation before year 1999, when the pension from the state pension system depended on the flat-rate base component and length-of-service component (reform abbreviation *payg_serv*) (see equation 8). In this scenario, the old-age pension is calculated as:

$$\text{First pillar pension}_{i,2045} = B_{2045} + V_{2045} \times \sum_{t=1999}^{2045} \min\left(\frac{\text{wage}_{i,t}}{\text{min_wage}_t}, 1\right) \quad (8)$$

where B_{2045} is the predicted flat-rate part of the pension, V_{2045} is the value of the length-of-service and insurance coefficient in 2045 and min_wage_t is the minimum wage required to receive one year of contributions. For each year when the wage exceeds the minimum wage, a person is attributed with one year to the length-of-service component; for lower earnings, the person is attributed with a fraction of one year. Both B and V are indexed using 50/50 weights of the increases in social tax revenues and the CPI.

The second scenario introduces an insurance component (as $K_{i,t}$ in the equation 9 and 10) in which case the old-age pensions in the first pillar depend

7. See Structural funds. 2013. *Prognoos_kuni_2060_09.10.13.xlsx* (Macroeconomic Forecast until 2060). <www.struktuurifondid.ee/sites/default/files/prognoos_kuni_2060_09.10.13.xls>.

Table 3. *Reforms scenarios*

Description	Base amount	Length of service component	Insurance component	Indexation formula*	Mandatory funded scheme	Actual years
1. PAYG + service component	Yes	Yes	No	50/50	No	... – 1998
2. Introduction of the insurance component into PAYG	Yes	No	Yes	50/50	No	1999–2002
3. Introduction of the II pillar	Yes	No	Yes	50/50	Yes	2002–2008
4. Change in indexation in the PAYG scheme	Yes	No	Yes	20/80 + quicker indexation of the base	Yes	2008–...

Note: The first number in the indexation formula refers to the weight of growth of the CPI and the second number to the growth of social tax revenues.

Source: Authors' calculations.

on individual contributions (see equation 9). This scenario describes the Estonian pension system in 1999–2002. Also, the insurance component is very similar to the German point system (Börsch-Supan, 2004).

$$\text{First pillar pension}_{i,2045} = B_{2045} + V_{2045} \times \sum_{t=1999}^{2045} K_{i,t} \quad (9)$$

The latter depends on the relative wage compared to the average wage (see equation 10). People with higher wages receive higher insurance coefficients.

$$K_{i,t} = \text{wage}_{it} / \text{average wage}_t \quad (10)$$

The indexation of B and V is the same as in the first scenario. Note that we assume that the cohort born in 1980 did not have any work experience before 1998 and, hence, the length-of-service component does not enter into the first pillar pension formula in this and the following scenarios.

The third scenario introduces a funded pension scheme, optional for the cohort born 1980. For those participating in the funded scheme, 4 per cent of the pension insurance part of the social tax is transferred to the scheme, complemented by an additional 2 per cent paid by the participant (see equation 11). As a result, the insurance coefficient of the first pillar will be smaller.

$$K_{i,t} = \text{wage}_{it} \times (20 \text{ per cent} - \text{transfer rate to II pillar}_{it}) / (\text{average wage}_t \times 20 \text{ per cent}) \quad (11)$$

The transfer rate to the second pillar is generally 4 per cent, but the percentage can differ from year to year (from 0 per cent to 6 per cent) as it did during the crisis

period (2009–2011) and after (2014–2017). Given that not all men participate in the scheme (about 75 per cent did by 2010, the last year in which joining the scheme was optional), we have additional variation in pensions caused by additional savings and our assumptions on the relative performance of the state PAYG pension scheme and the funded second pillar.

The accumulated savings from the second pillar depend on personal savings each year (gross wage multiplied by the transfer rate from the social tax and additional contributions by the employee) and the rate of return of these savings, which are set equal for all persons at 2.5 per cent plus CPI. We also present the main results with a lower rate of return. At the beginning of retirement all savings are converted into annuities, assuming 3 per cent nominal interest rate (the maximum set by the Estonian legislation) and life expectancy at age 65 of 20 years. We also present our results for when the nominal interest rate for annuities is 1 per cent.

Finally, the fourth scenario describes the situation in the first and second pillars from 2008 onwards. Compared to the previous scenario, we introduce two changes to the indexation⁸ of pension rights. First, the weights of the index change from 50/50 to 20/80 for the CPI and social tax revenue growth, respectively. As a result, first pillar pensions increase faster than compared to the previous scenario. Second, from 2008 the value of the base component of the first pillar pension will increase faster than the value of the insurance component.⁹ This will reduce inequality in state pensions as the proportion of the flat part increases. Figure 5 compares the development of the base and the insurance coefficient before and after the change in legislation in 2007.

According to 2007 legislation, the base component was worth 20 years of work while earning the average wage. The changes in indexation in 2008 will result in an increase to 27.7 years by 2045.

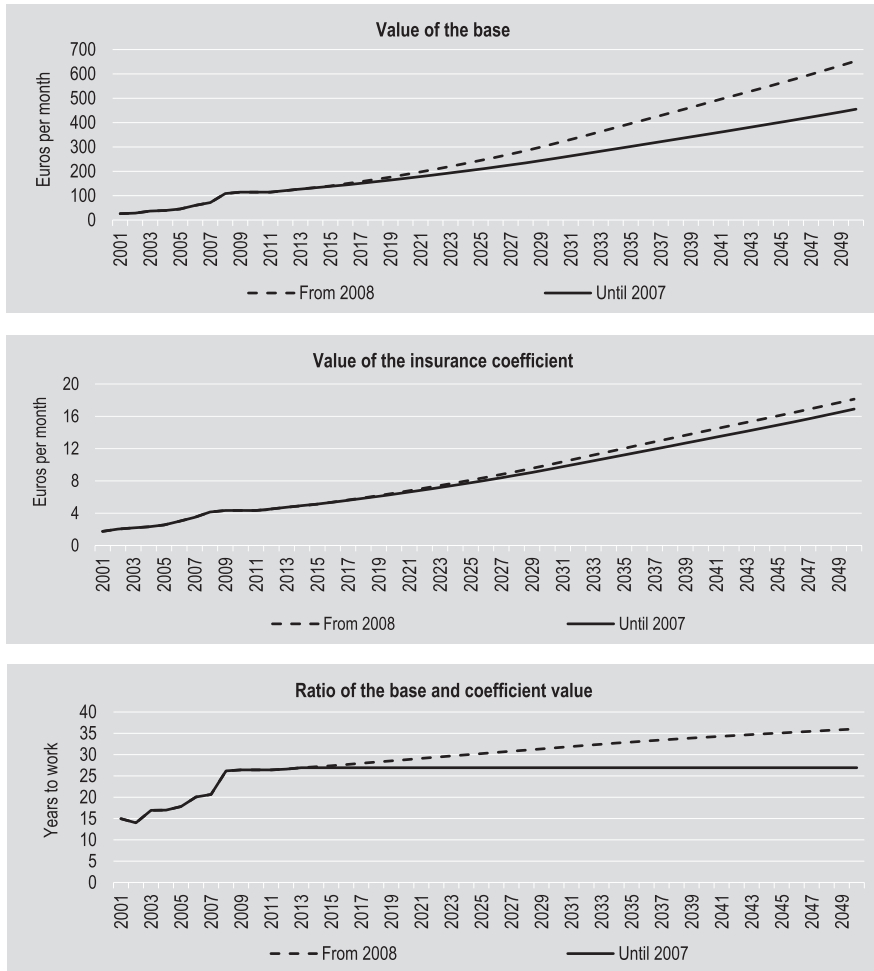
Results

We calculated old-age pensions in the four different scenarios under two different assumptions of wage distribution (constant distribution and changes of wages according to Markov transition probabilities). The inequality of pensions and the impact of reforms are described both graphically and by using changes in the Gini index. Figure 6 presents the distributions of pensions according to the four scenarios. The Gini index, presented in Table 4, summarizes changes in inequality in pension distribution.

8. The indexation is annual and takes place in April.

9. Each year the base value has about a 22.2 per cent (1.1/0.9) higher growth rate than the value of the insurance component.

Figure 5. Development of the value of the base and the insurance coefficient before and after the 2008 reform

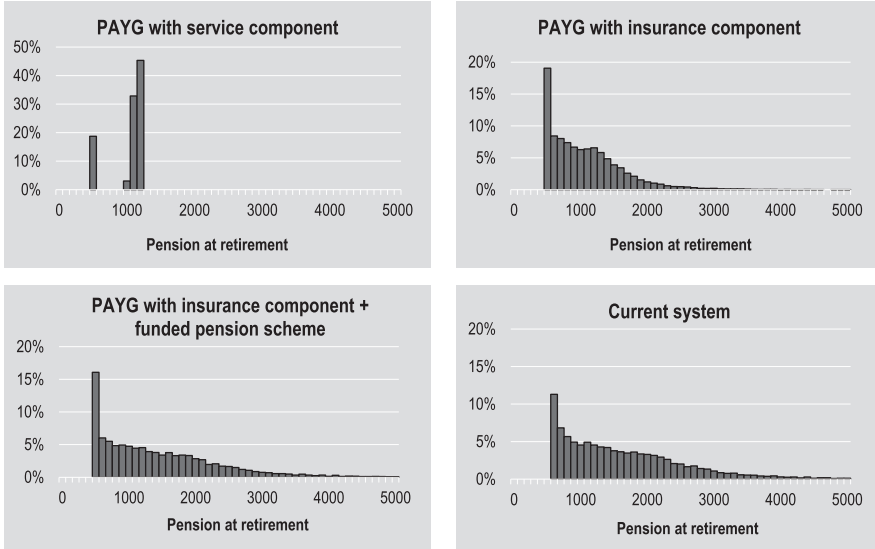


Source: Authors' calculations.

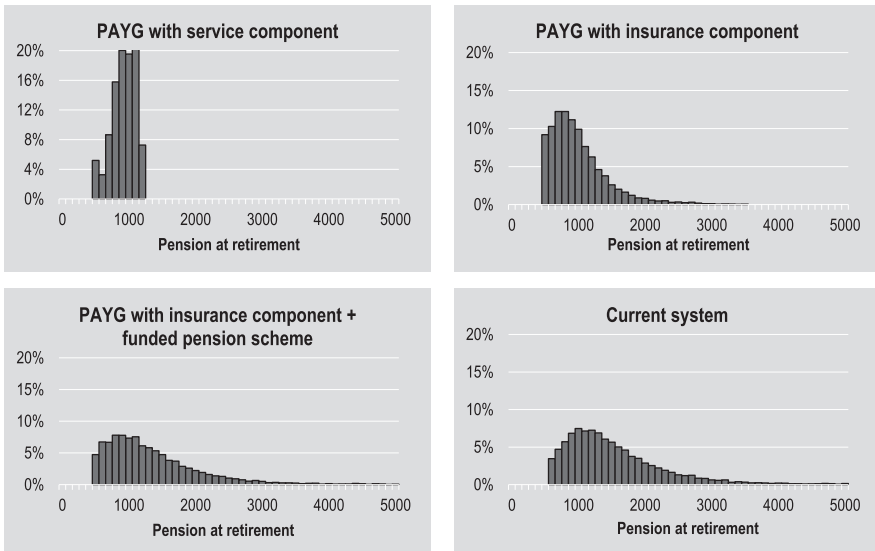
The results clearly illustrate that pensions before the introduction of insurance coefficients were homogenous. The Gini index of simulated pensions is about 0.10–0.11. This is close to the value of actual old-age pensions from the first pillar in 2013, which was 0.09 (Ministry of Finance, 2014). Both of these numbers are considerably lower than the Gini index of wages for the 1980 cohort, which was 0.485 on average in 2006–2010 or 0.375 as predicted for the whole period of 2006–2044 when allowing for transitions within the wage distribution.

Figure 6. *The distribution of simulated old-age pensions according to four scenarios with different wage distribution*

A. Static wage distribution



B. Changing wage distribution



Note: Top 1% of the observations are censored for better representation of the graph. Spikes at the low end of the pension distribution are a result of national pensions (minimum pension in case of insufficient pension rights). Also, first panel (PAYG with service component) of static wage distribution has different y-axis values.

Source: Authors' calculations.

Table 4. *Gini index of pensions, according to different reform scenarios**

Scenario	Static wage distribution (upper bound)			Dynamic wage distribution (lower bound)		
	I pillar pension	II pillar pension	I + II pillar	I pillar	II pillar	I + II pillar
(1) PAYG with service component (until 1998 system)	0.108		0.108	0.113		0.113
(2) PAYG with insurance component (1999–2002 system)	0.290		0.290	0.238		0.238
(3) PAYG with insurance component and funded pension scheme (2002–2007 system)	0.271	0.437	0.354	0.223	0.388	0.295
(4) Current system PAYG with insurance component, with changed indexation, and funded pension scheme	0.246	0.437	0.326	0.202	0.388	0.270
(5) Gini of average wages over 2006–2044	0.485			0.375		
(6) Gini of wages in 2044	0.485			0.741		

Notes: *The Gini index of funded pensions is calculated using only those people who have joined the second pillar, i.e. zeroes are excluded. High value of the Gini index of wages in 2044 under the scenario of dynamic wage distribution is caused by almost half of people not working just before retirement.

Source: Authors' calculations.

The main reason for the increase in inequality in future pensions was the introduction of the insurance component in 1999, which increased the Gini index of pensions by two to three times, depending on our assumptions (see row (2) in Table 4). If we assume a constant wage distribution, then the Gini index increases to 0.29. If we allow people to change positions in the wage distribution, the Gini index of pensions increases to 0.24.

The introduction of the funded pension scheme (row (3) in Table 4) increases inequality of future pensions further, as there is no redistribution within that scheme (except unisex mortality tables, but these do not have any influence on our cohort of males). The upper and lower bounds of the value of Gini indices rise further to 0.354 and 0.295. Given the transfer of a part of the social tax contributions from the first to the second pillar, inequality of pensions in the first pillar actually declines slightly.

In response to the predicted increase in inequality of future pensions resulting from the introduction of the funded pension scheme, the changes in the indexation of the first pillar state pensions from 2008 onwards sought to counterbalance this. Indeed, we found that these measures contribute to a moderate decline in inequality in the first pillar pensions (see row (4) in Table 4), but the effect is quite small, compared to the overall predicted inequality.

Table 5. *Descriptive statistics of individual gross replacement rates, dynamic wages*

Scenario	Average	Median	Standard deviation	Coefficient of variance	Gini
(1) PAYG with service component (until 1998 system)	34.1	27.9	23.0	0.68	0.53
(2) PAYG with insurance component (1999–2002 system)	31.8	26.9	17.1	0.54	0.46
(3) PAYG with insurance component and funded pension scheme (2002–2007 system)	41.1	37.3	17.8	0.43	0.39
(4) Current system PAYG with insurance component, with changed indexation, and funded pension scheme	48.4	42.9	22.4	0.46	0.41

Notes: Replacement rates were calculated as pensions at retirement age divided by lifetime average wages. Top 1% of replacement rates were excluded from calculations, because of the extreme values of replacement rates arising from very low life-time wages and flat-rate minimum pensions.

Source: Authors' calculations.

While the reforms increase inequality in old-age pensions, they reduce inequality in replacement rates, as individual pensions and life-time wages are more strongly correlated when personal insurance components and funded pensions are introduced into the pension system (Table 5). Owing to the flat-rate part of the first pillar pensions, the coefficient of variation of the replacement rates were the highest in the pure PAYG system with a length-of-service component only (row (1) in Table 5). The coefficient of variation and the Gini index of replacement rates were smallest in the case of policy rules valid in 2002–2007, when pensions depended on individual contributions to the largest extent. In addition, we see that later reforms have increased average and median replacement rates, because of additional contributions to the funded pension scheme and higher average indexation of the state pensions.

Sensitivity of results to assumptions

We tested the sensitivity of the results with respect to the rate of return of the funded pension scheme, guaranteed rate of return of annuities, and changes in life expectancy. First, we lowered the annual real rate of return of the funded pension scheme from 2.5 per cent to 0.5 per cent, which is more consistent with the average return witnessed since the introduction of pension funds in Estonia. Second, we increased life expectancy at age 65 from 20 years to 25 years. Finally, we lowered the nominal rate of return for annuities from 3 per cent to 1 per cent. In all cases, we used the dynamic approach to wage distribution, which should provide more realistic estimates of pension inequality. All these changes in our

Table 6. Gini index of pensions, according to different reform scenarios

	Unchanged		Baseline dynamic wage distribution		Lower real rate of return of funded pensions (from 2.5% to 0.5%)		Longer life expectancy at retirement (from 20 to 25 years)		Lower nominal rate of return of annuities (from 3% to 1%)	
	I pillar pension	II pillar pension	I + II pillar pension	II pillar pension	I + II pillar pension	II pillar pension	I + II pillar pension	II pillar pension	I + II pillar pension	II pillar pension
1) PAYG with insurance component and funded pension scheme (2002–2007 system)	0.223	0.388	0.295	0.395	0.276	0.388	0.286	0.388	0.388	0.284
2) Proportion of II pillar pensions in total pension			33.7%		26.0%		30.3%			29.6%
3) Mean of pension replacement rate to average wage	18.8%	9.6%	28.4%	6.7%	25.5%	8.2%	27.0%	7.9%		26.7%
1) Current system PAYG with insurance component, changed indexation, and funded pension scheme	0.202	0.388	0.270	0.395	0.252	0.38	0.261	0.388		0.259
2) Proportion of II pillar pensions in total pension			29.5%		22.5%		26.3%			25.8%
3) Mean of pension replacement rate to average wage	22.9%	9.6%	32.5%	6.6%	29.5%	8.2%	31.1%	7.9%		30.8%

Source: Authors' calculations.

assumptions impact only pensions from the funded pension scheme, which on average represented 34 per cent of the total pension (Table 6).

The lower rate of return of the funded pension scheme or annuities, as well as increased life expectancy, do not affect the inequality of funded pensions (there is marginal change from 0.388 to 0.395 when the lower real rate of return is due to the randomness of wages). However, with the share of funded pensions in the total pension being smaller, the overall inequality of old-age pensions is lower. Increasing life expectancy by 5 years will reduce the share of funded pensions in the old-age pension by about 3 percentage points; a declining real rate of return reduces the share by 7 percentage points. The resulting overall decline in the Gini index is about 0.01–0.02 points. The lower rate of return of pension annuities does not affect inequality in funded pensions, but as the share of funded pensions in the overall pension is again smaller by 4 percentage points, overall pension inequality declines by about 0.01 points.

Of course, there is also uncertainty about the first pillar pensions because of changes in key macroeconomic variables, such as the CPI, real wages and the employment rate, all of which affect consumer prices, aggregate social tax revenues and, hence, the pension index. However, these variations would have a smaller effect on the future distribution of pensions than potential changes in policy rules (e.g. accrual of rights, indexation, and pension age).

Conclusion

Estonia was one of the first European countries to adopt the so-called World Bank multi-pillar pension approach. The expectation was that the three pillars would increase savings for retirement and diversify the demographic and macroeconomic risks associated with pension systems. Creating a stronger link between individual contributions and pensions was supposed to reduce undeclared work and increase acceptance of the reforms by high wage earners.

Currently, pension inequality among Estonian pensioners is very low (the Gini index is about 0.1) and the average gross replacement rate is modest (about 40 per cent). Our results indicate that the simultaneous introduction of the insurance coefficients into the public PAYG pension scheme in 1999 and the creation of a fully funded pension scheme in 2002 will considerably increase inequality in future pensions in Estonia. The predicted inequality of pensions will more than double when measured by the Gini index, from 0.10 to around 0.27–0.33 by 2045, depending on assumptions on the persistence of the wage distribution and other key variables. The latest reform, in 2008, that increased the flat-rate part of the pension reduces the inequality of pensions, but the effect is small (about 0.02). In contrast, the inequality of individual replacement rates has decreased, as pensions depend more on the affiliated

person's own contributions. Sensitivity analysis showed that the lower real rate of return of funded pensions, longer life expectancy at retirement age, or the lower nominal rate of return of annuities would reduce the Gini index by 0.01–0.02 and simultaneously decrease the average replacement rate by up to 3 percentage points.

Our results show that in the case of high inequality in labour earnings, high unemployment rates and substantial early retirement, such as seen in Estonia, the introduction of a very strong link between contributions and future pensions may lead to inequality in pensions that is undesirably high. The simplest way to reduce such inequality would be through higher redistribution in the state pension scheme (first pillar) by either higher indexation of – or ad hoc increases to – the flat-rate component.

Bibliography

- Aaviksoo, A. et al.** 2011. *Eesti sotsiaalkindlustussüsteemi jätkusuutliku rahastamisvõimalused* [The sustainability of the Estonian social security system]. Tallinn, Praxis Centre for Policy Studies.
- Aubert, P.; Duc, C.; Ducoudré, B.** 2013. “French retirement reforms and intragenerational equity in retirement duration”, in *De Economist*, Vol. 161, No. 3.
- Auerbach, A. J.; Lee, R.** 2011. “Welfare and generational equity in sustainable unfunded pension systems”, in *Journal of Public Economics*, Vol. 95, No. 1–2.
- Been, J. et al.** 2016. “Public/private pension mix, income inequality and poverty among the elderly in Europe: An empirical analysis using new and revised OECD data”, in *Social Policy & Administration*, Vol. 51, No. 7.
- Bielawska, K.; Chłoń-Domińczak, A.; Stańko, D.** 2017. *Retreat from mandatory pension funds in countries of the Eastern and Central Europe in result of financial and fiscal crisis: Causes, effects and recommendations for fiscal rules*. Gdansk and Warsaw.
- Boado-Penas, M. C.; Vidal-Meliá, C.** 2012. “The actuarial balance of the PAYG pension system: The Swedish NDC model versus the DB-type models”, in R. Holzmann, E. Palmer and D. A. Robalino (eds), *Nonfinancial defined contribution pension schemes in a changing pension world: Vol. 2*. Washington, DC, World Bank.
- Bonenkamp, J.** 2009. “Measuring lifetime redistribution in Dutch occupational pensions”, in *De Economist*, Vol. 157, No. 1.
- Börsch-Supan, A. H.** 2006. “What are NDC systems? What do they bring to reform strategies?”, in R. Holzmann and E. Palmer (eds), *Pension reform: Issues and prospects for notional defined contribution (NDC) schemes*. Washington, DC, World Bank.
- Brown, R. L.; Prus, S. G.** 2004. “Social transfers and income inequality in old age: A Multinational perspective”, in *North American Actuarial Journal*, Vol. 8, No. 4.

- Clements, B.; Eich, J. F.; Gupta, S.** 2014. *Equitable and sustainable pensions: Challenges and experience*. Washington, DC, International Monetary Fund.
- Disney, R.** 1996. *Can we afford to grow older? A perspective on the economics of aging*. Cambridge, MIT Press.
- European Commission.** 2010a. *Green paper: Towards adequate, sustainable and safe European pension systems*. Brussels.
- European Commission.** 2010b. *Joint report on pensions: Progress and key challenges in the delivery of adequate and sustainable pensions in Europe – Country profiles*. Brussels.
- Eurostat.** 2015. *S80/S20 income quintile share ratio by sex and selected age group*. Luxembourg.
- Fox, L.; Palmer, E.** 2001. “New approaches to multipillar pension systems: What in the world is going on?”, in R. Holzmann and J. E. Stiglitz (eds), *New ideas about old age security: Toward sustainable pension systems in the 21st century*. Washington, DC, World Bank.
- Fukawa, T.** 2006. “Sustainable structure of the Japanese public pension system viewed from a Germany-Japan comparison”, in *The Japanese Journal of Social Security Policy*, Vol. 6, No. 1.
- Goudswaard, K.; Caminada, K.** 2010. “The distributive effect of public and private social programmes: A cross-country empirical analysis”, in *International Social Security Review*, Vol. 63, No. 1.
- He, L.** 2008. “The distributional effects of public pension reform in urban China”, in *Frontiers of Economics in China*, Vol. 3, No. 2.
- Hughes, G.; Stewart, J.** 2004. *Reforming pensions in Europe: Evolution of pension financing and sources of retirement income*. Cheltenham, Elgar.
- Karayel, A.** 2006. “The intragenerationally redistributive effects of the retirement insurance scheme in Turkey before and after the 1999 reform”, in *Applied Economics*, Vol. 38, No. 4.
- Klazar, S.; Slintáková, B.** 2012. “How progressive is the Czech pension security?”, in *Prague Economic Papers*, No. 3.
- Lassila, J.; Valkonen, T.** 2017. “Longevity, working lives, and public finances”, in *Contemporary Economic Policy*, October.
- Lefèbvre, M.** 2007. *The redistributive effects of pension systems in Europe: A survey of evidence* (LIS Working paper, No. 457). Luxembourg, Luxembourg Income Study.
- Leppik, L.** 2006. *Transformation of the Estonian pension system: Policy choices and policy outcomes* (Dissertations on social sciences, No. 21). Tallinn, Tallinn University Press.
- Leppik, L.; Võrk, A.** 2008. *Transition costs of reformed pension systems: Project No. VT/2007/042 – Final report*. Tallinn, Centre for Policy Studies PRAXIS.
- Lindbeck, A.; Persson, M.** 2003. “The gains from pension reform”, in *Journal of Economic Literature*, Vol. 41, No. 1.
- Milligan, K.** 2008. “The evolution of elderly poverty in Canada”, in *Canadian Public Policy*, Vol. 34, Suppl. 1.

- Ministry of Finance.** 2014. *Riikliku vanaduspensionide, kohustusliku kogumispensionide ja vabatahtliku kogumispensionide statistika* [Statistics of State old-age pension, mandatory and voluntary funded pensions]. Tallinn.
- Nisticò, S.; Bevilacqua, M.** 2013. "Notional defined contribution (NDC) pension schemes and income patterns", in *Economics: The Open-Access, Open-Assessment E-Journal*, No. 2013-29.
- Nisticò, S.; Bevilacqua, M.** 2017. "Some notes on the redistribution inherent in the U.S. public pension system", in *Contemporary Economic Policy*, December.
- OECD.** 2014. *OECD pensions outlook 2014*. Paris, Organisation for Economic Co-operation and Development.
- Orenstein, M. A.** 2011. "Pension privatization in crisis: Death or rebirth of a global policy trend?", in *International Social Security Review*, Vol. 64, No. 3.
- Oshio, T.; Shimizutani, S.** 2005. "The impact of public pension benefits on income and poverty of the elderly in Japan", in *The Japanese Journal of Social Security Policy*, Vol. 4, No. 2.
- Riigi Teataja.** 2001. *State Pension Insurance Act*. Tallinn.
- Schirle, T.** 2009. *Income inequality among seniors in Canada: The role of women's labour market experience* (Working paper, No. 51). Vancouver, Canadian Labour Market and Skills Researcher Network.
- Smeeding, T. M.; Williamson, J.** 2001. *Income maintenance in old age: What can be learned from cross-national comparisons* (LIS Working paper, No. 263). Luxembourg, Luxembourg Income Study.
- Vliet, O. van et al.** 2012. "Pension reform and income inequality among older people in 15 European countries", in *International Journal of Social Welfare*, Vol. 21, No. 1.
- Võrk, A.; Paat-Ahi, G.** 2013. *Pensions, health and long-term care: Estonia* (Country document 2013). Brussels, European Commission – ASISP.
- Weller, C. E.** 2004. "The future of public pensions in the OECD", in *Cambridge Journal of Economics*, Vol. 28, No. 4.
- World Bank.** 1994. *Averting the old age crisis: Policies to protect the old and promote growth*. Washington, DC, World Bank.

Access to social protection among people with disabilities: Evidence from Viet Nam

*Lena M. Banks**, *Matthew Walsham**,
*Hoang Van Minh***, *Doan Thi Thuy Duong***,
*Tran Thu Ngan***, *Vu Quynh Mai***,
*Karl Blanchet** and *Hannah Kuper**

*London School of Hygiene & Tropical Medicine, United Kingdom;

**Hanoi University of Public Health, Viet Nam

Abstract Although people with disabilities are frequently targeted as key beneficiaries of social protection, little is known on their access to existing programmes. This study uses mixed methods to explore participation in disability-targeted and non-targeted social protection programmes in Viet Nam, particularly in the district of Cam Le. In this district, social assistance and health insurance coverage among people with disabilities was 53 per cent and 96 per cent respectively. However, few accessed employment-linked social insurance and other disability-targeted benefits (e.g. vocational training, transportation discounts). Factors affecting access included the accessibility of the application process, disability assessment procedures, awareness and the perceived utility of programmes, and attitudes on disability and social protection.

Addresses for correspondence: Lena M. Banks, International Centre for Evidence in Disability, London School of Hygiene & Tropical Medicine, Keppel Street, London, WC1E 7HT, United Kingdom (corresponding author); email: morgon.banks@lshtm.ac.uk. Matthew Walsham, International Centre for Evidence in Disability, London School of Hygiene & Tropical Medicine, Keppel Street, London, WC1E 7HT, United Kingdom. Hoang Van Minh, Hanoi University of Public Health, 1A Duc Thang Road, Duc Thang Ward, North Tu Liem district, Viet Nam. Doan Thi Thuy Duong, Hanoi University of Public Health, 1A Duc Thang Road, Duc Thang Ward, North Tu Liem district, Viet Nam. Tran Thu Ngan, Hanoi University of Public Health, 1A Duc Thang Road, Duc Thang Ward, North Tu Liem district, Viet Nam. Vu Quynh Mai, Hanoi University of Public Health, 1A Duc Thang Road, Duc Thang Ward, North Tu Liem district, Viet Nam. Karl Blanchet, Health in Humanitarian Crises Centre, London School of Hygiene & Tropical Medicine, Keppel Street, London, WC1E 7HT, United Kingdom. Hannah Kuper, International Centre for Evidence in Disability, London School of Hygiene & Tropical Medicine, Keppel Street, London, WC1E 7HT, United Kingdom.

Matthew Walsham is also affiliated with the Global Development Institute, University of Manchester, United Kingdom.

Keywords disabled person, social protection, gaps in coverage, Viet Nam

Introduction

Social protection is increasingly used by governments in low- and middle-income countries as a strategy for ensuring individuals and their households are protected from poverty and other forms of vulnerability across the life cycle (World Bank, 2012). More broadly, aims of social protection include promoting the development of stronger livelihoods, ensuring access to healthcare and other social services, fostering economic and social development, and reducing inequalities (Gentilini and Omamo, 2011; ILO, 2017). Social protection may encompass a range of policies and programmes, including contributory schemes (social insurance), as well as non-contributory, tax-financed schemes (ILO, 2017). The latter includes various forms of social assistance, in which beneficiaries receive transfers in cash or kind.

Nationally appropriate “social protection floors” for all – in which states provide their citizens with a set of guarantees such as basic income security and access to healthcare and other essential services – have been advanced by the International Labour Organization’s Recommendation concerning National Floors of Social Protection, 2012 (No. 202), and recognized in the 2015–2030 Sustainable Development Goals (SDGs) as critical for inclusive and sustainable growth and development (UN, 2017). While social protection floors should be available for all, coverage is particularly important for individuals or groups who face a higher risk of poverty and other forms of marginalization (Gentilini and Omamo, 2011; Devereux and Sabates-Wheeler, 2004).

There are an estimated one billion people living with disabilities. As a group, people with disabilities are frequently targeted as key beneficiaries in national and international social protection strategies and programmes because they are significantly more likely to be living in poverty and face a wide range of social, economic and cultural forms of exclusion (Yeo, 2001; Elwan, 1999; WHO and World Bank, 2011). In addition to the needs-based argument for including people with disabilities in social protection programmes, the right to inclusion in all aspects of society – including in social protection – on an equal basis with others is well-established in international treaties such as the Universal Declaration of Human Rights (Articles 22 and 25) and the United Nations Convention on the Rights of Persons with Disabilities (UNCPRD) (Article 28) (UN, 1948 and 2006).

To fulfil the right to inclusion in social protection, states must ensure equitable access for people with disabilities to mainstream social protection programmes –

such as health insurance, social security and other benefits where disability is not an explicit condition of eligibility (Devandas Aguilar, 2017). Additionally, targeted programmes may be needed to address disability-specific concerns, such as access to assistive devices and specialist health and educational services. Account also must be made for the higher costs incurred by people with disabilities in participating in society, as a result of needs for accessible transport, carers, assistive devices and so on (ILO, 2017; Devandas Aguilar, 2017; Mitra et al., 2017). According to recent estimates from the International Labour Organization, 27.8 per cent of people with severe disabilities globally receive some form of disability benefit (ILO, 2017). However, there is considerable regional variation, with coverage lowest in Asia and the Pacific at 9.4 per cent and highest in Eastern Europe (97.9 per cent) (ILO, 2017). These estimates also result from the extrapolation of the 15 per cent global estimate of disability prevalence in each country's population, rather than to direct surveys. Additionally, little is known about inclusion of people with disabilities in mainstream schemes not specifically targeting people with disabilities, or about barriers to accessing either mainstream or targeted social protection (Banks et al., 2016).

Consequently, this study seeks to explore access to social protection among people with disabilities, using Viet Nam as the study setting. In the sections that follow, following an overview of social protection in Viet Nam, and in addition to presenting quantitative measures of access, this article identifies challenges and facilitators to participation in social protection.

Overview of social protection entitlements in Viet Nam

The right to social security is codified in Article 34 of the recently amended Constitution of Viet Nam (Government of Viet Nam, 2013a). Resolution 70/NQ-CP/2012 further describes the state's strategy for strengthening social protection across the period 2012–2020 (Vinh, 2016). Overall, there are four main components to Viet Nam's social protection framework: (i) social assistance to groups deemed at high risk of poverty; (ii) social insurance to mitigate financial risks associated with sickness, occupational injuries and ageing; (iii) programmes promoting access to basic services, such as education, healthcare and clean water/sanitation; and (iv) policies to improve opportunities for decent work (Vinh, 2016).

Within this remit, Viet Nam has a range of social protection policies and programmes in place. Non-contributory entitlements include a number of disability-targeted schemes, as well as programmes targeted to other groups deemed to be at high risk of poverty. For contributory schemes, various forms of insurance are mandatory for most formal employees, with optional opt-in schemes available to the rest of the workforce.

Table 1. *Disability-targeted social protection provisions*

Entitlement	Social Protection Component	Eligibility (disability degree)	Description of entitlement
Social assistance	Social assistance to groups at high risk of poverty	Severe, extremely severe	<i>Unconditional minimum monthly cash transfer:</i> VND 405,000 [USD 18] (severe), VND 540,000 [USD 24] (extremely severe). Slightly higher amounts for children and older adults A separate cash transfer is available for caregivers of people with extremely severe disabilities (VND 405,000/month [USD 18])
Health insurance	Social insurance, access to basic services	Severe, extremely severe	State pays full premium for health insurance; coverage of 95% of eligible medical expenses
Education supports	Access to basic services	Any classification	Various (e.g. individual education plan, adapted admission criteria; exempted tuition fees/scholarship if also poor)
Vocational training & employment supports	Opportunities for decent work	Any classification	Various (e.g. free vocational training at recognized centres, preferential loans for self-employed workers, incentives for employers to hire people with disabilities)
Transportation discounts	Access to basic services	Any classification	Free or subsidized public transportation

Source: Authors.

Disability-targeted social protection entitlements

People with disabilities in Viet Nam are eligible for the disability-targeted entitlements listed in Table 1. To be eligible for these entitlements, people with disabilities must first undergo an assessment of disability. Most assessments are conducted by the Disability Degree Determination Council (DDDC), which is located within the commune-level People's Committee, one of the most decentralized administrative units in Viet Nam (National Assembly of Viet Nam, 2010). The DDDC determines both the type and degree of disability using the Joint Circular 37/2012/TTLT-BLĐT BXH-BYT-BTC-BGDĐT,¹ which has two assessment tools (for children younger than age 6, and all others aged 6 or older). The degree of disability ("mild", "severe" or "extremely severe") determines which social protection benefits a person is eligible for. Degree determinations are calculated using a standardized scoring system based on the applicant's ability to perform eight daily life activities (walking; eating and drinking; toilet hygiene; personal hygiene; dressing; hearing and understanding what people say;

1. Hereafter, Joint Circular 37.

communicating using speech; and participating in housework such as folding clothes, sweeping, washing dishes and cooking), with or without assistance from others. Assessments are based on in-person observations of functioning as well as interviews with the applicant and/or their caregiver.

If the DDDC cannot reach a decision on the degree of disability, or if the applicant wishes to appeal their decision, the applicant is referred to the Medical Examination Council (MEC) (National Assembly of Viet Nam, 2010). MECs are located in provincial capitals and in Hanoi. In contrast to the DDDC, which uses a functioning-based approach, the MEC evaluates disability degree using solely medical criteria. Disability degree is based on the proportion of bodily injury due to disability, with 81 per cent and above considered “extremely severe” and 61–80 per cent considered “severe” (MoH and MoLWISA, 2012).

Some entitlements, namely subsidized health insurance and social assistance, are reserved for people with the highest degree of disability (“severe”, “extremely severe”), while others are open to people with disabilities of any degree classification (e.g. transportation discounts, free vocational training). It is important to note that Table 1 outlines the minimum requirements as codified in national laws and policies. Provinces have leeway in how to implement policies, including increasing the value of the Disability Allowance, extending eligibility or in offering additional programmes.

Finally, veterans of the Resistance war against the United States (the Viet Nam war) who developed a disability during their service or have family members who become disabled due to exposure to Agent Orange are entitled to separate social assistance programmes. These schemes offer a much higher level of support, ranging from 1,479,000–3,609,000 Viet Nam Dong (VND) (approx. USD 65–159) per month (Government of Viet Nam, 2017). Eligibility criteria is determined by the MEC, based on a defined list of diseases, impairments or abnormalities. Documentation of these conditions can be certified at district- or higher-level hospitals and forwarded to the MEC.

Non-disability targeted social protection entitlements

People with disabilities may also be eligible for programmes aimed at other targeted groups, if they meet their eligibility criteria. For example, unconditional social assistance is available to older adults (aged 80+ with no other sources of income), orphans, single parents, and people living with HIV in poverty (Government of Viet Nam, 2013b). Amounts range from VND 270,000 to VND 675,000 per month (approx. USD 12–30). Any individual who is eligible for more than one form of social assistance can only receive the one providing the highest amount. The only types of social assistance that can be received

concurrently with other schemes are the Single Parents' Allowance and the Caregivers of People with Extremely Severe Disabilities Allowance.

While people with “severe” and “extremely severe” disability degrees are one target group for state-subsidized compulsory health insurance (CHI), other social assistance recipients, as well as children younger than age 6, students, organ donors, workers in certain industries and individuals living under or near the poverty line are also eligible. Under CHI, the state covers a portion of the premium as well as user fees for eligible medical expenses. Premium subsidies range from 100 per cent for children younger than age 6 to 30 per cent for students (Government of Viet Nam, 2009; National Assembly of Viet Nam, 2008). CHI covers 80 per cent of medical expenses, but for certain users (i.e. people with severe disabilities, people below the poverty line, children younger than age 6), the state provides a further subsidy to cover user fees (95 per cent–100 per cent) (Government of Viet Nam, 2013b; Nguyen and Hoang, 2017). Coverage under the CHI may also be extended to workers in formal employment, where enrolment is mandatory for workers who have a contract of at least 3 months. In this case, the premium is set at 6 per cent of the employee's monthly salary, of which the employer contributes 4.5 per cent and the employee 1.5 per cent (National Assembly of Viet Nam, 2008 and 2014). For individuals not covered by state- or employer-subsidized CHI, voluntary health insurance (VHI) is available, with premiums equivalent to 4.5 per cent of monthly salary with no employer contribution. For both VHI and employer-subsidized CHI, 80 per cent of eligible health expenses are covered by plans.

Finally, social insurance regimes are available through either compulsory social insurance (CSI) or voluntary social insurance (VSI). CSI – which is mandatory for formal employees with at least a one-month contract – covers sickness, maternity, labour accidents and occupational diseases, retirement and survivor allowances (UNFPA, 2011). CSI contributions are set at 26 per cent of the employee's monthly salary, of which employers contribute 18 per cent. In contrast, anyone can opt into VSI, but this covers only retirement and survivor allowances and requires a monthly contribution by the employee of 22 per cent of their self-declared income (UNFPA, 2011).

Methods

A mixed-methods approach was used to evaluate the extent to which people with disabilities are accessing existing social protection programmes, including an evaluation of the effects of barriers and facilitators to access. First, a national policy analysis was conducted to provide an overview of available social protection entitlements, and how their design and implementation may affect access for people with disabilities. Second, qualitative and quantitative research

was conducted in one district of Viet Nam to measure coverage and uptake of specific entitlements and to explore factors influencing access in greater depth. While the focus was predominantly on disability-targeted entitlements, access to non-targeted schemes was also assessed where feasible.

Ethical approval for this research was granted from the Ethics Committees at the London School of Hygiene & Tropical Medicine and the Hanoi University of Public Health. Informed written consent was obtained from all study participants before beginning any interviews. For children younger than age 18 (age of consent) and people with impairments that severely limited their ability to understand/communicate, a carer answered on their behalf as a proxy. All data was collected from May to December 2016.

Setting

Viet Nam was selected as the study site for this research as it was identified in a rapid policy analysis as having a strong social protection system that has made concerted efforts to be inclusive of people with disabilities. As such, it presented a good opportunity to describe examples of good practice in the design and delivery of disability-inclusive social protection.

While the policy analysis was national in scope, district level data collection was used to explore access to social protection among people with disabilities in practice. Cam Le, part of the province of Da Nang in Central Viet Nam, was selected as the study district after consultations with stakeholders. During these consultations, Cam Le was highlighted as an area with a well-functioning social protection administration and a strong network of Disabled People's Organizations (DPOs) and disability-support services. Cam Le's disability-targeted social protection entitlements also are more generous than the national minimum. Specifically, CHI coverage is expanded to children younger than age 17 with "mild" disability degree classifications and Disability Allowance payments are topped up for the poor and older adults with a disability, if they receive monthly social assistance of less than 500,000 VND. As such, using Cam Le as the setting for district-level data collection meant that potential strengths of the system in terms of disability inclusion could be identified.

National policy analysis

A national policy analysis was conducted in order to describe the overall social protection landscape in Viet Nam, including the strengths and challenges associated with ensuring access to social protection for people with disabilities. Data was compiled through three avenues: (i) a literature review, (ii) in-depth interviews with

key stakeholders and (iii) a consultative workshop. For the literature review, relevant legal frameworks, policies and programmes in Viet Nam as well as existing research on the issue were identified through a scoping review of academic and grey literature in both English and Vietnamese. To complement the literature review, in-depth interviews were conducted with 16 key stakeholders within relevant government ministries, United Nations agencies, non-governmental organizations (NGOs), and DPOs. Participants were identified based on a review of existing projects and programmes related to disability and/or social protection. Interviews explored the design and delivery of social protection particularly for disability-targeted entitlements, factors influencing access for people with disabilities, strengths and challenges of programmes, and priorities for reform. Findings were analysed thematically. Finally, a consultative workshop of over 50 stakeholders working in disability and social protection across Viet Nam was held in May 2016 to further explore challenges and facilitators to access.

Quantitative research in Cam Le

Quantitative data collection was comprised of a population-based survey of disability across Cam Le, with a nested case-control study to compare knowledge of and participation in social protection between people with and without disabilities.

For the population-based survey, the 2009 national census was used as the sampling frame (GSOV, 2010). A two-stage sampling strategy was employed based on a methodology used in other surveys (Kuper, Polack and Limburg, 2006). In the first stage, probability-proportionate-to-size sampling was used to select 75 clusters in Cam Le. Clusters were “Population Groups”, the lowest administrative unit in Viet Nam (average size: 162 people). In the second stage, compact segment sampling was used to select households within clusters. With this method, maps of each selected cluster were divided with the assistance of village leaders or staff at nearby health centres into equal segments of approximately 80 people. One segment was then randomly selected, and households were visited systematically beginning from a random start point, until the sum of members aged 5+ across households reached 80 people. A minimum sample size of 3,000 people was needed to measure the prevalence of disability (with expected prevalence of disability = 5 per cent, precision required = 20 per cent, design effect = 1.5, response rate = 90 per cent, and confidence = 95 per cent). However, the sample was increased to 6,000 to account for uncertainty in the expected disability prevalence estimate and to ensure adequate numbers for the case control.

Within the population-based household survey, household heads reported on the functioning of all household members aged 5+, using the Washington Group Short

Set Questionnaire (Washington Group on Disability Statistics, 2009). The Washington Group Short Set comprises six questions on an individual's ability to perform everyday activities (seeing, hearing, walking, remembering/concentrating, self-care, and communicating). Respondents select one of four possible response options on the level of difficulty in performing each activity: "none", "some", "a lot" or "cannot do". People who were reported to experience "a lot of difficulty" or "cannot do at all" for at least one question were considered to have a disability. This cut-off is in line with international guidelines. It is also closely aligned with the eligibility criteria for disability-targeted social protection, particularly social assistance, as outlined in Joint Circular 37. In addition to measuring disability, the household survey also included questions on household socio-economic status and participation in social protection programmes.

Any individual who was identified during the household survey as having a disability was invited to take part in a case-control study. The case-control questionnaire explored in greater depth knowledge of and participation in various social protection programmes, amongst other indicators. In addition to recruitment through the population-based household survey, 72 people with disabilities who were participating in disability-targeted schemes were selected as additional cases from registers of the Disability Allowance; selection was based on proximity to included clusters (i.e. within the same ward/commune). Each case (whether identified from the survey or the register) was matched to a control without a disability (according to the Washington Group Short Set), who was of the same gender, from the same area of residence, and similar in age (± 5 years). Controls could not be from households with members with disabilities.

All questionnaires were administered in Vietnamese by trained data collectors using computer tablets. Data was analysed using STATA 15. Among people recruited through the population-based survey, multivariate regression was used to compare participation in various schemes between respondents with and without disabilities, controlling for age and gender.

Qualitative research in Cam Le

In-depth, semi-structured interviews were carried out with people with disabilities who were and were not benefiting from social protection (namely disability-targeted programmes), as well as district- and community-level stakeholders. Interviews with people with disabilities focused on their knowledge of disability-targeted programmes and their experience of accessing relevant schemes. Key informant interviews centred on understanding the ways in which the planning and implementation of social protection programmes facilitates or impedes access for people with disabilities.

A purposive sample of 32 participants with disabilities was identified, using data collected through the population-based survey, selected to reflect variation in terms of impairment type, sex, age (children, working-age or older adults) and geographic distribution. A total of 19 provincial-, district- and community-level stakeholders were selected through snowball sampling, comprising disability service providers, representatives of DPOs, and decision-makers/administrators responsible for social protection and related services. Interviews with all participants were transcribed in Vietnamese and a thematic approach was used to analyse findings.

Findings

Description of the study samples

In a population-based survey, 6,705 household members were selected and 6,379 screened for disabilities (response rate: 95.1 per cent). Overall, 150 individuals were identified as having a disability (prevalence: 2.5 per cent, 95 per cent; CI: 2.1–2.9 per cent).² Prevalence of disability did not differ by gender (Men: 2.3 per cent, 95 per cent; CI: 1.8–2.9 per cent, Women: 2.6 per cent, 95 per cent; CI: 2.1–3.2 per cent), but increased substantially with age (from 1.1 per cent in children aged 5–18, to 13.2 per cent in adults aged 76+; $p < 0.001$). In total, 444 people took part in the case-control study (150 people with disabilities recruited from the population-based study, 72 Disability Allowance recipients recruited from registers and 222 age-sex cluster matched controls without disabilities). The response rate was high (98 per cent), with only eight controls refusing to participate. Cases and controls were well matched by age and gender, as there were no significant differences in these characteristics between groups.

For the qualitative research, 32 people with disabilities were included (response rate=100 per cent). Of 32 people, 24 were interviewed directly and for eight participants, information was gathered through their caregivers (for people with disabilities younger than age 18 and one adult with severe physical and communication impairments). Twenty respondents were receiving the Disability Allowance. By impairment type, the following breakdown was observed: physical/mobility ($n=17$), communication ($n=10$), vision ($n=5$), hearing ($n=5$), psychosocial ($n=5$), intellectual/cognitive ($n=5$); 14 respondents had multiple impairments. Respondents ranged in age from ages 5–84 (5–17 years: $n=7$,

2. CI = confidence interval. CI measures the probability that a population parameter will fall between two set values.

18–64 years: $n=20$, 65+ years: $n=5$), and there was a near equal mix by gender (female, $n=18$; male, $n=14$).

Social protection access

Over half (52.7 per cent) of the people with disabilities identified in the survey were recipients of some type of social assistance, which was significantly higher than for people without disabilities (11.7 per cent) (Table 2). The Disability Allowance was the predominant source of social assistance accessed among people with disabilities (71 per cent of recipients of social assistance). Overall, coverage of the Disability Allowance was 40 per cent, with no participants accessing the scheme who did not meet the study's definition of disability. There were no statistically significant differences by sex across any social protection programme.

Coverage of health insurance was universally high for, both, people with and without disabilities, although people with disabilities were slightly more likely to be recipients. Among people with disabilities, health insurance was primarily CHI, due to disability or other reasons (e.g. recipient of another type of social assistance).

In the survey group, no one with a disability was accessing social insurance, due in large part to their exclusion from the labour market, particularly the formal

Table 2. *Social protection enrolment among people with and without disabilities in Cam Le district*

	People with disabilities ($n=150$)	People without disabilities ($n=222$)	aOR (95% CI)
Social assistance			
Any social assistance	82 (52.7%)	26 (11.7%)	9.6 (5.6-16.5)***
Disability Allowance	60 (40.0%)	0 (0 %)	n/a
Old Age Allowance (among adults, aged 80+; or 60+ and below the poverty line)	12 (35.3%) ^a	12 (35.3%) ^a	0.8 (0.2-2.5)
Other social assistance	15 (10.0%)	15 (6.8%)	1.4 (0.7-3.1)
Health insurance			
Any health insurance	144 (96.0%)	196 (88.3%)	2.9 (1.1-7.2)*
State-subsidized health insurance	109 (72.7%)	60 (27.0%)	7.7 (4.7-12.5)***
Social insurance			
Social insurance (among people who worked in the last year)	0 (0%)	24 (21.2%)	n/a

Notes: aOR: adjusted odds ratio (adjusted for age and sex); Statistically significant: * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.
^aIncludes two individuals between ages 60–79 who were not below the poverty line based on household income.

Source: Authors.

economy. In contrast, approximately a fifth of people without disabilities reported enrolment in social insurance, higher than among people with disabilities, yet still indicating low coverage among workers for retirement pensions and for protection against risks such as workplace injury (Table 2).

As outlined in Table 1, disability-targeted benefits other than the Disability Allowance and health insurance are available to all disability degree classifications. In the population-based survey, only one person had received a mild classification. Along with the 132 Disability Allowance recipients (60 population-based sample, 72 recruited from registers), uptake of these other benefits was very low (Table 3).

In comparing the characteristics of people with disabilities who were and were not receiving disability-targeted social protection, coverage decreased with increasing age (from 89 per cent for children younger than age 18 to 21 per cent for adults older than age 75). Coverage was highest for people with communication difficulties and lowest for people with sensory impairments. It is important to note that 92 per cent of people with communication difficulties had multiple functional limitations (compared to 51 per cent of people with disabilities overall). There was no difference between recipients and non-recipients by severity of disability (Table 4).

Factors influencing access to social protection among people with disabilities

From both the national policy analysis and research in Cam Le, several factors emerged which affected access to social protection among people with disabilities. These factors concerned: (i) geographic accessibility, (ii) financial accessibility, (iii) disability assessment criteria and procedures, (iv) awareness and

Table 3. *Uptake of entitlements among recipients of disability-targeted social protection in Cam Le district (n=135)*

Disability-targeted entitlement	Aware (%)	Uptake***(%)
Transportation discounts	6 (4.5%)	2 (1.5%)
Educational discounts (among children younger than age 18)*	5 (23.8%)	2 (8.3%)
Livelihoods supports (vocational training, preferential loans), among people aged 15–65**	19 (14.2%)	17 (17.1%)
Allowance for caregivers	14 (10.6%)	12 (8.9%)

Notes: *n=24, **n=99, ***among people aware of entitlement.

Source: Authors.

Table 4. Characteristics of Disability Allowance recipients compared to non-recipients with disabilities

	Receiving allowance (n=132) ^a		Not receiving allowance (n=78)	
	n (%)	n (%)	aOR (95% CI)	
Female	70 (58.3%)	50 (60.8%)	1.0 (0.6–1.9)	
Age group				
5–18 years	23 (85.2%)	4 (14.8%)	Reference	
19–40 years	48 (76.2%)	15 (23.8%)	0.6 (0.2–1.9)	
41–60 years	35 (61.4%)	22 (38.6%)	0.3 (0.08–0.9)*	
61–75 years	19 (46.3%)	22 (53.7%)	0.2 (0.04–0.5)**	
76+ years	7 (20.6%)	27 (79.4%)	0.05 (0.01–0.2)***	
Functional limitation^d				
Mobility	61 (52.6%)	55 (47.4%)	1.3 (0.6–1.8)	
Sensory (visual/hearing)	23 (45.1%)	28 (54.9%)	1.1 (0.6–1.9)	
Remembering	62 (70.5%)	26 (29.6%)	1.7 (0.9–3.2)	
Self-care	43 (54.4%)	36 (45.6%)	1.0 (0.5–1.9)	
Communication	53 (73.6%)	19 (26.4%)	2.0 (1.0–4.0)*	
Multiple	69 (61.1%)	44 (38.9%)	1.2 (0.6–2.2)	
	Mean	Mean	Coefficient (95% CI)^e	
Severity score^e	5.4	5.6	0.5 (-0.4–1.4)	

Notes: aOR: adjusted odds ratio (adjusted for age and sex); Statistically significant: *p<0.05, **p<0.01, ***p<0.001; ^aIncludes people recruited from Disability Allowance registers; ^bAdjusted for age, sex; ^cSeverity score: Total across six Washington Group domains (0=no difficulty, 1=some, 2=a lot, 3=cannot do for each domain); maximum score is 18; ^dNot mutually exclusive (i.e. sum >100%).
Source: Authors.

perceived utility of programmes, (v) broader disability-inclusive planning, and (vi) attitudes on disability and the need for social protection.

While the focus was predominantly on disability-targeted schemes – as they were by far the most known and accessed by people with disabilities – many challenges and facilitators are applicable to non-targeted schemes.

Geographic accessibility. In Viet Nam, applications for all forms of social protection are conducted at the local commune-level People's Committees, one of the lowest administrative units. Prior to the introduction of Decree No. 28/2012/ND-CP in 2012, applications for disability-targeted programmes were

conducted at the provincial capital. The shift in application location was widely cited by key informants at the national and local level as having helped improve coverage under disability-targeted programmes.

Now [the disability assessment] moves to the People's Committee because the People's Committee is the closest to people in the community, which avoids missing cases. Before the Council was at provincial level and there were so many severely disabled in the province, they could not cover them all, they could not meet all the people with disabilities. (Key informant)

The empowerment of the commune authority is one of its advantages. Commune authorities are more active in identifying people with disabilities. They are also closer to the targeted group who need to be identified... [As] the [DDDC] needs to directly meet the person to identify the form and level of disabilities, it is much easier and more accessible for a person to visit the commune hall compared with visiting [provincial] city hall. (Key informant)

Additionally, local officials noted that home visits were offered for applicants with severe functional limitations who were unable to travel to assessment locations, which they felt improved access.

72

However, not all people receive their assessment of disability at the local level. When the DDDC cannot make a determination on an assessment, cases must then be referred to the Medical Evaluation Council (MEC), which is located at provincial level. Children younger than age 6 and people with mental health conditions were noted to be particularly likely to be referred to the MEC. Additionally, if an applicant contests the result of their assessment, they can appeal the decision, but re-evaluations are done by the MEC. While over 80 per cent of disability-targeted social protection recipients in the quantitative survey completed their application at the commune-level and reported little issue with getting to application points, the remainder of recipients, as well as key informants, noted that travel to the provincial capital presented challenges to access. These barriers could be prohibitive, particularly for people with mobility limitations or who live in remote areas without adequate transportation links.

Financial accessibility. Direct application costs are low (VND 50,000; approx. USD 2). For appeals, however, applicants must cover the assessment fee by the MEC if their contestation is not supported. As the appeal assessment fee is high (VND 1,150,000; approx. USD 50), key informants noted that while this fee may protect against excessive contestations, it disproportionately impacts poorer applicants.

Additionally, indirect and opportunity costs of making the appeal could also be high, particularly for cases requiring re-evaluation at the MEC. While the assessment fee is waived for DDDC referrals and successful appeals, travel to the provincial centre and associated costs (e.g. accommodation, food) are not. Furthermore, applicants and anyone accompanying them must forgo time spent on other activities, such as work or schooling.

Disability assessment criteria and procedures. In 2012 the assessment criteria for determining eligibility and, importantly, “disability degree” classifications were updated through Joint Circular 37. With the implementation of this policy tool, assessments changed from a system based primarily on a medical classification of impairments to one focusing more on functioning. For example, as part of the disability degree classification under Joint Circular 37, the DDDC assesses whether a person can walk independently, with some help or not at all, based on self-reporting or in-person observation. In contrast, the MEC would diagnose a musculoskeletal impairment, and then consult Circular 20/2014/TT-BYT, which has a list of percentage “bodily injury” for a range of impairment types and health conditions. The main assessment body also switched from the MEC, which is comprised of medical professionals, to the DDDC, which is comprised of a range of representatives from different local government bodies, as well as DPO members where possible.

These changes to disability assessment procedures have been credited by key informants with greatly expanding access to social protection, which is reflected in national enrolment figures. In 2009, fewer than 385,000 people with severe disabilities nationally were receiving the Disability Allowance. By 2014, the figure had doubled to more than 700,000 recipients.

The use of a tool that does not require medical expertise greatly expands the capacity of the state to conduct assessments, particularly in areas of the country where medical resources are in short supply. Further, new procedures and policies are now more in line with the UNCRPD. For example, the involvement of DPOs promotes participation of people with disabilities in the implementation of social protection. Additionally, the move towards more functioning-based assessment criteria is closer to definitions of disability promoted in the UNCRPD.

Still, the policy review and key informants noted several limitations to the disability assessment criteria and procedures. The criteria focus disproportionately on physical functioning and self-care, and tend to underestimate the impact of certain impairments, notably profound hearing and communication impairments as well as mental health conditions. Key informants involved in assessments noted this could lead to lower degree classifications, or exclusion altogether:

Deaf people receive nothing from social welfare because they can walk, eat, have a bath, etc. without help. They can do all of this. Some cannot speak, but it is not enough for receiving social welfare. So, they are excluded. (Key informant)

Additionally, providing assessments to children younger than age 6 using Joint Circular 37 was reported as a persistent challenge. Consequently, most young children are referred to the MEC, which as mentioned previously creates additional barriers to access, as well as delays the receipt of needed support at a critical age.

There are also concerns that DDDC assessors are inadequately trained to conduct assessments, leading to inconsistent implementation and outcomes between communes and districts. Further, while, the DDDC is supposed to include the head of the commune-level DPO, in practice very few communes have a legal DPO. For example, the capital of Hanoi has 584 commune-level administrative units but, in 2013, it had only 63 commune-level DPOs (HPC and HDPA, 2014).

Awareness and perceived utility of programmes. The shift of the application process to the commune level has also been credited by key informants with improving awareness of disability-targeted programmes, as local officials are more involved in outreach. Among people with disabilities interviewed in the quantitative survey, almost 60 per cent were aware of disability-targeted social protection programmes, and almost half had heard about them from programme officials directly. The Disability Allowance and health insurance (state-subsidized or otherwise) were both the most well-known and deemed the most useful among people with disabilities.

I think that health insurance brings a lot of benefit, we should buy a health insurance card in case of illness. My entire family bought health insurance because of having fears about being ill. (Caregiver of a girl aged 11 who is not receiving the Disability Allowance)

Still, many people with disabilities were unclear about the eligibility requirements for programmes. The lack of clarity could dissuade people from applying, or result in confusion and frustration if applications were unsuccessful.

I cannot move my left hand, my right hand is weak. I had polio when I was young. I made a dossier and tried to apply several times but was not successful. Some other people who are like me receive monthly social welfare but I do not. I don't know why. I tried many times but always failed. That's why I don't want to try any more. (32 year old man who is not receiving the Disability Allowance)

While awareness of the Disability Allowance and CHI was high, few people (including people who were already receiving the Disability Allowance) were aware of the full range of entitlements available to them. For example as illustrated in Table 3, among Disability Allowance recipients, fewer than 15 per cent were aware of most other benefits. Lack of awareness of benefits, such as transportation discounts and free vocational training, likely dissuades applications from people with less severe impairments, who although not eligible for social assistance or subsidized health insurance could still benefit from other programmes. Programme administrators similarly had little awareness of these other benefits and thus were not in a position to offer information to recipients on how to access them. Among people with disabilities who were aware of additional entitlements, they were generally perceived to be of little value.

Broader disability-inclusive planning. For many disability-targeted entitlements, the perception of low utility was in large part linked to concerns about the quality and availability of the linked services. For example, vocational training tends to be urban based and was reported to not provide people with disabilities with employment skills based on their individual abilities and the demands of the local job market. Similarly, while transportation discounts address financial barriers to access, the limited availability and accessibility of public transportation restricts the utility of this benefit.

For people [with disabilities], they can have an exemption for using a public bus. But, there was no way for people with a wheelchair to get onto a public bus. It's a problem. (Key informant)

Additionally, physically inaccessible facilities and the absence of information provided in alternative formats could also serve as a barrier to applying for both disability-targeted and non-targeted programmes, as well as using benefits once approved. Social exclusion could also prohibit participation in non-targeted schemes. For instance, many working-aged people with disabilities were either not employed or were engaged in irregular, low pay-work, almost exclusively in the informal economy. Consequently, they were not eligible for employer-subsidized social insurance and, due to high levels of poverty and the irregularity of their work, the high monthly premiums attached to voluntary schemes were prohibitive.

Attitudes on disability and the need for social protection. Norms around who is considered “deserving” of social protection, particularly social assistance, could

influence decisions to apply for support as well as assessment outcomes. For example, functional decline due to ageing was often not considered by people with disabilities and administrators alike to be a “legitimate” form of disability, and some argued that the benefit should be targeted at people who are poor.

The government should support children with congenital abnormalities not elderly people like us. It is good if the government has social support for elderly people like us, we are getting old and weak, often being sick and difficult to move around. However, I don't make a dossier [to apply for the Disability Allowance]. I think it should be for people who are living in poorer living conditions than me. It is ok if they come to see me and make a dossier for me, if not, I am not going to ask for it. (65-year-old woman, not receiving the Disability Allowance)

Furthermore, although eligibility for disability-targeted social protection is based officially only on the presence of disability as determined by the scoring system outlined in Joint Circular 37, some officials noted that consideration of other circumstances could sway assessment outcomes.

Using forms in Decree 28 and the Joint Circular sometimes is difficult. Children for example, if they are children and cannot be in the severe category, we need to be flexible, for children to receive social welfare. (Key informant)

We consider about living conditions, if they are in economic difficulty, we can be more flexible. It is not in the guideline, but we can adjust it in practice. (Key informant)

Typically, this use of discretion by assessors was reported to result in favourable outcomes for applicants (i.e. approval of application, categorization to a higher degree). However, in certain cases straying from official guidelines could result in exclusion from disability-targeted programmes. For example, it was noted that local programme officials often play a gatekeeping role in encouraging or dissuading applications. In particular, people who would be unlikely to qualify for social assistance were often dissuaded from applying, even if they would be eligible for benefits earmarked for people with “mild” disability degree classifications.

Discussion

This study aimed to measure access to social protection among people with disabilities in Viet Nam and explore factors that support or hinder participation in relevant programmes. This research contributes to a relatively limited evidence

base on the inclusion of people with disabilities in social protection, which is needed to inform the planning and delivery of systems (Banks et al., 2016).

Participation

Few studies have measured the participation of people with disabilities in targeted and non-targeted social protection in a population-based sample, or have compared the access of people with disabilities to people without disabilities. Overall, this research found a relatively high uptake of many social protection programmes among people with disabilities. Health insurance was almost universally accessed, while slightly over half of people with disabilities were social assistance beneficiaries (predominantly the Disability Allowance). People with disabilities were more likely to be recipients of both health insurance and social assistance compared to people without disabilities. In contrast, no person with a disability reported participating in social insurance, with many ineligible as they were not employed in the formal economy or worked too irregularly to afford regular contributions.

While access to disability-targeted social assistance and health insurance was high, a large proportion of people with disabilities were not participating in programmes that they were eligible for. In addition to the 45 per cent of people with disabilities not receiving any form of disability-targeted social protection, many social protection beneficiaries were not accessing the full spectrum of benefits that were available to them. Key challenges to accessing social protection included: low awareness or perceived utility of certain entitlements, poor quality and availability of linked services, biases in assessment criteria and among programme staff, and geographic and financial barriers for people with disabilities who needed to travel from their local area to a central level of administration to make their application. Some of these challenges, particularly challenges in administering disability assessment and low levels of awareness of the availability of programmes, have been noted in other research (Banks et al., 2016; Gooding and Marriot, 2009; Kuper et al., 2016; Goldblatt, 2009; Graham, Moodley and Selipsky, 2013; Macgregor, 2006).

Still, this research also highlighted several strengths to the design and delivery of social protection in Viet Nam. The coverage of disability-targeted benefits in Cam Le (40 per cent), was much higher than previous estimates for Viet Nam (9.7 per cent) and the Asia-Pacific region (9.4 per cent) (ILO, 2017). Part of these differences may reflect differences in methodology, as this study used a direct survey approach, while other reported figures are estimates derived from applying the 15 per cent global disability prevalence to Viet Nam. However, the access of people with disabilities to many disability-targeted and non-targeted programmes appears to have expanded in recent years. For example, the number

of Disability Allowance recipients almost doubled from 2009 to 2014, from less than 385,000 to over 700,000 (Hoi, 2014; UNFPA, 2011). Similarly, in 2001–2002, only 19 per cent of people nationally with severe disabilities reported having health insurance (Palmer and Nguyen, 2012). Although this study broadens the scope of disability, it still found that over 90 per cent of people with disabilities had health insurance.

Some recent policy changes are likely to have had positive impacts on access. Notably, the introduction of Decree 28 and the Joint Circular 37 were credited by key informants in this study as substantially reducing geographic and financial barriers to access. These policies also transferred authority to local government bodies, increasing both awareness of programmes and the ease of administration. The benefits of moving away from purely medical assessments to more functioning-based protocols is supported in other research as more equitable, in line with a rights-based approach and easier to implement as they are not reliant on often limited specialized resources and expertise (Devandas Aguilar, 2017; Mont et al., 2016; Schneider et al., 2011; Gooding and Marriot, 2009; Mitra, 2005, p. 39). While evidence from Cam Le indicates most recipients undergo the predominantly functioning-based assessment at the DDDC, determinations for certain groups – for example young children and people with mental health conditions – still rely heavily on medical assessments. While policy changes are still being explored in Viet Nam to improve assessments for these groups, identifying appropriate tools is a global challenge (Mactaggart et al., 2016).

Further research is needed to understand how access to social protection varies in other regions of Viet Nam, as well as in other contexts internationally. For example, means testing and conditionality attached to the receipt of social assistance are common features of social protection programmes in other countries (ILO, 2017; Gooding and Marriot, 2009). Yet emerging evidence suggests that people with disabilities may face additional challenges accessing these types of schemes. For example, with means testing, eligibility thresholds rarely consider extra disability-related costs, which can alter determinations of who is considered to be poor (Banks et al., 2016; Gooding and Marriot, 2009; Mitra et al., 2017). One study in Viet Nam found that consideration of disability-related costs would increase the poverty rate among people with disabilities from 16.4 per cent to 20.1 per cent (Braithwaite and Mont, 2009), which would have important implications if programmes were means tested. People with disabilities may also have reduced access to conditional cash transfers, due to greater challenges complying with conditions (e.g. school attendance for children with disabilities in the absence of accessible schools) (Gooding and Marriot, 2009; Mont, 2006).

In Viet Nam and other countries, studies indicate that people with disabilities are more likely to be living in poverty and experience barriers to inclusion in

areas such as work, education and social participation (WHO and World Bank, 2011; UNFPA, 2011; Mont and Cuong, 2011; Palmer et al., 2015; Mitra, Posarac and Vick, 2013; Mizunoya, Mitra and Yamasaki, 2016; Bernabe-Ortiz et al., 2016), indicating a high need for social protection and other interventions. Studies are now needed to assess the effectiveness of social protection programmes in meeting their intended aims of reducing poverty, increasing access to key services and improving livelihoods.

Strengths and limitations

There are several limitations that should be considered when interpreting the findings of this study. Cam Le is urban, relatively affluent, and was identified by stakeholders as having a relatively well-functioning social protection system and adequate availability of disability-related services. Consequently, some of the district-level results from this study may not reflect the situation across all of Viet Nam. Coverage is likely lower in other areas, while certain barriers might be more pronounced elsewhere, particularly in remote districts.

Additionally, the Washington Group questions used to define disability in the quantitative surveys do not capture all forms of functional limitations. In particular, no questions ask about mental health, such as depression/anxiety, and it is not intended for use with children younger than age 5 (Groce and Mont, 2017). Our use of this tool would therefore have led to underrepresentation of these groups in our study. However, the experience of these groups is explored through the policy analysis and qualitative research.

Strengths include the use of mixed methods, which allows for a more comprehensive investigation into our research aims. The use of qualitative and quantitative research, in addition to a national policy analysis, enables us to corroborate and contrast findings across different methods and respondents, which ultimately both broadens and deepens our understanding of the strengths and weaknesses of designing and delivering social protection that is accessible to people with disabilities in Viet Nam.

Conclusion

Access to social protection among people with disabilities in Cam Le, Viet Nam, is relatively high, particularly for disability-targeted social assistance and health insurance. While Viet Nam's social protection system includes many examples of good practice in disability-inclusive social protection, gaps remain in extending coverage and increasing the use of certain benefits. Addressing these challenges is

essential for fulfilling the commitment in the UNCRPD and the 2030 SDGs of “social protection for all”.

Bibliography

- Banks, L. M. et al.** 2016. “Disability and social protection programmes in low-and middle-income countries: A systematic review”, in *Oxford Development Studies*, Vol. 45, No. 3.
- Bernabe-Ortiz, A. et al.** 2016. “Inclusion of persons with disabilities in systems of social protection: A population-based survey and case-control study in Peru”, in *BMJ Open*, Vol. 6, No. 8.
- Braithwaite, J.; Mont, D.** 2009. “Disability and poverty: A survey of World Bank poverty assessments and implications”, in *ALTER-European Journal of Disability Research*, Vol. 3, No. 3.
- Devandas Aguilar, C.** 2017. “Social protection and persons with disabilities”, in *International Social Security Review*, Vol. 70, No. 4.
- Devereux, S.; Sabates-Wheeler, R.** 2004. *Transformative social protection* (Working paper, No. 232). Brighton, Institute for Development Studies.
- Elwan, A.** 1999. *Poverty and disability: A survey of the literature* (Social protection discussion paper, No. 9932). Washington, DC, World Bank.
- Gentilini, U.; Omamo, S. W.** 2011. “Social protection 2.0: Exploring issues, evidence and debates in a globalizing world”, in *Food Policy*, Vol. 36, No. 3.
- Goldblatt, B.** 2009. “Gender, rights and the disability grant in South Africa”, in *Development Southern Africa*, Vol. 26, No. 3.
- Gooding, K; Marriot, A.** 2009. “Including persons with disabilities in social cash transfer programmes in developing countries”, in *Journal of International Development*, Vol. 21, No. 5.
- Government of Viet Nam.** 2009. *Quy định chi tiết và hướng dẫn thi hành một số điều của Luật Bảo hiểm y tế* [Decree on detailing and guiding a number of articles of the law on health insurance] (Decree No. 62/2009/ND-CP). Hanoi.
- Government of Viet Nam.** 2013a. *The Constitution of the Socialist Republic of Viet Nam*. Hanoi.
- Government of Viet Nam.** 2013b. *Quy định chính sách trợ giúp xã hội đối với đối tượng bảo trợ xã hội* [Regulation on social assistance for social protection beneficiaries] (Decree No. 136/2013/ND-CP). Hanoi.
- Government of Viet Nam.** 2017. *Quy định mức trợ cấp, phụ cấp ưu đãi đối với người có công với cách mạng* [Regulations on the levels of assistance and allowances for persons with meritorious services to the Revolution] (Decree No. 70/2017/ND-CP). Hanoi.
- Graham, L.; Moodley, J.; Selipsky, L.** 2013. “The disability-poverty nexus and the case for a capabilities approach: Evidence from Johannesburg, South Africa”, in *Disability & Society*, Vol. 28, No. 3.

- Groce, N. E.; Mont, D.** 2017. "Counting disability: Emerging consensus on the Washington Group Questionnaire", in *The Lancet Global Health*, Vol. 5, No. 7.
- GSOV.** 2010. *The 2009 Viet Nam Population and Housing census: Completed results*. Hanoi, General Statistics Office of Viet Nam.
- HPC; HDPA.** 2014. *Báo cáo hoạt động của Hội người khuyết tật Hà Nội năm 2013 và Kế hoạch hành động năm 2014* [Activity report of Hanoi Disabled People Association in 2013 and action plan for 2014]. Hanoi, Hanoi People's Committee, Hanoi Disabled People Association.
- Hoi, N. V.** 2014. *Những bước tiến quan trọng trong công tác bảo trợ xã hội* [Important advances in social protection]. Hanoi, Ministry of Labour, Invalids and Social Affairs.
- ILO.** 2017. *World social protection report 2017–19: Universal social protection to achieve the Sustainable Development Goals*. Geneva, International Labour Office.
- Kuper, H.; Polack, S.; Limburg, H.** 2006. "Rapid assessment of avoidable blindness", in *Community Eye Health*, Vol. 19, No. 60.
- Kuper, H. et al.** 2016. "Social protection for people with disabilities in Tanzania: A mixed methods study", in *Oxford Development Studies*, Vol. 44, No. 4.
- Macgregor, H.** 2006. "The grant is what I eat': The politics of social security and disability in the post-apartheid South African State", in *Journal of Biosocial Science*, Vol. 38, No. 1.
- Mactaggart, I. et al.** 2016. "Field testing a draft version of the UNICEF/Washington Group Module on child functioning and disability: Background, methodology and preliminary findings from Cameroon and India", in *ALTER-European Journal of Disability Research/Revue Européenne de Recherche sur le Handicap*, Vol. 10, No. 4.
- Mitra, S.** 2005. *Disability and social safety nets in developing countries* (Social protection working paper, No. 509). Washington, DC, World Bank.
- Mitra, S. et al.** 2017. "Extra costs of living with a disability: A review and agenda for future research", in *Disability and Health Journal*, Vol. 10, No. 4.
- Mitra, S.; Posarac, A.; Vick, B.** 2013. "Disability and poverty in developing countries: A multidimensional study", in *World Development*, Vol. 41.
- Mizunoya, S.; Mitra, S.; Yamasaki, I.** 2016. *Towards inclusive education: The impact of disability on school attendance in developing countries* (Innocenti working paper, No. 3). Florence, UNICEF Office of Research.
- MoH; MoLWISA.** 2012. *Determination of the degree of disability by Medical Examination Council* (Joint circular). Hanoi, Ministry of Health and Ministry of Labour, War Invalids and Social Affairs.
- Mont, D.** 2006. *Disability in conditional cash transfer programs: Drawing on experience in LAC* (Conference paper, Third International Conference on Conditional Cash Transfers, Istanbul, 26–30 June). [S.l.].
- Mont, D.; Cuong, N. V.** 2011. "Disability and poverty in Vietnam", in *The World Bank Economic Review*, Vol. 25, No. 2.
- Mont, D. et al.** 2016. *Disability identification cards: Issues in effective design* (Working paper, No. 29). London, Leonard Cheshire Disability and Inclusive Development Centre.

- National Assembly of Viet Nam.** 2008. *Law on Health Insurance*. Hanoi.
- National Assembly of Viet Nam.** 2010. *Law on persons with disabilities*. Hanoi.
- National Assembly of Viet Nam.** 2014. *Amendments to the law on health insurance*. Hanoi.
- Nguyen, L. H.; Hoang, A. T. D.** 2017. "Willingness to pay for social health insurance in Central Vietnam", in *Frontiers in Public Health*, April.
- Palmer, M. G.; Nguyen, T. M. T.** 2012. "Mainstreaming health insurance for people with disabilities", in *Journal of Asian Economics*, Vol. 23, No. 5.
- Palmer, M. et al.** 2015. "The economic lives of people with disabilities in Vietnam", in *PLoS One*, 21 July.
- Schneider, M. et al.** 2011. "Reflections on including disability in social protection programmes", in *IDS Bulletin*, Vol. 42, No. 6.
- UN.** 1948. *Universal Declaration of Human Rights* (General Assembly, Paris, 10 December). Paris.
- UN.** 2006. *Convention of the rights of persons with disabilities*. New York, NY.
- UN.** 2017. *Sustainable Development Goal 1: End poverty in all its forms everywhere* (Sustainable Development Knowledge Platform). New York, NY.
- UNFPA.** 2011. *People with disabilities in Viet Nam: Key findings from the 2009 Viet Nam Population and Housing Census*. Hanoi, United Nations Population Fund in Viet Nam.
- Vinh, D. Q.** 2016. *Social protection in Vietnam* (PowerPoint presentation, United Nations Expert Group Meeting on Poverty Eradication, New York, NY, 1–3 June). Hanoi, Ministry of Labour, Invalids and Social Affairs – Institute of Labour Science and Social Affairs.
- Washington Group on Disability Statistics.** 2009. *Understanding and interpreting disability as measured using the WG short set of questions*. Hyattsville, MD.
- WHO; World Bank.** 2011. *World report on disability*. Geneva, World Health Organization.
- World Bank.** 2012. *Resilience, equity, and opportunity*. Washington, DC.
- Yeo, R.** 2001. *Chronic poverty and disability* (Background paper, No. 4). Manchester, Chronic Poverty Research Centre.

Inequity in access to the Argentinian pension system (1994–2017)

*Milva Geri**, *Mariana de Santis*** and *Nebel Moscoso**

*Universidad Nacional del Sur, Bahía Blanca, Argentina;

**Universidad Nacional de Córdoba, Córdoba, Argentina

Abstract Pension coverage in Argentina is inequitably distributed between different income levels, both during working years and during retirement. The objective of the article is to study the evolution of inequity in access to the Argentinian pension system in terms of its association with the socio-economic status of individuals during the period 1994–2017. An evaluation is offered of how variables such as sex, age, and educational attainment influence such inequity. It is concluded that, although the level of average coverage increased, inequity in access increased significantly in the years following the 1994 reform, both among the active and the inactive population. However, inequity in access among active persons did not improve substantially with the return to the pay-as-you-go pension system, while it was considerably reduced among the inactive population. While the former are found to be affected to a greater extent in terms of coverage as a result of the pro-educated bias among the active population, the latter outcome is thought to be a direct result of the transitory plan (Pension Inclusion Plan) for pension inclusion, after which inequity was to resume its upward course.

Keywords pension scheme, coverage, Argentina

Addresses for correspondence: Milva Geri, IIESS-CONICET, Department of Economics, Universidad Nacional del Sur, Bahía Blanca, Argentina; email: mgeri@iess-conicet.gob.ar. Mariana de Santis, Institute for Economics and Finance, Faculty of Economic Sciences, Universidad Nacional de Córdoba, Córdoba, Argentina; email: mdsantis@eco.unc.edu.ar. Nebel Moscoso, IIESS-CONICET, Department of Economics, Universidad Nacional del Sur, Bahía Blanca, Argentina; email: nmoscoso1@gmail.com.

Introduction

The performance of a pension system can be evaluated in terms of three basic dimensions: coverage, adequacy of benefits, and sustainability (Rofman, Lucchetti and Ourens, 2008). Coverage refers to the proportion of the target population protected by the pension system, whether or not they are economically active (Bertranou, Grushka and Rofman, 2001). The adequacy of the benefits depends on whether they are sufficient to guarantee a minimum level of consumption for beneficiaries, and on whether the ratio between the monetary value of the benefits and the wages of the economically active meet the minimum standards stipulated by the International Labour Organization (ILO) or national legislation. Sustainability refers to the ability to keep the system operating without major disturbances in fiscal accounts (Rofman, Lucchetti and Ourens, 2008), while maintaining actuarial and financial equilibrium.

Bertranou and Bonari (2005) point out that, in addition to these dimensions, the distributive performance of the system must in particular be taken into account. This is done based on an analysis of the horizontal and vertical distribution of coverage. Distributive performance compares the degree of access to the system among individuals of different income levels (horizontal coverage), and evaluates the effectiveness of the system to reduce the poverty gap among the population that is not economically active, focusing on securing social security benefits for the vulnerable population (vertical coverage).

Some authors have tried to evaluate this type of performance empirically in the case of Argentina (Mesa-Lago, 1978; Mesa-Lago, 2008; Bertranou, 2011). Similarly, Rofman and Oliveri (2011) compare the hypothetical Gini coefficient for income distribution in Argentina – for a situation where the pension system did not exist – with the real observed Gini coefficient. They conclude that the existence of the pension system has a positive impact on income distribution. Using a different approach, Arza (2006) evaluates the income transfers between different generations and different worker profiles that have resulted from the Argentinian pension system over time, based on a systematic study of the evolution of eligibility conditions. Arza finds that the first generations covered benefited from high pension levels despite having contributed for only a relatively short time, while other generations suffered the consequences of systemic crises. That said, within each generation the net losers have been the workers with the lowest income levels, who have failed to meet the minimum number of years of contributions needed to qualify for contributory benefits, but who nevertheless indirectly fund the system through taxes on consumption. In this regard, the author suggests that the progressiveness of the pay-as-you-go

system may be affected by differences in mortality rates and the unequal distribution of coverage by income levels.

Argentina reformed its pension system in 1994 to introduce an individual capitalization pillar, which existed for 14 years alongside the traditional social insurance pillar until 2008, the year in which a single pure pay-as-you-go system was re-established. The reform tightened the eligibility conditions by raising the minimum retirement age by 5 years and by requiring 15 years of contributions, while provincial and municipal schemes were dissolved and transferred to the national scheme. It was hoped that the introduction of a capitalization pillar would increase pension coverage during periods of economic activity, since individuals would associate the money deposited in their respective accounts with their future retirement, a relationship that is not visible in a pay-as-you-go system (World Bank, 1994). As will be seen in the results section, the reform did not achieve that objective, and active pension coverage was reduced by fifteen points between 1994 and 2002 among employed workers.

Naturally, the reduction in coverage among the economically active suggests a subsequent reduction in coverage among the economically inactive, i.e. when individuals who were not protected by the pension system during their periods of economic activity reach retirement age. This was the main argument of the Pension Inclusion Plan (hereafter PIP) implemented in 2005, which aimed to enable self-employed workers – who according to various authors have a level of pension coverage even lower than that of employed workers during their period of economic activity (Casali and Bertranou, 2007; Bertranou and Maurizio, 2011) – to join a plan. Specifically, on reaching the minimum retirement age, the PIP facilitated payments for self-employed workers to buy back contribution arrears and other payments and to access pension benefits,¹ even if they had no record of contributions to the system (ANSES, 2011).

In a work by D'Elia (2013), income inequality among the beneficiary population was analysed through a breakdown of the Theil inequality index for the population of pension beneficiaries between 1996 and 2009, with the aim of estimating the impact of different factors on the variability of intra- and inter-income group pensions. The finding was that the absorption of the provincial sub-schemes by the national pay-as-you-go system in the 1990s and the tighter eligibility conditions introduced by the pension reform (Rofman, 2001) had the effect of increasing income inequality in terms of pension benefits between 1996 and 2003. By contrast, the PIP, commonly known as the Moratoria Plan (*Régimen de Moratoria*) (Arza, 2012) and which resulted in an increase in the proportion of minimum pensions, had the effect of

1. While the legal instrument by which it was established did not specifically provide for it, formerly employed workers who had become self-employed workers could also register (Iacobuzio, 2014).

reducing such inequality between 2006 and 2009, despite its inefficiency in terms of targeting² (Rofman and Oliveri, 2011).

Several international organizations, such as the Economic Commission for Latin America and the Caribbean (ECLAC), the International Labour Organization (ILO), and the Inter-American Development Bank (IADB), agree that the main objective of a pension system is to achieve universal coverage. To attain this objective without abandoning contributory financing schemes, good labour market performance is required: the demand for work must be able to absorb the supply under formal conditions. Argentina has made significant efforts to include older adults in the pension system, allocating close to 2.5 per cent of its GDP to the financing of the PIP (Rofman, Apella and Vezza, 2015). However the expansion of formal employment in recent years would not have been sufficient to finance universal coverage purely from contributory sources. In this sense, the unequal distribution of access to formal employment between different income levels and the evasion of social security contributions seem to be unresolved problems that jeopardize the largely contributory design of the system.³

From a different perspective, recourse to non-contributory sources of financing does not help strengthen redistribution, since a significant proportion of such sources are taxes on consumption; such as value added tax (VAT) and taxes on fuel and cigarette consumption. Given that the marginal propensity to consume is higher among those with lower levels of income, taxing consumption on a proportional basis is regressive with respect to income.

The main objective of this article is to assess the degree of inequity⁴ in access to the Argentinian pension system that is associated with the socio-economic status of individuals, represented here by level of income, both for the active working-age population and the economically inactive. At the same time, it is proposed to study how variables such as sex, age, and educational attainment are related to this type of inequity. In the following section the methodology used is described. Thereafter, the findings and discussions are presented, together with some final considerations. The appendix shows the results obtained in the models tested.

Methodology

On the basis of data from the Permanent Household Survey (hereafter, the EPH) in its detailed (1994–2003) and continuous (2003–2017) versions, the percentages of

2. "... the moratorium made it possible to include not only the poorest and most vulnerable groups of the population, but also those who had other income and/or pension benefits" (Rofman and Oliveri, 2011, p. 40).

3. In Argentina, around 60 per cent of financing comes from contributory sources (D'Elia, 2016).

4. This article distinguishes between two the concepts equity and equality. Equity: each person receives what he or she deserves. Equality: equivalence of two quantities or expressions.

average pension coverage, by deciles, of family per capita income (hereinafter IPF) are estimated for the active working-age population and the economically inactive population.

The active working-age population⁵ is defined as the population of individuals that are employed and older than age 18 but younger than the minimum retirement age, which is set at 60 years for women and 65 years for men. The economically inactive population is defined as the population of individuals older than the minimum retirement age. The active population covered comprises those who pay pension contributions through wage deductions, whether mandatory or voluntary; while the covered inactive population includes those who receive some retirement benefit, either retirement benefit as such or a pension.

For each of the 19 years and each of the 54 quarters covered by this study, the achievement and Wagstaff concentration indices adapted by Makdissi and Yazbeck (2016) are estimated based on the classification, by deciles, of individual fixed-rate taxation (IPF), in accordance with equations (1) and (3) respectively.

$$A(v) = \sum_{d=1}^{10} \omega_d(r_d, v) \mu_d \quad (1)$$

$$\omega_d(r_d, v) = \frac{(10 - r_d + 1)^v - (10 - r_d)^v}{10^v}, v \geq 1 \quad (2)$$

$$C(v) = 1 - \frac{A(v)}{\mu} \quad (3)$$

The achievement index A depends on v , a parameter of aversion to inequity in access to the social security system associated with socio-economic status, which can take on values from 1 (zero aversion to inequity) and above, where $v = 2$ is the standard value for the index and the one used in this work. Each average coverage per decile of IPF μ_d is multiplied by a parameter ω_d that depends on v and the relative ranking of individuals with respect to the socio-economic scale, which is determined by the decile of IPF to which they belong. Finally, the concentration index C is equal to: 1 minus the achievement index divided by the average coverage μ of the total population. If this index is positive, this is a pro-rich society that provides greater access for individuals ranking higher in the socio-economic scale. Alternatively, if this index is negative, it is a pro-poor

5. The analysis is limited to this type of worker, since the EPH makes it possible to determine participation in the formal economy only for such workers.

society that ensures greater access for lower-ranking individuals in the socio-economic scale.

Second, the Wagstaff concentration indices are re-estimated using the methodology of Wagstaff, van Doorslaerc and Watanabea (2003), which makes possible its subsequent breakdown in accordance with equation (4).

$$C = \frac{\nu}{\mu} \text{cov}(y_i, R_i) \quad (4)$$

The concentration index C , which will later be decomposed, depends on the inequity aversion parameter ν , the average pension coverage of the population μ and the covariance between the condition of coverage or non-coverage for each individual y_i and the rank of the individual on the socio-economic scale R_i . In this case, the procedure requires ranking individuals from lowest to highest IPF and then allocating their corresponding rank value.⁶

A simple linear model is then constructed to explain y_i as a function of a series of explanatory variables x_k that are available for active and inactive populations for comparative purposes. The selected variables were sex, age, and four binary variables associated with educational attainment: incomplete secondary, complete secondary, tertiary or incomplete university, and complete university or postgraduate. The elasticities, given by equation (5), are estimated from the coefficients associated with each variable.

$$\eta_k = \frac{\beta_k \bar{x}_k}{\mu} \quad (5)$$

The elasticity of each variable η_k is equal to the coefficient β_k obtained in the linear regression multiplied by the average value of each variable \bar{x}_k , divided by the average coverage of the population. Next, the Wagstaff concentration index is decomposed based on equations (6) and (7).

$$C = \sum_k \eta_k C_k + \frac{GC_\varepsilon}{\mu} \quad (6)$$

$$C_k = \frac{\nu}{\bar{x}_k} \text{cov}(x_i, R_i) \quad (7)$$

The total concentration index is equal to the sum of the elasticities of each explanatory variable multiplied by their corresponding concentration index, plus a generalized concentration index GC_ε of the error term ε , divided by the average

6. Naturally, individuals with the same IPF also have the same value for R_i . This may lead to differences between the concentration indices calculated according to a formula.

coverage of the population. This residual term reflects the inequity in access to the social security system associated with socio-economic status that cannot be explained by variations in the distribution by income levels of the explanatory variables.

Both the Wagstaff indices and their subsequent decomposition were estimated with software R version 3.4, based on a proprietary algorithm.⁷ The results are presented in graphic form in the results section and in greater detail in the tables in the appendix.

Results

The Argentinian pension system has historically shown differences in coverage of the active working-age and inactive populations (Isuani, 1985; Feldman, Golbert and Isuani, 1986), and between different income levels. The coverage gaps reveal various inconsistencies in the pension system. On the one hand, the gap between active and inactive coverage shows how the system loses its ability to cover its target population over time: a lower degree of coverage of the active population makes it possible to predict lower coverage of the future inactive population, since access to pension benefits currently requires 30 years of contributions. On the other hand, the coverage gaps between different income levels make it possible to conclude that the redistributive potential of the social security system is untapped in that it excludes the lowest ranking workers in the socio-economic scale (Bertranou, 2011).

Table 1 shows the average pension coverage by deciles of IPF, both for the active working-age population (Active) and for the inactive population (Inactive). The years selected mark the time immediately before the entry into force of the pension reform that introduced a capitalization pillar (May 1994); immediately prior to the entry into force of the counter-reform that abolished the capitalization pillar (fourth quarter of 2008); and the time of the latest available EPH (fourth quarter of 2017). The shaded cells correspond to deciles that presented lower (light grey) and higher (dark grey) degrees of coverage.

It is noted that, although pension coverage increased in average terms, both for the active and inactive populations, the coverage gaps between active and inactive and between different deciles of IPF showed obvious changes. On the one hand, while the coverage gap between active and inactive was only 6 points before the 1994 reform, it had increased to 11 points at the time of the counter-reform (2008), a value that is also noted in 2017. However, it should be clarified that this outcome is not necessarily the result of the introduction or abolition of the capitalization pillar, but rather of the implementation of the PIP, which, as will be seen later, increased active retirement coverage by 25 points between the second quarter of 2005 and the first quarter of 2017. Given that pension

7. The algorithm may be obtained on request from the authors.

Table 1 Pension coverage by deciles of IPF in selected years

Decile	Active	Inactive	Decile	Active	Inactive	Decile	Active	Inactive
1	42%	50%	1	20%	56%	1	27%	71%
2	51%	62%	2	39%	73%	2	43%	77%
3	55%	66%	3	52%	75%	3	56%	82%
4	58%	66%	4	59%	83%	4	65%	87%
5	60%	66%	5	64%	82%	5	70%	87%
6	61%	70%	6	73%	79%	6	76%	82%
7	64%	70%	7	77%	80%	7	82%	82%
8	66%	70%	8	83%	74%	8	86%	83%
9	69%	73%	9	87%	71%	9	92%	76%
10	72%	71%	10	91%	59%	10	95%	65%
PROM	60%	66%	PROM	64%	75%	PROM	67%	78%

Source: Authors' calculations, based on the detailed (1994–2003) and continuous EPH (2003–2017).

coverage during active working life did not increase by the same proportion, the coverage gap between active and inactive increased.

As regards the coverage gaps between different income levels, in 1994 there were about 30 points of difference between the decile with the highest active pension coverage (Decile 10) and the decile with the lowest active pension coverage (Decile 1). Fourteen years later, that difference had increased to 71 points between the deciles of greater (Decile 10) and lesser coverage (Decile 1). Finally, according to the latest information available, that difference has been reduced to 68 points between the deciles of greater (Decile 10) and lesser (Decile 1) coverage. Given that in the case of pension coverage among the working-age active population it is a permanent feature that such coverage increases with level of income, it is easy to conclude that there is inequity in access to the pension system for the active population. This diagnosis is verified at a later stage when the concentration indices (hereafter, CI) deriving from formulas (3) and (4) described in the methodological section are estimated.

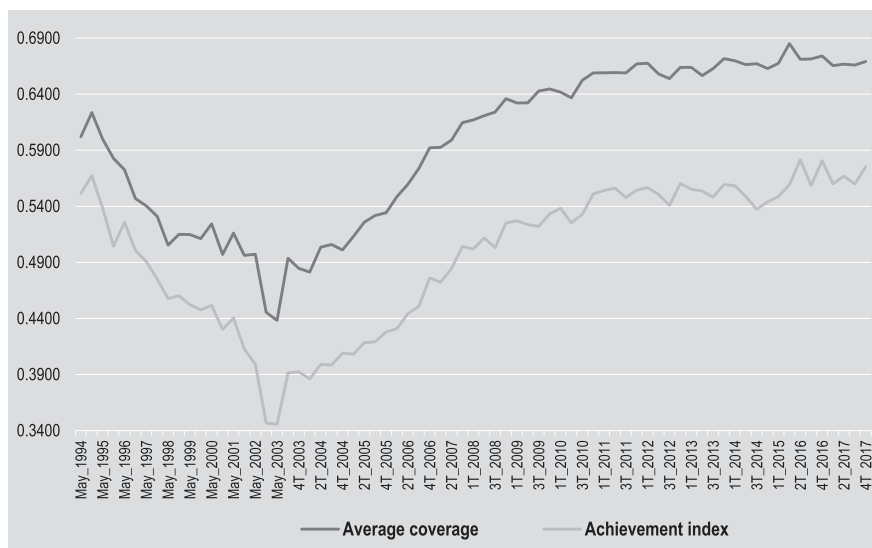
For pension coverage among the inactive population, it is not so easy to diagnose the existence of inequity in access to the pension system, at least at the last two points in time analysed. In 1994, there were 23 points of difference between the decile with the highest inactive pension coverage (Decile 9) and that with the lowest such coverage (Decile 1). This difference had increased to 27 points in 2008 between the deciles with greater (Decile 4) and lesser degrees of coverage (Decile 1); however, the intermediate deciles showed greater coverage

than the extremes. The gap is found to have been reduced to 22 points in 2017 between the deciles of greater (Deciles 4 and 5) and lesser coverage (Decile 10), but retained an inverted U form; that is, the extreme deciles continue to show a lower degree of coverage than the intermediate deciles (Figure 1 and Figure 2).

These results coincide with those found by Arza (2012), who concludes that elderly persons without coverage in Argentina are concentrated in the extreme deciles, which suggests that while the poorest individuals do not qualify for pension benefit because they do not comply with the requirement of 30 years of contributions, the richest individuals voluntarily decide to remain active because they consider the level of benefits to which they would be entitled insufficient. Alos et al. (2008) concur with this conclusion when assessing the factors on which the decision by older adults to continue in activity depend. In this sense, the authors warn that, unlike what has happened in Member countries of the Organisation for Economic Co-operation and Development (OECD), there has been no trend in recent decades towards early withdrawal from the labour force in Argentina. Rather, employment rates among older adults in Argentina have increased, with the main factor being the inadequacy of pension benefits.

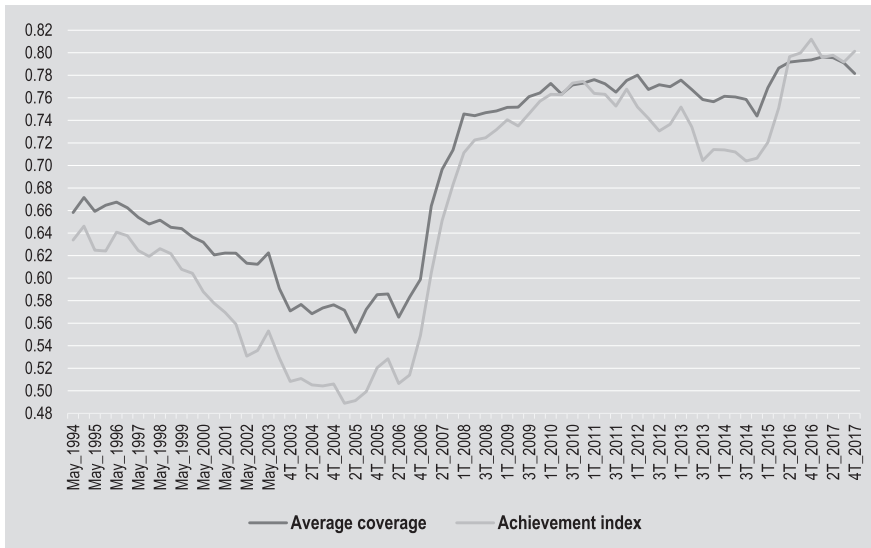
The difficulty of diagnosing inequity in access to the pension system during periods of non-activity, and its quantification, justify the need to estimate it using a more sophisticated method than simply observing the coverage gaps

Figure 1. Average pension coverage of the active population and its achievement index (1994–2017)



Source: Authors' calculations, based on the detailed (1994–2003) and continuous EPH (2003–2017).

Figure 2. Average pension coverage of the inactive population and its achievement index (1994–2017)

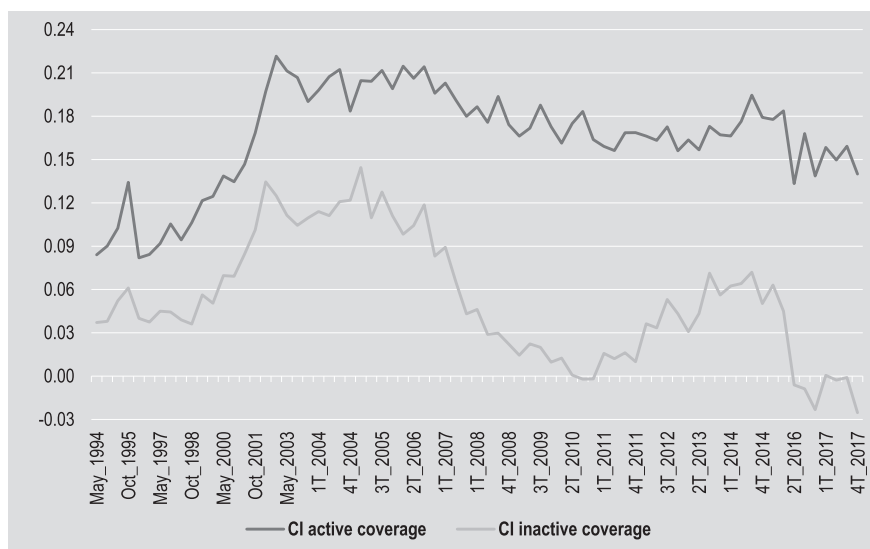


Source: Authors' calculation, based on the detailed (1994–2003) and continuous EPH (2003–2017).

between different levels of employment. For this reason, the first analysis is complemented by an estimation of average pension coverage and of the Wagstaff achievement index proposed by Makdissi and Yazbeck (2016) for the entire period under consideration. Analysis of the evolution over time of these indicators makes it possible to observe whether there is any kind of relationship between the most relevant modifications undergone by the pension system and inequity in access. Figure 3 describes social security coverage during active working life, while Figure 4 shows social security coverage during inactive life.

It is observed that average active coverage increased by only 7 percentage points between 1994 and 2017, with its lowest value occurring in October 2002 following the profound economic crisis suffered by the country. Bertranou, Rofman and Grushka (2003) suggest that this fall was the result of the recession that the country entered in 1998, which caused a sharp rise in unemployment that reached 22 per cent in 2002. Moreover, despite pension reform and the subsequent reduction in employers' contributions, together with the implementation of employment policies that made it possible to hire workers without compulsory social security charges, which marked an attempt to reduce informal employment, there was an increase in informal employment which made the situation worse.

The subsequent recovery did not see equal improvements for all the income deciles, and this is reflected in the achievement index, which was always below the

Figure 3. Concentration indices (CI) of active and inactive pension coverage

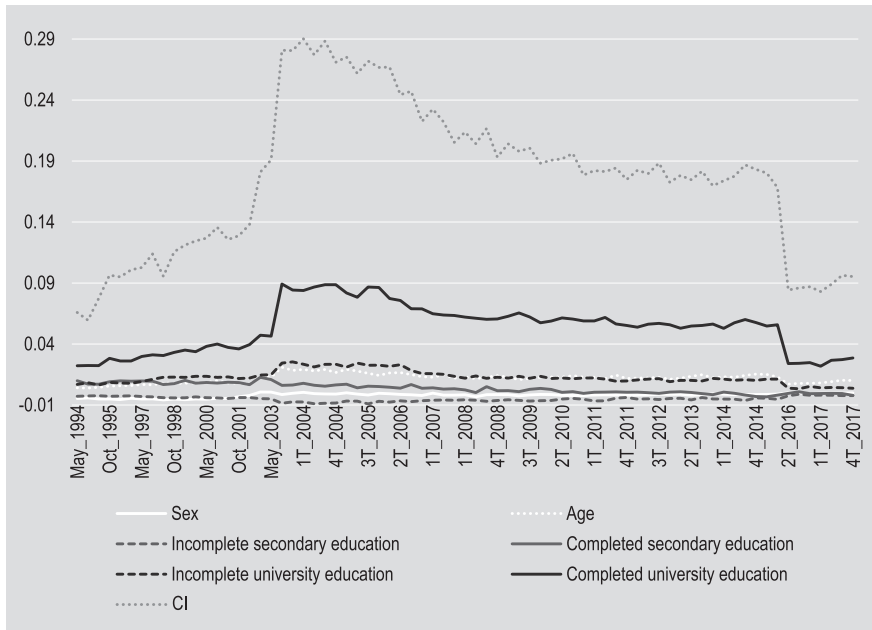
Source: Authors' calculations, based on the detailed (1994–2003) and continuous EPH (2003–2017).

average coverage level, indicating that the bias of coverage in favour of those with higher incomes impaired the distributive performance of the system. In short, the “achievement” of the pension system among those of active working age was lower than average coverage, since it was concentrated among the better off. As a result, the concentration index was positive throughout this period, confirming that it is a pro-rich society in terms of access to protection under the pension system for the active working-age population.

As regards average coverage of the inactive population, an increase of 12 percentage points was recorded between 1994 and 2017, reaching a minimum in the first quarter of 2005 before the implementation of the PIP. According to Bertranou, Rofman and Grushka (2003), this initial fall in the level of such coverage was a consequence of the stricter requirements for access to pension benefit, in particular the requirement of 30 years of contributions in the context of a strong deterioration in labour market conditions. In turn, government financing restrictions resulted in lower funding for non-contributory benefits, thwarting the objective of expanding coverage.

The recovery achieved as a result of the PIP did not see equal improvements for all the income deciles: the achievement index was above the average coverage level, which indicates a greater distributive impact in favour of those with lower incomes. In this case, the concentration index was below zero in the last two quarters of 2010, as well as in the last three quarters of 2016 and 2017. This result means

Figure 4. *Wagstaff concentration index for coverage of the active population and its decomposition in terms of selected variables (1994–2017)*



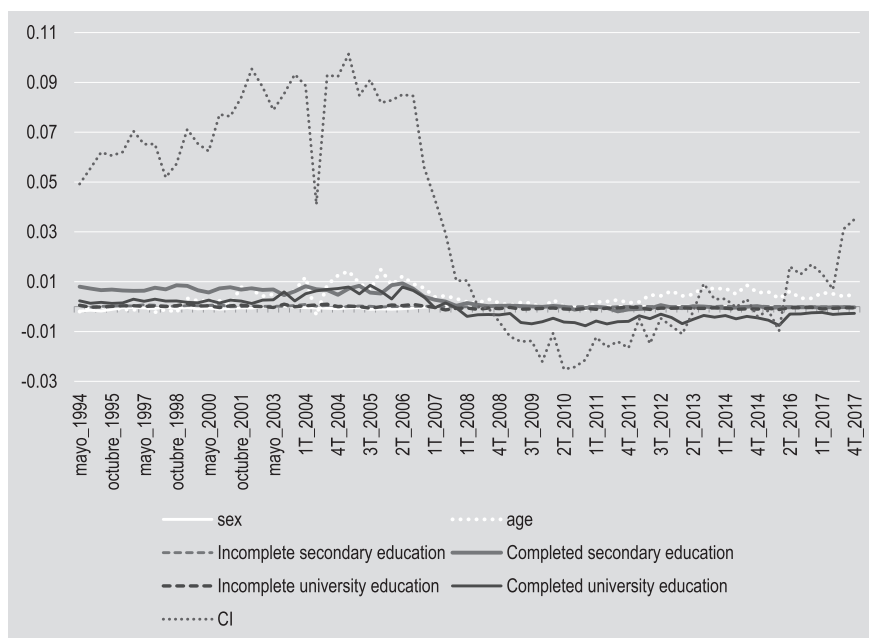
Source: Authors' calculations, based on the detailed (1994–2003) and continuous EPH (2003–2017).

that the PIP made possible a move from pro-rich to pro-poor in terms of access to the pension system during those years.

Figure 5 shows the evolution of the pension coverage CI based on formula (3), both for those in their active working lives and those not working. It can be observed that for both groups inequity in access increased in the years following the pension reform, reaching its maximum values in 2002 for those in their active working lives and 2005 for those not working. From May 2003 onwards, inequity in access among those of active working age fluctuates around a set of high values, and does not return to the values recorded prior to the reform. The abolition of the capitalization pillar does not seem to have had any effect in reducing such inequity in access.

In contrast, the drastic reduction in inequity in access seen among the inactive population is evidently a consequence of the PIP, which was marked by two major steps in implementation (2005 and 2014). This result is not surprising, since it is logical to conclude that the lower income deciles are also those that experience the greatest difficulty in meeting the requirement of 30 years of contributions, and therefore benefited to a greater extent from the PIP. Similarly, it is noted how

Figure 5. Wagstaff concentration index for coverage of the inactive population and its decomposition in terms of selected variables (1994–2017)



Source: Authors' calculations, based on the detailed (1994–2003) and continuous EPH (2003–2017).

abrupt falls in inequity are followed by fresh increases, which over time reflect the inequity in access found during the active working life, which is in turn transferred to the inactive population in the absence of a Moratorium Plan.

To evaluate how the variables of sex, age, and educational attainment are related in terms of inequity in access to the pension system, Figures 4 and 5 show the evolution of the Wagstaff concentration index based on formula (4), and offer a breakdown of the relative impact of each of these variables, both for the active and inactive population.

Between 1994 and 2004, the CI for the active population increased exponentially, from 0.07 to 0.29. This increase in inequity in access in favour of individuals who are better off in socio-economic terms shows that access to the Argentinian pension system was inequitable during that period. Even though from 2005 onwards inequity in access fell, the system retained a pro-rich structure. At the end of that period the index was 0.10.

The highest level of education attained by individuals explains to a substantial degree the inequity of coverage. In effect, graduation at higher educational levels accounts for between 24 and 38 per cent of the CI. This is not surprising, since

access to higher education or university is also a variable that is unevenly distributed by income levels. In addition, failure to complete higher education contributes between 4 per cent and 14 per cent of the CI. With respect to the average level of studies, graduation from only secondary education contributes between 0.1 per cent and 15 per cent, while failure to complete secondary education contributes between 1 per cent and 4 per cent. In this regard, Bertranou, Rofman and Grushka (2003) warn that the workers most affected by job insecurity were precisely those with the least qualifications.

In turn, age accounts for between 5 per cent and 12 per cent of the CI. In effect, age is slightly pro-rich in terms of distribution, which is attributable to the fact that older people are more likely to have registered or have formal jobs. Finally, the fact of being male contributes between 0.005 per cent and 7 per cent to the CI and its distribution is slightly pro-poor; that is, a greater relative number of males is found among the lower income deciles.

Between 1994 and 2005, the CI for the inactive population increased from 0.05 to 0.10, indicating an increase in inequity in access favouring high-income individuals. From that point onwards the index began to fall, reaching a minimum of -0.03 in the second quarter of 2010. This finding confirms that the PIP made possible a shift from pro-rich to pro-poor, guaranteeing greater access to pension benefits for those with fewer resources. Once the deadline for requesting moratoria expired, the trend towards inequity in access returned, reaching a maximum of 0.04 in the fourth quarter of 2017. At this point the trend resumed towards pro-rich, which is a natural response to a structure that is also pro-rich in terms of access to coverage during the active working life.

Since the PIP interrupted the natural tendency of the series, it was decided only to analyse the results for periods before the third quarter of 2006, since inequity in access was thereafter clearly affected by the Moratorium Plan.

During this sub-period, from May 1994 to the second quarter of 2006 inclusive, as in the case of the active population, the highest level of education attained by individuals also contributed substantially to inequity in access. Graduation from higher education contributed between 1 per cent and 15 per cent of the CI. This variable shows very unequal distribution by income levels. Graduation from secondary studies contributed between 5 per cent and 17 per cent of the total CI. This variable can hence also be seen to have a pro-rich structure, although less so than for the completion of higher education. Finally, failure to complete average studies and higher studies in all cases accounted for less than 1 per cent and 2 per cent, respectively.

The contribution of age was important in some quarters, accounting for between 0.1 and 18 per cent of the CI. This is a finding that concurs with that found by other authors, who note a positive relationship between coverage of the inactive population and age (Arza, 2012; Rofman, Lucchetti and Ourens, 2008). Finally,

the fact of being male in this sub-period accounted for less than 4 per cent of the CI, and its distribution was also slightly pro-poor among the inactive population.

As shown in Figure 5, the effect of the PIP was to dissociate educational level and age from participation in the system, thereby neutralizing the socio-economic bias. In effect, the moratoria halted the trend in the CI by increasing equity in access to the pension system during inactive life, since lower income individuals, mainly women, who probably did not enjoy coverage during their active working lives, gained access to social security benefits.

Discussion and final considerations

Coverage is one of the dimensions that must be taken into account when evaluating the performance of a pension system. Its distribution among different income levels has motivated different studies that sought to investigate the progressiveness or regressivity of the system. If it is believed that all persons, both working and inactive, must be included in the pension system, their socio-economic status should not affect their access to it. This article does not question or analyse income inequality in terms of the value of pension benefits. Rather, attention is paid to inequity in access. One weakness of this article is that it does not address inequity in access among self-employed workers, who according to various authors (Casali and Bertranou, 2007; Bertranou and Maurizio, 2011) account for a greater degree of informal labour than employed workers.

Analysis of the evolution of the concentration index shows whether there is any relationship between the changes introduced in the pension system and inequity in access. Although an increase in inequity occurred during the years following the pension reform, both for the active and inactive populations, it is not possible to state that such inequity was reduced with the return of the pay-as-you-go scheme. As regards coverage of the active population, inequity in access was slightly reduced during the period following the economic crisis in 2002 to the abolition of the capitalization pillar in 2008, and never reached the values that obtained prior to the reform. For the inactive population, the fall in inequity cannot be explained as the result of the return to the pay-as-you-go system, but by the implementation of the PIIP.

In this sense, Argentina has allocated a significant percentage of its GDP to financing universal pension coverage for its older adults. It managed to move artificially and for a transitional period from a pro-rich to a pro-poor system that to a greater extent ensured access for the inactive population who are most in need, being without alternative sources of income. This happened despite the fact that the design and implementation of the programmes was not optimal in terms of the targeting of the benefits.

However, given that the system's sources of financing remain largely contributory, conditions of access for the inactive population are positively associated with those enjoyed during active working life, which are unequally and inequitably distributed during the period under consideration.

This article has noted that people in the lower income levels have less access to formal employment, and as a result do not have the years of contributions required to access pension benefits on reaching retirement age, or indeed later. This indicates that, in terms of access to the Argentinian pension system, there is ample scope to reduce horizontal inequity. If levels of formal labour were increased, especially among less educated workers, so that coverage is independent of the level of education, age or gender of its contributors, this would contribute substantially to reducing this type of inequity.

A bias in coverage has been found that is favourable to those with higher levels of formal education. At the same time, the greater probability that individuals with higher levels of income will live longer, mainly during their inactive years, contributes significantly to inequity in access to the benefits of the pension system. Finally, the slightly pro-poor distribution of males by income levels, both among the active and inactive populations, does not contribute any substantial percentage to the concentration indices, although it is recalled here that the quarters in which inequity was influenced by the moratorium plans – which benefited women more than men – were omitted from the analysis.

The controversy surrounding the mostly contributory design of the system and the inability of the labour market to ensure full employment under formal conditions has been present since the inception of the pension system, not only in Argentina, but also in most Latin American countries. Several authors have pointed out this inconsistency: where the labour market is unable to absorb the labour supply under formal conditions, the pension system will be unable to ensure universal coverage of the elderly from purely contributory sources. Similarly, the consequent increase in non-contributory sources of financing can affect the distributive performance of the system, at least if one overlooks the progressivity or regressivity of taxation in relation to income.

The pension system faces a historic challenge in all Latin American countries where labour informality is a serious problem: how to finance universal coverage in view of the fact that its largely contributory design requires optimum performance of the labour market for it to be effective.

Bibliography

- ANSES. 2011. *Análisis de la cobertura previsional del SIPA: protección, inclusión e igualdad*. Buenos Aires, Administración Nacional de la Seguridad Social – Observatorio de la Seguridad Social.

- Arza, C. 2006. “Distributional impacts of pension policy in Argentina: Winners and losers within and across generations”, in *International Social Security Review*, Vol. 59, No. 3.
- Arza, C. 2012. “Extending coverage under the Argentinian pension system: Distribution of access and prospects for universal coverage”, in *International Social Security Review*, Vol. 65, No. 2.
- Bertranou, F. 2011. “Sistema previsional y equidad”, in M. Novick, and S. Villafañe, *Distribución del ingreso: enfoques y políticas públicas desde el Sur*. Buenos Aires, United Nations Development Programme, and Ministerio de Trabajo, Empleo y Seguridad Social.
- Bertranou, F.; Bonari, D. (eds). 2005. *Protección social en Argentina: Financiamiento, cobertura y desempeño, 1990-2003*. Santiago de Chile, International Labour Office.
- Bertranou, F.; Grushka, C.; Rofman, R. 2001. “Evolución reciente de la cobertura previsional en Argentina”, in F. Bertranou (ed.), *Cobertura previsional en Argentina, Brasil y Chile*. Santiago, Oficina Internacional del Trabajo.
- Bertranou, F.; Maurizio, R. (eds). 2011. *Trabajadores independientes, mercado laboral e informalidad en Argentina*. Buenos Aires, Oficina Internacional del Trabajo.
- Bertranou, F.; Rofman, R.; Grushka, C. 2003. “From reform to crisis: Argentina’s pension system”, in *International Social Security Review*, Vol. 56, No. 2.
- Casali, P.; Bertranou, F. 2007. *Los trabajadores independientes y la seguridad social* (Serie de Publicaciones de la Secretaría de Seguridad Social, Año 4, No. IV). Buenos Aires, Ministerio de Trabajo, Empleo y Seguridad Social.
- D’Elia, V. 2013. “Changes in pension inequality: A decomposition analysis of Argentina, 1995–2009”, in *Latin America Journal of Economics*, Vol. 50, No. 1.
- D’Elia, V. 2016. “The PAYG system and the optimal redistribution instrument in an overlapping generation model”, in *International Social Security Review*, Vol. 69, No. 2.
- Feldman, J.; Golbert, L.; Isuani, E. 1986. “Maduración y crisis del sistema previsional argentino”, in *Boletín Informativo Techint*, No. 240.
- Iacobuzio, A. 2014. *Previsión social en Argentina desde 2003* (Nota técnica, No. 83). Buenos Aires, Secretaría de Política Económica y Planificación del Desarrollo.
- Isuani, E. A. 1985. “Universalización de la seguridad social en América Latina: límites estructurales y cambios necesarios”, in *Desarrollo Económico*, Vol. 25, No. 97.
- Makdissi, P.; Yazbeck, M. 2016. “Avoiding blindness to health status in health achievement and health inequality measurement”, in *Social Science and Medicine*, Vol. 171.
- Mesa-Lago, C. 1978. *Social security in Latin America: Pressure groups, stratification and inequality*. Pittsburgh, PA, University of Pittsburgh Press.
- Mesa-Lago, C. 2008. *Reassembling social security: A survey of pensions and health care reforms in Latin America*. Oxford, Oxford University Press.
- Rofman, R. 2001. “The new pension system in Argentina: Experiences and lessons”, in *The Geneva Papers on Risk and Insurance*, Vol. 26, No. 4.
- Rofman, R.; Apella, I.; Vezza, E. 2015. “Expanding economic protection to the elderly in Latin America”, in *International Social Security Review*, Vol. 68, No. 1.

- Rofman, R.; Lucchetti, L. ; Ourens, G. 2008. *Pension systems in Latin America: Concepts and measurement of coverage* (Social protection discussion paper, No. 0616). Washington, DC, World Bank.
- Rofman, R.; Oliveri, M. L. 2011. *Las políticas de protección social y su impacto en la distribución del ingreso en la Argentina* (Documentos de trabajo sobre políticas sociales, No. 6). Washington, DC, World Bank.
- Wagstaff, A.; Doorslaer, E. van; Watanabea, N. 2003. “On decomposing the causes of health sector inequalities with an application to malnutrition inequalities in Vietnam”, in *Journal of Econometrics*, Vol. 112, No. 1.
- World Bank. 1994. *Averting the old age crisis: Policies to protect the old and promote growth*. Washington, DC, Oxford University Press.

Appendix

Table A1. *Wagstaff concentration indices their decomposition*

Active population (1994–2017)											
t	μ	A (v)	C (v, ω)	C (v,r)	$\eta_{sex}C_{sex}$	$\eta_{age}C_{age}$	$\eta_{sei}C_{sei}$	$\eta_{sec}C_{sec}$	$\eta_{uni}C_{uni}$	$\eta_{unc}C_{unc}$	
t5_1994	0.60	0.55	0.08	0.07	-0.0047	0.0041	-0.0029	0.0099	0.0069	0.0222	
t10_1994	0.62	0.57	0.09	0.06	-0.0042	0.0039	-0.0025	0.0071	0.0083	0.0224	
t5_1995	0.60	0.54	0.10	0.08	-0.0050	0.0045	-0.0024	0.0071	0.0064	0.0223	
t10_1995	0.58	0.50	0.13	0.10	-0.0050	0.0056	-0.0029	0.0090	0.0086	0.0283	
t5_1996	0.57	0.53	0.08	0.10	-0.0055	0.0058	-0.0027	0.0098	0.0081	0.0261	
t10_1996	0.55	0.50	0.08	0.10	-0.0045	0.0060	-0.0024	0.0095	0.0078	0.0261	
t5_1997	0.54	0.49	0.09	0.10	-0.0051	0.0067	-0.0030	0.0097	0.0093	0.0298	
t10_1997	0.53	0.48	0.11	0.11	-0.0049	0.0066	-0.0034	0.0095	0.0110	0.0311	
t5_1998	0.51	0.46	0.09	0.10	-0.0058	0.0081	-0.0040	0.0068	0.0128	0.0305	
t10_1998	0.52	0.46	0.11	0.12	-0.0052	0.0078	-0.0042	0.0076	0.0129	0.0332	
t5_1999	0.51	0.45	0.12	0.12	-0.0056	0.0079	-0.0041	0.0102	0.0127	0.0350	
t10_1999	0.51	0.45	0.12	0.12	-0.0051	0.0083	-0.0033	0.0079	0.0136	0.0337	
t5_2000	0.52	0.45	0.14	0.13	-0.0052	0.0083	-0.0040	0.0085	0.0136	0.0380	
t10_2000	0.50	0.43	0.13	0.14	-0.0045	0.0101	-0.0042	0.0080	0.0127	0.0400	
t5_2001	0.52	0.44	0.15	0.13	-0.0046	0.0081	-0.0047	0.0086	0.0130	0.0372	
t10_2001	0.50	0.41	0.17	0.13	-0.0032	0.0078	-0.0039	0.0084	0.0117	0.0360	

(Continued)

Table A1. *Wagstaff concentration indices their decomposition* - Continued

Active population (1994–2017)										
t	μ	A (v)	C (v, ω)	C (v, r_1)	$\eta_{sex}C_{sex}$	$\eta_{age}C_{age}$	$\eta_{sei}C_{sei}$	$\eta_{sec}C_{sec}$	$\eta_{uni}C_{uni}$	$\eta_{unc}C_{unc}$
t5_2002	0.50	0.40	0.20	0.14	-0.0022	0.0071	-0.0039	0.0067	0.0121	0.0395
t10_2002	0.45	0.35	0.22	0.18	0.0007	0.0134	-0.0047	0.0127	0.0145	0.0472
t5_2003	0.44	0.35	0.21	0.19	0.0006	0.0128	-0.0049	0.0108	0.0149	0.0464
t303	0.49	0.39	0.21	0.28	-0.0014	0.0210	-0.0085	0.0061	0.0244	0.0892
t403	0.48	0.39	0.19	0.28	-0.0004	0.0184	-0.0075	0.0063	0.0254	0.0843
t104	0.48	0.39	0.20	0.29	0.0004	0.0191	-0.0075	0.0079	0.0234	0.0839
t204	0.50	0.40	0.21	0.28	-0.0007	0.0180	-0.0089	0.0062	0.0212	0.0867
t304	0.51	0.40	0.21	0.29	-0.0010	0.0191	-0.0086	0.0054	0.0233	0.0886
t404	0.50	0.41	0.18	0.27	-0.0011	0.0167	-0.0083	0.0065	0.0234	0.0887
t105	0.51	0.41	0.20	0.28	0.0001	0.0192	-0.0067	0.0070	0.0210	0.0819
t205	0.53	0.42	0.20	0.26	-0.0010	0.0178	-0.0068	0.0041	0.0244	0.0784
t305	0.53	0.42	0.21	0.27	-0.0018	0.0160	-0.0091	0.0054	0.0226	0.0867
t405	0.53	0.43	0.20	0.27	-0.0004	0.0142	-0.0070	0.0052	0.0227	0.0863
t106	0.55	0.43	0.21	0.27	-0.0007	0.0163	-0.0076	0.0046	0.0217	0.0773
t206	0.56	0.44	0.21	0.24	-0.0014	0.0165	-0.0066	0.0038	0.0230	0.0757
t306	0.57	0.45	0.21	0.25	-0.0017	0.0149	-0.0072	0.0068	0.0183	0.0689
t406	0.59	0.48	0.20	0.22	-0.0022	0.0132	-0.0064	0.0037	0.0158	0.0688
t107	0.59	0.47	0.20	0.23	-0.0002	0.0128	-0.0061	0.0041	0.0157	0.0648
t207	0.60	0.48	0.19	0.22	-0.0019	0.0147	-0.0059	0.0031	0.0152	0.0638
t407	0.61	0.50	0.18	0.21	-0.0019	0.0121	-0.0061	0.0033	0.0136	0.0634
t108	0.62	0.50	0.19	0.21	-0.0016	0.0129	-0.0057	0.0024	0.0120	0.0620
t208	0.62	0.51	0.18	0.20	-0.0032	0.0116	-0.0061	0.0002	0.0139	0.0611
t308	0.62	0.50	0.19	0.22	-0.0015	0.0128	-0.0069	0.0050	0.0119	0.0602
t408	0.64	0.53	0.17	0.19	-0.0014	0.0141	-0.0062	0.0017	0.0128	0.0606
t109	0.63	0.53	0.17	0.20	-0.0015	0.0129	-0.0057	0.0018	0.0121	0.0627
t209	0.63	0.52	0.17	0.20	-0.0025	0.0109	-0.0062	0.0010	0.0135	0.0655
t309	0.64	0.52	0.19	0.20	-0.0017	0.0118	-0.0067	0.0028	0.0119	0.0621
t409	0.64	0.53	0.17	0.19	-0.0013	0.0126	-0.0065	0.0036	0.0135	0.0574
t110	0.64	0.54	0.16	0.19	-0.0014	0.0130	-0.0063	0.0027	0.0117	0.0589

(Continued)

Table A1. *Wagstaff concentration indices their decomposition - Continued*

Active population (1994–2017)										
t	μ	A (v)	C (v, ω)	C (v,r)	$\eta_{sex}C_{sex}$	$\eta_{age}C_{age}$	$\eta_{sei}C_{sei}$	$\eta_{sec}C_{sec}$	$\eta_{uni}C_{uni}$	$\eta_{unc}C_{unc}$
t210	0.64	0.53	0.17	0.19	-0.0021	0.0130	-0.0051	0.0004	0.0122	0.0614
t310	0.65	0.53	0.18	0.20	-0.0022	0.0141	-0.0046	0.0010	0.0115	0.0605
t410	0.66	0.55	0.16	0.18	-0.0023	0.0128	-0.0053	-0.0005	0.0122	0.0590
t111	0.66	0.55	0.16	0.18	-0.0017	0.0128	-0.0067	0.0005	0.0122	0.0589
t211	0.66	0.56	0.16	0.18	-0.0017	0.0115	-0.0066	0.0006	0.0112	0.0617
t311	0.66	0.55	0.17	0.18	-0.0018	0.0146	-0.0044	0.0007	0.0095	0.0564
t411	0.67	0.55	0.17	0.17	-0.0018	0.0117	-0.0038	0.0005	0.0097	0.0552
t112	0.67	0.56	0.17	0.18	-0.0019	0.0121	-0.0052	0.0006	0.0106	0.0538
t212	0.66	0.55	0.16	0.18	-0.0017	0.0122	-0.0050	0.0002	0.0113	0.0562
t312	0.65	0.54	0.17	0.19	-0.0012	0.0126	-0.0055	-0.0004	0.0117	0.0569
t412	0.66	0.56	0.16	0.17	-0.0012	0.0111	-0.0047	0.0006	0.0091	0.0558
t113	0.66	0.56	0.16	0.18	-0.0012	0.0120	-0.0045	0.0009	0.0102	0.0530
t213	0.66	0.55	0.16	0.17	-0.0020	0.0135	-0.0058	0.0003	0.0102	0.0547
t313	0.66	0.55	0.17	0.18	-0.0016	0.0149	-0.0039	-0.0006	0.0097	0.0553
t413	0.67	0.56	0.17	0.17	-0.0008	0.0122	-0.0050	-0.0015	0.0118	0.0563
t114	0.67	0.56	0.17	0.17	-0.0012	0.0131	-0.0051	0.0006	0.0112	0.0528
t214	0.67	0.55	0.18	0.18	-0.0016	0.0128	-0.0052	-0.0004	0.0103	0.0574
t314	0.67	0.54	0.19	0.19	-0.0013	0.0143	-0.0063	-0.0018	0.0107	0.0601
t414	0.66	0.54	0.18	0.18	-0.0014	0.0153	-0.0042	-0.0030	0.0102	0.0576
t115	0.67	0.55	0.18	0.18	-0.0013	0.0151	-0.0045	-0.0033	0.0113	0.0547
t215	0.69	0.56	0.18	0.17	-0.0010	0.0131	-0.0053	-0.0019	0.0112	0.0558
t216	0.67	0.58	0.13	0.08	0.0000	0.0071	-0.0024	-0.0005	0.0038	0.0240
t316	0.67	0.56	0.17	0.09	-0.0001	0.0077	-0.0012	0.0009	0.0033	0.0242
t416	0.67	0.58	0.14	0.09	-0.0006	0.0078	-0.0020	-0.0006	0.0052	0.0247
t117	0.67	0.56	0.16	0.08	-0.0003	0.0081	-0.0019	-0.0006	0.0041	0.0218
t217	0.67	0.57	0.15	0.09	-0.0002	0.0092	-0.0020	-0.0004	0.0043	0.0267
t317	0.67	0.56	0.16	0.10	-0.0003	0.0102	-0.0023	-0.0006	0.0042	0.0272
t417	0.67	0.58	0.14	0.10	-0.0001	0.0101	-0.0023	-0.0021	0.0037	0.0286

Note: sei = incomplete secondary education; sec = completed secondary education; uni = incomplete university education; unc = completed university education.

Source: Authors' calculations, based on the detailed (1994–2003) and continuous EPH (2003–2017).

All the variables were significant at 1% in the OLS models estimated in the 19 years and 54 quarters. The sample of active population varied between 13,479 individuals and 26,010. In 9 out of the 71 estimated OLS models, predicted values less than zero were obtained, although all of them were lower than 1% of the sample. In 59 of the 73 estimated models, predicted values higher than 1 were obtained, although all of them were lower than 7% of the sample. The correlation between the values predicted by linear models and those predicted by probit models was greater than 99% in the 73 cases.

Table A2. *Wagstaff concentration indices their decomposition*

Inactive population (1994–2017)										
t	μ	A (v)	C (v, ω)	C (v, η)	$\eta_{sex}C_{sex}$	$\eta_{age}C_{age}$	$\eta_{sei}C_{sei}$	$\eta_{sec}C_{sec}$	$\eta_{uni}C_{uni}$	$\eta_{unc}C_{unc}$
t5_1994	0.66	0.63	0.04	0.05	-0.0018	-0.0020	0.0003	0.0080	0.0006	0.0023
t10_1994	0.67	0.65	0.04	0.06	-0.0015	-0.0002	-0.0002	0.0072	-0.0002	0.0013
t5_1995	0.66	0.62	0.05	0.06	-0.0018	0.0000	0.0001	0.0066	-0.0002	0.0017
t10_1995	0.66	0.62	0.06	0.06	-0.0011	-0.0005	0.0002	0.0069	0.0001	0.0013
t5_1996	0.67	0.64	0.04	0.06	-0.0004	-0.0010	0.0002	0.0064	0.0003	0.0015
t10_1996	0.66	0.64	0.04	0.07	-0.0003	-0.0015	0.0003	0.0063	0.0004	0.0030
t5_1997	0.65	0.62	0.04	0.07	-0.0005	0.0004	0.0007	0.0064	0.0001	0.0021
t10_1997	0.65	0.62	0.04	0.07	-0.0008	-0.0023	0.0005	0.0076	0.0002	0.0030
t5_1998	0.65	0.63	0.04	0.05	-0.0002	-0.0011	0.0002	0.0069	0.0000	0.0022
t10_1998	0.65	0.62	0.04	0.06	-0.0008	-0.0023	0.0001	0.0085	0.0004	0.0023
t5_1999	0.64	0.61	0.06	0.07	-0.0004	0.0033	0.0004	0.0083	0.0011	0.0017
t10_1999	0.64	0.60	0.05	0.07	-0.0009	0.0023	0.0004	0.0065	0.0002	0.0015
t5_2000	0.63	0.59	0.07	0.06	-0.0006	0.0024	0.0005	0.0057	0.0003	0.0026
t10_2000	0.62	0.58	0.07	0.08	-0.0010	0.0023	0.0008	0.0073	-0.0004	0.0015
t5_2001	0.62	0.57	0.08	0.08	-0.0008	0.0009	0.0000	0.0078	0.0003	0.0026
t10_2001	0.62	0.56	0.10	0.08	-0.0005	0.0078	0.0000	0.0068	0.0006	0.0022
t5_2002	0.61	0.53	0.13	0.10	-0.0006	0.0067	0.0003	0.0073	0.0001	0.0012
t10_2002	0.61	0.54	0.12	0.09	-0.0001	0.0042	0.0001	0.0067	0.0000	0.0026
t5_2003	0.62	0.55	0.11	0.08	-0.0001	0.0049	0.0002	0.0069	-0.0003	0.0028
t303	0.59	0.53	0.10	0.09	0.0002	0.0041	0.0001	0.0046	0.0009	0.0059
t403	0.57	0.51	0.11	0.09	-0.0002	0.0065	0.0005	0.0061	-0.0001	0.0023
t104	0.58	0.51	0.11	0.09	-0.0004	0.0119	0.0009	0.0082	0.0003	0.0052

(Continued)

Table A2. *Wagstaff concentration indices their decomposition - Continued*

Inactive population (1994–2017)										
t	μ	A (v)	C (v, ω)	C (v,r)	$\eta_{sex}C_{sex}$	$\eta_{age}C_{age}$	$\eta_{sei}C_{sei}$	$\eta_{sec}C_{sec}$	$\eta_{uni}C_{uni}$	$\eta_{unc}C_{unc}$
t204	0.57	0.51	0.11	0.04	-0.0005	-0.0035	0.0002	0.0070	0.0007	0.0063
t304	0.57	0.50	0.12	0.09	-0.0007	0.0087	0.0005	0.0067	0.0010	0.0069
t404	0.58	0.51	0.12	0.09	-0.0008	0.0125	-0.0001	0.0048	0.0000	0.0073
t105	0.57	0.49	0.14	0.10	-0.0005	0.0142	0.0000	0.0072	0.0002	0.0078
t205	0.55	0.49	0.11	0.08	-0.0004	0.0094	0.0002	0.0084	0.0000	0.0051
t305	0.57	0.50	0.13	0.09	-0.0011	0.0066	0.0001	0.0056	-0.0007	0.0086
t405	0.59	0.52	0.11	0.08	-0.0009	0.0149	-0.0002	0.0053	-0.0001	0.0061
t106	0.59	0.53	0.10	0.08	-0.0010	0.0087	0.0000	0.0086	0.0007	0.0031
t206	0.57	0.51	0.10	0.09	-0.0009	0.0122	0.0001	0.0093	0.0004	0.0078
t306	0.58	0.51	0.12	0.08	-0.0006	0.0091	0.0001	0.0072	0.0009	0.0064
t406	0.60	0.55	0.08	0.06	-0.0002	0.0075	0.0002	0.0040	0.0002	0.0039
t107	0.66	0.60	0.09	0.04	-0.0002	0.0039	0.0001	0.0027	-0.0003	-0.0005
t207	0.70	0.65	0.07	0.03	0.0002	0.0043	0.0000	0.0020	-0.0013	0.0015
t407	0.71	0.68	0.04	0.01	0.0002	0.0032	-0.0002	0.0003	-0.0007	-0.0005
t108	0.75	0.71	0.05	0.01	0.0003	0.0018	-0.0001	0.0014	-0.0006	-0.0039
t208	0.74	0.72	0.03	0.00	0.0004	0.0015	-0.0002	0.0007	-0.0011	-0.0033
t308	0.75	0.72	0.03	0.00	0.0000	0.0029	-0.0001	0.0002	-0.0006	-0.0032
t408	0.75	0.73	0.02	-0.01	0.0002	0.0015	-0.0001	0.0003	-0.0008	-0.0033
t109	0.75	0.74	0.01	-0.01	0.0001	0.0005	-0.0001	0.0004	-0.0004	-0.0028
t209	0.75	0.73	0.02	-0.01	-0.0001	0.0017	-0.0001	0.0002	-0.0010	-0.0064
t309	0.76	0.75	0.02	-0.01	-0.0001	0.0014	0.0000	0.0001	-0.0009	-0.0069
t409	0.76	0.76	0.01	-0.02	0.0000	-0.0007	0.0000	-0.0001	-0.0007	-0.0061
t110	0.77	0.76	0.01	-0.01	0.0001	0.0027	-0.0001	0.0003	-0.0006	-0.0047
t210	0.76	0.76	0.00	-0.03	0.0000	0.0001	0.0000	0.0000	-0.0009	-0.0062
t310	0.77	0.77	0.00	-0.02	-0.0002	-0.0006	0.0000	-0.0012	-0.0012	-0.0065
t410	0.77	0.77	0.00	-0.02	-0.0001	-0.0011	0.0000	-0.0006	-0.0007	-0.0077
t111	0.78	0.76	0.02	-0.01	0.0001	0.0018	-0.0001	0.0000	-0.0011	-0.0058
t211	0.77	0.76	0.01	-0.02	-0.0001	0.0020	-0.0002	-0.0005	-0.0006	-0.0069
t311	0.77	0.75	0.02	-0.01	0.0001	0.0027	0.0000	-0.0019	-0.0006	-0.0061

(Continued)

Table A2. *Wagstaff concentration indices their decomposition - Continued*

Inactive population (1994–2017)										
t	μ	A (v)	C (v, ω)	C (v,r)	$\eta_{sex}C_{sex}$	$\eta_{age}C_{age}$	$\eta_{sei}C_{sei}$	$\eta_{sec}C_{sec}$	$\eta_{uni}C_{uni}$	$\eta_{unc}C_{unc}$
t411	0.78	0.77	0.01	-0.02	-0.0002	0.0015	0.0000	-0.0011	-0.0001	-0.0059
t112	0.78	0.75	0.04	0.00	0.0000	0.0019	0.0001	-0.0010	-0.0004	-0.0037
t212	0.77	0.74	0.03	-0.01	0.0001	0.0047	0.0000	-0.0008	-0.0011	-0.0048
t312	0.77	0.73	0.05	0.00	0.0001	0.0043	0.0000	0.0006	-0.0006	-0.0031
t412	0.77	0.74	0.04	-0.01	0.0000	0.0063	0.0000	-0.0004	-0.0007	-0.0044
t113	0.78	0.75	0.03	-0.01	0.0002	0.0043	0.0001	-0.0006	-0.0005	-0.0068
t213	0.77	0.73	0.04	0.00	0.0002	0.0049	0.0000	0.0002	-0.0007	-0.0051
t313	0.76	0.70	0.07	0.01	-0.0001	0.0079	0.0000	0.0001	-0.0007	-0.0035
t413	0.76	0.71	0.06	0.00	-0.0001	0.0071	0.0000	-0.0003	-0.0005	-0.0043
t114	0.76	0.71	0.06	0.00	0.0000	0.0073	0.0002	-0.0006	-0.0006	-0.0036
t214	0.76	0.71	0.06	0.00	0.0000	0.0050	-0.0001	-0.0004	-0.0011	-0.0049
t314	0.76	0.70	0.07	0.00	0.0001	0.0086	0.0000	0.0000	-0.0009	-0.0039
t414	0.74	0.71	0.05	0.00	-0.0003	0.0056	0.0002	0.0002	-0.0010	-0.0045
t115	0.77	0.72	0.06	0.00	0.0000	0.0059	0.0000	-0.0005	-0.0007	-0.0054
t215	0.79	0.75	0.04	-0.01	0.0001	0.0033	0.0001	-0.0003	-0.0012	-0.0076
t216	0.79	0.80	-0.01	0.02	-0.0003	0.0061	-0.0001	-0.0003	-0.0004	-0.0030
t316	0.79	0.80	-0.01	0.01	0.0000	0.0033	0.0000	-0.0003	-0.0004	-0.0030
t416	0.79	0.81	-0.02	0.02	0.0000	0.0033	0.0000	-0.0002	-0.0003	-0.0025
t117	0.80	0.80	0.00	0.01	-0.0001	0.0056	-0.0001	-0.0003	-0.0009	-0.0024
t217	0.80	0.80	0.00	0.01	-0.0001	0.0051	-0.0001	-0.0004	-0.0007	-0.0031
t317	0.79	0.79	0.00	0.02	0.0001	0.0041	-0.0001	-0.0002	-0.0005	-0.0028
t417	0.78	0.80	-0.03	0.01	-0.0002	0.0049	-0.0001	-0.0003	-0.0005	-0.0027

Note: sei = incomplete secondary education; sec = completed secondary education; uni = incomplete university education; unc = completed university education.

Source: Author's own calculations based on the detailed (1994–2003) and continuous EPH (2003–2017).

The values in bold indicate that the beta coefficients involved in the calculation of the elasticities were not significant in the linear models. In the rest of the cases, all were significant, at 1, 5, or 10%. In none of the 73 estimated linear models were predicted values lower than zero, but were all higher than 1, although all of them were lower than 12% of the sample. The correlation between the values predicted by linear models and those predicted by probit models was greater than 99% in the 73 cases.

The impact of international migration on the public pension system: The case of Portugal

*José Alves**, *Daniela Craveiro**,
*Maria Teresa Medeiros Garcia*** and *Paula Albuquerque**

*Universidade de Lisboa, Portugal;

**Lisbon School of Economics and Management, Portugal

Abstract This article analyses the impact of replacement migration on the financial sustainability of the old-age pension system in Portugal, a country with one of the largest ageing populations in Europe. We do this using demographic forecasts and prospective exercises for the evolution of the Portuguese economy. During the 2015–2060 period, our results evidence the positive impacts of international migration on old-age pension system financial balances, reaching over 3 per cent of GDP after 2045. Moreover, even when taking into considering the low dynamics for the Portuguese economy, replacement migration is an important input to improve pension system financial sustainability.

107

Addresses for correspondence: José Alves, ISEG – Lisbon School of Economics and Management, Universidade de Lisboa, Rua do Quelhas 6, 1200-781 Lisbon, Portugal; email: jose.borges.alves@gmail.com (Corresponding author). Daniela Craveiro, Research in Social Sciences & Management (SOCIUS/CSG), Portugal; email: daniela.craveiro@gmail.com. Maria Teresa Medeiros Garcia, ISEG – Lisbon School of Economics and Management, Rua do Quelhas 6, 1200-781 Lisbon, Portugal; email: mtgarcia@iseg.utl.pt. Paula Albuquerque, ISEG – Lisbon School of Economics and Management, Rua do Quelhas 6, 1200-781 Lisbon, Portugal; email: pcma@iseg.ulisboa.pt.

José Alves is also affiliated with REM – Research in Economics and Mathematics, UECE, University of Lisbon. Daniela Craveiro is also affiliated with Centre for Psychological Research and Social Intervention (CIS-IUL), ISCTE-University Institute of Lisbon. Maria Teresa Garcia is also affiliated with the Research Unit on Complexity and Economics, UECE, Universidade de Lisboa. Paula Albuquerque is also affiliated with the Research Centre in Economic and Organizational Sociology (SOCIUS), Research in Social Sciences and Management (CSG), Universidade de Lisboa.

UECE is financially supported by Fundação para a Ciência e a Tecnologia, through the strategic project UID/ECO/00436/2013.

Keywords migrant worker, social security financing, pension scheme, Portugal

Introduction

The ageing demography of contemporaneous societies represents one important challenge to the sustainability of public pension systems in Europe. Most of these systems incorporate pay-as-you-go (PAYG) schemes, meaning that present workers' future pension benefits are supported by the working contributions of future generations. Therefore, as the pensioner/worker ratio decreases due to population ageing, this places the financial balance of public pension systems under increasing pressure (OECD, 2017). In addition to parametric reforms, migration constitutes one further possible pathway to mitigate the effects of population ageing on the financial stability of such systems, as migrant flows tend to present younger age-structures than found in the migrant receiving countries. While this argument has been a focus of discussion for decades, only a few empirical studies have sought to assess the role of migration in the financial sustainability of public pension systems.

This article evaluates the impact of migration on the financial position of the Portuguese public pension system, focusing specifically on the old-age pension scheme. This takes into consideration factors such as trends in economic growth, productivity and labour market qualifications between 2015 and 2060, according to three different scenarios and by comparing the pension system financial balance with and without the migration input complementing the natural growth of the population resident in Portugal. This study forms part of a wider research project (Peixoto et al., 2017) based on the concept of replacement migration, here defined as the migration inputs necessary to address labour market demands in each scenario (UN-DESA, 2000).

The replacement migration approach gained visibility in the literature after the publication of a United Nations report (UN-DESA, 2000) in which the migration volumes required to mitigate the effects of an ageing demography were estimated in an international perspective. The exercise was executed with regard to three demographic aims: (i) maintain the size of the total population, (ii) maintain the size of the working-age population (15 to 64 years), and (iii) maintain the potential elderly support ratio (ratio between the working-age population and the population aged 65 or older). Even if the first two goals could be attained in general with net migration volumes similar to previous inputs, the potential support ratio could only be maintained by extraordinarily high migration inputs, alerting to the inevitability of the progression of the demographic ageing process.

Since 2000, replacement migration studies have been applied in other contexts (e.g. Sączuk, 2013 for a review). More recently, researchers have extended this approach from a strictly demographic perspective, assessing the interplay of these estimates with economic variables or scenarios (e.g. Bijak, Kupiszewska and Kupiszewski, 2008; Peixoto et al., 2017).

The approach adopted in our article combines both demographic and economic hypotheses, thus gaining the advantage of articulating multiple methodological approaches. For the definition of the baseline demographic projections, we took estimates from the national statistical institute (Statistics Portugal)¹ on mortality and fertility. We then applied the cohort component method to project the evolution in pension system contributor and recipient numbers. The Input-Output (IO) method generated different economic scenarios based on hypotheses driven by historical trends and the results of a Delphi study. Assuming all these premises and additional hypotheses regarding trends in the employment rate, medium salary, contribution rate, and earnings-retirement replacement rate, we estimated the evolution of the old-age pension scheme receipts and expenses with and without replacement migration.

The article contains five sections. In the following, we set out an overview of the recent literature on the impact of migration on pension system financial sustainability. We then offer a brief description of the Portuguese public pension system before establishing and explaining the hypotheses about the pension system's expenses and receipts. In turn, we present our results and the concluding discussion.

Migration impact on pension system sustainability

Over the last 15 years, the number of international migrants worldwide has grown rapidly, with about a third of these people coming to live in European countries from other parts of the globe (UN-DESA, 2015). Only a few studies have assessed the kinds of impacts these influxes of people are expected to have on fiscal systems and pension systems in receiving countries.

Razin and Sadka (1999, 2000) demonstrated how migrants benefit the pension system, estimating their contributions and benefits across the life course before concluding that their contributions as workers exceeds their benefits as retirees. Subsequently, Casarico and Devillanova (2003) concluded that the financial impact of immigrant arrivals in a PAYG system is not only positive but helps alleviate the financial stress of public pension systems.

1. See <www.ine.pt/xportal/xmain?xpgid=ine_main&xpid=INE>.

Preston (2014) provides a thorough conceptual survey about the impact of immigration on public finances, pointing out the complexities of developing a full understanding and the relevance of indirect effects, while covering both static perspectives and longer run dynamic issues.

Projections based on panel data studies reach similar conclusions. Lee and Miller (2000) calculated the longitudinal fiscal impacts of an annual increase in net immigration in the United States (100,000 additional immigrants annually since 1998). Their approach demonstrates how the fiscal impact of migration is positive overall, despite being initially negative before turning positive after a couple of decades. Specifically considering the pension system, the actuarial balance of the country's Old-Age, Survivors, and Disability Insurance reflects an improvement deriving from the increase in migration over a time line of 75 years (by +0.06 per cent).

Bongaarts (2004) approaches the topic through recourse to the demographic, labour force, and pension system projections of the seven largest economies among Member countries of the Organisation for Economic Co-operation and Development (OECD) (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States). This study compares public pension expenditure projections in different demographic and political scenarios to a baseline projecting the demographic trends to report an increase in the expected expenditure ratio in all countries, especially European states. One scenario considers the implications of a rise in 2.5 net migrants per one thousand people. Under this "higher migration variant" hypothesis, the results indicate that, in general, an increase in the annual net migration rate of one per one thousand population drives a decrease in pension expenditure of 5 per cent (Bongaarts, 2004).

More broadly, Gil-Alonso (2009) studies the impacts of the immigrant flow on social security systems in 27 European Union Member States (EU-27) for the years 2008 to 2050, projecting demographic, economic, and policy trends. Again, the results suggest that migration, in conjunction with other economic policy measures, would mitigate the challenging financial situation of social security systems in migrant receiving countries.

Also, the OECD's *International migration outlook 2013* (OECD, 2013) presents a comparative analysis of the fiscal impact of immigration, by comparing the net fiscal contributions (contributions minus transfers) of immigrant and native-born populations. Contrary to a more general trend across OECD countries, in Portugal (and in other Southern European countries), immigrants were shown to be in a less positive position than the native-born population, suggesting a more positive contribution to the overall system (OECD, 2013).

In the case of Portugal, and assessing the social security impact of immigrants between 2002 and 2010, Peixoto, Marçalo and Tolentino (2011) conclude that, in financial terms, the new entries to the system have resulted in a positive net

balance. Additionally, this study indicates that a flow of permanent immigration would be beneficial and desirable for the social security accounting balance. Santos and Fabián (2012) addressed the topic by estimating the net migration values needed to: (i) maintain the (old-age) population dependency ratio at 25 per cent; and (ii) balance the old-age pension subsystem contributions and expenditures through to 2050. They conclude that the influx required to provide stability in the dependency ratio in Portugal would also lead to highly positive finance balances in the old-age pensions system, but would require net migration figures to reach numbers too high to be plausible (9 million in 2025 and 702 million in 2050). The migration needed to contribute towards balancing out contributions and expenditures, however, comes in at a much lower level. The authors estimate that 0.1 million immigrants in 2025 and 1.9 million in 2050 would ensure a balance between contributions and expenditures.

More recently, Han (2013), applying cross-country time-series data from 1981 to 2009 for 14 European countries, concludes that the inflow of migrant workers prevents pension benefit retrenchment, government pension spending cuts, and private pension expansion. The results suggest that immigration can both attenuate the financial pressures on public pensions in Europe and generate more financial resources.

Although most such studies refer to the positive overall impacts of migration on the financial soundness of public pension systems, the literature also presents certain caveats. A first consideration is that the size of any effects remains relatively small, on average not greater than 1 per cent of any country's GDP (Coleman and Rowthorn, 2011; Lee and Miller, 2000). The migration effect may even be lower or disappear entirely when economies lack good access to international markets (Razin and Sadka, 2000). Inconsistency in the positive impacts is another dimension that requires attention. Migration tends to follow economic development and growth in employment. Therefore, during periods of economic downturn levels of immigration will decline, precisely when contributions are needed most to pay for pensions and benefits (Blake and Mayhew, 2006). The study by Casarico and Devillanova (2003) also interrelates migration with redistributive conflicts, given that its potential implications include generating differentiated redistributive flows among residents. Other considerations put forward in the literature warn of the challenges arising from cultural tensions, integrating migrants into the labour market as well as a possible mismatch of immigrant qualifications and the economic needs of receiving countries. These arguments underline the generally accepted position in the field: migration may contribute to the financial sustainability of public pension systems, but migration policy should form part of comprehensive reforms that address demographic, economic and political responses.

The Portuguese public pension system

The Portuguese public benefits system, within the social security system, guarantees cash benefits that serve as a replacement for working income lost in case of illness; maternity, paternity and adoption; unemployment; accidents at work and occupational diseases; disability; old age; and death. It is a self-financed system, based on the principle of professional-based solidarities with a direct relationship between the legal obligation to contribute and the right to benefits. Participation in the system is mandatory for all workers in the country and the contributory obligations of employers date from the beginning of employees exercising professional activities in their service. Presently, the global contribution rate stands at 34.75 per cent of earnings, split between employers (23.75 per cent) and employees (11.00 per cent) in the general regime. The old-age pension contribution rate represents the largest proportion of this global rate (20.21 per cent of earnings).

Following studies that identified weaknesses in the financial sustainability of the pension benefits subsystem (Silva, Calado and Garcia, 2004), there were recommendations that additional steps should be taken to reform the system, in particular to reinforce the pension reserve fund. Garcia and Lopes (2009) correspondingly analyse the impact of various types of reform options on pension system financial sustainability as well as on a range of macroeconomic variables. Their work considered the effects of parametric reforms to the existing PAYG system as well as the effect of a systemic reform with the implementation of a fully funded system. They concluded that the former were sufficient to ensure social security financial sustainability, even if this also required the implementation of proactive employment measures. Therefore, they suggest the elimination of early retirement schemes – even though this triggers an increase in both the employment and the unemployment rates – and an increase in the effective contribution rate. While some deterioration in overall economic performance is incurred, the combination of these two parametric reforms result in a consistent improvement in the financial sustainability of the pension system as well as in economic growth. Additionally, the mobilization of the pension reserve fund also delays the system insolvency date, revealing the importance of a mixed pension system (Feldstein, 2001). The transition from the existing PAYG system to a funded system does not however seem to provide a solution.

After 2007, there were rises in the normal retirement age in Portugal, interlinked with population longevity increases coupled with the introduction of a “sustainability factor” into the calculation of the pension benefit value, which penalises the pension earnings of those who retire prior to the normal retirement age (Garcia, 2017). Old-age pension benefits are calculated by multiplying three factors: the earnings reference, the record of years of contribution (up to a maximum of 40), and the sustainability factor. The earnings reference accounts

for the average income throughout the entire career, but with the values calculated according to different modalities among present pensioners due to system reforms and other variants introduced into the system. The introduction of the sustainability factor served to calibrate the retirement age with gains in population longevity and to penalise early retirement. This results from the ratio between average life expectancy at age 65 in 2000 and the average life expectancy at age 65 recorded in the year of retirement.

In 2015, the official retirement age was age 66. Nevertheless, the average age of retirement was much lower, standing at 63.1 years of age in the same year (data from ISS/MTSSS, PORDATA).²

Assuming this general architecture, the 2015 *Ageing report* (EC, 2015) estimated that Portugal had a gross earnings–retirement replacement rate of around 55.5 per cent of the final salary in 2015. This rate may not be as low as in some other European countries; nevertheless, in terms of salary levels in Portugal this generates situations of great vulnerability among the elderly. In 2015, the average annual old-age pension value was EUR 5,002.70, resulting in a monthly income of less than EUR 415 (ISS/MTSSS, PORDATA; see footnote 2).

Methodology

Our analysis involves comparing the financial balances of the old-age public pension system with and without human resource constraints to meet the labour demand of the Portuguese economy – that is, with or without replacement migration inputs. We thus calculated the financial balances according to different scenarios defined by the respectively different economic and demographic premises, which enable estimations of the system's revenues and expenditures. The following sections set out the key assumptions and methodological steps in (i) defining the scenarios and (ii) estimating the financial balances. We applied several steps to define the scenarios under analysis.

Demographic assumptions

The first methodological stage approaches the projections for the resident population (total volume and composition by age and sex), between 2015 and 2060, solely as a function of the expected natural movements (fertility and mortality rates). Data from the national statistical institute (Statistics Portugal) on the resident population by age and sex, for 31 December 2014, served as the baseline population. We applied the cohort component method, for each year coupling the population by age and sex with specific fertility rates and mortality

2. See <www.pordata.pt/Portugal>.

Table 1. *Fertility and life expectancy assumptions*

Indicators	2015	2030	2040	2045	2060
Total fertility	1.23	1.34	1.41	1.45	1.55
Average life expectancy					
Women	83.7	86.1	87.5	88.2	89.9
Men	77.7	80.2	81.7	82.3	84.2

Source: Table 1 of *Statistical Yearbook of Portugal 2014*; see footnote 3.

ratios for the period between 2015 and 2060, assuming the evolution of fertility and expected life expectancy as forecast in the prospective central scenarios set out by the Portuguese national statistical institute.³ The key demographic premises are presented in Table 1.

We then estimated the migration volumes necessary to meet the needs of the labour force across three economic scenarios, explained in the next section. This takes into consideration the concept of “replacement migration”, defined here as the migration volumes needed to ensure the size of the working-age population meets the needs prevailing in the respective scenario. Considering the employment volume projected in three economic scenarios, the working-age population required in each scenario between 2015 and 2060 was estimated by applying European Commission projections of the employment rate for the population between ages 15 and 64. The European Commission projects the employment rate to rise from 63.9 per cent in 2015 to 69.6 per cent in 2060 (EC, 2015).

We once again apply the cohort component method, coupling the age- and gender-specific fertility and mortality rates in the population in each year to determine the demographic outcome in the following year, to which is then added the migrant component needed in each year to complement the demographic projection of the expected working-age population without migrants.

We furthermore defined another set of assumptions for the migrant population to enable the estimation calculations. For the sake of simplicity, this assumes that the migrant population was balanced in terms of gender, presented fertility and mortality rates similar to those in the resident population, and displayed an age structure similar to those migrants entering Portugal in the last decade (Census data 2001 and 2011).⁴ This age structure reflects a typical case for migrant movements, greatly concentrated in young working ages and with a second cluster related to retirement-age groups (Rogers, Little and Raymer, 2010). This means we assess the actual implications of migration inputs to the resident population,

3. See Table 1 of *Statistical Yearbook of Portugal 2014*

4. For census data, see Statistics Portugal <www.ine.pt>.

considering not only the working-age population but also younger (younger than age 15) and older age groups (older than age 64) that also make up the migration fluxes.

Economic assumptions

For the purposes of comparative analysis, we hypothesized three economic scenarios for the Portuguese economy for the period between 2015 and 2060: High, Low, and Historic.

The High and Low scenarios for both the GDP and productivity variables were based on a Delphi study, which surveyed a group of Portuguese economic specialists about the long-run trajectories for GDP, sectoral and regional productivity rates, sectoral and regional labour market dynamics, as well as educational attainment levels through to 2060 for both the sectoral and regional dimensions.⁵ We opted for this type of methodology given the scarcity of long-run economic projections for the Portuguese economy. The scenarios put forward by these experts were congruent with more and less optimistic short-term prospective estimates provided by official bodies, such as the International Monetary Fund (IMF, 2017) or the Bank of Portugal (2015).⁶ Based on the surveyed specialists' answers, we employed an Input-Output (IO) approach to compute employment levels for the 2015–2060 period with the latest available national tables produced by Statistics Portugal⁷ serving as the baseline. In turn, the High scenario reflects annual GDP and productivity growth rates of 2.5 per cent and 2.0 per cent, respectively; the Low scenario holds these figures at 0.75 per cent and 1.0 per cent, respectively.

For the Historic scenario, the annual growth rates for GDP and for productivity equal the average historic values recorded in the 1977–2014 period, i.e. annual average GDP and productivity growth rates of 2.2 per cent and 1.9 per cent, respectively.

We assessed the impact of replacement migration by comparing the financial balances resulting from these three scenarios versus restrictions on replacement migration. This therefore considers three alternative scenarios (High*, Low*, and Historic*), by maintaining the same hypotheses for GDP and for productivity but assuming evolution in the demographic component constrained by the natural demographic growth rate. Thus, this limits the volume of the employed

5. $N=12$. For reasons of parsimony, the Delphi survey results are not detailed here. However, they are available from the authors upon request.

6. For Portugal, the International Monetary Fund (IMF, 2017) estimated a positive annual real growth rate of around 1 per cent between 2016 and 2020. In turn, the Bank of Portugal (2015) forecast a GDP growth rate that would reach 2.0 per cent in 2017.

7. The aforementioned national production tables are available at www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_cnacionais2010&contexto=ra&selTab=tab1&perfil=220675104&INST=220618790.

Table 2. *GDP and employment projections between 2015 and 2060*

Scenarios		High	High*	Low	Low*	Historic	Historic*
Baseline	GDP	156,021	156,020	156,021	156,020	156,021	156,020
	Employment	4,316	4,316	4,316	4,316	4,316	4,316
2030	GDP	225,965	191,404	174,525	165,108	216,574	187,452
	Employment	4,644	3,934	4,158	3,934	4,545	3,934
2045	GDP	327,264	211,926	195,224	157,696	300,629	203,266
	Employment	4,998	3,236	4,006	3,236	4,786	3,236
2060	GDP	473,976	249,111	218,378	159,899	417,306	234,000
	Employment	5,378	2,827	3,860	2,827	5,041	2,827

Note: The GDP and employment values are expressed in millions and in thousands, respectively.

Source: Authors' calculations.

population estimated to the resident population projection without any entry or exit of population (no migration scenario). Consequently, although the hypothesis for the economic variables remains the same, the size of GDP becomes lower in these latter scenarios.

In the IO models, the supply side of an economy is determined by the demand for goods and services and, at the same time, by deeming all components of final demand to be exogenous with the exception of the private consumption of residents. Our model is annual, static and derives from simultaneous determination (Tcheremnykh, 2009). The choice of this kind of model holds the advantage of considering the differentiating effects of demand according to sector (see Dias and Lopes, 2009). Table 2 presents the results of the GDP and employment projections through to 2060 based on the IO model.

Old-age pension system assumptions

Following the demographic and economic scenarios, we also established a set of assumptions to evaluate the financial impact both of replacement migration across the different scenarios proposed (the High, Low, Historic scenarios) and of restricting this replacement migration (the High*, Low*, Historic* scenarios).

In terms of the revenue side of the old-age pension system, we included only 58.16 per cent of the benefit system's total revenue. In addition, we calculated the effective 2015 contribution rate⁸ (22.91 per cent) and took this as the base value for the growth rate assumed for the period through to 2060. Hence, we

8. The effective contribution rate is the ratio between the contribution value and the salaries value.

assumed the effective contribution rate grows from 22.91 per cent in 2015 up to 30.00 per cent in 2060. We incorporated this rising dynamic as we expect collection gains during this period stemming from coercion efficiencies in social security contribution collection. Nevertheless, we set a theoretical ceiling at 30 per cent, a value below the legal level. We do this to consider both the multiplicity of contributory regimes (the 34.1 per cent rate applies to the general regime, but that does not include all workers) and the difficulties in ensuring the full efficiency of the contribution system.

To estimate revenues, we multiplied the average salary by 58.16 per cent of the effective contribution rate. Considering the demographic forecasts and economic projections for GDP, we computed the average salary by worker. However, for the salary calculations, we accepted two alternative hypotheses. The first (hypothesis 1) is that the percentage share of GDP generated by salaries in 2015 (34.1 per cent, according to Statistics Portugal data), remains unchanged until 2060. The second (hypothesis 2) is that the dynamic of the percentage share of GDP generated by salaries between 2015 and 2060 evolves in keeping with the trend in the GDP share of salaries between 1995 and 2015, i.e. a negative annual growth rate of 0.5 per cent.

Table 3. *Summary of revenues hypotheses, 2015–2060*

	2015	2030	2045	2060
Average global social security contribution rate (per cent)	23.41	30.00	30.00	30.00
Average global old-age pension system contribution rate	13.61	17.45	17.45	17.45
Hypothesis 1				
Share of GDP generated by salaries (per cent)	34.1	34.1	34.1	34.1
Salaries by worker:				
High	12.329	16.592	22.330	30.053
Low	12.329	14.312	16.616	19.291
Historic	12.329	16.249	21.418	28.230
Hypothesis 2				
Share of GDP generated by salaries (per cent)	34.1	31.6	29.3	27.2
Salaries by worker:				
High	12.329	15.389	19.209	23.979
Low	12.329	13.274	14.294	15.391
Historic	12.329	15.071	18.424	22.524

Source: Statistics Portugal and authors' calculations.

In Table 3, we summarize our hypothesis regarding the revenue side of the social security financial balances for the old-age pension system. We highlight how the average salaries remain the same for the scenarios with and without replacement migration (thus, comparing High and High*, Low and Low*, Historic and Historic*). This result is verified through attributing the same growth rates for GDP and productivity levels for the analogous scenarios accepting or restricting replacement migration. Therefore, the differences between scenarios including or excluding migration actually correspond to the size of GDP. In this sense, when setting out a scenario in Table 3, it makes no difference referencing whether or not this scenario allows for the replacement migration hypothesis.

Regarding the expenditure side, we considered the population numbers aged 65+ and an average value for the old-age pension. To account for the singularities of the Portuguese social security system, we multiply the size of the elderly population by 98.9 per cent and 99.5 per cent, in 2015 and 2020 respectively, in order to include only the population aged 65+ who receive an old-age pension benefit from the system. In addition, we estimated social security expenditures based on the effective replacement rate (the ratio between the last salary and the pension benefit), the average salary, and the entrance of people into the age 65+ age group for each period. We furthermore assumed three hypotheses for the effective replacement rate: one adopting the European Commission (EC, 2015) data projections for this variable (see Table 4); another considering the value as constant and equal to 50 per cent during the overall period under analysis, and a final hypothesis assuming a constant 30 per cent value for the same period.

Arising out of the combination of these assumptions is a set of four cases that differ in the definition of their premises for revenues and expenditures, as set out below:

- Case I: The salary share of GDP remains constant at the 2015 value (Table 3, hypothesis 1), while the effective replacement rate follows the European Commission projections (EC, 2015).
- Case II: The salary share of GDP evolves in keeping with the trend observed for this item between 1995 and 2015 (Table 3, hypothesis 2), while the effective replacement rate follows the European Commission projections (Table 4) (EC, 2015).

Table 4. *Projections for the effective replacement rate, 2015–2060*

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Effective replacement rate	55.5	50.7	44.8	43.2	38.8	36.1	39.0	35.2	31.8	30.7

Source: European Commission (2015).

- Case III: The salary share of GDP remains constant at the 2015 value (Table 3, hypothesis 1), while the effective replacement rate equals 50 per cent over the 2015–2060 period.
- Case IV: The salary share of GDP evolves in keeping with the trend observed for this item between 1995 and 2015 (Table 3, hypothesis 2), while the effective replacement rate equals 50 per cent over the 2015–2060 period.

Finally, to calculate the respective forecast outcomes, we combined these scenarios into the financial balances for the old-age pension system with those frameworks established for high, low, and historic economic growth rates with replacement migration (High, Low, or Historic) and without replacement migration (High*, Low*, or Historic*). For reasons of parsimony, we present detailed results for one case only (Case 1) that represents a middle scenario from among all the cases. Cases II – IV are presented as sensitivity tests to the assumptions made in case 1.

Empirical analysis

Demographic projections

The first set of results stems from the demographic projections. We start with the demographic projections based on natural growth before calculating the projections for the net replacement migration levels required by the different outlooks for economic growth, and finally, with the demographic projections resulting from the addition of those migrant volumes across time.

Table 5 displays the projections for the final analysis of the null migration scenario. Without migration, the working-age population is forecast to decrease by about 40 per cent, from almost 7 million people in 2015 to around 4 million in 2060, which reflects a potential loss of over 1.4 million employed people in the same period. In turn, the older population is predicted to increase in this

Table 5. *Population projections without any migration component, in thousands, 2015–2060 (thousands)*

Population groups	2015	2030	2045	2060
Working age	6,779	5,979	4,780	4,061
Older age	2,105	2,688	3,165	2,925
Employed	4,316	3,934	3,236	2,827

Note. Working age: aged 15–64. Older age: age 65+. Employed: Employed rate*Working-age population.

Source: Authors' calculations.

period, with its relative importance in the total population rising from 20 per cent to 37 per cent.

We calculated the replacement migration estimations in accordance with the employment generated by low, high and historic economic growth levels without any population ageing restrictions (Table 6). As referred to above, migrant inflows complement the natural growth in the resident population and ensure the total number of working-age people associated with each economic scenario, as derived from the application of the employment rate projections for the working-age population. The scenario of a high economic growth rate would demand average total annual net migration of around 100,000 people, close to the historical growth rate scenario (90,000). Furthermore, average net annual migration between 2015 and 2060 of 41,000 thousand migrants would satisfy the labour force requirements of a low economic growth rate scenario in Portugal.

The addition of this migrant component to meet labour needs generated by economic growth would account for important demographic transformations.

Table 6. Replacement migration by economic growth scenario, 2015–2060

Economic growth	2015–2030	2031–2045	2046–2060	2015–2060
High	91.0	124.1	94.7	103.3
Low	28.9	65.6	28.2	40.9
Historic	78.3	111.0	79.0	89.4

Note: The results represent average annual net migration in thousands.

Source: Authors' calculations.

Table 7. Population projections for replacement migration additions, 2015–2060 (thousands)

Economic growth		2015	2030	2045	2060
High	Working age	6,779	7,058	7,382	7,727
	Older age	2,105	2,822	3,613	3,921
	Employment	4,316	4,644	4,998	5,378
Low	Working age	6,779	6,319	5,918	5,546
	Older age	2,105	2,726	3,344	3,306
	Employed	4,316	4,158	4,006	3,860
Historic	Working age	6,779	3,907	7,070	7,242
	Older age	2,105	2,803	3,556	3,789
	Employed	4,316	4,545	4,786	5,041

Note: Working age: aged 15–64. Older age: aged 65+. Employed: Employed rate*Working-age population.

Source: Authors' calculations.

Table 7 presents the population projections when accepting replacement migration in accordance with each economic scenario. The high and historic economic growth rate scenarios would require the arrival of 4.6 and 4.0 million migrants over 45 years, respectively. In the former case, the working-age population would increase to 7.727 million people, and the retired population to 3.921 million. Under the historic economic rate scenario, the totals of the working-age population rises to 7.272 million and of retirees to 3.789 million in 2060. Furthermore, the low economic rate growth scenario would need an additional 1.8 million migrants to complement the natural growth in the resident population, an addition that would still not prevent the working-age population dropping to 5.546 million people in 2060.

Old-age pension system financial balance projections

The financial balance results focus on the differences between the comparable scenarios that accept (High, Low, Historic) or restrict (High*, Low*, Historic*) replacement migration inputs to account for the expected labour force demand (comparing High with High*, Low with Low*, Historic with Historic*).

Table 8 presents the estimations of revenues, expenditures and balances of the public old-age pension system, based on the premises of case I. The estimates of the financial balances for this case are negative throughout the entire estimated period in the scenarios with high, low, and historic economic growth, and with and without migration. We note that these estimations do not imply a negative balance in the over-all Portuguese social security system. The estimations concern the old-age pension account only, and are simultaneously both quite conservative as regards revenues and overvalued as regards expenditures.⁹

Based on the demographic and economic projections as well as the methodology applied to compute both revenues and expenditures for old-age pensions, our results suggest that in the scenarios without migration the financial balances turn more negative, irrespective of the assumed economic growth rate – High, Low, Historic. More specifically, the difference between each scenario, with and

9. We only estimate revenues corresponding to the contributions made by workers and employers, and not to other types of system revenue. In terms of expenditures, the set of simplifications in the estimates exacerbate the annual amounts paid out. For example, we factor in that all people aged 65+ receive an old-age pension without any penalty, when the normal age of access to the old-age pension varies according to the trend in average life expectancy at age 65. For reasons of simplification, we implicitly accept that all old-age pensioners in 2015 receive the same pension amount, yet many entered retirement in previous years with lower average-value pensions. Another aspect that overestimates pension expenditure is that we consider that all immigrant individuals who enter the age 65+ age group receive an old-age pension. However, only workers who fulfil the guarantee period are eligible to receive an old-age pension under the general scheme.

Table 8. *Economic and financial results for old-age pension social security system, 2015–2060 (Case I)*

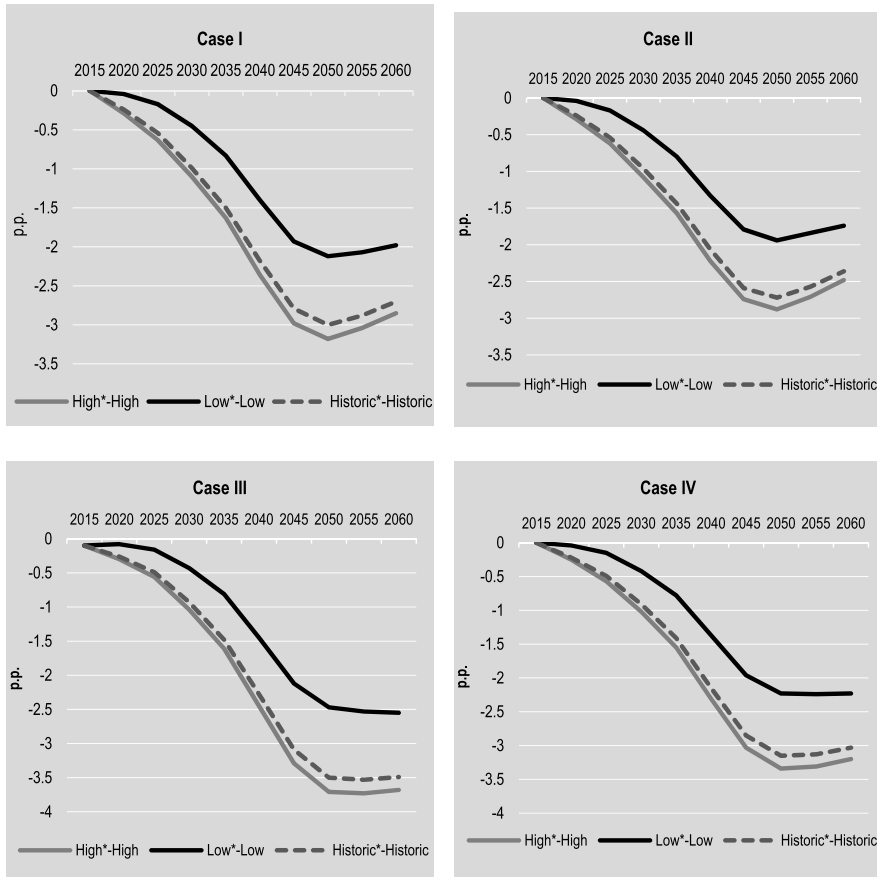
	<i>With replacement migrations</i>				<i>Without replacement migration</i>				
	Baseline	2030	2045	2060	Baseline	2030	2045	2060	
Revenues (in millions of 2015 euros)									
High	7,243	13,444	19,471	28,200	High*	7,243	11,388	12,609	14,822
Low	7,243	10,384	11,615	12,993	Low*	7,243	9,824	9,383	9,514
Historic	7,243	12,886	17,887	24,829	Historic*	7,243	11,153	12,094	13,922
Expenditures (in millions of 2015 euros)									
High	14,592	20,074	27,793	32,945	High*	14,592	19,109	24,298	24,411
Low	14,592	18,53	21,833	20,636	Low*	14,592	18,276	20,679	18,284
Historic	14,592	19,804	26,716	30,492	Historic*	14,592	18,987	23,742	23,425
Financial balance (in millions of 2015 euros)									
High	-7,349	-6,630	-8,321	-4,745	High*	-7,349	-7,721	-11,689	-9,589
Low	-7,349	-8,146	-10,217	-7,643	Low*	-7,349	-8,453	-11,296	-8,770
Historic	-7,349	-6,918	-8,829	-5,663	Historic*	-7,349	-7,834	-11,648	-9,503
Per cent of GDP									
High	-4.71	-2.93	-2.54	-1.00	High*	-4.71	-4.03	-5.52	-3.85
Low	-4.71	-4.67	-5.23	-3.50	Low*	-4.71	-5.12	-7.16	-5.48
Historic	-4.71	-3.19	-2.94	-1.36	Historic*	-4.71	-4.18	-5.73	-4.06
Difference in the financial balances between the with and without replacement migration hypotheses (in p.p.)									
	2020	2025	2030	2035	2040	2045	2050	2055	2060
High-High*	-0.29	-0.63	-1.1	-1.63	-2.36	-2.98	-3.18	-3.04	-2.85
Low-Low*	-0.04	-0.17	-0.45	-0.83	-1.4	-1.93	-2.12	-2.07	-1.98
Historic*-Historic*	-0.24	-0.54	-0.99	-1.5	-2.18	-2.79	-3.00	-2.88	-2.70

Source: Authors' calculations.

without replacement migration, jeopardizes the financial balance by about 3 percentage points (p.p.) in some periods.

Similar conclusions derive from the projections based on the alternative assumptions taken in estimating revenues and balances (Cases II–IV). Figure 1 shows the results for the differences between the fiscal balances with (High, Low, Historic) and without the replacement migration (High*, Low*, Historic*) scenarios, in percentage points (p.p.), for cases I to IV. In all cases, the financial

Figure 1. Financial balance net effects with and without replacement migration, based on alternative assumptions (Case I–IV) in GDP p.p., 2015–2060.



Note: High, Low, Historic = with replacement migration; High*, Low*, Historic* = without replacement migration.

Source: Authors' calculations.

balances in the scenarios allowing for no migration are lower (more negative) than the financial balances involving replacement migration. Two other trends remain consistent across these cases: (i) the absence of replacement migration emerges as more damaging in the scenarios involving higher growth rates and (ii) the damaging impact of the absence of replacement migration increases in the first three decades and tends to stabilize after 2050.

Only minor differences arise out of the alternative ways of computing the financial balances (Cases I–IV).

When we analyse the results regarding case II, the impact of the absence of migration is substantially lower than in case I, as this is partially compensated for

by the positive growth in the GDP rate due to the salaries paid under this scenario, favouring increases on the revenue side.

The case III projections are very similar to those of case I given these scenarios differ only in the predicted evolution of the effective replacement rate. Case III accepts a more favourable trend regarding retirees (converting to 50 per cent), which correspondingly imposes higher expenditure on the pension system. Regarding this scenario, we may conclude that the Low scenario incurs the lowest impact from the imposition of employment restrictions. Nevertheless, the High and Historic scenarios present some improvements in their balances, albeit to a very small extent, at the end of the period for our forecasting exercise (see Figure 1, Case III graph). The same effective replacement rate applies in case IV, while nevertheless assuming an increase in the share of GDP paid in salaries, resulting in the lesser impact of employment restrictions when compared to the results for case III.

Conclusions

This article presents an assessment of the impacts of migration on the financial outcomes of the Portuguese old-age pension scheme. This study integrates a wider research project focusing on integrating demographic, economic and social policy dimensions into prospective estimations. We operationally implement the replacement migration concept in order to interlink these dimensions in an integrative approach backed by different methodologies (the cohort component method, a Delphi study, input-output models, linear projections).

Throughout the present article, we have analysed the impact that replacement migratory movement restrictions might incur for the Portuguese old-age pension system's revenues and expenditures.

We consider not only the implications of migrant population social security contributions (assuming an employment rate similar to that of the resident population) but also the implications for expenditures related to the old-age pension (on reaching age 65). Our findings indicate that the entry of replacement migrants would make a positive contribution to the balancing of the system as opposed to what might occur were restrictions imposed, i.e. with the economy drawing only on its natural dynamics and without any immigration. Furthermore, this remains the case even under the condition that all migrants receive an old-age pension when reaching age 65 (which is only possible after satisfying the minimum qualification period of 15 years of social security contributions). On a more general basis, we conclude that the influx of immigrants – coupled with reduced emigration – not only serves to improve the functioning of the economy, ensure its need for labour, but also contributes to the financial equilibrium of the old-age pension system. These results validate

those reported in previous studies (e.g. Razin and Sadka, 1999; Casarico and Devillanova, 2003; Lee and Miller, 2000; Peixoto, Marçalo and Tolentino, 2011).

It is important to underline that the exercises carried out within the framework of this study do not provide forward-looking statements on the evolution of old-age pensions through to 2060. Rather, they act as an analytical tool intended to demonstrate the importance of demographic changes and to analyse the impacts of those changes on the financial balances of the old-age social security subsystem.

Analysis of these results must also take into account the magnitude of the replacement migration values involved. The amount of employment generated by the historic and high economic growth scenarios would require a much higher migration input than the historical maximums registered in Portugal around the first decade of this millennium. The realization of these scenarios correspondingly depends on the country's ability to attract foreign populations to live in Portugal, to ensure good levels of migrant labour integration, and to manage any eventual diversity-related cultural and political conflicts.

We may highlight three key limitations to our study that require addressing in future research. The first concerns the set of simplifications introduced into the model to estimate expenditures and revenues (see footnote 9). Better operationalization of the complexity of the social security system would aid in better understanding migrant worker impacts on the old-age pension system. Another issue of keen interest to this topic concerns assessing the migration implications for other components of the social security system other than the old-age pension subsystem (sickness, maternity, paternity and adoption, unemployment, accidents at work and occupational diseases, disability, and survival benefits). This falls beyond the scope of this study, but we consider this poses an important gap in the literature otherwise addressed only by a few studies in the field (e.g. Lee and Miller, 2000). Different economic scenarios place different pressures on social security subsystems that are important to consider within the overall evaluation of migration impacts on the social security system. Finally, taking into account the implications of different migrant profiles might improve the analysis of the impacts of migration on these systems. In our exercise, we assume that migrant natural growth rates (fertility, mortality) and economic behaviour (employment) are the same as for the resident population. Studying the consequences of differences in migrant population profiles may well provide a clearer overview on the real impact of migration on the social policies of receiving countries.

Nevertheless, by focusing on the key demographic and economic trends, we have addressed the implications of migration for the social security system in an integrative manner, which is seldom done in the literature. Comparing equivalent economic scenarios with and without human resource constraints –

i.e. whether or not replacement migration takes place – demonstrates the positive contributions of migration to the financial sustainability of Portugal's social security old-age pension system. This exercise also highlights the importance of integrating the demographic and economic dimensions. The old-age pension system financial balances and the impacts of migration vary in accordance with the economic scenario applied (high, low or historic economic growth) as well as with the extent of old-age protection provided as expressed by the increases in the percentage of salaries retained for pension payments or the return rate between salaries and retirement (Cases I–IV). Accounting for the interplay between these dimensions is crucial to analyse and measure the sensitivity of the pension system to population dynamics. This furthermore constitutes a valuable contribution to the discussion on pension system financial sustainability in the context of ageing populations to be explored in future research.

Bibliography

- Bank of Portugal.** 2015. *Projeções para a economia portuguesa: 2015–2017*. Lisbon.
- Bijak, J.; Kupiszewska, D.; Kupiszewski, M.** 2008. “Replacement migration revisited: Simulations of the effects of selected population and labor market strategies for the aging Europe, 2002–2052”, in *Population Research and Policy Review*, Vol. 27, No. 3.
- Blake, D.; Mayhew, L.** 2006. “On the sustainability of the UK State pension system in the light of population ageing and declining fertility”, in *The Economic Journal*, Vol. 116, No. 512.
- Bongaarts, J.** 2004. “Population aging and the rising cost of public pensions”, in *Population and Development Review*, Vol. 30, No. 1.
- Casarico, A.; Devillanova, C.** 2003. “Social security and migration with endogenous skill upgrading”, in *Journal of Public Economics*, Vol. 87, No. 3–4.
- Coleman, D.; Rowthorn, R.** 2011. “Who's afraid of population decline? A critical examination of its consequences”, in *Population and Development Review*, Vol. 37, No. 2.
- Dias, A.; Lopes, E.** 2009. *A multisectoral model for Portugal with a multiregional extension* (Conference paper, 17th International Input-Output Conference, São Paulo, 13–17 July). Lisbon.
- EC.** 2015. *The 2015 ageing report: Economic and budgetary projections for the 28 EU Member States (2013–2060)* (European economy, No. 3/2015). Brussels, European Commission – Directorate-General for Economic and Financial Affairs.
- Feldstein, M. S.** 2001. *The future of social security pensions in Europe* (NBER working paper, No. 8487). Cambridge, MA, National Bureau of Economic Research.

- Garcia, M. T. M.** 2017. "Overview of the Portuguese three pillar pension system", in *International Advances in Economic Research*, Vol. 23, No. 2.
- Garcia, M. T. M.; Lopes, E. G.** 2009. "Macro-economic impact of reforming a PAYG system: The Portuguese case", in *International Social Security Review*, Vol. 62, No. 1.
- Gil-Alonso, F.** 2009. "Can the rising pension burden in Europe be mitigated by immigration? Modelling the effects of selected demographic and socio-economic factors on ageing in the European Union, 2008–2050", in *Vienna Yearbook of Population Research*, Vol. 7.
- Han, K. J.** 2013. "Saving public pensions: Labor migration effects on pension systems in European countries", in *Social Science Journal*, Vol. 50, No. 2.
- IMF.** 2017. *Short-term recovery, long-term challenges: Seeking sustainable growth* (World Economic Outlook, October). Washington, DC, International Monetary Fund.
- Lee, R.; Miller, T.** 2000. "Immigration, social security, and broader fiscal impact", in *The American Economic Review*, Vol. 90, No. 2.
- OECD.** 2013. *International migration outlook 2013*. Paris, Organisation for Economic Co-operation and Development.
- OECD.** 2017. *Pensions at a glance 2017: OECD and G20 indicators*. Paris, Organisation for Economic Co-operation and Development.
- Peixoto, J. et al. (eds).** 2017. *Migrações e sustentabilidade demográfica*. Lisboa, Fundação Francisco Manuel Dos Santos.
- Peixoto, J.; Marçalo, C.; Tolentino, N. (eds).** 2011. *Imigrantes e segurança social em Portugal* (Estudios OI, No. 49). Lisbon, Observatório da Imigração.
- Preston, I.** 2014. "The effect of immigration on public finances", in *The Economic Journal*, Vol. 124, No. 580.
- Razin, A.; Sadka, E.** 1999. "Migration and pension with international capital mobility", in *Journal of Public Economics*, Vol. 74, No. 1.
- Razin, A.; Sadka, E.** 2000. "Unskilled migration: A burden or a boon for the welfare state?", in *Scandinavian Journal of Economics*, Vol. 102, No. 3.
- Rogers, A.; Little, J.; Raymer, J.** 2010. *The indirect estimation of migration: Methods for dealing with irregular, inadequate, and missing data*. London, Springer.
- Saczuk, K.** 2013. "Development and critique of the concept of replacement migration", in M. Kupiszewski (ed.), *International migration and the future of populations and labour force resources in Europe*. London, Springer.
- Santos, T. C. S. M. dos; Fabián, I. D.** 2012. *Immigration and pension system in Portugal* (Working paper, No. 84). Leiria, globADVANTAGE – Center of Research in International Business & Strategy.
- Silva, C. M. P. da; Calado, J. P. T.; Garcia, M. T. M.** 2004. "The financial sustainability of the Portuguese social security system", in *The Geneva Papers on Risk and Insurance*, Vol. 29, No. 3.
- Tcheremnykh, I. N.** 2009. "Input output models", in V. V. Tokarev and V. N. Livchits (eds), *Systems analysis and modeling of integrated world systems: Vol. 2*. Paris, UNESCO–EOLSS.

The impact of international migration on Portugal's public pension system

UN-DESA. 2000. *Replacement migration: Is it a solution to declining and ageing populations?*
New York, NY, United Nations Population Division – Department of Economic and Social Affairs.

UN-DESA. 2015. *Trends in international migration, 2015* (Population facts, No. 2015/4).
New York, NY, United Nations Population Division – Department of Economic and Social Affairs.

BOOK REVIEW

Greve, Bent. **Technology and the future of work – The impact on labour markets and welfare states**. Cheltenham, Edward Elgar, 2017, 153 pp. ISBN 978-1-78643-428-9.

The past decades have witnessed major gradual changes in labour markets, demography, society, the economy, public finances and new technologies. These changes have created new demands on welfare states – their ongoing restructuring in response to these changes have challenged the capacity of public finances and the role of the State, often resulting in the weaker protection of employees. The pace, scope, conjunction and relative importance of these factors differ over time and among welfare states.

Bent Greve's book focuses on changes in the labour market as a result of technological change and how these affect welfare states and societies, especially among advanced economies. His main concern is the viability of welfare states and their capacity to sustain groups in society that need support, failing which, the social divide will increase, adversely affecting the way in which societies function. Although the complexity of the concerns associated with the possible pressures on welfare spending of demographic ageing have been subject to an ongoing debate this concern has now been by-passed by a much greater challenge. The main concern of this book is the expected impact of new technology on job losses/creation and the quality of jobs, on the population's capacity to produce and consume goods compared to past experience, and the impact of these changes on the viability and effectiveness of welfare states.

The ten chapters deal successively with: the current challenges of the introduction of new technologies for European labour markets and welfare states (Chapter 1), what is new in "new technology"? (Chapter 2), the present and future pressures of technological change on labour markets and welfare states (Chapter 3), the importance of the growing "sharing/platform" economy (Chapter 4), the risks of an expanding dual labour market (Chapter 5), do these developments lead to the end of labour market organizations? (Chapter 6), to what extent are welfare states prepared to address the new technology "tsunami"? (Chapter 7), the growing impact of inequality (Chapter 8), will new types of jobs change recent migration trends? (Chapter 9), will these developments lead towards cohesive or divided societies? (Chapter 10).

The author asserts from the outset that the book cannot cover all the aspects of new technologies and their possible global impact on labour markets, welfare states and societies. It thus focuses mainly on Europe and selected EU countries, large and small countries in Northern, Eastern, Western and Southern Europe (plus the United States), covering classical welfare regimes and the diversity in their development. It attempts to reflect on the overall impact of new technology on labour market restructuring, notably on various professions, employment contracts, labour market organizations, and work-family life balance – especially in the context of rising precarious job status (associated

with low income, uncertain working hours and little or no social protection). These reflections help the author to assess, first, how these ongoing and expected changes will affect different kinds of welfare states (i.e. whether they will exert greater pressure on the more universal welfare states versus the Liberal and Continental ones), and, second, which of these two major social institutions (welfare states and labour markets) are more prepared to cope with the changes.

The author notes that the adverse changes induced by new technology have been aggravated by the global financial crisis, which resulted in widening the incidence of precarious jobs across the EU-28 and which concerns: (i) people in both voluntary and involuntary temporary jobs who are exposed to the risk of long gaps between jobs and a weaker position in the labour market; (ii) part-timers, some of whom are under-employed part-time workers, and the working poor; and (iii) declining employment of low-skilled people, rising unemployment in the wake of the financial crisis, and fewer hours of work for the self-employed; all of which indicate growing inequality and social division.

This leads the author to consider the technologically induced risk of unemployment, citing the history back to Gutenberg and the Luddites, and showing that this risk has always existed, while attempts to block it always failed. Across the advanced economies some forecasters have already announced dramatic scenarios of massive job losses within a decade or two. Yet, these forecasts appear to be based on questionable methodologies and outcomes. New technologies will no doubt also create new jobs, but no study has so far been able to show that job creation will compensate job losses, let alone create more new jobs. In any event, the introduction of new information and communication technologies (ICT) will produce major changes in the quantity and quality of jobs – and, no less so, changes in every area of society.

It is therefore important to use the potential of ICT for developing new types of production and services, associated with new types of jobs, besides (and necessarily) providing appropriate life-long skills training. Arguably, beyond the number of jobs, it is essential to focus on work status and working conditions in these jobs, to ensure the effective use of, and to benefit from, ICT. Indeed, the latter have brought new forms of employment, associated with the so-called “sharing-”, “collaborative-” or “platform-” economy (both for profit and not for profit), which have far-reaching social and economic implications for the labour market and the welfare state. These forms of “employment” include employee-sharing, job-sharing, casual work, voucher-based work. ICT enables the development of new market platforms to sell goods and services. Such activities imply that only those willing to provide work for the lowest pay will get “jobs”, or being self-employed, earning money by sharing what they own (e.g. flats, cars, or other durable goods that can be rented or otherwise shared) or offering/delivering various services. Such ill-defined status implies a more precarious and unstable social and economic situation, which reduces household income and puts workers at risk of poverty and social exclusion.

Indeed, significant changes have already taken place in the labour market, making the position of many workers weaker. Many working in the “sharing/platform economy” are deprived of employment protection and social security coverage, besides not figuring in unemployment statistics, making it more difficult to assess the actual size of the official workforce and the level of unemployment, while economic activity is not fully reflected in GDP. The sharing/platform economy therefore raises new and important policy issues, such as the definition of “work”, “workers” and the assessment of income adequacy and social protection coverage gaps. Another major concern is that platform companies do not pay taxes and duties, increasing the likelihood of expanding the informal

economy, and creating serious problems for welfare policy planning and the funding of social protection, especially for employees with precarious (or no) job security (especially the self-employed) who have no guaranteed minimum income and have no retirement savings or limited access to health care.

As welfare states adapt to changes in the economy, and to societal and labour market structures, coverage of various risks becomes a central issue, while simultaneously benefits are being reduced and stricter public budget controls have been introduced. This takes place as the welfare state adapts to long-term demands associated with demographic ageing, longer periods of pension coverage, as well as increasing demands for long-term care. These rising concerns coincide with the continuing weakening of labour market institutions, notably trade unions and of collective bargaining, which leave the labour force less protected. At the same time, growing international economic interdependence reduces governments' ability, especially in small EU countries, to pursue independent economic policies, limiting their capacity to structure and extend the tax system that would enable them to collect the necessary funds for welfare adequacy and ensure guaranteed minimum income for those temporarily or permanently outside the labour market. While most welfare states include such protection in various forms, they are not a guarantee against the risk of poverty. This leaves open the question of how to deal with the sharing/platform economy, how it should be regulated, and how its operation could be improved to address these social and economic shortcomings (for example via new types of regulations and social protection, to guarantee social rights and effective social protection, including the possible introduction of a guaranteed minimum income for people who are temporarily or permanently outside the labour market). A brief mention is made of the advantages and drawbacks of a guaranteed minimum (basic) income for labour market participants or for citizens. While such guarantees exist in several countries, it is not a guarantee against the risk of poverty, while it hardly provides a decent living standard for those outside the labour market. So there is a clear need to consider this issue. The author briefly mentions the current experiment of universal basic income in Finland, which will test its potential for enabling beneficiaries to re-enter the labour market.

To the question of whether welfare states are prepared to address the challenges posed by ICT, the author replies negatively. Given that welfare states are financed by general taxation and social security contributions, the expansion of the platform economy and non-standard jobs and self-employment will erode the tax base on which welfare funding depends. As part of the response, a type of a guaranteed minimum income could be associated with new definitions of what is understood by "work" and "worker" and "self-employed". Also, the platform economy should be defined as producing in the countries where the platform is used, and greater international cooperation could find ways to reduce the ability of large companies and platforms to avoid paying taxes. This also requires ensuring tax compliance and reducing work in the "underground" economy. The author considers that the stronger Nordic and Central European types of welfare states seem to be better able to understand and address the dramatic changes underway in labour markets, via state intervention, ensuring the taxation of capital and income associated with platform activities, to stem the growth of inequality and a fractured society.

Attention must also be given to stemming the economic dislocation associated with the fall in median wages and labour force participation rates that continues, notwithstanding the continuing growth of productivity levels and GDP. Five measures are proposed:

(i) Focusing on education and lifelong learning; (ii) Establishing a guaranteed (conditional) minimum income for those in the labour market; (iii) Redistributing wealth via progressive taxation on income and capital; (iv) Defining new ways to understand what is “work”, and creating socially useful activities; and (v) Supporting measures to increase well-being and quality of life via offering space and options for social recognition to ensure that societies remain cohesive.

Implementing these five priorities implies defining political choices for the role of welfare states that would preserve social cohesion in the digital era. Over the past two decades, robots have increased labour productivity and value added, while the number of low-skilled and middle-skilled work has declined as has labour’s share of income in many industrialized countries. The use of big data, analytics, robots, and so forth, and the growth of the sharing economy, is expected to further reduce demand for traditional goods, services and staff.

This volume highlights the complex, wide-ranging implications and challenges of the rapid expansion of new technologies and the related social risks. It clearly indicates the major challenges for policy-makers and social actors in the current climate of rising populism, and the declining perspective for international solidarity, cooperation or consensus. The conjunction of analysing the dramatic social and economic impacts of the deepening and widening use of new technologies seems quite original. The book should inspire policy-makers and social actors to consider seriously all the possible future social, economic and political implications.

Hedva Sarfati

*Independent consultant on labour market and welfare reforms,
Geneva, Switzerland*

Acknowledgements

The Editorial Board thanks the following specialists for their assistance in 2018:

Paul VAN DER AA	Thomas LAVERS
Dragos ADASCALITEI	Peter LLOYD-SHERLOCK
Nikola ALTIPARMAKOV	Markus LOEWE
Balázs BÉLA REIZER	Vincent A. MAHLER
Fabio BERTRANOU	Dayanand S. MANOLI
Craig CHURCHILL	Sarah MARCHAL
Inmaculada DOMINGUEZ FABIAN	Maria MARTINHO
Werner EICHHORST	Carmelo MESA-LAGO
Dalya ELZINIY	Mitchell ORENSTEIN
Lou ENOFF	Maria PETMESIDOU
Fernando GIL-ALONSO	Celine PEYRON BISTA
Krzysztof HAGEMER	Betina RAMIREZ LOPEZ
Moritz HESS	Brigitte ROHWERDER
David K. JESUIT	Mariana RULLI
Stephen KAY	Amdissa TESHOME
Markus KNELL	Sotirios ZARTALLOUDIS