Issue 1/2018 (Vol. 4)
ISSN 2190-6335

Intergenerational Justice Review

Issue topic:
Measuring Intergenerational Justice for Public Policy (Part II)

Table of Contents

Reviewers for this issue

(in alphabetical order):

Róbert Gál is a senior research fellow at the Hungarian Demographic Research Institute and Affiliated Professor at Corvinus University, Budapest. His research is in intergenerational resource reallocations. He published in Demographic Research, Population Studies, the Journal of European Public Policy and, as part of a research team, in Science.

Maria Grasso is a professor of Politics and Quantitative Methods at the University of Sheffield. Her doctoral research was funded by the Economic and Social Research Council and she was a Stipendiary Lecturer in Politics at the University of Oxford. Her research focuses on political sociology, social change, political generations and participation. Her academic work deals with quantitative research and statistical analysis of cross-national surveys on political behaviour.

Christian Hagist is the director of the DIE FAMILIENUNTERNEHMER endowed Chair of Intergenerational Economic Policy at WHU – Otto Beisheim School of Management. In addition to his academic work, he is also an online-columnist and policy consultant, for instance giving testimony at parliament hearings.

David Kingman is a PhD researcher at University College London as well as a senior researcher at the Intergenerational Foundation. His research interests include processes of decentralisation, governance and the general topic of intergenerational relations including housing, pensions, higher education, health and social care, employment, demography and participation.

Martin Kohli is an emeritus professor for the Department of Political and Social Sciences at the European University Institute and Distinguished Bremen Professor at the Bremen International Graduate School of Social Sciences. He has been a member or fellow of the Institute for Advanced Study (Princeton), and at the Hanse Institute for Advanced Study. His research includes intergenerational transfers, European social structures and welfare states.

Nathalie Laub is a researcher and PhD student at the Research Center for Generational Contracts (University of Freiburg, Germany). Her research interests are in the fields of social security, demography, pension systems and implications of pension reforms – regarding both fiscal sustainability and (in)equality.

The peer-reviewed journal Intergenerational Justice Review (IGJR) aims to improve our understanding of intergenerational justice and sustainable development through pure and applied research. The IGJR (ISSN 2190-6335) seeks articles representing the state of the art in the philosophy, politics and law of intergenerational relations. It is an open-access journal that is published on a professional level with an extensive international readership. The editorial board comprises over 50 international experts from ten countries, representing eight disciplines.

Earlier versions of the first two research articles published in this issue were the winning contributions to the 2016/2017 Demography Prize on the topic "Measuring Intergenerational Justice". The award was funded and supported by the Stiftung Apfelbaum (Apfelbaum Foundation).

Editorial

If you had to choose one moment in history in which to be born, and you didn't know in advance whether you were going to be male or female, which country you were going to be from, what your status was, you'd choose right now." This answer to his one-question test was used by Barack Obama in several of his speeches to demonstrate how humanity has made progress up until the present day.

Is he right? Beyond asking people what their preferred birth year would be in the context of such a thought experiment, it is possible to compare the attractiveness of actual birth years (and thus epochs in which to lead one's life) from official statistics. There are already a handful of indices which are, if recorded repeatedly, usable for measuring the changes in quality-of-life circumstances over time, and thus the "position" of succeeding generations in the course of history. Jamie McQuilkin, who is the winner of the 2016/17 Demography Prize, derives an additional index from national statistics in the opening article of this second part of the IGJR double issue on "Measuring Intergenerational Justice for Public Policy". He combines nine indicators: forest degradation rate, share of low-carbon energy consumption, and carbon footprint in the environmental dimension; adjusted net savings, current account balance, and wealth in equality in the economic dimension; and primary pupil-teacher ratio, fertility rate, and GDP-adjusted child mortality in the social dimension. Unlike other index-builders, McQuilkin takes great pains to lay out all the premises, definitions and data sources of his account in as clear a manner as possible, which makes his article an accessible and instructive read.

All-encompassing comparisons of the position of a generation in the "lottery of timing" are nonetheless notoriously difficult to draw. The two subsequent articles confine themselves to public policy. They both treat financial transfers between generations; but a deeper look reveals that their underlying rationale is quite different. Bernhard Hammer, Tanja Istenič and Lili Vargha use a framework of *direct* reciprocity between generations whereas Paul Kershaw (at least partly) builds upon a concept of indirect reciprocity. This is best explained when we look at the relationship between (familial) generations before the welfare state came into being. The directly reciprocal generational contract is the implicit expectation that parents will care for their children until they are old enough to care for themselves, and children will support their parents, in turn, when their parents can no longer support themselves. Here, the exchange happens between the same generational cohorts but while they are in different age groups. In their work, Hammer, Istenič and Vargha adapt this idea in the context of the welfare state, pinpointing the role of human capital-building and reproduction for the maintenance of generational contracts. The authors develop a new indicator to analyse whether there is a balance between transfers to children and transfers expected by the elderly population in the future. Their results indicate that, in most of the 16 EU countries analysed, the human capital investments in children are far too low to finance the necessary transfers to the elderly population in the future.

In the final article, Kershaw writes within a framework of a different logic: indirect reciprocity. Imagine in pre-welfare-state times the members of three generations walking together. The daughter accompanies her mother and her grandmother as they embark on a ritual journey intended to end with the grandmother's voluntary death. The girl takes pity on her grandmother and convinces her mother to promise to care for the old woman until her natural death in exchange for a promise from the girl to do the same for her mother when the time comes. Here, the exchange does not happen between the same generational cohorts. The creditor generation cannot be paid back by the (then) deceased debtor generation. As the (previous) middle generation has become the debtor generation, the obligation is passed on the next generation (now the middle generation).

Kershaw discusses three different approaches in this framework for Canada: the elderly/non-elderly spending ratio; intergenerational reciprocity; and the ability to pay of different age cohorts.

Next to calculating some striking results, Kershaw further develops the *elderly bias in social spending* (EBiSS) as an indicator for the (un)fairness of intergenerational welfare state contracts. For the utility of cross-country comparisons, medical care spending (which is consumed disproportionately in later life) and education (which is consumed earlier) must be taken into account according to Kershaw.

Kershaw's first two stages of analysis are complemented by a discussion about the fairness of the different treatment of generations in welfare states. Since some cohorts are born into favourable eras, and others are not, it is important to examine intergenerational public finances by reference to the standard of living inherited by different age groups, and the socio-economic circumstances they currently face. In response to this, Kershaw in the third stage of his research considers how the standard of living for contemporary seniors compares with that of elderly Canadians four decades earlier; and how the standard of living four decades earlier – when contemporary seniors were young adults – compares with that of young people today. In short, Kershaw suggests that the Canadian government needs to introduce policy changes to readjust the intergenerational imbalances that are negatively affecting younger generations.

In the book review section, the first review assesses Birnbaum, Ferrarini, Nelson and Palme's *The Generational Welfare Contract: Justice, Institutions and Outcomes*. Again, the focus is on the redistribution of a welfare state's resources in time. Partly qualifying the "mainstream" thesis that public programmes, such as health care and pensions, are not affordable at their current extent in ageing welfare states, the authors put forward the hypothesis that intergenerational welfare state contracts can lead to positive-sum solutions.

In the second book review, Michael Rose's *The Representation of Future Generations in Today's Democracy*, is brought to the attention of the scientific community. The book is written in German but of importance for the debate on specialised agencies for the future.

Jörg Tremmel (University of Tübingen)
Maria Lenk (FRFG)
Antony Mason (IF)
Markus Rutsche (University of St. Gallen)

Doing Justice to the Future: A global index of intergenerational solidarity derived from national statistics

by Jamie McQuilkin

Abstract: This paper proposes an index of national levels of "intergenerational solidarity", defined as "investments or sacrifices that are intended to increase or sustain the well-being of future generations".

This is measured by examining changes to the value and stability of various capital flows and stocks. Nine indicators are drawn from national-level statistics: forest degradation rate, share of low-carbon energy consumption, and carbon footprint in the environmental dimension; adjusted net savings, current account balance, and wealth in equality in the economic dimension; and primary pupil-teacher ratio, fertility rate, and GDP-adjusted child mortality in the social dimension.

This returns a comparative index score of intergenerational solidarity for 120 countries covering 92% of the world's population. Throughout, the state of the current research on intergenerational transfers and on the individual metrics used is discussed, and suggestions are made for further improvements and work in measuring intergenerational solidarity.

As it stands, the index provides the widest coverage of indicators and nations aimed at measuring any similar concept. As such, it is particularly useful for those who wish to investigate the causes of intergenerational solidarity through cross-cultural comparisons.

Keywords: *Intergenerational, Index, Intertemporal, Discounting, Long-term*

Editorial note: all supplementary material, consisting of descriptive statistics (Appendix I), some indicators considered for inclusion (Appendix II) and the full table of indicator and index scores (Appendix III) can be found on igjr.org.

Introduction[1]

"We act as we do because we can get away with it: future generations do not vote; they have no political or financial power; they cannot challenge our decisions." World Commission on Environment and Development (1987: 8)

For as long as societies have existed, we have saved, planned, bequeathed, and built for the future. As awareness has risen of the grievous long-term[2] consequences of some of our collective choices, there has been increased interest in quantifying and understanding intergenerational solidarity[3] (Oxford Martin Commission 2013).

Fortunately, in the last decades we have gained the national statistics and computational power to do this work. If we can first quantify and then find causes for variations in intergenerational allocations across cultures and institutions, we may be able to ensure that our own generations' legacy is more stable, just and sustainable.

This paper indexes intergenerational solidarity across 120 countries and 92% of the world's population, and begins to address this gap in the literature. The index includes nine variables, three each from economic, environmental and social dimensions, and aims to provide a common independent variable for those researching the causes of cross-cultural variations in intergenerational solidarity. Iterations of the index could also allow us to keep track of whether societies are (in theory) giving greater or less intergenerational solidarity from one year to another.

Anecdotally, it has long been said that the current generation discounts the future[4] to a greater extent than those before them. Laugier asserts:

> *"The ancients jealous of leaving to the latest posterity traces of their abilities, spared nothing in giving to their buildings that strength which triumphs over common accidents... Our artists have now-a-days none of that great taste of solidity. They doubt if their works can sustain the assault of three centuries. They are accused even of avoiding with design to render them lasting, because they are supposed interested to renew the labour of them. It is most certain that one often sees amongst our buildings quite new ones that threaten ruin."* (Laugier 1755: 129)

Are we, as Laugier says, becoming more short-termist? Are we thus heaping greater burdens on future generations? Are the reasons he suggests valid? This index is a first step to answering these questions.

If we can first quantify and then find causes for variations in intergenerational allocations across cultures and institutions, we may be able to ensure that our own generations' legacy is more stable, just and sustainable.

Conceptual framework

"Intergenerational justice" is a concept here defined as synonymous with "intergenerational equity". Defining what actually is "equitable" is impossible to do *a priori* in the context of future generations, who are silent in their preferences, of an unknown number, and of unknown means. Nonetheless, this does not prevent us from comparing intergenerational allocations, here set in the context of intergenerational solidarity.

"Intergenerational solidarity" does not yet have a standardised definition. Until the Rio+20 conference, "intergenerational" usually meant "between old and young generations" (World Future Council 2013). Here, as in current sustainability usage, intergenerational solidarity "goes beyond relations among the currently living representatives of different generations to embrace the future generations who do not yet exist" (United Nations 2013). "Solidarity" in this context can be approximated by "intentional actions that increases or sustains wellbeing" (see Lopes 2015) usually involving "sacrifices and investments" (United Nations 2013).

Thus, the working definition of "intergenerational solidarity" for this paper might be "investments or sacrifices that are intended to increase or sustain the wellbeing of future generations". This can be said to be the means by which we carry out our impression of what is intergenerationally just.[5]

Criteria for selection

The criteria for selecting indicators (after Hsu et al. 2013; OECD 2008) are as follows:

Theoretical relevance. Indicators must have a strong conceptual relationship to intergenerational resource allocation and to human wellbeing.

Coverage. The index must cover >100 national entities containing >90% of the world's population, and its range must be such that it is able to distinguish countries in a meaningful way.

Comprehensiveness. The index must include indicators relating to economic, environmental and social spheres in equal measure. Each metric must not have disproportionate influence over the total index. Few or no indicators should be missing for any country.

Transparency. The number of indicators should be concise, and assumptions, sources and transformations should be clear. The index should avoid a "black box" approach.

Source Quality. Sources must be respected, use standardised collection methods and provide open access.

Future-proof. There must be an on-going commitment from source institutions to regularly update indicator data.

> Are we, as Laugier says, becoming more short-termist? Are we thus heaping greater burdens on future generations?

National accounts are the level of analysis for a practical reason: reliable and comparable data simply do not or cannot yet exist for measuring intergenerational solidarity of component parts of society, such as companies, civil society organisations, individuals or governments.

However, it seems reasonable that national statistics may have a bias towards revealing of the priorities of governments, although they will also be affected by the choices of individuals and institutions. It is also often assumed that part of the duty of government, in the implicit[6] social contract that legitimates them, is to work for the *demos* of today and the future – this is less so for other parts of society.

Similar existing work

Little work has been done to construct cross-cultural indexes of intergenerational solidarity or similar measures, especially outside of the OECD. In a paper correlating cultural values and long-termist policy, Kasser (2011) used advertising to children, CO_2 emissions, parental leave and child wellbeing. Elsewhere, Vanhuysse (2013) used a figure of public debt per child, ecological footprint and age-based differences in poverty to compile an "Intergeneration Justice Index". Also, Noguchi et al. (2014) used Google searches for future years as an indicator of national future orientation.

Kasser's work is an example of where this index can be useful, as a framework for researchers in disparate fields looking to correlate their own dependent variables (cultural values in his case) with intergenerational solidarity.

In the sustainability literature, there are a vast array of composite indexes (for a review of some, see Singh et al. 2012; Stiglitz et al. 2009) but almost all do not focus on the future. One exception is the World Bank's Adjusted Net Savings (ANS; included in this paper; see the section on Economic Indicators for more details). This is the best-known attempt at a comprehensive economic measure of changes in capital stocks, and includes measures of environmental and human capital. Unfortunately, its assumptions and ethical framework are dubious (Thiry/Cassiers 2010); the most important objection is that, as with other indicators of "weak" sustainability (Pierce/Atkinson 1993), it is over-simplistic in its assumption that all value can be adequately reduced into fungible dimensions denominated in dollars.

On the other hand, the Index of Economic Wellbeing (Osberg/Sharpe 2002) does have a similar aim but does not quantify everything in dollars. Its other dimensions are interesting – particularly the "economic security" dimension which addresses risks rather than value – but the datasets the authors use only exist for a fraction of OECD countries.

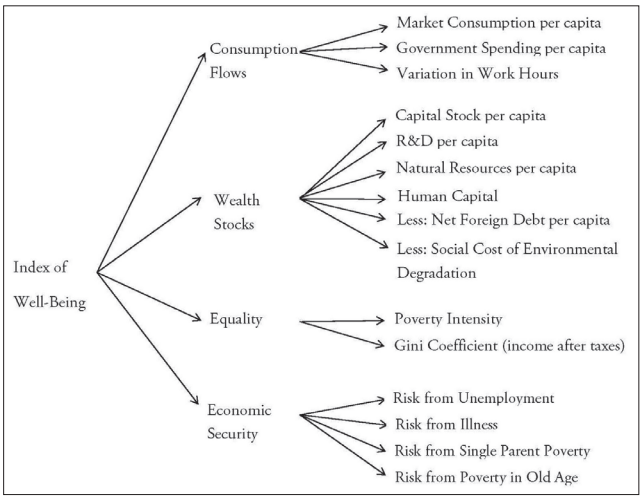


Figure 1: Index of Economic Wellbeing weighting tree (Osberg/Sharpe 2002)

Environmental indexes (e.g. Hsu et al. 2014) often measure effects over the long term, but differences in time horizons are rarely acknowledged. For instance, radioactive pollution is a significant issue for future generations, whereas particulate pollution is largely not. CO_2-equivalent greenhouse gas indexes are a notable exception; global warming potential is usually explicitly calculated over 100-year time horizons (Shine 2009), so as to adjust the impacts of e.g. short-lived methane vs. long-lived carbon dioxide.

Method

Operationalising "intergenerational solidarity"

Intergenerational solidarity's "investments or sacrifices" can be expressed in terms of change to the value and stability of various kinds of non-substitutable[7] inherited capital. Capital encompasses a society's "manufactured capital, human capital, natural capital, and knowledge, but also its institutions" (Dasgupta 2001: 142). Stability implies *resilience*, "the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks"; *adaptability*, "the capacity of actors in a system to influence resilience"; and *transformability*, "the capacity to create a

fundamentally new system when ecological, economic, or social (including political) conditions make the existing system untenable" (Walker et al. 2004). For example, building a house with intergenerational solidarity in mind might mean building a sturdy, useful, low-impact structure (i.e. with high capital value) that is designed to be flexible to different uses (resilient), easily repairable and adjustable (adaptable), and might be recycled at the end of its useful life (transformable).

Environmental indexes often measure effects over the long term, but differences in time horizons are rarely acknowledged. For instance, radioactive pollution is a significant issue for future generations, whereas particulate pollution is largely not.

However, although they are crucial to intergenerational solidarity, parameters of stability are highly specific to whatever individual system they refer to, and it is not possible to measure them on aggregate at a national level.[8] Instead, in this index they are discussed when they relate to other indicators.

The index aims to measure proportional solidarity: from each nation according to its ability to give. However, the poorest nations must prioritise survival needs above all, something reflected in the generally high social discount rates set by governments of developing countries (Zhuang et al. 2007).

Selecting indicators

A longlist of candidates was selected and winnowed.[9] Nine indicators were chosen in sets of three, each primarily focused on economic, environmental or social dimensions. This number allows for simplicity whilst ensuring that no one indicator had disproportionate influence. All of the indicators are likely to be proxies of several kinds of capital, but were grouped according to their primary focus.

It should go without saying that this index is not intended to be precise or comprehensive, but rather a working yardstick for an otherwise unmeasurable composite construct. In the aim to make an index with wide coverage of countries, it is also inevitable that indicators will be excluded that would otherwise give greater precision.

Normalising and aggregating indicators

After selection, the indicators were normalised to a common range of 0-100. The boundaries were set based on the boundaries of the original range or on benchmarks based on literature or data distribution. The goal of normalising the indicators was to give thresholds, not targets. For example, in the indicator of forest degradation, "zero net loss" is the benchmark for 100. Net gain may or may not indicate intergenerational solidarity, but here is not given more "credit" than zero net loss. To give another example, the upper bound for primary pupil-to-teacher ratio was set at 10:1 and the bottom at 50:1 purely from data distribution; prescriptive targets for this indicator simply do not exist.

Importantly, this means that scores on indicators (and thus the index) only make sense in terms of comparisons between countries. Where noted, some indicators were normalised for population or GDP (with purchasing power parity) or transformed to give greater weight to relatively small differences or to cluster extreme differences. The standard equation used was:

$$100 \left(\frac{Observed\ value - minimum}{Target - minimum} \right)$$

which is a variant of that used in the Environmental Performance Index (Hsu et al. 2013) and the Human Development Index (UNDP 2014). Details are given where this was modified.

Most indicators averaged the most recent available data (following the method of Vanhuysse 2013), over the most recent five years – a common policy timeframe – to smooth fluctuations. However, countries were not excluded if some years used in the average were missing.

All indicators have equal weight but are aggregated geometrically following the method of the Human Development Index (UNDP 2014). Equal weighting is common in composite indexes (Böhringer/Jochem 2007), particularly in the absence of clear theory on their relative importance.

Intergenerational solidarity only has meaning in terms of an aggregate of its component parts.

Geometric aggregation takes the following form, with indicator scores represented by i and the number of indicators n:

$$(i_1 \times i_2 \ldots \times i_n)^{\frac{1}{n}}$$

Geometric aggregation, while more difficult to communicate than linear aggregation, partially rectifies the problem of the unsubstitutability of capital stocks and flows (Hsu et al. 2013). It ensures that high scores in the index should reflect a high score in most of the indicators, rather than particular excellence in a few areas, and that low scores are disproportionately penalised (Böhringer/Jochem 2007; Ebert/Welsch 2004), suiting it to indexes aggregating radically different dimensions (OECD 2008; UNDP 2010). It also means that more critical attention should be paid to the assumptions behind benchmarks and transformations. For instance, one extremely low indicator will have a significant effect on the final score: even if eight indicators score 100, if the last scores one[10] then the index will only give a total score of 60.

There is a long-running debate in sustainability literature about the dangers inherent in aggregating indicators (OECD 2008). However, intergenerational solidarity only has meaning in terms of an aggregate of its component parts. As Stiglitz et al. put it, "composite indicators are better regarded as invitations to look more closely at the various components that underlie them" (Stiglitz et al. 2009: 65).

Environmental Indicators

To be in solidarity with future generations, today's generations must curtail pollution and ecological degradation and ensure that resources are used with an eye to limits. Specifically, greenhouse gas emissions, soil degradation, biodiversity loss and nutrient pollution appear to be the issues with greatest cause for global alarm (Bindraban et al. 2012; Steffen et al. 2015). Unfortunately, there

are only national accounts of greenhouse gas emissions, due to measurement difficulties. However, the three indicators chosen for the index – forest degradation, carbon footprint and low-carbon energy use – can be considered proxies for soil degradation and biodiversity loss inasmuch as these are exacerbated by climate change (Nearing et al. 2004; Thomas et al. 2004) or are caused by deforestation (Maina et al. 2013; Mendenhall et al. 2012; Siikamäki/Newbold 2012).

The three indicators chosen for the index – forest degradation, carbon footprint and low-carbon energy use – can be considered proxies for soil degradation and biodiversity loss inasmuch as these are exacerbated by climate change or are caused by deforestation.

Forest degradation is the only indicator with missing data for some countries, due to lack of forest cover. To compensate, in these instances the weighting of the other two environmental indicators was increased from 1/9 to 1/6, in order to preserve equality of contribution from each dimension.

Environmental Indicator: Net forest degradation

The indicator

Satellite data for forest density in 30m^2 blocks were used (Hansen et al. 2013b) because of the much greater accuracy of that database over UN FAO self-report data (UNFAO 2014, see Hansen et al. 2013a). A twelve-year average was used based on the limited data currently published, to which the authors have guaranteed regular updates. Only forest of >50% canopy was used because of limitations on forest gain data, and 19 countries with <200km^2 of this were excluded, after the EPI method (Hsu et al. 2014).

Metric	0	100	Equation[1]	Time period	Source
Net change in forest with >50% canopy cover	≤-10%	≥0%	$100\,\frac{x-(-10)}{0-(-10)}$	12-year average (2000-2012)	Hansen et al. (2013a)

Table 1: Equation, definition and data source for net forest degradation indicator

10% annual loss was used as a lower benchmark as the worst performer's loss rate of 16.8% was extreme (Figure 2). Zero net loss was the upper benchmark as the afforestation of some nations is ecologically questionable (e.g. see Geary 2001 for discussion of Uruguay's 22% increase). Only 10 of 120 included nations achieved zero net loss.

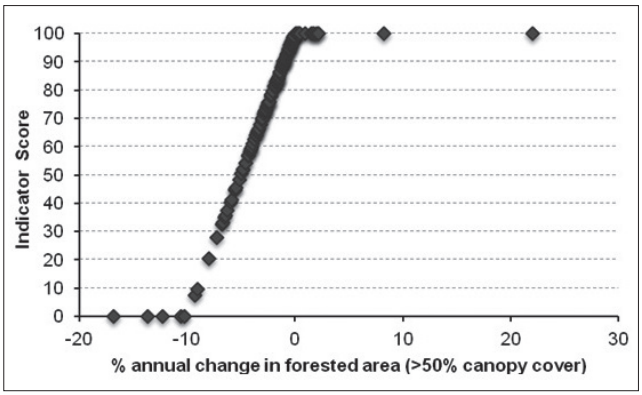


Figure 2: Relationship between forest degradation indicator scores and annual forest loss

Theoretical basis

"The diligent farmer plants trees of which he will never taste the fruit" (arbores seret diligens agricola, quarum aspiciet bacam ipse nunquam) – Cicero in *Tusculanae Disputationes*, c.45 BCE

Forest husbandry is inherently a long-termist enterprise, whether by preservation or active plantation. For example, in an extraordinary continuous act of intergenerational solidarity, peasant coppice foresters in 2nd-millenium European countries would often rotate coppice-with-standards on regular cycles of 30 years for the coppice understorey, and up to 160 years for the overstorey that grew above them (Short/Hawe 2012). It also seems plausible that a country that conserves its trees may protect other ecosystems.

However, the indicator is not sensitive to the fine-grain forest ecology. Will future generations prefer diverse old-growth forest ecosystems, or relatively barren reforested but economically-preferable Sitka spruce plantation as is common in Europe (Magura et al. 2002)? Or would they prefer an ecologically-sensitive agroforestry regime to any of these, something classed as "degraded forest" here?

Lastly, trees do not just fall to chainsaws – they are also affected by storms, climate change, fire, disease, drought and a number of other factors (Le et al. 2012). Notable instances of this are cyclone damage in Sweden (4.1% annual net loss – see Valinger/Fridman 2011), and beetle plagues in Canada (3.7% loss – see Kurz et al. 2008). Nonetheless, it is quite clear that humans are driving the degradation in most countries (Hansen et al. 2013a).

The indicator is not sensitive to the fine-grain forest ecology. Will future generations prefer diverse old-growth forest ecosystems, or relatively barren reforested but economically-preferable Sitka spruce plantation as is common in Europe? Or would they prefer an ecologically-sensitive agroforestry regime to any of these, something classed as "degraded forest" here?

Future directions

Some countries are reducing degradation rate substantially – for example, Brazil's loss in 2011 was over two-thirds less than the 1996-2005 average by one measure (Boucher et al. 2011). When annual data are available, it may be better to look at a predicted long-term trend in degradation rate. It may also be possible to control for natural causes of degradation discussed above. Also, once satellite data on forest gain of <50% canopy cover exist, it may be preferable to differentiate clear-felling from degradation.

Environmental Indicator: Carbon footprint (consumption-based)

Metric	0	100	Equation	Time period	Source
Carbon footprint component of ecological footprint	Undefined	≤ 0.6 Global hectares per capita (Gha/c)	$100 \cdot \frac{0.6}{x}$	2011	Global Footprint Network (2015)

Table 2: Equation, definition and data source for consumption-based carbon footprint indicator

The indicator

The consumption-based carbon footprint is a component of the ecological footprint. All data come from the 2011 dataset (Global Footprint Network 2015) except for Iceland's, which was estimated

to be the same as Norway's because of similarities in consumption patterns, consumer imports and renewable energy production.

The world's average carbon footprint was estimated to be 1.4 global hectares per capita (Gha/c) in 2009, and average ecological footprint 2.6 Gha/c. The world's biocapacity was estimated at 1.8 Gha/c. Assuming that most of this 0.8 Gha/c reduction must come from carbon emissions, the target carbon footprint should be 0.6 Gha/c. This target is consistent with the data: Algeria, Ecuador, Guatemala and Jamaica all have ecological footprints of 1.8 Gha/c and have carbon emissions of 0.5-0.8 Gha/c.
A simple reciprocal transformation was used to adjust the scale, meaning that doubling footprint halves the indicator value – i.e. 1.2 Gha/c = 50, and 2.4 Gha = 25.

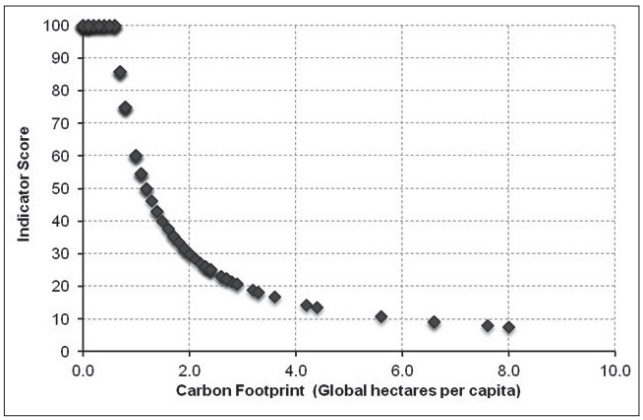


Figure 3: Relationship between carbon footprint and indicator scores

Theoretical basis
The benefits of emitting greenhouse gases are frontloaded and severe damage is back-loaded over thousands of years (Solomon et al. 2009). It also is the only part of the ecological footprint which can go into "debt"; i.e. the other components cannot by definition exceed the earth's biocapacity. There is also a general consensus that it is more useful than the greater ecological footprint measure (Stiglitz et al. 2009: 71, 80).

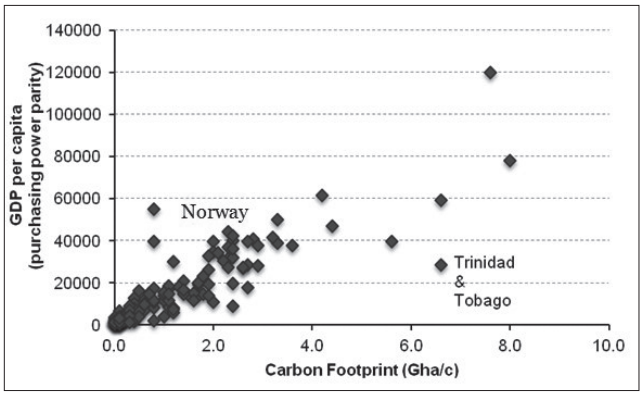


Figure 4: GDP and carbon footprint (2011 data)

Consumption-based emissions implicitly assign greater responsibility to consumers to reduce consumption or demand better efficiency, which is often justified by the current economic inequality between consumers and producers. However, it should be noted that currently, many low per-capita CO_2 emissions are often not due to intergenerational solidarity but rather a sign of poverty (Figure 4).

Consumption-based emissions implicitly assign greater responsibility to consumers to reduce consumption or demand better efficiency, which is often justified by the current economic inequality between consumers and producers. However, it should be noted that currently, many low per-capita CO_2 emissions are often not due to intergenerational solidarity but rather a sign of poverty.

Future directions
It might be argued that this indicator should be corrected for GDP, not done here to preserve simplicity. In particular, a "carbon intensity" (Davis/Caldeira 2010) correction of the following form was considered:

$$(i_1 \times i_2 \ldots \times i_n)^{\frac{1}{n}}$$

where G is GDP/c and current footprint (x) was set at a minimum of 0.6 Gha/c to emphasise the need for economic development. This formula would, in a rough way,[12] measure how much GDP is generated within the quota of 0.6 Gha/c and rank countries accordingly.

Environmental Indicator: Low-carbon energy generation

Metric	0	100	Equation	Time period	Source
Low-CO_2 energy generation as % of total consumption.	=0%	=100%	$100\sqrt{\frac{x-0}{100-0}}$	5-year Average (2007-2011)	International Energy Agency (IEA, 2015a) and U.S Energy Information Administration (US EIA, 2014)[13]

Table 3: Equation, definition and data source for low-carbon energy use indicator

The indicator
This indicator measures energy use from minimal-CO_2 energy sources such as geothermal, hydroelectric, nuclear, wind and solar. It excludes biofuels such as sugarcane or corn ethanol. A square-root transformation (Figure 5) was applied for reasons explored below.

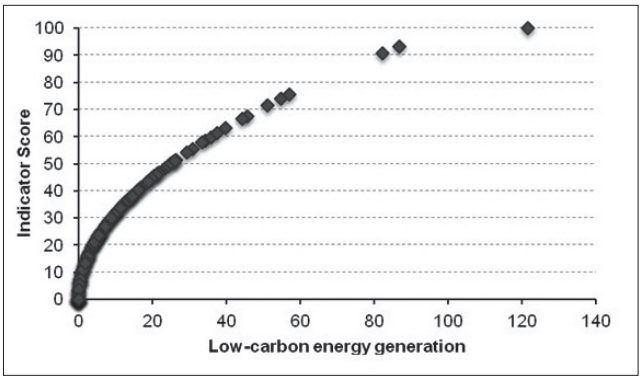


Figure 5: Relationship between low-carbon energy generation indicator scores and low-carbon energy generation, including for export

Theoretical basis
Fossil fuel use makes up a large part of most nations' CO_2e emissions (e.g. c.79% for the USA in 2013 – US Environmental Protection Agency 2015) and the high cost and long life-

times of its infrastructure entails formidable path dependency. Given the urgent need for drastic decarbonisation of energy generation, current low-carbon energy use improves the wellbeing of future generations not only through emitting less CO_2, but also through not deferring the cost of investing in low-carbon infrastructure.

Much has been said about long-term planning of nuclear waste disposal (and lack thereof), but nuclear energy remains one of the most long-term-oriented enterprises that industrial civilisation undertakes. A plant lifecycle may be 100 years, and fuel disposal must plan for radioactive isotopes with half-lives of millennia.

Nuclear fuel is non-renewable, but including it adds a particularly long-term component to this indicator, given its vital current role in decarbonising energy generation. Much has been said about long-term planning of nuclear waste disposal (and lack thereof), but nuclear energy remains one of the most long-term-oriented enterprises that industrial civilisation undertakes. A plant lifecycle may be 100 years, and fuel disposal must plan for radioactive isotopes with half-lives of millennia. For example, the Onkalo deep geological repository in Finland is midway through an 80-year design, operation and decommissioning cycle and is expected to safely store nuclear waste for 10,000 years (Nummi et al. 2012: 38).

It should also be noted that a very high score is often due to a combination of easy availability of hydroelectric dam sites and low populations rather than long-term planning. Particular examples of this are Norway, Paraguay, Iceland (also geothermal) and Tajikistan. In order to elevate the scores of less favoured countries that still invest in the long term, a square root transformation was applied.

Future directions

An assessment of the sustainability of biofuels and household waste might significantly improve the accuracy of the indicator in some countries. For example, in Brazil 22.9% of energy consumption in 2012 came from biofuels (IEA 2015b). However, sufficient source data and precise theory on the sustainability of biofuels are currently lacking.

It may also be possible to adjust for the CO_2e impact of renewables, for example from the titanic quantities of cement used in some hydroelectric dams and the vast quantities of methane released from tropical reservoirs. Currently, however, there is too much uncertainty about lifecycle analyses of both this and biofuels for them to be taken into account (Johnson 2009; Liska et al. 2014; Melillo et al. 2009).

Economic Indicators

Increasing the wealth of nations is critical for future welfare, yet current policy is often focused on optimising production, rather than the sustainability or division of future wealth (Stiglitz et al. 2009). In order to address these issues, the economic dimension includes the adjusted annual amount of product saved, the sustainability of current investment, and the distribution of wealth.

The central government social discount rate used in calculating cost-benefit analyses is unfortunately omitted here. Despite its importance to intergenerational projects and particularly to climate change mitigation and adaptation, many countries have no available social discount rate or different rates between departments (Zhuang et al. 2007). Currently, its use is worryingly arbitrary; Moore et al. (2004) memorably characterise policy-makers as demanding that economists "just give me a number!"

Economic Indicator: Adjusted Net Savings

Metric	0	100	Equation	Time period	Source
% of GNI, 5-year average	≤0%	≥20%	$100\left(\frac{x-0}{20-0}\right)$	5-year average (2008-2012)	World Bank, (2015)

Table 4: Equation, definition and data source for Adjusted Net Savings indicator

The indicator

Adjusted Net Savings (ANS) is an attempt at a catch-all indicator for "sustainable investment". It is calculated by taking gross savings (itself made up of gross capital formation, net capital inflows and changes in foreign reserves) and subtracting estimated resource depletion, emissions damages from particulates and CO_2, and consumption of fixed capital, and adding public spending on education (Figure 6). The World Bank calls it an indicator of a broadly-defined "weak sustainability" (Bolt et al. 2002) that assumes substitutability of different kinds of capital.

The economic dimension includes the adjusted annual amount of product saved, the sustainability of current investment, and the distribution of wealth.

Adjusted Net Savings is currently the most comprehensive dollar-equivalent index of changes in capital, covering 173 nations and groupings. It was normalised in the range 0-20% of GNI based on data distribution (Figure 7).

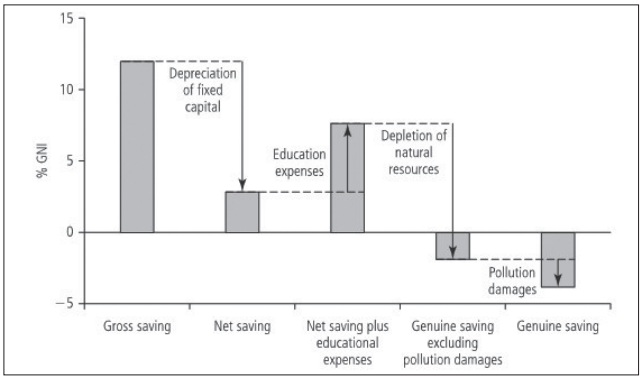


Figure 6: Calculating Adjusted Net Savings (World Bank 2006)

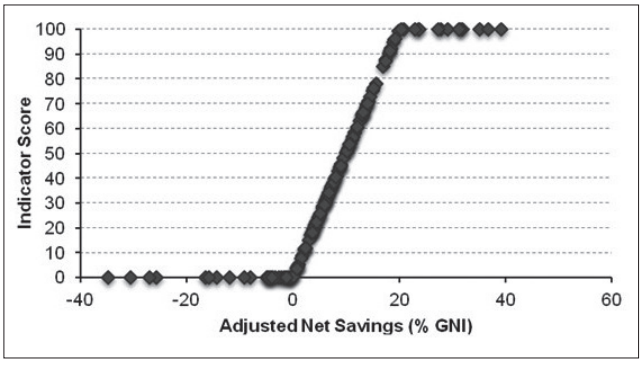


Figure 7: Relationship between ANS indicator score and ANS

Theoretical basis

That Adjusted Net Savings essentially measures consumption deferred to the future. However, ANS has been robustly criticised, amongst other reasons for assumptions of substitutability of capital, production-based responsibility for pollution, market valuing of resources and so on – see Pillarisetti (2005) and Thiry/Cassiers (2010) for summaries. It also seems to have only a weak relationship to other indicators that might be considered to be proxies for the wellbeing of future generations, e.g. infant mortality and Human Development Index (Gnègnè 2009). Following Stiglitz et al. (2009), it seems best to treat it as a measure of savings of solely economic wealth; we should not forget John Ruskin's caution that "that which seems to be wealth may in verity be only the gilded index of far reaching ruin" (Ruskin 1872: 52).

Future directions

ANS may be superseded by more comprehensive indexes with similar aims such as the Inclusive Wealth Index (UNU-IHDP/UNEO 2014). However, this also has poor assumptions, such as an economic valuation of human life proportionate to GDP per capita, with the consequence that an African's life is "worth" less than a European's.

Economic Indicator: Current account balance

Metric	0	100	Equation	Time period	Source
Current account balance (% of GDP)	≤-10%	≥0%	$100\left(\frac{x-(-10}{0-(-10)}\right)$	5-year average (2009-2013)	International Monetary Fund (IMF, 2015)

Table 5: Equation, definition and data source for current account balance indicator

The indicator

The current account quantifies the balance of flows of goods and services in and out of a national economy, as well as investment income and unreciprocated transfers (e.g. international aid and remittances). Simplistically, a deficit in the current account must be met by selling assets or foreign borrowing. Cut-offs were based on theoretic concerns as described below, and no transformation was applied (Figure 8).

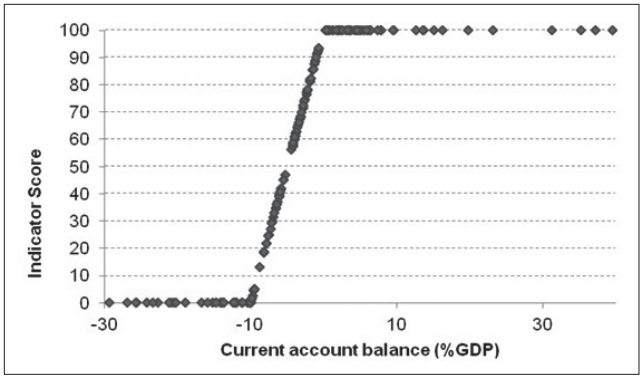


Figure 8: Relationship between current account balance indicator scores and current account balance

Theoretical basis

Current account deficits directly affect capital transfer to future generations. Today's deficits require matching future surpluses financed by exports, higher savings or lower investment (Olivei 2000); another description of these patterns is "intertemporal trade" (Corden 2011; Leimbach/Baumstark 2011).

A deficit is not necessarily bad if the foreign investment potential outweighs the costs of incurring debt or selling assets (Blanchard/Milesi-Ferreti 2012), but even "good" deficits mean borrowing or selling assets against future income and are risky (Obstfeld 2012), potentially making whole economies less resilient. This has been shown many times in massive investment failures in developing countries, and capital flight as a result of asset bubbles (Edwards 2004).

A deficit is not necessarily bad if the foreign investment potential outweighs the costs of incurring debt or selling assets, but even "good" deficits mean borrowing or selling assets against future income and are risky, potentially making whole economies less resilient.

While there is a consensus that significant current account deficits are "bad" because they imply instability (Boljanović 2012; Edwards 2004), it is difficult to be precise in giving a range to this indicator. A lower bound of -10% of GDP can be justified by risk, looking at the current account deficits that predicated various capital flight[14] crises and the economic performance of countries in the Eurozone in the last 10 years.[15] For example, immediately before their crisis in 1997, the South East Asian economies had deficits of between 2% and 8% (Radelet/Sachs 1998), and a 5% current account deficit is generally considered to be problematic (Boljanović 2012).

The upper bound is not higher than 0% (no net "intertemporal trading") because current account surpluses, while often good for future wellbeing in individual nations, are sometimes damaging to the nation (Blanchard/Milesi-Ferreti 2012) and imply a deficit in other countries.

Future directions

A more refined metric might disaggregate the causes of current account deficits (e.g. differentiate consumption binges from development aid), which can determine to a great extent whether they cause crises (Milesi-Ferretti et al. 1996). It might also penalise countries, particularly those with above-average GDP, which have excessive surpluses in the long term without a good cause (e.g. Germany). More work should also be done to examine the multi-decadal current account deficits of the USA, UK and others – in the argument of "monetary hegemony", these countries may be able to sustain long-term deficits with few ill effects as an effect of demand created by their currencies being used as international reserves.

Economic Indicator: Wealth inequality

Metric	0	100	Equation	Time period	Source
Gini coefficient of wealth inequality	=1	= 0	$100-100\left(\frac{(x-1)+1}{0-1}\right)^2$	2014	Stierli, Shorrocks, Davies, Lluberas, & Koutsoukis (2014)

Table 6: Equation, definition and data source for wealth inequality indicator

The indicator

National wealth data including its Gini coefficient are not collected by any intergovernmental agency with coverage larger than the OECD, but are currently estimated annually by Crédit Suisse. Crédit Suisse are widely respected, use a transparent method (Shorrocks et al. 2014) and give quality ratings for the estimations for each country. Their definition of wealth includes financial assets, housing and land; liabilities are subtracted; and their analysis applies to adult individuals (i.e. not households) aged over 20.

Given economic growth is finite, future poverty reduction will mean wealth redistribution. Also, it seems reasonable that equal wealth distribution indicates long-term social planning and strong institutions, as it requires strong redistributive institutions and takes time to implement.

The equation for this indicator includes a square transformation which has been inverted and shifted towards the y axis. Superficially similar to a logarithmic transformation, it gives a steeper gradient in mid-values for improved differentiation.

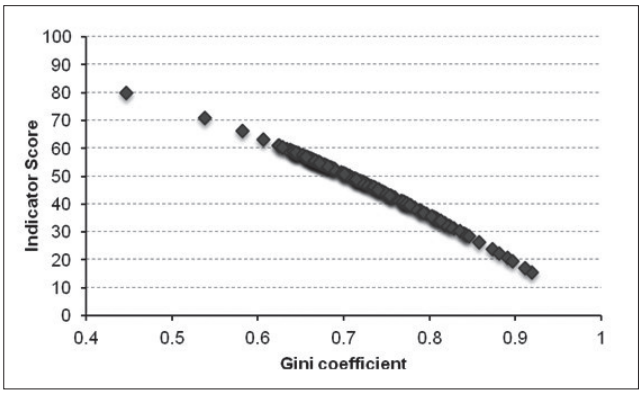


Figure 9: Relationship between wealth inequality indicator scores and wealth-Gini coefficient

Theoretical basis

The inclusion of this indicator rests on an ethical argument about the inheritance of future generations, based on the well-known "veil of ignorance" theory (Rawls 1999) of morality and a widely-held belief that wealth can give wellbeing only if it is equally or meritocratically distributed (Piketty 2014). Given that economic growth is finite, future poverty reduction will mean wealth redistribution (Daly 1990). Also, it seems reasonable that equal wealth distribution indicates long-term social planning and strong institutions, as it requires strong redistributive institutions and takes time to implement.

While wealth data are noisier than income data, the relative persistence of wealth inequality, its causative role in persistent income inequality and its greater importance to wellbeing and illbeing (particularly regarding security) prioritises its inclusion (Carter/Barrett 2006; Headey/Wooden 2004; Kuypers/Marx 2016; Piketty 2015; Ruberton et al. 2016). Wealth also plays a smoothing role in household economies through reducing uncertainty, which may be more relevant to rates of intertemporal savings than average income itself (Sørensen 2013).

A Gini index of 0 is unachievable and may also be undesirable within the current economic framework; there are likely to be diminishing returns to wellbeing below a certain level. However, given the absence of an empirically-derived "ideal" value of wealth inequality, it is used as an upper bound.

The social dimension of sustainability is notoriously difficult to define, and has been characterised as "a concept in chaos" (Vallance et al. 2011: 342).

Future directions

Measurements of household wealth are still in their infancy. The method and data for this indicator should be given particular scrutiny in future updates, and it may be possible to take account of different levels of public provision of e.g. housing, health and education that can lessen the effects of inequalities in private wealth. The range for the indicator might also be adjusted based on theory.

As data resolution and coverage continue to improve, it may be feasible to incorporate data sources with more robust methods (e.g. Alvaredo et al. 2017) or specific components, such as the share of public wealth. Also, incorporating work on the relationship between wealth and time discounting may strengthen the conceptual foundation of this indicator.

Social Indicators

The social dimension of sustainability is notoriously difficult to define, and has been characterised as "a concept in chaos" (Vallance et al. 2011: 342). Here, the indicators measure the inheritance of human capital in the form of education and health, but it seems that indicators of future social capital do not exist.[16] As a compromise, an adjusted fertility rate is used as an indicator of social capital, with the argument that too-high and too-low rates may predict difficulties for social institutions.

Social Indicator: Primary pupil-teacher ratio

Metric	0	100	Equation	Time period	Source
Pupil-teacher ratio in public primary schools	50:1	10:1	$100\left(\frac{50-x}{50-10}\right)$	10-year average (2002-2012)	UNESCO (2015) and ACARA (2011, 2013); Agency for Statistics of Bosnia and Herzegovina (2011); Lomborg (2009); OECD (2014); Wolff (2008)

Table 7: Equation, definition and data source for primary pupil-teacher indicator

The indicator

This indicator measures the number of teachers for every pupil in publicly-funded primary education (UNESCO 2012). Due to poor collection, some countries have only one data point in the last 10 years, hence the long average. It should also be noted that this indicator is not the same as class size.

Due to lack of conclusive targets in the literature, the indicator benchmarks were based mostly on a subjective assessment of data distribution, with no transformation. Only three countries in the index (Iceland, Sweden and Norway) had better ratios than 10:1, and only 10 nations had ratios greater than 50:1, ranging up to 76:1 for Malawi (Figure 10). "Large class size" is also sometimes defined as >50:1 (Jin/Cortazzi 1998; Qiang/Ning 2011);

Krueger (2011) found improved results for class size at least down to 15:1.

> The indicators measure the inheritance of human capital in the form of education and health, but it seems that indicators of future social capital do not exist.

Changes in the values of the benchmarks were also analysed to ensure that overall index results were not sensitive to them; e.g. a lower boundary of 60:1 would affect index scores by <1 point on average, and change rankings by an average of 2 places, with very little effects on the countries at the top of the rankings.

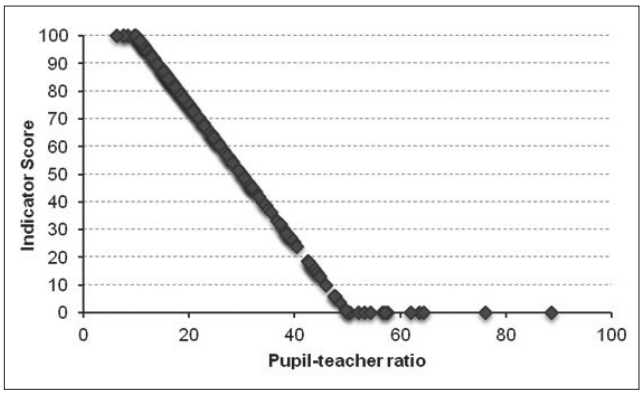


Figure 10: Relationship between pupil-teacher ratio indicator score and pupil-teacher ratio

Theoretical basis

"To plan one year ahead, plant grains. (一年之計，莫如樹穀) *To plan ten years ahead, plant trees.* (十年之計，莫如樹木) *To plan a lifespan ahead, plant people.* (終身之計，莫如樹人)"
- Guan Zhong (管仲) and other scholars as quoted in the Guanzi (管子), 7th to 4th century BCE

Primary education was specifically chosen because it is an investment in the wellbeing of future generations that is not likely to directly benefit current generations for 10-20 years at least. Also, as the Secretary-General of the United Nations put it:

> *"Education is itself critical to intergenerational solidarity as the means of transmitting accumulated, or at least the most recent, scientific and other knowledge to future generations."* (United Nations 2013: 8)

Regardless of educational outcomes, it is also indicative of a more general societal willingness to trade off current wellbeing (money spent on teachers' salary[17]) for others in the future (Kasser 2011). Secondary and particularly tertiary education were excluded because they are less comparable between countries because of greater differences in public and private education models, and because they are more directly linked to the economic interests of current generations.

Future directions

In some nations with pyramidal demographic structures, a high pupil-teacher ratio may not be caused by lower prioritisation of education, but instead purely by the ratio of children to adults. It may be possible to correct for this. A priority for this indicator should be to incorporate research into the differential effects of the pupil-teacher ratio on educational achievement, as it seems quite unlikely that there is a purely linear effect.

Social Indicator: Fertility rate

Metric	0	100	Equation	Time period	Source
Predicted number of children per woman in five years projected using a five-year average (x), corrected for child (<5 years) mortality (y)	n/a	1.8	$100\left(\frac{1.8}{1.8+\sqrt{(1.8-x)^2}}\right)^2 \cdot y$	5-year prediction (2017) based on 5-year regression (2008-2012)	World Bank, (2015b)

Table 8: Equation, definition and data source for fertility rate indicator

The indicator

This indicator measures the predicted fertility rate using a linear extrapolation of the trend of the last five years, in order to measure policy as opposed to current status. Countries where the regression coefficient for the previous five years was ≤0.5 were instead predicted using the average of the last five years. The indicator score is calculated using the formula above, giving a representation of "distance from the optimum", either positive or negative (Figure 11). The square of the full fraction was added to address the fact that population does not grow or shrink linearly and small differences make large effects; if left unsquared, a fertility rate of 7.2 would score 25 despite being socially problematic.

> A shrinking population might sometimes be beneficial, implying that absolute GDP, footprint and so on may be reduced while maintaining or increasing GDP per capita. However, too much reduction [...] may also result in so-called "government of the elderly, by the elderly and for the elderly" as in Japan.

The selected optimum value of 1.8 is theoretically based on an assumed replacement-level fertility of 2.1, and explained further below. The figure of 2.1 is below replacement for countries with significant mortality rates before menopause (Espenshade et al. 2003). As a partial correction for this, fertility rates were multiplied by the fraction of children surviving to five years; data for later pre-fertility years could not be currently obtained.

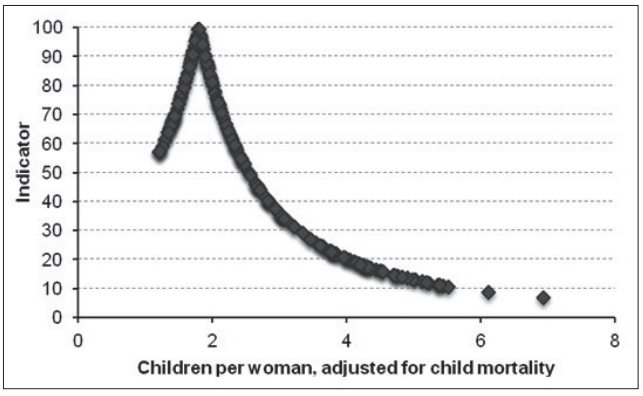


Figure 11: Relationship between fertility rate indicator and adjusted fertility rate

Theoretical basis

Population growth and decline is an emotive and controversial subject that has often been simplistically addressed in economics

and sustainability literature. However, there are several arguments for its inclusion in a measure of intergenerational solidarity.

First, as is noted in the I=f(P,A,T)[18] equation (Alcott 2010), a rising population may increase impact on the environment. This applies most in the richest countries, as the majority of growth in developing nations comes from the families with the lowest footprints (Aassve et al. 2005). However, in these nations it may imply increasing inequality, expansion of slums and pressure on social institutions (Davis 2006). Population growth may also negatively affect future wellbeing through reduction in share of scarce resources such as water.

A shrinking population might sometimes be beneficial, implying that absolute GDP, footprint and so on may be reduced while maintaining or increasing GDP per capita. However, too much reduction at once means that few young people are left to care for elderly dependents. This is especially so if, as in many developed countries, lifespans have increased but pensioning ages have not. It may also result in so-called "government of the elderly, by the elderly and for the elderly" as in Japan (Coulmas 2007: 92).

On balance, it seems prudent for countries to aim for fertility rates of less than replacement, but not too low. The "optimum" of 1.8 was chosen conservatively based on figures tentatively suggested by demographers Striessnig and Lutz (2014) in research involving thousands of simulated populations. They state "longer-term fertility levels somewhere between 1.5 and 1.8 are the best for our planet and will, at the same time, result in future higher welfare as long as we invest more in… education."

Future directions

It is preferable to correct for differences in the death rates of children and younger adults in a more extensive way than using just child mortality rates. Net reproduction rate (Espenshade et al. 2003) should replace the current formula as soon as data make it feasible. Additional theory might be used to better inform the slopes of the indicator adjustments, and to benchmark the optimum figure.

In addition, the 1.8 target used currently is not a fair target for countries early in demographic transition. For these, it may be possible to use a more complex formula that compares current and predicted adjusted fertility rates in order to compensate for this.

Social Indicator: GDP-adjusted child mortality

Metric	0	100	Equation	Time period	Source
% difference between actual child mortality and predicted child mortality	≥50%	≤-50%	$100\left(\frac{x-50}{-50-50}\right)$ [See Figure 12 for equation used to predict values]	5-year average (2008-2012)	UN Inter-agency Group for Child Mortality Estimation, (2015)

Table 9: Equation, definition and data source for child mortality indicator

The indicator

This indicator examines child (under-5) mortality. In order to correct for GDP, for each year a power regression was calculated (Figure 12) which was used to estimate what child mortality "should" be based on a country's per-capita income. Observed child mortality was expressed as a percentage of this, and entered into the equation above. The upper and lower benchmarks were chosen based on the data range, and for explanatory power: a score of 50 is equivalent to matching the predicted mortality rate, and every point of difference from that is a % distance from that rate (i.e. a score of 75 implies a country is 25% below the predicted mortality rate).

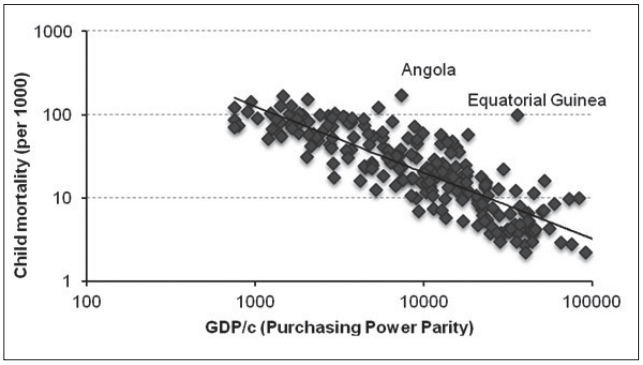


Figure 12: Log-log relationship between child mortality and GDP/c in 2012, with regression best fit: r^2=0.70 p<0.01, y = 30482$x^{-0.79}$

Theoretical basis

Health is one the main forms of human capital that are passed on between generations, and child mortality is used here as an indicator of the health component of the next generation's human capital. It is also widely regarded as one of the best indicators of current national health status (Wang 2002). However, GDP is a significant direct and indirect causal variable (O'Hare et al. 2013); of the years 2008-2012 it predicted an average of 74.9% of variance in child mortality (log-log, see Figure 12 for 2012's regression). As this index measures intergenerational solidarity proportional to ability to give, it seems reasonable to control for GDP per capita. To illustrate, Iceland has one of the lowest child mortality rates in the world, declining from 2.7 to 2.2 per 1,000 over 2008-12. Based on the regression of all countries, and given its GDP of $44 200, we might expect it to have a 2012 child mortality rate of 5.3; it is doing more than twice as well as might be expected, and therefore receives 100 in the index. Other countries with similar ratios are Cuba, South Korea and Eritrea; while Eritrea has a 2012 child mortality rate of 51.6 per 1000, it is so poor that this is around half its expected rate, and its high score in the indicator seems justified given its comparatively successful campaigns against malaria (Mufunde et al. 2007) and maternal mortality (Holzgreve et al. 2012).

Health is one the main forms of human capital that are passed on between generations and child mortality is used here as an indicator of the health component of the next generation's human capital.

There seem to be several causal pathways to decreasing child mortality, and disagreement about which are most important in which contexts. However, in developing nations a considerable amount of the variance seems to be driven by female education (Filmer/Pritchett 1999; Gakidou et al. 2010) – another form of intergenerational capital transfer which this indicator may be a proxy for.

Future directions

This indicator is fundamentally related to the annual derivation of the relationship between GDP and child mortality. If the relation-

ship between these variables becomes less significant or precise, then the indicator method should be changed to reflect this.

Results

Map of results

Figure 13: Choropleth map of index score

Distribution of countries

The full table of results for the index can be seen in Online Appendix II (see igjr.org). In total, 120 countries covering 92.4% of the world's population were included. Most countries were in the middle of the range, with the median being 42 and the mean being 40. Norway was the best performing country by some way (78 vs. 70 for the next highest, Costa Rica), and Mongolia took bottom place with 10. Table 10 shows some cultural divisions of particular note. Within these groups, there are some outliers of note. In the OECD, Turkey, Greece and Portugal are on 32 and 33, while the USA does only marginally better on 40. In Latin America, Nicaragua trails on 24, behind next-placed Paraguay on 36, but Costa Rica comes second in the world on 70, 10 points ahead of Peru. It is important to note that these categories exclude countries with insufficient data. These tended to be very small countries, those below the Sahara, and those in the Middle East.

Group	Mean	Range
Countries with constitutional reference to future generations:	42	65
Communist/Post-Communist:	47	58
Nordic Countries:	61	28
Anglosphere:	53	24
Latin America:	47	46
Sub-Sahara:	21	24
Oil-Producers:	39	63
OECD:	54	46
Confucian:	63	11

Table 10: Selected mean index scores and ranges of different groups of countries. See supplementary material for a list of countries in each grouping

Discussion

How useful is the index?

After compiling an index, it is important to sense-check it. Does it say anything useful? Does it react well to different data inputs? This section summarises some of the indications that it works well.

Geometric aggregation

The use of geometric aggregation has allowed the index to react well to extremes of poor performance, even in only one dimension. For example, regarding low performance in one field, Paraguay has middling economic and slightly below-average social components, and its carbon footprint and renewable energy use are among the best in the world. However, given it has the worst forest degradation rate in the world (an astonishing 16.8%), its final score of 32 is much lower than it might otherwise be – if it had even the same degradation rate as Brazil, its final score would have jumped to 50.

Correlations

All indicators except wealth inequality correlated with the final outcome (see supplementary material online at igjr.org). The standard deviation for wealth inequality was low (10.9) even after a square transformation, which is likely to be one reason for this. This does not necessarily suggest that it should be excluded, given that it did change countries' relative scores with each other. Indeed, it may come to be of more discriminative use in the future as wealth inequality in many countries is rising (Stierli et al. 2014).

One of features of a good index is that it is interesting, i.e. it differentiates superficially similar countries and provides a good explanation for that. For example, it may be surprising that the USA's score of 40 is so low compared to similar countries in the OECD; however, this can be traced partly to high inequality and carbon footprints, low savings rates and very poor child mortality given its GDP per capita.

Carbon footprint correlates negatively, but this is mostly driven by poor, low-footprint countries and it affects the rankings of better-scoring countries in a highly heterogeneous way. It is worth noting that five of the top 10 scoring countries had footprints of 0.8 Gha/c or below.

Differentiation

One of features of a good index is that it is interesting, i.e. it differentiates superficially similar countries and provides a good explanation for that. For example, it may be surprising that the USA's score of 40 is so low compared to similar countries in the OECD (Table 10); however, this can be traced partly to high inequality and carbon footprints, low savings rates and very poor child mortality given its GDP per capita. Thus, the USA can be said to generally act less in the interests of future generations than other similar countries, something that is not necessarily apparent from individual indicators.

Another example is that despite their generally high scores, the three Scandinavian countries are further spread than might be expected for such culturally, linguistically and economically homogenous countries. The root causes can be traced to varying investments in renewable energy, savings, and differing inequality. Interestingly, forest degradation appears highest in Sweden, despite having by far the most forest area per capita. Iceland, which shares many cultural features, fares the worst of all Nordic countries despite very good environmental and social scores. This is entirely caused by its recent history of economic mismanagement and consequential current account and savings problems.

Patterns of note

<u>High and low performers</u>

The highest scores are generally driven by good performance in all of the social indicators, healthy current account balances and high

savings (see supplementary material), while environmental indicators are not much above the median aside from low-carbon energy generation (+20). Amongst low scorers, the differences seem to be driven by forest degradation (the bottom deciles are on average -34 points from the median), balances of payments (-45 points), pupil-teacher ratios (-45 points), and fertility rates (-31 points).

Cultures and groupings

In dividing up the world into some social and economic groupings (Table 10), some patterns can be discerned. Despite the top 10 containing three post-communist countries, one communist country (Vietnam; China is 11th) and two Nordic social democracies, countries with socialist or communist heritage have a wide range of scores and this group also contains the overall lowest country (Mongolia). Further research might investigate the particulars of the legacy of socialist planning on their levels of intergenerational solidarity; it may be that certain countries have retained the kind of long-term orientation that supposedly characterised planned economies (Ellman 2014). The Nordic social democracies all score above average, but the four Confucian nations included do even better; some researchers have proposed that long-termism is an inherent part of Confucian culture (e.g. Hofstede 1993) and this gives some evidence to this suggestion. In an interesting contrast, it appears that reference in a nation's constitution to future generations is irrelevant to actual actions – these countries perform no better than others on average. Also, the large oil incomes that fund some nations' sovereign wealth investment funds – Norway and Saudi Arabia, for instance – do not appear to have a universal effect on intergenerational solidarity, with the average score of major oil producers similar to the average of all countries.

The Nordic social democracies all score above average, but the four Confucian nations included do even better; some researchers have proposed that long-termism is an inherent part of Confucian culture (e.g. Hofstede 1993) and this gives some evidence to this suggestion.

Correlates

There are some interesting relationships with national variables of population density, population and GDP (PPP) per capita[19]. It seems that there is relatively little relationship with density or population, thus casting doubt on the idea that intergenerational solidarity may be something that is particularly easy for sparsely-populated or small countries. However, despite attempting to measure proportionality and thus expressing a preference for indicators that were not purely proxies for income, GDP/c does have a large and significant relationship with several indicators and a medium relationship with the overall index. There may also be a causative relationship in either direction, i.e. that rich countries can give proportionally more to future generations or that long-termist countries end up with higher incomes. Rawls suggests that this is the case:

> *"When people are poor and saving is difficult, a lower rate of saving should be required; whereas in a wealthier society greater savings may reasonably be expected since the real burden of saving is less."* (Rawls 1999: 255)

However, the correlation does only predict 22% of variance and there are many outliers; it is quite likely that much of the effect comes from the generally poor performance of Sub-Saharan African countries suffering from well-documented complexes of socioeconomic and institutional problems. It should also be noted that within the top decile of nations, there is a very wide range of per-capita income, from $694 in Nepal and $3279 in Sri Lanka to over $100,000 in Norway.

Suggestions for refinements and future research

Rawls asserts

> "*Each passes on to the next a fair equivalent in real capital as defined by a just savings principle… capital is not only factories and machines, and so on, but also the knowledge and culture, as well as the techniques and skills, that make possible just institutions and the fair value of liberty.*" (Rawls 1999: 256)

This index could not capture the kinds of capital he mentions, except through a measure of each nation's investment in primary education. Further consideration should be given to these as the coverage and quality of measurement of social capital improves. As datasets become available, indicators from other dimensions should be added to the index, whilst retaining the ratio between different dimensions. Of those mentioned in Online Appendix I (see igjr.org), the social discount rate should be one of the main priorities for further research. Theory-based predictors of personal discount rates should also receive attention.

It appears that reference in a nation's constitution to future generations is irrelevant to actual actions – these countries perform no better than others on average.

Weighting is an area of contention in index-building. While this index has *a priori* equal weighting, *a posteriori* contributions from each indicator could be calibrated through the use of structural equation modelling or similar, although dimensions should remain equally-weighted. Also, more GDP-corrections might be considered for a number of the indicators; as this index is conceived as a comparative tool between cultures rather than a direct measure, this would help adjust for ability to give. Poor nations that give more than would be expected to their future generations are at least as important to study as those more able to give, if not more so.

Further editions of the index might also take into account cross-cultural surveys about our attitudes and behaviour towards the future, for example the Consideration of Future Consequences Scale (Strathman et al. 1994) or the Zimbardo Time Perspective Inventory (Zimbardo/Boyd 1999). An interesting project in itself would be to see if future orientation by either of these measures correlates with the results of this index. Similarly interesting would be further research into the reasons for high index scores, particularly as to whether "Confucianism" can really explain why Korea, Japan, China and Vietnam score so highly.

Greater statistical analysis (e.g. factor analysis, sensitivity analysis) could be performed on the index in order to better select variables and in particular to adjust the transformations and processing of indicator data to ensure equal weighting. It would be of benefit to do this after review from academics in relevant fields, to better determine subjective impressions of the indicator results. In the first iterations of the index, equal weighting is justified by a lack of

information, but as we better define the constituents of intergenerational solidarity and assess the ability of indicators to measure this, weighting may be used.
Lastly, the index could be calculated regularly to give time-series data. Historical data are also available for all indicators except pupil-teacher ratio and forest degradation, but each year back in time includes fewer countries. It seems promising that both of these factors will be measured with greater accuracy in the future.

Conclusion

This index is a coherent attempt to construct a theory-based multidimensional composite measure of intergenerational solidarity, the yardstick for intergenerational justice. As a starting point, it is still far from being precise or accurate, but in this regard it suffers from the same limitations as all composite indexes, and accounts for many of the problems in others.
Despite its limitations, the usefulness of a composite figure is shown in revealing interesting patterns of nations, for example that high income does not necessarily guarantee proportionally high levels of intergenerational solidarity, that constitutional reference to future generations is largely irrelevant to action in their interests, and that countries with a Confucian heritage do seem to act more in the interests of future generations. Where it may be most useful is in the decomposition of national scores to look for plausible reasons behind a lack of intergenerational solidarity. As it stands, this index can assist further research into the causes of intergenerational solidarity and lends itself to refinement by other scholars.
The task of understanding and prioritising intergenerational solidarity may seem daunting, but we live in a world that is testament to the long-term plans and actions of our ancestors. This index was conceived in an oak-coppice forest in Wales where cover trees have been planted in 150 year rotations for at least the last millennium. If medieval charcoal-burners and foresters – some of the poorest classes of their time – were able to be so magnanimous, then there is hope for the societies of our own time.

Notes

1 I would like to thank Brynhildur Davíðsdóttir and Þröstur Þorsteinsson for their comments on an earlier version of this paper, and Beth Stratford and Bec Sanderson for their intellectual solidarity. I would also like to thank the forestry workers of Coppicewood College in Wales for keeping our heritage of intergenerational solidarity alive and, in doing so, inspiring this project.
2 This is used throughout as ">50 years" following the definition of "intergenerational discounting" set out by Moore et al. (2004).
3 See section "Conceptional framework" for a definition.
4 "Discounting the future" refers to the extent to which we prefer present over future value. The "discount rate" is an economic term used to define the net present value of future stocks and flows of capital. It has a vital role in determining investment in future generations, but see section "Economic Indicators".
5 This conceptualisation is close to "sustainable development", i.e. "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987: 41). However, Stiglitz et al. note (2009: 72) that measures of sustainable development often "effectively conflate the measurement of current wellbeing and the measurement of its sustainability". This index is focused only on the future, specifically on investments in future wellbeing (i.e. beyond basic needs). This is meant to encompass all parts of society, not just government investments.
6 And sometimes explicit – more than 40 nations reference obligations to future generations in their constitutions (Boyd 2011: 311).
7 As with the "strong" version of the sustainability concept.
8 This is not to say that they are vague, however – for example, the capacity of societies to transform might be related to evidence-based policy decisions, capture of government by special interests, path dependency in infrastructure choice etc. Aggregating this would clearly be difficult, but the area deserves qualitative commentary.
9 see Online Appendix I (see igjr.org).
10 All null values were aggregated using a value of 1, as is necessary for geometric aggregation to function.
11 Equations are unsimplified for explanatory clarity. Here, -10 is the scale minimum, and 0 is the maximum.
12 Assuming e.g. a linear relationship between GDP and carbon footprint.
13 For Malawi, Uganda, Madagascar, Laos, Paraguay, Niger, Burkina Faso, Mali, Rwanda, Guinea, Burundi, Liberia.
14 Some classic examples of national economic crises predicted by a large current account deficit are: the 1991 Indian crisis; the 1997 Asian crisis (Radelet/Sachs 1998); the 2008 Icelandic crisis (Obstfeld 2012); the 1999-2002 Argentinian crisis (Bussière 2007); the 1994 Mexican crisis (Blecker/Ibarra 2013); and arguably the ongoing crisis in much of the Eurozone (Krugman 2014), or even the 2008 global financial crisis (Corden 2011).
15 There is considerable discussion of the relationship between current account deficits and post-2008 GDP, e.g. see Backus et al. (2005); Blanchard (2007); Blanchard/Milesi-Ferretti (2012); Brissimis et al. (2012); Herwartz/Siedenburg (2007); Milesi-Ferretti et al. (1996); Radelet/Sachs (1998).
16 Vemuri and Costanza (2006) could find no measure of social capital that adequately related even to current wellbeing, and Glaeser et al. (2004) found no necessary relationship between institutional quality (a common measure of social capital), growth and poverty-reduction, and considered most measures of institutional quality to be "conceptually unsuitable" for measuring what they purported.
17 It is common for indicators of educational capital in composite indexes to use spending on education or years of schooling as an indicator. However, years of primary schooling do not vary meaningfully outside of the least developed countries, and the number of teaching staff probably has a closer relationship with education outcomes than spending more generally (Glewwe et al. 2013).
18 i.e. impact is a function of population, affluence and technology.
19 See supplementary material.

References

Aassve, Arnstein et al. (2005): Poverty and Fertility in Less Developed Countries: A Comparative Analysis (No. 2005–13). Colchester: Institute for Social & Economic Research.

ACARA (2011): National Report on Schooling in Australia 2009: Part 9 Additional Statistics. Sydney.

ACARA (2013): National Report on Schooling in Australia 2011: Part 9 Additional Statistics. Sydney.

Agency for Statistics of Bosnia and Herzegovina (2011): Bosnia and Herzegovina in Figures 2011. Sarajevo.

Alcott, Blake (2010): Impact caps: why population, affluence and technology strategies should be abandoned. In: Journal of Cleaner Production, 18 (6), 552-560.

Alvaredo, Facundo (2017): Global inequality dynamics: New findings from WID. world. In: American Economic Review, 107 (5), 404-409.

Backus, David et al. (2005): Current account fact and fiction (Meeting Papers No. 155), Society for Economic Dynamics.

Bindraban, Prem S. et al. (2012): Assessing the impact of soil degradation on food production. In: Current Opinion in Environmental Sustainability, 4 (5), 478-488.

Blanchard, Olivier (2007): Adjustment within the euro. The difficult case of Portugal. In: Portuguese Economic Journal, 6 (1), 1-21.

Blanchard, Olivier / Milesi-Ferretti, Gian M. (2012): (Why) Should Current Account Balances Be Reduced? In: IMF Economic Review, 60 (1), 139-150.

Blecker, Robert A. / Ibarra, Carlos A. (2013): Trade liberalization and the balance of payments constraint with intermediate imports: The case of Mexico revisited. In: Structural Change and Economic Dynamics, 25 (1), 33-47.

Böhringer, Christoph / Jochem, Patrick (2007): Measuring the immeasurable: A survey of sustainability indices. In: Ecological Economics, 63 (1), 1-8.

Boljanović, Srdan (2012): A sustainability analysis of Serbia's current account deficit. In: Economic Annals, 57 (195), 139-172.

Bolt, Katherine / Makete, Mampite / Clemens, Michael (2002): Manual for Calculating Adjusted Net Savings. World Bank.

Boucher, Doug / Roquemore, Sarah / Fitzhugh, Estrellita (2011): Brazil's Success in Reducing Deforestation. In: Tropical Conservation Science, 6 (3), 426-445.

Boyd, David R. (2011): The Environmental Rights Revolution: A Global Study of Constitutions, Human Rights, and the Environment. Vancouver: UBC Press.

Brender, Adi / Drazen, Allen (2005): Political budget cycles in new versus established democracies. In: Journal of Monetary Economics, 52 (7), 1271-1295.

Brissimis, Sophocles et al. (2012): Current account determinants and external sustainability in periods of structural change. In: Economic Change and Restructuring, 45 (1), 71-95.

Bussière, Matthieu (2007): Balance of payment crises in emerging markets: how early were the "early" warning signals? No. 713. https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp713.pdf?66593e384324cd4bf1a8ada85cba80d5. Viewed on 24 May 2018.

Carter, Michael / Barrett, Christopher B. (2006): The economics of poverty traps and persistent poverty: An asset-based approach. In: Journal of Development Studies, 42 (2), 178-199.

Ceriani, Lidia / Verme, Paolo (2012): The origins of the Gini index: Extracts from Variabilità e Mutabilità (1912) by Corrado Gini. In: Journal of Economic Inequality, 10 (3), 421-443.

CIA (2012): Country Comparison > Oil Production. http://www.indexmundi.com/g/r.aspx?v=88. Viewed on 18 April 2018.

Conijn, J. G. et al. (2013): Global changes of net primary productivity, affected by climate and abrupt land use changes since 1981. Towards mapping global soil degradation. https://www.isric.online/sites/default/files/isric_report_2013_01.pdf. Viewed on 19 June 2018.

Corden, W. Max (2011): Global imbalances and the paradox of thrift. Centre for Economic Policy Research: Policy Insight, April, 1-10.

Coulmas, Florian (2007): Population Decline and Ageing in Japan: The Social Consequences. New York: Routledge.

Daly, Herman E. (1990): Toward some operational principles of sustainable development. Ecological Economics, 2 (1), 1-6.

Dasgupta, Partha (2001): Human Well-being and the Natural Environment. Oxford: Oxford University Press.

Davis, Mike (2006): Planet of slums. (1st edn). London: Verso.

Davis, Steven J. / Caldeira, Ken (2010): Consumption-based accounting of CO_2 emissions. Proceedings of the National Academy of Sciences of the United States of America, 107 (12), 5687-5692.

Ebert, Udo / Welsch, Heinz (2004): Meaningful environmental indices: A social choice approach. Journal of Environmental Economics and Management, 47 (2), 270-283.

Edwards, Sebastian (2004): Thirty Years of Current Account Imbalances, Current Account Reversals, and Sudden Stops. IMF Staff Papers, 51.

Ellman, Michael (2014): Socialist Planning (3rd edn). Cambridge: Cambridge University Press.

Espenshade, Thomas / Guzman, Juan Carlos / Westoff, Charles (2003): The Surprising Global Variation in Replacement Fertility. Population Research and Policy Review, 22 (5-6), 575-583.

Filmer, Deon / Pritchett, Lant (1999): Child Mortality and Public Spending on Health: How Much Does Money Matter? Policy Research Working Papers. https://pdfs.semanticscholar.org/bfc5/d78e4a35049e64b24001f39b35a0c149d01a.pdf. Viewed on 24 May 2018.

Food and Agriculture Organisation (2014): Forest area (% of land area). http://data.worldbank.org/indicator/AG.LND.FRST.ZS. Viewed on 18 April 2018.

Gakidou, Emmanuela et al. (2010): Increased educational attainment and its effect on child mortality in 175 countries between 1970 and 2009: A systematic analysis. In: The Lancet, 376 (9745), 959-974.

Geary, Timothy F. (2001): Afforestation in Uruguay: Study of a changing landscape. Journal of Forestry, 99 (7), 35-39.

Glaeser, Edward L et al. (2004): Do institutions cause growth? In: Journal of Economic Growth, 9, 271-303.

Glewwe, Paul et al. (2013): School resources and educational outcomes in developing countries: A review of the literature from 1990 to 2010. Cambridge, MA.

Global Footprint Network (2015): Ecological Footprint Public Data Package. http://old.footprintnetwork.org/en/index.php/GFN/page/public_data_package. Viewed on 18 April 2018.

Gnègnè, Yacouba (2009): Adjusted net saving and welfare change. In: Ecological Economics, 68 (4), 1127-1139.

Hansen, Matthew C. et al. (2013a): High-resolution global maps of 21st-century forest cover change. In: Science, 342 (6160), 850-853.

Hansen, Matthew C. et al. (2013b): High-resolution global maps of 21st-century forest cover change. (Supplementary Material). In: Science, 342 (6160), 850-853.

Havránek, Tomáš et al. (2015): Cross-country heterogeneity in intertemporal substitution. In: Journal of International Economics, 96, 100-118.

Headey, Bruce / Wooden, Mark (2004): The effects of wealth and income on subjective well-being and ill-being. In: Economic Record, 80 (1), 24-33.

Herwartz, Helmut / Siedenburg, Florian (2007): Determinants of current account imbalances in 16 OECD countries: An out-of-sample perspective. In: Review of World Economics, 143 (2), 349-374.

Hofstede, Geert (1993): Cultural constraints in management theories. In: The Executive, 7 (1), 81-94.

Holzgreve, Wolfgang / Greiner, Dorothea / Schwidtal, Peter (2012): Maternal mortality in Eritrea: Improvements associated with centralization of obstetric services. In: International Journal of Gynecology and Obstetrics, 119 (Supplement 1), S50-54.

Hsu, Angel et al. (2014): The 2014 Environmental Performance Index, The 2014 Environmental Performance Index. New Haven, Yale Center for Environmental Law & Policy.

Hsu, Angel / Johnson, Laura / Lloyd, Ainsley (2013): Measuring Progress: A Practical Guide from the Developers of the Environmental Performance Index (EPI). New Haven, Yale Center for Environmental Law & Policy.

IEA (2015a): Alternative and nuclear energy (% of total energy use). http://data.worldbank.org/indicator/EG.USE.COMM.CL.ZS. Viewed on 18 April 2018.

IEA (2015b): Brazil Sankey Balance. http://www.iea.org/Sankey/#?c=Brazil&s=Balance. Viewed on 18 April 2018.

IMF (2015): Current account balance (BoP, current US$). http://data.worldbank.org/indicator/BN.CAB.XOKA.CD/countries. Viewed on 18 April 2018.

Jin, Lixian / Cortazzi, Martin (1998): Dimensions of dialogue: Large classes in China. In: International Journal of Educational Research, 29 (8), 739-761.

Johnson, Eric (2009): Goodbye to carbon neutral: Getting biomass footprints right. In: Environmental Impact Assessment Review, 29 (3), 165-168.

Kasser, Tim (2011): Cultural values and the well-being of future generations: A cross-national study. In: Journal of Cross-Cultural Psychology, 42, 206-215.

Kojo, Matti / Kari, Mika / Litmanen, Tapio (2010): The socio-economic and communication challenges of spent nuclear fuel management in Finland. The post site selection phase of the repository project in Eurajoki. In: Progress in Nuclear Energy, 52 (2), 168-176.

Krueger, Alan (2011): Economic Considerations and Class Size. In: The Economic Journal, 113 (485), F34-F63.

Krugman, Paul (2014): Currency Regimes, Capital Flows, and Crises. In: IMF Economic Review, 62 (4), 470-493.

Kurz, Werner et al. (2008): Mountain pine beetle and forest carbon feedback to climate change. In: Nature, 452 (7190), 987-990.

Kuypers, Sarah / Marx, Ive (2018): Estimation of Joint Income-Wealth Poverty: A Sensitivity Analysis. In: Social Indicators Research, 136 (1), 117-137.

Laugier, Marc-Antoine (1755): An Essay on Architecture (2nd edn). London: Gray's Inn.

Le, Hai et al. (2012): More than just trees: Assessing reforestation success in tropical developing countries. In: Journal of Rural Studies, 28 (1), 5-19.

Leimbach, Marian / Baumstark, Lavinia (2011): Intertemporal trade and the Integrated Assessment of climate change mitigation policies (No. 3036).

Liska, Adam et al. (2014): Biofuels from crop residue can reduce soil carbon and increase CO2 emissions. In: Nature Climate Change, 4, 398-401.

Lomborg, Bjørn (2009): Latin American Development Priorities. Cambridge: Cambridge University Press.

Lopes, Carlos (2015): Rousseau, Rio and the Green Economy. In: Mancebo, Francois / Sachs, Ignacy (eds.): Transitions to Sustainability. Amsterdam: Springer Netherlands, 65-76.

Lu, Yingying / Stegman, Alison / Cai, Yiyong (2013): Emissions intensity targeting: From China's 12th Five Year Plan to its Copenhagen commitment. In: Energy Policy, 61, 1164-1177.

Magura, Tibor / Elek, Zoltán / Tóthmérész, Béla (2002): Impacts of non-native spruce reforestation on ground beetles. In: European Journal of Soil Biology, 38 (3-4), 291-295.

Maina, Joseph et al. (2013): Human deforestation outweighs future climate change impacts of sedimentation on coral reefs. In: Nature Communications, 4.

Melillo, Jerry et al. (2009): Indirect emissions from biofuels: how important? In: Science, 326 (5958), 1397-1399.

Mendenhall, Chace / Daily, Gretchen / Ehrlich, Paul R. (2012): Improving estimates of biodiversity loss. In: Biological Conservation, 151, 32-34.

Milesi-Ferretti, Gian Maria / Razin, Assaf (1996): Sustainability of persistent current account deficits. NBER Working Papers 5467.

Moore, Mark A. et al. (2004): Just give me a number! Practical values for the social discount rate. In: Journal of Policy Analysis and Management, 23 (4), 789-812.

Mufunda, Jacob et al. (2007): Roll back malaria: An African success story in Eritrea. In: South African Medical Journal, 97 (1), 46-50.

Nearing, Mark / Pruski, Fernando / O'Neal, M.R. (2004): Expected climate change impacts on soil erosion rates: A review. In: Journal of Soil and Water Conservation, 59 (1), 43-50.

Noguchi, Takao et al. (2014): Characterizing the time-perspective of nations with search engine query data. In: PloS One, 9 (4), 1-5.

Nummi, Olli / Kyllönen, Jarkko / Eurajoki, Tapani (2012): Long-Term Safety of the Maintenance and Decommissioning Waste of the Encapsulation Plant. Helsinki: Posiva Oy.

O'Hare, Bernadette et al. (2013): Income and child mortality in developing countries: a systematic review and meta-analysis. In: Journal of the Royal Society of Medicine, 106 (10), 408-414.

Obstfeld, Maurice (2012): Does the current account still matter? In: American Economic Review, American Economic Association, 102 (3), 1-23.

OECD (2008): Handbook on Constructing Composite Indicators. Methodology and User Guide. http://www.oecd.org/sdd/42495745.pdf. Viewed on 19 June 2018.

OECD (2014): Indicator D2: What is the student-teacher ratio and how big are classes? In Education at a Glance 2014: OECD Indicators. OECD Publishing.

Olivei, Giovanni P. (2000): The Role of Savings and Investment in Balancing the Current Account: Some Empirical Evidence from the United States. In: New England Economic Review, July. Federal Reserve Bank of Boston, 3-14.

Osberg, Lars / Sharpe, Andrew (2002): An Index of Economic Well-Being for Selected OECD Countries. In: Review of Income and Wealth, 48 (3), 291-317.

Oxford Martin Commission (2013): Now for the Long Term. Oxford. https://www.oxfordmartin.ox.ac.uk/downloads/commission/Oxford_Martin_Now_for_the_Long_Term.pdf. Viewed on 24 May 2018.

Pearce, David / Atkinson, Giles (1993): Capital theory and the measurement of sustainable development: an indicator of "weak" sustainability. In: Ecological Economics, 8 (2), 103-108.

Piketty, Thomas (2014): Capital in the Twenty-first Century. Cambridge: Harvard University Press.

Piketty, Thomas (2015): About Capital in the Twenty-First Century. In: American Economic Review, 105 (5), 48-53.

Pillarisetti, J. Ram (2005): The World Bank's "genuine savings" measure and sustainability. In: Ecological Economics, 55, 599-609.

Qiang, Wang / Ning, Zhang (2011): Teaching Large Classes in China English as a Foreign Language. http://www.ntu.edu.vn/Portals/96/Phuong%20phap%20GD/Teaching%20large%20classes%20(7).pdf. Viewed on 24 May 2018.

Radelet, Steven / Sachs, Jeffrey (1998): The onset of the East Asian financial crisis. NBER Working Paper No. 6680.

Rawls, John (1999): A Theory of Justice: 2nd, rev., ed. Cambridge: Harvard University Press.

Ruberton, Peter / Gladstone, Joe / Lyubomirsky, Sonja (2016): How Your Bank Balance Buys Happiness: The Importance of "Cash on Hand" to Life Satisfaction. In: Emotion, 16 (5), 575-580.

Ruskin, John (1872): Unto this last: four essays on the first principles of political economy (1st edn). New York: J. Wiley & Sons.

Shine, Keith (2009): The global warming potentia: the need for an interdisciplinary retrial. In: Climatic Change, 96 (4), 467-472.

Shorrocks, Anthony / Davies, Jim / Luberas, Rodrigo (2014): Global Wealth Databook 2014. Zürich: Credite Suisse.

Short, Ian / Hawe, Jerry (2012): Possible silvicultural systems for use in the rehabilitation of poorly performing pole-stage broadleaf stands: Coppice-with-standards. In: Irish Forestry, 69 (1-2),148-166.

Siikamäki, Juha / Newbold, Stephen (2012): Potential biodiversity benefits from international programs to reduce carbon emissions from deforestation. In: Ambio, 41 (Supplement 1), 78-89.

Singh, Rajesh Kumar et al. (2012): An overview of sustainability assessment methodologies. In: Ecological Indicators, 15 (1), 281-299.

Solomon, Susan et al. (2009): Irreversible climate change due to carbon dioxide emissions. Proceedings of the National Academy of Sciences of the United States of America, 106 (6), 1704-1709.

Sørensen, Aage (2013): Toward a Sounder Basis for Class Analysis. In: American Journal of Sociology, 105 (6), 1523-1558.

Srebotnjak, Tanja et al. (2012): A global Water Quality Index and hot-deck imputation of missing data. In: Ecological Indicators, 12 (17), 108-119.

Steffen, Will et al. (2015): Planetary Boundaries: Guiding human development on a changing planet. In: Science, 347 (6223), 1-17.

Stierli, Markus et al. (2014): Global Wealth Report 2014. Zürich: Credite Suisse.

Stiglitz, Joseph / Sen, Amartya / Fitoussi, Jean-Paul (2009): Report by the Commission on the Measurement of Economic Performance and Social Progress. http://ec.europa.eu/eurostat/documents/118025/118123/Fitoussi+Commission+report. Viewed on 24 May 2018.

Strathman, Alan et al. (1994): The Consideration of Future Consequences: Weighing Immediate and Distant Outcomes of Behavior. In: Journal of Personality and Social Psychology, 66 (4), 742-752.

Striessnig, Erich / Lutz, Wolfgang (2014): How does education change the relationship between fertility and age-dependency under environmental constraints? A long-term simulation exercise. In: Demographic Research, 30 (16), 465-492.

Thiry, Géraldine / Cassiers, Isabelle (2010): Alternative Indicators to GDP: Values behind Numbers Adjusted Net Savings in Question. IRES Discussion Papers 2010018. Université catholique de Louvain.

Thomas, Chris D. et al. (2004): Extinction risk from climate change. In: Nature, 427 (6970), 145-148.

US Environmental Protection Agency (2015): National Greenhouse Gas Emissions and Sinks 1990-2013. Washington.

UN Inter-agency Group for Child Mortality Estimation (2015): Mortality rate, under-5 (per 1,000 live births). https://data.worldbank.org/indicator/SH.DYN.MORT. Viewed on 24 May 2018.

UNDP (2010): Human Development Report 2010. New York: Palgrave Macmillan.

UNDP (2014): Human Development Report 2014. New York: Palgrave Macmillan.

UNESCO (2012): The International Standard Classification of Education 2011. Montreal: UNESCO Institute for Statistics.

UNESCO (2015): Pupil-teacher ratio, primary. http://data.worldbank.org/indicator/SE.PRM.ENRL.TC.ZS. Viewed on 18 April 2018.

United Nations (2013): Intergenerational solidarity and the needs of future generations, A/68/322.

UNU-IHDP / UNEP (2014): Inclusive Wealth Report 2014. Measuring progress toward sustainability. Cambridge: Cambridge University Press.

US EIA (2014): International Energy Statistics. http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=6&pid=29&aid=12. Viewed on 18 April 2018.

Valinger, Erik / Fridman, Jonas (2011): Factors affecting the probability of windthrow at stand level as a result of Gudrun winter storm in southern Sweden. In: Forest Ecology and Management, 262 (3), 398-403.

Vallance, Suzanne / Perkins, Harvey / Dixon, Jennifer (2011): What is social sustainability? A clarification of concepts. In: Geoforum, 42, 342-348.

Vanhuysse, Pieter (2013): Intergenerational Justice in Aging Societies: A Cross-national Comparison of 29 OECD Countries. Gütersloh: Bertelsmann Stiftung. https://www.bertelsmann-stiftung.de/en/publications/publication/did/intergenerational-justice-in-aging-societies/. Viewed on 19 June 2018.

Vemuri, Amanda W. / Costanza, Robert (2006): The role of human, social, built, and natural capital in explaining life satisfaction at the country level: Toward a National Well-Being Index (NWI). In: Ecological Economics, 58 (1), 119-133.

Walker, Brian et al. (2004): Resilience, adaptability and transformability in social-ecological systems. In: Ecology and Society, 9 (2), https://www.ecologyandsociety.org/vol9/iss2/art5/. Viewed on 24 May 2018.

Wang, Limin (2002): Determinants of Child Mortality in Low-Income Countries: Empirical Findings from Demographic and Health Surveys. http://siteresources.worldbank.org/INTEEI/214578-1112740369617/20486217/HealthOutcomes.pdf. Viewed on 19 June 2018.

Wolff, Laurence (2008): Education in Haiti: The Way Forward. Washington: PREAL.

World Bank (2006): Recent Genuine Saving Estimates. In Where Is The Wealth of Nations? (1st edn). Washington: World Bank Publications.

World Bank (2015a): Adjusted net savings, including particulate emission damage (% of GNI). http://data.worldbank.org/indicator/NY.ADJ.SVNG.GN.ZS. Viewed on 18 April 2018.

World Bank (2015b): Fertility rate, total (births per woman). http://data.worldbank.org/indicator/SP.DYN.TFRT.IN. Viewed on 18 April 2018.

World Commission on Environment and Development (1987): Report of the World Commission on Environment and Development: Our Common Future.

World Future Council (2013): Report on Expert Panel on Intergenerational Solidarity. http://www.futurejustice.org/blog/blog/report-on-expert-panel-on-intergenerational-solidarity/. Viewed on 18 April 2018.

Zhuang, Juzhong et al. (2007): Theory and practice in the choice of social discount rate for cost-benefit analysis: a survey. ERD Working Papers No. 94. Manila: Asian Development Bank.

Zimbardo, Philip G. / Boyd, John N. (1999): Putting time in perspective: A valid, reliable individual-differences metric. In: Journal of Personality and Social Psychology, 77 (6), 1271-1288.

Jamie McQuilkin is an interdisciplinary scientist with particular interests in how various academic disciplines and social institutions value, measure or apply long-term decision-making. He currently works running R&D for an environmental engineering company in Reykjavík, primarily in the practical matters of measuring and reducing the impact of sewage and municipal solid waste.

Contact details:
Jamie McQuilkin
Stangarholti 26
Reykjavík
Iceland
E-Mail: jamie.mcquilkin@gmail.com

The Broken Generational Contract in Europe: Generous transfers to the elderly population, low investments in children

by Bernhard Hammer, Tanja Istenič and Lili Vargha

Abstract: Based on European National Transfer Accounts data from 2010, this paper quantifies and evaluates the balance of intergenerational transfer flows in 16 EU countries, including transfers in the form of unpaid household work. On average, the value of net transfers received by a child amounts to sixteen times the labour income of a full-time worker, and the net transfers received by an elderly person to six times the labour income of a full-time worker. Intergenerational transfers can be regarded as the reciprocal exchange between two generations: the size of the transfers to the child generation determines their potential to generate income and finance public transfers to the elderly population once they enter employment. We develop and calculate an indicator to analyse if there is a balance between transfers to children and transfers expected by the elderly population. The results indicate that in most of the analysed countries the human capital investments in children are far too low to finance the generous transfers to the elderly population in the future.

Keywords: *Generational Contract, Intergenerational Transfers, National Transfer Accounts, Intergenerational Indicators*

Introduction[1]

Periods of dependency in childhood and old age are characteristic of the human life course. The economic needs during these periods are largely covered through transfers from the working-age population. For children, the most important transfers are those from their own parents, with personal care and household services playing a particularly important role. In Europe, the transfers to the elderly population are predominately in the form of public transfers, of which pensions and health services are the largest components. There is an interrelationship between the intergenerational transfers to the child generation and the transfers to the elderly population. For a generation to receive public transfers in old age, it requires the transfers of resources to children in the first place, providing for their needs, upbringing and education. These transfers determine the human capital of the child generation, including their number, and thereby influence their productivity and their potential to contribute to the public transfer system.

However, as Gál et al. (2017) emphasise, there is an asymmetry in the visibility of transfers between generations. While the public transfers to the elderly population are recorded in the central economic statistics such as National Accounts, the private transfers to children are hardly visible in official statistics. The working-age population faces a trade-off between transfers to children, transfers to the elderly population and their own use of resources. There is the danger that the more visible, mandatory public transfers crowd out transfers to children and create an unsustainable imbalance of intergenerational transfers. Using

There is an interrelationship between the intergenerational transfers to the child generation and the transfers to the elderly population.

data from 57 countries, Ehrlich and Kim (2007) find a significant negative relationship between the introduction and expansion of pay-as-you-go pension systems and fertility.

Several measures indicate that the economic situation of young generations has been worsening in the last decade. Chen et al. (2018) show that the risk of poverty for the young and the working-age population has increased significantly since the financial crisis in 2008/09, while it has declined sharply for the elderly population. They conclude that the real incomes of the elderly population were effectively shielded from the crisis, while social protection systems are ill-equipped to provide assistance to the young. Using a range of different measures, Leach et al. (2016) generated a composite *Intergenerational Fairness Index*, which indicates a decline in intergenerational fairness and living standards of the young generations. Because transfers to children are mainly provided by the parents, it is not surprising that researchers find a strong relationship between fertility and the economic conditions (Matysiak et al. 2018; Buckles et al. 2018). Worsening economic conditions for the young population could therefore lead to a vicious cycle of lower fertility and strong population ageing, an increasing burden through public transfers and a further reduction of fertility and investments in the child generation. Keeping a balance between transfers to children and transfers to the elderly population is of key importance for maintaining and recreating the human capital of societies and the maintenance of the intergenerational support system in the long run.

The contribution of this paper is threefold. First, we describe and analyse the relationship between transfers to the child generation and transfers to the elderly population using the concept of a generational contract (Section 2). The concept of a contract provides a framework that facilitates the analysis of economic relationships between generations and the analysis of challenges for the public transfer system due to population ageing. Second, the value of intergenerational transfer flows in 16 EU countries is measured using data from the European National Transfer Accounts and the European National Time Transfer Accounts (Section 3). We distinguish between private transfers of goods and services bought on the market, non-market transfers in the form of services such as household work and care, and public transfers. Third, we develop and calculate a new indicator to analyse if the current level of intergenerational transfers comply with the generational contract and if there is a balance between transfers to children and transfers to the elderly population (Section 4). This measure shows that the age pattern and levels of intergenerational transfer flows is out of balance in most of the countries: human capital investments, in particular in terms of the number of children, are too low to enable the child generation to finance the rather generous transfers to the large elderly population in the future.

Intergenerational transfers and the concept of a generational contract

By using the concept of a contract to describe intergenerational transfers, we emphasise that the economic relationships between generations have characteristics that are usually associated with contractual relationships. This includes in particular reciprocity and the binding nature. However, the term *generational contract* is used in different contexts and with different meaning. Laslett (1992) raises the criticism that it is seldom clear what type of generational relationships is in the mind of politicians or transfer analysts when they refer to generational contracts. We therefore use this section to discuss and clarify the notion and the underlying concepts.

Keeping a balance between transfers to children and transfers to the elderly population is of key importance for maintaining and recreating the human capital of societies and the maintenance of the intergenerational support system in the long run.

We have identified two different types of concepts of generational contracts that are used in the literature and the public discourse. One of these concepts follows the basic logic of social contracts and describes intergenerational support as a hypothetical agreement between different generations, without explicit reciprocal exchange between the contractual partners. The other concept uses the notion of a generational contract to describe intergenerational support as reciprocal, mutual exchange between individuals belonging to two different generations. Our own concept of a generational contract adapts the latter concept and describes intergenerational economic transfers as mutual exchange between generations as a whole, not as direct exchange between individuals belonging to different generations. Such conceptualisation enables us to account for the private and public part of the system of intergenerational support. Before we explain our own concept in detail, we briefly discuss the existing concepts.

The generational social contract

The notion of a generational contract in the meaning of a social contract is not often used in the scientific literature, but is often used in public discourse, in particular in Germany. It justifies the obligation of the current productive generations to finance the pensions and health services of the older generation by arguing that future generations will provide the same service once the current productive generations retire (e.g. CECU 2018). The concept of the generational contract with the meaning of a social contract is derived from social contract theory, in which socio-political arrangements including the state as a whole are interpreted as if they were grounded in the consent of all members of society (Kersting 2015). The intuitive idea of a "social" generational contract is that the redistributive mechanism of the welfare state is based on a hypothetical agreement of different generations or cohorts (Lorenz-Meyer 1999). The popularity of the notion of a *generational contract* or *solidarity contract between generations* in the German-speaking world is based on its appearance in the so called *Schreiber-Plan* (Schreiber 1955), which contributed important elements to German pension reforms in 1957. However, Schreiber's original plan included also transfers to children and was designed as a defined-contribution-pay-as-you-go pension system, with the yearly adjustment of benefits to match total contributions. The concept of a social contract is clearly inappropriate to describe and justify the current organisation of public intergenerational transfers to the elderly population with fixed benefits. Such a contract would be a contract at the expense of a third party and a promise to expropriate the young generation to the extent needed to finance these transfers. Eventually, the working-age population would find themselves unable to finance these transfers. Although the term generational contract in the meaning of a social contract

is still used in public discourse, its use is heavily criticised (e.g. Komp and Van Tilburg 2010; Borchert 2004; Schüller 1996).

The concept of a social contract is clearly inappropriate to describe and justify the current organisation of public intergenerational transfers to the elderly population with fixed benefits.

A generational contract between individuals

The notion of a generational contract should be used only when the relationship it describes actually has characteristics of a contractual relationship. A contract is defined as "an agreement with specific terms between two or more persons or entities in which there is a promise to do something in return for a valuable benefit known as consideration."[2] The consideration is something of objectively determined value given by both parties to a contract that induces them to enter into the agreement to exchange mutual performances.[3] In the context of a generational contract, the considerations are economic transfers between individuals belonging to different generations.

Focusing on African countries, Whyte et al. (2008) and Roth (2008) use a comprehensive concept and describe the generational contract as the implicit expectation that parents will care for their children until they can care for themselves, and children will support their parents when they can no longer support themselves. Roth emphasises the contractual nature by describing the contributions to and benefits from this contract as being based on "the logic of debt", with parents as the creditors of their children. The children pay off their debt with support for their parents in old age. In the countries analysed by Whyte et al. and Roth, the intergenerational transfers are indeed a mutual exchange between individuals, as public transfers are not common. Social norms and cultural values act as enforcement mechanism of mutual obligations between generations (Göransson 2013). The concept of a generational contract as agreement between individuals belonging to successive generations fits well in countries with a small welfare state and an important role of the family in the transfer system.

A contract between generations

In European societies, the transfers that comprise the generational contract are split between the family and the state. The transfers to children are mostly privately organised, while the transfers to the elderly are predominantly public transfers. Gál et al. (2017) estimate that about 80% of net transfers to children are private transfers, while the net transfers to the elderly tend towards 100% public transfers. Laslett (1992) argues that in societies with generous public health care and pension systems the transfers from parents to children are made without explicit expectation for return; these transfers can hardly be interpreted as resulting from an agreement between individuals. However, the parental generation does expect the child generation as a whole to finance their pensions, health services and care in old age. Although public old-age provision acts as fertility insurance and does not require a certain individual to have children (Sinn 2004), it is nevertheless required for a generation as a whole.

We therefore adapt the concept and think of intergenerational transfers as mutual exchange between two generations. The parental generation provides resources to the child generation until they enter the labour force and maintain themselves. These transfers include the time and other economic resources that parents provide to their own children, but also publicly provided education and health services which are financed by all taxpayers. We can regard these transfers also as investment, because by transferring resources to children, a generation acquires a claim on part of the children's future labour income. Once the children enter the labour force, they pay part of their taxes and social contributions to finance pensions and health care for the elderly population. The description of intergenerational transfers as a contract between generations emphasises the binding character of these reciprocal transfer flows. The transfers to children are an essential, indispensable part of the contract as they create the contribution base to finance the old-age transfers. The transfers to the elderly constitute a well-protected part of the public distributional system: once young people enter the labour force, they are bound to pay taxes and social contributions on labour income.

We [...] think of intergenerational transfers as mutual exchange between two generations. The parental generation provides resources to the child generation until they enter the labour force and maintain themselves. [...] Once the children enter the labour force, they pay part of their taxes and social contributions to finance pensions and health care for the elderly population.

Voluntarity is a necessary condition for a legal contract between parties to be valid and ensures a balance in the value of considerations. A party that does not see an advantage in the mutual exchange offered in a contract would simply not enter the contract. The concept of a contract between two generations therefore deviates from the definition of a contract in the legal sense, since the child generation is forced into the generational contract. It is this characteristic that creates the problem of imbalances in the transfer system. The impossibility for the child generation to opt out of the generational contract enables the parental generation to extract a high and increasing share of the income of the young generation. As a result, it can become increasingly difficult for the young generation to finance transfers to the elderly population, to keep a decent living standard for themselves and to invest into their own children at the same time. This asymmetry requires the monitoring of the generational contract. Imbalances can seriously harm societies in the long run, as they hinder the reproduction and the recreation of human capital.

The generational contract concept constitutes a flexible framework for analysing economic transfers between generations. It is explicit about the type and direction of transfers that are the contribution of each generation to the contract. However, it says nothing about the exact size of transfers. This flexibility is desirable as it allows adaption to different uses, for example the development of different indicators for sustainability and intergenerational fairness. Hammer et al. (2018) uses the concept to calculate a sustainability indicator for public transfers, taking the longevity of the elderly generation and the change in employment rates and retirement age of the child generation into account. They show that not even a considerable increase in the retirement age of the child generation would be able to eliminate the imbalances. The generational contract concept puts these imbalances in the intergenerational transfer system into a context. For example, it is able to identify the difficulties of financing the public transfers to the

elderly as a consequence of low investments in the child generation. By including private transfers, it is better suited to discussing intergenerational fairness than generational accounting (Kotlikoff 2017; Laub/Hagist 2017), a concept which focuses only on public transfers.

Methodology and data: European National Transfer Accounts

Our estimates of intergenerational transfer flows are based on the European National Transfer Accounts data (Istenič et al. 2017) and the European Time Transfer Accounts data (Vargha et al. 2017).[4] National Transfer Accounts (NTA) are built up as an accounting system that introduces information on the relationship between age and economic activity into National Accounts (for details, see UN 2013; Lee/Mason 2011). NTA measure how much labour- and asset-income each age group generates, how income is redistributed between age groups through public and private transfers, and how the disposable income is used for consumption and saving. The dataset contains age-specific per capita averages of income, public transfer payments and public benefits, private transfer payments and benefits, consumption and saving.

The generational contract concept constitutes a flexible framework for analysing economic transfers between generations.

The production boundary in National Accounts, and consequently in NTA, excludes most of the services which are produced by households for their own use, such as housework and child care, or which are provided free of charge to other households. Information about household production is usually introduced into National Accounts through so-called *Household Satellite Accounts* (Holloway et al. 2002; European Communities 2003; Abraham and Mackie 2005). Accounting for unpaid household work is of particular importance in the context of NTA, because the services produced through unpaid household work constitute important intergenerational transfers. Donehower (2013) developed a method to generate Household Satellite Accounts by age, to account for the intergenerational transfers in the form of unpaid work. The estimation of these accounts is mainly based on time use data, which is the reason for calling them *National Time Transfer Accounts* (NTTA). NTTA measure the age-specific production, the transfers and the consumption of services produced for the households' own consumption. In addition, unpaid production activities for other households are included, such as care for grandchildren. Several attempts have been made by researchers to combine NTA and NTTA, providing comprehensive information on public and private transfers between age groups (Kluge 2014; Hammer 2014; Zannella 2015; Gál et al. 2015; Hammer et al. 2015; Rentería et al. 2016; Gál et al. 2017). The results highlight the importance of transfers in the form of unpaid work, constituting clearly the largest transfer component of the total transfers to children. The Harmonized European Time Use Survey and the Multinational Time Use Survey provide comparable time use data for a range of countries. Both data sources have been used by Vargha et al. (2017) to generate comparable NTTA for 17 countries.[5]

In this paper we combine the new European NTA data with European NTTA, and NTTA based on the Austrian time use survey, to provide a comprehensive picture of the system of intergenerational transfers in 16 countries.[6] The combination of NTA and NTTA is not straightforward and requires assumption and approximations, which we have to keep in mind when we analyse the results. NTA and NTTA refer to different years. While NTA refer to the year 2010, the NTTA, and the time use surveys they are based on, are in most countries considerably older.[7] We use 2010 as the base year and assume that age-specific intergenerational transfers in the form of time are the same in 2010 as in the survey year. This assumption can be justified, as changes in time use are rather slow and we adjust the transfers so that outflows and inflows match over the total population. Unfortunately, NTA data are only available for the year 2010, which was in many countries characterised by unusually high government expenditure relative to labour income and public revenues. This pattern affects in particular the results for public transfers in Latvia and Lithuania; both countries reduced government expenditure relative to labour income in the years after 2010.

A controversial issue is the valuation of time use for production in monetary terms. NTA are based on National Accounts and therefore measured in market prices. For household work, such market prices do not exist. The usual approach is to value unpaid work activities with wage rates that could be earned on the market for similar activities. Unfortunately, there is no data source that would allow a consistent estimation of the hourly wage rates for domestic staff across all included countries. We therefore use the average country-specific net wage per hour to value the time spent on unpaid household work.

In the remaining part of this section we give a quick overview of the combined NTA and NTTA transfer data, first the age-specific per capita values, then the total transfers between generations in the economy.

The results highlight the importance of transfers in the form of unpaid work, constituting clearly the largest transfer component of the total transfers to children.

Intergenerational transfers per capita by type and age in 2010

Figure 1 plots the simple average of age-specific net transfer benefits by type in the 16 countries. In order to make the transfer flows comparable, we standardised the transfer data before calculating the average. The transfers are measured as a share of the average labour income of a full-time worker (YLFT) in each country, calculated using the measure of labour income as defined in NTA and data on working hours from the European Labour Force Survey. This standardisation eliminates differences in the level of hourly labour income across countries, but accounts for differences in employment rates. Two countries with similar levels of productivity per working hour and similar tax rates would be different regarding the levels of transfers when measured in terms of YLFT, with transfers being higher in the country with the higher employment rates.

The black area represents the public transfers, the dark-shaded area the private market transfers and the light-shaded area the private non-market transfers. The basic pattern is highly similar in all of the countries. Children and young adults are net receivers of transfers until their early twenties in all of the countries, on average until the age of 23. The non-market transfers to children are clearly the most important transfer component at a very young

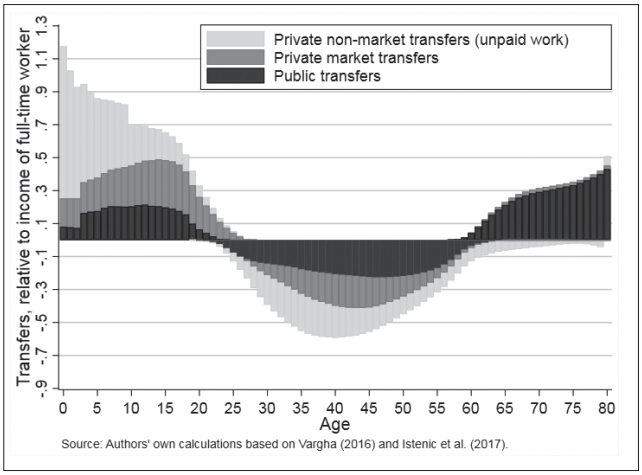


Figure 1: Intergenerational transfers by type and age in 2010

age, amounting to almost one YLFT in the first years of life. We could interpret these numbers as childcare for young children corresponding to a full-time job. While the private non-market transfer benefits decline strongly with the age of the children, private market transfers and public transfers are higher for older children and peak around the age of 15 because of the public expenditure for formal education. After the age of 15, there are more and more who enter the labour force and generate their own income, therefore the net transfer benefits decline strongly after this age. On average, members of the age groups from 24 to 62 are net providers of intergenerational transfers. The highest non-market transfers are provided by the population with young children, in most countries the age groups around 30-35. While the non-market transfers decline with the age of the own children, the market transfers to children increase and peak at the age of 40-45. Total net contributions to intergenerational transfers correspond to more than 0.5 YLFT between the ages of 30 and 50. The population in old age are net receivers of intergenerational transfers, mostly of public transfers. The average yearly values correspond to 0.3 - 0.4 YLFT. This seems small, but the measure of labour income in NTA includes all taxes on labour, including the employers' social contributions and labour-based taxes on production. In many countries there is a small flow of private non-market transfers from the elderly population to younger generations.

Total intergenerational transfers by type and life stage in 2010

The total transfers between generations in an economy is not only determined by the age-specific values per capita, but to a considerable degree by the population structure. We use the pattern of net transfers to define the three life stages: childhood, working age and old age. Childhood is defined as young ages with positive average net transfer benefits, working age covers the ages with positive net contributions, and old age is characterised by positive net benefits. We derive a measure for the total net transfers between generations by multiplying the age-specific averages per capita with the corresponding population and adding up all age groups in childhood, working age and old age, respectively. Table 1 shows the country-specific age borders and the values of net transfer benefits relative to the total labour income in the economy.

The highest non-market transfers are provided by the population with young children, in most countries the age groups around 30-35.

The sum over all life stages for non-market transfers is zero, as contributions have to equal the net benefits exactly. There are some cross-border flows of private market transfers; the sum over all life stages is therefore not necessarily zero. The sum of the pub-

	Young	Working	Old		Young	Working	Old
Austria (AT)	**0.36**	**-0.54**	**0.17**	**Belgium (BE)**	**0.43**	**-0.58**	**0.15**
Public	0.08	-0.28	0.19	Public	0.11	-0.26	0.14
Market	0.11	-0.11	0.00	Market	0.12	-0.14	0.01
Non-market	0.17	-0.15	-0.02	Non-market	0.19	-0.19	0.00
Age-border	22		60	Age-border	23		62
Bulgaria (BG)	**0.47**	**-0.50**	**0.15**	**Germany (DE)**	**0.35**	**-0.51**	**0.15**
Public	0.05	-0.17	0.13	Public	0.07	-0.22	0.15
Market	0.19	-0.14	0.05	Market	0.12	-0.13	0.00
Non-market	0.22	-0.19	-0.03	Non-market	0.16	-0.17	0.00
Age-border	24		62	Age-border	24		63
Denmark (DK)	**0.40**	**-0.51**	**0.11**	**Estonia (EE)**	**0.44**	**-0.50**	**0.15**
Public	0.10	-0.22	0.12	Public	0.10	-0.23	0.16
Market	0.12	-0.12	0.00	Market	0.15	-0.10	0.01
Non-market	0.18	-0.17	-0.01	Non-market	0.19	-0.17	-0.02
Age-border	23		64	Age-border	22		62
Spain (ES)	**0.49**	**-0.55**	**0.14**	**Finland (FI)**	**0.37**	**-0.50**	**0.20**
Public	0.09	-0.15	0.14	Public	0.09	-0.22	0.20
Market	0.14	-0.15	0.01	Market	0.13	-0.13	0.00
Non-market	0.26	-0.26	-0.01	Non-market	0.15	-0.15	0.00
Age-border	26		63	Age-border	23		62
France (FR)	**0.44**	**-0.54**	**0.16**	**Italy (IT)**	**0.47**	**-0.67**	**0.18**
Public	0.11	-0.22	0.17	Public	0.08	-0.29	0.19
Market	0.14	-0.14	0.00	Market	0.15	-0.16	0.00
Non-market	0.19	-0.19	-0.01	Non-market	0.23	-0.22	-0.01
Age-border	23		61	Age-border	25		62
Lithuania (LT)	**0.57**	**-0.51**	**0.18**	**Latvia (LV)**	**0.46**	**-0.39**	**0.12**
Public	0.13	-0.16	0.17	Public	0.11	-0.12	0.16
Market	0.24	-0.17	0.02	Market	0.17	-0.13	0.02
Non-market	0.20	-0.19	-0.02	Non-market	0.18	-0.13	-0.06
Age-border	24		61	Age-border	24		61
Poland (PL)	**0.53**	**-0.61**	**0.17**	**Sweden (SE)**	**0.36**	**-0.53**	**0.16**
Public	0.09	-0.20	0.16	Public	0.10	-0.26	0.14
Market	0.18	-0.16	0.02	Market	0.11	-0.12	0.00
Non-market	0.26	-0.25	-0.01	Non-market	0.14	-0.16	0.01
Age-border	24		60	Age-border	23		65
Slovenia (SI)	**0.42**	**-0.53**	**0.15**	**United Kingdom (UK)**	**0.47**	**-0.56**	**0.15**
Public	0.09	-0.22	0.16	Public	0.10	-0.18	0.15
Market	0.15	-0.15	0.01	Market	0.14	-0.15	0.00
Non-market	0.18	-0.16	-0.03	Non-market	0.23	-0.22	-0.01
Age-border	25		60	Age-border	22		63
Avg. EU16	**0.44**	**-0.53**	**0.15**				
Public	0.09	-0.21	0.16				
Market	0.15	-0.14	0.01				
Non-market	0.20	-0.18	-0.01				
Age-border	24		62				

Market refers to the private transfers of goods and services bought on the market, e.g. necessities and housing.
Non-market refers to private transfers of services produced by unpaid work, e.g. care and household work.

Table 1: Aggregate intergenerational transfers by type and life stage as share of total labour income in 2010

lic net benefits over the three life stages can be considerably different from zero. First, there are considerable cross-border flows for public transfers. Second, public contributions can be used for interest payments or savings and the public benefits can be financed out of dissaving or public asset income. In most countries part of the benefits is financed through dissaving, therefore the total contributions to the public transfer system are in most countries smaller than the total benefits.

The values of total transfers to children range from 35% of total labour income in Germany to 57% in Lithuania. Because personal services are such an important component of transfers to children, the total transfer net contributions of the working-age population is high in the countries with large private non-market transfers, such as Italy and Poland. In these two countries the value of transfer payments of the working-age population exceeds 60% of total labour income. The transfers to the elderly consist mainly of public transfers and range between 11% of total labour income in Denmark to 20% in Finland.

Imbalances in the intergenerational transfer system

The level of age-specific per-capita transfers strongly depend on the age structure of the population. Many European countries experienced a baby boom after the Second World War, though with varying length and extent. The current population structure in these countries is characterised by a high share of the population being in working age and net contributors to the transfer system. Therefore the net transfer contributions per member of the working-age population can be low compared to the benefits received by children and the elderly. In the context of the generational contract we can state that the parents of the baby boomers invested heavily in the child generation. Together with the educational expansion and high economic growth rates, this pattern enabled the expansion of the public health and pension systems, reflected in increasing levels of benefits and increasing life expectancy coupled with declining retirement age. The change in the age structure of the populations and the retirement of the baby boomers themselves, characterised by much lower fertility, requires adjustments in the level of old-age benefits. There is an imbalance between the, comparably low, investments in the young generation and the generous old-age benefits.

Intergenerational transfers by type from a life course perspective

In a first step, we calculate measures that provide information on the size of transfers individuals would receive and pay over the life course, given the size of age-specific transfers in 2010. The measures are based on a thought experiment. We assume that the cross-sectional age pattern of transfers in the year 2010 corresponds to the transfer contributions and benefits of an individual over the lifetime. This individual faces an age-specific mortality corresponding to the age-specific rates observed in 2010.[8] We then calculate the amount of transfers that our hypothetical cross-section individual receives in childhood, the amount he/she transfers to children and the elderly during working life and the amount that he/she receives in old age. We want to emphasise that our analysis does not tell us anything about the transfers of a certain individual or member of a certain cohort. This would require longitudinal data for a long time-period, covering the whole life course of a generation. Our measures are designed to provide information on important characteristics of the pattern of intergenerational transfers in a given year. The simulation of the life course values of transfers is used as a tool to derive intuitive and meaningful measures.

There is an imbalance between the, comparably low, investments in the young generation and the generous old-age benefits.

Total net transfers received in childhood T_{young} are calculated as the sum of expected transfers per capita at all young ages with positive net transfer benefits (Equation 1). The term represents the net public transfer benefits at age i; the term $T_{market,i}$ the private market transfers; and the term $T_{non\text{-}market,i}$ the private non-market transfers. The age groups included range from zero to , with referring to the oldest age group in young age with positive net transfer benefits. We refer to this measure as *expected* transfers, because we adjust the age-specific NTA per capita values with survival probability. The measure of transfers paid during working age T_{work} is calculated as the sum of net transfer contributions over all age groups from l+1 to u-1, with u referring to the youngest age group in old age with positive net benefits (Equation 2). The total transfers in old age T_{old} are calculated as the sum over all age groups from up to 100 (Equation 3). Since transfer data in NTA are only available until age 80+, for all older age groups we use the age-specific value at age 80. The S_i stands for the survival probability until age i, calculated from cross-sectional mortality data. For i=100 the S_i represents the life expectancy at age 100, given the mortality rates of 2010.

$$T_{young} = \sum_{i=0}^{l} \left(T_{public,i} + T_{market,i} + T_{non-market,i}\right) * S_i \quad (1)$$

$$T_{work} = \sum_{i=l+1}^{u-1} \left(T_{public,i} + T_{market,i} + T_{non-market,i}\right) * S_i \quad (2)$$

$$T_{old} = \sum_{i=u}^{100} \left(T_{public,i} + T_{market,i} + T_{non-market,i}\right) * S_i \quad (3)$$

The results are shown in Table 2, reporting the value of expected transfers relative to YLFT by type and life stage for each country. The total value of transfers a child can expect until becoming net contributor to the transfer system ranges between 12.6 YLFT in Belgium and more than 19 YLFT in Poland, Slovenia and Bulgaria. The differences across countries are mainly influenced by the amount of the private non-market transfers, ranging from less than 6 YLFT in Belgium and more than 10 YLFT in Poland. The cross-country differences in the value of public transfers and private market transfers are much lower: the simple average of the values across countries is 3.5 and 5.3 YLFT, respectively.

The expected net contributions to the intergenerational transfer system in working age amount to 10 YLFT in Latvia and to about 17 YLFT in Poland and Sweden. The level of the different types of transfers varies considerably across countries. Public transfer contributions amount to slightly more than 3 YLFT in Latvia and Lithuania and more than 8 YLFT in Sweden and Austria. The values of private non-market transfer contributions during working age range between slightly more than 3 YLFT in Latvia to more than 6 YLFT in Spain, Poland and the UK. However, the year 2010 was exceptional for the former two countries, characterised

	Young	Working	Old	Diff.		Young	Working	Old	Diff.
AT	**16.1**	**-16.3**	**7.4**	**7.2**	**BE**	**12.6**	**-13.9**	**4.6**	**3.4**
Public	3.6	-8.4	8.0	3.2	Public	3.3	-6.2	4.5	1.7
Market	4.6	-3.2	0.1	1.6	Market	3.6	-3.3	0.2	0.6
Non-market	7.9	-4.7	-0.7	2.4	Non-market	5.6	-4.5	-0.1	1.1
BG	**19.7**	**-13.2**	**3.6**	**10.1**	**DE**	**15.4**	**-14.5**	**4.9**	**5.8**
Public	2.5	-4.7	3.2	1.1	Public	2.9	-6.2	4.9	1.7
Market	7.7	-3.7	1.3	5.3	Market	4.9	-3.4	-0.1	1.4
Non-market	9.5	-4.8	-0.9	3.7	Non-market	7.5	-4.9	0.1	2.7
DK	**13.5**	**-15.0**	**4.5**	**3.0**	**EE**	**16.9**	**-14.4**	**4.6**	**7.0**
Public	3.4	-6.4	4.6	1.6	Public	4.0	-6.6	5.0	2.4
Market	4.1	-3.5	0.1	0.7	Market	5.6	-3.0	0.2	2.8
Non-market	6.0	-5.1	-0.2	0.7	Non-market	7.3	-4.9	-0.5	1.9
ES	**18.2**	**-13.1**	**5.4**	**10.5**	**FI**	**13.9**	**-15.4**	**8.0**	**6.5**
Public	3.3	-3.5	5.5	5.4	Public	3.4	-6.6	7.9	4.7
Market	5.3	-3.5	0.2	2.0	Market	4.9	-4.0	-0.1	0.9
Non-market	9.6	-6.1	-0.3	3.2	Non-market	5.7	-4.8	0.1	1.0
FR	**13.2**	**-14.7**	**6.3**	**4.8**	**IT**	**17.6**	**-15.9**	**5.6**	**7.3**
Public	3.2	-5.9	6.6	3.9	Public	3.2	-7.0	5.8	2.1
Market	4.1	-3.7	0.0	0.4	Market	5.7	-3.7	0.0	2.0
Non-market	5.8	-5.1	-0.2	0.5	Non-market	8.8	-5.3	-0.3	3.2
LT	**17.0**	**-11.5**	**3.9**	**9.4**	**LV**	**16.7**	**-10.0**	**2.9**	**9.6**
Public	3.6	-3.4	3.8	4.0	Public	4.0	-3.2	3.8	4.6
Market	6.6	-3.7	0.5	3.3	Market	5.8	-3.4	0.5	2.9
Non-market	6.8	-4.3	-0.4	2.1	Non-market	6.8	-3.4	-1.4	2.1
PL	**20.0**	**-16.8**	**6.5**	**9.6**	**SE**	**13.4**	**-17.1**	**6.7**	**3.0**
Public	3.5	-5.5	6.3	4.3	Public	3.7	-8.4	6.1	1.4
Market	6.3	-4.7	0.6	2.2	Market	4.2	-3.7	0.1	0.6
Non-market	10.2	-6.6	-0.4	3.2	Non-market	5.5	-5.1	0.6	1.0
SI	**19.6**	**-15.9**	**6.4**	**10.2**	**UK**	**16.1**	**-16.5**	**6.5**	**6.1**
Public	4.3	-6.6	6.9	4.6	Public	3.4	-5.4	6.5	4.4
Market	6.6	-4.4	0.4	2.7	Market	4.8	-4.4	0.2	0.6
Non-market	8.7	-4.8	-0.9	2.9	Non-market	8.0	-6.7	-0.1	1.1
Avg. EU 16	**16.2**	**-14.6**	**5.5**						
Public	3.5	-5.9	5.6						
Market	5.3	-3.7	0.3						
Non-market	7.5	-5.1	-0.4						

Table 2: Simulation of intergenerational transfers by life stage and type. Based on the 2010 transfer and mortality pattern

by high dissaving of the public sector and low contributions relative to benefits. The value of private market transfers in working age range between 3 and 4.7 YLFT.

The total value of transfers a child can expect until becoming net contributor to the transfer system ranges between 12.6 YLFT in Belgium and more than 19 YLFT in Poland, Slovenia and Bulgaria.

The value of public transfers in old age reflects the value of public contributions and the size of the public sector. It ranges from slightly more than 3 YLFT in Bulgaria to more than 7 YLFT in Austria and Slovenia. There are only minor private net transfers to and from the elderly population in the form of private market transfers. In all of the countries the elderly population are net contributors in the form of private non-market transfers, but the values exceed 1 YLFT only in Latvia. These transfers reflect for example the involvement of the elderly population in taking care for their grandchildren.

The fourth column in Table 2 shows the difference between contributions during working age and the benefits in childhood and old age. Obviously, the value of total average net transfers paid during working age is considerably lower than the transfers received in childhood and old age. This pattern reflects the large share of the working-age population in most of the countries, who provide transfers for a comparably low number of children and, in relation to the working-age population, a comparably low number of elderly persons.

A measure of imbalances in the transfer system

We use the results from the previous section to evaluate the compatibility of the 2010 age patterns of transfers with the generational contract. Given these patterns, are the investments of the current working-age population in the young generations large enough to finance their old-age benefits when they enter retirement? For this purpose, we generate two sub-indicators. The first sub-indicator measures the number of children that can be supported and raised with the transfers that are provided to the child generation during working age. The second sub-indicator measures the number of net contributors to the transfer system that are required to finance the total amount of transfers to a person in old age. We then calculate the difference between these two measures, which can be interpreted as the number of additional children and net contributors that would be required to finance the transfers to the elderly population.

For the first sub-indicator, the number of supported children, we assume that the net transfer benefits received in childhood measure the transfers that are required by a child to grow up and become a net contributor to the transfer system. The number of supported children is calculated by dividing the total transfers to children that are provided during working age, with the total amount of transfers that is required in childhood. Since contributions in working age and benefits of children are of very similar size for the population as a whole, this sub-indicator approximates the average number of children of the working-age population. To derive a measure for the net transfer outflows in working age that are provided to children, the total outflows are split in the part transferred to children and a part transferred to the elderly. The split is based on the relative size of total net benefits of children and the net benefits of the elderly population by type of transfer (taken from Table 1). Private transfers go almost exclusively to children while public transfers are mainly transfers to the elderly population. Additionally, we assume that the net contributions of private transfers of the population in old age are directed to the young generation, thereby reducing the costs of children for the working-age population. The results are shown in the first column of Table 3. The values range from 0.5 in Latvia to 0.88 in Sweden. In other words, the transfers that an average couple provides in working age finances the net benefits for one child in Latvia and 1.76 children in Sweden.

Private transfers go almost exclusively to children while public transfers are mainly transfers to the elderly population.

The second sub-indicator measures the expected net transfers received in old age relative to the transfers to the elderly that are provided in working age. It can be interpreted as the number of working-age contributors that are required to finance the old-age net benefits. The values are reported in the second column of Table 3 and range from 1.11 in Bulgaria to 2.53 in Spain. The low values for Bulgaria reflect the low level of public transfers and the comparably low life expectancy. The high values for Spain can be explained with the low tax rates on labour, the high unemployment rates and a large dissaving of the public sector in 2010. Public dissaving enables the financing of public old-age benefits without an immediate increase of the contributions. The value of about 1.2 in Italy, for example, means that over the whole working life 1.2 net contributors provide the total transfers that are expected by a person in old age. The system would be balanced if fertility is about 2.4 children per women and the number of supported children is 1.2.

The difference between the two sub-indicators is our measure of interest (third column in Table 3). It measures the number of contributors per person that would be required, additional to their own children, to enable them to finance the transfers to the elderly without increasing the contribution rate or reducing the benefits. The values range from 0.37 in Sweden to 1.93 in Spain. The value of 1 in Slovenia means that it would require an increase in fertility of 2 children per women to have enough contributors financing the transfers to the elderly population. We have to conclude that in all of the analysed countries the intergenerational transfer system is considerably out of balance.

Country	No. of supported children per contributor in working age	Required contributors per elderly beneficiary	**Balance indicator**
AT	0.67	1.37	**0.70**
BE	0.82	1.31	**0.49**
BG	0.49	1.11	**0.63**
DE	0.66	1.16	**0.50**
DK	0.86	1.35	**0.48**
EE	0.63	1.24	**0.61**
ES	0.61	2.53	**1.93**
FI	0.78	1.77	**0.98**
FR	0.86	1.80	**0.94**
IT	0.64	1.21	**0.57**
LT	0.55	1.89	**1.34**
LV	0.50	1.86	**1.36**
PL	0.66	1.78	**1.12**
SE	0.88	1.25	**0.37**
SI	0.60	1.60	**1.00**
UK	0.82	1.92	**1.10**
EU16	**0.69**	**1.57**	**0.88**

Table 3: The generational balance of transfers

Discussion

The importance of private transfers is also the focus in Gál et al. (2017). In a similar way as this paper, they combine NTA and NTTA results to get a comprehensive picture of intergenerational transfers. Observing the larger amount of transfers provided to children, they conclude that we live in a *child-orientated continent*. However, whether more resources should be transferred to children or to the elderly population is not a meaningful question. Obviously, a child requires a much higher level of transfers than an average person does in old age. All children have to acquire the physical strength and the cognitive abilities in the first place through a lengthy learning process. During this process, they rely on transfers from their parents and public transfers. A balanced transfer system has to reflect the larger amount of resources and transfers that are required by the children. Our indicator shows that despite the much larger value of transfers to children, these investments are still too low to enable the child generation to finance the old-age transfers to the parental generation.

We have to conclude that in all of the analysed countries the intergenerational transfer system is considerably out of balance.

The concept of a generational contract describes the fundamental relationship between transfers to children and transfers to the elderly population. Our results indicate that the rather generous public old-age benefits observed in 2010 will have to adjust to the lower investments in children of the population that enter retirement in the coming decades. Taking the net transfers relative to labour income as a benchmark, the observed pattern is unfair from a generational perspective. The current working-age population has to provide a large share of resources to the elderly population, while having fewer resources for themselves and their own children. As a consequence, they themselves will receive much lower benefits in old age.

How could such imbalances be avoided in the first place? Automatic balancing mechanisms would be desirable. These mechanisms should be simple, to allow individuals to predict their contributions and their benefits; furthermore, they should not create incentives that intensify the imbalance; and they should be fair – thus, they should not distribute from those who invest in the child generation to those who do not. The current pension rules in most of the countries do not have any of these characteristics. Pension rules rewarding labour income and transfers to the elderly provide disincentives for having children, as in most countries children are associated with the reduction of paid work. For the same reason they redistribute from those who have children and invest in the human capital of societies to those who do not. Furthermore, they largely ignore the capacities of the young generation to provide for these transfers. A possible solution would be the suggestion of Sinn (2013), who proposes a change to a funded pension system with a pay-as-you-go component for those who have children. He argues that childless couples could save the resources that families with children have to use for the intergenerational transfers to children.

Summary and conclusion

The contributions of this paper are threefold. First, we develop a framework for analysing intergenerational transfer flow using the concept of a generational contract. Intergenerational transfers to children and to the elderly population are best understood as mutual exchange between two generations. It requires human capital

investment in the child generation to enable the child generation to finance the public transfers to the elderly population once they enter employment. The public transfer system and the challenges due to population ageing cannot be understood without taking public and private transfers into account.

> Pension rules rewarding labour income and transfers to the elderly provide disincentives for having children, as in most countries children are associated with the reduction of paid work.

Second, we use age-specific data on transfer contributions and benefits provided in NTA and NTTA to quantify intergenerational transfers, including private transfers to children in the form of household work. Using the average transfer pattern of 16 EU countires in 2010, the value of total transfers to a child amounts to 16 times the yearly labour income of a full-time worker. The net transfers to the elderly are mostly public transfers, amounting to six times the yearly labour income of a full-time worker.

Third, based on the transfer data we develop and calculate an indicator that measures the extent of imbalances in the transfer system. In the countries analysed, the transfers to children provided by one person during working age can support about 0.7 children, on average. However, to finance the total transfers of a person in old age it requires almost 1.6 contributors, on average. Such a situation can only be maintained because most European countries experienced a baby boom in some years between the Second World War and the 1980s. The generation that is currently in retirement, the parents of the baby boomers, invested considerably more in the young generation than the current working-age population. The imbalance in the transfer system cannot be maintained; a reduction of transfers to the elderly population relative to the average labour income and an increase in the contributions of the child generation is inevitable.

To make transfers predictable and to maintain a balance of intergenerational transfers, an automatic adjustment mechanism of old-age benefits would be highly desirable. These mechanisms ideally take the transfers to children into account, at the level of a generation as well as on an individual level. Pension rules that take the number and education of children into account could help to avoid such imbalances.

Notes

1 This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613247. This paper uses data from Eurostat, European Labour Force Survey, 2010. The responsibility for all conclusions drawn from the data lies entirely with the authors.

2 Collins Dictionary of Law (2006). Viewed on 28 July 2016 from http://legal-dictionary.thefreedictionary.com/contract.

3 Collins Dictionary of Law. (2006). Viewed on 28 July 2016 from http://legal-dictionary.thefreedictionary.com/consideration.

4 The data can be accessed on www.wittgensteincentre.org/ntadata (accessed on 6 March 2018).

5 NTA and NTTA data can be downloaded from www.wittgensteincentre.org/ntadata (viewed on 28 September 2017).

6 Austrian NTTA is based on: Statistics Austria, Zeitverwendungserhebung 2008/09.

7 The reference years of the time use surveys are the following: Austria 2008/09, Belgium 2005, Bulgaria 2002, Germany 2002, Denmark 2001, Estonia 2000, Spain 2003, Finland 2000, France 1999, Italy 2003, Lithuania 2003, Latvia 2003, Poland 2004, Sweden 2001, Slovenia 2001, United Kingdom 2005.

8 Source: EUROSTAT, population and number of deaths by age in 2010.

References

Abraham, Katharine G. / Mackie, Christopher D. (2005): Beyond the Market: Designing Nonmarket Accounts for the United States. Washington, DC: Nation Academies Press.

Borchert, Jürgen (2004): Sozialpolitik als semantischer Betrug? Der Generationenvertrag löst sich von selber auf. In: Zeitschrift für Rechtspolitik, 37 (5), 173–174.

Buckles, Kasey / Hungerman, Daniel / Lugauer, Steven (2015): Is Fertility a Leading Economic Indicator? NBER Working Paper No. 24355. http://www.nber.org/papers/w24355. Viewed on 5 March 2018.

CECU (2018): Generationenvertrag. In: Cecu.de. Portal für Finanzen und Versicherungen. https://www.cecu.de/lexikon/grv/2143-generationenvertrag.htm. Viewed on 5 March 2018.

Chen, Tingyun et. al. (2018): Inequality and Poverty Across Generations in the European Union. IMF Staff Discussion Note 18/01. https://www.imf.org/~/media/Files/Publications/SDN/2018/sdn1801.ashx. Viewed on 5 March 2018.

Donehower, Gretchen (2013): Incorporating Gender and Time Use into NTA: National Time Transfer Accounts Methodology. http://www.ntaccounts.org/doc/repository/Incorporating%20Gender%20and%20Time%20Use%20into%20NTA,%20Version%204.docx. Viewed on 30 November 2017.

Ehrlich, Isaac / Kim, Jinyoung (2007): Social Security and Demographic Trends. Theory and Evidence from the International Experience. In: Review of Economic Dynamics, 10 (1), 55–77.

European Communities (2003): Household Production and Consumption. Proposal for a Methodology of Household Satellite Accounts. European Communities. Office for Official Publications of the European Communities. Luxembourg.

Gál, Robert / Vanhuysse, Pieter / Vargha, Lili (2018): Pro-Elderly Welfare States within Child-Oriented Societies. In: Journal of European Public Policy, 25 (6), 944–958.

Gál, Robert / Szabó, Endre / Vargha, Lili (2015): The Age-Profile of Invisible Transfers. The True Size of Asymmetry in Inter-Age Reallocations. In: Journal of the Economics of Ageing, 5, 98–104.

Göransson, Kristina (2013): Reassessing the Intergenerational Contract. In: Journal of Intergenerational Relationships, 11 (1), 62–75.

Hammer, Bernhard (2014): The Economic Life Course. An

Examination Using National Transfer Accounts. PhD thesis. Vienna University of Technology. http://media.obvsg.at/p-AC11566320-2001. Viewed on 2 June 2014.

Hammer, Bernhard / Fürnkranz-Prskawetz, Alexia / Gál, Róbert I. / Vargha, Lili / Istenič, Tanja (2018): Human Capital Investment and the Sustainability of Public Transfer Systems Across Europe. In: Journal of Population Ageing, 1-26.

Hammer, Bernhard / Prskawetz, Alexia / Freund, Inga (2015): Production Activities and Economic Dependency by Age and Gender in Europe. A Cross-Country Comparison. In: Journal of the Economics of Ageing, 5, 86–97.

Holloway, Sue et al. (2002): Household Satellite Account (Experimental) Methodology. London: Office for National Statistics.

Istenič, Tanja et. al. (2017): European National Transfer Accounts. http://www.agenta-project.eu/Jacomo/upload/agenta_european_nta_manual.pdf. Viewed on 9 March 2018.

Kersting, Wolfgang (2015): Vertragstheorien: Kontraktualistische Theorien in der Politikwissenschaft. Stuttgart: Kohlhammer Verlag.

Kluge, Fanny A. (2014): The Economic Lifecycle by Gender: Results Combining Monetary and Time Use Estimates. In: Comparative Population Studies, 39 (4), 707–726.

Komp, Kathrin / Van Tilburg, Theo G. (2010): Ageing Societies and the Welfare State. Where the Inter-Generational Contract is Not Breached. In: International Journal of Ageing and Later Life, 5 (1), 7–11.

Kotlikoff, Laurence J. (2017): Measuring Intergenerational Justice. In: Intergenerational Justice Review, 3 (2), 56–63.

Laslett, Peter (1992): Is There a Generational Contract? In: Laslett, Peter / Fishkin, James S. (eds): Justice between Age Groups and Generations. New Haven: Yale University Press, 24–47.

Laub, Natalie / Hagist, Christian (2017): Pension and Intergenerational Balance: A Case Study of Norway, Poland and Germany using Generational Accounting. In: Intergenerational Justice Review, 3 (2), 64–77.

Leach, Jeremy et al. (2016): European Intergenerational Fairness Index: A Crisis for the Young. Intergenerational Foundation Report. http://www.if.org.uk/wp-content/uploads/2016/03/European-Intergenerational-Fairness-Index_Final-2016.pdf. Viewed on 5 March 2018.

Lee, Ronald D. / Mason, A. (eds) (2011): Population Aging and the Generational Economy: A Global Perspective. Cheltenham: Edward Elgar.

Lorenz-Meyer, Dagmar R. (1999): The Gendered Politics of Generational Contracts: Changing Discourses and Practices of Intergenerational Commitments in West Germany. PhD thesis. London School of Economics.

Matysiak, Anna / Sobotka, Tomáš / Vignoli, Daniele (2018): The Great Recession and Fertility in Europe: A Sub-National Analysis. Vienna Institute of Demography Working Paper 02/2018.

Rentería, Elisenda et al. (2016): Intergenerational Money and Time Transfers by Gender in Spain: Who are the Actual Dependents? In: Demographic Research, 34 (24), 689–704.

Roth, Claudia (2008): "Shameful!" The Inverted Intergenerational Contract in Bobo-Dioulasso, Burkina Faso. In: Alber, Erdmute / Van der Geest, Sjaak / Whyte, Susan (eds): Generations in Africa: Connections and Conflicts. Münster: LIT Verlag, 47–69.

Schreiber, Wilfrid (1955): Existenzsicherheit in der industriellen Gesellschaft. Reprint Bund Katholischer Unternehmer e.V. http://www.flegel-g.de/PDF/disk28schreiber.pdf. Viewed on 5 March 2018.

Schüller, Heidi (1996): Die Alterslüge: Für einen neuen Generationenvertrag. Reinbek: Rowohlt.

Sinn, Hans-Werner (2013): Das demographische Defizit: Die Fakten, die Folgen, die Ursachen und die Politikimplikationen. In: ifo Schnelldienst, 66 (21), 3–23.

Sinn, Hans-Werner (2004): The Pay-as-you-go Pension System as Fertility Insurance and an Enforcement Device. In: Journal of Public Economics, 88 (7–8), 1335–1357.

UN (2013): National Transfer Accounts Manual: Measuring and Analysing the Generational Economy. United Nations, Department of Economic and Social Affairs, Population Division.

Vargha, Lili / Gál, Róbert / Crosby-Nagy, Michelle (2017): Household Production and Consumption over the Life cycle: National Time Transfer Accounts in 14 European Countries. In: Demographic Research, 36 (32), 905–944.

Whyte, Susan / Alber, Erdmute / Van der Geest, Sjaak (2008): Generational Connections and Conflicts in Africa: An Introduction. In: Alber, Erdmute / Van der Geest, Sjaak / Whyte, Susan (eds): Generations in Africa: Connections and Conflicts. Münster: LIT Verlag, 1–23.

Zannella, Marina (2015): Reallocation of Resources Between Generations and Genders in the Market and Non-Market Economy: The Case of Italy. In: Journal of the Economics of Ageing, 5, 33–44.

Bernhard Hammer has been a researcher at the Vienna Institute of Demography since 2015. During his doctoral studies (2010-14) at the Technical University in Vienna he worked on National Transfer Accounts, an accounting system which measures the relationship between the age of individuals and their economic activities. His research interests focus on measuring, analysing and understanding the generational aspects of the economy, including the generational patterns of economic activity and intergenerational redistribution.

Contact details:
Bernhard Hammer
Vienna Institute of Demography
Welthandelsplatz 2
1020 Vienna, Austria
E-Mail: bernhard.hammer@oeaw.ac.at

Tanja Istenič works as a teaching assistant at the Academic Unit for Mathematics, Statistics and Operations Research at the Faculty of Economics, University of Ljubljana. She has a PhD in Economics at the Faculty of Economics, University of Ljubljana. Her main research interests are in socio-economic effects of population ageing, intergenerational transfers, gender issues and welfare regimes.

Contact details:
Tanja Istenič
University of Ljubljana
Kardeljeva ploščad 17
1000 Ljubljana, Slovenia
E-Mail: tanja.istenic@ef.uni-lj.si

Lili Vargha is a junior researcher at the Hungarian Demographic Research Institute and a PhD candidate in Demography at the Doctoral School of Demography and Sociology (Pécs, Hungary). Her main research interests are in population ageing, intergenerational transfers, human capital investments and time use.

Contact details:
Lili Vargha
Hungarian Demographic Research Institute
Budapest, Hungary
Doctoral School of Demography and Sociology
University of Pécs, Hungary
E-Mail: vargha@demografia.hu

Intergenerational Justice in Public Finance: A Canadian case study

by Paul Kershaw

Abstract: This study examines whether Canadian governments have adapted budgets for the ageing population in accordance with norms of intergenerational justice. Public finance data in 2016 are analysed compared to 1976 in light of three constructs: the elderly/non-elderly ratio of social spending change, intergenerational reciprocity, and ability to pay. Findings include that (i) governments increased per capita spending for seniors 4.2 times faster than for those under the age of 45; (ii) public finance requires younger Canadians to contribute 22%-62% more in income taxes for the elderly now by comparison with 1976; and (iii) the contemporary ageing population has a greater ability to pay than cohorts immediately before and after them.

Keywords: *Taxes, Government Expenditures, Generational Equity, Housing Wealth, Public Reporting*

Canada, like many countries, is ageing. Seniors represent 16.5% of the population, up from 8.7% in 1976.[1] In countries experiencing such trends, there are worries about "bankruptcy for publicly funded health care and pension systems […], unfair treatment of children vis-à-vis the elderly […] and the burdening of future generations" (Lee/Mason 2011: 3). Canada is no exception. The federal government has made, and repealed, changes to the age of eligibility for Old Age Security. Provincial premiers launched a Task Force on Aging, and the national social science agency prioritised the research question "What are the future implications of state regulation from cradle to grave?" that arise from "Life cycle issues… challenging society."[2] This study helps to answer the question by reviewing the evolution of key age-related policies in Canadian public finance over the last four decades in light of norms of intergenerational justice.

Several recent comparative public finance studies about generational equity include Canada (Tepe/Vanhuysse 2010; Bradshaw/Holmes 2013). The most sophisticated is by Vanhuysse (2013), who finds that Canada is among the worst 9 of 29 nations for intergenerational justice. Generally, even the strongest comparative studies omit spending on medical care, tax expenditures, and sometimes even education, which undermine their utility.[3] In response, more scholars are producing country-specific analyses.[4] For example, the anthology by Lee and Mason features over 20 single country studies in recognition that "designing effective policy […] is a complex, detailed, and inherently country-level task that is best carried out one country at a time" (Lee/Mason 2011: 30). I design this study accordingly.

Generational equity in public finance received substantial attention in the 1990s when funding for the Canada and Quebec Public Pensions (C/QPP) factored prominently in public debate. Much of this work responded to Oreopoulos and Kotlikoff (1996), who estimated that total government spending in 1995 required taxes of future generations that were twice what current generations were paying. Following government adaptations to the C/QPP, Statistics Canada published an anthology edited by Corak (1998). This included an updated study by Oreopoulos and Vaillaincourt (1998), who concluded that spending cuts, tax increases and revisions to C/QPP between 1995 and 1998 restored balance to tax collection between contemporary and future generations. By 1999, total government revenue collection was 43.6% of GDP, while total expenditure was 41.9%.[5] There has been little analysis of generational fairness in Canadian public finance since then, and no government routinely reports on this theme. Given that government revenue fell 4.7% of GDP in the subsequent years, while expenditure dropped only 1.7%,[6] it is timely to revisit questions about intergenerational justice.

Canada, like many countries, is ageing. Seniors represent 16.5% of the population, up from 8.7% in 1976.

This article has five sections. I begin by summarising the theoretical framework and methods, focusing on three constructs that are common in the literature: the elderly/non-elderly spending ratio; intergenerational reciprocity; and the ability to pay of different age cohorts. Sections 2 to 4 apply the constructs to analysis of Canadian data. These data provide evidence that Canadian governments did not prioritise intergenerational justice over the last four decades and, as discussed in the final section, illuminate opportunities to rebalance public finance between the young and aged.

Theoretical framework and methods

Guided by the United Nations' vision of a society for all ages,[7] I focus on whether governments *budget for all ages*, drawing on population health scholarship. A robust scientific literature reveals that health does not start with health care. It starts with the social determinants of health where we are born, grow, live, work and age.[8] These include the distribution of wealth, income, education, employment, housing, human impact on the climate, and the government policies that shape these other determinants. Biological sensitivity to the social determinants is particularly strong during our earliest years (Commission on the Social Determinants of Health 2008: chapter 5; Keating/Hertzman 1999). As a result, budgeting for all ages requires legislators to promote "health in all policies" in recognition that health promotion is the domain of social, economic and environmental ministries, whereas medical ministries treat illness more than they prevent it (Commission on the Social Determinants of Health 2008: chapter 10; Kershaw 2018).

I operationalise the concept of budgeting for all ages in three stages. First, following the path-breaking scholarship of Lynch (2006: 20) and Vanhuysse (2013), I calculate the *elderly/non-elderly ratio of spending changes* over the last four decades. For the elderly, I

examine spending on retirement income and medical care. For non-elderly, I prioritise programmes that invest in generations raising young children, because epigenetics literature reveals opportunities to advance life-long health by investing in this demographic (Keating/Hertzman 1999; Boyce 2007). In accordance with Kershaw and Anderson (2016), I conceive of this age group as those under the age of 45,[9] and focus on childcare services, parental leave, cash supports for families with children, education and medical care. These represent major policies by which governments can adapt costs for younger generations, although it is not an exhaustive list.

> Canadian governments did not prioritise intergenerational justice over the last four decades.

I calculate changes in spending on programmes for 2016 compared to 1976, and interpret these in the light of revenue changes over the same period. Aggregate and per capita figures are assessed. All expenditures are adjusted for inflation and economic growth using consumer price index[10] and gross domestic product (GDP) data available at Statistics Canada. 1976 is selected for comparison, because it marks the beginning of the five-year period in which the largest part of the Baby Boom generation (born 1946-64) came of age as young adults. I thus examine government spending at two pivotal stages for Boomers: when raising children 40 years ago, to which I compare public finance now for Canadians under 45, a cohort that includes many of their children; and now at retirement, to which I compare spending 40 years ago for the cohort of seniors that included many of their parents.

The second stage of analysis digs further into revenue collection to explore the *intergenerational golden rule* recommended by Wolfson et al. (1998: 108). With roots in reciprocity theories of intergenerational justice (Gosseries 2009), this norm implies that "one generation, when it becomes old and frail, should not expect to be treated any better by its children than it treated its parents' generation in their old age" (Wolfson et al. 1998: 108). I examine this theme by calculating income taxes owed by representative 35 year-olds, measuring the amount of taxes paid to medical care and Old Age Security for contemporary seniors. I then repeat the tax calculations for inflation-adjusted incomes in 1976 to assess whether young taxpayers today pay more, or less, for programmes targeting the elderly by comparison with when today's elderly were young. I use Statistics Canada's Social Policy Simulation Database and Model (SPSD/M) to calculate taxes. It is widely used to analyse the financial interactions of governments and individuals in Canada.[11]

> [I]t may be appropriate for a generation to pay more in taxes or transfers than its predecessors, if that generation inherits more affluence than did its parents.

The third stage of analysis examines whether generations come of age in more, or less, advantageous circumstances, with unearned implications for their relative need or ability to pay. I refer to this theme as the *lottery of timing*, which is important to scholars of intergenerational justice who build on the tradition of Rawls (Rawls 1971: section 44). Behind a veil of ignorance where parties do not know if they will inherit poor or affluent circumstances or to what generation they may belong, Rawls judges that the obligations of one generation to save on behalf of successors or invest in elders will vary in proportion to the epochal conditions in which they live. This insight anticipates that it may be appropriate for a generation to pay more in taxes or transfers than its predecessors, if that generation inherits more affluence than did its parents. I analyse this theme by reporting on indicators selected by Vanhuysse (2013) for his Intergenerational Justice Index. I pay additional attention to earnings relative to housing costs, and explore implications for wealth accumulation. Ultimately, the third stage invites evaluation of whether intergenerational adaptations in public finance are made in proportion to the social determinants of health faced contemporarily by different age cohorts, as well as relative to the advantages and disadvantages inherited by those cohorts.[12]

Spending on the elderly and on those under the age of 45: 1976 and 2016

This section describes changes in public spending by all levels of Canadian government for citizens aged 65+ and under the age of 45 in 2016 by comparison with 1976 (see Table 1). Almost all spending comes from general revenue, which grew by $11.3 billion in 2016.[13] The Canada and Quebec Public Pensions (C/QPP) are the exception, with separate revenue streams to which citizens prepay for later benefits. C/QPP revenue had increased $36.5 billion by 2016.

As general revenue hovered around 35% of GDP in both years, governments increased spending for seniors on medical care by $36.1 billion in 2016,[14] and Old Age Security (OAS) by $4.9 billion.[15] OAS spending grew little, because retirement income spending grew primarily in the C/QPP, which surged by $48.5 billion.[16] The $91.6 billion increase in spending (half from general revenue) partly reflects there are 4 million more seniors today than in 1976, as the population aged 65+ increased from 8.7% to 16.5%.

> As general revenue hovered around 35% of GDP in both years, governments increased spending for seniors on medical care by $36.1 billion in 2016, and Old Age Security (OAS) by $4.9 billion.

Substantial demographic changes among younger Canadians, however, did not drive comparably large aggregate expenditure increases. For example, 4.6 million more Canadians under 45 now have post-secondary credentials than in 1976, as graduation from university, college or trades increased from 28% to 70% for people aged 25-44.[17] But post-secondary spending remained relatively flat over the two years, up $2.7 billion.[18] Similarly, 2.3 million more women aged 25-44 are in the labour force, as their participation increased from 54% in 1976 to 83% in 2016.[19] Despite the resulting increase in demand for child care, annual spending on this budget line grew just $3.6 billion.[20] Such comparisons reveal that substantial new spending on the ageing population reflects factors beyond demography,[21] since other comparable demographic changes did not motivate similarly-sized spending increases.[22]

As spending on seniors from general revenue increased four times more than revenue, governments dealt with resulting budget shortfalls in two ways. They increased the debt/GDP ratio by half a trillion dollars,[23] and reduced spending elsewhere. Reductions

	Aggregate spending					Major dem
	1976	2016	2016 minus 1976 %GDP	2016 minus 1976 $ millions		19
GDP ($ millions, per capita)	205,123	2,027,544				
Revenue						
Total Gov't General Revenue	34.99%	35.55%	0.56%	**11,349**	*Population grows from 23.4 million to 36.3 million. GDP/person grows 54%*	23,
CPP/QPP Revenue	1.60%	3.39%	1.80%	**36,483**		23,
Total	36.59%	38.95%	2.36%	**47,832**		23,
Spending 65+						
From general revenue						
Medical care to 65+	1.94%	3.82%	1.88%	**38,108**	*4.0 million more seniors, up from from 8.7% to 16.5% of population. Consistent enrolment rate in programmes. Per capita use of medical spending up 55%*	1,
sensitivity analysis	1.79%		2.03%	41,089		
OAS	2.10%	2.34%	0.24%	**4,947**		1,
General revenue Subtotal	*4.03%*	*6.16%*	*2.12%*	***43,056***		
From C/QPP Revenue	0.54%	2.93%	2.39%	**48,501**		1,
Total	4.57%	9.09%	4.52%	**91,556**		1,
Spending <45						
Child care services	0.05%	0.23%	0.18%	**3,559**	*2.3 million more women <45 in LF, up from 54% to 83%*	16,
sensitivity analysis						4,
Parental leave	0.07%	0.19%	0.12%	**2,418**		16,
sensitivity analysis						
Family income support	0.95%	1.04%	0.09%	**1,790**	*<age 45 from 72% to 56% Consistent enrolment rate*	16,
Elementary & Secondary	4.72%	3.30%	-1.41%	**-28,643**	*0.5 million fewer students Consistent enrolment rate*	16,
sensitivity analysis						5,
Post-secondary	2.20%	2.33%	0.13%	**2,721**	*4.6 million more grads, from 28% to 70% of 25-44 yrs*	16,
sensitivity analysis						9,
Medical care <45	2.29%	2.31%	0.01%	**297**	*<age 45 from 72% to 56% Consistent enrolment rate. Per capita use up 102%*	16,
sensitivity analysis	2.40%		-0.09%	-1,799		
Total	10.27%	9.39%	-0.88%	**-17,857**		16,
Debt	19.20%	43.88%	24.68%	**500, 405**		23,

Sources: Population data from Statistics Canada (2017a): CANSIM Table 051-0001; Revenue, OAS, C/QPP, Family income from Statistics Canada (2018a): CANSIM Table 380-0080; GDP d
Friendly et al. 2015: 136; Parental leave from Canadian Tax Foundation (1979): Table 7-9; and Government of Canada (n.d.): Chart 2; Elementary & Secondary data from Statistics Canada (201
1976 data from Statistics Canada 1978a, 1978b; Female labour force data from Statistics Canada (2017c): CANSIM Table 282-0002; Debt data from Statistics Canada (n.d. a): CANSIM Table

Table 1: Change in the government spending on the elderly and on those under the age of 45: 1976 to 2016

		Total Taxes		1976 Taxes to medical for age 65+		Taxes to OAS for age 65+		*Total $ to medical & OAS*	
Age 35 income percentile	2016 income	Average rate	$ amount	% of total taxes	$ amount	% of total taxes	$ amount		A
25th	24,797	9.2%	2,283	5.0%	114	5.4%	123	*237*	1
50th	45,570	17.6%	8,022	5.0%	400	5.4%	434	*834*	1
75th	71,274	23.1%	16,436	5.0%	820	5.4%	889	*1,709*	2
99th	203,506	38.1%	77,449	5.0%	3,863	5.4%	4,189	*8,052*	3

Sources: Income percentile data from Statistics Canada (n.d. b): Data Table, Total Income percentiles. Taxes are author calculations using Statistics Canada Social Policy Simulation Database and

Table 2: Income taxes paid, 1976 vs 2016, by 2016 income percentiles (2016$)

ographic changes				Spending per capita 2016$						
Population		Female LFP	Postsec Enrol	Aggregate 1976 spending before adjusting for Growth			Growth *		2016 minus 1976	
76	2016	2016/1976 ratio		/pop	*LFP	*Postsec	*1.54	2016	w/o Growth	* Growth
				36,196				55,876		
397,056	36,286,425			**12,666**			*19,553*	**19,866**	**7,200**	*313*
397,056	36,286,425			**577**			*891*	**1,897**	**1,319**	*1,005*
397,056	36,286,425			**13,243**			*20,444*	**21,762**	**8,519**	*1,318*
969,837	5,990,511			**8,322**			*12,847*	**12,913**	**4,591**	*66*
				7,690			*11,871*		5,223	*1,042*
969,837	5,990,511			**9,023**			*13,929*	**7,929**	**-1,094**	*-6,000*
				17,345			*26,776*	*20,842*	*3,497*	*-5,933*
969,837	5,990,511			**2,303**			*3,556*	**9,910**	**7,606**	*6,354*
969,837	5,990,511			**19,648**			*30,331*	**30,752**	**11,104**	*420*
987,225	20,216,021	1.54		25	**38**		*59*	**226**	**188**	*167*
585,620	4,700,034			92	141		*218*	972	831	*754*
987,225	20,216,021	1.54		35	**53**		*83*	**190**	**136**	*107*
705,802	784,192			837	1,287		*1,986*	4,887	3,601	*2,901*
987,225	20,216,021			**472**			*729*	**1,038**	**566**	*309*
987,225	20,216,021			**2,352**			*3,630*	**3,314**	**962**	*-316*
634,883	5,110,835			7,089			*10,944*	13,109	6,020	*2,165*
987,225	20,216,021		2.49	1,095		**2,725**	*4,207*	**2,338**	**-387**	*-1,869*
593,025	13,144,475			1,940		4,826	*7,450*	3,596	-1,230	*-3,854*
987,225	20,216,021			**1,143**			*1,764*	**2,314**	**1,171**	*550*
				1,194			*1,844*		1,120	*470*
987,225	20,216,021			5,122		**6,784**	*10,472*	**9,420**	**2,637**	*-1,052*
397,056	36,286,425			**6,951**			*10,730*	**24,521**	**17,570**	*13,790*

data from Statistics Canada (2018b): CANSIM Table 380-0063; Medical care data from CIHI 2017: Tables A.3.3.1, E.1.18.2 and E.1.1.2; Childcare from Government of BC 1977: D.41; and 17d): CANSIM Table 478-0014; Post-secondary spending data from Statistics Canada (2018d): CANSIM Table 380-0081; 2016 post-secondary utilisation data from Statistics Canada (2017b): e 378-0073 and (2018e): CANSIM Table 378-0121; Inflation adjustment data from Statistics Canada (2018c): CANSIM Table 326-0021.

Total taxes		2016 Taxes to medical for age 65+		Taxes to OAS for age 65+		*Total $ to medical & OAS*	**2016 minus 1976 Total taxes**	***Total $ to medical & OAS for age 65+***	
verage rate	$ amount	% of Total Taxes	$ amount	% of total taxes	$ amount			**$ change**	**% change**
0.3%	2,554	9.2%	236	5.8%	149	*385*	**271**	**147**	**62%**
4.9%	6,778	9.2%	626	5.8%	395	*1,021*	**-1,244**	**187**	**22%**
0.3%	14,437	9.2%	1,333	5.8%	840	*2,174*	**-1,999**	**465**	**27%**
5.8%	72,930	9.2%	6,736	5.8%	4,246	*10,982*	**-4,519**	**2,929**	**36%**

d Model (SPSD/M) versions 8.1 and 26.1. All assumptions and interpretations are the responsibility of the author.

include a $28 billion decline in spending on grade (elementary and secondary) school as the number of school-age children fell by half a million.[24] While some of this reduction may be interpreted to pay for the small spending increases for post-secondary and child care discussed above, as well as cash transfers to families (up $1.8 billion) (Statistics Canada 2018), parental leave (up $2.4 billion),[25] and medical care for those under 45 (up $297 million), most of the grade school reduction was reallocated elsewhere. In total, the suite of programmes on which younger Canadians rely fell by $17.9 billion.

[S]ubstantial new spending on the ageing population reflects factors beyond demography, since other comparable demographic changes did not motivate similarly-sized spending increases.

Aggregate public finance trends need interpretation in light of per capita figures. Alas, Canadian governments do not publish age analyses of per capita spending. Kershaw and Anderson fill this gap, finding all levels of government combine to allocate over $33,000 per person aged 65+ by comparison with less than $12,000 per person for those under the age of 45 (Kershaw/Anderson 2016). Unfortunately, data are not available to replicate their comprehensive analysis for 1976. To examine change over time, I instead analyse per capita budgeting for the policies featured above, adjusting first for inflation, and then economic growth. It is necessary to separate these factors to reveal how governments invested the proceeds from growth, with options including further investment in well-established programmes, like medical care or post-secondary; growing a nascent programme, like child care; or reducing tax rates.

The Canadian population increased from 23.4 million to 36.3 million since 1976.[26] Per capita general revenue increased $7,200 by 2016, while funds for C/QPP increased by $1,319.[27] Over the same period, GDP per person rose 54%, or nearly $20,000.[28] This means total general revenue per person increased by $313 beyond the rate of growth, as did C/QPP revenue by $1,005.

Per capita spending on medical care and retirement income for Canadians aged 65+ increased by $11,104 since 1976,[29] whereas per capita spending on programmes for Canadians under the age of 45 grew by $2,637. As a result, the elderly/non-elderly (under-age-45) ratio in change of spending is 4.2 to 1.[30] This ratio signals that Canadian governments prioritized per capita spending increases for the ageing population at a rate that is over four times faster than for citizens under 45.

The per capita increase for Canada's 6.0 million seniors is 57% higher than the $19,468 per capita spending in 1976, which represents an increase that is slightly faster than economic growth ($420/senior). The increase for each of the 20.2 million Canadians under the age of 45 is 39% higher than the $6,784 per capita spending in 1976, approximately 71% of economic growth. The slower rate of increase by comparison with economic growth represents $1,052 less per person for the under-45s as of 2016 – or $21.3 billion less when multiplied by all the people in the age group. This sum represents enough to fund, for example, a high-quality, universal childcare programme twice over (Kershaw/Anderson 2009), or a 46% increase to the post-secondary budget.[31]

Of the new spending on seniors, the $4,591 increase in medical care spending per person aged 65+ is notable for two reasons. First, it is 74% larger than the entire increase per person under the age of 45 for child care, parental leave, family income support, education and medical spending. Second, additional medical spending comes from general revenue, whereas increases to retirement income come from C/QPP. Canadians prepay the latter, meaning that the larger benefits now enjoyed by seniors partly reflect their larger contributions than past generations. This is not the case for larger medical expenditures, which taxpayers fund in response to annual demand. Since Canadian data show demand rises as individuals age,[32] I explore the implication for taxes paid by younger Canadians now versus the past when examining the intergenerational golden rule.

Post-secondary expenditures represent the largest per capita decline for younger Canadians: down $387 from 1976 after inflation, and down $1,869 compared to economic growth projections.[33] Per capita medical care spending is also noteworthy, because it is the largest increase (up $1,171) for young people, rising $550 faster than economic growth would predict. Since social spending in Canada correlates with improvements in life expectancy and preventable mortality more so than medical spending (Dutton et al. 2018), this allocation likely compromises young people's wellbeing. Budgeting for all ages requires concern for the ratio between social and medical spending given the extensive scientific literature that finds health begins where we are born, grow, live, work and age – not with medical spending (Kershaw 2018).[34]

As spending on seniors from general revenue increased four times more than revenue, governments dealt with resulting budget shortfalls in two ways. They increased the debt/GDP ratio by half a trillion dollars, and reduced spending elsewhere. Reductions include a $28 billion decline in spending on grade school as the number of school-age children fell by half a million.

Some may worry the population under the age of 45 is too large a denominator to provide adequate comparisons between spending on seniors and younger people. I therefore perform sensitivity analyses reported in Table 1, beginning by apportioning childcare spending entirely to those under the age of 12 to find a per capita increase of $831. When post-secondary spending is allocated only to those age 18-45, there is a per capita reduction of $1,230. If parental leave spending is assigned just to children under the age of 1 and a primary caregiver, the per capita increase is $3,601. If grade school spending is assumed to benefit only children aged 5-17, not parental labour force attachment, the per capita increase is $6,020.[35] This latter change is of the same magnitude as the $4,591 increase in medical care per senior, or $6,513 combined increased to C/QPP and OAS. As such, the $29 billion reduction to aggregate grade school funding (measured as %GDP) is smaller than would have been expected from the drop in school-age population.

	All earners				Full-time earners only			
Age	**1976-80**	**2012-2016**	**2012-2016 minus 1976-1980**	**% change**	**1976-80**	**2012-2016**	**2012-2016 minus 1976-1980**	**% change**
25-34	41,720	36,640	-5,080	-12%	53,040	49,200	**-3,840**	**-7%**
35-44	46,980	46,340	-640	-1%	60,140	59,740	**-400**	**-1%**
45-54	44,800	45,880	1,080	2%	57,740	59,880	**2,140**	**4%**
55-64	34,200	39,180	4,980	15%	53,400	56,920	**3,520**	**7%**
65-plus	14,420	26,900	12,480	87%	43,160	57,540	**14,380**	**33%**

Sources: All earners: Statistics Canada (2018g): CANSIM Table 206-0052; Full-time earners: Statistics Canada (n.d. d): Custom Table C856285.

Table 3: Median total income 2016$, by age, 1976 and 2016

Intergenerational golden rule: evolution in taxes paid by younger citizens

The previous section reveals that governments increased per capita spending for seniors 4.2 times faster than for Canadians under the age of 45, as spending increased beyond the rate of economic growth for seniors, but slower for young people. In this section, I examine implications for individual taxes owed by young people, guided by the intergenerational golden rule introduced in the methods section. All else being equal, it implies elderly Canadians today should expect transfers from their offspring that are on a par with transfers they made as young adults to their parents' generation when elderly (Wolfson et al. 1998: 108).

To explore this concept, I examine total income taxes paid by a young person in 2016 compared to 1976, along with the sub-total paid to medical care for seniors and OAS.[36] I refer to simulated 35-year-olds with incomes from employment that represent the 25th, 50th, 75th and 99th percentiles in 2016,[37] and adjust these for inflation to calculate federal and provincial taxes owed in 1976 and today.[38] From the diversity of provincial tax codes, I select Ontario because it is the largest province.

> [T]he elderly/non-elderly (under-age-45) ratio in change of spending is 4.2 to 1. This ratio signals that Canadian governments prioritised per capita spending increases for the ageing population at a rate that is over four times faster than for citizens under 45.

There are two broad findings, summarised in Table 2. First, income taxes owed in 2016 are generally lower than in 1976, with average tax rates down 2-3 percentage points. Low-income earners are the exception for whom the average tax rate is now one percentage point higher. Whereas an earner at the 25th percentile pays $271 more in income taxes today, the median earner pays $1,244 less, the 75th percentile pays $1,999 less, and the top one per cent pays $4,519 less. This finding signals there is less progressivity in Canada's income tax code now than four decades ago. Tax rates are lower for middle and higher earners today while still generating more revenue as a share of the economy, because GDP per capita increased 54% over the period.

Second, as taxes generally fell, the amount of taxes paid on behalf of seniors increased. 5% of total government revenue went to medical care for seniors in 1976; now 9.2% does. The revenue share for OAS rose more modestly from 5.4% to 5.8%.[39] Given these changes, a 35 year-old at the 25th percentile now pays $147 more a year to medical care for seniors and OAS than in 1976, equal to a 62% increase. A median earner adds $187 (up 22%); an earner at the 75th percentile contributes an extra $465 (up 27%); and a young person in the top one per cent pays an extra $2,929 (up 36%).[40]

These findings reveal that the cohort retiring today expects more in taxation from its children than it paid for its parents' generation when elderly. In addition, lower average tax rates permit some citizens aged 65+ to pay less in tax toward their offspring than their elderly parents contributed toward them in 1976. The two trends erode government fiscal capacity to invest in – or mitigate the risks facing – contemporary younger cohorts.

The lottery of timing: variations in ability to pay among age cohorts

The first two stages of analysis reveal that governments used the proceeds from economic growth to (i) raise per capita spending on Canadians aged 65+ over four times faster than for citizens under 45; and (ii) reduce tax rates, while requiring younger Canadians to contribute more in income taxes for elderly citizens now by comparison with 1976. The final stage of analysis invites questions about the fairness of these public finance patterns. Since some are born into favourable eras, and others are not, scholars of justice like Rawls (1971: section 44) signal it is important to examine intergenerational public finances by reference to the standard of living inherited by different age groups, and the socioeconomic circumstances they currently face. In response, I now consider how the standard of living for contemporary seniors compares with that of elderly Canadians four decades earlier; and how the standard of living four decades earlier when contemporary seniors were young adults compares with that of young people today.

I follow Vanhuysse's Intergenerational Justice Index to examine this theme, starting with his focus on child and elderly poverty rates (Vanhuysse 2013).

> This shift in economic insecurity aligns with other income and wealth changes that signal prosperity more generally shifted from younger to older Canadians.

Canada has two low-income measures that date back to 1976. The first is the low-income cut-off (LICO), which measures the share of residents who spend 20% more on food, shelter and clothing than the average size-adjusted family. The second is a low-income measure (LIM), which measures the proportion of residents who fall below 50% of median adjusted income.[41] The after-tax LICO shows reductions in low-income for both children (under 18) and the elderly (65+) since 1976: dropping from 13.4% to 7.3% for children in 2016, and from 29% to 4.7% for seniors. By contrast, the LIM shows little change in low-income for children: 14.3% in 1976 and 14.0% in 2016. For seniors, the LIM dropped from 30.6% to 14.2%. Both metrics convey a substantial shift in the ratio of child/elderly low-income. Whereas children had less than half the rate of low-income of elderly Canadians in 1976 on both

	1977 ($ adjusted to 2016)			2016			2016 minus 1977		
Housholds, by age of primary earner	Home ownership rate	Total market value minus total mortgage debt (millions $)	Share of total net value in principal residences	Home ownership rate	Total market value minus total mortgage debt (millions $)	Share of total net value in principal residences	% change in rate of home owners	Change in total market value minus total mortgage debt (millions $)	% change in share of total net value in principal residences
under 35	41%	92,604	15%	35%	223,080	7%	-14%	130,476	-55%
35-44	73%	130,182	22%	64%	439,867	14%	-12%	309,685	-37%
45-54	74%	146,923	24%	70%	757,038	24%	-6%	610,115	-3%
55-64	70%	119,951	20%	77%	832,780	26%	10%	712,829	30%
65+	63%	114,459	19%	67%	965,077	30%	7%	850,618	58%
Total		604,119			3,217,842			2,613,722	

Sources: 1977 data: Statistics Canada (1977): Survey of Consumer Finance Micro Data File; 2016 data: Statistics Canada (2017g): CANSIM Table 205-0002.

Table 4: Total net value in Canadian principal residences, by age: 1977 vs 2016

measures, now they have the same rate when measured by the LIM, and 155% of the rate when measured by the LICO.[42]

This shift in economic insecurity aligns with other income and wealth changes that signal prosperity more generally shifted from younger to older Canadians. Table 3 shows that median income fell $5,080 (-12%) for Canadians age 25-34 since 1976-80, and down $640 (-1%) for those age 35-44.[43] The decline persists after controlling for the evolution in part-time work and post-secondary enrolment by measuring only full-time, full-year earners, for whom median income is down $3,840 and $400 respectively.[44] Over the same period, median income rose over $12,000 for Canadians aged 65+ (up 87% for all earners, and 33% for full-time earners).[45]

As earnings fell for young Canadians, their primary cost of living surged. Whereas an average home cost $210,089 in 1976, the price had reached $490,495 by 2016.[46] The ratio of median full-time income for a 25-34 year-old relative to average home cost therefore increased from 4:1 to 10:1.[47] This young person must now work 13.4 years to save a 20% down payment on an average home, up from five years in 1976-80.[48] Even with historically low interest rates, the typical 25-34 year-old must make mortgage payments that are 15% higher now than in 1976-1980.[49] Average rents have also increased in large urban centres.[50]

While escalating home prices require more work of young people (and all renters), they shift housing wealth from younger to older Canadians. Price escalation increased net wealth in owner-occupied principal residences by $2.6 trillion since 1976.[51] Table 4 shows that 5% of the additional wealth is owned by households under the age of 35, which represent 29% of the adult population. One-third of the additional wealth is owned by Canadians aged 65+, who make up 21% of the adult population. Given lower ownership rates for younger Canadians,[52] the typical household headed by an adult under 35 faces higher rents without reaping wealth gains from rising prices. By contrast, Table 5 shows that the typical senior household reports an increase of $277,903 in net housing wealth by comparison with the same age group in 1977.[53]

As earnings fell for young Canadians, their primary cost of living surged. Whereas an average home cost $210,089 in 1976, the price reached $490,495 by 2016. The ratio of median full-time income for a 25-34 year-old relative to average home cost therefore increased from 4:1 to 10:1.

Vanhuysse (2013) supplements metrics about private income trends for different age cohorts with two metrics for public space. The first is debt per younger person,[54] which increased from $14,779 per person under the age of 45 in 1976 to $44,013.[55] The second is the ecological footprint per capita, which measures how much demand human consumption places on the biosphere. At present, a footprint of 1.7 global hectares per person is necessary if each global citizen is to live within the means of our planet's resources (Global Footprint Network 2018). In 1976, the Canadian ecological footprint per person was 10.3 global hectares. As of 2014, it was 8.0 global hectares, the seventh largest on the planet (Global Footprint Network 2018). This change signals that Canadians reduced our footprint on average by 0.06 hectares per year since 1976. To achieve 1.7 global hectares by mid-century, a key time commitment in the Paris Agreement (United Nations 2015), Canadians must now accelerate threefold the pace at which we reduce our footprint to 0.18 hectares per year.[56]

In sum, findings from this third analysis suggest today's ageing population has "lucked out" in the lottery of timing by comparison with those who preceded and follow them, and thus enjoy a greater ability to pay, or lesser need. Seniors today have more prosperity on average than did elderly Canadians four decades ago. They have lower levels of poverty, higher median earnings, and more wealth in their homes.

Older Canadians today also generally faced more favourable socioeconomic circumstances as younger adults in 1976 than do

	1977 (all $ adjusted to 2016)			2016			**2016 minus 1977**			
Housholds, by age of primary earner	% home owners	Market value minus mortgage ($)	Mortgage debt ($)	% home owners	Market value minus mortgage ($)	Mortgage debt ($)	**Change in % home owners**	**Change in market value minus mortgage**	**Change in mortgage debt ($)**	**Change in debt for extra $1 of net value ($)**
under 35	41%	81,219	76,468	35%	185,552	214,248	**-14%**	**104,333**	**137,780**	**1.32**
35-44	73%	130,164	51,131	64%	255,975	204,025	**-12%**	**125,811**	**152,895**	**1.22**
45-54	74%	156,785	29,471	70%	377,000	143,900	**-6%**	**220,215**	**114,429**	**0.52**
55-64	70%	151,297	12,579	77%	381,852	76,348	**10%**	**230,555**	**63,769**	**0.28**
65+	63%	131,568	3,194	67%	409,471	22,529	**7%**	**277,903**	**19,335**	**0.07**

Sources: 1977 data: Statistics Canada (1977): Survey of Consumer Finance Micro Data File; 2016 data: Statistics Canada (2017g): CANSIM Table 205-0002.

Table 5: Mean change in individual household net housing value and mortgage debt, by age: 1977 vs 2016

younger Canadians now. Older Canadians started with higher median earnings, which could stretch further when paying for rent, saving for a down payment, and paying a mortgage. Today's seniors also inherited smaller government debts as young people, and reduced their ecological footprint at just one-third of the rate that young adults must now do. As a counterpoint to this general trend, 1976 witnessed higher rates of low-income among children when measured by the LICO, but not the LIM.

It is relative to this lottery of timing that the justness of public finance trends can begin to be assessed. Three findings give reason to worry that Canadian governments strayed from norms of intergenerational justice since 1976. First, governments invested in later life course stages at a rate that is 4.2 times faster than for earlier life course stages, and did so on behalf of a cohort that enjoyed more affluence by comparison with cohorts that preceded and followed them. Second, governments violated the intergenerational golden rule. Younger Canadians now transfer 22%-62% more in income taxes to elderly citizens than today's seniors contributed to their forebears, even though contemporary young people have a lesser ability to pay. Third, the interaction of the first two trends crowd out resources to support younger people to adapt to new risks, including lower earnings, higher costs, less time at home when children are young, and climate change.

Older Canadians today [...] generally faced more favourable socioeconomic circumstances as younger adults in 1976 than do younger Canadians now. Older Canadians started with higher median earnings, which could stretch further when paying for rent, saving a down payment, and paying a mortgage. Today's seniors also inherited smaller government debts as young people, and reduced their ecological footprint at just one-third of the rate that young adults must now do.

Since life expectancy at birth for Canadians aged 25 in 1976 is 7 to 10 years higher than for Canadians aged 65 in 1976,[57] time comparisons of spending on seniors are difficult to interpret. Some may judge that contemporary older Canadians must financially manage more birthdays than did seniors in the past, and thus have greater need. Some may judge that additional birthdays ahead of contemporary seniors mean they are "younger," less frail, and thus have a greater ability to pay (Sanderson/Scherbov 2008). However one aligns with these perspectives, the data from this study invite public dialogue about whether Canadian public finance has found the right balance in adapting for older Canadians in proportion to the initial circumstances they inherited, and to new realities now facing them and younger citizens. This dialogue will be shaped by values as much as by empirical data.

Policy recommendations

Generational inequities in public finance are more likely to be ignored if not monitored. It is time for Canadian governments to publish routine reports that feature data about the elderly/non-elderly ratio of spending changes; trends in tax rates, and taxes paid in allegiance to the golden rule; along with metrics that assess the relative ability to pay of various age cohorts. Because of concerns about government deficit and debt as metrics of fiscal sustainability, offices of Parliament should also perform fiscal gap and generational accounting every three years as the European Union now does for member countries (Kotlikoff 2017:59).

When evidence emerges of intergenerational imbalance, the search for public finance responses should target cleavages between age groups. A current cleavage is the gap between home prices and earnings, which reduces the ability to pay among young adults, while driving wealth accumulation for many seniors. An extensive international literature observes that residential property often enjoys favourable tax treatment (Freebairn 2016; O'Sullivan/Gibb 2012; Cho/Francis 2011), including in Canada (Boadway 2015: 261). For example, capital gains from the sale of principal residences are not counted as income for tax purposes, representing a federal tax expenditure of $7 billion annually (Government of Canada 2017:39), and corresponding reductions for provincial coffers. Simultaneously, annual revenue from municipal property taxation is down $4.4 billion as a share of GDP compared to 1976.[58]

It is time for Canadian governments to publish routine reports that feature data about the elderly/non-elderly ratio of spending changes; trends in tax rates, and taxes paid in allegiance to the golden rule; along with metrics that assess the relative ability to pay of various age cohorts.

Since all provinces have infrastructure to assess annually the market value of homes, shifting the balance of revenue generation toward housing wealth is an optimal starting point for renewing commitment to intergenerational justice in Canadian public finance.[59] This tax shift would target the primary trend creating a socio-economic fissure between older and younger citizens. It also taps older Canadians with financial means for additional taxation in recognition that they disproportionately accumulated housing wealth over the last four decades; and their generation passes down larger public medical care bills to their children than their parents passed down to them. Tax deferment could accommodate "home-rich but income-poor" citizens by postponing collection of new annual taxes on high-value homes until the sale of the property. On top of funding medical care for the ageing population, additional taxation of housing wealth would preserve fiscal capacity for governments to address new social risks for younger Canadians, and reduce incentives for speculative demand on real estate to cool down housing prices. That could be a win-win-win for all generations.

Notes

1 Statistics Canada (2017a): CANSIM Table 051-0001.

2 Social Sciences and Humanities Research Council (n.d.).

3 Such omissions undermine the utility of comparative projects, because medical care spending is consumed disproportionately in later life, while education is consumed earlier. Likewise, the omission of tax expenditures means one country's baby bonus will be counted as a traditional budget expense when another country's child tax credit will not, although the two are functionally equivalent.

4 For example, Bradshaw/Holmes 2013.

5 Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

6 Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

7 United Nations (2002) assemblies on ageing emphasise the rights of older persons to independence, participation, care,

self-fulfilment and dignity, while the United Nations (1989) convention on the rights of the child invokes special protections for children, and implies investment in their guardians.

8 For a summary of this literature, see the Commission on the Social Determinants of Health 2008.

9 By examining spending on Canadians under the age of 45, I largely avoid the problem of apportioning benefits between parents and children. Tenuous assumptions would otherwise be required when calculating the portion of cash transfers to families from which parents benefit apart from their children, or what quantity of childcare and school expenditures provide early development opportunities for children by comparison with the portion that supports parents to connect to the labour market, etc. As Lynch (2006:20) observes, there is "considerable overlap between the wellbeing of children and non-elderly adults, and the scant similarity between the wellbeing of seniors and of their children's and grandchildren's age groups."

10 The CPI figure for 1976 is 31.1 The CPI figure for 2016 is 128.4. See Statistics Canada (2018c): CANSIM Table 326-0021.

11 2016 tax calculations rely on SPSD/M version 26.1 and 1976 calculations rely on version 8.1. Since the released version of the latter only included years 1984 to 2005, Statistics Canada staff updated the parameters for this study to reflect the 1976 tax structure for federal and provincial taxes. The updates were provided by Laurie Plager (laurie.plager@canada.ca) on 19 January 2018. The assumptions and calculations underlying the simulations were prepared by the author, and the responsibility for the use and interpretation of these data is entirely that of the author.

12 Some may lament that this study does not perform generational accounting (GA). Developed by Auerbach, Gokhale, Kotlikoff (1991) and colleagues, it is a methodology widely used among economists to study whether a government's current fiscal policy is balanced in terms of taxes owed and benefits received between contemporary and future generations, assuming current policy persists indefinitely. If there is imbalance, GA permits estimation of the scale of revenue and/or expenditure adaptations needed to restore balance. The method is motivated by critique that conventional concepts of deficit and debt "do not constitute meaningful measurements of the fiscal burden being foisted on young and future generations" because of arbitrary accounting practices that keep some liabilities off government books (Kotlikoff 2017: 60).

In their recent GA study of pension reform in Norway, Germany and Poland, Laub and Hagist (2017: 72) observe that the success of policy adaptations to promote intergenerational justice "is highly dependent on whether people accept them, and adapt to them or not. Thus a transparent reform process and a broad approval of reform steps taken" are necessary for the revisions to be politically viable. While GA can contribute to this process by providing a measure of the fiscal gap between contemporary and future generations, they conclude "it has to be complemented by other assessments" that help to bring along the public and decision-makers. This study falls in the "other" category, by focusing on a retrospective, descriptive analysis of changes to public finance so that Canadians can better understand trends that produced the current suite of intergenerational policies. As Kotlikoff (2017: 57) acknowledges in his review of GA scholarship over recent decades, "how well current generations fared in the past may matter for assessing the justice of current generation policy."

13 Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

14 2016 age estimates for medical spending are calculated in three steps. The Canadian Institute for Health Information (CIHI) provides per capita data about provincial medical spending reported for five-year age ranges (2017: Table E.1.18.2). The most recent are for 2015. I first apply 2015 per capita data to the Canadian population in 2016 to estimate total projected spending. Second, I calculate the percentage of this projected spending for Canadians under the age of 45 (29.2%) and aged 65+ (46.7%). Third, I attribute these percentages to the $163.3 billion actually forecasted as total public spending on medical care for Canada in 2016 (CIHI 2017: Table A.3.3.1). These calculations reflect average per capita figures of $2,314 per person under 45 and $12,913 per person aged 65+ (See Table 1). GDP data are from Statistics Canada (2018b): CANSIM Table 380-0063.

I calculate the age distribution of medical spending in 1976 in the same way, with one exception. CIHI data about per capita use of medical care date back to 1998 (2017: Table E.1.1.2). To estimate per capita spending in 1976, I calculate the average annual change between 1998 and 2014 for each five-year age group, and attribute that average change to each year between 1976 and 1997. These figures are applied as step 1 to the population in 1976 to estimate total projected spending. I calculate in step 2 the percentage of projected spending on Canadians under the age of 45 (43.5%) and 65+ (36.7%). I then apply these percentages to the total spending of $10.8 billion in 1976 reported by CIHI (2017: Table A.3.3.1). These calculations reflect average per capita assumptions of $1,143 per person under 45 and $8,322 per person aged 65+ after adjusting for inflation into 2016 dollars (See Table 1).

As a sensitivity analysis for the 1976 calculation, I change step 1 by attributing the per capita spending values in 1998 to the population distribution in 1976. This sensitivity analysis predicts 45.4% of spending in 1976 went to those under the age of 45, and 33.9% went to those aged 65+. These predictions reflect assumptions of $1,194 per person under 45 and $7,690 per person aged 65+. (See Table 1).

The sensitivity analysis suggests that primary figures underestimate the annual increase in medical care spending for Canadian seniors by $3 billion in aggregate, and over $600 per capita. Similarly, the sensitivity analysis suggests that primary figures underestimate a decline in spending for the under-45 population by approximately $2 billion in aggregate, and overestimate the resulting per capita increase by around $50.

15 Old Age Security data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

16 Canada and Quebec public pension data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063. Legislation requires that C/QPP revenues remain separate from other taxation so that arms-length boards invest prepayments to fill the gap between contributions and projected expenditures.

17 2016 data about post-secondary credentials are from Statistics Canada (2017b). 1976 data are from two sources. Statistics Canada (1978a): "Table 30. Population 15 years and older not attending school full time by age groups and sex, showing level of schooling, for Canada and provinces 1976." Statistics Canada

(1978b): "Table 14. Population 15 Years and Over by Age Groups and School Attendance, Showing Labour Force Activity and Sex, for Canada and Provinces, 1976." Due to data limitations, note that the 1976 calculations assume (i) all people in post-secondary in that year have a certificate/degree, and (ii) all people over the age of 35 in post-secondary fall in the under-age-45 cohort. These assumptions overestimate the percentage of people under the age of 45 who had post-secondary credentials in 1976, and thus underestimate the increase in the proportion of people under 45 with post-secondary credentials as of 2016. The latter underestimation means the per capita decrease in spending on post-secondary as of 2016 is likely larger than reported in Table 1.

18 Post-secondary spending data from Statistics Canada (2018d): CANSIM Table 380-0081. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

19 Labour force data from Statistics Canada (2017c): CANSIM Table 282-0002.

20 Childcare expenditure data are from Friendly/Grady/Macdonald/et al. (2015: 136). GDP data are from Statistics Canada (2018b): CANSIM Table 380-0063. Since comprehensive data on childcare spending do not exist for 1976, I estimate spending based on the province of British Columbia, and then adjust for the portion of the national population represented by BC in 1976 to generate a national estimate. BC data are from Government of British Columbia 1977: D.41. The $3.6 billion increase is approximately $10 billion less than Kershaw and Anderson (2009) estimate is required to build a high-quality system, and why Canada ranks among the bottom of OECD countries for investment in early childhood education (Petersson/Mariscal/Ishi 2017: 19).

21 The data reviewed in this study are in keeping with Barer, Evans and Hertzman (1995: 194), who find that population ageing alone accounts for little of the increased utilisation of health care by seniors in Canada. Utilisation is driven more by the fact that the health system is doing more to and for seniors than in the past, "suggesting that the appropriate care of elderly people should be a central issue for health care policy and management."

22 These findings are consistent with Tepe and Vanhuysse (2010), who report that dramatic demand-side demographic trends influence public finance relatively little in advanced democracies, although the historical timing of when governments begin addressing social risks shapes spending patterns.

23 Debt data from Statistics Canada (n.d. a): CANSIM Table 378-0073 and Statistics Canada (2018e): CANSIM Table 378-0121. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

24 Elementary and secondary school spending data from Statistics Canada (2017d): CANSIM Table 478-0014. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

25 Parental leave spending data in 2016 from Government of Canada (n.d.): Chart 2. Parental leave data in 1976 from Canadian Tax Foundation 1979: Table 7-9. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

26 Statistics Canada (2017a): CANSIM Table 051-0001. There are 3.2 million more people under the age of 45, 5.6 million more people age 45-64, and 4 million more seniors.

27 Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. Population data from Statistics Canada (2017a): CANSIM Table 051-0001.

28 GDP data from Statistics Canada (2018b): CANSIM Table 380-0063. Population data from Statistics Canada (2017a): CANSIM Table 051-0001.

29 Medical care calculations are based on Canadian Institute of Health Information (2017) data about total health spending by governments, and analysis of per capita health spending by age group. See note 32 for further detail. The per capita figures account for an estimated 55% increase in use of publicly-paid medical care services per person aged 65+ between 1976 and 2016 (from $8,322 to $12,913); and an estimated increase of 102% per person under the age of 45 (from $1,143 to $2,314).

30 Per capita figures for childcare and parental leave in Table 1 account for the increased demographic demand for these programmes as a result of the 54% increase in labour force participation among women age 25-44 between 1976 and 2016. Similarly, the figure for post-secondary accounts for the 149% increase in the share of Canadians age 25-44 who earned post-secondary credentials by comparison with 1976. Even if these adjustments to per capita spending on younger Canadians are not made, the elderly/non-elderly (under the age of 45) ratio of change in social spending is 2.6 to 1; and the $4,591 rise in medical care spending per senior is on its own larger than the $4,299 increase in spending on the entire suite of programmes for younger generations ($4,299 = $9,420 - $5,122). See Table 1 for further detail.

31 Post-secondary spending data from Statistics Canada (2018d): CANSIM Table 380-0081. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

32 The Canadian Institute for Health Information has reported the age pattern in health care consumption from 1998 onward (with a 2-3 year data lag). These data consistently reveal escalation in medical spending over the life course. For example, the 2015 figures reveal less than $2,000 in spending per person age 1-24, and $2,000 to $3,000 per person age 25-49. By aged 65-69, the figure is around $6,600, and rises to over $29,000 for Canadians 90+. The one exception to this trend is spending on infants, approximately $11,000, reflecting the costs associated with birthing. For further discussion of the age pattern in Canada, see also Forget et al. (2008).

33 In keeping with per capita reductions in government spending on university, college and the trades, annual undergraduate tuition rose from $2,332 in 1976 to $6,373 in 2016 (Statistics Canada (2017e): CANSIM Table 477-0077; and Statistics Canada (n.d. g): Tuition Living Accommodation Costs (TLAC) Standard Table 8E.1a) Weighted average tuition fees for full-time Canadian Undergraduate students by province and Canada total, in current dollars, 1972-2006). This finding is consistent with Cheung et al. (2012) who report that tuition fees in Canada increased 40% between 1997 and 2011, and that Canadian public investment in tertiary education provides a low level of grant funding, and a high level of loan funding, by comparison with the OECD average.

34 This observation is especially important in Canada, where public funding for medical care is relatively high by international standards, but purchases below-average access to doctors and diagnostics, along with well-remunerated physicians (OECD 2017: 156, 168, 170).

35 All population estimates are from Statistics Canada (2017a): CANSIM Table 051-0001.

36 An optimal analysis would examine age patterns in revenue from taxation of individual income and goods/services. Canadian

data do not permit age analyses of the latter. However, it is likely that goods/services taxation is down for most or all age groups, because the tax mix has shifted away from taxes on goods/services in favour of additional income taxation. Income taxes represented 28.5% of total government revenue in 1976 and 30.3% of total revenue in 2016. By contrast, taxes on goods/services represented 33.8% of total revenue in 1976 and 30.9% in 2016. This shift represents a $27.4 billion increase in taxation of individual income (measured as a share of GDP), compared to a $7.2 billion reduction in taxation of goods/services. (Revenue data from Statistics Canada (2018a): CANSIM Table 380-0080. Population data from Statistics Canada (2017a): CANSIM Table 051-0001). GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.

37 Statistics Canada (n.d. b): Data Table, Total Income percentiles.

38 Taxes owed are calculated using versions 8.1 and 26.1 of Statistics Canada's Social Policy Simulation Database and Model (SPSD/M). See note 27 for further information.

39 These findings are consistent with Evans, Hertzman and Morgan (2007: 302-303), who report that "several provincial governments have in the last decade made significant cuts to their income tax rates, and then cut expenditures to restore budget balance. Since cutting health spending is so politically charged, they have chosen to cut other programs more."

40 Larger income tax transfers from young people to seniors reflect in part that there were nearly seven workers for every Canadian aged 65+ in 1976, while there are now fewer than four, and projections anticipate fewer than three in the decades ahead (Statistics Canada 2014).

41 Statistics Canada (n.d. c).

42 Low income data from Statistics Canada (2018f): CANSIM Table 206-0041.

43 Median income data from Statistics Canada (2018g): CANSIM Table 206-0052. I examine five-year time periods from 1976-1981 and the first half of the current decade to dampen the influence of the business cycle on time comparisons.

44 Full-time, full-year median income data from Statistics Canada (n.d. d): Custom Table C856285. Younger Canadians who work full-time, full-year earn less today despite the trend toward more education discussed earlier. 70% of 25-44 year-olds now have post-secondary credentials compared to 28% four decades ago. While people with post-secondary still earn more on average than those without, more recent labour market entrants do not enjoy as large a return for their post-secondary investments as did graduates in the past (see Beaudry/Green 2000. Moos 2014).

45 Lower median income for Canadians under the age of 45 coupled with higher median income for those over 45 are consistent with the stagnation in Canadian earnings reported by Rouillard and Rouillard (2015) since 1980. These age patterns are also in line with evidence from Chen, Ostrovsky and Piraino (2017) who find that research from the late 1990s overestimated intergenerational income mobility in Canada.

46 Canadian Real Estate Association (n.d.): Custom Table. Average home prices today reflect the fact that many more young people now purchase homes in condominiums or apartments without yards, or in suburbs that require longer commutes than the past (Kershaw/Minh 2016).

47 The ratio increases from 4:1 to 9:1 when mean full-time, full-year earnings are swapped for the median figures reported in this section.

48 Guided by Rea et al. (2008) and Statistics Canada, I assume that the typical Canadian trying to buy into the housing market can save 15% of their income for a down payment on top of rent or other shelter payment. This rate of saving is more aggressive than the 10% rate assumed by CityLab (2012) when making similar calculations for US cities. My findings are consistent with Moos (2014: 2096), who reports for younger Canadians that "Housing costs are higher and more income is required to attain a similar kind of housing status to those of previous cohorts." See also Cheung (2014), who reports that housing prices have increased significantly over the past decade, requiring first-time home-buyers to spend more of their income to purchase homes, and coinciding with a shortage in rental housing in several cities.

49 Building on the analysis of work required to save a 20% down payment, I calculate mortgage payments for a loan that equals 80% of the value of an average-priced home. Average home price data from Canadian Real Estate Association (n.d.): Custom Table. Interest rate data from Statistics Canada (n.d. e): CANSIM Table 176-0043. Interest payments calculated using the Vancity Credit Union (n.d.) Mortgage Calculator.

50 Rental data from Statistics Canada (2017f): CANSIM Table 027-0040.

51 Housing wealth data for 1977 from Statistics Canada 1977. Data for 2016 from Statistics Canada (2017g): CANSIM Table 205-0002.

52 Home ownership is down 12%-14% for people under 45 today by comparison with 1977, while ownership is up 7%-10% for Canadians aged 55 and older. Home ownership data for 1977 from Statistics Canada 1977. Data for 2016 from Statistics Canada (2017g): CANSIM Table 205-0002.

53 These findings about wealth accumulation via increased housing capital are in line with Lemieux and Riddell (2016), who report that the share of national income in Canada received by workers has dropped when compared to income received by owners of capital.

54 Vanhuysse (2013) calculates the debt per child. Consistent with my focus on the generations raising children, I calculate the debt per person under the age of 45. As Kotlikoff (2017) rightly critiques, public debt suffers from arbitrary accounting decisions that limit its accuracy as a metric of fiscal sustainability. Still, as the dominant fiscal debt measure of which the public is aware, an increasing level of debt per capita signals lesser prioritization of fiscal sustainability among decision-makers accountable to the public. It is therefore meaningful to examine if lesser priority is given to sustainability, even if the metric may not be an accurate measure of the actual level of (un)sustainability.

55 Debt data from Statistics Canada (n.d. a): CANSIM Table 378-0073 and Statistics Canada (2018e): CANSIM Table 378-0121. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063. Population data from Statistics Canada (2017a): CANSIM Table 051-0001.

56 Similarly, the Intergovernmental Panel on Climate Change Working Group III (2001: 89) reports that greenhouse gas emissions must fall below two tonnes per person to avoid severe damage to the climate. In order to achieve this reduction by 2050, decarbonisation plans could have been phased in more gradually in 1976 than today. At that time, the International Energy Association (2017: CO2/population) estimated Canada emitted 16.59 tonnes per person, which required annual reductions of 0.2 tonnes per

year. By this logic, per capita emissions should now be under nine tonnes – not the 15.32 tonnes recorded by the IEA in 2015. Given the slow pace of adaptation in previous decades, carbon-reduction must now occur at twice the pace, dropping 0.4 tonnes per year.
57 Statistics Canada (n.d. f): CANSIM Table 102-0512.
58 Property tax data from Statistics Canada (2018a): CANSIM Table 380-0080. GDP data from Statistics Canada (2018b): CANSIM Table 380-0063.
59 Support for including home wealth more in calculations of taxes owed or fees required to pay for the costs of population ageing is also growing in Australia (Ong 2016) and the UK (Searle/McCollum 2014, O'Sullivan/Gibb 2012), given the substantial escalation in home prices experienced in those countries in recent decades. In addition, several commentators speak of the value of recurrent taxation of property wealth for efficiency reasons (Wood/Ong/Cigdem 2016, Eerola/Maattanen 2013, Evans 2012), observing that sheltering of housing wealth accelerates investment in real estate at the expense of capital investment in more productive sectors.

References

Auerbach, Alan J. / Gokhale, Jagadeesh / Kotlikoff, Laurence J. (1991): Generational Accounts: A Meaningful Alternative to Deficit Accounting. In: Tax Policy and the Economy, NBER, 5.

Barer, Moris L. / Evans, Robert G. / Hertzman, Clyde (1995): Avalanche or Glacier? Health Care and the Demographic Rhetoric. In: Canadian Journal on Aging, 14 (2), 193-224.

Beaudry, Paul / Green, David (2000): Cohort Patterns in Canadian Earnings: Assessing the Role of Skill Premia in Inequality Trends. In: Canadian Journal of Economics, 33 (4), 907-936.

Boadway, Robin (2015): Tax Policy for a Rent-Rich Economy. In: Canadian Public Policy, 41 (4), 253-264.

Boyce, W. Thomas (2007): A biology of misfortune: Stress reactivity, social context, and the ontogeny of psychopathology in early life. In: Masten, Ann S. (ed.). Multilevel Dynamics in Developmental Psychopathology: Pathways to the Future. Minneapolis: University of Minnesota, 45-82.

Bradshaw, Jonathan / Holmes, John (2013): An Analysis of Equity in Redistribution to the Retired and Children over Recent Decades in the OECD and UK. In: Journal of Social Policy, 42 (1), 39-56.

Canadian Real Estate Association (n.d.): Custom Table. Average home prices by province and selected cities, 1976 onward. Table provided by jlemoine@crea.ca on 15 January 2018 and 16/17 January 2017.

Canadian Institute for Health Information (2017): National Health Expenditure Trends, 1975-2017: Data tables on health spending. https://www.cihi.ca/sites/default/files/document/nhex2017-full-datatables-en.zip. Viewed on on 18 April 2018.

Canadian Tax Foundation (1979): The National Finances 1977/78. Toronto: Canadian Tax Foundation.

Chen, Wen-Hao / Ostrovsky, Yuri / Piraino, Patrizio (2017): Lifecycle variation, errors-in-variables bias and nonlinearities in intergenerational income transmission: new evidence from Canada. In: Labour Economics, 44, 1-12.

Cheung, C. (2014): Deconstructing Canada's Housing Markets: Finance, Affordability and Urban Sprawl. In: OECD Economics Department Working Papers, No. 1145. Paris: OECD Publishing.

Cheung, C. / Guillemette, Y. / Mobasher-Fard, S. (2012): Tertiary Education: Developing Skills for Innovation and Long-Term Growth in Canada. OECD Economics Department Working Papers, No. 991. Paris: OECD Publishing.

Cho, Sang-Wook (Stanley) / Francis, Johanna L. (2011): Tax treatment of owner occupied housing and wealth inequality. In: Journal of Macroeconomics, 33, 42-60.

CityLab (2012): "How Long Will You Need to Save to Buy a Home In Your City?" In: The Atlantic. http://www.citylab.com/housing/2012/08/how-long-will-you-need-save-buy-home-your-city/3085/. Viewed on 21 November 2014.

Commission on the Social Determinants of Health (2008): Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health. World Health Organization. http://www.who.int/social_determinants/thecommission/finalreport/en/index.html. Viewed on 15 January 2010.

Corak, Miles (ed.) (1998): Government Finances and Generational Equity. Ottawa: Ministry of Industry, Government of Canada.

Dutton, Daniel J. / Forest, Pierre-Gerlier / Kneebone, Ronald D. et al. (2018): Effect of provincial spending on social services and health care on health outcomes in Canada: an observational longitudinal study. In: Canadian Medical Association Journal, 190 (3), E66-71.

Eerola, Essi / Maattanen, Niku (2013): The Optimal Tax Treatment of Housing Capital in the Neoclassical Growth Model. In: Journal of Public Economic Theory, 15 (6), 912-938.

Evans, Alan W. (2012): Optimal tax theory and the taxation of housing in the US and the UK. In: Journal of Property Research, 29 (4), 368-378.

Evans, Robert / Hertzman, Clyde / Morgan, Steve (2007): Improving Health Outcomes in Canada. In: Leonard, Jeremy / Ragan, Christopher / St-Hilaire, France (eds): A Canadian Priorities Agenda: Policy Choices to Improve Economic and Social Well-Being. Montreal: Institute for Research on Public Policy, 291-327.

Forget, Evelyn L et al. (2008): Variations in Lifetime Healthcare Costs across a Population. In: Healthcare Policy, 4 (1), e149-e167.

Freebairn, John (2016): Taxation of Housing. In: The Australian Economic Review, 49 (3), 307-316.

Friendly, Martha / Grady, Bethany / Macdonald, Lyndsay et al.

(2015): Early Childhood Education in Canada 2014. Toronto, ON: Childcare Resource and Research Unit. http://childcare-canada.org/sites/default/files/ECEC-2014-full-document-revised-10-03-16.pdf. Viewed on 24 January 2018.

Global Footprint Network (2018): Ecological Footprint per Person. http://data.footprintnetwork.org/#/. Viewed on 2 May 2018.

Global Footprint Network (2018): Open Data Platform: NFA 2018 Edition. https://api.footprintnetwork.org/v1/data/33/all/earth. Viewed on 16 April 2018.

Gosseries, Axel (2009): Three Models of Intergenerational Reciprocity. In: Meyer, Lukas / Gosseries, Axel (eds): Intergenerational Justice. Oxford: Oxford University Press, 119-146.

Government of British Columbia (1977): Public Accounts. Victoria, BC: Ministry of Finance.

Government of Canada (2017): Report on Federal Tax Expenditures. Ottawa: Department of Finance Canada.

Government of Canada (n.d.): Employment Insurance Monitoring and Assessment Report for the fiscal year beginning April 1, 2015 and ending March 31, 2016. Chapter II - 1. Employment Insurance benefits overview. Ottawa: Employment and Social Development Canada. https://www.canada.ca/en/employment-social-development/programs/ei/ei-list/reports/monitoring2016/chapter2/ei-overview.html#section1.1. Viewed on 23 January 2018.

Intergovernmental Panel on Climate Change Working Group III (2001): Climate Change 2001: Mitigation. Intergovernmental Panel on Climate Change. http://www.ipcc.ch/ipccreports/tar/wg3/index.php?idp=0. Viewed on 24 January 2018.

International Energy Association (2017): CO2 emissions from fuel combustion 2017 database. www.iea.org/publications/freepublications/publication/CO2-emissions-from-fuel-combustion-highlights-2017.html. Viewed on 24 January 2018.

Keating, Daniel P. / Hertzman, Clyde (eds) (1999): Developmental Health and the Wealth of Nations: Social, Biological, and Educational Dynamics. New York: The Guilford Press.

Kershaw, Paul (2018): The need for health in all policies in Canada. In: Canadian Medical Association Journal, 190 (64), E64-65.

Kershaw, Paul / Anderson, Lynell (2016): Measuring the Age Distribution in Canadian Social Spending. In: Canadian Public Administration, 59 (4), 556-579.

Kershaw, Paul / Anderson, Lynell (2009): Is a pan-Canadian system of early child development possible? Yes, when we redress what ails Canadian culture. In: Paediatrics and Child Health, 14 (10), 685-688.

Kershaw, Paul / Minh, Anita (2016): Code Red: Rethinking Canadian Housing Policy. Vancouver: Generation Squeeze. http://bit.ly/GSCodeRed. Viewed on 24 June 2016.

Kotlikoff, Laurence (2017): Measuring Intergenerational Justice. In: Intergenerational Justice Review, 3 (2), 56-63.

Laub, Natalie / Hagist, Christian (2017): Pension and Intergenerational Balance: A case study of Norway, Poland and Germany using Generational Accounting. In: Intergenerational Justice Review, 3 (2), 64-76.

Lee, Ronald / Mason, Andrew (eds) (2011): Population Aging and the Generational Economy: A Global Perspective. Cheltenham, UK: Edward Elgar Publishing.

Lemieux, Thomas / Riddell, Craig (2016): Who Are Canada's Top 1 Percent? In: Green, David / Riddell, Craig / St-Hilaire, France (eds): Income Inequality: The Canadian Story. Montreal: Institute for Research on Public Policy, 103-155.

Lynch, Julia (2006): Age in the Welfare State: The Origins of Social Spending on Pensioners, Workers and Children. Cambridge: Cambridge University Press.

Moos, Markus (2014): Generational Dimensions of Neoliberal and Post-Fordist Restructuring: The Changing Characteristics of Young Adults and Growing Income Inequality in Montreal and Vancouver. In: International Journal of Urban and Regional Research, 38 (6), 2078-2102.

OECD (2017): Health at a Glance 2017. Paris: OECD publishing. http://dx.doi.org/10.1787/health_glance-2017-en. Viewed on 23 January 2018.

Ong, Rachel (2016): Financing aged care: The role of housing wealth and intergenerational relationships. In: Kendal, Hal / McDonald, Peter/ Piggott, John (eds): Population Ageing and Australia's Future. Acton: Australian National University Press, 261-280.

Oreopoulos, Philip / Kotlikoff, Laurence J. (1996): Restoring Generational Balance in Canada. In: Choices, 2 (1), 2-52.

Oreopoulos, Philip / Vaillancourt, Francois (1998): Applying Generational Accounting to Canada: Findings and Fallacies. In: Corak, Miles (ed.): Government Finances and Generational Equity. Ottawa: Statistics Canada, Ministry of Industry, 7-20.

O'Sullivan, Anthony / Gibb, Kenneth (2012): Housing Taxation and the Economic Benefits of Homeownership. In: Housing Studies, 27 (2), 267-279.

Petersson, Bengt / Mariscal, Rodrigo / Ishi, Kotaro (2017): Women are Key for Future Economic Growth: Evidence from Canada. International Monetary Fund. https://www.imf.org/en/Publications/WP/Issues/2017/07/19/Women-Are-Key-for-Future-Growth-Evidence-from-Canada-45047. Viewed on 24 January 2018.

Rawls, John (1971): A Theory of Justice. Cambridge, MA: Harvard University Press.

Rea, Willa / Yuen, Jennifer / Engeland, John et al. (2008): The dynamics of housing affordability. In: Perspectives, 20, 15-26.

Rouillard, Jacques / Rouillard, Jean-François (2015): Salaires et productivité du travail au Canada depuis le début du 20e siècle: les travailleurs bénéficient-ils de la croissance économique? In: Relations Industrielles / Industrial Relations, 70 (2), 353-377.

Sanderson, Warren / Scherbov, Sergei (2008): Rethinking Age and Aging. In: Population Bulletin, 63 (4), 3-16.

Searle, Beverley A / McCollum, David (2014): Property-based welfare and the search for generational equality. In: International Journal of Housing Policy, 14 (4), 325-343.

Social Sciences and Humanities Research Council (n.d.): Future Challenge Areas and Subquestions. Ottawa: Government of Canada. http://www.sshrc-crsh.gc.ca/society-societe/community-communite/Future_Challenge_Areas-domaines_des_defis_de_demain-eng.aspx#4. Viewed on 23 January 2018.

Statistics Canada (2018a): CANSIM Table 380-0080: Revenue, expenditure and budgetary balance - General governments, quarterly (dollars). Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3800080. Viewed on 15 May 2018.

Statistics Canada (2018b): CANSIM Table 380-0063: Gross domestic product, income based, quarterly (dollars). Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3800063. Viewed on 15 May 2018.

Statistics Canada (2018c): CANSIM Table 326-0021: Consumer Price Index. Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=3260021. Viewed on 15 May 2018.

Statistics Canada (2018d): CANSIM Table 380-0081: Revenue, expenditure and budgtary balance - Provincial administration, education and health, quarterly (dollars). Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3800081&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (2018e): CANSIM Table 378-0121: National Balance Sheet Accounts, quarterly (dollars). Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3780121&&pattern=&stByVal=1&p1=1&p2=31&tabMode=dataTable&csid=. Viewed on May 15 2018.

Statistics Canada (2018f): CANSIM Table 206-0041: Low income statistics by age, sex and economic family type, Canada, provinces and selected census metropolitan areas (CMAs), annual. Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2060041&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (2018g): CANSIM Table 206-0052. Income of individuals by age group, sex and income source, Canada, provinces and selected census metropolitan areas, annually (Number unless specified). Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2060052&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (2017a): CANSIM Table 051-0001. Estimates of population, by age group and sex for July 1, Canada, provinces and territories. Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=510001. Viewed on 15 May 2018.

Statistics Canada (2017b): 2016 Census, Catalogue Number 98-400-X2016241. Highest Certificate, Diploma or Degree (15), Major Field of Study - Classification of Instructional Programs (CIP) 2016 (82), Age (9) and Sex (3) for the Population Aged 15 Years and Over in Private Households of Canada, Provinces and Territories, Census Metropolitan Areas and Census Agglomerations, 2016 Census - 25% Sample Data. Ottawa: Industry Canada. http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Ap-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=0&PID=110633&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2017&THEME=123&VID=0&VNAMEE=&VNAMEF=. Viewed on 15 May 2018.

Statistics Canada (2017c): CANSIM Table 282-0002: Labour force survey estimates (LFS), by sex and detailed age group, annually (Persons). Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&searchTypeByValue=1&id=2820002. Viewed on 15 May 2018.

Statistics Canada (2017d): CANSIM Table 478-0014: Public and private elementary and secondary education expenditures, annual (dollars). Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=4780014&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (2017e): CANSIM Table 477-0077: Canadian and International Tuition Fees by Level of Study. Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=4770077&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (2017f): CANSIM Table 027-0040. Canada Mortgage and Housing Corporation, average rents for areas with a population of 10,000 and over. Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0270040&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (2017g): CANSIM Table 205-0002. Survey of Financial Security (SFS), assets and debts held by economic family type, by age group, Canada, provinces and selected census metropolitan areas (CMAs), occasional (2016 constant dollars unless otherwise noted).

Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2050002&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (2014): Population projections: Canada, the provinces and territories, 2013 to 2063. In: The Daily, http://www.statcan.gc.ca/daily-quotidien/140917/dq140917a-eng.htm. Viewed on 26 January 2018.

Statistics Canada (1978a): 1976 Census of Canada. Population: Demographic Characteristics. Level of Schooling by Age Groups. Ottawa: Ministry of Supply and Services, Canada.

Statistics Canada (1978b): 1976 Census of Canada: Labour Force Activity. Labour Force Activity by Age, Sex and Educational Characteristics. Ottawa: Ministry of Supply and Services, Canada.

Statistics Canada (1977): Survey of Consumer Finances 1977. Micro Data File: Income (1976), Assets and Debts (1977) of Economic Families and Unattached Individuals. Ottawa: Consumer Income and Expenditure Division, Statistics Canada, Industry, Canada.

Statistics Canada (n.d. a): CANSIM Table 378-0073: National balance sheet, government, annually (dollars). Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3780073&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (n.d. b): Data Table: Total income percentiles (single years of age), Census of population, 1986, 1996, 2006, 2016. Ottawa: Industry Canada.

Statistics Canada (n.d. c): Low Income Definitions. Ottawa: Industry Canada, https://www.statcan.gc.ca/pub/75f0011x/2012001/notes/low-faible-eng.htm. Viewed on 2 May 2018.

Statistics Canada (n.d. d): Custom Table C856285. Ottawa: Income Statistics Division, Survey of Labour and Income Dynamics & Canadian Income Survey, Industry Canada.

Statistics Canada (n.d. e): CANSIM Table 176-0043. Financial market statistics, last Wednesday unless otherwise stated, Bank of Canada. Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2050002&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (n.d. f): CANSIM Table 102-0512: Life expectancy at birth, by sex, by province. Ottawa: Industry Canada. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=1020512&&pattern=&stByVal=1&p1=1&p2=49&tabMode=dataTable&csid=. Viewed on 15 May 2018.

Statistics Canada (n.d. g): Tuition Living Accommodation Costs (TLAC) Standard Table 8E.1a) Weighted average tuition fees for full-time Canadian Undergraduate students by province and Canada total, in current dollars, 1972-2006. Ottawa: Industry Canada.

Tepe, Markus / Vanhuysse, Pieter (2010): Elderly bias, new social risks and social spending: change and timing in eight programmes across four worlds of welfare, 1980-2003. In: Journal of European Social Policy, 20 (3), 217-234.

United Nations (2015): Paris Agreement, http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf. Viewed on 24 January 2018.

United Nations (2002): Report of the Second World Assembly on Ageing. Madrid, 8-12 April 2002: United Nations publication. A/CONF.197/9. Sales No. E.02.IV.4. http://daccess-ods.un.org/access.nsf/Get?Open&DS=A/CONF.197/9&Lang=E. Viewed on 26 January 2018.

United Nations (1989): Convention on the Rights of the Child, http://www.unhcr.org/uk/4aa76b319.pdf. Viewed on 9 October 2017.

Vancity Credit Union (n.d.): Mortgage Calculator, https://www.vancity.com/Mortgages/MortgageCalculators/. Viewed on 16 April 2018.

Vanhuysse, Pieter (2013): Intergenerational Justice in Aging Societies: A Cross-national Comparison of 29 OECD Countries. Gütersloh: Bertelsmann Stiftung. https://www.bertelsmann-stiftung.de/en/publications/publication/did/intergenerational-justice-in-aging-societies/. Viewed on 16 September 2016.

Wolfson, Michael et al. (1998): Historical Generational Accounting with Heterogeneous Populations. In: Corak, Miles (ed.): Government Finances and Generational Equity. Ottawa: Industry Canada, 107-125.

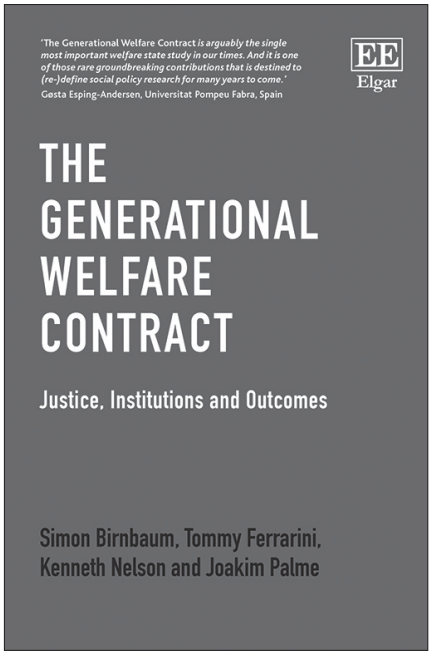
Wood, Gavin / Ong, Rachel / Cigdem, Melek (2016): Housing Tax Reform: Is There a Way Forward? In: Economic Papers, 35 (4), 332-346.

Dr Paul Kershaw received the award for Academic of the Year in 2016 from the Confederation of University Faculty Associations of British Columbia for his work on generational equity. The Canadian Political Science Association has twice honoured Kershaw with national prizes for his research.

Contact details:
Paul Kershaw
University of British Columbia
School of Population & Public Health
440 – 2206 East Mall
Vancouver, BC V6T 1Z3
Canada
E-Mail: paul.kershaw@ubc.ca

Simon Birnbaum, Tommy Ferrarini, Kenneth Nelson and Joakim Palme: The Generational Welfare Contract: Justice, Institutions and Outcomes

Reviewed by Steffen Suur-Nuuja and Jörg Tremmel



Politics: Who Gets What, When, How is the famous title of a classic (1936) book by Harold D. Lasswell, and a cogent formulation of the key question of political science as an academic discipline.

This question can be more specifically targeted and reformulated as: "Who, in the capacity of being a young, middle-aged or old person, gets which entitlements when from the welfare state?" This is the question, albeit framed a little differently (see below), at the heart of the book *The Generational Welfare Contract: Justice, Institutions and Outcomes*, written by Simon Birnbaum, Tommy Ferrarini, Kenneth Nelson and Joakim Palme. As one can see from the outset, the question is both normative (*Who should get...?*) and empirical *(Who, de facto, gets...?).* And the question is of a stubborn intractability as we all age and thus pass through different life spans. While Lasswell treated the "who" as one unified individual, the more refined question above treats it as the combination of intra-personal identities, that is: between our younger and older selves.

Birnbaum et al. focus on three particular stages of the life course: childhood, working age and old age (9). For each of these three stages, the authors claim a specific "vulnerability" (2) that justifies the ascription of "social citizenship rights" (8-10) to individuals.

The book adds to the growing part of the literature that is interested in intergenerational justice, but not in those abstract phenomena (such as the non-identity problem) that arise only if generations are treated as non-overlapping, non-coexisting entities. Birnbaum et al. understand "generations" as "age groups" and "cohorts".

When the baby boomers born after the Second World War retire, they will not be replaced by cohorts of the same size. From this (uncontroversial) starting point, many other authors have questioned the long-term affordability of public programmes, such as health care and pensions, in their current extent. The proponents of an age crisis of the welfare state, namely its pension system, point to the massive impact (an "agequake", according to Wallace 2001) that the retirement of the baby boomers (if not postponed by a rising retirement age) will have for a welfare state's abilities to pay all kind of social expenditures (Preston 1984; Kotlikoff/Burns 2012). In terms of benefiting from the welfare state, some scholars call the post-baby boomers a "disadvantaged" (Green 2017) or "precarious" (Bessant/Farthing/Watts 2017) generation. The unwillingness of the "selfish" (Beckett 2010; Thomson 1991) baby-boomer generation (who have all the political clout at the ballot box) to give up their social entitlements (which are, according to this view, privileges rather than rights) and the dire prospects of the post-baby-boomer generation are two sides of the same coin. In a similar vein, but adding the assumption of an empowerment of the politically powerless post-baby boomers, the thesis of "generational storms" or "clashes" (Kotlikoff and Burns 2012) has been brought forward. Some authors have even hypothesised that the existing implicit generational contracts (such as pay-as-you-go pension systems) will be terminated soon by the youngsters if the ratio of public resources that go to the elderly relative to the amount of resources going to young people is constantly increasing.

In contrast, Birnbaum, Ferrarini, Nelson and Palme proclaim the hypothesis that intergenerational welfare state contracts can lead to positive-sum solutions, and thus "it becomes an important task to identify and actively promote forms of intergenerational cooperation that enhance the welfare of all age groups" (3). This approach emphasises the potential to make all successive generations in a political community better off by mutually cooperating instead of relying solely on their own savings: "Allowing welfare states to redistribute resources between members of different generations as they pass through different age groups (or life stages) should be conceived as an arrangement for borrowing from our later selves in early stages of our selves, and to save for old age during the more economically active years in life in a way that effectively serves the long-term interests of all citizens" (20). This refers to Norman Daniels' *prudential lifespan account* as a concept for optimal allocation of resources during a lifetime. But is the step from intra-personal redistribution to intra-societal redistribution justified? The main counterargument is that different age groups can have different sizes – a problem obviously not affecting a single person. In line with the fathers of pay-as-you-go pension systems (such as Winfried Schreiber in Germany), the authors hold that one can reasonably expect the support of one's children if one has supported one's parents. This principle has also been dubbed *indirect reciprocity* in the literature (e.g. Tremmel 2009). The main idea is cogently summarised by a popular legend: "[A]

boy in ancient times accompanies his father and his grandfather as they embark on a ritual journey intended to end with the grandfather's voluntary death, as he is no longer self-supportive. The boy takes pity on his grandfather and persuades his father to promise to support the old man until his natural death in exchange for a promise from the boy to do the same for his father when the time comes" (Lindh/Malmberg/Palme 2005: 470).

But what if the (grand)children generation is not as numerous as their parents' generation? The authors concede that population ageing can lead to welfare state entrenchments. But they qualify: "The one-eyed focus on pension reform may severely distort conclusions about generational justice as it fails to recognize that increases in pension expenditures do not always come at the expense of younger generations and their access to adequate social protection" (33). Moreover, the authors contradict the "demography is destiny" thesis which postulates that ageing societies necessarily have to cut back their expenditure. Instead, they write: "It is an undeniable fact that social spending on old-age benefits has increased alongside population ageing" (32).

The purpose of this book is to analyse how different welfare states respond to age-related social risks from a justice-based perspective, and if and under what conditions some countries perform better than others in promoting generational equity (2). To approach these matters, the authors want to bring together perspectives from two strands of academic research: political philosophy and comparative social policy. This is to respond to perceived shortcomings: "Despite the long tradition in normative political theory of debating principles of social justice and their practical implications, conceptual and theoretical discussions often remain at high levels of abstraction with limited reference to systematic empirical evidence" (4). Comparative welfare state research, for its part, has too often been reduced to crude analyses of social expenditures without having developed a coherent framework "that specifies central principles in welfare state program designs of particular relevance for analyses on generational justice" (4).

This ambitious interdisciplinary approach is one of the strengths of the book. It is ambitious because it demands, to a certain degree, the authors to be familiar both with techniques of descriptive data analysis and regressions, and with the strands of the philosophical debate about generational justice. Such a combination of the normative and the empirical approaches is seldom found, but it has great potential for new insights. Normative statements should be "fleshed out" empirically whenever possible. For instance, the ongoing debate between protagonists of a "complete life course view" (Daniels 1988; Schokkaert/van Parijs 2003) and "relational equality" (McKerlie 2013; Bidadanure 2016) would strongly benefit from having their theories fleshed out with as much empirical evidence as possible. For readers who are not familiar with the debate: Daniels' assumption is that it is not *prima facie* problematic that at one given point in time different age groups receive an unequal treatment from the state. Let's assume that some countries spend much more on every elderly citizen than on every non-elderly one. Those who are old now were once young and those who are now young will some day be old. As long as the specific ratio value stays relatively stable over time, there is no inequality between people's complete lives, as everyone belongs in turn to each of the age groups. Such cases of "Spartan-childhoods for luxury-old-age" trade-offs (Vanhuysse/Tremmel 2018) are not per se signs of intergenerational injustice then. Against this complete life course view, other authors have posited a "relational equality view", and argued that we should look at how people fare at each single stage of their lives independent of how they fare in terms of their lifetime as a whole. The fact that each generation X, while passing through their young age bracket, is dominated by the (then) old age group is not rendered fair by the fact that the same generation X will become the dominator (with regard to the succeeding generation Y) when they turn older and become members of the old age bracket themselves.

Normative theories often abstain from real-life-contexts and are seldom operationalised. For instance, the relational equality theory implicitly suggests statements about the monetary level of an adequate minimum income, independent of age. Not making such statements explicitly is eschewing empirical tests of the hypothesised effects of such theories. Empirical research can and should inform normative debates. This is what the interdisciplinary work *The Generational Welfare Contract* tries to do. Both philosophers and social scientists who work on intergenerational justice should make the effort to read those parts of the book that are respectively less accessible to them.

Clearly structured, the introduction of the book is followed by three philosophical-theoretical chapters that discuss three perspectives on generational justice, thereby establishing the theoretical and normative framework of the empirical research that follows in the later chapters. In Chapter 3, and Chapter 4, the notion of a "balanced generational welfare contract" is defined, thereby at the same time conceptualising three kinds of welfare contracts that are unbalanced because they are "pro-child", "pro-work" or "pro-old". The authors here enter into a vivid debate (without citing details) about indicators for the alleged pro-elderly bias where ageing welfare states are more supportive of retirees than of other age-groups. One prominent indicator was developed by Vanhuysse (2013) with the *elderly-bias indicator of social spending* (EBiSS) (for previous such approaches, see e.g. Lynch 2006; Tepe/Vanhuysse 2010). In an update, Vanhuysse/Tremmel (2018) state that within OECD countries currently Poland, Greece, Italy, Slovakia and the Czech Republic have the highest EBiSS levels: these states spend on average between 5.5 and 8.5 times as much on every elderly citizen as on every non-elderly one. With their own methodological approach, Birnbaum, Ferrarini, Nelson and Palme come to strikingly different results (52): Australia, Canada, Ireland, Italy, New Zealand, the UK and the US are the pro-old regimes of our times (whereas four countries display pro-work schemes and no countries pro-childhood schemes, the rest are "balanced"). Unfortunately, the authors do not refer specifically to previous attempts to measure elderly-biased (or "pro-old") welfare schemes. Regarding their own methodology, Birnbaum et al. explain: "[W]e use income replacement in major age-related social insurance schemes to measure and analyse the generational structure of social citizenship. [...] For each age related social risk, entitlements are calculated net of taxes and expressed as percentages of an average production of worker's net wage. [...] For old-age risks we use the yearly pension benefit of two model families; a single retired person and a married retired couple. In both instances, the breadwinner is assumed to have a 40-year employment record. The non-working spouse only qualifies for a minimum pension, if applicable. Income replacement for old-age risks is an additive index of the net pension replacement rate of

the two model families" (42-45). And regarding the dataset: "The database includes up to 47 countries and [...] we draw on data for 18 long-standing welfare democracies from 1960 to 2010 which is the most recent wave of data" (42).

The distinction between "balanced" and "unbalanced" profiles is central for the rest of the book as "balanced profiles" is the independent variable in the regressions of Chapters 5-8 for welfare state outcomes, such as poverty or wellbeing. Therefore the methodological construction of "balanced profiles" (and thus "unbalanced profiles") deserves a closer look. Birnbaum et al. explain: "The cut-off used to determine whether social citizenship rights are balanced or not is of course to some extent arbitrary. We have for each country analysed differences in income replacement between the three age-related risk categories by calculating a straightforward statistical measure of dispersion. We decided that it is reasonable to categorize profiles of income replacement in age-related social insurance with a relative standard deviation below 20 percent as balanced" (50). If, on the other hand, one age group receives 20% more than the others, the scheme is defined as "unbalanced", as illustrated in Figure 1.

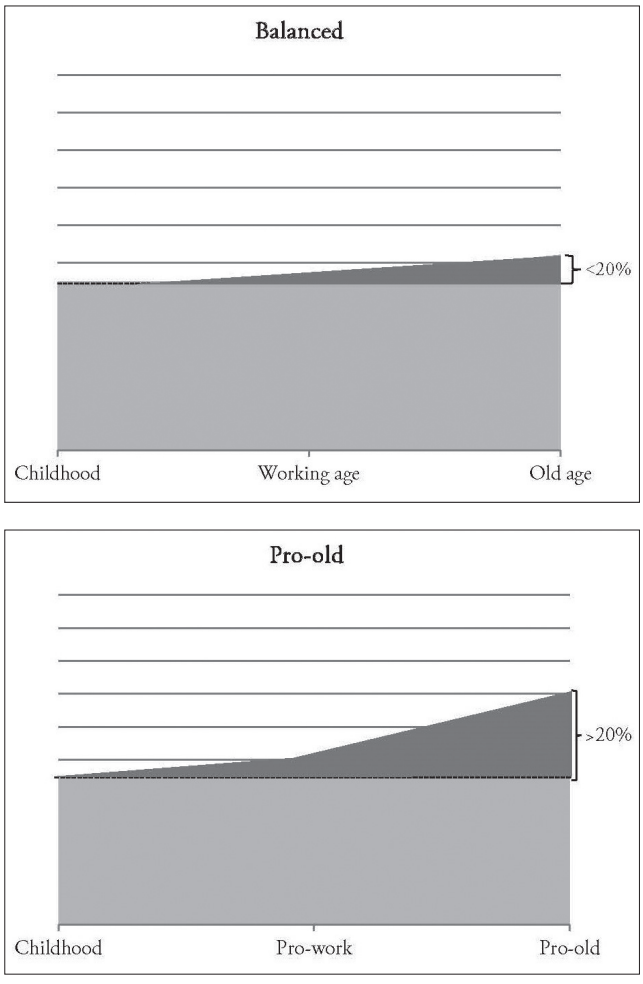


Figure 1: The construction of the "balanced" scheme and an "unbalanced" scheme (here: pro-old) in comparison

It now becomes clear what the authors mean when they speak about "positive-sum solutions": in countries where income replacement in social insurance is *more evenly* distributed across age-related social risks, the *overall* level of income replacement tends to be higher. A regression analysis (55) is conducted by the authors to lend evidence to the hypothesis that balanced schemes are causal for high overall levels of social expenditure, or, in the terminology of the authors, "high levels of social citizenship rights" (8).

The next three chapters all deal with specific welfare state outcomes. As mentioned, balanced schemes (as constructed above) are used as the explanatory variable in a number of regressions that follow. In Chapter 5, the focus is on poverty, objectively measured. In Chapter 6, the focus shifts to wellbeing, subjectively assessed in the eye of the beholders. In Chapter 7, the analysis is complemented by a look on political and social trust; in Chapter 8, (un)employment comes to the fore.

With regard to poverty, their regression analysis shows that countries with a balanced generational welfare contract have significant lower poverty risks over all three age groups (77). The intermediary variable is the high overall level of income replacement. Concerning subjective wellbeing (divided into life satisfaction and happiness), the analysis comes to the conclusion that balanced generational structures are related to high levels of subjective wellbeing (91). The intermediary variable, again, is the high overall level of income replacement.

With regard to citizens' trust (in each other as well as in political institutions), there is a positive correlation between balanced schemes and trust, and the regression analysis corroborates the hypothesis that the former causes the latter. There are a few outliers, though. The Netherlands and Switzerland are two countries with the pro-work type scheme, but they nonetheless have levels of social and political trust that are on a par with countries in the balanced group (100).

Being aware of conjectures in the literature that high levels of social expenditure might not foster high employment outcomes ("the dominating view in mainstream behavioral economics", 120), Birnbaum et al.'s study focuses on labour force participation as well. Their empirical results show that "(un)employment appears to be largely unrelated to the ways in which countries have organized their generational welfare contracts" (120).

In the concluding Chapter 10, the Swedish/Finnish author team reiterates the main findings and summarise: "The story that we are telling in this book thus clearly diverges from the narrative of an unavoidable generational war in social policymaking" (141).

The book has already received a lot of praise. Gøsta Esping-Andersen (Universitat Pompeu Fabra) has called it "arguably the single most important welfare state study in our times" (front cover). *The Generational Welfare Contract* is indeed an innovative, sensible and topical work. There is no room here to discuss the proclaimed causalities between "balanced generational contracts" and a number of welfare state outcomes in detail. The most important contribution of this study, in our view, is one aspect that went largely unnoticed or is at least not particularly emphasised by the Swedish/Finnish author team: they have laid out a framework to further empirically test one vividly debated theory, the "selfish baby boomers" theory. This needs to be explained: as mentioned, two different concepts of "generation" are relevant with regard to public spending (for an illuminating visualisation, see Vanhuysse/Tremmel 2018). First, when we want to evaluate intergenerational justice over *complete lives*, we need the concept of *(birth) cohorts.* These are groups of people who were born in the same year or narrow range of years. Cohort members, by virtue of ageing together, experience distinct public policies but also external events (such

as deep recessions for the worse or technological progress for the better). Second, when we want to make a snapshot analysis of intergenerational justice at a *given moment* in time, we need to look at *age groups* which are people of the same (narrow) age bracket at a particular moment. Age group members find themselves in the same stage in the lifecycle, which is politically relevant because public policies tend to institutionalise the life course, proscribing and inhibiting certain behaviours. As mentioned, many scholars (with Daniels) hold that it is not *prima facie* problematic that at one given point in time different age groups receive an unequal treatment from the state. But if such inequalities are perpetuated across different birth cohorts over the entire life cycle, then we do end up with intergenerational inequities. While fairness between age groups can involve unequal benefit treatment in different life stages, fairness between birth cohorts implies enjoying approximate equality in benefit ratios. To make such statements, empirical data must add up to a longitudinal series of the "snapshots", mentioned above, for as many decades as possible. Using the EBiSS as an indicator, Vanhuysse/Tremmel 2018 derive from these considerations the conceptual statement that if those countries that have for instance a high EBiSS in 2010 had a low one 40 years ago, age-group inequality would turn into cohort injustice, for this meant nothing else than people that were in their twenties and thirties in 1970 (that is: forty years ago) profited a lot from state benefits in *all* stages of their lives.

One of the few empirical studies on how different generations have fared under the social welfare policies of governments since the 1930s is David Thomson's (1991), who argues that in New Zealand "the big winners […] have been […] those born between about 1920 and 1945. Throughout their lives they will make contributions which cover only a fraction of the benefits" (Thomson 1991: 3). Recent studies (Chauvel/Schröder 2014; see also Chauvel 2010) have shown some empirical evidence that in countries in Southern Europe such as Spain, Italy, and France, the baby-boomer generation born after the Second World War has been significantly better off in terms of post-tax-and-transfer disposable income than cohorts born both beforehand and afterwards. In Birnbaum et al.'s methodology, the childhood bar would need to be highest in 1960, the working-age bar highest in 1980 and the old-age bar highest in 2010 to justify the "selfish baby boomers" hypothesis.

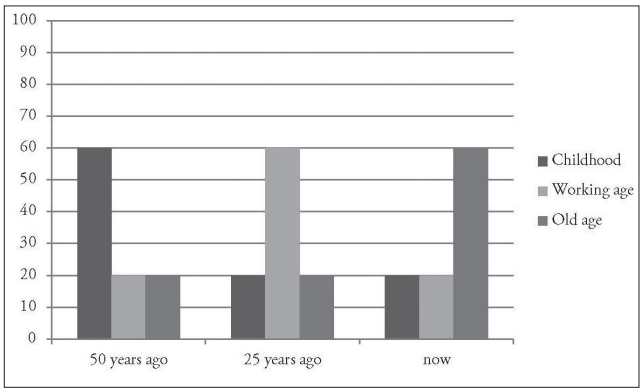


Figure 2: Conceptualisation of the "selfish baby boomers" hypothesis, applying Birnbaum et al.'s methodological framework

Birnbaum, Ferrarini, Nelson and Palme's empirical analyses show diverging results for the 18 countries they have decided to look at (46-50). Some countries, such as Canada or Ireland, have an exchange between the pro-work bar and the pro-old bar between 1980 and 2010 in favour of the ageing baby boomers, but a clear trend is not visible (and was not the focus of the Swedish/Finnish author team).

A consolidated account of the 18 OECD countries depicts that in 1960, childhood entitlements were quite low (around 20%) while working-age and old-age entitlements were about the same and about 40%. In 1980, the relative height of all bars is still the same but they all are higher. In 2010, all bars have approximately the same height, therefore forming what the authors call a "balanced" generational welfare contract (see Figure 3).

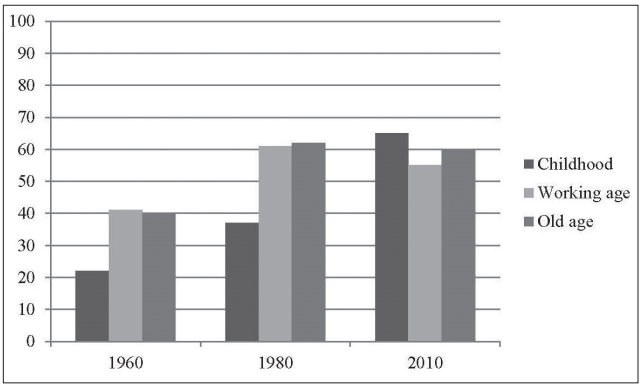


Figure 3: Income replacement in social insurance for three age-related social risks (average for 18 OECD countries) (Birnbaum et al. 2017: 47)

This might not be enough to repudiate the "selfish baby boomers" hypothesis (which in some of its variations is not focused on the past, but on the years when the baby boomers retire, that is from 2025 on), but it lays out the path for further research.

All else being equal, interdisciplinary approaches are more ambitious but also often more promising than mono-disciplinary ones. And in the case of *The Generational Welfare Contract,* the authors have lived up to the promise.

References

Bidadanure, Juliana (2016): Making sense of age-group justice: a time or relational equality? In: Politics, Philosophy and Economics, 15 (3), 234-260.

Beckett, Francis (2010): What did the Baby Boomers Ever do for Us? London: Robson Press.

Bessant, Judith et al. (2017): The Precarious Generation: A Political Economy of Young People. London: Routledge.

Chauvel, Louis (2010): Comparing Welfare Regime Changes: Living Standards and the Unequal Life Chances of Different Birth Cohorts. In: Tremmel, Jörg (ed.): Young Generation under Pressure? The Financial Situation and the "Rush Hour" of the Cohorts 1970-1985 in a Generational Comparison. Heidelberg: Springer, 23-36.

Chauvel, Louis / Schröder, Martin (2014): Generational Inequalities and Welfare Regimes. In: Social Forces, 92 (4), 1259-1283.

Daniels, Norman (1988): Am I My parents' Keeper? An Essay on Justice between the Young and the Old. Oxford: Oxford University Press.

Green, Andy (2017): The Crisis for Young People: Generational Inequalities in Education, Work, Housing and Welfare. Basingstoke: Palgrave Macmillan.

Kotlikoff, Laurence J. / Burns, Scott (2012): The Clash of Generations. Cambridge, MA: MIT Press.

Lasswell, Harold D. (1936): Politics: Who Gets What, When, How. New York: McGraw-Hill.

Lindh, Thomas / Malmberg, Bo / Palme, Joakim (2005): Generations at War or Sustainable Social Policy in Ageing Societies? In: Journal of Political Philosophy, 13 (4), 470-489.

Lynch, Julia (2006): Age in the Welfare State: The Origins of Social Spending on Pensioners, Workers, and Children. Cambridge, UK: Cambridge University Press.

McKerlie, Dennis (2013): Justice between the Young and the Old. Oxford: Oxford University Press.

Preston, Samuel (1984): Children and the elderly: divergent paths for America's dependents. In: Demography, 21 (4), 435-457.

Schokkaert, Erik / van Parijs, Philippe (2003): Social justice and the reform of Europe's pension systems. In: Journal of European Social Policy, 13 (3), 245-264.

Tepe, Markus / Vanhuysse, Pieter (2010): Elderly bias, new social risks, and social spending: Change and timing in eight programs across four worlds of welfare, 1980–2003. In: Journal of European Social Policy, 20 (3): 218-234.

Thomson, David (1991): Selfish Generations? The Ageing of New Zealand's Welfare State. Wellington, N.Z.: Bridget Williams Books.

Tremmel, Jörg (2009): A Theory of Intergenerational Justice, London: Earthscan.

Vanhuysse, Pieter / Tremmel, Jörg (2018): Measuring intergenerational justice for public policy. In: Poama, Andrei / Lever, Annabelle (eds): Routledge Handbook in Ethics and Public Policy. London: Routledge. Forthcoming.

Wallace, Paul (2001): Agequake: Riding the Demographic Rollercoaster Shaking Business, Finance, and Our World. London: Nicholas Brealey Publishing.

Birnbaum, Simon / Ferrarini, Tommy / Nelson, Kenneth / Palme, Joakim (2017): The Generational Welfare Contract: Justice, Institutions and Outcomes. Cheltenham, UK / Northampton, USA: Edward Elgar. 192 pages. ISBN: 978-1-78347-102-7, price: £70.

Michael Rose: The Representation of Future Generations in Today's Democracy: Theory and Practice of Proxy Representation

Reviewed by Jonathan M. Hoffmann

Michael Rose's *Zukünftige Generationen in der heutigen Demokratie: Theorie und Praxis der Proxy-Repräsentation* (Future Generations in Today's Democracy: Theory and Practice of Proxy Representation) is an ambitious and fascinating work. It provides a new conceptualisation of the representation of future generations and it also delivers the most extensive empirical study of institutions for the representation of future generations available to date. The book is based on Rose's PhD thesis at the Heinrich Heine University, Düsseldorf, Germany, and is 516 pages long (excluding an extensive bibliography, list of sources and appendices). A third of the thesis is devoted to short case studies of a total of 29 institutions which are presented in a catalogue format, allowing this section to be used as an encyclopaedia. The book is written concisely and is well documented throughout.

The book makes contributions to both the theoretical as well as empirical study of the representation of future generations. This review begins with an overview of Rose's contribution to the conceptualisation of the representation of future generations. Then I turn to his discussion of the Münchhausen Problem of Motivation. Following this, I review his qualitative comparative

analysis of institutions for the representation of future generations and conclude with a few critical and lauding paragraphs.

Conceptualising the representation of future generations

Rose begins his book with a consideration of the justification of the representation of future generations. He argues that the all affected principle is an appropriate basis for such a justification and he provides reasons for a causal interpretation (instead of a legal interpretation) of the principle. Having shown that the all affected principle provides grounds for the inclusion of future generations in current democracies, Rose reviews the discourse on representative theory in a structured and clear manner. His aim is to check whether any of the readily available conceptions of political representation can be fruitfully discussed with regard to the representation of future generations. He finds that none of the "standard" conceptions are able to deal with future generations as (non-available) constituents. More promising conceptions of representation are discovered in the representative turn literature, such as Michael Saward's theory of representative claims (Saward 2010) and Andrew Rehfeld's general theory of political representation (Rehfeld 2006). On account of the process character of Saward's work, Rose gives preference to Rehfeld's theory as a basis for his own theory of "proxy representation". Thus, Rose's contribution can be understood as a subcategory of Rehfeld's theory of representation.

The function of proxy representation, according to Rose, is to "make future generations present in today's political decision process, thus to bring forth their interests there" (128, my translation). The function of proxy representation provides the conceptual basis for further elaboration. Rose finds that there are three requirements for proxy representation. There needs to be (a) an agent, (b) access to the political decision process, and (c) acceptance of the task through the agent. It is the task of the proxy to identify the relevant interest of future generations and to represent these in adequate ways in the political decision process.

As both accountability and authorisation are not available as measures to ensure the legitimacy of representation with regard to future generations, proxy representation must rely on alternative instruments for the production of legitimacy. Rose dismisses Saward's idea of ex-post legitimisation through the constituents, as future generations are not able to hold their representatives responsible, even in the long run. Instead, Rose suggests thinking of proxy representations as a form of democratic self-commitment. Thus, Rose (158, my translation) writes that "[p]roxies are legitimised democratically, therefore, paradoxically on the one hand through the authorisation of the political-administrative system, which is expressed through the access to the political decision process, and, on the other hand, not being responsible to the governing majority, of whose recognition it is depended, but through being obligated to future generations." As the representatives of future generations cannot be held responsible by their constituents, Rose argues that this should also be done by surrogates such as other political actors or the media. He admits that the legitimacy of proxy representation will always be deficient in comparison to standard accounts of representation but argues that proxy representation is normatively required as there is no viable alternative (162).

The Münchhausen Problem of Motivation

In the second part of the theoretical half of his thesis, Rose discusses the Münchhausen Problem of Motivation (Jensen 2015; Kates 2015). Jensen (2015: 541) defines it as follows: "We start out from the observation that the present generation tends not to take the interests of future generations sufficiently into account. But the same generation is supposed to reform democracy and appoint representatives of future generations. So how should their preferences be changed in a less short term direction?"

Little attention has been given to this problem in the discourse of institutions for future generations. One solution is described by Kates (2015). While it may sometimes not be possible to install an institution for future generations directly due to the short-term focus of the political system, it may still be possible to reform the political system in such a way that it becomes less presentistic and, therefore, more attentive to future generations' issues.

Rose evaluates the validity of Kates' argument for an iterative approach to the reform of the political system towards the long term. He develops a set of circumstances that could be enabling (or constraining) to the implementation of institutions for the representation for future generations. Among these are political variables, such as number of parties in a government (single vs multi-party government), a left-wing government (vs a right-wing government) and low institutional path dependency (measured in number of changes to the constitution in the last years, vs few and bygone changes to the constitution), economic variables such as above-average economic growth (vs lower rates of economic growth) and a low rate of unemployment (vs higher rates) and, lastly, a cultural variable, namely the prevalence of emancipative values in society (vs a low level of such values in society).

A comparative analysis of institutions for the representation of future generations

The short case studies, of usually three to five pages, contain not only well-known candidates like the Hungarian Ombudsman for Future Generations and the Israeli Commissioner for Future Generations, but also a wide array of less-known institutions like sustainability tests in southern Germany, and various consultative sustainability councils. At the beginning of each case study, Rose provides a table with key details such as the institution's potential impact, its channel(s) to the political system, date of installation and legal foundation and the political instruments of the institution. This allows this chapter to be used as a compendium of institutions. Rose assigns each institution a potential impact level. These range from high impact (Hungarian Ombudsman), to moderately high impact (Israeli Commissioner and Future Generations Commissioner for Wales), institutions with hard power instruments to low and very low potential impact (e.g. British Strategy for Sustainability and German Council for Sustainable Development), and institutions that only have soft power instruments in their repertoire.

Providing a detailed set of qualitative comparative analyses, Rose is able to test the impact of the above mentioned circumstantial variables on the implementation of institutions for the future. Rose compares the circumstantial variables at the point of implementation of high and moderately high potential impact institutions (such as the Hungarian Ombudsman) with the circumstantial variables of those institutions that have been assigned a lower potential impact level (e.g. the interdepartmental committee for

Sustainable Development in Switzerland). He finds that none of these circumstances had a generalisable constraining or enabling effect on the implementation of high impact institutions of future generations. Further, the absence of presumably positive circumstances such as a high increase in GDP, a high employment rate or a high level of emancipative values prove to be no hindrance to the implementation of institutions for the future in general. Many of these institutions have been implemented, albeit presumably enabling circumstances were *not* a given. "[T]he implementation of proxies with large impact potential does therefore not need good circumstances, it is also possible under dire political-institutional, economic and cultural circumstances" (477, my translation). Accordingly, Rose suggests that where low or very low potential impact institutions have been installed, circumstances could also have allowed a more powerful institution to be founded.

Critical Appraisal

I want to make two critical points regarding Rose's justification for the concept of proxy representation before I turn to some appraisal.

Rose is right in addressing the gap in the representation literature. Moreover, his concept seems appropriate for the purpose. The first point concerns the (lack of) legitimacy of proxy representation. Rose's argument relies on the all affected principle in order to justify the implementation of institutions for the representation of future generation. However, he takes little care to explain how "being affected" translates into the right to be politically involved in some way. If we take future generations as political equals, it would follow that future generations would be in a majority or should even have an "overwhelming vote, or even a veto, because of the magnitude of future needs and numbers" (Attfield 2003: 130). Furthermore, we should represent, as Goodin (2007) points out, not only those who will actually be affected as part of the *demos*, but also all those who *could* be affected. In the case of future generations, this results in a very large *demos* of unknown size that could even be infinite. The representation of all those possible future people seems an overburdening task for any institution.

A second point I want to make here concerns the interests of future generations and the according obligations of the institutions representing them. According to Rose, these interests are not known to us, apart from those that generally follow from the human condition. He argues that it remains for the institutions themselves to comprehend the interests of future generations. While it seems plausible that a general theory of proxy representation cannot provide us with the details of future generations' interests, it would have been worthwhile to consider more closely how this could be done by the institutions in question. One problem that Rose only briefly mentions is the plurality of future generations' interests (Bovenkerk 2015: 508-511). The distribution of future generations in time and also space (who says that future generations are bound by the same nation states as we are?) may result in conflicting interests across generations. Furthermore, the interests of future generations are "moving targets" (Karnein 2016: 87). As such, our political decisions influence the interests that future generations will have. As Rose rightly remarks, the representation of future generations will often result in a higher consideration of future generations (instead of a full representation of their preferences). However, if raising the consideration of future generations is the main objective of proxy representation, we may ask with Karsten Klint Jensen (2015) whether we should not try to raise their consideration directly and cut out the detour through representation theory.

Now to the praise. Rose delivers first insights on the (non-) constraining effects of political and economic circumstances on the implementation of institutions for the future on an empirical basis. Such studies are timely, as most discussions of such institutions and proposals for such institutions have so far only worked with plausible but untested assumptions regarding feasibility (if they discuss this issue at all). More work is needed here to better understand what actually made the implementation of these institutions for future generations possible and what caused some of these institutions to be disbanded relatively shortly after their implementation. Thus, I hope that Rose's work will initiate further discussions and research in the political sciences, as further work in this vein is needed very much and has been lacking hitherto.

References

Attfield, Robin (2003): Environmental Ethics. Cambridge: Polity Press.

Bovenkerk, Bernice (2015): Public Deliberation and the Inclusion of Future Generations. In: Jurisprudence, 6 (3), 496-515.

Goodin, Robert (2007): Enfranchising all affected interests, and its alternatives. In: Philosophy & Public Affairs, 35 (1), 40-68.

Jensen, Karsten Klint (2015): Future Generations in Democracy: Representation or Consideration? In: Jurisprudence, 6 (3), 535-548.

Karnein, Anja (2016): Can we Represent Future Generations? In: Gonzalez-Ricoy, Iñigo / Gosseries, Axel (eds): Institutions for Future Generations. Oxford: Oxford University Press, 84-98.

Kates, Michael (2015): Justice, democracy, and future generations. In: Critical Review of International Social and Political Philosophy, 18 (5), 508-528.

Rehfeld, Andrew (2006): Towards a General Theory of Political Representation. In: The Journal of Politics, 68 (1), 1-21.

Saward, Michael (2010): The Representative Claim. Oxford: Oxford University Press.

Rose, Michael (2018): Zukünftige Generationen in der heutigen Demokratie: Theorie und Praxis der Proxy-Repräsentation. Wiesbaden: Springer VS. 562 pages. ISBN: 978-3-658-18845-0, price € 70.

Call for Papers: IGJR issue 2/2018 and 1/2019
How attractive are political parties and trade unions to young people?

The IGJR publishes articles from the social sciences/humanities, reflecting the current state of research on intergenerational justice. Its editorial board consists of about 50 internationally renowned experts from ten different countries. The 2/2018 and 1/2019 double edition will have the additional help of Professor Ann-Kristin Kölln, University of Aarhus, who will be serving as guest editor.

The topic of the 2/2018 and 1/2019 double issue will be:

"How attractive are political parties and trade unions to young people?"

We welcome submissions to the issue 2/2018 and 1/2019 that illuminate the complex relationship between young people and political parties and trade unions.

Submission Requirements
Submissions will be accepted until 1 July 2018 / 1 February 2019. Entries should be up to 30,000 characters in length (including spaces but excluding bibliography, figures, photographs and tables.) Articles may be submitted electronically through the IGJR homepage (see "Submissions").

Topic abstract
Political parties are intrinsically linked to the functioning of modern democracies. They provide fundamental linkage mechanisms of representation and participation that connect citizens with the state (Keman 2014; Webb 2000). Party members and affiliates, more generally, are in this respect one of the linking mechanisms that are beneficial for the effective functioning of political representation.
Members are often described as the "eyes and ears" (Kölln/Polk 2017; Kölln 2017) of parties in the electorate because of their communicative role. They bring new policy ideas to the party and communicate the party's programme within society. In addition, members are among the primary sources of political personnel because party membership is often an informal prerequisite for acquiring political office. From this representative perspective and following the notion of "descriptive representation" (Mansbridge 1999), members' social makeup should ideally reflect that of the general population.
Although party members have hardly ever been entirely representative of the population in their demographic characteristics (Scarrow/Gezgor 2010), the general decline of party membership seems to affect younger generations disproportionately. They enrol less often in parties, rendering the parties' age-profiles all too often considerably older than the broader electorate that they hope to embrace (Bruter/Harrison 2009; Scarrow/Gezgor 2010). For instance, the share of young members (under 26 years old) in German parties is at most 6.3% (LINKE) but can also be as little as 2.2% (CSU) (Niedermayer 2016). In contrast, around one quarter of the general population belongs to this age group. And even though the age-profile of Swedish parties is considerably better, with over 14% of members being under 26 years old (Kölln/Polk 2017), this figure is largely driven by members of the Green Party (Miljöpartiet) in which almost 26% are under 26 years old. In other countries, hardly any of these problems seem to exist. According to 2017 figures from the United Kingdom, the share of members aged 18-24 reflects the general population of 8.9% quite well: group size estimates suggest that 18-24s make up 14.4% of the Green Party, 13.2% of the Conservative Party and 11.5% of the Labour Party, with only the Scottish National Party and UK Independence Party (UKIP) below the 8.9%, at 6.9% and 6.7% respectively (UK Party Members Project; https://esrcpartymembersproject.org).
Overall, however, the statistics suggest not only an age problem in political parties across many European democracies, but also substantial country- and party-level differences. German parties seem to be doing particularly poorly in the descriptive representation of the young, while other countries and individual parties are apparently much better in engaging younger generations.

Trade unions are facing similar problems in recruiting young members across Europe (Gumbrell-McCormick/Hyman 2013). Reasons for this pattern might be found in the dominant political issues that trade unions care about. Younger people are confronted with the rapidly changing nature of the workplace as well as the rise in temporary work and zero-hour contracts, and are probably more interested in salaries, entry requirements and work contracts, rather than in end-of-career matters such as pensions and retirement ages. The skewed age profile of trade unions could shift the discussion more towards the latter concerns, deterring younger generations and reinforcing existing age problems.

Given members' importance and their overall age profile, it could be argued that political power or access to it is unequally distributed between the young and old. Parties and trade unions might be disproportionally representing older rather than younger generations because of their own social-demographic makeup. This could create an unjust distribution of political influence between living generations.

Articles could approach the topic through a broad range of questions, including:
- Is the unequal representation of young members in and for political parties and trade unions problematic from a democratic perspective?

- What about the age structure of employers' associations? Could the underrepresentation of younger members be viewed as a problem here as well?
- How great is the reluctance of young people to engage in and for political parties and trade unions from an internationally comparative perspective, for instance OECD-wide? What can we learn from a historically comparative perspective?
- Why do young people avoid political parties and trade unions?
- Why are some parties and trade unions better than others in engaging younger people?
- What can parties and trade unions do to attract more young members or affiliates and to retain them? What lessons can be learned from examples in which specific parties or unions have accomplished this, such as recently the British Labour Party?
- What role can the youth organisations of political parties and trade unions play in increasing the attractiveness of their mother organisations?
- Do regulations prohibit specific reform measures which could render parties and unions more attractive for young people? What role do membership fees play?
- What would be the consequences if young people permanently and irrevocably eschewed political parties?

We welcome submissions from all fields, including (but not limited to) political science, sociology, economics, and legal studies. Philosophers and/or ethicists are invited to contribute applied normative research.
Articles may be submitted electronically through the IGJR homepage (see "Submissions").

Intergenerational Justice Prize 2017/18: Note that this topic is closely related to the subject of the Intergenerational Justice Prize 2017/18, promoted by the Foundation for the Rights of Future Generations (FRFG) and the Intergenerational Foundation (IF). The prize is endowed with 10,000€ and has 1 July 2018 as its deadline. Young researchers may also wish to participate in this essay competition, and it is hoped that this edition of the IGJR will contain a selection of the best prize submissions in English. For more information, see "Prizes" under "Research" at www.if.org.uk.

References

Gumbrell-McCormick, Rebecca / Hyman, Richard (2013): Trade Unions in Western Europe: Hard Times, Hard Choices. Oxford: Oxford University Press.

Keman, Hans (2014): Democratic Performance of Parties and Legitimacy in Europe. In: West European Politics, 37 (2), 309–330.

Kölln, Ann-Kristin (2017): Has Party Members' Representativeness Changed Over Time? In Anderssoon, Ulrika et al. (eds.): Larmar och gör sig till. SOM-undersökningen 2016, SOM-rapport no. 70, Gothenburg: SOM-Institut, 387–400.

Kölln, Ann-Kristin / Polk, Jonathan (2017): Emancipated party members: Examining ideological incongruence within political parties. In: Party Politics, 23 (1), 18–29.

Mansbridge, Jane (1999): Should Blacks Represent Blacks and Women Represent Women? A Contingent "Yes.". In: The Journal of Politics, 61 (3), 628–657.

Scarrow, Susan E. / Gezgor, Burcu (2010): Declining memberships, changing members? European political party members in a new era. In: Party Politics, 16 (6), 823–843.

Webb, Paul (2000): Political parties in Western Europe: linkage, legitimacy and reform. In: Representation, 37 (3–4), 203–214.

For a list of recommended literature, see "Announcements" on www.igjr.org

Imprint

Publisher: The Foundation for the Rights of Future Generations (Stiftung für die Rechte zukünftiger Generationen) and The Intergenerational Foundation
Editors: Antony Mason, Jörg Tremmel, Markus Rutsche, Maria Lenk
Guest editor: Pieter Vanhuysse
Layout: Angela Schmidt, Obla Design
Print: Kuhn Copyshop & Mediacenter, Nauklerstraße 37a, 72074 Tübingen
Website: www.igjr.org
Email: editors@igjr.org

Editorial offices:
Foundation for the Rights of Future Generations (Stiftung für die Rechte zukünftiger Generationen)
Mannspergerstraße 29
70619 Stuttgart, Germany
Tel.: +49(0)711 - 28052777
Fax: +49(0)3212 - 2805277
Email: kontakt@srzg.de
Website: www.intergenerationaljustice.org

The Intergenerational Foundation
19 Half Moon Lane
Herne Hill
London SE24 9JU
United Kingdom
Email: info@if.org.uk
Website: www.if.org.uk