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Intergenerational Justice Review

Issue topic:
Measuring Intergenerational Justice for Public Policy

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The peer-reviewed journal Intergenerational Justice Review (IGJR) aims to improve our understanding of intergenerational justice and sustainable development through pure and applied ethical 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.
Published contributions do not necessarily reflect the opinions of the Foundation for the Rights of Future Generations (FRFG) or the Intergenerational Foundation (IF).

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Population ageing across the advanced economies (though not in large parts of Africa and Asia) has become a growing concern for academics, policy-makers and the public at large. More specifically, the question of the economic and financial sustainability and the intergenerational fairness of contemporary public policy constellations and socio-economic models has come to the fore against the backdrop of low or declining fertility rates and large cohorts of longer-living elderly citizens. Yet efforts to empirically conceptualise and measure intergenerational sustainability and fairness have often gone in different directions and have not always added to a greater cohesion, or clarity, of knowledge. This special issue on **"Measuring Intergenerational Justice for Public Policy"** aims to take stock of such efforts, and to provide an overview of where we stand today.

The first two articles, both winners of the 2016/17 Demography Prize, focus on the dominant methodologies for thinking empirically about intergenerational fairness and sustainability. The first article is a general overview essay on Generational Accounting, authored by Laurence Kotlikoff, a founding father of this methodology. Kotlikoff notes that since David Ricardo's work, it took another century and a half for economists to develop models capable of realistically tracking the impact of policies on the welfare of current and future generations. Today, large-scale, dynamic computable general equilibrium models remain too stylised to provide much more than a qualitative sense of generational impacts. To fill this gap, Kotlikoff and others have pioneered the use of available data to directly measure the fiscal treatment of current and future generations. Kotlikoff's essay surveys these efforts over the past three decades to quantify generational fiscal burdens using both fiscal gap and generational accounting. On the whole, he is optimistic about the pace of progress, thanks in part to the acute if belated awareness by economists that intergenerational fairness is a topic of both policy importance and moral urgency. But Kotlikoff notes that conventional approaches based on concepts of national debt and deficits remain dominant in government practices even though governments are able to manipulate what to keep off their books. This points to the need to study power and governance in research on intergenerational fairness.

The second article, by Natalie Laub and Christian Hagist, applies Generational Accounting to analyse whether and to what extent current policies put heavier burdens on the shoulders of future generations compared to current generations. Specifically, they study the impact of recent reforms in pay-as-you-go pension systems in Norway, Poland and Germany. They find that reforms have reduced the implicit debt to be paid by future generations in all cases, but the burden is shared differently. In Norway current pensioners have to contribute to enhancing financial sustainability, while Poland and Germany seem to be more politically constrained by the electoral power of pensioner-voters: reforms have put in place "grandfathering clauses" that protect current pensioners at the expense of younger generations.

In the last article, Róbert Gál and Judit Monostori present an insightful and concise taxonomy of empirical indicators of economic sustainability and intergenerational fairness, summarised from their earlier wide-ranging survey of over 80 indicators.[1] They neatly organise their taxonomy along four different scope conditions: specific public programmes, the general government, the market economy, and the total economy, which adds the household economy (the output of unpaid household labour). The article shows that indicators of sustainability are based all too often on ad hoc partitioning of the life cycle, exemplified by the standard practice of letting adulthood start at 15 or 18, and old age at 65. Surveying significant advances in the measurement of ageing by Warren Sanderson and Sergei Scherbov and others,[2] Gál and Monostori instead propose indicators that mitigate or eliminate the ad hoc nature of partitioning. More importantly still, they demonstrate that the conclusions the observer is led to draw regarding sustainability and intergenerational fairness can be different, sometimes radically, depending on the level of analysis. Taking the five largest EU countries, they show that seemingly worrying levels of unsustainability in the pension system can go hand in hand with modest sustainability worries at the level of the economy. Building on earlier work by Gál et al.,[3] they also show that conclusions on the very direction of intergenerational resource transfers simply *reverse* when the scope of analysis moves from public policies to the total economy including households. In 17 European countries, the elderly population gets significantly higher per capita net transfers through public channels than children do. But if intra-familial transfers of cash and, crucially, time, are taken into account, this pro-elderly bias flips over entirely. Children now receive *more* transfers per capita than the elderly. The value of investments in human capital and other intra-familial transfers is so important that they frequently reverse the results of a more narrow public policy analysis. Thus the key message from Gál's earlier work is corroborated: Europe is a continent of "pro-elderly welfare *states* within child-oriented *societies*."[4] This highlights an important further conclusion we can draw from this special issue. Since different levels of analysis may lead to very different conclusions, discussing *families* of related indicators is the more cautious approach to measuring intergenerational justice.

Notes

1 Gál/Monostori (2016): see page 85.
2 Sanderson/Scherbov (2013): see page 86.
3 Gál/Vanhuysse/Vargha (2018): see page 85.
4 Ibid.

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Measuring Intergenerational Justice

by Laurence J. Kotlikoff

Abstract: Concern with intergenerational justice has long been a focus of economics. This essay considers the effort, over the last three decades, to quantify generational fiscal burdens using label-free fiscal gap and generational accounting. It also points out that government debt – the conventional metric for assessing generational fiscal justice – has no grounding in economic theory. Instead, official debt is the result of economically arbitrary government labelling decisions: whether to call receipts "taxes" rather than "borrowing" and whether to call payments "transfer payments" rather than "debt service". Via their choice of words, governments decide which obligations to put on, and which to keep off, the books. The essay also looks to the future of generational fiscal-justice analysis. Rapid computational advances are permitting economists to understand not just direct government intergenerational redistribution, but also how such policies impact the economy that future generations will inherit.

Keywords: *Generational Accounting, Fiscal Gap, Deficit Delusion*

Intergenerational justice and its measurement

Justice, the saying goes, is in the eyes of the beholders. But when it comes to intergenerational justice, future generations aren't here to assess, let alone contest their treatment. Consequently, it falls to current generations to consider the welfare of their descendants. This is exceedingly and conveniently difficult. No one can foretell the future. Unfortunately, this provides a ready excuse for many to ignore not just central tendencies, but worst-case outcomes.

Yet the generationally myopic, wilfully ignorant and self-interested are in the minority. Most of us care for our progeny. And since our offspring's fates are co-determined with those of our contemporaries, most of us recognise the collective skin, if not potentially comingled DNA, we have in the intergenerational game. This limits our capacity to look the other way as the climate changes, nuclear weapons proliferate, fiscal obligations grow, infrastructure is degraded, education is diminished, inequality rises… In short, our common maternal and paternal instincts lead most of us to ask and try to answer the question "What are we doing for sure or for maybe to our children?"

This natural concern for our descendants has been inscribed through the ages in covenants, compacts, constitutions and case law, all of which were written to extend *from generation to generation*. Indeed, generational commitments covering the infinite horizon show up in Genesis 9:12, which states, "This is the sign of the covenant which I am making between Me and you and every living creature that is with you, for all successive generations."

Generational responsibility is a common civic as well as religious theme. In his Farewell Address, President Washington admonished us to "not ungenerously [throw] upon posterity the burden [of debts] which we ourselves ought to bear." President Jefferson wrote, "It is incumbent on every generation to pay its own debts as it goes." President Lincoln proclaimed, "The fiery trial through which we pass will light us down in honor or dishonor, to the latest generation." And President Kennedy stated, "We… shall be remembered either as part of the generation that turned this planet into a flaming funeral pyre or the generation that met its vow 'to save succeeding generations from the scourge of war'."

Unfortunately, the distance between generational rhetoric and generational action seems to be growing, particularly in heterogeneous societies whose inhabitants don't view other people's children as their own, let alone their responsibility. The tug of genetics, the dictates of morality, and the economics of collective benefit are, it seems, in constant conflict with each generation's craven instinct to *take as you go* – the habit of each generation to extract the maximum possible from the next.

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Intergenerational versus intragenerational justice

The focus of this short essay on the measurement of intergenerational justice does not in any way negate the importance of measuring intragenerational justice. Intergenerational justice looks across those born at different dates. Intragenerational justice looks across members of a given cohort. A climate policy that permits sea levels to rise 100 feet over the next two centuries and drown a major share of the earth's population, if not destroy all human life, represents generational injustice. A healthcare policy that leaves the poorest members of each cohort with either no healthcare coverage or minimal healthcare coverage represents intragenerational injustice. Both forms of injustice demand proper measurement. The focus of this essay on intergenerational, not intragenerational, justice does not elevate the former over the later as an ethical imperative.[1]

Assessing intergenerational justice from the current, not the original position

Generational justice seems best examined in terms of the distribution at a given point in time in the expected lifetime wellbeing (utility) of current and future generations. For current generations, expected lifetime utility incorporates their realised past utility as well as their uncertain future utility.

Considering generational justice from our current (initial) condition rather than from some Rawlsian original position is practically minded. The past can't be changed. Bygone policy and economic shocks may have left current and future generations in dire straits, and those actions and outcomes may be viewed as both extremely unfair and unfortunate. But such assessments are irrelevant for forming today's and tomorrow's generational policy, which are the only things we can control when it comes to generational justice. Stated differently, generational justice is not a metaphysical but a practical question. It concerns how we

are going to act from this point forward, and what we can expect will happen based on those actions to current and future generations. This said, the set of initial conditions includes the realised past welfare of current generations. How well current generations fared in the past may matter for assessing the justice of current generation policy.

This does not suggest that the treatment of currently deceased generations is irrelevant to the bigger question of whether a country, over the course of time, has been unjust in its treatment of deceased versus living and future generations. But such analyses are philosophical in nature. The practical economic question is the distribution of lifetime welfare among those whose welfare can still be changed, namely those now alive and those yet to be born. The role of the economist is not to declare particular generational policies just or unjust. Economists are not ethicists and their social judgements are personal, not scientific. Instead, the role of economists is to analyse the implications of different generational policies on the distribution of generational welfare.

This said, knowing the levels and distribution of economic well-being of past generations is a proper focus of economic analysis, and such findings will, presumably, inform policy judgements concerning the treatment of current and future generations. For example, a finding that past generations had much higher welfare than the current and future generations will be able to sustain, and that the reason reflects systematic redistribution to past generations from current and future generations, may lead policy-makers to decide to end ongoing policies that will continue to immiserate future generations at the benefit to current generations.

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Economic theory and the measurement of generational justice

Economic theory is an indispensable guide for assessing generational justice in terms of the need to take policy actions given the current position or, as economists put it, the state of the world. There are two major strands of theory that go to the heart of generational justice. One is the intergenerational altruism model, clarified by Barro (1974), in which each generation's welfare includes the welfare of its children. The other is the pure life-cycle model, which traces to the work of Fisher (1930), in which each generation is solely concerned with itself.

The intergenerational altruism model

Barro's interlinkage of utility functions collapses (is isomorphic) to the Ramsey (1928) model of a single, infinitely-lived agent, where the agents' future selves reference or represent their descendants. As Barro pointed out, this possibility – that each generation cares about the next, effectively making today's generation care about all future generations – was originally suggested by David Ricardo in 1820 in his "Essay on the Funding System". Ricardo's suggestion, which Barro elegantly exposited and elaborated, was that if today's generations cared sufficiently for tomorrow's, they would privately provide them the means to offset government intergenerational redistribution arising, for example, from the issuance of government debt.

Such operative intergenerational altruism lessens, if not fully eliminates, collective concern over intergenerational justice. The reason is that, given intergenerational altruism, current generations will automatically internalise the welfare of future generations and take actions to protect those generations. This is particularly the case in the presence of marriage. As Bernheim and Bagwell (1988) and Kotlikoff (1989) have independently showed, the marriage between two members of two altruistic clans will effectively altruistically link those clans. Bernheim and Bagwell make the further point that – given the extent of intermarriage across religious, national, ethnic, and racial lines – the probability of altruistic linkages across essentially all inhabitants on the planet rapidly approaches One. Since such global altruism would rule out wars, among other things, these papers represent a telling critique of the intergenerational altruism proposition.

Interestingly, Ricardo was himself dubious about the efficacy of intergenerational altruism. Although he raised such altruism as a theoretical possibility, he rejected its empirical relevance (in literally the next sentence)[2]. Specifically, he questioned the ability of current generations to correctly assess and appropriately offset government redistribution to them at the expense of their descendants.

Kotlikoff et al. (2009) question a critical, implicit assumption underlying Barro's (1974) so-called "debt neutrality" result (i.e. that the government's intergenerational redistribution will be neutralised by private, intra-family transfers). They point out that it hinges critically on the assumption that agents within the extended family take each other's transfers to them as given; i.e., there is no hold-up behaviour in which one family member says, for example, "I'm rejecting your gift if that's all you are giving me." In this context, in which extended family members differ on how much they weigh each other's utility, Barro's Nash equilibrium collapses with the resulting bargaining between family members depending on their threat points. Since intergenerational redistribution by the government will change these threat points, such redistribution will have real impacts and alter the degree of intergenerational justice, no matter how measured. Stated differently, Barro's model requires both intergenerational altruism and particular game-theoretic behaviour. Without the latter, his proposition of debt neutrality no longer holds.

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Yet another critique of debt neutrality in the context of generational altruism is that raised by Laitner (1992). This and Laitner's subsequent papers point out that if extended family members don't perfectly share preferences, altruistic dynasties can be at corners with respect to making transfers to their members in the context of their facing earnings shocks, longevity risk, and other forms of risk. An example of preference differences is one-side

altruism in which parents care for the utility of their children, but children do not care about, or care less about, the utility of their parents. In this case, if children, for example, have sufficiently high earnings relative to their parents, the parents may be at a corner and make no transfers to their children notwithstanding government redistribution from children to parents, provided it isn't large enough to move them away from their corner.

The life-cycle model

Fisher's (1930) life-cycle consumption choice model rejects intergenerational altruism outright in so far as it posits agents who care only for their own welfare. Although Fisher laid out the microeconomics of intertemporal consumption choice, it took economists decades to begin examining how those micro decisions, coupled with generational policy, impacted macro outcomes and the distribution of welfare across current and future generations.

The first dynamic overlapping generation (OLG) model was developed in 1947 by Maurice Allais (1947). Samuelson (1958), who focused on the efficiency of overlapping economies, is the next major theoretical contribution to the OLG model. The third seminal OLG study is that of Diamond (1964). Diamond examined how government redistribution from young and future generations to current older generations (characterised in his study as "deficit policy") would impact current and future generations, both directly in terms of their levels of taxation, and also indirectly in terms of the wages and asset returns they would receive. In highlighting the intergenerational redistribution inherent in intergenerational fiscal policy, Diamond made intergenerational justice a major topic of economic analysis.

These early studies relied on simple two-period (youth and old age) models whose dynamics could be described in terms of a first-order, non-linear difference equation in the economy's relative supply of capital to labour. The two-period OLG model became a workhorse in economics because of its ease of use and exposition. But it also stimulated interest in developing and solving more realistic models in which agents lived for periods corresponding to years. The goal was to understand the timing of annual economic responses to changes in policy as well as technology. The timing of those responses would also govern how particular policies impacted particular generations, i.e. how they would matter to the measurement of intergenerational justice.

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But solving such models posed a major problem. Adding extra periods transformed the transition equation from first order to very high order. For example, a model in which adults live for up to 80 periods, from 20 to 100, produces a 160th order non-linear difference equation. Since mathematics offers nothing beyond approximate solutions to such problems, economists were stumped. The OLG model was, and arguably is, the core dynamic model of the profession, but no one could determine how it actually worked in real time. In the absence of a way to solve for realistic OLG transition paths, many economists, e.g. Tobin (1967), simply ignored the economy's transition path and focused on the long run, i.e. on the steady states of realistic OLG models. Others, e.g. Summers (1981), "solved" the transition problem by assuming agents formed irrational expectations – specifically myopic expectations under which agents always assume the economy to be in a steady state (i.e. that all future product and factor prices will equal prevailing values), even though they learn from one year to the next that the opposite is true.

In 1981, 34 years after Allais had produced the first OLG model, Auerbach and Kotlikoff (1981) showed how the transition path of realistic OLG models could be solved on a computer using a Gauss-Seidel-type algorithm, with inner and outer loops, that iterated over the economy's entire transition path. Auerbach and Kotlikoff (1987) used their simulation method to study the wide variety of means by which governments redistribute across generations. They showed that, regardless of how governments characterise policies that take from the young and give to the old, such policies can affect major welfare losses on successive generations, both through their direct fiscal and indirect general-equilibrium feedback effects. The Auerbach and Kotlikoff OLG simulation method was quickly adopted by researchers around the world. In the ensuing years, economists have developed computable OLG models that incorporate heterogeneous agents, realistic age-specific rates of fertility and mortality, multiple regions encompassing the global economy, multiple traded and non-traded goods, international specialisation, capital adjustment costs, region- and cohort-specific rates of technological change, immigration, labour supply as well as consumption decisions, unintended and intended bequests, informality, educational choice, borrowing constraints, idiosyncratic wage rate uncertainty, robots, climate change, all manner of fiscal policies, and many other economic factors and issues.

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Thanks to the work of Marcet (1988) and Judd, Maliar and Maliar (2009), economists can also now simulate large-scale OLG models with aggregate shocks. Hasanhodzic and Kotikoff (2013), which includes 80 periods and major shocks to the economy's productivity growth and capital deprecation rates, is the first such model. While their model is highly stylised, it provides a blueprint for the production of more realistic stochastic OLG models. Such models can be used to show how particular policies impact the distribution of welfare changes of current and future generations. The Hasanhodzic and Kotlikoff study is also important in so far as it indicates that even large shocks to the economy do not materially affect the intergenerational redistribution arising from policy changes. Stated differently, their study shows that OLG models without shocks – which are easier to simulate and can more readily handle complex economic factors – can provide good estimates for the generational redistribution arising in models with shocks, even large ones. The intuition is that each generation lives for many years. Hence even large, serially correlated annual shocks tend to cancel out over time. Moreover, contemporaneous generations can share these risks with one another via bond and other financial markets.

Assessing the two intergenerational frameworks

The two intergenerational frameworks, briefly reviewed above, continue to compete for economists' consideration and use. The single-agent, infinitely lived, implicitly intergenerationally altruistic model has become the mainstay of the real business cycle literature in macroeconomics. This literature focuses on the economy's response to shocks, which are computationally much easier to handle with the assumption of a single representative agent. The life-cycle model has, for its part, primarily been used in deterministic settings to study dynamic feedback effects of policy changes as well as the interconnected impacts of changes in demographics.

The ability of the life-cycle model to handle economic as well as policy shocks, as demonstrated in Hasanhodzic and Kotlikoff (2013), will likely lead more macro economists to work on the life-cycle model. The reason is the strong evidence, accumulated over the years, against operative intergenerational altruism. Micro studies by Altonji, Hayashi and Kotlikoff (1992, 1997) and Hayashi, Altonji and Kotlikoff (1996) show that extended families share neither their resources nor shocks to their resources when it comes to determining how much each extended family member should consume. Rather than acting like a unitary family, parents and their adult children consume, in the main, as if they were unrelated.

Altruism has also been strongly rejected in cohort data in a study by Abel and Kotlikoff (1994). And Gokhale, Kotlikoff, and Sabelhaus (1996) and Lee and Mason (2011) show remarkable shifts through time in favour of the elderly in the US profile of average consumption – shifts which coincide with major and ongoing redistribution from younger to older generations.[3] In the early 1960s, the US age-consumption profile was hump-shaped, peaking at roughly age 50. Today it is an upward sloping line. These robust findings against operational intergenerational altruism are complemented by strong findings by Browning et al. (2011) and others against operational altruism between spouses within marriages.

Direct measurement of intergenerational justice

There are many aspects of intergenerational justice which economics is just beginning to examine in computable general equilibrium simulation models. An example is the impact of climate change on the welfare of future generations. When this research is completed, it will provide qualitative and quantitative assessments of the range of impacts that current climate policy may have on future generations.

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To date, most of the direct measurement of intergenerational justice has centred around the fiscal treatment of current versus future generations. This has taken the form of fiscal gap and generational accounting.[4] Fiscal gap accounting focuses on the government's intertemporal budget constraint, which requires that the present value of a government's expenditures, no matter how labelled, equals the present value of its receipts, no matter how they too are labelled. The fiscal gap measures the extent to which expenditures exceed taxation valued in the present.[5]

To illustrate fiscal gap accounting, consider the current US federal government's fiscal gap. It is massive, totalling roughly $200 trillion.[6] Since US GDP is close to $20 trillion, the US fiscal gap represents 10 years of current US GDP or 10.5% of GDP through the infinite horizon.[7] Eliminating the US fiscal gap via tax hikes would require an immediate and permanent 53% increase in all federal taxes or, alternatively, a 33% immediate and permanent cut in all federal expenditures, including those the US government labels as "official debt service".

Waiting to make fiscal adjustments makes the size of the requisite adjustments even larger. And the longer the government waits to address its generational problem, the larger will be the number of older generations allowed to consume through the end of their lives without having to pay more in taxes or receive less in benefits. This, in turn, means a larger fiscal burden that will be imposed on today's young and future generations over the course of their lifetimes.

Generational accounting is an extension of fiscal gap accounting. It was introduced by Auerbach, Gokhale, and Kotlikoff (1991) to measure the burden on future generations of balancing the government's intertemporal budget (eliminating the fiscal gap) assuming current generations are entirely exempted from helping eliminate a country's fiscal gap. Based on current US fiscal policy, future generations face lifetime net tax rates (the present value of lifetime net taxes divided by the present value of lifetime labour earnings) that are some 70% higher than those today's young generations would face under maintenance of current law.[8]

The huge US fiscal gap and generational bill being foisted on unborn Americans reflects the country's demographics, its post-war expansion of pension and healthcare benefits provided to the elderly, and successive rounds of federal tax cuts not matched by reductions in defence and other discretionary federal spending.

American economists have strongly endorsed fiscal gap and generational accounting, as may be seen at www.theinformact.org. The Inform Act is a bipartisan bill that would compel three US government agencies – the Congressional Budget Office, the Office of Management and Budget, and the General Accountability Office – to do fiscal gap and generational accounting on a routine basis. The bill, which has received limited support in Congress and has not, therefore, been enacted, has been endorsed by 20 American Nobel Laureates in Economics and over 1,300 American economists, primarily from academia.

Fortunately, other countries are taking the measurement of intergenerational fiscal imbalances seriously. The creation of Norway's Petroleum Fund (now called The Pension Fund Global) appears to have been strongly influenced by Auerbach, Gokhale, Kotlikoff and Steigum (1993) as well as Steigum et al. (1999). Both are generational accounting studies, which asked whether Norway was overconsuming its petroleum wealth.

The European Union is now producing fiscal gap measures for its member countries every three years. It references this measure as the S2 indicator. European Commission (2015) reports fiscal gaps for 10 of 26 member countries in excess of 3% of GDP on an ongoing basis. While far smaller than the 10.5% figure for the US, even 3% of GDP per year represents a very major fiscal

imbalance.[9] And, given the zero-sum nature of generational accounting, the longer adjustment is delayed to eliminate these fiscal gaps, the larger the fiscal burden that will be left for today's young as well as future generations.

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Fiscal gap accounting, generational accounting or both have been done over the years by the IMF, the World Bank, Her Majesty's Treasury, the Bundes Bank, the New Zealand Treasury and many other institutions and government entities around the world, including, as mentioned, the European Commission. The list of countries that have engaged in fiscal gap or generational accounting, or an equivalent calculation, whether on a one-time or routine basis includes not just most members of the European Union, but also Australia, New Zealand, Mexico, Russia, China, Japan, South Korea, Canada, Thailand, Chile, Brazil, El Salvador, the UK and the US.

A number of these studies are included in *Generational Accounting Around the World*, a 1999 National Bureau of Economic Research (NBER) volume edited by Alan Auerbach, Laurence Kotlikoff and Willi Leibfritz. This volume also includes a study entitled "Generational Accounting in General Equilibrium" by Hans Fehr and Laurence Kotlikoff, which shows that general equilibrium effects can materially impact, but not fundamentally alter, the picture of generational equity produced by standard partial equilibrium generational accounting.

The critique of deficit accounting

The strong global interest in fiscal gap and generational accounting reflects, in large part, the realisation that convention deficit and debt accounting do not constitute meaningful measurements of the fiscal burdens being foisted on young and future generations. Feldstein's (1974) introduction of the concept of Social Security wealth made clear that the US government was keeping liabilities of various kinds off its books, i.e. liabilities that weren't being recorded as US official debt.

But the problem Feldstein discovered ran and runs far deeper than the well-known fact that governments don't disclose everything they owe. As Kotlikoff (1986, 1988, 1993, 2002, Auerbach and Kotlikoff (1987), and Green and Kotlikoff (2009) show, government debt is not theoretically well-defined. Instead, the debt and its change through time, the deficit, reflect economically arbitrary choices of how to label government receipts and payments.

Indeed, Green and Kotlikoff (2009) provide a general proof that fiscal policy can be arbitrarily labelled to permit governments to report any time path of official debt (positive or negative) regardless of the government's underlying fiscal policy. Their proof holds for all neoclassical models with rational agents, i.e. agents who are not fooled and whose economic decisions are not influenced by the choice of language.

The Green and Kotlikoff study indicates that a country with a zero fiscal gap and a highly intergenerationally just fiscal policy could, via the choice of fiscal labels, nonetheless project a path of official debt that perpetually rises relative to the economy. Alternatively, the country could have a large and growing fiscal gap and state that it has a surplus (negative official debt), whose projected value is rising through time. Again, all that's needed to claim your country is fiscally responsible when the opposite is true is the adoption of the right, internally consistent labelling convention. Since the Green-Kotlikoff paper shows that *all* neoclassical models with rational agents can be relabelled, the indeterminacy of the debt and the deficit is unrelated to market imperfections, adverse selection, moral hazard, distortionary taxation, liquidity constraints, uncertainty, monopoly, and all other economic issues that have been studied using economic models with rational agents.

All that's needed to claim your country is fiscally responsible when the opposite is true is the adoption of the right, internally consistent labelling convention.

In contrast to official debt and deficit numbers, the fiscal gap and lifetime net tax rate facing future generations that is needed to eliminate the fiscal gap, which generational accounting produces, are label-free measures; i.e. their values are the same regardless of the choice of fiscal-labelling convention.

The proposition that conventional debt measures are economically meaningless is a critically important finding when it comes to the measurement of intergenerational justice. Yes, economists largely understand the labelling problem; yes, fiscal gap and generational accounting are becoming standard methods of fiscal analysis in certain parts of the world; and yes, simulation studies of the fiscal/demographic transition in large scale OLG models are becoming more frequent. But official debt and deficit accounting remains the central measuring rod for governments' fiscal decision making as well as fiscal discourse. In the US, for example, the country's long-term fiscal imbalance is rarely mentioned by politicians, whereas the size of the debt and deficit are routinely discussed. Since those numbers are both figments of language, not true economic indicators, fiscal policy-making in the US and other countries is deeply irrational. International institutions, including the World Bank and the IMF, contribute to this problem by putting the debt and deficit front and centre in their discussions of fiscal sustainability.

This situation is akin to governments and international institutions basing decisions involving the physical world ignoring relativity's teaching that time and distance are effectively functions of language (one's frame of reference based on the direction and speed of travel). Just as the equations of physics do not pin down unique measures of time and distance, the equations of neoclassical economics do not pin down measures of the debt and the deficit or, for that matter, taxes and transfer payments. The "accounting" of such "concepts" is, unfortunately, content-free.

Just as the equations of physics do not pin down unique measures of time and distance, the equations of neoclassical economics do not pin down measures of the debt and the deficit or, for that matter, taxes and transfer payments.

Conclusion

The ongoing use of official debt to consider fiscal sustainability and, implicitly, to assess intergenerational justice is without scientific merit. The economics profession has the primary responsibility to make this clear to the general public, the press, and

the politicians. We cannot meaningfully discuss intergenerational justice by resorting to measures that purport to bear on this question but do nothing of the kind. Economists are aware of this problem but need to be much more vigorous in educating the general public and, ultimately, policy-makers to focus on fiscal reality not linguistics.

In discussing intergenerational justice, economists would do well to point to the lesson of Argentina, which, a century back, had one of the world's highest levels of per capita GDP. Today Argentina's per capital GDP is less than a quarter of that in the US. Argentina's long-term, *generational* decline in relative, if not absolute, living standards, doesn't reflect immutable productivity shocks, natural disasters, or sustained changes in its terms of trade. It reflects, from all appearances, a century of poor governance, which enriched politicians, internal power groups and current generations at the expense of long-term economic growth and the welfare of future Argentines. Any fair-minded observer of Argentina's history of fiscal, monetary, and other policies must conclude that its long–term economic decline represents a case study in intergenerational injustice.[10]

While the US has a far more stable democracy and far better adherence to the rule of law, its fiscal policy is slowly but surely taking future generations down the path of Argentina. A country's fiscal gap is measured in present value. As such, it is like a household's credit card bill, which grows with interest when left unpaid. America's fiscal gap is not being officially acknowledged, let alone being eliminated. Indeed, it is growing at roughly $6 trillion per year! But the US is not alone in leaving massive unpaid bills to the unborn. Other countries, including Japan, China, Russia, and at least 10 EU member countries, are engaged in a fierce, ongoing generational policy of *take as you go*.

Looking long-term, measurement of generational injustice will likely rely less on fiscal gap and generational accounting and more on the results of Monte Carlo simulations of large-scale, highly detailed life-cycle models, which feature uncertainty and incorporate not just intergenerational redistribution through fiscal policy but the truly mega issues of generational equity, namely climate change and nuclear proliferation.

As Weitzman (2009) points out, our posterior probability distributions of catastrophic events arising from such planetary life and death issues have fat tails because we have such limited information on their likelihood. Given this, the next generation of dynamic and, thus, intergenerational models will need to incorporate disaster distributions that feature, to the extent possible, not only our uncertainty about things we know but also our ignorance about things we don't know.

> Just as the equations of physics do not pin down unique measures of time and distance, the equations of neoclassical economics do not pin down measures of the debt and the deficit or, for that matter, taxes and transfer payments.

Cai et al. (2013) is indicative of how quickly economics is moving to refine and expand its modelling in the area of climate change. Their model counts among the first to seriously incorporate both uncertainty about climate change damage and the potential for climate-change tipping points. They show, as Weitzman suggested, that uncertainty greatly strengthens the case for immediate and strong climate-change mitigation in the form of the imposition of far higher carbon taxes than have previously been suggested. This research makes clear that the future of measuring intergenerational justice and determining policies to achieve intergenerational justice lies in stochastic, dynamic modelling that simultaneously captures all major interacting factors.

Measuring intergenerational justice is, of course, only the first step in achieving generational justice. As described above, many countries have pursued and are pursing policies that pose tremendous risks – fiscal, environmental, and, arguably, existential risks – to our descendants. This is passing strange in a world where parents universally proclaim their children to be their most precious possession. The measurement of intergenerational justice is now moving at an accelerating pace. Whether it is matched with the rapid actions needed to protect the welfare of our collective progeny remains to be seen.

> Measuring intergenerational justice is, of course, only the first step in achieving generational justice. [Many] countries have pursued and are pursing policies that pose tremendous risks – fiscal, environmental, and, arguably, existential risks – to our descendants. This is passing strange in a world where parents universally proclaim their children to be their most precious possession.

Notes

1 Auerbach/Kotlikoff/Koehler (2016) provides a new method for measuring intragenerational inequality.

2 O'Driscoll (1977) provides a full description of Ricardo's assertion and immediate rejection of "Ricardian Equivalence".

3 In 1970, payments to Medicare, Social Security and Medicaid (70% of which goes to the poor elderly) per oldster (person 65 and older) equalled 37% of per capital GDP. Today the ratio is close to 70%.

4 Generational accounting references a specific framework developed by the author, Alan Auerbach and Jagadeesh Gokhale (see Auerbach, Gokhale and Kotlikoff (1991)), to calculate and characterise fiscal burdens being left to future generations assuming currently living generations do not contribute to eliminating the fiscal gap. Generational accounting, as formalised in Auerbach, Gokhale, and Kotlikoff (1991), does not capture other net burdens, such as climate degradation, that current generations impose on future generations. The generational accounting framework has been modified by other researchers to, for example, allocate, by generation, the benefits of public goods spending and to examine the fiscal treatment of future generations in all or some of the fiscal gap that is closed via additional net taxes levied on current generations (see, for example, Raffelhüschen and Walliser (1996) and Bonin (2013)).

5 Governments cannot escape satisfying their intertemporal budget constraints since doing so would imply that a country could consume more than its resources, where consumption and resources are both measured in present value. Hence, fiscal gap accounting is an inherently partial equilibrium analysis showing the need for fiscal adjustment, while leaving open the means of fiscal adjustment. Practically speaking, a government that attempted to maintain a positive fiscal gap indefinitely would find itself trying to extract more than 100% of the resources of the young to trans-

fer to the old or to the government. This produces "game over", which is illustrated in Evans, Kotlikoff and Phillips (2012).
6 Author's calculations based on projections of the Congressional Budget Office.
7 I.e. the present value of 10.5% of GDP projected over the infinite horizon equals roughly $200 trillion.
8 Estimate by author.
9 To get a sense of the size of 3% of GDP, note that 3% is roughly the ratio of US Social Security benefits (paid for, in part, by a 12.4% payroll tax) to US GDP.
10 See Cavallo and Runde (2017) for an outstanding review of 20th- and 21st-century economic history.

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Pension and Intergenerational Balance: A case study of Norway, Poland and Germany using Generational Accounting

by Natalie Laub and Christian Hagist

Abstract: In this paper we apply the method of Generational Accounting to analyse whether today's government policy burdens future generations with a heavier load than current generations. We analyse pay-as-you-go pension systems and their reforms in Norway, Poland and Germany. Our results show that, through these reforms, pension systems in all three countries became more intergenerationally balanced as the implicit debt to be paid by future generations was reduced. However, the burden is shared differently: in Norway current pensioners have to contribute to enhancing the financial sustainability of the pension system while Poland and Germany seem to protect current pensioners at the expense of younger generations.

Keywords: *Generational Accounting, Pension Reform, International Comparison, Sustainability, Intergenerational Redistribution*

Introduction[1]

In the light of ageing societies, the relationship between current and future generations is a hot topic not only in political debates and TV talk shows but also in social science research.[2] While it is often presumed that ageing societies act to the detriment of future generations, there are also examples showing a balanced situation. In Norway, the so-called "Government Pension Fund Global" was established in 1990. Its aim is

> *"to support long-term considerations in the government's spending of petroleum revenues, as well as savings to finance pension expenditure under the National Insurance Scheme. Sound long-term management will help ensure that Norway's petroleum wealth can benefit both current and future generations."* [3]

However, only very few countries are in the favourable situation of being able to generate fiscal surpluses. Thus for most countries the issue of intergenerational justice is much more skewed towards a battle between the generations. However, to be able to answer the question about how an intergenerationally just society should look, a definition of the term intergenerational justice is necessary. In recent decades, a growing branch of literature has developed around this research question.[4] In the field of economics, the most prominent view of intergenerational justice was probably established by Rawls:

> *"The correct principle, then, is one the members of any generation (and so all generations) would adopt as the principle they would want preceding generations to have followed,[…]. Since no generation knows its place among the generations, this implies that all later generations, including the present one, are to follow it."* [5, 6]

Börsch-Supan, however, raises the objection that

> *"a properly defined concept of generational justice has to set up a balance sheet […] which attributes all gains and costs of inventions, wars, demographic and economic crises to the respective generation according to the causative principle. This is simply impossible."* [7]

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If the definition of intergenerational justice is a field of study on its own, it is hardly surprising that measuring intergenerational justice is far from being trivial. For the "Intergenerational Justice Index", for example, Vanhuysse combines several economic measures and a measure for the ecological footprint.[8] The "European Intergenerational Fairness Index"[9] also applies several mainly economic measures from housing costs to expenditure for R&D to assess the position of young people. Both studies succeed in providing a comprehensive insight into the complex issue of intergenerational justice. However, complementing these indices with an in-depth analysis of single measures may be worthwhile. Take for example government debt, which enters both indices. Feldstein already pointed out in 1974 that official debt is not able to reflect unfunded liabilities arising in pay-as-you-go financed social security systems. Following this line of thought, Auerbach et al. developed the method of Generational Accounting in the late 1980s:

> *"Regardless of their true fiscal policies, governments can label their policies so as to report any time path of deficits or surpluses they want. The fundamental problem with deficit accounting is that the deficit does not represent the answer to a well-posed economic question. Generational Accounting, in contrast, attempts to answer two well-defined economic questions. First, what is the magnitude of the fiscal burden being left for future generations by current policy, and second, how does a change in fiscal policy alter the intergenerational distribution of welfare?"* [10]

At the core, Generational Accounting assumes that taxes paid minus transfers received over the remaining lifetime of both current and future generations have to equal government (explicit and implicit) debt. Thereby, Generational Accounting is not able to give a normative statement on intergenerational justice. It can only highlight fiscal consequences of current policies.[11] Thus, for the field of public finance, Generational Accounting can detect whether today's government policy burdens current generations with a heavier load than current generations. Therefore the focus of this paper can probably be titled intergenerational balance and should be understood as one attempt (among many) to approach the vast topic of intergenerational justice. Generational Accounting can prove very helpful, e.g. by designing the following thought experiment:

"By what percentage would one need immediately and permanently to raise income taxes so as to be able (in conjunction with other tax receipts) to pay for the government's projected future expenditures and its current net financial liabilities and never have to raise taxes again?"[12]

Towards the end of the century and in the gloomy light of ageing populations it turned out that pension systems would fail to be as generous with future generations.[...] Slowly but surely, pension reforms were implemented in almost every European country.

Ultimately, the inventors of Generational Accounting assess the merits of their method as follows:

"Generational accounting makes us look ahead. It makes us refine our long-term fiscal projections. It makes us consider the rising cost of policy procrastination. It makes us ask tough questions about who will pay the government's bills. It makes us address economic issues, rather than play accounting games. And it makes us acknowledge the extent to which we are expropriating our children's resources by accumulating fiscal liabilities, be they implicit or explicit"[13].

In the following, the method of Generational Accounting is applied to assess implications of pension reforms in different countries. When it comes to the question of intergenerational redistribution, pension schemes that follow the pay-as-you-go principle play an important role for several reasons. First of all, in many European countries public pension expenditure is one of the largest budgetary items of public finances, amounting to almost 12% of GDP in 2013 (EU28 average).[14] Moreover, pay-as-you-go pension systems explicitly require a contract between different generations. Thereby, this contract is not a contract in the juridical sense, but rather describes rights and duties between different generations. It aims at smoothing income over the life cycle.[15] Finally, many pension systems have undergone severe changes in the past two decades. In the second half of the past century pension systems in Europe were often characterised by generous regulations both regarding the benefits paid out as well as the time which could be spent in retirement. Towards the end of the century and in the gloomy light of ageing populations it turned out that these systems would fail to be as generous with future generations. Even more, it became evident that future generations would be burdened by past benefits being too generous.[16] Slowly but surely, pension reforms were implemented in almost every European country. Countries like Norway and Poland switched to a notional defined contribution (NDC) system while other countries – at least from a legal perspective – reformed their existing systems more gradually, e.g. Germany. The Norwegian system is chosen here because the entire pension system was changed only recently, in 2011, from a quasi-NDC system to the real NDC type. The Polish pension reform was quite similar to the Norwegian one; however, the change was more severe, has started about ten years earlier, and reforms are still in progress. While pension reform meant a complete change of the existing systems in Norway and Poland, reforms were more gradual in Germany. Nevertheless, the changes were not less far-reaching than in the other two countries.

Therefore we compare in this paper Norway, Poland and Germany to evaluate if such reforms – drastic or more subtle – really alleviate the demographically induced burden of pay-as-you-go type public retirement systems for future generations and are thus able to restore (or at least enhance) intergenerational balance.

The paper is structured as follows. First, we briefly describe our chosen set of countries with a focus on their demographic development and the pension reforms analysed. Then we describe in detail our methodology, as well as its theoretical and empirical weaknesses. We then provide the outcome of our Generational Accounts for the three pension systems and their reforms, and discuss them in detail. Thereby, the focus is on whether these reforms improved intergenerational balance and how the burden imposed by these reforms is shared between different generations. The paper finishes with a conclusion and outlook.

Demographic developments in comparison

An international comparison of all relevant demographic developments and their parameters would be a study of its own. Therefore we will focus on the factors of life expectancy and fertility, which are the two most important driving forces of demographic development.

All three countries considered have faced an increase in life expectancy during past decades and this development is very likely to be continued. While numbers differ only slightly for Norway and Germany, they still lag behind for Poland. In 2010 life expectancy at birth was only 80.1 years for women and 71.7 years for men in Poland (see Table 1). In contrast, life expectancy at birth was 83.1 (82.7) years for women and 78.7 (77.6) years for men in Norway (Germany) in 2010. According to projections by Eurostat (2011), in 2060 life expectancy for men will be 82.4 years in Poland, 84.8 years in Germany and 85.2 years in Norway. Numbers for women will amount to 87.9 years in Poland, 88.9 years in Germany and 89.2 years in Norway. While life expectancy will still be shortest in Poland, the country is projected to catch up remarkably.

Table 1: Life-expectancy at birth[17]

	Male		Female	
	2010	2060	2010	2060
Norway	78.7	85.2	83.1	89.2
Poland	71.7	82.4	80.1	87.9
Germany	77.6	84.8	82.7	88.9

As regards the development of fertility rates, there are some recognisable trends in all three countries: for example, low fertility rates during the Second World War, and overall high fertility rates during the baby boom of the 1960s. While all three countries faced sharp declines in fertility rates following the baby boom, a quick and substantial recovery took place only in Norway. In 2010 fertility rates were still high in Norway with 1.9 children per woman, whereas Poland and Germany reached a number of 1.4 children per woman only.

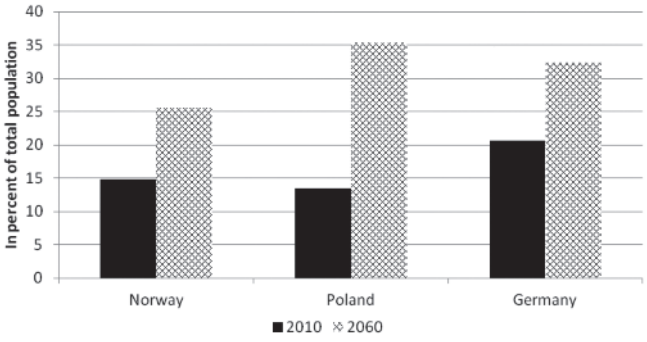
Another driving force of demographic development is migration.[18] Again, patterns differ considerably between Norway, Poland and Germany. In Norway, net migration was positive in

every single year from 1990 until 2010. The situation is almost similar in Germany; however, the crude rate of net migration per 1,000 inhabitants is overall lower and it turned negative in 2008 and 2009. In contrast, emigration was almost always higher than immigration in the case of Poland between 1990 and 2010.[19]

In 2060 Norway will be the country with the lowest proportion of elderly people. In contrast, about one-third of the population will be 65 years and older in Germany and Poland.

As demographic development is mainly formed by the factors described above, future trends will be quite different in the three countries. This can be seen in Figure 1: today, Poland has the lowest proportion of elderly people, followed by Norway. While population ageing will take place in all three countries, the development will be severest in Poland. In 2060 Norway will be the country with the lowest proportion of elderly people. In contrast, about one-third of the population will be 65 years and older in Germany and Poland. Over the coming decades, the share of elderly people will rise sharply in Poland and is expected to be more than two and a half times larger in 2060 than it was in 2010.

Figure 1: Share of population aged 65 and above in 2010 and 2060[20]



Reforming pension systems

Norway

The reformed Norwegian pension system started to take effect in 2011.[21] The benefit plan of the new system consists of a "guarantee pension" and a public earnings-related pension system.[22]

For a person to be eligible for a guarantee pension a period of residence in the country of at least three years is required. To get the full amount, 40 years of residence are necessary. The guarantee pension cannot be claimed before the age of 67. The earnings-related pension (called "income pension") is counted against the guarantee pension. The guarantee pension is indexed annually in accordance with wage growth minus the effect of the life expectancy adjustment (see below).

The new public earnings-related pension system is of NDC type. The pension system is a pay-as-you-go (PAYG) scheme fully integrated with the state budget and financed by a mixture of general taxation and employer and employee social security contributions. Each year an amount equivalent to 18.1% of earnings up to a threshold is credited to an individual notional pension account. The accumulated holdings on these accounts are indexed annually in step with average wage growth. Furthermore, there are several credits, e.g. for periods of raising a child, caregiving or military services. Retiring is possible between the age of 62 and the age of 75. When a person retires, entitlements are converted into a lifetime pension payment. The calculation is based on the age at retirement entry and the average life expectancy of the respective cohort. The take-up of pension benefits can be combined freely with full-time or part-time employment. Income pension is indexed annually according to wage growth minus 0.75 percentage points.[23]

Poland

Currently, the Polish private sector pension system is in a transition phase after the reform of 1999, which changed it from a defined benefit scheme to an NDC scheme.[24] Until 2011, the new scheme applied to all workers born after 1968 and was designed as follows: Contribution is set at 19.52% of gross earnings, with payment equally split between employers and employees. 12.22% is credited to individual accounts at the central insurance institution, with a rate of return equal to the growth of the wage sum of a respective year after controlling for inflation. The remaining 7.3% is invested into private funds with an individual and variable market rate of return.[25] After retirement, account values are converted into an annuity which is based on the average unisex life expectancy of the age group at the age of retirement. Employees born between 1949 and 1969 are covered by the reformed system, but they can decide whether or not to participate in the funded part of the new scheme. In contrast, people born before 1949 still receive their pension from the former defined benefit scheme. If pension benefits fall below a defined threshold, there is a supplement paid out of tax accounts. In general, existing pensions are indexed with the inflation rate plus 20% of real wage growth.

Over the coming decades, the share of elderly people will rise sharply in Poland and is expected to be more than two and a half times larger in 2060 than it was in 2010.

Mainly due to public budget constraints, the government changed the proportions of contributions transferred to the different pillars in May 2011. The Funded Defined Contribution (FDC) part was lowered to 2.3%, with the remaining 5% going to a second NDC scheme. Contributions to the funded part were legislated to rise again until they will reach 3.5% sometime after 2017.

In 2012 the statutory retirement age for men and women insured in the NDC/FDC system was legislated to rise gradually from 60 to 67 between 2013 and 2040 for women and from 65 to 67 between 2013 and 2020 for men. The retirement age will be raised by three months each year.[26]

Finally, further reforms were adopted in 2013, including the following changes:

- The FDC contribution rate will be fixed at 2.92% without any future changes.
- 51.5% of FDC assets will be taken over by the general government and booked on the second NDC scheme.
- The FDC scheme will no longer be obligatory.
- A new mechanism of the FDC-related pensions will be introduced: Starting ten years before reaching the statutory retirement age, the FDC assets will be cashed at a rate of 10% annually and gradually cumulated on the respective individual second NDC account.

Germany

In Germany, there is a mandatory PAYG scheme to which private sector employees have to contribute a certain rate of their income (18.9% in 2010) up to an annually adjusted threshold.[27] Payments are made by the employer and the employee in equal parts. In 2001 a voluntary, fully-funded system with tax credits was introduced. Workers can contribute up to 4% of their income to this so-called "Riester-Rente". At the same time, an upper limit was set to contributions to the mandatory PAYG scheme (20% until 2020, 22% until 2030).

By contributing to the mandatory scheme people earn pension points, with one point corresponding to one year of average earnings. The benefits are calculated as the product of accumulated points and the differing point values after retirement. The value of one pension point is annually adjusted to the growth of gross wages minus pension contributions and notional contributions to the "Riester-Rente". Furthermore, a sustainability factor was introduced which anchors the point value to the ratio of contributors to retirees.

The regular retirement age will be raised to 67 years between 2012 and 2031, with a possibility for early retirement after the age of 60, which has been raised to 63 since 2006. There is a penalty of 0.3 percentage points per month for early retirement and a bonus of 0.5 percentage points per month for late retirement.

In 2014 the most recent reform took place, enabling members of certain cohorts to retire at the age of 63 without any reductions in benefits if they have been working for 45 years.[28]

Summing up, Table 2 gives an overview over the earnings-related pension systems in Norway, Poland and Germany.

Table 2: Pension systems in Norway, Poland and Germany[29]

	Norway	Poland	Germany
public earnings-related pension systems			
name	inntektspensjon	Emerytura	Altersrente
type	notional defined contribution	notional defined contribution	point scheme
subject to mandatory insurance	working population	private sector employees	private sector employees
financing			
principle	pay-as-you-go	pay-as-you-go / funded	pay-as-you-go
contribution rate	18.1%*	19.52%	18.9%
basis of accrual	wage income	wage income	wage income
contribution ceiling	yes	yes	yes
benefits			
pensionable age	62-75	67	67
earliest possible age	62	-	63
period taken into account for calculation of benefits	entire career	entire career	entire career
indexation of accrual	wage	wage sum growth controlled for inflation	wage
indexation of benefits	wage growth - 0.75 percentage points	inflation + 20% of wage growth	wage growth adjusted for several factors
balancing mechanisms			
life expectancy	yes	yes	indirectly
sustainability	no	no	yes

* Actually distinct contributions to the pension system do not exist, but this is the amount of pension accrual.

Measuring sustainability

The methodology of Generational Accounting[30]

In the following, the method of Generational Accounting will be applied to analyse whether the reforms described above can improve intergenerational balance in the respective pension system, and which generations bear the burden of these reforms – given that "intergenerational redistribution occurs whenever a government policy expands the consumption opportunities of one generation at the expense of another."[31]

> [Generational accounting] is a micro-founded macro-model which attempts to measure both fiscal sustainability on the macro- and intergenerational redistribution on the micro-level.

Generational Accounting was originally developed by Alan Auerbach, Jagadeesh Gokhale and Laurence Kotlikoff in the early 1990s to project the long-term development of public finances.[32] It is a micro-founded macro-model which attempts to measure both fiscal sustainability on the macro- and intergenerational redistribution on the micro-level. The intertemporal budget constraint over an infinite time horizon marks the starting point of Generational Accounting.[33]

$$\sum_{k=b}^{b-D} N_{b,k} + \sum_{k=b+1}^{\infty} N_{b,k} = B_b$$

D denotes the agents' maximum age and b the base year. $N_{b,k}$ represents the present value of year b's net tax payments (i.e. transfers minus contributions),[34] made over the remaining life cycle by all members of a generation born in a specific year k. Thus the first term on the left-hand side of (1) represents aggregate net taxes of all generations alive in the base year b. The second term aggregates the net tax payments made by future generations born in year $b + 1$ or later. Together, these two terms have to be equal to B_b, which stands for the net debt[35] of the pension system in year b. Thus, if living generations receive a net transfer and if the net debt is positive, this will have to be financed by the net taxes of future generations.[36]

The calculation of net tax payments includes several components. Firstly, all different kinds of contributions are summed up and set off against different transfer types. Thereby, fiscal policy in place in the base year is assumed to be constant over the projection horizon. Furthermore, the summation of net tax payments is conducted separately for male and female individuals to account for gender-specific profiles of contribution payment and benefit reception. The projection of future net tax payments also takes into account the number of cohort members who survive until each year under consideration. Therefore long-term population forecasts are applied.

For living and future generations, a cohort's Generational Account ($GA_{b,k}$) in a specific year is defined by dividing the aggregate remaining lifetime net payments by the number of cohort members alive in that year ($P_{b,k}$):

$$GA_{b,k} = \frac{N_{b,k}}{P_{b,k}}$$

Generational Accounts are constructed in a purely forward-looking way; only the contributions paid and the transfers received in or after the base year are considered. In consequence, Generational Accounts cannot be compared across living generations as they incorporate effects of different lifetimes. However, Generational Accounts of agents born in the base year and in the future can be compared, as both are observed over their entire life cycle. Intertemporal public liabilities *(IPL)* arise when the intertemporal budget constraint of pension systems is violated:

$$IPL_b = B_b - \sum_{k=b-D}^{\infty} N_{b,k}$$

The amount of intertemporal public liabilities measures aggregate unfunded claims on future budgets, assuming that the present policy will hold for the future. The Sustainability Gap is now derived by setting intertemporal public liabilities in relation to the base year's GDP:

$$SG_b = \frac{IPL_b}{GDP_b}$$

On the one hand, the Sustainability Gap can easily be interpreted as comparable to the Maastricht criteria (however, it accounts for both debt incurred in the past as well as in the future). On the other hand, results are highly sensitive to changes in underlying assumptions, especially the difference between growth and interest rate and demographic scenarios.

Generational Accounts cannot be compared across living generations as they incorporate effects of different lifetimes. However, Generational Accounts of agents born in the base year and in the future can be compared as both are observed over their entire life cycle.

This drawback can be overcome by applying alternative indicators, which close the Sustainability Gap over a certain time horizon.[37] Benz and Fetzer[38] show that the strong interpretation of the Sustainability Gap in a Generational Accounting framework such as ours can easily be transferred into other methods assessing fiscal sustainability, like the OECD method or econometric approaches.
The question at hand is if there is at all a relation between the Sustainability Gap and intergenerational balance or even intergenerational justice. Perhaps the Ponzi game, if played by governments, could be played for eternity? As regards Germany, current debt levels are obviously not punished by financial markets, which would be at least an indication that the Ponzi game could not be going on for ever. Take Japan as another example, which has already accumulated an official debt of over 250% of GDP and still enjoys an A rating on its bonds. However, these may be exceptions which prove the rule. Reinhart and Rogoff for example[39] show in their prominent work that countries exceeding certain values of public debt are reducing their growth potential. Therefore some generations have to pay a certain share of the Sustainability Gap, or in other words the intertemporal budget constraint is binding.

Theoretical and empirical limitations

On the theoretical level, one of the major objections towards Generational Accounting is the question whether or not the underlying neoclassical life-cycle hypothesis holds. Neoclassical theory assumes that individuals plan and allocate resources over their entire life.[40] This also underlies Generational Accounting, as net tax payments are calculated over the remaining life cycle. However, if the individual planning horizon was much shorter or longer, implications of Generational Accounting results could be misleading. Empirical evidence shows that individuals are neither purely short-sighted (if they were, voluntary long-term savings would not occur) nor perceive their families as infinitely living dynasties (if this was the case, intergenerational redistribution due to fiscal policy would be offset by bequests).[41] Thus, while the neoclassical life-cycle hypothesis does not perfectly describe reality, it seems to strike a fairly good balance.
Another drawback is that Generational Accounting is a partial equilibrium analysis and thus does not account for macroeconomic feedback effects.[42] This would only be possible in a dynamic general equilibrium model. Thus the incidence of e.g. an increase in contribution rates cannot be measured correctly. Therefore Generational Accounting is not able to provide a base for welfare judgements.

On the theoretical level, one of the major objections towards Generational Accounting is the question whether or not the underlying neoclassical life-cycle hypothesis holds. Neoclassical theory assumes that individuals plan and allocate resources over their entire life.

Regarding empirical limitations, the most severe one is the use of single growth and discount rates.[43] The discount rate incorporates both the cost of waiting and the risk of future payment streams. Actually, this should be reflected in different rates. Furthermore, the choice of growth and discount rates is more or less arbitrary. However, the outcome of Generational Accounting mostly depends on the difference between growth and discount rates, which seems to be fairly stable over time.[44]
Furthermore, it can be criticised that Generational Accounting holds constant age- and gender-specific tax- and transfer-profiles.[45] However, increasing female labour market participation or the overall prolonging of working life due to augmented retirement ages affect these profiles. Furthermore, Generational Accounting does not incorporate private intergenerational transfers (which might cushion fiscal policy). The setting-up of so-called National Transfer Accounts tries to overcome these limitations. National Transfer Accounts are based on the System of National Accounts but estimate age-specific profiles for income, consumption and savings; sometimes even for time-use.[46]
Finally, the projection of demographic developments, which have a major influence on the results of Generational Accounting, is deterministic. Again, including stochastic elements could mitigate this point of criticism. Another remedy comes from carrying out sensitivity analyses, which is also useful to oppose criticism concerning the choice of growth and discount rates.[47]
Generational Accounting faces important limitations both applying to forecasts in general and to this method in specific. However, one important advantage of Generational Accounting is that it shows the effects of prolonging base-year's fiscal policy into the future. Thus the results of Generational Accounting can be seen as a worst-case scenario and can serve as a warning to policy-makers. It can also be shown that Generational Accounting is a valuable method when the number of countries which apply this method

is considered. A respective table can be provided by the authors upon request.

> The results of Generational Accounting can be seen as a worst-case scenario and can serve as a warning to policy-makers.

Limitations in scope[48]

The method of Generational Accounting was developed to assess long-term sustainability of public finances. However, with this focus the important issue of adequacy may fall from view. The significance of adequate benefits can nicely be illustrated by looking at public pension systems and the reforms undertaken in this field during the past few years.

Until the 1990s, public pensions became more generous, both in terms of the amounts paid as well as in terms of the period that could be enjoyed in retirement. Facing severe demographic changes, securing the long-term sustainability of pension systems became an important issue. Reforms enacted in this context often focused on defined contribution schemes and prefunding. They were thus designed to unfold their positive effect on sustainability in the medium to long run. However, in the course of the financial crisis starting in 2008, many European countries faced large budget deficits and were pressured severely. They were forced to enact reforms with short-term effects. Thus the focus on pension reforms shifted to measures like raising the pensionable age, restricting access to early retirement options or cutting pension indexation. Often these reforms did not grant generous grandfathering regulations but rather applied to current pensioners as well. Furthermore, these reforms reinforced the link between retirement benefits and labour market outcomes. Employability and chances to find and hold a job providing sufficient and secure income will thus become more important in the future. Reaching this goal may be easier for some parts of the population than for others. However, the Generational Accounting analysis does not account for these kinds of distributional issues.

Besides pension reforms enacted during the crisis, protecting people from old-age poverty and securing a decent living standard is and will remain a genuine task of public pension policy. However, these reform measures nicely illustrate the trade-off which may occur between adequacy and sustainability. To provide adequate pensions, increasing benefit levels may become necessary at some time in the future. Guarantee of income security in old age and protection against poverty might be difficult, if lowering benefits was the only way to ensure fiscal sustainability. There may not only be a trade-off between adequacy and sustainability, but the two goals may also be intertwined. Inadequate pension benefits will harm long-term financial sustainability as earlier or later policy reversals will become necessary. Thus an appropriate balance between adequacy and sustainability should be pursued.

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General assumptions and data description

Presumed life expectancy determines the duration of payment of pension annuities. Therefore it is a main input factor for the assessment of fiscal sustainability. Our assumptions on the future development of life expectancy are based on the demographic projection of Eurostat, EUROPOP2010.[49] This guarantees a harmonised set of assumptions for cross-country comparison. Data on future fertility rates and migration development are also taken from EUROPOP2010.

Expected wage growth considerably determines the level of future pension benefits, as all three schemes incorporate this figure both in the adjustment of accrued pension rights and in the indexation of pension benefits. In recent years wage growth was relatively heterogeneous across the three countries. We will consider these heterogeneous wage growth paths in our calculations and apply the productivity assumptions of the Ageing Working Group[50] (AWG).[51] Thereby, it is assumed that wages grow in line with labour productivity per hour. For Norway, this means that for the next decade wage growth will amount to 1.7%, while from 2025 on, this figure will fall to 1.5%. In Germany, wage growth started at 0.9% in 2010 and is predicted to rise slowly until it reaches the target value of 1.5% in 2025. Figures are projected to be much higher in Poland. Starting from 2.5% in 2010, 2.9% was predicted to be reached in 2015. Hereafter, wage growth will slow down, albeit on a very smooth path, so that it will still amount to 2.0% by 2045. Only in 2060 will the 1.5% mark be reached.

When it comes to choosing the interest rate, we also follow the AWG and apply a 3% interest rate in real terms, which reflects more or less the average bond yields of past decades.

While the AWG focuses on future pension expenditure, we extend this perspective by incorporating the revenue side in our calculations as well. For that reason, we use age- and gender-specific contribution profiles, which are weighted with our demographic projections and adapted to economic forecasts. Furthermore, we take into account that in Norway, for example, there are no specific pension contributions and that often a proportion of pension expenditure is financed via the tax revenues of the general government. Usually, selected non-contributory periods, such as times of child care or unemployment, are credited in the benefit formula and funded by tax inflows into the pension scheme budget. Therefore we additionally estimate future tax payments – assuming that these expenses are covered by revenues from value added tax, as the value added tax is levied in every country and has a very broad tax base.

The above section, which described the institutional settings, showed that in each of the three countries important reforms took place regarding the retirement age. While in Poland and Germany retirement age is legislated to rise, in Norway a fixed retirement age of 67 years has been abandoned in favour of a flexible regulation making retirement possible from 62 years on. Now, through this flexibility many persons could be tempted to retire as early as possible.[52] However, as the direct effect of early retirement for the pension system is covered by actuarially fair discounts, we abstract from possible early retirement. Effects on the labour market and therefore on taxes and transfers are thus not covered by our approach. For Poland and Germany, increases in retirement age are reflected in our calculations according to legislation.[53]

In the above description of institutional settings, pension reforms enacted until spring 2014 were taken into account to display as complete a picture as possible. For the sake of comparability between the three countries, the following results will however only entail reforms which had already become law by September 2011. At this point in time, the redesign of pension rules had largely

been completed in Norway and Germany. In Poland, important reforms were enacted in 2013. Thus, to be able to compare the Polish pension system to the other two systems, these reforms are included in the projections.

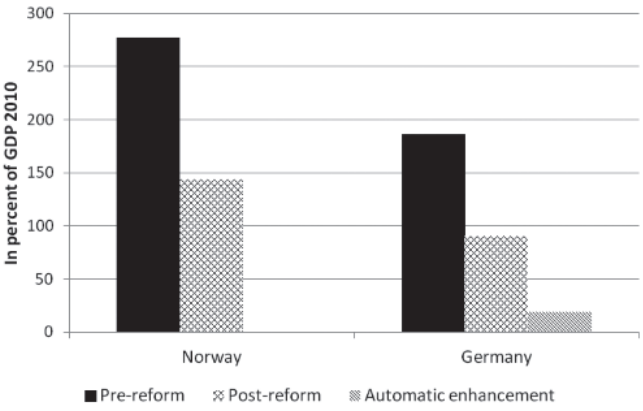
Sustainability gains of pension reforms in comparison

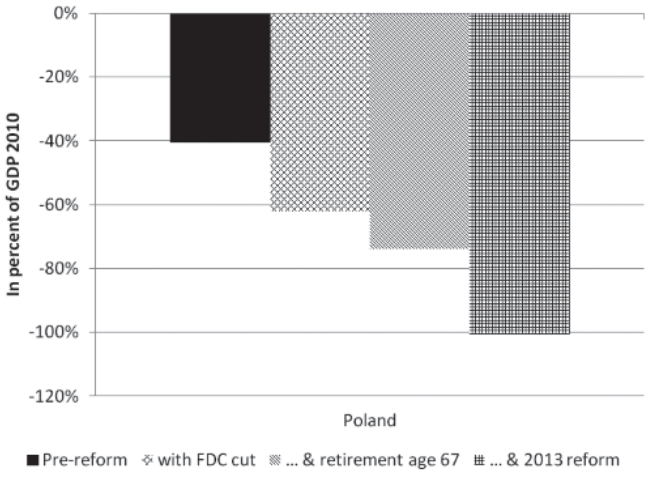
The concept of Sustainability Gaps can help to show the overall effect of pension reforms by comparing the Sustainability Gap of a country before and after a reform. If a reform reduces the Sustainability Gap, this means that it is beneficial from the perspective of intergenerational balance, as the burden which has to be borne by future generations shrinks. In the following, Sustainability Gaps before and after the reforms are estimated for Norway, Germany and Poland.

The overall impact

Before the intergenerational distribution of the burden induced by pension reforms is analysed, a glance at the overall impact of these reforms may be worthwhile. The large impact of the Norwegian pension reform is clearly visible in Figure 2. The Sustainability Gap was almost cut in half from 277.7% of GDP to 144%. This result holds if the assets from the Norwegian Government Pension Funds are taken into account. In 2010 these assets were worth 103.8% of GDP. However, in our calculations we do not include the value of the oil and gas reserves. In theory, one could also add the present value of oil and gas reserves, which would significantly decrease the Sustainability Gap. From this regard, Norwegian pension policy could probably even be labelled sustainable.[54] Germany started from a lower level of 186% of GDP and will arrive at 18.7% eventually. Here it is taken into account that imbalances can be offset by a rise in the contribution rate.[55] Without this possibility, the Sustainability Gap would amount to 90% of GDP instead of 18.7%. In contrast, the Polish system has more than closed the Sustainability Gap. Figures for Poland show that each new reform added to future surpluses. Eventually, these will amount to 100% of GDP. This is mainly because Poland currently faces a transition period from a pay-as-you-go system to a partially funded one. The transition is financed by current tax inflows projected for the future. Jabłonowski and Müller[56] show that the Sustainability Gap would however, be positive, if it was assumed that in the future only contribution payments have to finance pension benefits. Thus the negative Sustainability Gap shows that in the future tax inflows of the current amount will probably not be necessary. However, without any tax inflows, the reforms enacted cannot render a pension system sustainable.[57]

Figure 2: The effect of pension reforms on the Sustainability Gap[58]





Comparing post-reform Sustainability Gaps in Norway, Poland and Germany, the Norwegian pension policy does not seem to be sustainable, i.e. it seems as if in Norway future generations will have to bear a larger burden than current generations do. Yet, applying the concept of Sustainability Gaps, one has to bear in mind that cross-country comparison is applicable only to a limited extent, e.g. because of different demographic developments in each country. Demographic developments determine a country's future economic power and thus the ability to pay debts. For countries with increasing population numbers (Norway) the economic power differs from countries with declining population numbers (Germany and Poland).[59]

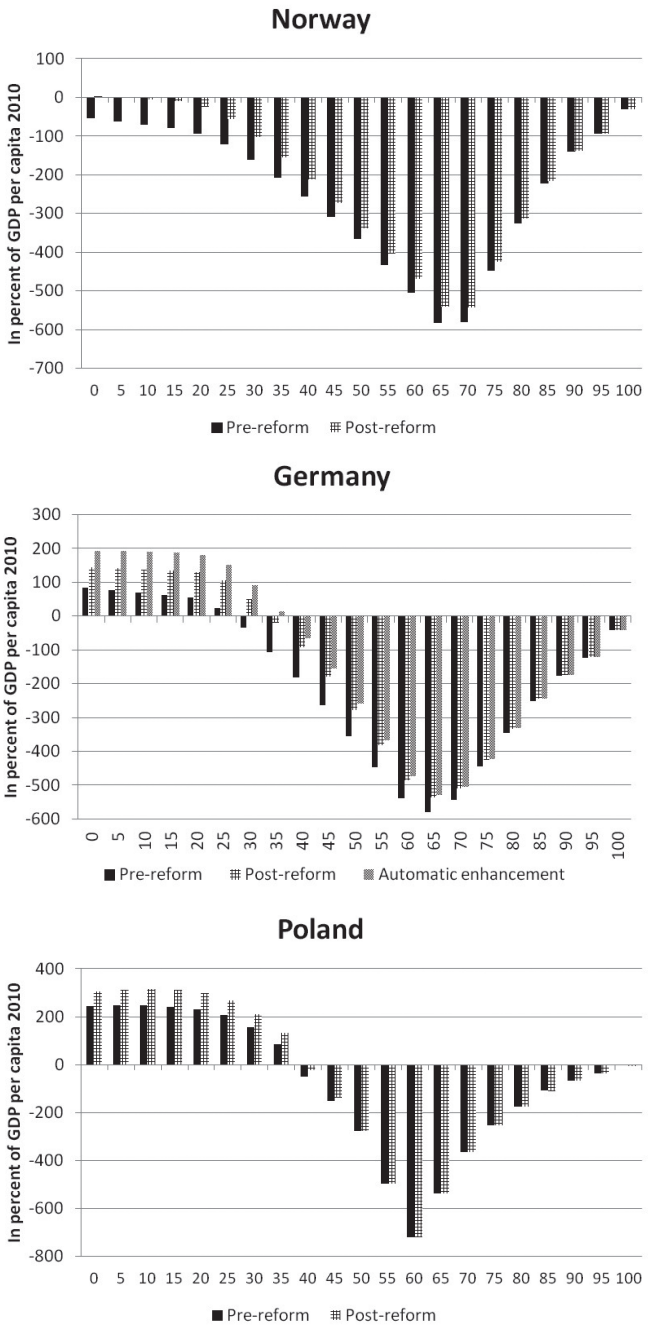
Demographic developments determine a country's future economic power and thus the ability to pay debts.

However, insofar as populations grow mainly due to migration, the integration of immigrants is crucial for the impact of migration on the pension system's sustainability. For example, Frassi et al.[60] show for Italy that the Sustainability Gap can be closed with the help of immigration if integration is successful. In contrast, Bahnsen et al.[61] show that forced migration to Germany in 2015 had a negative impact on the overall Sustainability Gap.[62]

The impact of pension reforms on intergenerational burden-sharing can be made visible through Generational Accounts. They set aggregate remaining lifetime net payments in relation to the size of a corresponding cohort. Figure 3 shows Generational Accounts before and after the pension reforms for Norway, Germany and Poland. The sinusoidal pattern that can be observed in the German and the Polish figure is very common in countries with strong pay-as-you-go systems. The younger generations, up to the age of 35, finance the older generations. In the Norwegian figure, Generational Accounts are only positive for very young cohorts close to the newborns. This means that in the course of their remaining life cycle almost everyone will receive more pension benefits than they will contribute to finance the system.

The comparison shows that in Norway and Germany, almost every cohort has to contribute to the reduction of the Sustainability Gap. In Poland, younger cohorts have to contribute while older ones do not. Thus, from the perspective of intergenerational balance, it seems as if the reforms in Germany and Norway were more equalised than in Poland.

Figure 3: Generational accounts before and after the pension reforms[63]



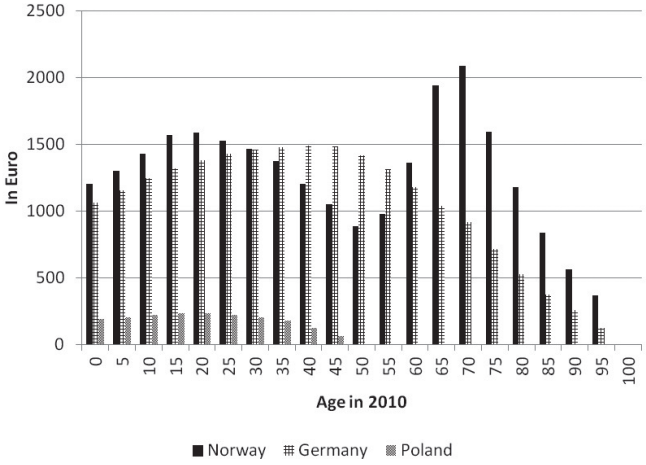
As Generational Accounts are strictly forward-looking, a comparison (of Generational Accounts) for living generations is not possible. Thus, for a thorough analysis of intergenerational balance, another indicator is necessary.

Who bears the burden of reforms?

Using the method of Generational Accounting can help to make intergenerational distributional effects of pension reforms visible. This is done in a first step by calculating Generational Accounts before and after a reform for every single cohort. Secondly, for a comparison between cohorts, the resulting differences in Generational Accounts before and after a reform are expressed as annuities per cohorts. Thus it can be shown which cohort bears the largest burden of a particular pension reform. For example, the Norwegian newborns have a close to zero Generational Account in the new system. This means that, over their life cycle, taxes paid and transfers received will neutralise. In the old system, they received a significant net transfer from the pension system. Thus the burden analysis shows that the newborns contribute significantly to reducing the Sustainability Gap of the pension system. The results of this burden analysis are shown in Figure 4.

Using the method of Generational Accounting can help to make intergenerational distributional effects of pension reforms visible. This is done in a first step by calculating Generational Accounts before and after a reform for every single cohort.

Figure 4: Induced burden of pension reforms per cohort in annuities[64]



In the Norwegian case, the burden of cohorts aged 65 and 70 catches the eye. It is relatively high and it is the largest of all cohorts. Here, the impact of a change in indexation rules is clearly visible.[65] Thus, for the Norwegian case, the suspicion does not hold that pension policy favouring current beneficiaries is enacted at the expense of younger generations. In contrast, cohorts approaching retirement bear the smallest burden. This pattern has different reasons. Firstly, the transition period protects generations still working but close to retirement age from the full effect of the longevity adjustment factor.[66] Those with 47 years of age are the first fully affected cohort. Nevertheless, they are better-off than their older counterparts, as discounting reduces their losses in present value. Younger cohorts are also worse off. This is due to the increasing life expectancy of these cohorts. In the old pension system, increasing life expectancy meant increasing benefits in present value terms. The linking of benefits to life expectancy, as in the new system, reverses this gain into a loss.[67]

As regards Germany, the burden is distributed more equally across the generations. The particularly large cohorts (the baby boomers), in 2010 aged around 50 years, bear a larger part of the burden than their Norwegian counterparts. On the other hand, in Norway pensioners contribute to bearing the burden to a larger extent than in Germany. German pension reforms mostly affected younger cohorts and protected those who were already retired. In the Polish case, figures are much smaller due to the fact that the pension system is actuarially quite fair. Recent reforms have raised contributions but at the same time, accrued pension rights went up as well.

Overall, Figure 4 shows that the burden induced by pension reforms in the three countries considered is distributed differently. In Norway current pensioners bear quite a large share of the burden. In contrast, pension policy seems to favour current

beneficiaries at the expense of younger generations in Poland and Germany.

Conclusion and outlook

In this paper we applied the method of Generational Accounting, which can reveal whether today's government policy burdens future generations with a heavier load than current generations. Thus, with this focus on measuring intergenerational balance, we approached the vast field of intergenerational justice. We analysed pay-as-you-go pension systems and their reforms, as these systems by design chain different generations through rights and duties.

> In Norway current pensioners bear quite a large share of the burden. In contrast, pension policy seems to favour current beneficiaries at the expense of younger generations in Poland and Germany.

Our results showed that first of all, in the three countries considered, pension reforms could reduce the Sustainability Gap. This means that pension systems became more balanced in an intergenerational sense as the implicit debt which has to be paid (or at least serviced) by future generations was reduced. A more thorough analysis revealed that the burden of pension reforms is shared differently in the three countries. In Norway current pensioners also have to contribute to enhancing the financial sustainability of the pension system. In contrast, Poland and Germany seem to protect current pensioners at the expense of younger generations.

However, we also pointed out that Generational Accounting is not able to take into account the important issue of adequacy. When it comes to pension reforms, sustainability is an important constraint, especially regarding intergenerational fairness. While sustainability can be measured by Generational Accounting, adequacy cannot. However, the latter concept is also important, as at least in democratic societies, fiscal sustainability alone is not sufficient for a sustainable pension system. Without acceptable adequacy, the pension system is not politically viable, as the median voter will become older and therefore make adequate pensions a political priority.[68] Therefore, while fiscal sustainability may be a helpful yardstick to establish sensible policies, it is important not to lose sight of adequacy.

In our case studies, with Poland as an example we were able to show that fiscal sustainability might be achieved at a high price. Recent pension reforms have led to financially sound systems, but at the same time it is questionable whether these systems will be able to grant adequate pension benefits in the future. Therefore the question arises: will reforms be enforced as they were legislated or will a governmental intervention become necessary? Political pressure on pension systems is already high and it can be guessed that it will rather increase than decrease in the future.[69] Today it is already apparent that resisting this pressure is not always what politicians want. The case of Germany can serve as an example here: after more than a decade of exemplary pension reforms, the Merkel government decided to take a step back by re-introducing early-retirement channels. The situation is even more severe in Poland, where large parts of the pension reform have been withdrawn.

The success of pension reforms 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 might be helpful to create a pension system that is not only sustainable and guarantees adequate benefits but is also politically stable.

> The success of pension reforms is highly dependent on whether people accept them and adapt to them or not.

The diversification of risks can support the overall stability of old-age income provision. It can be reached by establishing a multi-pillar system of old-age income.[70] In the countries considered here, an expansion to more than one pillar was part of recent reforms. Nevertheless, it should be kept in mind that second and third pillars can only cushion reductions in public pension systems if they cover as many parts of the population as these systems do. In putting more weight on second and third pillars, politicians have to make sure that pension provision granted by these pillars is affordable for as large a part of the population as possible. This holds especially for those who would be exposed to the risk of being poor by relying on public pensions only. In the end, the question boils down to the appropriate mixture of both pay-as-you-go and funded parts of old-age provision. In our mind, to abolish public pension systems altogether would for sure not be intergenerationally justifiable. In the end, to have real sustainable reform, sustainability alone is the necessary (while adequacy being the sufficient) condition.

Our results show that while it may be impossible to have a numerical (hence positive) measurement of intergenerational justice, the societal debate about such questions is more than ever important. Despite all its limitations, the method of Generational Accounting can contribute to this debate by revealing whether current policy is intergenerationally balanced in a sense that it does not load a heavier burden on future generations than on current ones. Additionally, it can be shown which generation has to bear the largest share of reform-induced burdens. Therefore Generational Accounting may be a valuable instrument to assess the merits and downsides of different policy alternatives. However, for a comprehensive picture, it has to be complemented by other assessments.

Notes

1 We are grateful to Katharina Saunders, Stefan Seuffert and three anonymous reviewers for valuable comments.

2 Hardach 2006: 5 even supposes that the focus of distributional issues will be on generations in the 21st century (having been on class and gender in previous centuries).

3 Norwegian Ministry of Finance 2017: 9.

4 For an overview see Tremmel 2008 and especially Tremmel 2012.

5 Rawls 2001: 160.

6 For a more detailed discussion, see Hüther 2008.

7 Börsch-Supan 2003: 224, own translation.

8 See Vanhuysse 2013.

9 See Leach/Broeks/Østensvik/Kingman 2016.

10 Auerbach/Kotlikoff/Leibfritz 1999: 4.

11 This argumentation follows Börsch-Supan 2003: 225.

12 Auerbach/Kotlikoff/Leibfritz 1999: 3.

13 Auerbach/Kotlikoff/Leibfritz 1999: 6.

14 See Directorate-General for Employment, Social Affairs and Inclusion and Social Protection Committee 2015. Pension expenditure also enters both the European Intergenerational Fair-

ness Index and the Intergenerational Justice Index.
15 Hardach 2006 provides a comprehensive insight into the historical development of the generational contract in Germany.
16 Thereby, Generational Accounting contributed substantially to unveil this.
17 Source: EUROPOP2010, own illustration.
18 As forecasts about migration are highly speculative, this factor is not looked at in detail in the subsequent estimations. For the assumptions on migration applied later in our calculations see the corresponding section below.
19 Data from Eurostat database 2014, table tsdde230.
20 Source: own calculation based on EUROPOP2010
21 For a more detailed description see Pedersen 2012.
22 As the reformed pension system has been in operation since 2011 only, the former system is still quite important. Persons born in 1953 and earlier are entirely covered by the former system. For persons born in 1963 and later the new system applies; those born in between are covered by both systems.
23 Besides these components of the public pension system, about 50% of all private sector employees are covered by the so-called AFP-arrangement, which from 2011 on is a lifetime top-up of the public earnings-related pension.
24 A detailed description of the NDC system in Poland can be found in Chlón-Dominczak/Góra 2006.
25 This part of the pension system is often referred to as the Funded Defined Contribution (FDC) part.
26 Nevertheless, the reform leaves special privileges granted in past decades unchanged, e.g. to miners, teachers or pre-retirement beneficiaries.
27 A detailed description of the German pension system can be found in Börsch-Supan/Wilke 2006.
28 However, this reform is not taken into account in the following calculations.
29 Source: own illustration.
30 The following two sections draw heavily on Hagist 2008.
31 Kotlikoff 1999: 10.
32 See Auerbach/Gokhale/Kotlikoff 1994, 1992 and 1991. For a detailed and more formal description see Hagist/Raffelhüschen/Risa/Vårdal 2013. For the demographic projections, we use Bonin 2001's projection program which is based on the component method proposed by Leslie 1945. The standard procedure has been extended to distinguish between genders and to incorporate immigration. Parameters like life expectancy and fertility change for every cohort according to the general trend.
33 Benz/Fetzer 2006 show that other assessment techniques use different time horizons, for example until one specific year or over a certain period of time. However, as these choices are rather arbitrary and, therefore, at least in theory, the intertemporal budget constraint is not binding, we opt for the strict interpretation of Generational Accounting according to Raffelhüschen 1999.
34 In case public finances in general are assessed, all different types of taxes, contributions and transfers are considered.
35 However, in some countries – as for example Norway – there are large funds instead of a net debt. The Norwegian Government Pension Fund has a wide influence on pension system finances.
36 Auerbach/Kotlikoff 1999: 31 explain that the intertemporal budget constraint does not imply that debt has to be paid off at any date in the future. Rather, it requires debt to grow at a rate smaller than the discount rate. Thus deficits can exist in the long run. However, they have to be serviced.
37 Tepe/Vanhuysse 2012 point to the important issue of timing reforms. Therefore, probably, also the variety of less-sensitive indicators towards economic variables may have different political sensitivity.
38 See Benz/Fetzer 2006.
39 See Reinhart/Rogoff 2010.
40 The so-called life-cycle theory was established by Modigliani/Brumberg 1954.
41 Empirical analyses were for example conducted by Mello/Kongsrud/Price 2004, Reitschuler/Cuaresma 2004 and Kotlikoff 2004.
42 This was put forward by Börsch-Supan 2001.
43 This critique is extensively debated in CBO 1995.
44 See Fetzer 2006.
45 An extensive review of Generational Accounting can be found in Haveman 1994, where the issue of constant profiles is also discussed.
46 A detailed description of National Transfer Accounts can be found in United Nations 2012 and d'Albis/Moosa 2015. Hsieh/Tung 2016 use National Transfer Accounts within a Generational Accounting framework to assess the intergenerational burden-sharing of the Taiwanese public pension system. Gál/Vanhuysse/Vargha 2018 show that as soon as private intergenerational transfers of both cash and time are accounted for, children actually receive more per capita resources than the elderly.
47 It can also be mentioned that the base-year's budget might be influenced by business cycle effects. This might have an important effect, as Generational Accounting analysis starts from the base-year and projects base-year values into the future. However, Benz/Hagist 2007 could show that the effect is rather small.
48 This section draws on Directorate-General for Employment, Social Affairs and Inclusion and Social Protection Committee 2015.
49 For more details see Eurostat 2011.
50 The Ageing Working Group was commissioned by the Economic Policy Committee of the European Union to improve the quantitative assessment of the long-term sustainability of public finances. In this regard the AWG published the Ageing Report in 2009, 2012 and 2015. The long-term projections underlying the Ageing Report assume that in all countries labour productivity growth will converge to 1.5% in the long run. To model the convergence path, it is assumed that countries where GDP per capita is low at present will display a higher potential for catching up. As the GDP per capita is currently below the EU average in Poland, the catching-up process is modelled via higher growth rates in the near future. For more details see Directorate-General for Economic and Financial Affairs and Ageing Working Group 2011: 121-128.
51 For the country-specific assumptions see Directorate-General for Economic and Financial Affairs and Ageing Working Group 2012.
52 Indeed, Brinch/Vestad/Zweimüller 2015 show that due to the Norwegian pension reform claiming pensions at the age of 62 became more likely.
53 For Germany, we included the step-by-step increment of the retirement age up to 67 but not the most recent reforms which

introduced exceptions for long-term employees and higher payments for specific groups like mothers. For details about these reforms, and their impact on fiscal sustainability, see Hagist/Moog/Raffelhüschen 2014.

54 For a calculation incorporating the present value of oil and gas reserves see Hagist/Raffelhüschen/Risa/Vårdal 2013.

55 In the German case, a possible increase in the contribution rate is taken into account, because it is restricted by law that the contribution rate is allowed to grow at most up to 22% by 2030. Taking this increase into account can be viewed as a clearly defined benchmark scenario. In other countries, for example in Norway, such rules do not exist. Including general tax increases would be arbitrary as regards the amount of the increase. Therefore we do not take account of tax increases in situations in which they are not clearly defined in advance.

56 See Jabłonowski/Müller 2014: 26.

57 Vanhuysse 2013: 27 shows that current Polish policy strongly favours elderly cohorts. However, our long-term analysis shows that through the far-reaching reforms enacted, at least in the pension system, intergenerational balance can be achieved.

58 Source: own calculations.

59 There is always the question whether countries can outgrow their fiscal sustainability problems. As Holmøy 2006 shows this depends on the wage dependency of the expenditure side compared to the revenue side of public coffers. In our case, pension benefits grow in most cases less than wages, which our model takes into account. Changing the level of wage growth only changes the results qualitatively if the discount rate is chosen below the growth rate. However, this is a dynamic inefficiency and therefore outgrowing the pension problem purely is not possible.

60 See Frassi/Hagist/Pammolli 2017.

61 See Bahnsen/Manthei/Raffelhüschen 2016.

62 Unfortunately, the degree of integration could not be included in the calculations of this paper. However, this would have been worthwhile especially in the cases of Norway and Poland. First of all, these two countries display very different migration patterns (as explained above). Second, migrants from Poland form by far the most important group of foreigners in Norway. Thus there is considerable room for future research.

63 There is always the question whether countries can outgrow their fiscal sustainability problems. As Holmøy 2006 shows this depends on the wage dependency of the expenditure side compared to the revenue side of public coffers. In our case, pension benefits grow in most cases less than wages, which our model takes into account. Changing the level of wage growth only changes the results qualitatively if the discount rate is chosen below the growth rate. However, this is a dynamic inefficiency and therefore outgrowing the pension problem purely is not possible.

64 Source: own calculations.

65 Indexing pensions in payment to a rate lower than wage growth leads to benefit losses, especially for those who are at the beginning of retirement because they face the longest period of benefits.

66 Why it is exactly these cohorts who were protected most, would be an interesting analysis on its own.

67 We model increasing life expectancy until 2060, which is why there is again a turn in the burden for the cohorts between 15 and 20 years of age.

68 In the sense that in the future a majority will still be in favour of the system.

69 Actually, Tepe/Vanhuysse 2012 demonstrate that politicians in ageing societies seem rather to opt for medium-size pension reforms. Thus they seem to try avoiding larger reforms which would cause more opposition from the electorate and are therefore politically riskier.

70 A detailed analysis of the different risks in pay-as-you-go and funded pension pillars and an estimation of the optimal mix of these two pillars is e.g. provided in Börsch-Supan 2005, Lindbeck/Persson 2003 and Anders/Groneck 2017.

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Economic Sustainability and Intergenerational Fairness: A New Taxonomy of Indicators

by Róbert I. Gál and Judit Monostori

Abstract: The aim of this paper is to facilitate informed choice about indicators of economic sustainability and intergenerational fairness and decisions about their uses. We focus on four issues. First, we found that the same type of indicator measured at different levels – such as the general government, the (market) economy or the total economy, which includes both the market economy and the household economy – often leads to different conclusions. Second, sustainability analysis is frequently built on exogenously set age limits even though it is obvious that old age does not everywhere start at age 65; it did not always start there where it does today; and most likely it will not start there in the future. Third, we use our taxonomy of more than 80 indicators to spot holes, shortcomings and absences. Fourth, we show some structural differences between indicators of sustainability and fairness.

Keywords*: intergenerational indicators, economic sustainability, intergenerational fairness, National*

Introduction

Economic sustainability and intergenerational fairness are closely related issues.[1] The problem of sustainability, which includes the long-term affordability of public programmes such as health care and pensions but in more general terms the subsistence of current consumption patterns,[2] came to the fore as a result of the changing age composition of society during the second demographic transition, which is characterised by the combination of low fertility and increasing life expectancy. Ageing societies face problems of financing their large intergenerational transfer programmes. Alternatively, they have to come to terms with the fact that currently young and future cohorts must accept significantly worse conditions, which translates the problem of sustainability into the terms of intergenerational fairness. The connection between the two concepts is intuitive even though both sustainability and intergenerational fairness have various definitions and reference points. Many of the indicators measuring the two interlinked issues reflect one or the other such reference points.

As population ageing is becoming a growing concern, a number of new indicators have been suggested by the research community. Currently the problem is not that we do not have indicators describing the ageing process and its consequences; the problem is we have too many and that they are frequently misinterpreted. Besides, we possibly do not have the most meaningful of them yet.

Surveying the related literature, we have collected over 80 indicators of which we will refer only to a few in this paper; further details can be found in our report.[3] This is not the first such collection. The growing number of measurement tools has also led to efforts to survey them. Robert Fenge and Martin Werding bring together indicators measuring the consequences of population ageing for the public pension system and the general government.[4] They organise their findings in two dimensions: by scope (indica-

tors applying to specific public programmes, such as the pension system, or the entire general government) and by level (whether the concept applies at the micro-level, and as such affects individual decisions, or at the macro-level). We explicitly use and extend the "scope" dimension of their taxonomy. Jeroen Spijker goes beyond the strict focus on the public sector and differentiates among indicators by the domains covered, such as purely demographic, purely economic, demographic and economic-related, health- and disability-related and based on human capital.[5] Our subcategories in the cross-sectional partitioning owe much to his suggestions.[6]

> Currently the problem is not that we do not have indicators describing the ageing process and its consequences; the problem is we have too many and that they are frequently misinterpreted.

We created a notation system and translated each indicator in order to make them comparable. We established a taxonomy to find overlaps, connections and families of indicators as well as to discover holes in the indicator system and facilitate the invention of new indicators. The structure of the taxonomy is presented in Table 1. We include only those indicators that we describe in the paper. The comprehensive classification table completed with formal definitions, occasional comments and references can be found in the online Appendix (see igjr.org).

This paper is structured so as to focus on some of our conclusions. First, we show that the scope of an indicator matters. Conclusions of a social process on sustainability and intergenerational fairness can be quite different if we limit the analysis to the pension system or extend it to the entire economy or beyond. Secondly, we show that the indicators in question are based all too often on ad hoc partitioning of the life cycle, such as old age defined as a stage of life starting at age 65. Instead, we will show indicators that mitigate the ad hoc nature of partitioning by endogenising it or eliminating it altogether by parametrising the entire age distribution. Thirdly, we found that the classification table helps inventing new indicators that can be relevant. Fourthly, we will differentiate between indicators of sustainability and fairness.

Table 1: A taxonomy of indicators of economic sustainability and intergenerational fairness[7]

	Cross-sectional				**Long time-horizon**		
	Partitioning of the population by			**Parametric characterisation**	**Cohort**		**Population**
	Chronological age	**+ Other non-economic characteristics**	**+ Other incl. economic characteristics**		**Remaining lifetime**	**Entire lifetime**	
Specific public programmes	old-age dependency ratio			pension support ratio; turnover duration	contribution wealth; pension wealth	net transfer rate	contribution wealth; implicit pension debt; pension wealth; *implicit education capital*
General government				fiscal support ratio	human capital investment gap	generational imbalance	sustainability gap
Market economy				economic support ratio; arrow diagram; Silver Club			*consumption deficit*
Total economy				total support ratio			

Scope

The first dimension of our taxonomy is the scope or measurement level of the indicator.

We distinguish four such levels, those of

- specific public programmes, such as education, health care or pensions
- the general government[8]
- the market ecownomy, and
- the total economy, which combines the market economy and the household economy.[9]

Below we present two examples for the use of the "scope" dimension but we will also refer to its potential later. Both examples demonstrate that a population process can spell different consequences on sustainability in various sectors of the economy or society. Also, it can shed new light on widely held views on intergenerational fairness.

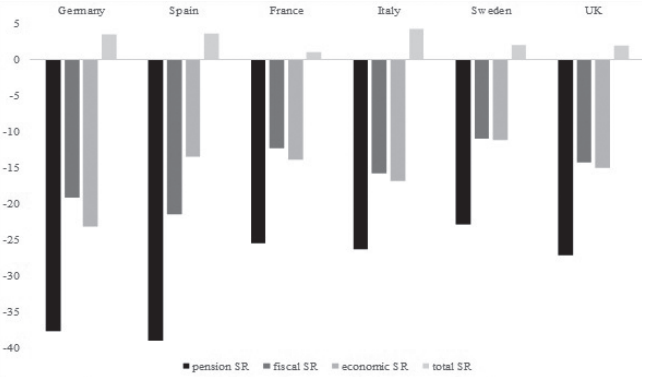
The "scope" dimension can be applied to establish families of related indicators such as the group of support ratios. All members of this indicator family include the age distribution of the population but in addition to that they also take into account economic characteristics. The *fiscal support ratio*[10] weights the demographic age distribution by the age profiles of benefits received from, and taxes paid to, the general government respectively, and calculates the ratio between the resulting numbers of effective taxpayers and effective beneficiaries. The *pension support ratio* does the same but it is limited to benefits and contributions of the public pay-as-you-go pension system. In contrast, the *economic support ratio*[11] extends the scope to the entire market economy and applies per capita age-profiles of labour income and consumption as weights. Finally, the *total support ratio* extends the economic support ratio to include age profiles of unpaid household labour produced and consumed.

> A population process can spell different consequences on sustainability in various sectors of the economy or society.

The rationale of connecting related indicators or extending the scope of analysis from the pension system to the general government to the market economy and finally to the total economy is that sustainability conclusions can turn out to be quite different at the various levels. In Figure 1 we demonstrate for a sample of selected countries that the dramatic unsustainability in the pension system can go hand in hand with modest or even mild sustainability problems in the general government and the economy in particular if the household economy is also taken into account. The columns in the figure represent percentage changes in the respective support ratios if the 2010 per capita age profiles of inflows and outflows mentioned above are combined with the age distribution of the population in 2060.

The countries in Figure 1 were selected so as to include the five largest nations in the EU and at least one representative of all European welfare regimes.[12] In each case, the pension support ratio, that is the rate of the number of effective contributors to the number of effective pensioners, would take a major negative drop of between 23% in Sweden and 39% in Spain should current per capita age profiles of contributions and benefits still prevail in 2060. This implies serious sustainability problems. However, the population pressure on the general government is less severe (the fiscal support ratio would decrease between 11% in Sweden and 22% in Spain), because the beneficiaries of the general government are less old and its contributors are older than those of the pension system. Consequences on the economic support ratio would be broadly comparable. More strikingly, if the total economy is considered – which includes the market economy recorded in the National Accounts as well as the household economy that is the output of unpaid household labour – population ageing would not create any negative effect at all on the support ratio. The age profile of consumption is so much younger, and that of labour is so much older in the household economy[13] that the resulting decrease in consumption and growth in labour would compensate for the imbalances of the market economy.[14]

Figure 1: Changes in various support ratios if per capita age profiles of the public sector and the economy in 2010 are applied to the expected 2060 age distribution in selected European populations (%)[15, 16]



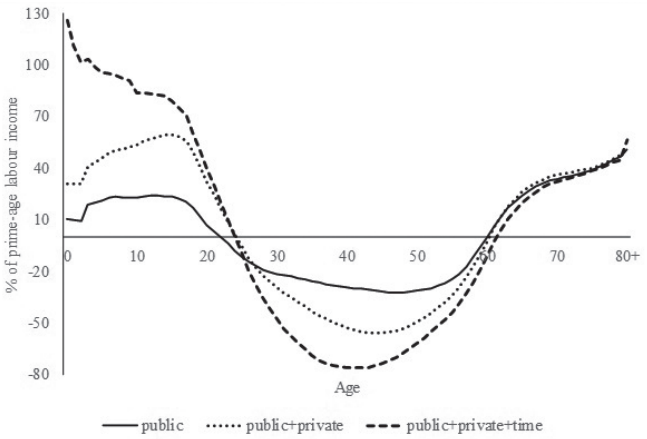
In short, population ageing affects the pension (and health care) systems seriously and these institutions require major reforms, but societies on the whole are exposed to smaller pressure and consequently they have the necessary resources to mobilise when confronted with the later phases of the demographic transition. Such findings based on data-intensive but simple indicators are in line with results produced by more complex models. Ronald Lee, Andrew Mason and their co-authors[17] show that intergenerational reallocations of different scope, such as the general government or the market economy, imply different levels of optimal fertility, and although current fertility levels are insufficient to maintain inter-age transfers conveyed by government in industrialised countries, they are not far from what is required for maintaining current consumption levels.

Our other example for the merits of using families of indicators based on the variation of scope rather than single indicators is the pro-elderly bias in public spending. As it has been demonstrated, (1) currently older persons receive more public transfers than in past decades; (2) the elderly population receive more than children; and (3) the elderly/children public transfer ratio has been increasing.[18] However, these observations, while true, ignore other transfers and are limited to the public sector. If the scope of measurement is expanded to the level of the market economy and further to the total economy the conclusion reverses. In Figure 2 we show per capita values of three transfer packages. The curves represent 17 European countries covering 85% of the EU population. For the sake of cross-country comparability, values are rescaled by the per capita labour income of the 30–49 year-old population. The first package is net public transfers (taxes paid, less transfers and public services received) at the level of the general government. The shape of the continuous curve confirms pro-elderly bias: the elderly population gets significantly higher per capita net transfers through public channels than children do. However, if net private, mostly intra-familial transfers of market goods and services are taken into account – that is, the scope is extended to the market economy – the pro-elderly bias disappears (see the dotted line in Figure 2). Finally, when net transfers of the value of unpaid household labour are also included – that is, the analysis is extended to the level of the total economy – children receive more transfers per capita than the elderly (dashed line in Figure 2). The pattern is repeated in each of the 17 sampled countries.

Children receive most of their transfers from their family in forms unrecorded by current statistical standards and consequently invisible for much of the analysis of intergenerational relations, whereas the old population is supported through well documented, mostly public, channels.

In short, as first noted by Gál, Vanhuysse and Vargha,[19] children receive more, not less, transfers per capita than the elderly population. The "age-bias" of public transfers – a child/elderly ratio of 0.4 measured in terms of per capita transfers – balances out at the level of the national economy (taking a value of 1.1), and reverses (with the ratio of 2.4) if transfers of the household economy are also taken into account.[20] However, children receive most of their transfers from their family in forms unrecorded by current statistical standards and consequently invisible for much of the analysis of intergenerational relations, whereas the old population is supported through well documented, mostly public, channels.[21]

Figure 2: Per capita values of various transfer packages in the European Union[22, 23]



This result significantly modifies the one-sided narrative of intergenerational transfers as a sneaky grab for resources by the old. The frequent references on "gerontocracy" and the growing "grey

power" are limited to the statistically visible world of public transfers and largely ignore intra-familial transfers of cash and time. The more complete picture based on a family of related indicators is consistent with an alternative narrative of intergenerational developments. The growing public share of resources flowing to older persons may well have gone in parallel with increasing societal resources for the young. Higher public transfers to elderly recipients may turn out to be a form of compensation for lost private and time transfers mostly due to lower co-habitation levels with adult children. Notwithstanding elderly bias in public spending, the twentieth century may also have been the Century of the Child, as Ellen Key (1909) predicted at its start.[24]
We cannot address such questions at this stage. We only used the two examples to demonstrate that families of related indicators frequently can tell more about sustainability and fairness than single indicators and sometimes even question widely held perceptions. The quest for the best indicator may turn out to be the quest for the best family of indicators.

The frequent references on "gerontocracy" and the growing "grey power" are limited to the statistically visible world of public transfers and largely ignore intra-familial transfers of cash and time.

Partitioning versus parametric characterisation of age distributions

Support ratios are cross-sectional indicators (see Table 1), which take their values from one period of time, *t*. This *t* is not necessarily the current period: it can be in the past or in the future. As a matter of fact, cross-sectional indicators are frequently applied in projections. However, even if *t* takes place in the future, a cross-sectional indicator takes the value of one period at a time (or potentially a compound of two such measures) irrespective of where this period is in the timeline. In contrast, what we call long time-horizon indicators sum up information of the base period, *t*, as well as subsequent periods in one indicator. Whenever cross-sectional indicators are applied to characterise the future, they refer to the future. In contrast, long time-horizon indicators as present values include references to the future even when they are used to characterise the present. Cross-sectional indicators are central tendencies (medians or means), rates or subtractions whereas long time-horizon indicators are built on summations or integrals over a specified time period.

The shift from childhood to adult life or from working age to old age occurs at different ages across countries and changes over time.

Most cross-sectional indicators partition the age distribution and compare its sections with each other (in the first three columns of Table 1). This is the most populous group in our collection (even if not in Table 1, but see the online Appendix for details). The most frequently used partitioning is the triad of childhood, active or working age, and old age. All related indicators are based on some simple or more chiselled definition of the three life stages. Some of them cover part of the population such as the various beneficiaries/contributors (or benefits/contributions) ratios characterising pension systems. Others range over the entire population including children as well. Partitioning of the age distribution can be based purely on age but more sophisticated partitioning methods include other pieces of information. They can be monetary, but they can refer to other conditions such as health, level of education, labour market position or some institutional conditions as well.

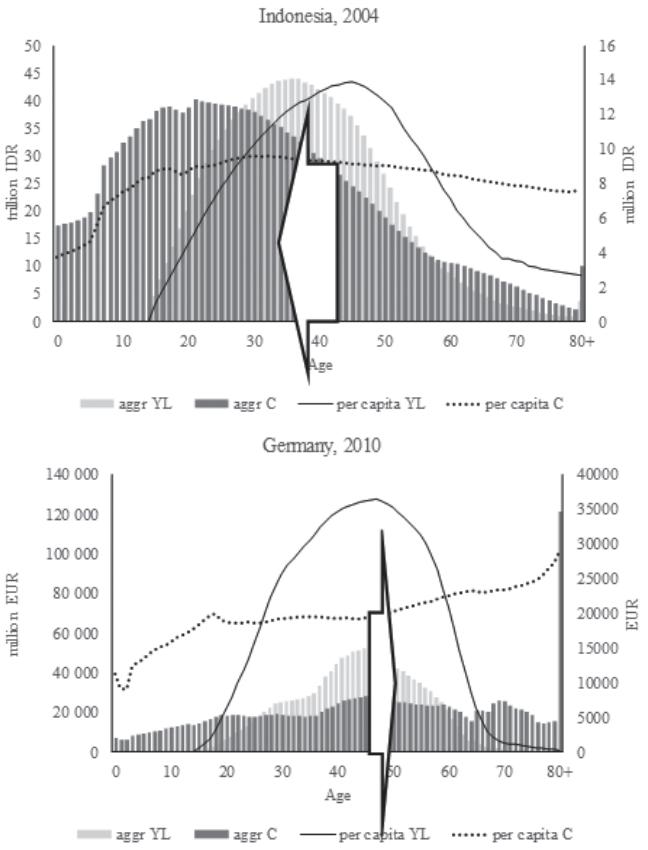
Partitioning in its most frequent form cuts the life cycle at externally given demarcation ages, such as 15 years as the age of becoming adult and 65 years as the age of growing old. Such a simplification eases cross-country comparisons or projections but also distorts the results. The shift from childhood to adult life or from working age to old age occurs at different ages across countries and changes over time. An old man in Africa is not necessarily old in Sweden; a 16 year-old woman could have been easily a housewife in ancient Rome but she would be considered a child in modern-day Italy.
In a series of papers Warren Sanderson and Sergei Scherbov overcome this problem by introducing the concept of characteristic age.[25] They offer a general framework that translates various characteristics of people to years of age. Such characteristics can vary over a wide range of frequently used measures of population ageing, including variants of remaining life expectancy, such as prospective old age thresholds for the entire population or various social groups (the average age of a social group at which their remaining life expectancy is a given threshold of years, usually 15 years) or the prospective median age (the age of a person in a population who sees as many people with higher and as many people with lower life expectancy than his/her own); survival probabilities, such as the probability of surviving the next five years; health conditions of the population as a whole (such as the proportion of self-reported good/bad health) or that of various social groups (such as the average hand-grip strength).
The translation procedure requires two characteristic schedules. Average chronological ages of various social groups in a fixed age-specific characteristic schedule are related to chronological ages, called alpha ages, in another, variable characteristic schedule. With some simplification, this re-mapping creates iso-age contours by selecting the age equivalents of chronological ages in the variable characteristic schedule. Fixed schedules can be as different as a pre-set remaining life expectancy (such as 15 years); some demographic characteristic of a reference group, such as one of the two sexes, a nation, a group with a given level of education or a group in a given year. Variable schedules can be cross-country differences; changes over time or differences by age within one social group.
Sanderson and Scherbov collect a number of striking examples. Whereas the 15-year prospective old age threshold rapidly increased between 1960 and 2010 in East Asia (by nearly 12 years in China and nearly 11 years in Japan), the mortality crisis in Russia resulted in a stagnation. In a more colloquial language, 66 was the new 54 in China; 73 was the new 62 in Japan; but 64 remained 64 in Russia if old age was defined as the age when the remaining life expectancy is 15 years. Another example is median-aged Mexicans who were older in 2010 as compared to 1960, but they were further away from their death in that their remaining life expectancy was longer than their counterparts' fifty years before. In a similar way, iso-age contours can be drawn by level of education or self-reported health. As Sanderson and Scherbov show, the gender difference in life expectancies vary much more by education in Eastern Europe than in Western Europe, so high-

ly educated Eastern Europeans become old more or less at the same age as Western Europeans but the demarcation line between working age and old age runs at a significantly lower age among poorly educated Eastern Europeans.

A society becomes a member of the Silver Club at the moment its Lee arrow changes direction and consumers grow older than producers.

Other cross-sectional indicators circumvent the problem of ad hoc partitioning by avoiding it altogether. Such indicators give a parametric characterisation of the entire age distribution by comprising information in one parameter, such as a weighted mean (column 4 in Table 1). Support ratios mentioned in the previous section belong in this group. Another example of this type is the *arrow diagram* sometimes called the Lee arrow after its inventor.[26] It is built on parametric characterisations of two related age profiles. It is the difference between the mean age of consumers weighted by the amount of their consumption and the mean age of workers weighted by their labour income. It takes the shape of an arrow in its graphical representation of intergenerational relations (see Figure 3). It has a direction (depending on whether consumers or workers are older), length (depending on the age difference) and width (the current amount of per capita consumption). If it is negative (in a graphical representation an arrow points to the left), consumers are younger than workers, or in a longitudinal interpretation consumption precedes production; if it is positive (the arrow points to the right), workers are younger than consumers and it is production that precedes consumption. For illustration we present a young and an old society, Indonesia and Germany, in Figure 3. In order to give the order of magnitude of the arrows we show consumption (C in the figure; shown by the dotted lines) and labour income (YL; by continuous lines) by age. Both are per capita values and measured on the right-hand axes of the panels. However, the direction of the arrow can only be derived from population-weighted values of consumption and labour income. They are presented as shaded areas and measured on the left-hand scales.

Figure 3: Per capita and aggregate labour income (YL) and consumption (C) by age and the resulting arrow diagram in a young and an old society[45]



The dominant effect in young societies is that consumers build up debts in order to finance their consumption. Such a debt can be an implicit or even informal intra-familial debt. In contrast, the dominant effect in an old society is that of saving and wealth accumulation. Robert Willis,[27] and in a more general setting Ronald Lee,[28] show that, assuming a stable population, the area of the arrow diagram gives an indication of the per capita demand for life-cycle wealth or, with some simplification, debt or wealth accumulation in the future. As such, the Lee arrow is a simple and powerful tool for sustainability analysis.

A direct application of the arrow diagram for population ageing is membership in the *Silver Club*.[29] A society becomes a member of the Silver Club at the moment its Lee arrow changes direction and consumers grow older than producers. In Table 2, we present the directions and lengths of the arrow diagram for selected European countries, the European Union as a whole, as well as other regions of the World. The names of Silver Club members are shown in bold.[30]

Table 2: Weighted mean ages of consumers and workers and the lengths and directions of the resulting Lee arrows[31, 32]

	mean age of consumer	mean age of worker	length and direction of the Lee arrow
Germany	46.7	43.9	2.7
Spain	42.3	42.0	0.3
France	43.3	42.2	1.1
Italy	45.1	43.8	1.3
Sweden	43.4	44.5	-1.1
UK	44.1	42.6	1.5
European Union	42.3	42.4	-0.1
US	41.8	44.0	-2.2
East Asia	36.8	40.5	-3.7
Latin America	33.9	40.0	-6.1
South and South East Asia	31.2	39.4	-8.2
Africa	26.1	39.5	-13.4

Silver Club membership signals an important stage of population ageing when the first demographic dividend is about to turn negative and the phase for harvesting a potential second dividend is about to open. The first dividend is a consequence of the temporarily growing proportion of working-age population just when rapid population growth stops and cohorts larger than the cohorts of their parents start to have fewer children. This period creates opportunities for higher labour supply (as child-raising does not demand so much work any longer) and for higher consumption and investments (as fewer children have to be raised by potentially more workers). This dividend is positive as long as the relatively large cohorts are in working age, and turns negative once they retire. However, there is a chance for a prolongation of growth. If the additional resources due to higher labour supply and less downward transfers to children are saved rather than consumed, a second dividend can be harvested. Silver Club membership sig-

nals this opportunity, which is, unlike the automatism of the first dividend, if not more than that, an opportunity. Its realisation depends on the quality of public policies, the reliability of the financial sector and the willingness of the public to save.

In this context, turnover duration is the difference between the average age of pensioners weighted by the amount of their benefits and the average age of contributors weighted by the amount of their contributions.

Another closely related indicator, called in pension economics the *turnover duration* of a pay-as-you-go scheme, is a counterpart of the Lee arrow with a narrower scope.[33] In this context, turnover duration is the difference between the average age of pensioners weighted by the amount of their benefits and the average age of contributors weighted by the amount of their contributions. The distance of the two weighted means indicates the average length of "maturation" of contributions in a notional account of a non-financial defined contribution system.[34] In other words it signals the average time that contributions "spend" in the "accumulation phase" in a notionally funded scheme. Multiplied by the period amount of contributions, it gives an indication of the accumulating stock of contributions of the system. Expressed in an alternative way, it reflects the amount of notional wealth held by the pension system. Differences between turnover durations reflect the variance in the underlying age distribution as well as in employment patterns. One of the potential applications of the indicators is the automatic balance mechanism of the indexation formula used in the Swedish public pension system.[35] The formula in question adjusts benefits of retirees and the notional wealth of contributors in an annual, incremental way in order to assure smooth and continuous adjustment to a sustainable path.

Absentees: missing companions of existing indicators

As shown in Table 1, the turnover duration, a cross-sectional indicator, is related to the *contribution wealth*, or the present value of future contributions of a pay-as-you-go system, which is an indicator with a time-horizon. They are two approaches to quantifying the same thing, a stock of wealth building up from a future stream of revenues. The turnover duration is based on stronger assumptions and as such applies no references to the future.[36] The contribution wealth even in its simplest form contains a discount factor. It is a constituent part of an increasingly popular sustainability indicator, the *implicit pension debt* (IPD).[37] This name refers to three related indicators. *Accrued-to-date liabilities* is the present value of future pensions based on eligibilities collected by plan members so far. It gives the cost of closing the system now. No new contributions are expected to be paid into the system, consequently no new eligibilities emerge. *Closed-system liabilities* is the present value of future benefits less the present value of future contributions (the contribution wealth introduced above) of plan members who have paid so far. This measure contains future contributions and new obligations arising from such future contributions. The imaginary institutional setting underlying this interpretation is closing the pension system for new entrants. Finally, *open-system liabilities* is the net of the two present values of future streams of benefits and contributions on condition that the system lasts forever.

The concept of IPD has become rather influential in recent years. It left the academic circles and the research community and it is on the way to becoming a standard statistical tool regularly published by official agencies. However, we are not aware of any calculations of its potential counterparts, concepts like an *implicit education capital* or *implicit health capital*. We added them to Table 1 but set them in italics as they have not been established yet. Both would quantify human capital that has been created and can be mobilised in the future to extend working lives and in this way counterbalance the implicit debt of a pay-as-you-go scheme. It is intuitive that investments in education and health have an impact on effective retirement age decades later. However, a budget-planning procedure armed with the IPD indicator but having no measures of implicit education capital and implicit health capital would give the red signal to additional investments in education or health care. The current versions of IPD reflect human capital investments only indirectly, in the form of an exogenously chosen growth rate of productivity, and so they do not reflect growth in the human capital base of the pension system induced by additional education or health spending. Clearly, an otherwise rich and useful indicator such as the IPD, employed in this way, would trigger wrong policies.

The concept of IPD has become rather influential in recent years. It left the academic circles and the research community and it is on the way to becoming a standard statistical tool regularly published by official agencies.

As the name suggests, IPD applies to a specific public programme. It can be generalised and defined with a larger scope. The equivalent of open-system liabilities at the level of the general government is called the *sustainability gap*.[38] It is the present value of expected aggregate future imbalances of the tax-transfer system and it is frequently applied as a by-product of generational accounting. We will briefly return to this below.

In principle, the sustainability gap can be further generalised at the level of the economy although we have not found reference to such an indicator in the literature. Nevertheless, an indicator with a related content could be invented. It would be a sort of accumulating *consumption deficit* defined as the difference between the present values of future consumption and future labour income (or potentially, future primary income, which also includes revenues from capital and property). It would give the amount of future consumption unfunded by labour (and, in the alternative definition, capital). This indicator is also set in italics in Table 1. The relationship between the consumption deficit and the arrow diagram of the previous section resembles the relationship mentioned above between the contribution wealth and the turnover duration, although the fact that consumers can be both younger and older than workers (the arrow diagram can change direction) – whereas contributors are always younger than beneficiaries – makes some differences. The consumption deficit with a content outlined above would be relevant in sustainability discussions and indirectly in intergenerational issues as well. A sizeable consumption deficit indicates that the life path of future generations will be different from that of currently living generations.

Calculations pointing to an indicator such as the one called here consumption deficit have been suggested. They differ in the way the consumption deficit is balanced. Eshan Khoman and Martin Weale[39] calculate the additional savings required in maintaining current consumption patterns in France, Italy, Spain and the UK. An alternative way of filling the gap is higher fertility. Ronald Lee,

Andrew Mason and their co-authors,[40] mentioned before, present the fertility rates required to reserve current consumption patterns in a sample of 40 countries. Both models can serve as a base for creating indicators related to the consumption deficit.

Sustainability versus fairness

In Table 1, we distinguished among long time-horizon indicators between those referring to a cohort or the entire population. Conclusions based on one or the other are rather different. Whereas indicators containing information on the entire population all at once are applied in sustainability analysis, cohort figures can also serve for intergenerational comparisons and in this way the analysis of intergenerational fairness. Although some indicators can be interpreted both at cohort level and at population level, the analyses they are applied in are different. Our example here is *pension wealth*, sometimes called *social security wealth*, an indicator with frequent references in the academic literature[41] but also used by international agencies such as the OECD. Pension wealth is the expected present value of the future stream of benefits in a pay-as-you-go pension scheme. Defined as a system-level indicator, it is the same as the above-mentioned accrued-to-date interpretation of the implicit pension debt or the liability side of the other two interpretations. However, pension wealth can also characterise a cohort. Such an indicator can be useful in the analysis of the wealth portfolio of members of pay-as-you-go schemes as well as in the explanation of saving behaviour. Cohorts counting on sufficient pension wealth may behave differently than cohorts having no such wealth components in their portfolio. Also, pension wealth by cohort can tell winners from losers in a pay-as-you-go system.

Population level indicators hardly contain retrospective information. They are typically used in sustainability analyses, which are based on current and future data. In special cases "current" may be set in the future, as future base years can also be selected, for instance, when the researcher wants to quantify the increasing costs for future generations of a postponement of reforms.

> Proper inter-cohort comparisons require data covering the entire life cycles of the cohorts in question, often involving the collection of retrospective information and projections regarding the future.

By contrast, cohort level indicators are often fed with historical data. In fact, this is what distinguishes a proper analysis of intergenerational fairness from a sustainability test. Indeed, the results of a sustainability study are frequently interpreted in terms of intergenerational fairness saying that current patterns are so unsustainable that the adjustment will unfairly affect future generations. While such predictions may sound convincing, proper statements on intergenerational fairness cannot be made without covering the entire lifetime of cohorts in the comparison, which usually requires retrospective data. Proper inter-cohort comparisons require data covering the entire life cycles of the cohorts in question, often involving the collection of retrospective information and projections regarding the future.[42]

Once such a dataset is prepared, various methods are available to quantify intergenerational equity. Such indicators can be based on subtractions (net present values of lifetime inflows and outflows such as taxes and benefits or labour income and consumption) such as the *net transfer rate*, which projects the net present value of lifetime benefits and taxes on lifetime earnings. Alternatively, they can be ratios of present values such as the *benefit/tax ratio*. Such calculations have been published for the public pension systems of numerous countries but only a handful of net transfer rates of the entire tax-transfer system have been calculated so far.[43]

However, without life-cycle data no real inter-cohort comparisons can be made, rendering conclusions on intergenerational fairness futile. This is tacitly acknowledged in the *generational imbalance*, a key indicator of generational accounting.[44] Although the method is based on calculating present values of net taxes through the remaining lifetime of each cohort, currently living and future, generational imbalance compares such present values only of the new-born cohort and the future generation (future cohorts are not distinguished from each other but treated as a single cohort). That is, the imbalance is established between two full lifetimes. Remaining lifetime balances of all other living cohorts are neglected by the indicator in the end, and are taken into account only in the calculation of what is in fact the sustainability gap of the tax-transfer system (see above). This gap is what is charged on future generations making their lifetime present values different from that of the new-born. Even this acknowledgement by the method makes it difficult to interpret it in terms of intergenerational fairness. Generational imbalance compares two highly abstract life cycles after all; it is better interpreted as a sustainability measure or as a predictor of reforms.

> The quest for the best indicator may turn out to be the quest for the best indicator family.

Conclusions

As population ageing is becoming a growing concern, a number of new indicators measuring the consequences on economic and financial sustainability and intergenerational fairness have been suggested by the research community. The increasing number of measurement tools has also led to efforts to survey them. Following this stream, we have established a taxonomy of over 80 indicators in order to find overlaps and connections as well as to facilitate the invention of new indicators. The development of new statistical standards, such as the National Transfer Accounts, as well as newly opening datasets, will likely lead to further inventions, which in turn will most likely revise exploratory tools such as our taxonomy. At this stage, our main conclusions can be summed up in two points. First, we found that the same type of indicator measured at different levels – such as the general government, the (market) economy or the total economy, which includes both the market economy and the household economy – often leads to different conclusions. A family of related indicators frequently can tell more than a single indicator. The quest for the best indicator may turn out to be the quest for the best indicator family. Secondly, we found that conclusions on sustainability and intergenerational fairness derived from indicators limited to the "visible" world of current statistical standards can be misleading. The value of investments in human capital or intra-familial transfers of cash and time are so important in this field that they frequently change and sometimes even revise the results of the analysis. Ignoring them can lead to misleading conclusions.

Notes

1 We are grateful for comments by (in alphabetical order) Alexia Fürnkranz-Prskawetz, Bernhard Hammer, Miguel Sánchez

Romero, András Simonovits, Lili Vargha and two anonymous referees as well as participants of NTA workshops in Belo Horizonte, Barcelona, Vienna and Mölle. The usual disclaimer holds. This paper was written as part of the AGENTA project. AGENTA (http://www.agenta-project.eu/en/index.htm) has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613247.

2 Sustainability is a broad concept including environmental and social issues as well. In this paper we limit ourselves to indicators of the financial/economic aspects of sustainability and intergenerational fairness.

3 Gál/Monostori 2016.

4 Fenge/Werding 2003.

5 Spijker 2005.

6 Further, our taxonomy table was also influenced by the taxonomies of Balassone/Franco 2000; Benz/Fetzer 2006; and Langenus 2006.

7 Note: The table includes indicators that are specifically referred to in this paper. Definitions and further description are given in the text. Many cells appearing empty here are populated in the complete taxonomy table that includes more than 80 entries. It can be found in the online Appendix.

8 General government is a statistical term referring to the combination of the central (federal and state) government, local governments, social security and other public funds.

9 The total economy, measured by what Ironmonger/Soupourmas (2012) call the Gross Economic Product, consists of the market economy, described by aggregates such as the GDP, and the household economy, that is the value of products and services produced by unpaid household labour applying household facilities. Estimates of the size of the household economy range between 25% and as much as 80% of GDP depending on calendar year, country and measurement method. The household economy is large even in industrialised countries. The sheer size and the age profile of household labour (see Vargha/Gál/Crosby-Nagy 2017) make the inclusion of such estimates highly relevant for sustainability measures.

10 Miller 2011.

11 Cutler/Poterba/Sheiner/Summers 1990.

12 Although we include representatives of each main regime type we do not explore their differences here. Albertini/Kohli/Vogel (2007) and Albertini/Kohli (2013) show that private transfers among adult children and their parents differ along a North-South scale in Europe. Whereas they take place mostly within the household in Mediterranean countries, Scandinavian children leave relatively early and receive net support from their parents in the form of inter-household transfers.

13 Vargha/Gál/Crosby-Nagy 2017.

14 Calculation of the support ratio family and other intergenerational indicators was made possible by the National Transfer Accounts (NTA) methodology. NTA, a new chapter in the development of national accounting, introduces age into age-insensitive National Accounts (NA). In the standard form of NA, revenues flow among institutions such as households, corporations and government. In NTA they flow among people of different ages. NTA was established by Lee 1994a,b. The United Nations (2013) has published a revised manual. A comprehensive introduction to the method, including theoretical foundations, comparative results and a wide range of country-studies can be found in Lee/Mason 2011a. NTA age profiles can be downloaded from www.ntaccounts.org (global data) and http://www.agenta-project.eu/en/dataexplorer.htm (European data).

15 Authors' calculations based on data of Eurostat (population projection), Istenič et al. (2017) (public and private transfers), Vargha et al. (2016) (household time transfers).

16 SR = support ratio (see descriptions in the text).

17 Lee/Mason/members of the NTA Network 2014.

18 See also Gál/Vanhuysse/Vargha 2018, and specifically Kotlikoff/Burns (2012) on older generations gaining ground, Vanhuysse (2013) on pro-elderly bias in public spending and Preston (1984) on the shifting elderly/children ratio in public transfers.

19, 20, 21 Gál/Vanhuysse/Vargha 2018.

22 Authors' calculations based on Istenič et al. (2017) (public and private transfers) and Vargha et al. (2016) (household time transfers).

23 European Union: 17 member states representing 85% of the EU population. Prime-age: the age bracket of 30–49 year-olds.

24 Gál/Vanhuysse/Vargha 2018.

25 Sanderson/Scherbov 2010, 2013, 2014, 2016.

26 The arrow diagram was developed by Ronald Lee (see Lee, 1994a; Lee/Mason, 2010).

27 Willis 1988.

28 Lee 1994a.

29 Authors' calculations based on the international NTA database (www.ntaccounts.org) (Indonesia) and Istenič et al. (2017) (Germany).

30 The concept of the Silver Club was suggested by Timothy Miller.

31 The table contains entries for the European Union as a whole. These values are simple averages of 26 out of the 27 member states in 2010 (with Malta missing). Altogether 17 of them were Silver Club members and 7 others were on the edge. Only Cyprus and Ireland were still a few years away.

32 European figures: authors' calculations based on data of Istenič et al. (2017). Other figures are from Lee and Mason (2011b).

33 EU: 26 member states in 2010.

34 This definition of the turnover duration was developed by Settergren/Mikula 2006.

35 Non-financial defined contribution (NDC) systems of pay-as-you-go financing imitate funded schemes in that they set up individual accounts on which contributions are credited. The accumulating notional wealth grows by new contribution inflows and a notional interest, which in one way or another is related to the period rate of return of the system.

36 Settergren 2001.

37 See Settergren/Mikula 2006; Lee 1994a; Bommier/Lee 2003.

38 Holzmann/Palacios/Zviniene 2004.

39 Bonin (2001), Bonin/Patxot 2004.

40 Khoman/Weale 2008.

41 Lee/Mason/members of the NTA Network 2014.

42 See the series edited by Gruber/Wise 1999, 2004, 2005.

43 Intergenerational transfers, both public and intra-familial, reallocate resources flowing in opposite directions, from the working-age population to children (forward) and from the working-age population to the elderly (backward). This connects forward transfers (childcare, education, etc.) in time t and backward transfers (pensions, health care) in time t+1. Due to its immense data needs or reliance on simulation methods, most indicators of economic sustainability and intergenerational fairness avoid addressing this feature directly even though it would hold out a combined inter-

pretation in terms of sustainability and fairness. A recent proposal, the human capital investment gap (Hammer et al. 2016), still in the experimental phase, aims at this combination by giving the unsustainability measure in terms of inadequate investments of one generation in the human capital of a subsequent generation.
44 See for instance Hills (1995) for the UK and Bommier et al. (2010) for the US.
45 Auerbach/Gokhale/Kotlikoff 1991.

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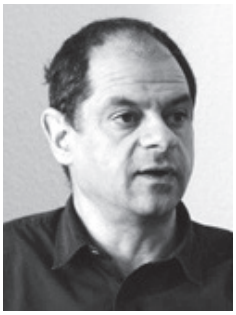

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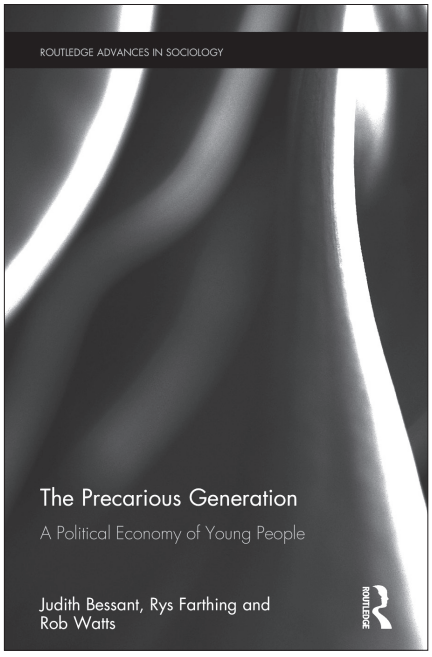
Judith Bessant, Rys Farthing and Rob Watts: The Precarious Generation: A Political Economy of Young People

Reviewed by Thomas Tozer



The end of the 20th century saw young people increasingly singled out as a uniquely troubled social category. Nowadays, it is commonplace to talk about how, while the baby boomers recline inside their own homes, enjoying healthy pensions and free bus passes, millennials are finding themselves afflicted by poor job prospects, huge debts and tremendous difficulty in getting onto the housing ladder. Meanwhile, the doctrine of neoliberalism – in essence, the project of scaling back the state and promoting individualism and free-market capitalism – has come to dominate political decision-making.

Is this rise of neoliberalism responsible for young people's political woes? That is the question which *The Precarious Generation: A Political Economy of Young People* seeks to answer. Tracing the effects of neoliberal policy since the 1970s on the US, UK, Australia, France and Spain, among others, the authors argue that neoliberal policy has systematically disadvantaged a generation of young people. Adopting a "political economy of generations"(4) approach, they begin, in Chapter 1, by demonstrating the particular struggle of young people today, considering a number of different economic indicators. Their conclusion is that intergenerational inequality is present in all five countries: "young people earn less on average and have higher levels of unemployment"(32). Furthermore, the *comparative* worsening of their incomes, and the increasing unavailability of affordable housing assets for the young, does not bode well for their future. The chapter also charts the increase of inequality in the above countries over the past few decades, and shows that social expenditure has tended to be lower as a share of GDP in the neoliberal regimes of the UK, US and Australia than in the "conservative corporatist" regimes of France and Spain.

In Chapter 2, the authors critically examine the category of "generation". They begin by critiquing Côté's "substantialist" framing of reality, giving a thorough account of the sociological literature. Côté's framing is criticised for its tendency towards the "structure" vs "agency" debate (are people's actions determined by certain structures, or do people make completely free choices about how to act?). What the authors favour is, rather, a relationist approach, such as that offered by Bourdieu. Such an approach regards the category in question not as "constructed by the researcher", nor as inherently real, but as constituted by relationships: the relations and processes of the category in question. They conclude that, used carefully, the category of a "generation" can be a helpful aid for making sense of political happenings, particularly the experiences of young people. Young people, they add, are suitable to be considered a generation because the millennials who were born into the "neo-liberal zeitgeist" have been affected by a particular, and unsettling, combination of political events and policies of previous generations.

In Chapters 3-6, the authors describe particular ways in which neoliberal policies have impacted negatively on young people. Chapter 3 gives a broad overview of the rise of neoliberal policies in the late 1970s, with specific reference to Australia, the US, Britain and France. The chapter explains the essential features of the Keynesian policy paradigm, with its full employment policies and state spending in order to boost economic growth. The authors then chart the rise of this paradigm, its effects on the above four countries, and the 1970s "crisis of the Keynesian welfare state"(61). After this crisis, the authors explain, the doctrine of neoliberalism began to take hold. This turned everyone into "market actors"(62) and, based on the principles of neoclassical economics, recommended individualistic behaviour and the stripping down of state intervention. The doctrine was not without contradiction, however: the authors point out that at the same time as being antagonistic to government, neoliberalism has relied on government to promote its policies, for example in bailing out the banks and imposing austerity after the 2008 crash. The final part of this chapter describes the impact of neoliberal policies on the four countries' respective welfare states.

Chapter 4 then considers recent popular anxiety about "intergenerational justice", and the concern that the baby boomers are living comfortably while bequeathing a huge debt burden, as well as other issues such as environmental problems, to future generations. The extent of the debt burden is calculated using a system called "intergenerational accounting", which gives a precise measure of the debt that will be passed on. The authors object to this system and the recommendations it generates, however. Intergenerational accounting is misleading because it relies on contentious economic predictions, and because in a number of important ways state spending and debt is unlike private spending and debt. Furthermore, the austerity policies being pursued in order to reduce the debt burden of future generations are actively harming younger people: it is contradictory to promote intergenerational injustice today in order to avert intergenerational injustice in the future. The authors then consider the basis of a concern for intergenerational justice, explaining Rawls's approach and rejecting it

in favour of Sen and Nussbaum's account of "justice as freedom", on the grounds that only the latter begins by acknowledging how our lives are marked by various significant differences. Such an acknowledgement, they suggest, is required by any adequate theory of justice. Furthermore, Sen and Nussbaum's account of justice as freedom is "directly relevant to intergenerational justice"(85).

A particular example of neoliberal thinking, and the false promises that it offers young people, is its conceptualisation of education as a system for increasing "human capital". This is the topic of Chapter 5. "Human capital theory" saw investing in education as a way to increase an individual's economic value, benefiting both them and society. In the 1980s, neoliberalism carried this theory to prominence; it began to shape government policy, leading to a mass expansion of higher education. Neoliberalism also led to the movement to charge students for their education through student loans. The apparent justification for this, the authors explain, was that the students would enjoy much greater earnings as a result of the education. But it is not at all clear that young people have enjoyed the promised results of their investment. Indeed, youth unemployment is rife; and there are simply not enough "professional" jobs to meet the new demand for them. The authors conclude that the promise inherent in human capital theory – of a fairer, more just society and life-long socio-economic opportunities for the individual, business and society – is now broken.

Next, in Chapter 6, the authors consider the impact of neoliberalism on the justice system. The chapter maps the paradox of a dramatic increase in criminalisation in the US, England and Australia and in the perception of how prevalent crime is, and a consistent decrease in actual crime rates in these countries since the 1980s. There is a particular contradiction between public fear about juvenile crime and a significant body of research showing that young people are, in fact, not particularly tumultuous or criminally inclined. In explaining all this, the authors point to a link between neoliberalism and more punitive legal policies: egoistic individualism, lauded by neoliberalism, is often expressed as not caring for others and being prepared to punish deviants. The authors also note the close association of security with liberty in the liberal tradition of Smith, Bentham and Mill; and they reflect on the contradiction of the neoliberal paradigm, which wants to "shrink the state" but has overseen a large increase of public spending on criminal justice.(122) "Young people", they conclude, "diminished by decades of neoliberal cutbacks, need care and respect – not more punishment."(123).

Chapters 7 and 8 explore how young people interpret their own situation, and argue that a political economy of generations helps us understand this. Chapter 7 gives a number of transcripts of conversations with, or statements by, young people which show that they are quite aware of their situation and the way various hardships that they are experiencing are the result of policies that are benefiting the baby boomers. The older baby boomers, on the other hand, are revealed as often contemptuous and derisive towards the young, acting as though the better conditions they (the boomers) enjoy are entirely the result of their own choices, and blaming the young for the difficulties they are experiencing. The authors draw particular note to the way in which the young naturally and easily use the concept of "generation" to describe the predicaments that they face, and observe that although young people often claim to be uninterested in politics, their social media reading habits suggest otherwise.

Chapter 8 then considers novel ways in which young people are becoming involved with politics, and why such actions can correctly be called "political". Though young people are chastised by some as heralding a '"crisis of democracy", particularly on account of their low electoral turnout, others see them as the progenitors of a sophisticated new form of online politics. Yet things are more complex than this binary allows. A political economy of generations, the authors argue, appreciates that young people are largely excluded from the traditional political field because they do not possess the political "capital" (determined by factors such as one's place in the social hierarchy) that makes such access possible. But various more unconventional activities by young people, such as causing the FBI's website to collapse by collectively flooding it with requests at a particular time, can correctly be called political. The authors also examine the English street riots of 2011, a use of satire to mock the Catalan government in 2014, and the rise of the "ultra-right" in Australia. They argue that these are all legitimate examples of young people engaging in political actions.

In their final chapter, the authors consider the concept of an intergenerational contract and argue for certain principles that could guide the drawing up of a new such contract. They give two versions of a previous implied generational contract: that each generation will not be worse off than the previous one, and that young people will benefit from spending more time in higher education. Both forms of the contract are broken. A new intergenerational contract must be informed by ideas about justice; it must be ethical (not based on personal preferences); it must give an account of the good life; and it must be the result of a continual deliberative process that engages young people and elders in conversation with one another. Drawing on the capabilities approach of Sen and Nussbaum, the authors argue for a conception of the good life based not on money or utility, but the ability to realise certain substantive goods.(173f) They also argue that such a contract should be developed in a multiplicity of competing publics – including cyber public spheres and informal modes of political expression, which can be added to more traditional deliberative sites. Finally, they propose a "basic income" and the cancelling of student debt as two possible gestures that would go some way toward restoring intergenerational fairness.(182f)

The authors conclude by presenting the current clash between neoliberalism and the rise of new technological possibilities as a political "tipping point". Having arrived at this point we will have to make choices, and one crucial aspect of this process relates to the shape of a new intergenerational contract – hopefully one that will enable "a just society and a good life for all"(189).

The project of the book is laudable and very welcome, and its explication of how neoliberalism has influenced policy since the late 70s, systematically disadvantaging young people in its wake, is rich and illuminating. Furthermore, by relating their research to five different political regimes, with varying respective levels of neoliberal underpinnings, the reader is given a particularly broad understanding of, and nuanced insight into, the influence of neoliberalism over the past four decades. The book is also structured in a way that is easy to follow, with a helpful concluding section at the end of each chapter, and it neatly weaves together academic theory with recent history in a way that enables the reader to appreciate the intellectual drive behind various policy choices at the same time as learning about their effects.

The Precarious Generation's broad purview is not without drawbacks, however, with the book often suffering as a result of its tendency to sacrifice depth in favour of breadth. Various important and complex issues, ranging from Keynesian economics to Rawlsian justice, are dealt with in a somewhat cursory manner, occasionally bordering on inaccuracy, with the reader sometimes left feeling more like he or she is reading a literature review than a precise argument or explanation. Furthermore, data are presented in a way that is inconsistent and muddled. The five countries under review are considered in what often seems like arbitrary order, with other countries added and members of the original five marginalised or ignored with little apparent reason; and the graphs, while sometimes clear and helpful, at other times evoke new complications that beg explanation. Moreover, the philosophical rigour with which the authors defend their arguments is often rather lacklustre. A number of critical analytic considerations, such as the fact that young people have had less time to work their way up the job and income ladders and so cannot be expected to match the jobs and incomes of older generations, or the crucial distinction between young people faring worse than older generations and faring *relatively* worse than previous generations of young people (in comparison to previous older generations), are severely neglected.

In spite of all this, however, *The Precarious Generation*'s novel approach and extensive research nonetheless offers a significant and valuable contribution to the field of political economy. It will be read with benefit by anyone interested in the impact of neoliberalism on the past four decades of policy, or in boosting the prospects of the young.

Notes

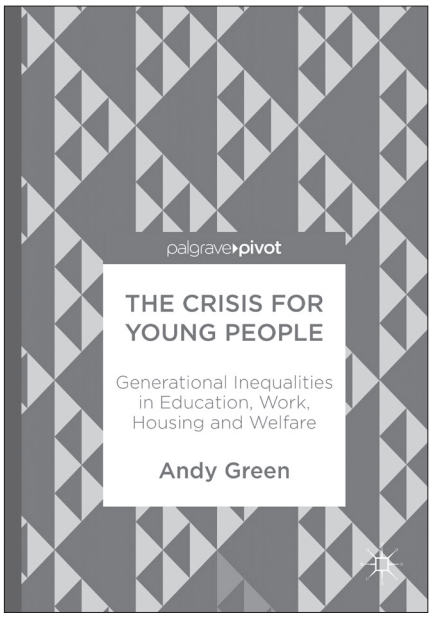
1 Roughly: those born between 1946 and 1964.
2 Roughly: those born between 1980 and 2000.

Bessant, Judith / Farthing, Rys / Watts, Rob (2017): The Precarious Generation: A Political Economy of Young People. London: Routledge. 228 pages. ISBN 978-1138185470, price £85. eBook ISBN 978-1315644493, price £31.49.

Andy Green: The Crisis for Young People: Generational Inequalities in Education, Work, Housing and Welfare

Reviewed by Gabriela de Carvalho

Andy Green's *The Crisis for Young People: Generational Inequalities in Education, Work, Housing and Welfare* examines one of the main social challenges of our time: intergenerational inequalities. Green successfully conveys the disparities that lead to a break in the social contract between generations – the expectation that each generation will achieve a higher socio-economic status than the previous one. The book investigates whether and to what extent opportunities have changed from one generation to another, and if today's youth are being offered with fewer opportunities than their parents. The main thesis of *The Crisis for Young People* states that Millennials (defined as people who were born after 1979) are likely to be the first generation since the Edwardian era with fewer opportunities and poorer life chances than the preceding generation, especially in domains such as housing, pensions, welfare benefits and, to some extent, employment.



The book is divided into eight chapters, each dealing with the areas that most impact life opportunities (education, employment, housing, wealth, welfare distribution and political power). Chapters 1–5 discuss theoretical conceptions presented in the current literature and ongoing debates regarding each domain, showcasing empirical evidence from numerous sources to show how young people's lives are being adversely affected by structural changes in these key areas. The final three chapters present policy modifications that address intergenerational inequality, taking into account the ideal political environment needed to make these changes possible. *The Crisis for Young People* is a mixed-method research project, and focuses on the United Kingdom's youth – even though a clear effort to make cross-country comparisons is evident throughout the book.

The introductory chapter highlights the main drivers of changes in generational opportunities for Millennials: demographics (rising life-expectancy and the ageing of the population), globalisation (mostly changes in the labour market), the 2007/2008 financial

crisis, and the consequent period of austerity. Green points out that these drivers have an impact in almost all areas that most affect the opportunities presented to a generation, and the findings show that today's young people are more likely to experience and be negatively affected by these important structural changes.

Building on this, the first part of the book discusses and analyses the chances and opportunities presented to today's youth in education, employment, housing, and wealth and welfare compared to the baby-boomer generation (people born between 1945 and 1965, and most likely Millennials' parents). According to Green, education is the only domain in which young people are doing better than previous generations. Millennials are more likely to receive higher educational opportunities and more years of schooling than their parents, which has led to an increase in the number of people gaining higher qualifications in the United Kingdom. Empirical evidence suggests that the inequality of opportunities and outcomes in terms of qualifications have decreased overall. This is the result of a greater range of provision and more support, in particular financial support, provided by public sector entities in the form of loans, scholarships or educational grants. On the other hand, the author shows that there is an increase in the inequality of opportunity for competences in skills such as literacy and numeracy. Most important, though, is the conclusion that better qualifications do not automatically result in better jobs in a given generation. Regarding employment, Millennials have been negatively affected by the consequences of the financial crisis of 2007/2008 and have experienced its externalities more than any other age cohort. Higher unemployment levels, low wages, a rising number of precarious jobs (part-time, zero-hours, and temporary contracts), the decreasing value of university degrees and certifications, and poor working conditions seem to suggest that opportunities for employment are fewer, and as a result, the lifestyle of today's youth is worse than that of their parents. These disadvantages, however, may be reduced for some over the next decades: according to Green, the most qualified individuals will achieve the same occupational and earnings levels as the previous generation of baby boomers, but those less qualified are likely to do far worse than their equivalents in the previous generation.

In assessing the intergenerational decline in opportunity, a strong emphasis is placed on what Green calls the UK's "housing disaster". Growing inequality in access to housing in the United Kingdom is the result of wealth inequality, government policy, demographic issues, the deregulation of the private rental market, and the rise in house prices, among other factors. These issues mean that it is very difficult for most young people to enter the property market, especially those with lower wages and with more precarious jobs. Property ownership is commonly regarded as a vehicle for wealth accumulation and a facilitator of social mobility. Young people who decide to leave their parents' home face an expensive private rental market in which housing quality is significantly low and tenures are insecure. Additionally, Millennials are waiting longer before purchasing – or taking out a mortgage on – their first homes. Given the rising property values over time, Millennials pay more for fixed living expenses than the previous generation, and most of the time the rents paid go to older adults of preceding generations. These factors all contribute to increased intergenerational inequalities in housing opportunities.

Property is a major source of wealth and wealth is often inherited, which has benefited older generations. Millennials, however, are less likely to inherit, and are buying less property than their parents, making them poorer than previous generations. In addition, governments have increasingly prioritised – and allocated more public spending to – programmes for the elderly. This trend could be explained by the increasingly ageing population and improvements in public health that result in longer generational lifespans. Young and older generations alike are paying more taxes to fund health care and pensions, but this system may not be sufficiently sustainable to benefit the younger generations by the time they reach retirement.

The second part of the book details a range of policy recommendations that directly target intergenerational inequality in the areas of education, work and housing, and prospects for the future. Green's comprehensive understanding of the intergenerational gap is reflected in the plentiful and thorough policy recommendations. The author begins by recommending a myriad of changes for pre-schooling, secondary, and tertiary education. He goes one step further to suggest the application of an all-age, graduated tax to better distribute the impact borne by the Millennial generation, in an attempt to curb the negative externalities resulting from current policies and practices, such as educational loans. Regarding housing, Green suggests a joint-effort approach by the public and private sectors to build affordable homes, and reforms to the current tax practices that would reduce house prices, decrease property speculation, and discourage developers from leaving properties empty. The author also mentions the importance of the re-regulation of the rental sector through new forms of rent controls, legal notice periods, longer-term tenancy contracts and licensed landlords.

Green ends this study by highlighting the increased political power of the baby boomers, which stems from their high concentration in the population as well as their disproportionate ratio of voting participation compared to other generations. For this reason, Green suggests that the media and major political parties tend to reflect their preferences, which has the potential to increase the age-related inequalities evident in society to an even greater extent. The turnout and results of previous elections and other democratic events, such as the United Kingdom's "Brexit" referendum of 2016 concerning European Union membership, provide support to Green's claim that young people are less and less inclined to vote. However, the 2017 British General Election results showed a higher turnout among Millennials, and an impressive level of support for the Labour Party leader, Jeremy Corbyn, who notably formulated and marketed his progressive policies toward youth.

Green concludes by reaffirming what the empirical evidence suggested throughout the book: younger generations are likely to be less prosperous than their parents. This thesis, according to Green, questions "our whole notion of historical progress and indeed the viability of the current social and political order" (122).

The Crisis for Young People presents a strong argument but is not without its weaknesses. The study analysed interview results from a pool of 100 Millennials, but only a few chapters seem to have benefited from their personal experiences, inputs and quotes. The chapter on Employment is the only section in which data collected during the interviews is fully explored and shared, making this the most developed chapter. The most comprehensive sections are the result of the successful combination of quantitative and qualitative methods applied by the author. That said, the project might

have benefited from a comparative analysis with corresponding interviews with baby-boomers. In addition, readers may question Green's proposal of policy changes in education, considering this is the only domain in which generational opportunities have improved. The author justifies this by saying that education "is amenable, at least is some areas, to some relatively simple policy reforms which would make a difference" (87). Although many important aspects of the issue are represented in Green's proposals, recommendations in the domains of welfare, wealth and employment could potentially have more impact on the lives of young people.

Although there has been much debate about the current situation of today's youth in advanced economies, not much has been said about intergenerational inequality. Andy Green's *The Crisis for Young People* takes an important step to fill this gap. The multidisciplinary facet of the book makes it a valuable source for people from all backgrounds, and the subject is covered in a way that is easily accessible to readers at all academic and professional levels. Even though the book focuses on the British experience, many of its findings can be applied to other advanced economies, and many new studies using new cases could be derived from it. The research behind Green's work can also serve as a helpful information source for policy-makers. The idea that today's youth are set to be the first generation since the Edwardian era with fewer opportunities and poorer life chances than their parents is conveyed using many different sources, methods, and theoretical frameworks, making this book an important contribution to the literature.

Green, Andy (2017): The Crisis for Young People: Generational Inequalities in Education, Work, Housing and Welfare. Basingstoke: Palgrave Macmillan. 174 pages. ISBN 978-3319585468, price £20. eBook ISBN 978-3319585475, open access: free of charge.

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