AN INTERGENERATIONAL JUSTICE INDEX FOR PORTUGAL

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AN INTERGENERATIONAL JUSTICE INDEX FOR PORTUGAL

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Foreword

Between 2018 and 2022, the Gulbenkian Intergenerational Initiative aimed to bring intergenerational justice into public discussion and onto the political agenda, as well as encouraging the design of fair public policies for all generations.

Studies analyzing the main inequalities between generations were promoted, and the factors that contribute to the successful implementation of long-term policies were identified. A methodology was also created to assess the impact of public policies on current and future generations.

At the start of the project, few or any national researchers had intergenerational justice on their agenda. In 2022, after 11 studies promoted by the Foundation and several policy briefs published, there is an interdisciplinary network of researchers on the subject from dozens of national and foreign universities.

At the end of the five years of the initiative, the aim was to ensure that the "agenda" of intergenerational justice continues to be taken up by academy and civil society, with support for projects that can continue and leverage the initiatives developed by the Calouste Gulbenkian Foundation.

In this context, the Institute of Public Policy - Lisbon (IPP) was supported in the creation and public dissemination of an aggregate index of intergenerational justice, with indicators in the areas of housing, the labor market, the environment and natural resources, public finance, health and poverty and living conditions.

We would like to thank all the authors, and in particular its coordinator, Paulo Trigo Pereira, for their work, which has given renewed impetus to research and debate on key issues of intergenerational justice, contributing to the promotion of a new social contract that guarantees a fairer future for all generations.

Luis Lobo Xavier

Coordinator of the Gulbenkian Intergenerational Project

Acknowledgements

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It presents the methodology for constructing both a new "Index of Intergenerational Justice for Portugal" and six indexes of Intergenerational Justice in the six dimensions considered. Both are well developed in sectoral policy papers by various authors, identified in this study and which will be progressively published on the IPP website dedicated to this project (https://www.ipp-jcs.org/indice-de-justica-intergeracional/) by the end of 2023. Details on methodologies, formulas used, basic data and sources should be consulted in these papers. An initial version of these policy papers was discussed at six sectoral workshops. We would like to thank the many participants in these workshops for their contributions, which have certainly helped to improve it. The usual disclaimer applies, and the authors are responsible for any errors and omissions. The opinions expressed in this study are not binding on IPP, the Calouste Gulbenkian Foundation or any other institution to which they belong.

A word of appreciation to ISEG (of the University of Lisbon) for hosting the Institute of Public Policy - Lisbon, which is an independent association, not linked to any institution and with a deliberate inter-university and inter-disciplinary nature. Last, but not least, a special mention to the entire team involved in this project, not just the authors, but in particular Rita Fonseca and Joana Garrido Amorim.

Paulo Trigo Pereira

Professor at ISEG University and President of IPP

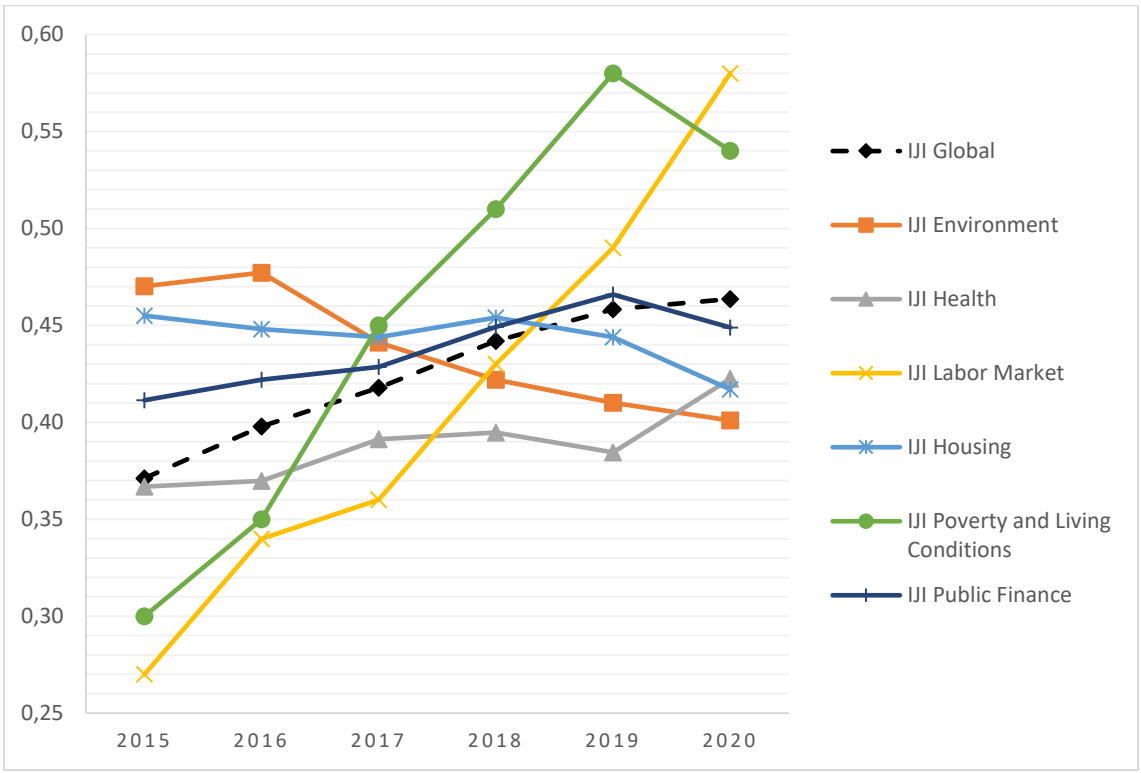
Executive Summary

1. **What obligations do we have towards future generations? Are we making decisions that contribute to intergenerational justice or, on the contrary, are we overburdening future generations? What variables and indicators should we choose to assess how intergenerational justice is evolving in Portugal?**

The necessity for this study arises from two fundamental ideas. It is essential to promote public and political deliberation about justice between contemporary and future generations in Portugal. On the other hand, an effective approach to accomplish this is to establish a type of "dashboard" featuring indexes derived from annually monitored indicators. This will enable us to track the evolution of variables that affect intergenerational justice. Had such a system been in place years ago, it would not be surprising to see, for instance, much earlier public policy measures dealing with the housing crisis. It is crucial for both civil society and political decision-makers to have regular and straightforward access to the country's ongoing developments.

This study addresses the above issues by first reflecting on the concept of intergenerational justice and other related concepts. We believe that sustainability (environmental, financial or otherwise) is a necessary but not sufficient condition for intergenerational justice. On the other hand, reciprocity, which is often associated with justice, is not a necessary condition for intergenerational justice. Ideally, we should answer these questions by analyzing the evolution of different cohorts (e.g. Baby Boomers, Millenials) over the years, rather than age groups. In practice, data limitations mean that indicators focused on younger age groups and their evolution over time are sometimes used.

In this work, we consider six dimensions in which to assess the evolution of intergenerational justice in Portugal: the environment and natural resources, health, the labor market, housing, poverty and living conditions and, finally, public finances. For each dimension, we identified sub-dimensions that seemed relevant to us, and built indicators that should be monitored annually to see to what extent intergenerational justice is varying in Portugal and what factors determine this variation. We thus obtained a global indicator of intergenerational justice (global IJI) and sectoral indicators that can vary between 0 and 1. It is not the absolute value of these indicators that is relevant, but their annual variation. The results are summarized in this graph, where a variation in the indicator towards unity means a relative improvement for the younger and upcoming generations in relation to the adult and senior generations.



Graphic 1-Global and sectorial Intergenerational Justice Indexes

From 2015 to 2020, there was a slight improvement in intergenerational justice in Portugal in aggregate terms. This improvement is the result of the opposite effects of several dimensions. If we look at the pre-pandemic period (since 2020 is an outlier), there are mainly three dimensions that improve (poverty and living conditions, the labor market and public finances). There are two that are getting worse (the environment and natural resources and housing), and finally one that is relatively stable (health). Each dimension is divided into a maximum of five - dimensions for which indicators have been selected.

The negative contribution of the *environment and natural resources* dimension is due to the country's inability to meet its commitments under the circular economy targets, particularly in terms of waste production and recycling, as well as growing water stress. This is despite progress in decarbonizing the economy. On the other hand, the increasingly negative contribution of housing for young people and new cohorts is mainly due to both the growing inaccessibility of owning their own home and the growing loss of autonomy. In fact, in 2020, more than half of young people (aged 25 to 34) were still living with their parents.

The trend in relation to the *labor market* in recent years has been positive and this is mainly due to an improvement in the country's macroeconomic framework, which is reflected in lower levels of unemployment, and a slight upward trend in real wages for young people, partly explained by the rise in the minimum wage, despite greater job insecurity. Also positive is the contribution of the *poverty and living conditions* dimension (if we exclude housing) which is explained above all by the fact that, in the period analyzed (2014-21), there was a clear downward trend in poverty and material deprivation and an increase in young people's participation in formal education. These trends increase the likelihood of new generations being able to access a better life. Still on a positive note is the dimension of *public finances*. Despite the long-term imbalance in public finances (clear from an analysis of generational accounts) and

a debt-to-GDP ratio that is excessive and well above the 60% reference value in the European Union, there has been an improving trend towards the sustainability of public finances, although we are still far from achieving it.

Finally, we have the *health* dimension, which has had a relatively stable trajectory in the 2015-2019 period, given some opposite effects. This is the result, on the one hand, of a slight improvement in both the life expectancy at birth and healthy life expectancy at birth indicators and, on the other, of a deterioration in the prevalence of mental illness and spending on prevention.

In short, in all dimensions there are critical aspects that can harm intergenerational justice. The variables that should be monitored annually to avoid harming future generations are all those presented in this study. In particular the following: in the *environment*, the production and recycling of urban waste, forest management and forest fires and in the *labor market*, fixed-term contracts, unemployment and youth emigration. In *housing*, accessibility to housing, as well as the degree of autonomy of young people and in the dimension of *poverty and living conditions*, the incidence of poverty and material deprivation. Finally, in *public finances*, their medium and long-term sustainability, namely the budgetary effort borne by each generation in the adjustment process and the reduction of public debt to more acceptable levels that reduce the country's vulnerability to external shocks. There is annual statistical information from credible sources that allows calculating these indicators every year, even if in some cases they are somewhat out of time.

While this study is not concerned with analyzing public policies that could improve intergenerational justice, we are nonetheless looking at the recent past and presenting some measures that could be beneficial in promoting it.

1. Introduction

1.1. The problem

Are we being fair to future generations in Portugal? Can we measure intergenerational (in)justice? What exactly are we referring to when we talk about intergenerational justice? These are not easy questions, not least because there is no single concept of intergenerational justice.

The problem of a potential injustice of contemporary generations towards future generations is clearly identified in the literature. Democracies tend to underestimate the interests of future generations (who have not yet been born and do not vote). In relation to the various contemporary cohorts, international studies indicate a trend that is also true in Portugal: the low political participation of young people. This means that the median citizen entitled to vote is younger than the median *voter* who, according to some theories (the median voter theorem), drives political choices. This further reinforces the bias of political choices not only towards present generations, but towards older cohorts of current generations.

The manifestation of this problem in the younger generations and those to come is already clear in several dimensions. In the problem of climate change and the excessive use of natural resources, in the growing difficulty in accessing housing, in the duality and precariousness of the job market, in excessive public and external indebtedness. On the other hand, there are dimensions in which new and future generations will be able to access a higher level of well-being than current generations, through the accumulation of a greater stock of human capital and technological development that opens up a greater potential for choice and increases life expectancy and, potentially, the quality of life in old age.

1.2. What is intergenerational justice?

There is no single theory of intergenerational justice that can be applied to all the relevant dimensions of a society.

As Valente and Gosseries point out on a background paper for this report, there are many theories of intergenerational justice, which for the sake of simplicity can be divided into two families: *commutative* (based on reciprocity) and *distributive*. "Commutative theories focus on fairness in exchange. They often say: "Because I give this, I should receive that in return". In contrast, distributive views are concerned with fairness in the background distribution between parties. From this perspective, my entitlement to some benefit is not based on having contributed something in the first place. Instead, it is based, for example, on the fact that I am a human being who deserves to be treated fairly and that I find myself in a more disadvantaged position (in the case of egalitarianism, for instance).."[1]

The fact that there are several theories of intergenerational justice, and that there are limitations to the ability to longitudinally analyze data on different cohorts of individuals over

[1] The policy paper by Manuel Sá Valente and Axel Gosseries "Intergenerational Justice: Are we measure what matters?", which addresses and develops the issue of intergenerational justice from a philosophical point of view, is available at https://www.ipp-jcs.org/en/2023/09/25/policy-paper-27-intergenerational-justice-are-we-measuring-what-matters/. A summary is presented in section 2.1 below

time, poses obvious challenges to the construction of an index, something that will be addressed in the following chapter.

1.3. Why measure, what to measure and how to measure?

When you measure something, what you are measuring becomes visible. The aim of this study is therefore to highlight issues of intergenerational justice in the public and political debate, to identify where are the most relevant intergenerational injustices, and, to a certain extent, to understand which public policies could mitigate these injustices. Portuguese society should be more attentive to intergenerational justice, both between the various contemporary cohorts and between them and those to come. The construction of this intergenerational justice index helps to achieve this.

We constructed six intergenerational justice indexes in different dimensions (environment and natural resources, health, labor market, housing, poverty and living conditions and public finances) from which an **intergenerational justice index** was constructed for Portugal. More than the absolute value of the aggregate index, it is important to understand how and why each of its components varies. These dimensions were selected because they are considered to be the most relevant sources of potential intergenerational injustices and those that can best be influenced by public policies.

The difficulties of measuring intergenerational justice lie at various levels. Firstly, in the understanding that can be given to the concept of intergenerational justice. Next, the choice of a restricted set of indicators that can capture, within each dimension, relevant aspects of intergenerational (in)justice. Here the essential difficulty lies in distinguishing between deliberate and voluntary choices made by individuals and exogenous factors that determine or induce different behaviors. Inequalities that stem from different individual preferences and choices are not necessarily a source of intergenerational injustice. However, inequalities that result from economic and social factors that largely determine the transmission of different resources or opportunities between generations are probably an indicator of intergenerational injustices. Finally, the way in which all the indicators are normalized on the same scale, the type of aggregation of the indicators of the various sub-dimensions in each sectoral dimension and then the way in which these indicators are aggregated into a single index of intergenerational justice necessarily incorporates value judgments.

1.4. The structure of the study

Chapter 2 discusses the different theories of intergenerational justice, the main methodological problems associated with the construction of the index, as well as its interpretation, and presents the main methodological options in the construction of the sectoral intergenerational justice indices (IJI), as well as the global results of the IJI.

Chapters 3, 4, 5, 6, 7 and 8 present the sectoral intergenerational justice indices for each of the dimensions, as well as the indicators used to construct them and the main results. Chapter 9 draws some conclusions.

2. Intergenerational Justice Index: from theories to constructing the index.

The construction of an index of intergenerational justice faces two types of difficulties. The first concerns the need to anchor it in one, or more, theories of intergenerational justice. The second has to do with the variety of methodological options for operationalising the index in its various dimensions. This chapter deals first with the theories, followed by the chosen operationalisation method, as well as how the results of the index should be read.

2.1. Intergenerational Justice: Are We Measuring What Matters?[2]

Behind any measurement of intergenerational justice, there is an underlying theory. Any such theory will require two crucial decisions. One is what it means by *generation* - if age groups or birth cohorts. An age group is a group of those having reached the same age. It is in this sense that young and old belong to different generations. A birth cohort is a group of those born at the same time. *Millennials* and *Baby Boomers* are different generations in this second sense. Under the first meaning, we constantly change generation throughout our lives, from youth to old age. Under the second, however, we belong all our life to a single generation.

Another important decision is what we mean by *justice.* Among other options, we can choose here between a more commutative conception, typically involving the idea of reciprocity, or a more distributive one. Commutative theories focus on fairness in exchange. They often say: "Because I give this, I should receive that in return". In contrast, distributive views are concerned with fairness in the background distribution between parties. From this perspective, my entitlement to some benefit is not based on having contributed something in the first place. Instead, it is based, for example, on the fact that I find myself in a more disadvantaged position (in the case of egalitarianism, for instance).

It is common for measurements of intergenerational justice to focus on justice as *reciprocity* and on generations as *age groups*. In this section, we explore possible drivers of this situation and the problems it can generate. We then show that the indicators proposed in this project can help us measure intergenerational injustice, even on an approach that is neither centered on reciprocity nor restricted to age groups.

Birth cohorts versus Age Groups

As an example of the focus on the concept of age, there is the "European Fairness Index 2016" (Leach et al. 2016). It proposes to identify the main drivers behind the different prospects of young and *old* Europeans. The indicator built by Vanhuysse (2014) also focuses on age groups in three of its four dimensions. Ecological footprint aside, the measurements of *youth* poverty, the burden of debt on young people and the pro-*elderly* bias of welfare states in social spending illustrate well the primary focus on age groups. However, as we will see below, these indicators can still be relevant for comparisons between cohorts.

[2] For developments in this topic see Manuel Sá Valente e Axel Gosseries “Intergenerational Justice: Are we Measuring What Matters?” (op. cit).

In practice, measuring disparities between cohorts is more difficult than between age groups. To determine whether a specific age group benefits more from the state than another, it is enough to take a snapshot of reality at a particular time. In contrast, measuring differential treatment of cohorts seems to require longitudinal studies - which follow the entire life of each birth cohort - rather than snapshot data. More information is needed to carry out such studies, and policymakers and researchers tend to lack this kind of data.

To complicate things further, data on less recent cohorts is more complete than data on more recent cohorts (which requires a greater degree of prediction). We need to combine hindsight and foresight, in different proportions. Some have most of their lives in the past, while others have most of it ahead of them. We also need foresight to act early to correct problematic inequalities. In short, the difficulty with focusing on cohorts has to do with *longitudinal approaches being both prospective and retrospective and, therefore, more difficult to achieve and render politically legible.*

Although it is more accessible to study age groups, theories of intergenerational justice focus more on birth cohorts. The intuition here is that the relevant unit of comparison from a justice perspective is people's entire lives rather than instantaneous inequalities[3]. For example, some age groups benefit more from the state than others. However, this does not automatically point to a difference between the entire lives of each cohort. For example, it does not necessarily show that *Baby Boomers* will benefit more from the state than *Millennials.* Given that theories of justice tend to give a central role to the entire lifetimes of individuals rather than to specific phases of their lives, it is more appropriate, from the point of view of justice, to focus on cohorts rather than age groups.

Reciprocity versus Distributive Equality

There is, then, a discrepancy between what seems generally feasible in the social sciences and what ends up being relevant in normative terms. Later on, we will propose some ways of overcoming this problem. But before we do, it is worth noting that this mismatch between what should be studied and what is actually studied concerns not only the groups at stake. It also has to do with the implicit conceptions of justice we adopt.

Kotlikoff's (2017) approach is a good example of a focus on reciprocity[4]. He uses a generational accounting method, in which intergenerational justice implies that net current transfers "are zero for all generations" (see Zuber 2016). The underlying idea here is that each generation should receive as much in transfers as it contributes over the course of a lifetime, so as not to force future generations to be either net contributors or net beneficiaries (i.e., to contribute more or less than they benefit). This involves the notion of fair exchange underlying reciprocity: each generation benefits as much from the state as it transfers to others.

Another example is Wolfson & Rowe (2007). They associate intergenerational justice with a version of the golden rule, which says that a generation should not expect to be treated better by its children than how it treated its parents. The intergenerational rule they cite echoes a statement by the House of Commons in 1983, according to which "(t)hose now working could build up a moral claim on future pension entitlements by making transfers to the current elderly of at least the same magnitude as they would expect to receive when their time came"[5].

3 See e.g., Gosseries (2023b).
4 See e.g., Kotlikoff (2017).
5 Ibid. Also, see Kershaw (2018), who uses the golden rule adjusted to capacity to pay.

The focus on reciprocity has to do with the influence of popular opinions on justice, with measurability, with its allegedly uncontroversial nature, among other factors. Empirical studies suggest that the notion of reciprocity and its focus on fair exchange is appealing to many, especially in the intergenerational domain[6]. In terms of measurability, it is convenient to be concerned with *benefit ratios*, such that each generation should benefit equally from the state, or at least according to their contribution. At least, it is easier than measuring injustice by following more distributive conceptions, as we will see below.

There are, however, different conceptions of reciprocity. The most common in the context of intergenerational justice are indirect or "open", in the sense that each generation does not benefit the same generation from which it received benefits. For example, we can talk about *descending reciprocity* - we owe our children as much as we receive from our parents, or *ascending reciprocity* - we owe our parents as much as our parents transferred to our grandparents. Descending reciprocity is common when discussing the capital that each generation inherits (housing, health, carbon budget, etc.). It tells us that these transfers should not diminish from one generation to the next.

Despite these various types of reciprocity, there is a problem common to all of them. The problem is the following. Substantively, we can wonder whether it is fair to expect that a person always gives back as much as she receives[7]. Let us consider a paradigmatic case. We often think it is acceptable, if not required, for the state to implement net transfers between people of different socioeconomic conditions, for example, in favour of victims of serious genetic diseases. In this sense, more favoured socioeconomic groups are not entitled to reciprocity, understood as people receiving as much in state transfers as they contribute. If reciprocity is implausible *within* a given generation, why should it be endorsed between generations? It seems equally plausible to demand net transfers between generations under unequal conditions.

Reciprocity can sometimes be plausible, but not as a general view that prohibits net transfers. We tend to favour commutative duties because we think that duties of justice are triggered respectively by the harms we suffer or the benefits we receive. But these triggers can only derive their normative force from background conditions of distributive justice that precede them,§ and that result from recognising our status as human beings worthy of moral consideration.

Alternatively, let us consider a maximin/leximin egalitarian principle as illustrative of a distributive view that does not require strict equality[8].More specifically, it tells us that we can move away from equality if, and only if, this improves the situation of people who are worse off. This idea requires comparing various intergenerational scenarios, asking us to choose the scenario under which the most disadvantaged, whatever generation they are in, are better off than the most disadvantaged one under any alternative scenario. To be more specific, let us add that we are primarily concerned with those who are disadvantaged because of opportunities and circumstances rather than choices and preferences.

Distributive equality tells us that unequal benefit ratios can be fair under unequal conditions between generations. It can be fair for a cohort to receive more than it has transferred, if it contains the least well-off members of all generations and if these generational net benefits are directed towards improving their situation. For example, we might find that younger generations will contribute more to healthcare than they will benefit. But if younger generations are fortunate enough to live longer in better conditions, their net contributions to previous generations may not be unfair from a whole-life perspective. On the contrary, this may be typical

6 See Wade-Benzoni (2002).

7 See Gosseries (2017: 126-8) on Barry (1989). One might wonder why giving something to someone is sufficient and/or even necessary to justify a duty on the part of others to give us something in return.

8 See, for instance, Gosseries (2023a), ch.2.

redistribution from the most favoured generations (younger generations with longer lives) to the most disadvantaged ones (older generations with shorter lives).

Although it may be more plausible than reciprocity, maximin equality is more challenging to measure. It requires going beyond the amounts that the parties transfer to each other (for example, through benefit ratios). It requires us to assess the background conditions between the parties. In addition, the commitment to benefiting the least advantaged will also involve counterfactual claims about their position under various scenarios and determining which of these best improves their condition. As before, there is also a discrepancy here between what seems feasible and what ends up being normatively relevant. In what follows, we propose three ways of overcoming such problems.

Approximations

In this section, we show that the indicators chosen are relevant, even for an approach that is neither centered on reciprocity nor restricted to age groups. We divide the indicators into three types: annual trends, age-focused indicators, and benefit ratios.

Annual trends

Annual trend indicators are not centered on age but are relevant for measuring distributive equality between birth cohorts. If living conditions tend to improve, this represents a more significant advantage for more recent cohorts over less recent ones. Unlike the latter, the former still have a whole lifetime ahead to enjoy such benefits. Although it can be formulated in terms of reciprocity - not leaving the future something worse than we inherited from the past - we think the underlying idea here is to look at the extent to which members of one generation are at a disadvantage compared to those of another.

We have examples of annual trend indicators in various areas. Regarding the *environment*, the environmental stock is measured, in line with the idea of not leaving future generations, in the short or long term, a level of "natural capital" lower than that we inherited[9]. Insofar as *health* is concerned, we measure the evolution of the state of health over the years, both in terms of quantity and quality of health, as well as accessibility and orientation towards preventive care (improvements that put more recent cohorts at an advantage). As to the *labour market*, we look at the evolution of gender inequality. An improvement shows that more recent cohorts are doing better than those born more recently. The same can be said of the aggregate indicators of *living conditions and poverty*, such as household income, the poverty rate and the intensity of poverty. Regarding *housing*, accessibility gives us a sense of how much more difficult it can be for more recent cohorts to find a house, especially given that less recent cohorts tend to already have their own homes.

To sum up, annual trends can give us a good approximation of whether conditions are getting worse or better for more recent cohorts, allowing us to draw conclusions about whether one is likely to end up experiencing an advantage in terms of opportunities over the other.

9 In the case of climate change, this will only happen once carbon neutrality has been achieved, which Europe is aiming for by 2050, i.e., a long-term goal. Until then, what needs to be measured, and what we are doing in this study, is the extent to which we are on the right path to reducing greenhouse gas emissions and meeting the intermediate targets before reaching this long-term goal.

Age-focused Indicators

Age indicators can also have cohortal relevance. We use them in the case of the *labour market*, with indicators on job insecurity, unemployment, gender inequality, and emigration of young people. In *housing*, we are concerned with the housing autonomy of young people. And in *living conditions and poverty*, we also pay special attention to the incidence of poverty, material and social deprivation among young people, as well as their participation in education.

With that in mind, some indicators focus on the extent to which young people are deprived of certain critical goods. One first reason why youth is relevant is that the focus on the young ages covers all members of their cohort. Unlike old age, which not everyone reaches, we were all young once. Indicators on young people do not, therefore, exclude the members of a cohort who do not reach old age, who are often the most disadvantaged among us.

Secondly, and even more importantly, we know that certain deprivations have *scarring effects* on the entire lives of individuals. Deprivation in youth has consequences on the lifetime income of cohorts and, not only, but also on the future rights of that cohort (for example, to future pensions). Whenever scarring effects are significant, data on the position of young people over time can tell us something relevant about the fate of different cohorts. We are not the first to say this. Vanhuysse (2013) already did so when he motivated the need to measure child poverty. We can say that data on young people is more relevant prospectively, precisely because of these scarring effects.

This does not mean that data on older people cannot also be relevant in obtaining information on birth cohorts. Although this project does not explore this possibility as much, data on older ages can still be cohortally relevant as they have the advantage of capturing cumulative effects from the past. As mentioned above, indicators on both age groups can also be suitable for measuring fairness between different birth cohorts.

Benefit Ratios

Benefit ratios can also be relevant to a conception of justice between birth cohorts even if it is not based on reciprocity. The tendency is to associate our indicators in *public finance* with reciprocity. This includes their sustainability in the long and medium term; that is, the idea that future generations should not have to bear more taxes for similar levels of benefits than present generations (and vice versa) and the idea that current generations should not bear more or less of the burden of budgetary adjustment to respect the rules of the *Stability and Growth Pact* than future generations. The same view may underlie the ratio between social contributions currently paid to fund pensions and the value of pensions, and the one between the average retirement age and the average life expectancy at 65[10].

While it is tempting to associate these proposals with the idea of reciprocity, we can still look at these indicators as some form of equal protection of the various generations, which is generally intuitive. This does not necessarily go against distributive equality if we do not take inequality between generations for granted. It is this type of inequality that we are trying to discover, rather than assume, with this project. We can, therefore, assume that each generation is otherwise equal to the previous one, as this is studied in other areas. What we know so far is that *all other things being equal*, a benefit ratio (i.e., the ratio of benefits to contributions) should not favour one generation over another. Doing so is, all else constant, to put one at a disadvantage over the other. Of course, such injustice can be accentuated or attenuated

10 This underlies the Portuguese legislation that positively associates the increase in life expectancy with an increase in the statutory retirement age, which is also considered one of the public finance indicators.

depending on the results we obtain in other areas, so as to worsen or improve the final value of intergenerational injustice.

*

In conclusion, indicators for measuring intergenerational justice often tend to focus on reciprocity (as opposed to more distributive conceptions of justice) and age groups (as opposed to birth cohorts). That is what also happens, partially, with this study. We provided some descriptive explanations for this decision, but we have also pointed out some normative problems that this decision may bring. Finally, we proposed three ways the indicators could be relevant to an approach that is neither centered on reciprocity nor restricted to age groups. It is, however, essential to insist that these strategies are still imperfect approximations, and that more needs to be done to refine the indicators in order to make them more directly significant from a normative perspective.

2.2. The Intergenerational Justice Index- main methodological choices[11]

Before presenting each dimension of this index of intergenerational justice, it is important to clarify its calculation and some of the methodological choices made.

The dimensions chosen and their relative weight

Any composite index such as the "IJI - Portugal" results from various methodological choices, some of which are due to technical or operational reasons (e.g., data availability), whereas others result from normative decisions. This section aims to clarify some of the options raised by the analysis and the *choices* that have been made.

The *IJI-PT is an index made for Portugal* and is primarily intended to be analysed diachronically for Portugal. Unlike other indices (e.g., the World Bank's Development Index), its ultimate goal is not to compare countries. It is, instead, to analyse the evolution of intergenerational justice indicators over time in Portugal. Even with minor adjustments that do not detract from the consistency of the chronological series, it would be desirable for the index to be updated and calculated for at least a decade (until 2033). It should be noted that in 2030, we have the first major goal concerning climate change (Paris Agreement), which is why it is important to observe and monitor Portugal's progress concerning its international and national commitments, not only environmentally, but in several other relevant dimensions.

The first general methodological option was choosing the *dimensions* through which we approached intergenerational justice. The few indices of solidarity or intergenerational justice, as well as of sustainability indices, consider indicators in various areas. Various inequalities between cohorts were identified in the labour market, public finances, access to housing, and climate change contribution[12]. The choice of the six dimensions mentioned earlier was not indifferent to their relevance for public policy in Portugal. As we have mentioned, less studied but no less relevant are inequalities between cohorts in terms of poverty and income distribution, on the one hand, or health, on the other. How these and other inequalities between cohorts impact intergenerational justice also remains under-studied.

[11] Readers who are less interested in technical issues can skip this section without prejudice to an overall understanding of the study. Still we consider these methodological notes relevant to understand that there are always several options when constructing an index of intergenerational justice.
[12] The four studies already carried out for the Calouste Gulbenkian Foundation analyzed these inequalities from an intergenerational justice point of view. See Domingos and Vieira (2021), Franco (2021), Martins (2021) and Xerez, Pereira and Cardoso (2019).

For each dimension (i=1,2,3,4,5,6), a sectorial Intergenerational Justice Index *(IJIi*) was constructed based on sub-dimensions and a set of j indicators[13]. In each of these dimensions, it was clarified what is considered *fair* from an intergenerational point of view or, in a weaker version, what is *not considered unfair*. Sometimes, when measuring *intergenerational justice* was problematic, we measured the *sustainability* of some indicator. Although different concepts, sustainability and intergenerational justice are nevertheless related. *Sustainability is a necessary condition, but not sufficient, for intergenerational justice.* If the net liabilities (e.g., financial or environmental) left to future generations have an increasing tendency and are unsustainable, they are a source of severe intergenerational injustice. In other words, unsustainability is a sufficient condition for intergenerational injustice.[14]

Therefore, each "sectoral" indicator of justice has its own interpretation and must be read in relation to what is considered intergenerational (in)justice in the specific area.

The second general methodological option refers to the proposal of weights and the form of the various dimensions. This option is clearly normative and subjective. A third level of methodological options relates to each sectoral dimension, the choice of weights used, the form of aggregation carried out and the indicators' standardization method.

If there is no reason for the sub-indicators to be weighted differently, geometric aggregation is generally adopted.

Selection and Standardisation of indicators and forms of aggregation

The selection of variables took into account various criteria:[15]

Comprehensiveness - the indicators should cover a wide area of potential sources of intergenerational injustices. The dimensions considered in this study are: i) the environment and natural resources (IJI1) ii) health (IJI2); iii) the labour market (IJI3), housing (IJI4), poverty and living conditions (IJI5) and public finances (IJI6).

Rigour - The data sources must be credible, and the data should preferably be publicly accessible.

Transparency and simplicity - The number of indicators should be reduced in each area. The indicators should be clear either because they are based directly on credible primary sources with meta-information about the variables or because, as they are constructed, the sources used, the assumptions made, and the methodologies applied to build them are clear. Complex indicators that require a significant amount of work to develop were avoided because they would detract from transparency and understanding and jeopardise the ability to update them annually over the next decade.16

Comprehensibility and accessibility - The more aggregated a composite index, the lower its "readability". Having a single index (and its annual variation) facilitates accessibility of the result and the transmission of communication to citizens, the media and political decision-makers, who are the main stakeholders of this study. A single index provides little information. But that

13 Each IJIi indicator is the result of aggregating a maximum of 5 indicators. We will then use the notation for sub-indicator j of area i as IJIij, with j=1,2,...5.

14 A paradigmatic case is the unsustainability of Portugal's public finances in 2010-11, associated with an increase in the weight of debt to GDP that led to the country's financial rescue by the Troika (International Monetary Fund, European Commission and European Central Bank). The heavy fiscal consolidation measures were borne by the generations and sectors most affected by unemployment (particularly young people) and the fall in real wages.

15 These criteria are discussed in OECD (2008) and McQuilckin (2018), among others.

16 Of course, more complex indicators allow for a finer analysis of intergenerational justice, and simpler indicators sometimes tell us more about sustainability than intergenerational justice.

is precisely why this Intergenerational Justice Index for Portugal results from indices in the various dimensions.

Perenniality and annuality of primary data - The institutions that produce the data are and have a historical record of data going back at least a decade, with guarantees that they will continue to produce such data for years to come (e.g. INE, Ministry of Finance, EUROSTAT, etc.).

Relevance - The indicators must be appropriate for measuring variation in intergenerational justice in the various dimensions. This means that in each area, there must be a rationale for how the indicators are considered to measure specific dimensions of intergenerational justice or how they prevent intergenerational injustices.

Non-overlap: There should be no significant overlap between sub-indicators within each area but, most importantly, between sub-indicators of different dimensions. This means that there should not be a high correlation between sub-indicators of distinct areas, as that would mean that they would likely be measuring the same underlying reality, which not only ends up overweighting that indicator in the IJI – Portugal, but also introduces some overlap between what is measured in different dimensions.

Non-volatility: Given their impact on the sectoral IJIi and the global IJI, the indicators should be constructed in such a way as to avoid very pronounced variations from year to year. This is achieved, for example, by using moving averages of 3, 4 or 5 years (the higher the number, the more stable the indicator). That is not necessary for those that are already relatively stable from year to year (e.g., life expectancy at birth)[17].

To construct the Intergenerational Justice Index (IJI) and sub-indices IJI1, IJI2, IJI3, ...IJI6, it was decided to normalise all the indicators to the same *interval* open to the left)0,1). Special attention was given to the value of 1, and the same meaning was attributed *to increasing values* of the indicator in this interval. *Increasing* values of the indicator towards 1 mean that you are implicitly *improving* the relative well-being of future generations or increasing the relative stock of liquid assets of *future cohorts* in relation to *present ones*[18]. Values progressively closer to 0 mean that from the point of view of intergenerational justice, evolution is in *favour* of today's older cohorts (*baby boomers*). With the interval)0,1), and if there is a limited field in which a particular variable x varies, we can use the Min-max method, assuming that a high value for this variable x is *unfavourable* for future generations and could put them at risk (e.g., X is the value observed in year t in dimension 1, for indicator 6: drinking water pollutants)[19]. In that case, the indicator will show the minimum value if the observation in that variable has the *maximum* value:

$$IJI_{1,4}^{t} = \frac{x^{Max} - x_{1,6}^{t}}{x^{Max} - x^{Min}}$$

17 As we will see, a cross-sectional analysis of the indicators for the various dimensions and sub-dimensions shows that the above characteristics were generally met. The exceptions, in terms of transparency and accessibility, are the indicators relating to water, the environment and natural resources and the sustainability of public finances. In these cases, an attempt was made to make the indicators as simple as possible within the methodology used.

18 Rather than the absolute value of the indicator, what will be relevant over time is the *variation* in the indicator. Suppose we adopt a utilitarian perspective. Despite whether the analysis is made in terms of *stocks* or *flows* (the productivity of capital determines the relationship between the two), *the change in the relative valuation* of the "well-being" of future cohorts compared to present cohorts does not depend on the discount rate. An improvement in the indicator means that the welfare levels of future generations are improving compared to present ones. The discount rate will be relevant if we want to make a comparison between levels of "wealth" (stocks) or "income" (flows) of future generations in relation to present ones, which is not the case.

19 As the next chapter will show, the environment and natural resources dimension (dimension 1) has five sub-dimensions. The fourth sub-dimension, water pollution, is only observed through one indicator, which is the sixth indicator (out of 8 indicators) of this dimension.

Since this is a numerical scale, on the other hand an *increasing* value for this indicator (associated with a *lower* value of the level of pollutants) means that today's water pollution is reducing the risks posed to future generations. The value 1 is achieved when pollution is (x^t) is minimal.

With the indicators normalised in the)0,1) range, the last stage consisted of constructing the indexes (IJIi for each dimension and IJI). There are various ways of aggregating sectoral indices into a composite indicator, the most common being *linear aggregation* (the arithmetic mean, where it is implicit that all weights are equal to 1) and *geometric aggregation*. Given the reasons set out in an OECD (2008) study on constructing composite indicators, we opted for geometric aggregation.

Once again, it should be emphasised that the intention here is not to convey that the variation in *one single index* can summarise what is happening in Portugal regarding intergenerational justice. Any variation must be explained and analysed; for that, it is necessary to look at what is happening to each one of the indicators in each dimension and sub-dimension.

Unless there is a better argument to the contrary, we adopt the same methodology within each dimension. For example, in the area of the environment and natural resources (ARN), the dimension index in year t will be a function of a set of indicators for each sub-dimension, which, given the availability of data, will always be somewhat mismatched[20]. With five indicators, we have:

$$IJI_1^t = \left(IJI_{1,1}^t * IJI_{1,2}^t * IJI_{1,3}^t * IJI_{1,4}^t * IJI_{1,5}^t\right)^{\frac{1}{5}}$$

In this regard, the overall intergenerational justice index is a function of *IJIi* and given by:

$$IJI^t = (IJI_1^t * IJI_2^t * IJI_3^t * IJI_4^t * IJI_5^t * IJI_6^t)^{\frac{1}{6}}$$

2.3. The Intergenerational Justice Index- Aggregate results

How has intergenerational justice evolved in recent years in Portugal? Obviously, the answer to this question depends on the assumptions of the analysis and the methodological choices that have been made and explained in this chapter.

In summary, we can say there has been some improvement in the situation of the younger generations and in what is expected for future generations, as reflected in the overall IJI indicator, which rose from 0.41 in 2015 to 0.47 in 2020.

This improvement results from the opposite effects of various dimensions through which we assess intergenerational justice. If we analyse the pre-pandemic period (since 2020 is a year), there are mainly three dimensions that have improved (poverty and living conditions, the labour

[20] As you will see in chapter 3, by the time this study concludes, some dimensions can obtain annual data up to 2021. In other areas, the last year available is 2020, which is why the IJI Portugal is calculated up to 2020.

market and public finances), two that have worsened (environment and natural resources and housing) and, finally, one that is relatively stable (health)

Table 1- Global Intergenerational Justice Index (Global IJI) and sectoral indices

Source: authors' calculations

Anos	IJI Global	IJI Environment	IJI Haelth	IJI Labour Market	IJI Housing	IJI Poverty and Living Conditions	IJI Public Finance
2015	0.41	0.47	0.37	0.27	0.46	0.30	0.41
2016	0.42	0.48	0.37	0.34	0.45	0.35	0.42
2017	0.44	0.44	0.39	0.36	0.44	0.45	0.43
2018	0.46	0.42	0.39	0.43	0.45	0.51	0.45
2019	0.47	0.41	0.38	0.49	0.44	0.58	0.47
2020	0.47	0.40	0.42	0.58	0.42	0.54	0.45

To each of these dimensions, we associate an index of intergenerational justice, which is explained by the various sub-dimensions. Thus, the negative contribution of *the environment and natural resources* dimension is due to the country's inability to comply with its commitments concerning the circular economy, namely in terms of waste production and recycling, as well as the increasing water *stress* (see chapter 3). This is despite all the progress made in decarbonizing the economy. On the other hand, the increasingly negative impact of *housing* on young people and more recent cohorts is mainly due to both the increasing inaccessibility of home ownership and the growing loss of autonomy reflected in the fact that, in 2020, more than half of young people (aged 25 to 34) were still living with their parents (chapter 6).

In contrast, the trend in the *labour market* in recent years has been positive, mainly due to an improvement in the country's macroeconomic conditions, which is reflected in lower levels of unemployment and a slight upward trend in young people's real wages, partly explained by the rise in the minimum wage (chapter 5). Also positive has been the contribution of the *poverty and living conditions* dimension (if we exclude housing). Mainly, that is because, in the period analyzed (2014-21), there was a clear downward trend in poverty, material deprivation and an increase in young people's participation in formal education. These increase the likelihood of the new generations being able to access a better life (chapter 7). Still on a positive note is the dimension of *public finances*. Despite the long-term imbalance of public finances (clear from an analysis of generational accounts) and an excessive debt-to-GDP ratio of well over 60% - the reference value in the European Union - there has been a trend of improvement towards the sustainability of public finances, even if we are still far from achieving it (chapter 8). Such sustainability is a necessary but not sufficient condition for intergenerational justice.

Finally, there is the health dimension, which turns out not to have contributed positively or negatively to intergenerational justice in recent years, given that it has sub-dimensions that evolve in opposite directions (chapter 4).

3. Intergenerational Justice Index: Environment and Natural Resources[21]

3.1. The Environment and Natural Resources dimension

Evaluating intergenerational justice in the context of the environment and natural resources presents major operational challenges. The difficulty of quantifying this justice leads us to use an associated but distinct concept, that of *strong sustainability*, which translates into leaving future generations a level of "natural capital" not inferior to that received by current generations.

The main difficulties in approaching this issue are related to the uncertainties of the future. We don't know the size of the future population, nor their preferences regarding the use of natural resources. There are also uncertainties about the availability of natural resources and future technological development. In addition, the behavior of other countries in relation to climate challenges is also uncertain, so global coordination in the fight against climate change is difficult. That said, it would not be appropriate to approach intergenerational justice using a utilitarian view or Maximin/Leximin, as these require a level of information that we do not have or assumptions of preferences that are not recommendable. We therefore adopt a *contractualist view* between generations. The hypothetical ideal social contract between present and future generations would consist of a commitment not to hand over the environment and natural resources in worse condition than we received them. In the area of climate, for example, this is not the case, as we are still increasing global warming. There are, however, national and international commitments made by Portugal, in the medium and long term, which we can consider to embody these "social contracts" and which we can monitor.

3.2. Sub-dimensions

The intergenerational justice index (IJI) in the environment and natural resources is based on five sub-dimensions that are relevant to public policies in areas considered critical. In this sense, and to identify these most critical areas, both the study by Domingos and Vieira (2021) and the assessment of Portugal's environmental performance recently made by the OECD (2023) were relevant. The sub-dimensions chosen were: (i) climate change; (ii) forests (management and carbon sink effect); (iii) the circular economy (waste reduction and recycling) and finally water in the dual aspects of (iv) pollution and (v) consumption. The indicators chosen also considered criteria developed by the OECD and the European Commission (2008) for the construction of composite indicators. For each sub-dimension, we propose one or two specific indicators (see Figure 1).

[21]The Policy Paper prepared by Paulo Trigo Pereira, Luísa Nobre and Diogo Esteves, develops this chapter in greater depth and with more data. See the Institute of Public Policy's website dedicated to the project: https://www.ipp-jcs.org/indice-de-justica-intergeracional/

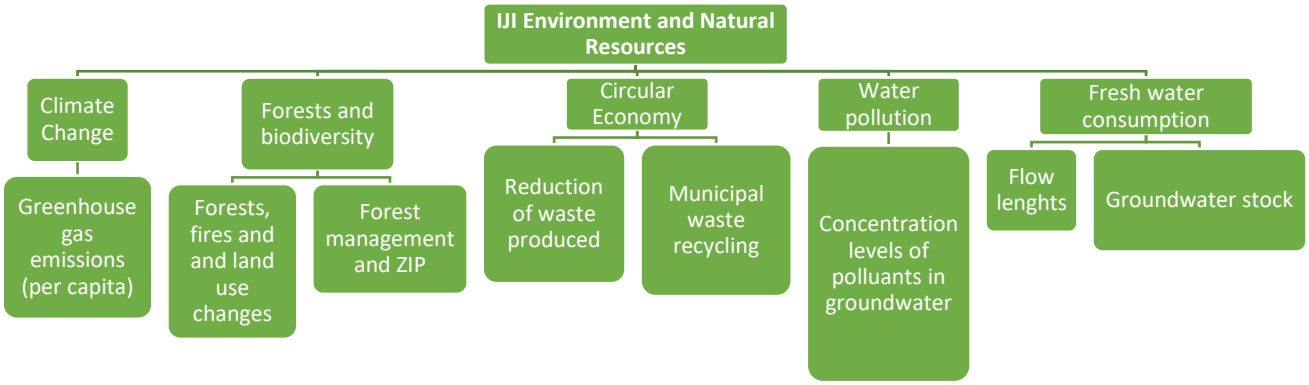


Figure 1- Sub-dimensions and indicators of intergenerational justice considered in Environment and Natural Resources.

3.3. Indicators

The *climate change* indicator is a function of *greenhouse gas emissions* (GHG, without forests and land use changes). It aims to measure the implementation of the intergenerational "social contract" in which current generations make an effort towards carbon neutrality, thus avoiding global warming above the "planetary boundary". The medium and long-term emission targets are those defined in the national carbon neutrality objectives, considering the Paris Agreement and the European Green Deal. The proposed indicator is intended to portray how far we are from carbon neutrality and a desirable emissions mitigation path. Bearing in mind that a very rapid reduction presupposes greater effort on the part of present generations, the aim is to calculate short-term targets. We only consider that we are in a situation of relative climate justice when we reach carbon neutrality, the target set for 2050.

Forests are one of the main components of the natural capital left to future generations. In addition to their productive potential, forests provide an important set of ecosystem services: they contribute to maintaining water tables, prevent soil erosion, promote biodiversity, have a carbon sink effect, among many other benefits. The fact that the services of these ecosystems are not paid for is an additional factor, along with others, to suggest that forest management is inefficient and that there is a tendency towards deforestation and the promotion of alternative land uses.

The environmental indicator that is generally used in the few studies on intergenerational justice related to forests is precisely the rate of deforestation, since it signifies the dilapidation of natural capital. Globally, the area occupied by forests has been decreasing. In Europe, on the other hand, it has been increasing, particularly in some countries. In the period from 1990 to 2020, the forest area increased significantly in countries such as Spain (33.6%), Italy (26%) and France (19.5%). Portugal is one of the few cases in which forest area has decreased, even slightly (-2.6%) in recent decades.

Given the multiplicity of possible indicators for evaluating *forests and biodiversity*, and the fact that there was no significant degree of deforestation we chose two indicators associated with forests and land use: i) the net removal of GHG originated in land, land use change and forests

(LULUCF) and ii) the quality of forest management measured by a proxy, the area under Forest Intervention Zones (ZIF).[22]

In the field of waste production and recycling, the indicator chosen is intended to show the state of the nation in terms of progress towards a *circular economy* and the reduction of total waste generated. It was built considering the European Union's medium and long-term objectives defined in the "Green Deal", adopted and adapted by Portugal for its PNGR2030 waste treatment and management plans. Two different sub-indicators were used to construct this indicator: on the one hand, the municipal waste recycling rate was used as a proxy for the circular economy and, on the other, the municipal waste capitation to illustrate the trajectory of the waste generated. Once again, the desirable trajectory for reaching the long-term targets is calculated. We have thus created an indicator that penalizes how far we are from the long-term goals and also from a desirable short-term path towards a circular economy with less waste generated.

The indicator selected to assess water pollution focuses on groundwater quality indexes. More specifically, we used data of the concentrations in mg/l of the pollutants ammonia (NH4) and nitrate (NO3) in groundwater, comparing them with the quality standards defined by the Portuguese Environment Agency. The quality of groundwater is of fundamental importance for agriculture and water supply in Portugal, especially during periods of drought when surface water is scarce. The main source of pollution comes from certain fertilizers used in agriculture, which seep into the soil and contaminate the water. Due to the difficulties in identifying polluting sources and the weak regulation in the sector, farmers do not internalize the negative externalities arising from their farming practices. Consequently, they have no incentive to adopt cleaner and more sustainable techniques. Unlike the previous indicators, here we calculate the sustainability of these resources. Given the very high cost associated with cleaning up groundwater, the aim is not to damage the natural resource to the point of compromising its future consumption.

The indicator for freshwater consumption is the result of two sub-indicators: one for groundwater and the other for surface water. These indicators are based on the difference between the amount of water available and consumption. This distinction is necessary because the consumption of different resources has different economic and environmental dynamics and implications. The excessive use of groundwater highlights the absence of adequate management, regulation and investment in the sector. Ultimately, high levels of consumption can lead to the contamination of water reserves with salt water, making future consumption impossible. Data on groundwater piezometric levels - i.e. the depth of water levels - was used to monitor water availability. As for the surface water sub-indicator, the minimum volume needed to preserve quality and biodiversity is defined. In this case, we used data on river flows in Portugal. Once again, the aim is to guarantee the sustainability of the natural resource and ensure that the natural capital bequeathed by one generation is passed on to the next.

[22] "A Forest Intervention Zone (ZIF) is a continuous and delimited territorial area, consisting mainly of forest spaces, subject to a Forest Management Plan (PGF) and which complies with the provisions of the Municipal Forest Defense Plans Against Fires, and administered by a single entity, which is called ZIF Management Entity." Instituto da Conservação da Natureza e Florestas.

3.4. Results

Years	Climate Change	Forest and Biodiversity	Circular Economy	Water Pollution	Water Consumption	IJI Environment
2015	0.19	0.38	0.69	0.69	0.61	0.47
2016	0.25	0.37	0.64	0.68	0.53	0.48
2017	0.25	0.34	0.54	0.61	0.53	0.44
2018	0.26	0.37	0.44	0.65	0.47	0.42
2019	0.27	0.42	0.34	0.60	0.47	0.41
2020	0.32	0.46	0.25	0.62	0.51	0.40
2021	0.37	0.50	0.18	0.65	0.51	0.40

Table 2- Evolution of standardized indicators relating to intergenerational justice in Environment and Natural Resources.

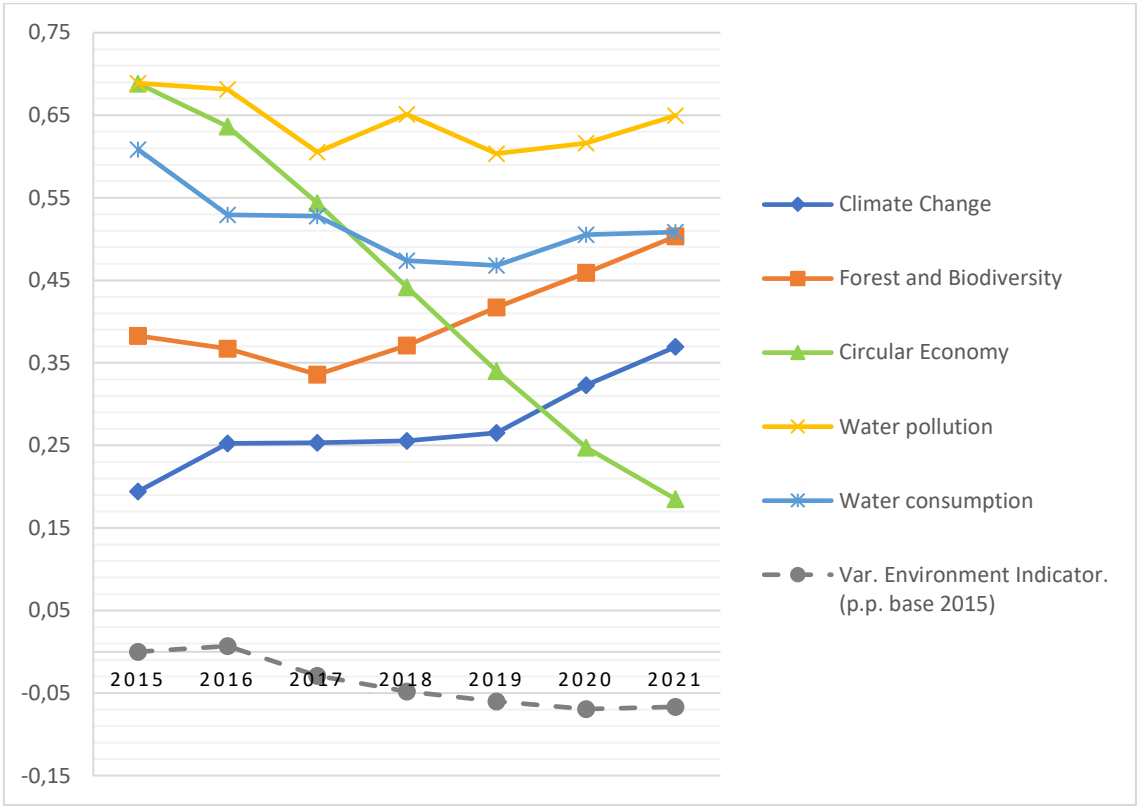
The results of these indicators and their evolution are in line with the main and recent concerns of international institutions regarding Portugal (see OECD 2023), which reinforces the importance of the indicators chosen and their annual monitoring.

A situation of intergenerational justice, interpreted as *strong sustainability*, would involve having a unit value in all the sub-dimensions. Being below one means that future generations are getting worse off in terms of inheriting “natural capital”. Regardless of the absolute value of the index, it is important to evaluate whether we are on a path to fulfilling the implicit "social contracts" to which Portugal has committed itself.

If we look only at the most recent period, there has been slight progress in decarbonizing the economy, reflected in an improvement in the climate change index, which was 0.19 in 2015 and 0.37 in 2021. The forests and biodiversity index has two indicators that have evolved in the opposite direction. In terms of forest management, there have been improvements in recent years, due to the creation of new forest intervention zones (ZIF). However, in terms of the sink effect of forests, and in terms of the ecosystem services provided by forests, there has been a decline, especially following the fires of 2017.

Finally, we can also look at the most worrying dimensions from a public policy point of view: the situation relating to waste production and recycling (circular economy) and water stress. Instead of Portugal making progress towards the annual targets it wants to achieve (the implicit "social contract" with future generations), it is moving away from these targets.

These indicators, which use data at a minimum annual frequency, make it possible to monitor the main anthropogenic impacts on the environment and natural resources and to evaluate whether, in the short term, we are making progress in line with the long-term goals inscribed in the "social contracts" we make with new generations.



Graphic 2-Sub-dimensions of Intergenerational Justice considered in Environment and Natural Resources

3.5. Public policies and intergenerational justice

In relation to the sub-dimensions studied, the fight against climate change deserves a positive mention. This is due to the public policies of the last decade that have changed the energy mix, moving away from oil and coal towards gas and renewable energies. The closure of the last coal-fired power stations in 2021 has had a positive impact in domestic terms, although this has had an impact on the trade balance in energy products. While national projections indicate that Portugal is on track to meet its 2030 targets and commitments (with a 55% reduction in GHG emissions compared to 2005), it is also true that additional public policies are needed to achieve not only the 2030 target, but also the 2050 carbon neutrality target (see OECD 2023). It is in this sense that annual monitoring of indicators, such as those proposed in this study, are relevant to understanding the extent to which we are meeting the targets we have set.

In the sub-dimension of forests and biodiversity, we focused on forest management (indicator of the area of forest intervention zones) and the potential carbon sink effect that forests should have. Many studies and recommendations have been made in this area after each wave of fires. What seems necessary, along with improving the forest register and the quality of forestry information, is to strengthen the incentives for owners to integrate the ZIFs. On the other hand, we need to implement the recommendations of these studies so that the forest, in addition to its market value, performs the essential function of maintaining biodiversity and absorbing carbon. It's important not to forget that the goal of carbon neutrality by 2050 presupposes a significant contribution from forests.

While there have been some improvements in the decarbonization of the economy and forests since 2016, the same cannot be said of the circular economy and waste in particular. The OECD considers that Portugal has missed a large part of its 2020 targets, particularly due to its inability to decouple economic growth from waste production, and its failure to reduce municipal waste.

Regarding waste treatment and management, Portugal has a National Waste Management Plan (PNGR) which sets out the goals and objectives for the next decade. These objectives are in line with the strategy outlined by the European Union in the "Green Deal". After the PNGR 2020 (which includes specific plans such as PERSU) was approved, an analysis was made of whether or not the established targets had been met. As the PNGR 2020 targets were not met, there was a less ambitious readjustment of the targets for the PNGR 2030, which was only approved very late after public consultation[23]. By readjusting targets that have not been met (when the trajectory has been one of deterioration rather than improvement, as in the case of municipal waste collection), government has “embellished” the real state of waste treatment and management in Portugal. It is therefore essential to keep targets for a longer period of time, not allowing them to be adjusted too often, forgetting the damage done to ecosystems and future generations, which could be irreversible.

Water-related indicators show non-compliance with some of the objectives of the Water Act (Directive 2000/60/EC of the European Parliament and of the Council of October 23, 2000), which include: (i) gradually reducing groundwater pollution, (ii) ensuring a sufficient supply of good quality surface and groundwater and (iii) preventing further degradation and protecting and improving the state of aquatic ecosystems as well as terrestrial ecosystems. Individual incentives are not aligned with the objectives, which is why regulation is necessary. Due to the characteristics of aquatic resources, the coordination of economic agents for long-term sustainable management is unfeasible without a strong public policy in place. There are three aspects of public policy, as evidenced by the indicators, which need to be improved. The first is the maintenance of ecological river flows. In this area, there is a lack of data on the calculation of flows for each river. Supervision and control cannot be carried out effectively when the basic parameters have not even been calculated. The second is the right incentives in agriculture, especially about fertilizers and cultivation methods. Finally, incentives for sustainable consumption, and combating water losses, including more efficient forms of irrigation in agriculture and water reuse. It is important to stress that there are targets for water reuse, however Portugal is currently far below these targets, with only a water reuse rate of around 2%.

In addition, climate change poses new challenges. Droughts are expected to become more frequent and longer duration. Water management should not only maintain the natural capital it has received, but also improve it, as future scenarios are not favorable.

[23] The PNGR 2030 was only approved by Council of Ministers Resolution 31/2023 of March 24, after public consultation, when it should have been as soon as 2020.

4. Intergenerational Justice Index: Heath[24]

4.1. The heath dimension.

Health and health policies have a potential intergenerational impact that is not negligible, and it is necessary to consider the long-term effects of current decisions and changes associated with these policies. The socio-economic determinants of health, economic development and the sharing of resources have implications for the health of future generations and therefore deserve specific attention.

The concept of health, from the perspective of intergenerational justice, is related to the amount of health capital that is transmitted from one generation to the next, which implies an analysis of the determinants of the production and accumulation of this *capital*. The notion of health *capital* considered here coincides with that proposed by Grossman (1972). According to this perspective, health *capital* should be seen as a durable asset, which everyone enjoys at birth, but which depreciates over time and with age. Despite its depreciation over time, health *capital* can be replenished or improved with investments in health (which includes medical and non-medical care) and is therefore also an asset produced by each individual.

Each individual's *health capital* is determined by a wide range of factors (Dahlgreen and Whitehead 1991), including factors of a biological nature, cultural factors, as well as institutional factors linked to the health system or working conditions. These health determinants influence each individual's health capital over time, with potential intergenerational implications. While some determinants can make an advantageous contribution to future health capital, such as better housing conditions and schooling, other determinants can have a negative effect, such as environmental degradation or an excess of agro-chemicals in agri-food production.

The provision of health care should be seen as one of the factors - among many others - that contributes to greater accumulation of health capital. An important health determinant that favors health capital is directly related to the country's health system. It is this institutional structure that responds to the population's health needs and contributes directly to the improvement and growth of the population's health capital (Murrey, Frenk and WHO 1999). Thus, a health system characterized by a high number of unsatisfied health needs contributes less to population health and to greater health inequalities. On the other hand, a health system that has a greater commitment to maternal and child health care functions to the detriment of geriatric health or prevention may influence the distribution of health across different age groups, which in the long term will have an effect on the health capital of the different cohorts and on the health of the population.

Despite these determinants, health capital is not a limited resource distributed between and within generations and cannot be directly traded or exchanged. There is evidence of some intergenerational transmission of health at the level of each individual (micro). The literature suggests that socio-economic advantages throughout life are reflected in health benefits over several generations. In other words, the intergenerational transmission of income, wealth, social support and human capital within the family is associated with better levels of health in descendant generations (Marmot 2005, Ahlburg 1998, Halliday et al. 2020).

24 See the Policy Paper prepared by Aida Isabel Tavares and Eduardo Costa on the Institute of Public Policy website, which will be available here https://www.ipp-jcs.org/indice-de-justica-intergeracional/

From an aggregate point of view, it is also accepted that there is a positive correlation between the health of the population and economic growth, and that the causal relationship can go in both directions. The general idea is that a healthy population increases the country's human capital by increasing productivity and thus contributes to economic growth. On the other hand, economic growth can contribute to improving the macroeconomic, institutional, environmental and cultural determinants of health and, therefore, to the health of the population (Bloom, 2008; Bloom, 2018; Lange, 2017). This macroeconomic perspective is dynamic, longitudinal in nature and therefore expresses relationships between different generations (Mayer-Foulkes, 2004). In fact, there are several macro-determinants of population health that can be transmitted between generations, and, for this reason, it is important to assess the intergenerationality of health (WHO, 2015). What is expected, due to the relational process of "economic growth - health", is that the next generation will have greater and/or better quality health capital than the previous generation. In the case of an economic recession, the transmission of health capital to the next generation can be expected to be smaller or of lower quality.

However, due to other health determinants such as social inequalities, climate change, population ageing and unexpected factors (e.g. pandemic crises), the hypothesis regarding the evolution of health capital between generations may not always be verified. The next generation may inherit, create and enjoy less health capital than the previous generation.

On the other hand, the determinants of health have the capacity to influence health capital in the long term, i.e. they influence the risk factors for loss of health, starting at the time of a woman's conception and pregnancy. Thus, the intergenerationality of health capital can be the result of the determining factors that the previous generation shaped or influenced. In this case, we could consider an inter-temporal production function, whose *inputs* at time *t* have an impact on the *output* (health *capital*) at time *t+n*. For example, the generation of young people in the 1960s experienced high infant mortality rates, while the generation of young people in the 2020s does not have the same disadvantage; however, the generation of young people in the 1960s was less likely to contract a disease associated with pollution or agrochemical excesses than the current generation of young people in the 2020s. These changes in life expectancy and quality of life are the result of health determinants and not a direct transmission of health capital.

4.2. Sub-dimensions

It is important to monitor the evolution of a set of indicators grouped into two sub-dimensions (Figure 2). On the one hand, the **health capital** sub-dimension, which aims to measure the evolution of the population's state of health. This sub-dimension includes indicators to capture quantity of life, quality of life and well-being.

On the other hand, the aim is to analyze the contribution of the health system's performance to improving health capital, i.e. **health system coverage**. This sub-dimension considers indicators in terms of access to health care, in order to measure the population's difficulties in accessing health care; it also takes into account the prevention-oriented coverage of the health system. A health system that tends to contribute to the health capital of younger people tends to have a significant focus on prevention, i.e. a concern for health promotion alongside the treatment of disease.

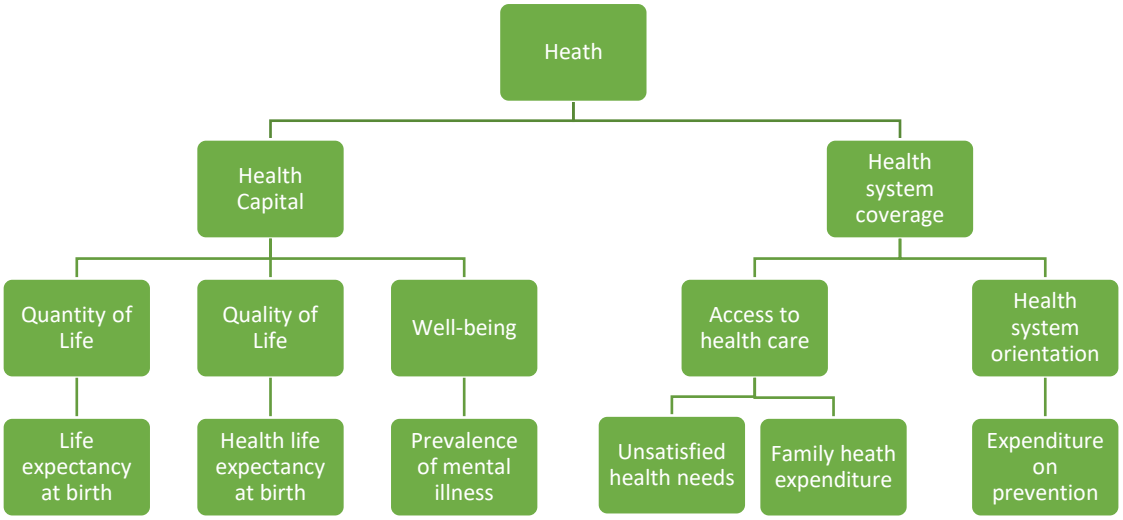


Figure 2- Sub-dimensions and indicators of intergenerational justice considered in Health.

4.3. Indicators

As part of the **health capital** sub-dimension, we considered three indicators: life expectancy at birth, healthy life expectancy at birth and prevalence of mental illness.

Life expectancy at birth

Regarding health capital, the aim is to analyze the evolution of the quantity of this capital captured by the evolution of life expectancy at birth, measured in number of years. This indicator represents the average number of years left to live from birth, subject to current and age-specific mortality conditions.

The growth of this indicator over time means that future generations have greater health capital than previous generations. In this case, it is assumed that the evolution of health determinants, including dimensions related to the evolution of the health system and technology, allows new generations to achieve higher levels of life expectancy than previous generations. This indicator centrally represents the evolution of health capital over time and an increase in this value translates into a growing benefit for future generations.

Healthy life expectancy at birth

Life expectancy ignores quality, i.e. it ignores non-fatal illness, morbidity and disability during life. For this reason, an indicator has been introduced to assess the evolution of healthy life expectancy at birth. This indicator corresponds to the number of years of healthy life at birth and therefore measures the number of years a person is expected to live without moderate or severe illness or disability; in other words, it combines mortality data with data on the health status of the population. An increase in this indicator over time signals the accumulation of better health capital by future generations. Although healthy life expectancy can be related to life expectancy, an increase in one variable does not necessarily translate into an increase in the

other[25]. This is because the two indicators capture different information about the population's average state of health. The fact that there is an upward trend in life expectancy at birth does not guarantee that there will be an equal upward trend in the number of years of healthy life in the population.

Prevalence of mental illness

Quality of life is potentially affected by multiple dimensions. One of the main ones is mental health which has received increasing attention in recent years. However, indicators of quality and quantity of life tend not to fully reflect variations in mental health status. On the other hand, historically, health systems themselves have not had mental health at the center of their care priorities. For these reasons, it was considered relevant to highlight the problem associated with mental health through the inclusion of an indicator related to the prevalence of mental illness in the population. An increase in this indicator over time signals a deterioration in the mental health status of current generations, compared to that recorded in previous generations.

The indicator of the prevalence of mental illness is given by the percentage of the population with mental health problems[26]. If the value of this indicator increases, then it can be said that there is a burden on descendant generations who will have to deal with worse mental health states throughout their lives.

Within the sub-dimension of **health system coverage**, we will consider three indicators: unsatisfied health needs, household health expenditures and prevention expenditure. The first two indicators are combined into a geometric average to create a measure of access to health care.

Unsatisfied heath needs

Unsatisfied health needs represent the percentage of the population that reports not having been able to access health care in the last 12 months due to financial difficulties, long waiting lists or transportation problems. This indicator is self-reported and calculated from sample data, which can introduce some biases, but it provides an estimate of the potential barriers to accessing the health system. A health system that has little capacity to respond to the health needs of its population is a system that will tend to be unproductive of health capital. The coverage of health needs reflects the broad objective of a health system, which is universal health coverage (coinciding with the objective of sustainable development 3.8). Covering these needs is a way of ensuring the financial protection of those who access health care and of guaranteeing the recovery and maintenance of people's health so that they can participate in society. An increase in this indicator signals a growing difficulty for current generations to access the health system, with repercussions for future health.

Family Health expenditure

Direct payments made by families to access health goods and services are measured annually as a percentage of direct expenditure in total current health expenditure. This indicator represents the lack of financial protection when it comes to accessing health care. This household health

[25] See more details in the Aida Tavares and Eduardo Costa, Health Policy Paper on the IPP website.

[26] This indicator was introduced after discussion with health experts. However, its value has not varied significantly over time. The mental illnesses included in this indicator are depression, anxiety, bipolarity, eating disorders and schizophrenia.

expenditure is made up of households' primary income or savings. A health system with high percentages of direct payments in total health expenditure has weaknesses in its function of guaranteeing the financial protection of those who access and need health care. Depending on people's financial capacity (to pay for access, transport or time off work), so will be the access to health care, generating inequalities that can be passed on to future generations, as indicated by the various microeconomic empirical evidence. The higher levels of direct spending on health by families in recent years mean that new generations have to make a greater financial effort to access health care, reducing their disposable income for other essential goods and services.

Expenditure on prevention

Health status is affected by several factors beyond the direct provision of health care. Adopting healthy behaviors and focusing on disease prevention can contribute to improving people's state of health. For this reason, health systems should be geared towards activities that promote disease prevention and health promotion. This dimension includes the indicator of expenditure on health activities linked to preventive care aimed at avoiding or reducing the incidence or severity of accidents and diseases as well as their complications. An upward trend in this expenditure benefits future generations in particular, who will reap the benefits of the investment made in health.

4.4. Results

After constructing the indicators, namely smoothing the series with three-year moving averages, the following five indicators (in bold) are obtained, as shown in Table 3:

Years	**Life expectancy at birth Index**	**Healthy life expectancy at birth Index**	**Prevalence of mental illness Index**	Unsatisfied health needs index	Family health expenditure	**Access indicator Index**	**Expenditure on prevention Index**	**IJI Health**
2015	0,56	0,40	0,60	0,10	0,32	0,18	0,27	0.37
2016	0,57	0,27	0,73	0,22	0,29	0,25	0,24	0.37
2017	0,58	0,32	0,68	0,40	0,27	0,33	0,22	0.39
2018	0,59	0,38	0,62	0,54	0,25	0,37	0,18	0.39
2019	0,61	0,40	0,60	0,63	0,20	0,36	0,16	0.38
2020	0,59	0,44	0,56	0,72	0,29	0,45	0,20	0.42

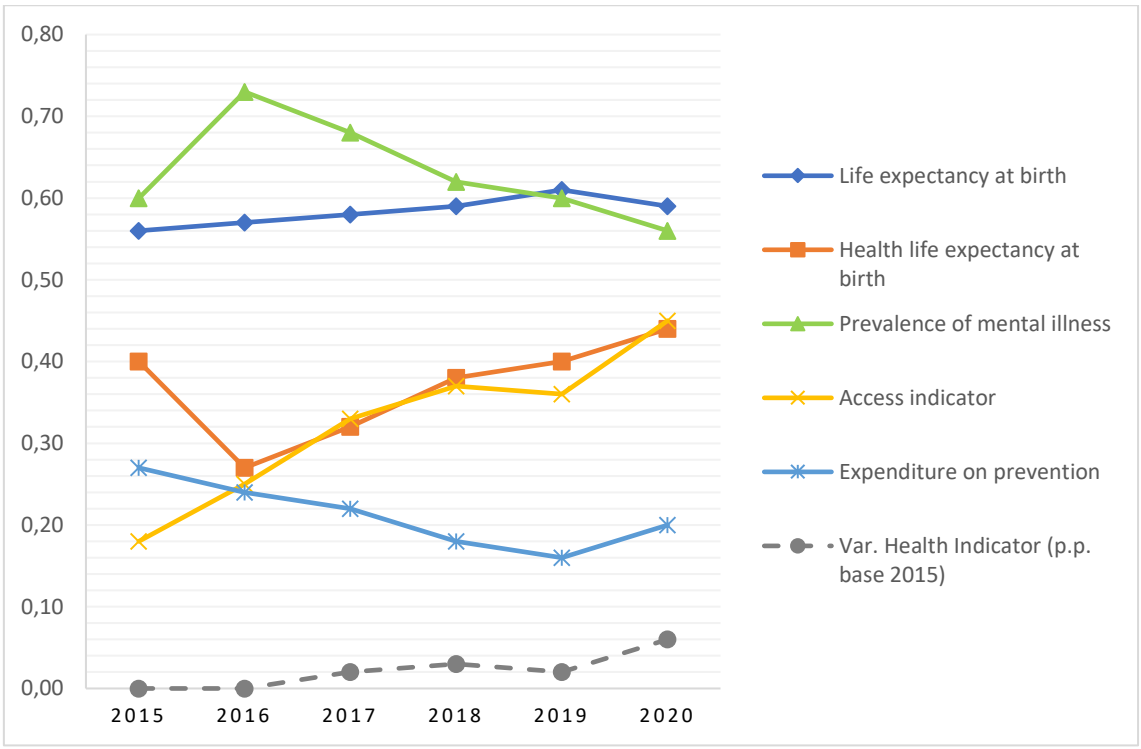
Table 3- Evolution of standardized indicators relating to intergenerational justice in Health.

The intergenerational health[27] index, which is the result of these indicators, is shown in Graph 2. As with the indexes for the other dimensions, values approaching 1 indicate relative intergenerational health advantages for future generations, while values approaching 0 reflect intergenerational health disadvantages for future generations. It should be remembered that these indexes are not the basic variables (e.g. life expectancy at birth, or expenditure on prevention), but rather transformations of these variables from the point of view of analyzing intergenerational justice.

The intergenerational health index has had a relatively stable trajectory over the period 2015-2019, varying from 0.37 in 2015 to 0.38 in 2019. This is the result, on the one hand of a slight improvement in both the life expectancy at birth indicator and the healthy life expectancy at birth indicator. On the other hand, the indicators for the prevalence of mental illness and spending on prevention have deteriorated.

In the year 2020 of the COVID-19 pandemic, the index of intergenerational justice in health increased. To counterbalance the losses in life expectancy at birth and increases in the prevalence of mental illness, all the other indicators increased in value.

[27] The time series data between 2015 and 2020 is presented in the Policy Paper by Aida Isabel Tavares and Eduardo Couto available on the Institute of Public Policy website. Available at www.ipp-jcs.org



Graphic 3-Sub-dimensions of intergenerational justice considered in Health.

4.5. Public policies and intergenerational justice

All public policies potentially have an impact on health (*health in all policies*[28]), so it is not possible to identify policies with a specific and quantifiable impact on health.

Regarding previous policies with special relevance for the health of the younger generation, we can point to the policies to control salt in bread, sugar in sweet drinks[29] and the places where tobacco is sold and consumed. These are policies with a strong prevention vocation and whose effects will only be felt in the future. On the other hand, the recent creation of the Secretary of State for Health Promotion, if translated into a greater share of prevention spending in total health spending, could also contribute to benefits for the younger generations. In the long term, these investments in prevention could translate into gains in health, both in quantity and quality.

The implementation of the Mental Health Reform (which includes measures such as the generalization of Community Mental Health Team models, the requalification of acute hospitalization, among others) could also contribute to reducing the prevalence of mental illness, with benefits for the younger generations.

We can also point to the absence of policies to solve structural problems in the health system, such as the absence of family doctors to cover the health needs of a high percentage of the population. This absence of of primary health care to a significant portion of the population

28 See OMS at www.who.int/activities/promoting-health-in-all-policies-and-intersectoral-action-capacities.

29 See analysis of the impact of excise duty on sweet drinks at: www.portugal.gov.pt/download-ficheiros/ficheiro.aspx?v=%3D%3DBAAAAB%2BLCAAAAAAABAAzM7I0AQCQMNv8BAAAAA%3D%3D

means that, in the future, there will be damage to the population's health outcomes. In the case of younger people, this will mean more years with a lower quality of life.

Finally, as far as future policies are concerned, and since it is not the purpose of this work to propose future policy measures, we can turn to the recently presented work of the PHSSR - *Partnership for Health System Sustainability and Resilience for Portugal*[30], which lists 43 health policy recommendations. Of these recommendations, we highlight three that are particularly relevant to intergenerational health:

i) Invest in health promotion through initiatives (e.g. exercise and healthy eating) at municipal level, using a transfer of responsibilities in the decentralization process,

ii) Develop intersectoral campaigns (involving health and education) to promote literacy about modifiable disease risk factors, and

iii) Regulate commercial activities and practices that affect health, such as advertising and easy access to harmful products (tobacco, unhealthy food and/or alcohol).

30 See the report for Portugal at www.phssr.org/findings

5. Intergenerational Justice index: Labour Market[31]

5.1. The Labour Market dimension

In general, the diagnosis of the Portuguese labour market has been made and the inequalities between cohorts have been identified and are evident (e.g. Centeno (2018) and Martins (2021)). Older cohorts have and have had greater job stability and protection throughout their life cycle. On the other hand, the younger cohorts (generation Z, born after 2000, and the *Millenials*, born between 1981 and 2000), have greater job mobility, more precariousness, and greater interruptions in their working lives due to unemployment. The current social security funding, based on workers' social security contributions model, means that these cohorts will have less social protection on retirement.

As already mentioned in this study, the focus of the analysis should be on cohorts and not age groups. Inequalities between generations (age groups) in the labour market are not necessarily an indicator of intergenerational injustice. If these inequalities were maintained over time, and with similar life expectancy for all cohorts, everyone would experience the same situation throughout the life cycle and we would not be able to identify relative injustice between cohorts.

We should then clarify what we mean by intergenerational (in)justice in the labour market. Ideally, we should be able to distinguish, by observing changes in the characteristics of the market (e.g. precariousness), what results from changes in the *preferences* of workers from various cohorts, from changes that result from the dynamics of the labour market and which are not only exogenous to workers, but are not aligned with their preferences. Only these should be considered a source of intergenerational injustice.

Take the case of *job insecurity*. The greater job insecurity observed in younger cohorts may be due to two different types of factors. One is exogenous to the individuals themselves, such as the higher rate of company creation and destruction, or the greater use of fixed-term contracts by companies as a cost minimization strategy. The other, which is intrinsic to each individual, has to do with individual preferences. Different cohorts can (and certainly do) have different ethics in relation to work and leisure and may even prefer shorter-term contracts over open-ended ones, as they may not have the prospect of staying at the same institution for many years. This last source of inequality, if it exists, is not a source of intergenerational injustice because it results from individual preferences. The former, because it is imposed on individuals, is a source of relative injustice.

What was said about job insecurity also applies to *emigration*. It would be useful to be able to distinguish between what may be the result of *millennials* or generation Z's greater preference to get to know and work in other countries and what is the result of not being able to afford (remuneration, housing prices, etc.) to live and work in Portugal. Even with this difficulty, observing trends in the variation of young emigration gives a good indication of the existence or absence of opportunities in the country.

Something that affects all cohorts differently and has an impact on intergenerational justice are the effects of external shocks, which affect the labour market. In Portugal, there were recessions in 1993, 2003, 2009, 2011-2013 and 2020. The cohorts that were active in these three decades

[31] See the Policy Paper prepared by Paulo Trigo Pereira and Joana Garrido Amorim on the Institute of Public Policy website dedicated to this project:https://www.ipp-jcs.org/indice-de-justica-intergeracional/

(1993-2023) suffered a greater impact than those that preceded them, and perhaps those that will succeed them. This can be seen in indicators such as higher *unemployment rates*, lower real *incomes* and greater *emigration* in search of better living conditions. Other factors that have had an impact on the labour market include joining the euro, the enlargement of the European Union to include Eastern European countries, the growth of China in international trade, labour and social security reforms, and the COVID-19 pandemic, among others. These largely exogenous factors are very important in the labour market, as they are responsible for the most significant changes, and for increasing, not worsening or decreasing inequalities between generations.

Being parsimonious in the choice of variables to monitor intergenerational justice in the labour market, variables associated with job insecurity, income, unemployment and emigration appear to be relevant. Finally, it is not difficult to theoretically justify including gender pay equality as a factor associated with intergenerational justice[32].

5.2. Sub-dimensions

The index of intergenerational justice in the Portuguese labour market can therefore be subdivided into five sub-dimensions (Job insecurity, Income per individual, Unemployment, Gender pay equality, Emigration). Each sub-dimension corresponds to a relevant aspect of the labour market and is translated into standardized indicators that allow for a detailed and dynamic analysis of its evolution over the generations.

Ideally, we should focus on a longitudinal analysis of cohorts. However, to have annual data on the indicators of the various sub-dimensions, we generally use indicators that reveal trends for certain age groups. All other things being equal, it can be said that a favorable change in one of the indicators has a positive impact on intergenerational justice. For example, a consistent upward trend in unwanted job insecurity will be associated, *ceteris paribus*, with some intergenerational injustice. However, if this greater precariousness were associated with a greater wage premium, this might not be the case. Hence the importance of considering sub-dimensions and indicators where *tradeoffs* may exist.

[32] Adapting the Rawlsian perspective (Rawls 1971), that we are behind a "veil of ignorance" as to which gender we are, as members of this or the next generation, we would find it difficult to accept gender-based wage inequality. Thus, we could argue that we are moving towards greater intergenerational justice if there is a trend towards greater equality in hourly wage remuneration, because whatever gender we come to know that we have lifted the "veil of ignorance", we should not be discriminated against on the basis of gender. By simplification, then, we will assume that less inequality in hourly pay according to gender is a source of greater intergenerational justice for future generations.

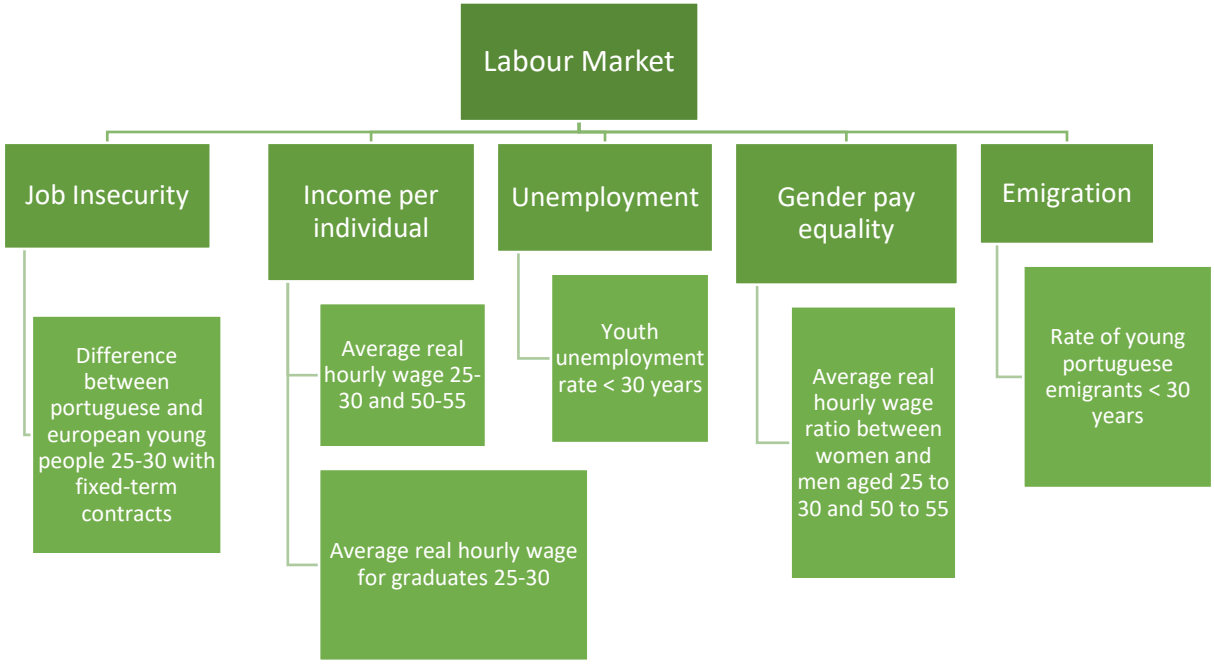


Figure 3- Sub-dimensions and indicators of intergenerational justice considered in the Labour Market.

5.3. Indicators

Before presenting the standardized indicators of intergenerational justice in the labour market, it is important to characterize the labour market in relation to a range of variables that will be used to construct these indicators. About job insecurity, in the 2010s there has been a significant upward trend in the proportion of young people with fixed-term contracts, rising from 35% in 2010 to more than half of all contracts in the years before the pandemic (2016 to 2019). If we compare this with young Europeans, we see that not only is this proportion much lower in Europe (around 20%), but it hasn't increased over the same decade (see Table 4).

If we look at average real wages over this period, we see that young people (25-30) have a lower average real wage than older workers (50-55), but that there has been some progress in the former case, but not in the latter. What they have in common is the fact that during the period when the *troika* was present in Portugal (2011-14) there was a decrease in real wages in both age groups. The main difference is that there was a slight increase in the real salary of young people, probably because of the rise in the national minimum wage, which affects young people more at the start of their careers, but a decrease in the average real salary of older people. Finally, if we look at the wage premium associated with young people having a degree, we can see that it became smaller and smaller from 2010 to 2016 and only started to rise from that year onwards, again something that may have been influenced by the changes to the minimum wage.

Looking at gender inequality, it's interesting to see that it hardly exists among young people, where working women are paid almost as much as men (93% in 2021), but it widens throughout the life cycle so that it is significant in the 50 to 55 age group, due in part to the wage impact of motherhood, which many women experience in the meantime. The positive aspect is that this gender inequality has been reducing over the 2010s.

Finally, we have two variables that reflect the country's macroeconomic conditions. The year of most intense recession in this period was 2012 (which continued into 2013), which saw the highest youth unemployment rates of the decade, as well as the highest emigration rates. This suggests the importance of these variables in the construction of our intergenerational justice indicators, which are summarized below.

Years	Young Portuguese 25-30 with fixed-term contracts (%)	Young Europeans 25-30 with fixed-term contracts (%)	Average real hourly wage 25-30 (€)	Average real hourly wage 50-55 (€)	Average real hourly wage for graduates 25-30 (€)	Youth unemployment rate < 30 years (%)	Hourly gender pay ratio 25-30 (F/M)	Hourly gender pay ratio 50-55 (F/M)	Portuguese emigrants < 30 years old (%)
2010	35.16	20.59	5.50	7.43	7.47	20.1	0.92	0.71	2.59
2011	37.56	20.22	5.42	7.28	7.42	22.7	0.92	0.71	2.94
2012	38.74	21.69	5.28	7.18	7.10	28.4	0.93	0.71	5.74
2013	42.11	21.81	5.15	7.04	6.78	29.5	0.92	0.71	5.22
2014	46.00	22.05	5.09	6.96	6.59	25.8	0.92	0.72	4.82
2015	48.65	22.27	5.09	6.89	6.45	23.1	0.90	0.72	4.41
2016	50.46	22.24	5.15	6.84	6.41	21.1	0.91	0.74	4.18
2017	52.53	21.62	5.28	6.83	6.48	16.9	0.91	0.75	3.10
2018	53.61	19.81	5.46	6.90	6.63	14.2	0.91	0.76	2.89
2019	51.98	17.47	5.68	7.00	6.92	12.7	0.91	0.77	2.80
2020	47.39	16.68	5.90	7.26	7.15	15.9	0.93	0.78	2.45
2021	45.14	20.59	6.08	7.37	7.33	15.9	0.93	0.79	2.63

Table 4- Evolution of the basic variables for the intergenerational justice indicators in the Labour Market.

Source: Authors' calculations using INE "Quadros de Pessoal" and EU Labour Force Survey databases.

Precariousness and fixed-term contracts

Fixed-term contracts are a very relevant sub-dimension in the analysis of the labour market and from the perspective of intergenerational justice because they are an indicator of precariousness. Fixed-term contracts can be of two types, fixed-term and uncertain-term, with fixed-term contracts being no longer than two years and uncertain-term contracts no longer than four years. Most of the time, there is a preference for employers to choose this type of contract, whether it's to hire a seasonal worker, when there is an exceptional increase in the company's activity, to carry out a certain project, or to serve employment policies, when the government launches incentive and support programs for hiring, such as hiring unemployed workers or young people looking for their first job.

The indicator for this sub-dimension compares the percentage of the young Portuguese population aged 25 to 30 with fixed-term contracts with the percentage of the young European population of the same age with fixed-term contracts, which is used as a *benchmark* for what could be seen as a structural change in the preferences of young Europeans. The underlying idea is to understand how precarious labour relations had evolved over the generations of young people in Portugal compared to young Europeans aged 25 to 30.

A complementary analysis using the "Quadros de pessoal" database shows that the average real hourly wages of young Portuguese people aged 25 to 30 without fixed-term contracts are higher than the average real wages of young Portuguese people aged 25 to 30 with fixed-term

contracts, which leads us to conclude that the population in this age group in Portugal with fixed-term contracts is more exposed to precarious employment and that this is not associated with higher but lower wages.

Income per individual

The real average hourly wage is an indicator of individuals' income resulting from work. It is given by the average real gross monthly wage per hour worked and paid (at constant 2016 prices), reported in October of each year by firms to the Ministry of Labour, by individual employees.

We considered two age groups over time. The adult age group from 50 to 55 and the young age group from 25 to 30. Each surviving cohort passes through the two age groups, so what is relevant for intergenerational justice from the point of view of future generations is the dominant trend, whether it is growth, decline or stagnation in individuals' real income.

Average real gross monthly wages include basic pay and regular benefits, which include overtime pay, bonuses, seniority and other payments each year.

This sub-dimension is calculated according to two sub-indicators: i) one which is an income indicator, calculated by aggregating the average real monthly wages per hour worked and paid for each year *t* of the individuals in the two age groups mentioned and ii) another which aims to measure not only the variation in the human capital of employed workers, but also the wage premium for having achieved a more advanced level of education. This is given by the product of the average real monthly hourly wage of young people aged 25 to 30 who entered the job market with a level of education equivalent to an undergraduate degree by the percentage of the population aged 25 to 30 with that degree in each year *t*. The goal is to reach 40% of the young population aged 25 to 30 with an undergraduate degree entering in the job market by 2030. It will be positive from the perspective of future generations if both increase.

Unemployment

The unemployment rate of a country's total population reflects the proportion of the labour market force that does not have a job but is available and actively looking for work. It is a wide measure of the supply of labour that is not being used and reflects the general performance of the labour market and the economy as a whole.

The unemployment indicator is a function of the youth unemployment rate under the age of 30, and is calculated here based on the 5-year moving average: *t-4, t-3, t-2, t-1, t* of the youth unemployment rate for each year *t*.

Gender pay equality

The differences in pay between men and women in the context of the labour market and for the same jobs are indicative of labour injustice and gender inequality. The fact that certain professions are mostly held by men and others are mostly held by women reveals gender pay *gaps* that will always exist. However, it is the evolution of this *gap*, through convergence or divergence, that allows us to assess the evolution of gender pay equality between generations over time.

The indicator of gender pay equality is given by the average real wage ratio between men and women for paid hours and is calculated as the ratio between the average real monthly hourly wage for women and the average real monthly hourly wage for men for each year *t*, at constant 2016 prices. It includes basic pay and regular benefits such as overtime pay, bonuses, seniority and other payments in each year t. This indicator is calculated for young people aged 25 to 30 and adults aged 50 to 55.

Emigration

Emigration can have various causes: economic, political, cultural or environmental. As discussed, it would be important to distinguish in the migratory phenomenon what results from changes in young people's preferences from changes in circumstances, i.e. Portugal's relative macroeconomic context in relation to other countries.

The emigration indicator is a function of the number of young Portuguese emigrants under the age of 30. It is calculated for year *t* based on the 5-year moving average*: t-4, t-3, t-2, t-1, t*, of the number of young Portuguese emigrants. Young emigration will be greater the fewer attractive opportunities there are for young people in the Portuguese labour market and the greater they are in other countries. It is a source of intergenerational injustice if young people are unable to develop their skills and talents in the Portuguese labour market if they so wish. The fact that the young emigration variable is related to the existence of recessions suggests that it is not a question of preferences, but of needs.

5.4. Results

Table 5 shows the evolution of the standardized indicators relating to intergenerational justice in the Labour Market, where values closer to one mean greater benefit for the younger generations in the period considered (2010-2021).

Years	Job insecurity index	Income Index per individual (25-30 and 50-55) and Education	Unemployment Index	Gender pay equality index	Emigration Index	IJI Labour Market
2010	0,49	0,43	0,82	0,81	0,89	0,66
2011	0,54	0,37	0,76	0,81	0,83	0,63
2012	0,51	0,28	0,64	0,81	0,52	0,52
2013	0,46	0,16	0,54	0,81	0,35	0,41
2014	0,36	0,06	0,51	0,81	0,25	0,29
2015	0,3	0,03	0,57	0,81	0,39	0,27
2016	0,25	0,07	0,66	0,82	0,47	0,34
2017	0,2	0,08	0,75	0,83	0,59	0,36
2018	0,15	0,21	0,85	0,83	0,68	0,43
2019	0,15	0,32	0,94	0,84	0,77	0,49
2020	0,21	0,49	0,95	0,85	0,81	0,58
2021	0,25	0,57	0,93	0,86	0,83	0,62

Table 5- Evolution of the standardized indicators referring to intergenerational justice in Labour Market.

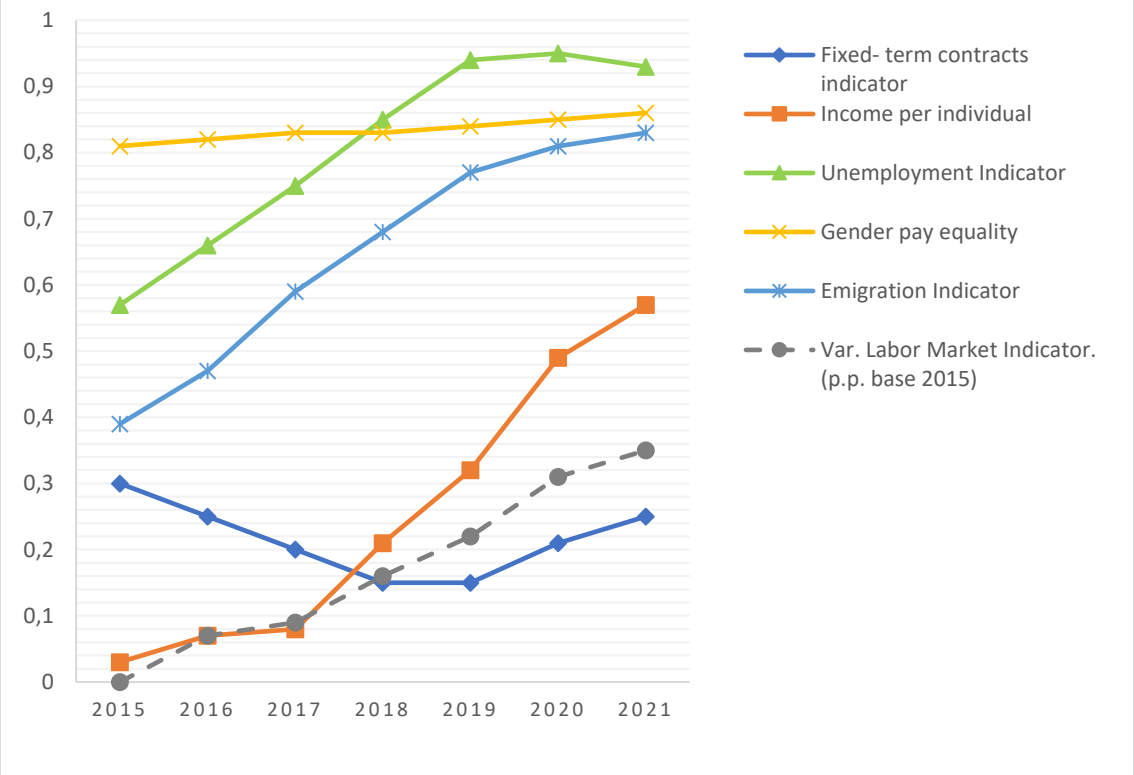
Source: Estimated by the authors using the Staffing levels database and the EU Labour Force Survey.

Note: As the indices tend towards 1 when the relative situation of young cohorts improves, an increase in precariousness causes the index to decrease and a reduction in youth unemployment or emigration causes it to increase.

Remember that the indicators approach the unit value when the situation of the younger cohorts improves in relation to their situation. In terms of job insecurity, young Portuguese (compared to Europeans) have been getting worse until the pre-pandemic year (2019), improving slightly afterwards. In any case, the situation of the new cohorts is significantly worse than at the beginning of the 2010s. Then there is a set of indicators that reflect the country's macroeconomic conditions, whether in terms of income, unemployment or emigration. Roughly speaking, from 2012 to 2015, years of restrictive fiscal policy and a significant part of recession, were years in which these indicators affected society in general, and young people in particular. Recent years, after 2015 have shown a relative improvement.

Regarding precariousness, the situation for younger cohorts is deteriorating and this is not offset by a higher wage premium. Only about gender equality we see improvements which, as we have seen, are more the result of a reduction in inequality at a later stage in the life cycle (50 to 55 years).

Graph 3 summarizes the evolution of the various sub-dimensions of the index of intergenerational justice in the labour market (IJI), as well as the variation of the index with reference to 2015. Since then, the indicator has improved despite high levels of job insecurity. The downward trends in unemployment and emigration have a positive impact that outweighs the negative impact of job insecurity.



Graphic 4-Sub-dimensions of intergenerational justice considered in the Labour Market.

5.5. Public policies and intergenerational justice

As pointed out in this chapter, the dynamics of the labour market depend very much on the evolution of the country's macroeconomic conditions. Cohorts subject to longer and more intense periods of recession will be worse off than those in which the country has seen higher rates of economic growth and lower unemployment rates. The main challenge for the next decade is for Portugal to achieve growth and employment rates above the European Union average. The role of public policies in the labour market is mainly regulation and inspection, on the one hand, and incentives within the framework of sectoral programs with specific objectives, on the other. The International Labour Organization (ILO) has a series of Conventions and Recommendations applied to the labour market, many of which have been ratified by Portugal.

The problem doesn't seem to lie so much in the level of labour laws, but rather in their enforcement, which indicates a lack of human resources at the General Labour Inspectorate. This shortage may partly explain the excessive use of fixed-term employment contracts by the Portuguese business community.

This reality has a very negative consequence in terms of intergenerational justice. With greater job insecurity and shorter and more irregular contributory careers, the formation of future pensions for today's young cohorts will be compromised unless there are substantial changes to the pension calculation formula.

It is not the aim of this study to make policy recommendations, but in any case, it is possible to list some measures that would have a positive impact on intergenerational justice.

An integrated and sustained program of incentives for the desired birth rate as a way of combating demographic decline and the ageing of the population should be a priority in public policy. This should combine incentives of a budgetary nature (in terms of personal income tax and social benefits) and incentives for Portuguese companies to adopt greater flexibility in employment relations, allowing for a better work-life balance and an incentive for fathers and mothers to take parental leave.

It is important to make policymakers aware of the vulnerability of young people in the labour market, who are most affected by external shocks, instability, and economic and financial crises. These impacts have scarring effects on entry into the labour market and on the construction of this age group's professional and personal career. Similarly, greater care must be taken with adult unemployment, by promoting policies for the active reintegration and professional retraining of these workers in the labour market.

Finally, in terms of information, it is essential to make disaggregated labour market data available on national statistical platforms by profession and sector of activity, so that it is easier and more accessible to identify groups of workers and sectors that are more vulnerable to unemployment, fixed-term contracts, low incomes, emigration, among others. Finer data on emigration (and data on immigration), particularly of young people by level of qualification, is also a good indicator for monitoring intergenerational justice.

6. Intergenerational Justice index: Housing[33]

6.1. The housing dimension.

What obligations do older people have towards young people? This question is at the heart of the Intergenerational Commission's report (2018) and has its natural relevance to housing. The concept of intergenerational justice has been discussed for several decades, but it was the 2008 financial crisis that consolidated its analysis at European level. Intergenerational justice is the idea that the pursuit of well-being by current generations should not condition the opportunities for a good and decent life for subsequent generations (Morton, 2013). In most European countries, the consequences of the 2008 crisis have led to rising unemployment, stagnant wages, reduced public spending, and have had a strong impact on young people, particularly in southern European countries (Gentili, & Hoekstra, 2021). The differences between generations have widened. The elderly generally have greater protection, because due to their stage in life, they receive a pension, are less exposed to the risks of the labour market, such as unemployment, and can benefit from a financial asset - their own home - which they acquired in a period of housing promotion and real estate appreciation.

In southern European countries, the housing crisis seems to have an even greater impact on young people. The commodification of housing, the importance of real estate assets as a source of security and well-being seem to drive intergenerational support for housing, as well as intra-generational and intergenerational inequalities - within and between generations (Arundel, & Lennartz, 2019; Arundel, & Ronald, 2021). Housing has become less and less affordable for young people (Heath, 2018; Roberts, 2020). Young people are facing more and more problems in accessing housing, are finding it harder to pay housing costs, and are staying longer and later at home with their parents (Christophers, 2018; Byrne, 2020; Eurostat, 2020; Hoolachan & McKee, 2018).

Because of the high costs, the rental market has long ceased to be an option for a large proportion of young people. The problem of young people's access to housing also raises new questions and inequalities. Previous generations have been able to invest in their own homes, which have appreciated in value over the years, constituting important real estate wealth and security in retirement. Housing can be inherited and transferred between generations, but the time for transferring ownership tends to be later and later because of increasing longevity (Heath, 2018; Cook, 2021).

[33] See developments in the Policy Paper prepared by Romana Xerez and Paula Albuquerque on the Institute of Public Policy website for the "Intergenerational Justice Index" project: https://www.ipp-jcs.org/indice-de-justica-intergeracional/

6.2. Sub-dimensions

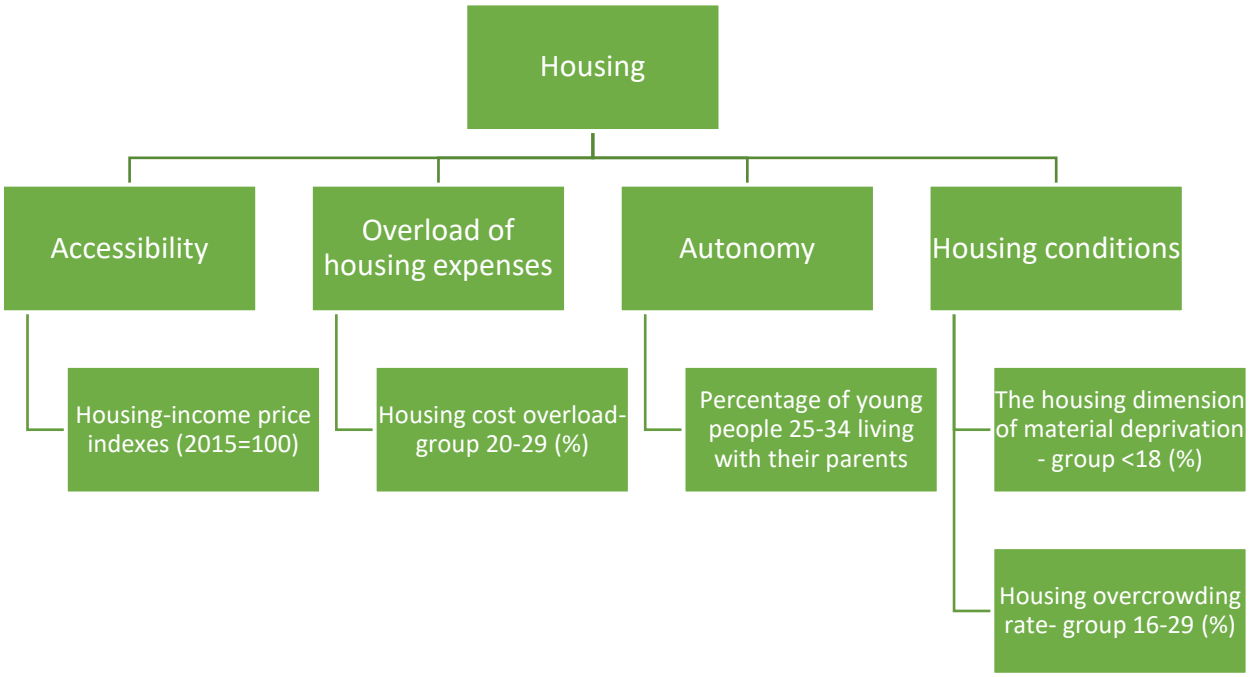


Figure 4- Sub-dimensions of intergenerational justice considered in Housing.

The Intergenerational Justice Index - Portugal, developed in this study, includes several dimensions, including one associated with housing. The aim of this dimension is to express the inequalities between generations in access to housing as a condition for transition to independent living. To do this, we propose aggregating four sub-dimensions: 1) *accessibility*; 2) *overload of housing costs*; 3) *autonomy*; and 4) *housing conditions*. For each sub-dimension we propose one or two specific indicators.

6.3. Indicators

The *accessibility* sub-dimension aims to measure the housing effort given by the relationship between housing prices and household disposable income and is made up of the *index* indicator of the *ratio between housing prices and income*. Currently, young people's housing costs are very high (see Table 6 below).

The *overload* sub-dimension is part of *the housing cost overload ratio indicator* and measures the percentage of individuals in their age group who live in households where the costs of rent, mortgage interest, maintenance, water, electricity, gas and sewage, and taxes on housing represent 40% or more of their equivalent disposable income.

The *autonomy* sub-dimension has as its indicator the *index of the percentage of young people aged 25-34 living in their parents' home.*

The housing conditions sub-dimension is made up of two indicators: *housing overcrowding rate* and *housing dimension of material deprivation*. The overcrowding rate corresponds to the percentage of individuals in their age group living in a dwelling with a number of rooms below the minimum for the household composition. The number of rooms is sufficient when there is one common room, one room for each couple, one room for each adult, one room for each two people of the same sex aged between 12 and 17, one room for each person of different sex aged between 12 and 17, and one room for each two people under 12. The *housing dimension of material deprivation* corresponds to the percentage of individuals in their age group living in dwellings with one or more of the following problems: 1) leaks 2) lack of light 3) no bath/shower 4) no indoor sanitary facilities.[34]

6.4. Results

Table 6 shows the evolution of the original variables and Table 7 shows the evolution of the standardized indicators between 2006 and 2020 and the values obtained for the Housing index.

	Accessibility	**Overload**	**Autonomy**	**Housing conditions**	
	Housing price-income index (2015=100)	Overload of housing costs - 20-29 group (%)	Percentage of young people 25-34 living with their parents	Housing overcrowding rate - 16-29 group (%)	Housing dimension of material deprivation - <18 group (%)
2004	127	4,2	36,9	21,9	67,9
2005	124,9	5,6	39,1	23,5	69,0
2006	124	4,5	39,3	22,6	68,3
2007	119,1	6,0	41,7	24,5	69,5
2008	107,6	7,9	44,2	23,5	75,4
2009	107,3	7,0	46,2	21,0	77,8
2010	106,6	4,1	46,8	22,8	73,8
2011	103,6	8,1	46,3	17,3	75,7
2012	98,3	10,3	44,5	15,5	73,2
2013	96,8	9,1	45,0	18,2	62,3
2014	100,9	10,0	45,1	16,6	62,3
2015	100	11,1	45,7	16,3	68,5
2016	103,1	8,8	45,6	17,7	65,8
2017	109,4	8,5	45,6	16,5	67,4
2018	115,9	6,7	45,5	17,1	68,5
2019	122,1	6,7	45,2	16,0	70,9
2020	134,9	4,1	52,3	14,3	70,6

Table 6- Evolution of non-standardized variables referring to intergenerational justice in Housing.

[34] The choice of indicators was the result of several considerations: a) They are distinct and without overlapping information; b) They are calculated regularly and by credible institutions, or are easy to calculate from what is regularly available; c) They provide information on the relative position of the generations in terms of housing.

Years	Accessibility Index	Overload Index	Autonomy Index	Housing conditions Index			IJI Housing
	Housing price-income index	Indicator of housing cost overload group 20-29	Indicator of young people 25-34 living with parents	Indicator of housing overcrowding group 16-29	Housing dimension of material deprivation group <18	Geometric average of the two indicators	
2006	0.45	0.70	0.72	0.13	0.18	0.15	0.43
2007	0.49	0.67	0.67	0.10	0.17	0.13	0.41
2008	0.58	0.62	0.61	0.10	0.14	0.12	0.40
2009	0.66	0.57	0.53	0.12	0.11	0.11	0.39
2010	0.73	0.60	0.48	0.14	0.09	0.11	0.39
2011	0.75	0.60	0.45	0.22	0.09	0.14	0.41
2012	0.79	0.53	0.47	0.29	0.11	0.17	0.43
2013	0.84	0.43	0.49	0.35	0.15	0.23	0.45
2014	0.85	0.39	0.50	0.36	0.21	0.27	0.46
2015	0.85	0.37	0.49	0.35	0.22	0.28	0.46
2016	0.81	0.38	0.48	0.35	0.21	0.27	0.45
2017	0.77	0.41	0.48	0.35	0.19	0.26	0.44
2018	0.69	0.50	0.48	0.34	0.19	0.26	0.45
2019	0.59	0.54	0.49	0.36	0.17	0.25	0.44
2020	0.47	0.64	0.41	0.39	0.16	0.25	0.42

Table 7- Evolution of standardized indicators relating to intergenerational justice in Housing.

Note: A normalized indicator closer to 1 reflects a more favorable situation for young people.

Accessibility

The OECD has been publishing this ratio for Portugal since 1995. The increase in this index (see table 6) is detrimental to younger people, as they are the ones most interested in buying a home.

The house price-household income index measures the evolution of housing affordability. This index analyzes the evolution of housing prices in relation to disposable income - it represents one of the most important indicators of housing affordability. On average in the OECD, this index increased steadily until the beginning of the pandemic and increase significantly again in the second quarter of 2020.

In Portugal, the evolution of the relationship between housing prices and income, i.e. the evolution of housing affordability, was favorable for those who wanted to buy a home - such as those who wanted to start a family, especially at a younger age - until 2013-2015, and began to deteriorate afterwards.

The overload

The housing cost overload for young people between 20 and 29 worsened until 2015, and then began to improve. Although the indicators used to measure affordability and overload are associated with the financial capacity of individuals, the situation of young people seems to be worsening according to the first and improving according to the second. In fact, the information provided by the two indicators is relevant and complementary, there doesn't have to be a correlation between the two. The ratio of house prices to disposable income, reflecting the ability to buy a house, is measured for the entire population, with the majority of people wishing to buy a house belonging to the younger group. In contrast, overburden is measured exclusively for people aged between 20 and 29. Furthermore, the indicator does not measure the burden of housing costs, but the percentage of people whose housing costs represent at least 40% of their disposable income. On the one hand, the increase in the weight of housing costs does not necessarily occur homogeneously throughout the distribution. On the other hand, the increasing number of those who don't get to buy housing because it's not affordable don't have a burden.

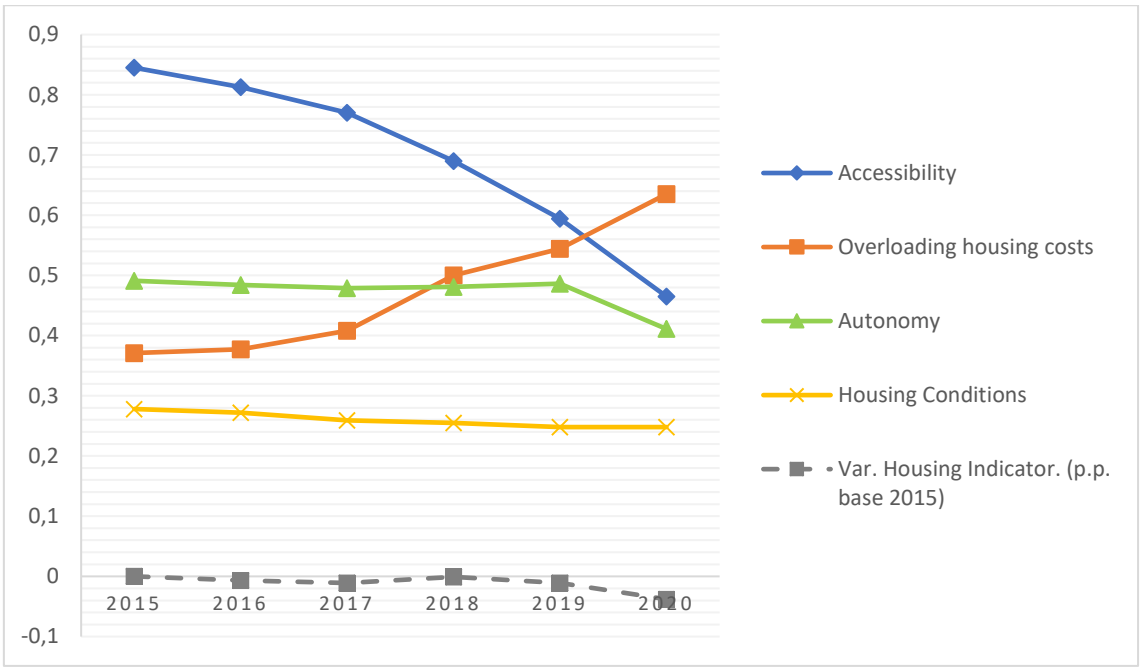
Autonomy

Recently, this indicator has been widely discussed and used to show the worsening of access to housing. In countries where access is more difficult, economic conditions have worsened and the price of housing has risen. This situation has been most felt in southern European countries, where the percentage of young people staying at home has risen sharply, reflected in a drop in the standardized indicator. Staying at home is not an option, but a condition that they cannot change. Leaving the parental home is considered a milestone in the transition from childhood to adulthood. The reasons for leaving more or less late depend on various circumstances, such as studying, working, living with a partner, getting married and having children, etc. Young adults (25-34 years old) staying late at home with their parents is a current trend, aggravated in Southern European countries, especially Portugal. Staying at home has become a risk, affects well-being and leads to a new *intergenerational trade-off*. The late emancipation of young people is explained by cultural factors, but also by the economic and political situation, which hinders access to housing. This situation is often pointed out as a disadvantage for young people today compared to previous generations.

Housing conditions

As far as the housing conditions of younger people are concerned, the trend has been improving. The financial crisis doesn't seem to have had any negative effects. The number of young people aged 16 to 29 living in overcrowded housing started out high but improved steadily after the start of the financial crisis. After a period of stabilization in overcrowding figures, there has been a further improvement in recent years.

Housing deprivation for the under-18 group has fluctuated, curiously worsening up until the financial crisis, improving thereafter, but worsening again in recent years.



Graphic 5-Sub-dimensions of intergenerational justice considered in Housing.

6.5. Public policy and intergenerational justice

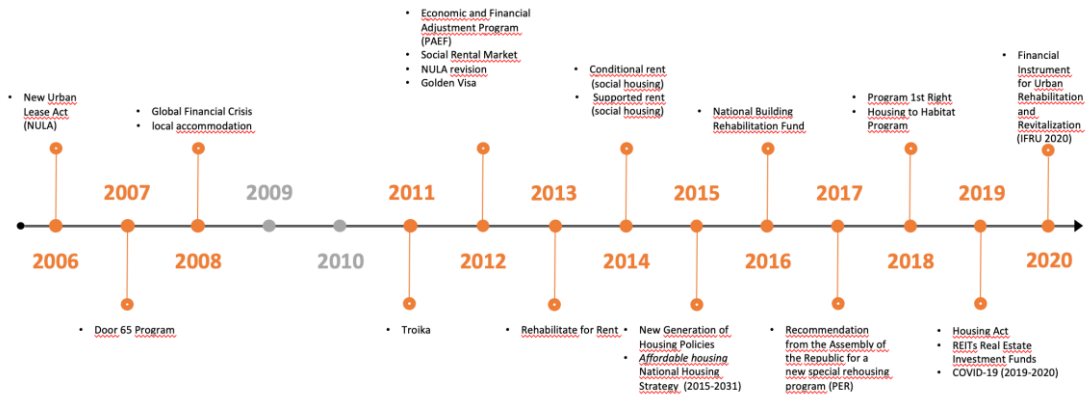


Figure 5- Evolution of housing policy, 2006-2020

Source: Prepared by the authors Romana Xerez and Paula Albuquerque (See Policy paper on the IPP website).

Although the data analyzed in the housing study refers to 2006-2020, it is important to mention some previous events that mark the evolution of the housing market and policies in this period. The early 2000s were characterized by a change in housing policy, with a greater emphasis on renting to the detriment of home ownership and less public intervention in housing (Xerez et al. 2019). The end of subsidized youth loans in 2002 marked an important turning point, and the following years were characterized by a reduction in new housing licenses, greater precariousness in the labour market and a decline in the confidence of economic agents.

Over almost two and a half decades, public housing policies (figure 5) have been marked by various changes and crises, most notably the Global Financial Crisis (GFC) in 2008 and the COVID-19 pandemic crisis between 2019 and 2020. In the wake of the GFC and the sovereign debt crisis, external financial support was requested, which meant the implementation of the Economic and Financial Adjustment Plan (EFAP) between 2011 and 2014, with the intervention of the Troika. These crises and fiscal consolidation aggravated the reduction in income and reduced the value of household assets (Sequeira 2022).

Several measures have led to a progressive liberalization of the housing market: the New Urban Lease Regime in 2006, with changes in 2012, 2014 and 2017, 2019 and 2020, as well as the creation of local accommodation in 2008.

The creation of the "Porta 65 - Renting to Young People" program in 2007 was the result of the "incentive to rent to young people" created in 1992. Despite the creation of a specific rental program for young people, this measure had specific objectives of residential mobility and rehabilitation - very different aspects from the actual needs of young people and the current problems of access to housing.

In 2012, the "Social Rental Market" initiative was launched with the aim of creating an intermediate rental market. Urban rehabilitation was boosted by programs such as "Reabilitar para Arrendar" (Rehabilitate to Rent), created in 2013, and the creation of the National Building Rehabilitation Fund in 2016.

The increase in families' financial difficulties led to additional measures in 2014, in social housing, conditional rent and supported rent. In 2015, the National Strategy for Housing (2015-2031) was drawn up, which provided for extended intervention until 2031, but was abolished with the change of government.

The serious and growing housing problems have once again brought up the discussion of rehousing needs. In 2017, the Assembly of the Republic recommended that the government survey rehousing needs and create a new program for access to the right to housing. In 2018, the "1st Right" and "From Housing to Habitat" programs were created to support the promotion of housing solutions for people living in unworthy housing conditions and the New Generation of Housing Policies was created, with the aim of promoting access to housing, improving quality and combating real estate speculation. The new Affordable Housing program is far from achieving its objectives. The Basic Law on Housing was created in 2019 and established the foundations of the right to housing and the objectives of public housing policies. In the same year, instruments such as REITs - Real Estate Investment Funds and the Financial Instrument for Urban Rehabilitation and Revitalization (IFRU 2020) were created, promoting rehabilitation.

During the 2006-2020 period, public housing policies were characterized by a lack of continuity across different governments, a profound difference between legislative initiatives and their actual implementation and a lack of evaluation. The liberalization of the housing market, the financial valuation of housing and the reduction in public spending in this area, coupled with the reduction in household income, have worsened access to housing, especially for younger people, who face new problems. Situations of homelessness, such as overcrowding, tend to worsen and contribute to intergenerational housing inequalities.

7. Intergenerational Justice Index: Poverty and Living Conditions [35]

The incidence of poverty faced by each generation is an important dimension for constructing an index of intergenerational justice. The existence of a higher level of poverty is undoubtedly an obstacle to a fairer and more supportive society.

The way in which poverty affects different generations or age groups is a key element in identifying the main determinants of poverty today. In Portugal, as in most European Union countries, there has been a significant transformation in the profile of the poor population[36]in recent decades. While until the beginning of this century the older population was the one most exposed to poverty, in recent years there has been a strong increase in the poverty of children and young people, with poverty rates higher than those of the elderly and even the population as a whole.

This change in the age profile of the poor population, reflected in a higher incidence of poverty among children, could, if left unchecked, accentuate the structural character of poverty in Portugal and have a marked impact on the opportunities and quality of life that today's children will have throughout their lives.

But this transformation in the age profile of poverty may also explain why most of the few studies that take into account the impact of poverty on intergenerational justice focus on comparing poverty levels between the young and the elderly population, preferably opting for an approach based on age groups rather than generations. Examples of this approach focused on age groups are the reports 'European Fairness Index 2016' by Hanton (2016) published by the Intergenerational Foundation or 'Social Justice in the EU and OECD - Index Report 2019' by Hellman et al. (2019). An attempt to analyze the level of monetary income and the incidence of household poverty in the context of several generations is made by Duffy (2021) in 'Generations - Does When You'Re Born Shape Who You Are?

Another aspect that has become increasingly important in poverty studies is the intergenerational transmission of poverty estimated through longitudinal surveys or qualitative analysis of interviews with the poor. The latter is followed in the study by Diogo et al. (2021), which clearly illustrates the importance of the intergenerational transmission of poverty in Portugal. This area of the literature on poverty has a direct relationship with intergenerational justice by directly questioning the more structural component of poverty and its transmission between the different generations. Despite its importance, this is an aspect of poverty analysis that presents serious difficulties to model in terms of constructing an index of intergenerational justice because it presupposes the ability to follow the path of families and individuals throughout their life cycle, which would only be possible through longitudinal studies that do not exist in our country.

[35] See the Policy Paper prepared by Carlos Farinha Rodrigues and Isabel Andrade on the Institute of Public Policy website dedicated to this project: https://www.ipp-jcs.org/indice-de-justica-intergeracional/

36 On this change in the poverty profile in Portugal, see, for example, Rodrigues et al. (2013, 2016).

7.1. The dimension of Poverty and Living Conditions

Although the importance of poverty and the living conditions of the population in the construction of an index of intergenerational justice seems to be consensual, the way to establish the connection between the notion of intergenerational justice and a set of sub-dimensions that reflect the reality of poverty is much more complex.

A first way of approaching this connection is to consider that the higher the level of poverty in society, the lower the social justice associated with it. The implicit notion that intergenerational justice presupposes the identification of the resources, institutions and values that society must protect in order to ensure that they are passed on to subsequent generations in order to foster adequate conditions for human development is clearly present here.

When constructing an intergenerational justice indicator, the way in which this temporal evolution takes place takes on added weight. This means assuming that the reduction in poverty over time can be interpreted as an improvement in the living conditions of the younger generations, and that society is giving them an increased ability to meet their needs and enjoy better living conditions. To this end, the evolution of the intergenerational justice index that reflects the reality of poverty must be constructed in such a way that its approximation to the value considered ideal unequivocally represents an increase in intergenerational justice.

In this context, the choice of variables to be used in the construction of the index will consider the possibility of combining information on the same variable for the population as a whole and for younger groups. For example, in the case of the monetary poverty rate, the evolution of the incidence of poverty will be considered simultaneously for the population as a whole and for two age groups: those under 18 and those aged between 18 and 24.

Another question involves defining the preferable state to be achieved, i.e. what desirable value would constitute the maximization of intergenerational justice. When we look at issues such as poverty, the answer to this question is not easy. For example, it is legitimate to aspire to a society with zero poverty, although this depends heavily on the definition of poverty adopted, whether it is expressed in absolute or relative terms.

The solution adopted in this study consists of defining the target value to be achieved in each sub-dimension in a relative way, taking as a reference the best values achieved in the European Union. It was decided, even if relatively arbitrarily, to take as the *target* the fifth best value for each indicator (variable) obtained by the 27 countries of the European Union in 2018. For example, the target for the national poverty rate is 12.3%, which was Hungary's poverty rate in the reference year. Considering this single value rather than, for example, the average of the different countries, aims to give more ambition to the assessment of the impact that each indicator should have on the construction of the intergenerational justice index.

Given the limited number of observations available, it was decided not to smooth the original series using, for example, moving averages for the last three or four years.

7.2. Sub-dimensions

Four sub-dimensions were selected to characterize the evolution of poverty and living conditions and how these relate to the very notion of intergenerational justice: disposable income per adult equivalent in real terms; the monetary poverty rate, officially adopted by EU countries as an indicator of poverty; the material and social deprivation rate, defined by the EU as an indicator of material living conditions under the 20-30 strategy, and the participation of young people in the education system, measured by the participation rate of young people in the education system and the NEETs rate (proportion of young people who are neither employed nor have attended any education or training activity).

The first sub-dimension aims to capture the resources available to the population and young people. This is not the income earned directly by each individual, but rather the monetary resources that each individual can count on, taking into account the household in which they live. In this sense, income per equivalent adult is a *proxy* for the potential economic well-being of each individual.

The second sub-dimension relates directly to the incidence of monetary poverty, defined in relation to a poverty threshold set at 60% of the median income per adult equivalent.

The third sub-dimension measures the level of material and social deprivation. This indicator, built on identifying the ability to access a set of material and social indicators, aims to measure the living conditions of the population and young people in a way that is relatively independent of the income distribution present in the two previous sub-dimensions.

Finally, a fourth sub-dimension is young people's access to the education system. Practically all the studies carried out in Portugal on poverty and living conditions identify the population's qualification levels as the main factor mitigating the risk of poverty and social exclusion[37]. In this sense, education can be considered as one of the main *drivers* for ensuring better living conditions for individuals and an end to poverty.

The first two sub-dimensions considered, based on the distribution of the population's disposable income, can be clearly seen in the logic of Welfare theory and to some extent reflect a certain utilitarian view of measuring social well-being. The complementarity between these sub-dimensions and the use of sub-dimensions that are more independent of income distribution, such as material and social deprivation indicators, allows for a broader view of the living conditions of the various generations that is closer to a Rawlsian approach. Finally, considering young people's access to the education system makes it possible to take into account what appears to be one of the main determinants of the level of living conditions and to take into account how present generations ensure the well-being of future generations.

The choice of these indicators was strongly conditioned by the need to have annual values. The source of the indicators used in all the sub-dimensions selected is Eurostat, with the EU-SILC (EU Statistics on Income and Living Conditions) for the first three sub-dimensions and the EU-LFS (EU Labour Force Survey) for the fourth. All have been available since at least 2014[38].

37 See, for example, Rodrigues et al. (2013).
38 Although the EU-SILC series covers the period 2003-2022, the material and social deprivation rate variable was only introduced in 2019 as part of the definition of the indicators used to monitor the Europe 20-30 Strategy. Eurostat only recalculated this indicator retrospectively until 2014, which makes it impossible to use a longer statistical series for the material and social deprivation rate.

Figure 6 illustrates the four sub-dimensions and the different indicators considered in each of them.

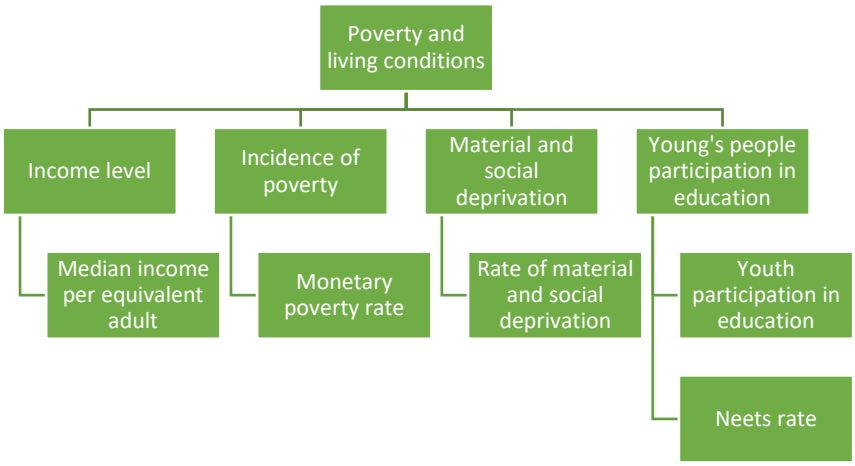


Figure 6- Sub-dimensions and indicators of intergenerational justice in Poverty and Living Conditions.

7.3. Indicators

For each of the four sub-dimensions mentioned above, a set of variables is considered that best reflect the changes that have occurred, assuming that the temporal reduction in poverty conditions and the improvement in living conditions can be interpreted as an improvement in the living conditions of the younger generations. To this end, each sub-dimension and indicator is constructed and normalized in such a way that its approximation to the value considered ideal, normalized value one, unequivocally represents an increase in intergenerational justice, while its departure from this value and approximation to normalized value zero represents a decrease in this intergenerational justice.

The following definitions are based on the meta information available from Eurostat for the different indicators used.

Median disposable income per equivalent adult – obtained by dividing the income of each household by the number of equivalent adults in it. This concept models the size and composition of each household using the OECD's modified equivalence scale. Income values in real terms are calculated using the CPI (consumer price index) with a base year of 2018. Income is expressed in purchasing power parities so that the target defined as the fifth highest income among the 27 EU countries in 2018 can be used.

Poverty rate – proportion of the population whose disposable income per adult equivalent is below the poverty line, i.e. less than 60% of the median disposable income per adult equivalent.

Material and social deprivation rate - proportion of the population that does not have access to at least five of the 13 items defined by Eurostat (7 are at the household level and 6 are at the personal level).

Youth participation in education– proportion of the number of people aged 15-24 who attended formal education activities in the 4 weeks before the EU-LFS survey was carried out.

Neets rate - proportion of the number of individuals aged 15-24 who are *neither employed* (i.e. unemployed or inactive according to the OIT definition) nor have attended any education or training activity (formal or informal) in the 4 weeks before the EU-LFS survey.

7.4. Results

Table 8 shows the main results achieved for the Poverty and Living Conditions dimension, IJI5, and for each of the four sub-dimensions considered, IJI5.i, i=1-4, for the 2014-2021 period.

Years	Income Level	Incidence of Poverty	Material and social deprivation	Participation of young people in education	IJI Poverty and Living Conditions
2014	0.385	0.104	0.061	0.183	0.145
2015	0.419	0.200	0.298	0.329	0.301
2016	0.424	0.215	0.403	0.403	0.349
2017	0.415	0.398	0.545	0.474	0.455
2018	0.468	0.422	0.656	0.530	0.512
2019	0.517	0.580	0.714	0.546	0.585
2020	0.525	0.332	0.777	0.626	0.539
2021	0.493	0.487	0.729	0.867	0.624

Table 8- Evolution of standardized indicators referring to intergenerational justice in Poverty and Living Conditions.

The different sub-dimensions show different values over the period under analysis, thus reflecting a different evolution of the various components of poverty and the population's living conditions. However, all the sub-dimensions show a significant improvement between 2014 and 2021, which should be associated with a positive contribution by this dimension to increasing intergenerational justice.

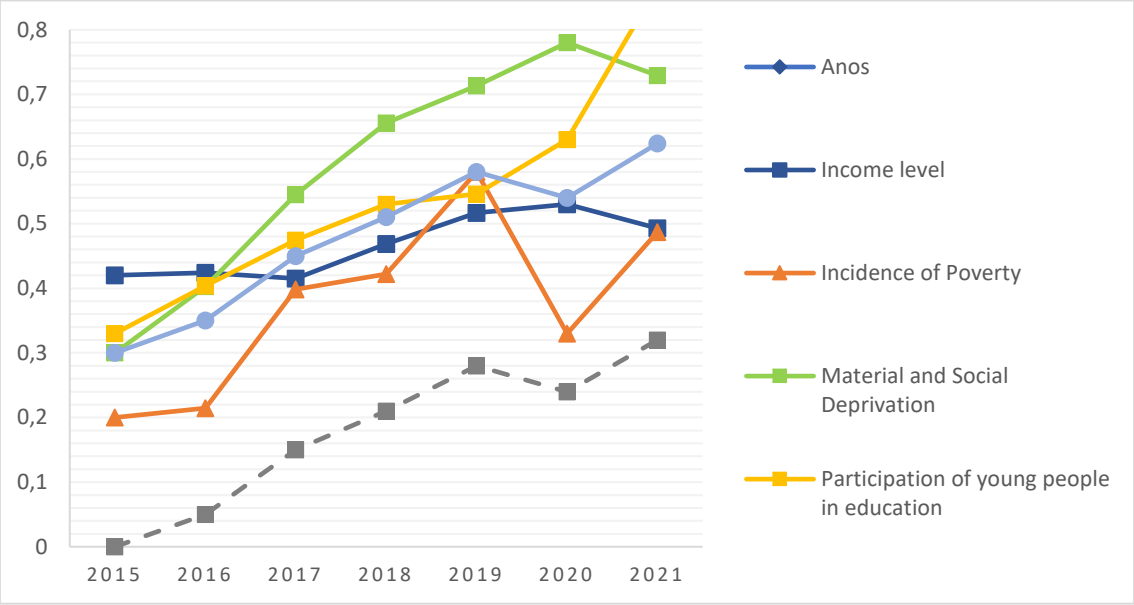
The sub-dimension that stands out most in terms of positive evolution is deprivation, whose value went from 0.061 in 2014 to 0.729 in 2021. However, it is in the sub-dimension of participation in education that Portugal shows the highest increases and values (0.867 in 2021).

The reading of the different sub-dimensions should, however, be taken with caution as it is not a question of identifying how each of them has evolved, but rather whether or not in each of them there has been an approximation to the target values defined on the basis of the best performing countries in the European Union.

Between 2014 and 2021, the index increased from 0.145 to 0.624, reflecting a positive contribution to increasing social justice and increasing the possibilities for new generations to access a better life[39].

39 It should be noted that the different sub-dimensions considered in the Intergenerational Justice index in the area of Poverty and Living Conditions do not include some dimensions that are currently more critical for the new generations, such as access to housing or access to decent employment, which are dealt with in other chapters of this study.

However, the intergenerational justice index also reflects the socio-economic cycle, clearly showing the impact of the effects of COVID-19 in 2020.



Graphic 6-Sub-dimensions of intergenerational justice considered in Poverty and Living Conditions.

7.5. Public policies and intergenerational justice

The contribution of the poverty and living conditions dimension to increasing intergenerational justice implies not only reducing the incidence of poverty and improving the living conditions of the population as a whole, but also ensuring that future generations enjoy a level of social well-being that is not inferior to that of present generations. These objectives are today at the center of public policies in the European Union and in Portugal. The approval in 2017 of the European Pillar of Social Rights and the National Strategy to Combat Poverty in Portugal in 2019 enshrined the commitment of political decision-makers to reducing poverty and improving the living conditions of the population and, in particular, young people.

The goals set out in the National Strategy to Combat Poverty, to be achieved by 2030, will not only lead to a significant improvement in the living conditions of the population, but will also have an important impact on the poverty and living conditions dimension of the Intergenerational Justice Index and, consequently, on the overall index itself.

Among the axes and targets of the National Strategy to Combat Poverty most closely related to this dimension of the IJI are the following:

- Strategic axis: Reducing poverty among children and young people and their families;
- Strategic axis: Promote the full integration of young adults into society and the systemic reduction of their risk of poverty;
- Target: Lifting 660,000 people out of poverty by reducing the monetary poverty rate to 10%;
- Target: Halve monetary poverty among children, which represents a reduction of 170,000 children in poverty;
- Target: Bring the child deprivation rate indicator closer to the European average;

Achieving these objectives and targets implies the implementation of a wide range of measures (many of them provided for in the Strategy itself) that reflect an effective prioritization of public policies in the fight against poverty, which cannot be restricted to the more traditional set of social policies. If they are achieved, they will also allow for a significant improvement in intergenerational justice, increasing solidarity between generations and ensuring that future generations can enjoy a higher level of well-being than present ones. It is important to monitor a set of indicators, such as those considered in this study, to understand whether Portugal is moving towards achieving these goals.

8. Intergenerational Justice Index: Public Finance[40]

Given the complexity and the number of different visions and approaches that exist in the intergenerational justice literature, the measurement of the intergenerational equity dimension from a public finance perspective is based on a combination of some existing methodological approaches.

8.1. The Public Finance dimension

The first approach is based on the idea that the long-term intertemporal sustainability of public finance is a *necessary condition for intergenerational justice*. Its central element is that intergenerational equity is only possible if public finance is sustainable, otherwise future generations will have to bear more taxes to receive similar levels of goods and services as present generations or receive fewer transfers or public goods and services for the same level of taxation as at present. A restrictive interpretation of this approach is that there must be monetary reciprocity at constant prices between generations. In fact, the measure we propose does not imply such reciprocity. The measure we propose only shows whether the existing structure of public finance ensures that current younger generations transfer resources to older generations, and that future younger generations will also be able to transfer resources to future older generations on the same terms without compromising the sustainability of public finance.

The second methodological approach assumes that the existing rules on the limit of the weight of public debt in GDP in the Stability and Growth Pact (SGP) are active restrictions for current and future generations. The assumption that the public debt adjustment rule contained in the SGP is intergenerationally fair is a very strong hypothesis. In fact, we don't evaluate the rule in the intergenerational dimension and we simply take it as an active constraint on political choices. In this view, current generations should bear neither more nor less of the burden of the adjustment needed to comply with the rule than future generations, until the 60% of GDP ratio objective is reached. In short, a budget rule may or may not be intergenerationally fair, but given that it is a mandatory rule, current taxpayers should be no more or less responsible than future taxpayers in the onus of respecting the rule.

The third methodological approach is based on the analysis of intergenerational welfare (using a social welfare function) and focuses more specifically on the current social security system, given its relevance to both public finance and social welfare. This approach is based on the maximization of a "social welfare function"[41] developed by Samuelson (1947), in which a benevolent planner allocates resources optimally between and within generations. In this approach, the "social planner" weighs the utility of each generation. An increase in the weight of a particular generation inclines the planner's choices to favor that particular generation. Therefore, if we increase the weight of future generations, the planner's choices will favor future

40See Policy Paper prepared by Francesco Franco on the Institute of Public Policy website. Available at: www.ipp-jcs.org

41 A social welfare function is a function that classifies social states (complete alternative descriptions of society) as less desirable, more desirable or indifferent for each possible pair of social states. The inputs to the function include any variables considered to affect the economic well-being of a society. By using measures of the well-being of people in society as inputs, the social welfare function has an individualistic form. One use of a welfare function is to represent prospective patterns of collective choice regarding alternative welfare states. The welfare function provides the government with a simple guideline for achieving the optimal distribution of resources. In the simplest terms, a social welfare function (SWF) is nothing more than an ethical judgment about what constitutes the well-being of a society, based on the levels of welfare (or utility) of its members. The simplest version, in the case of classical utilitarianism and for a given society at a given moment in time, is to say, like Bentham, that social welfare (W) is the unweighted sum of the welfare levels of each individual i=1, ...n. (i.e. W=U1+U2+...+Un). We can, as Samuelson did, extend the SWF to two or more periods with overlapping generations. In these cases, and as individuals belong to several generations, we must weight the level of well-being of each generation in the aggregate level of social well-being. In contrast, the max-min or Rawlsian social welfare function (based on the philosophical work of John Rawls (1971) considers the social welfare of society based on the welfare of the least well-off individual member of society: W = min(U1,U2,...,Un). Even ignoring the concept of SWF, policymakers are, by taking policy measures that impact several generations (e.g. social security reform) changing the relative welfare levels of several generations.

generations. The choice of weights is subjective and there are different schools of thought on how to choose them. For example, the *pure Benthamist approach* (known as utilitarianism) will weight each generation by its size. The two indicators we propose are based on the implicit changes in welfare weights consistent with the changes observed in the evolution of variables linked to the welfare system such as pension expenditure and retirement age. In simple words, the change in the measures we propose can be consistent with an increase or decrease in the welfare weights of current or future generations.

8.2. Sub-dimensions

The three different methodological approaches described above are used to consider two areas, defined here as sub-dimensions. The first is the budgetary sustainability of public finance in general and the second is the intergenerational equity of the social security system.

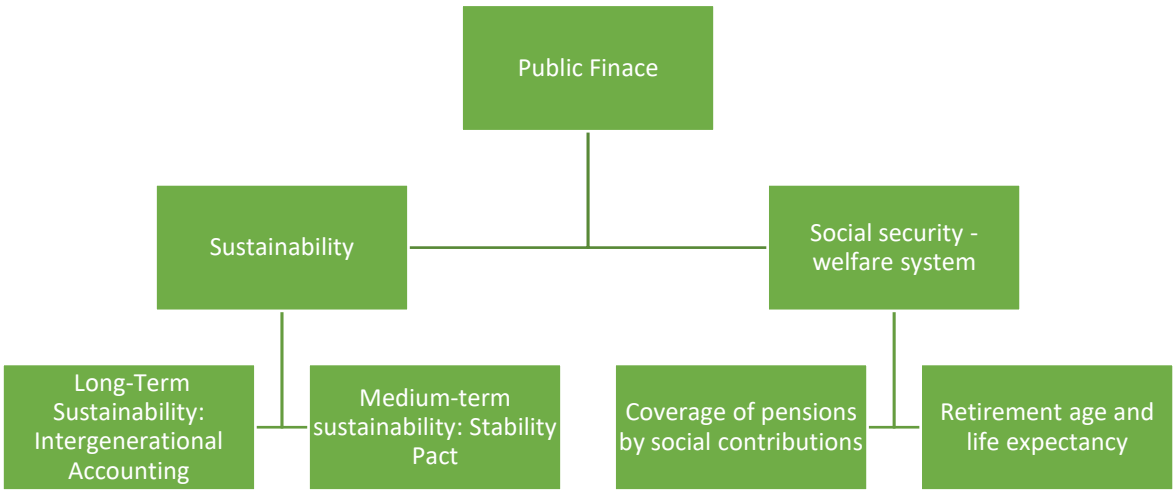


Figure 7- Sub-dimensions of intergenerational justice considered in Public Finance.

The sustainability of public finance sub-dimension is divided into long and medium-term indicators.

The long term is impacted by very slow trends, particularly demographic trends. The generational accounts methodology[42] we use allows us to analyze the effects of changes in the demographic pyramid implied by current and projected fertility and mortality rates. Demographic projections are not very controversial because fertility and mortality change very infrequently and migration flows are relatively small.

The medium term is impacted by trends in the average economic growth rate and the average level of interest rates implicit in public debt.

42 Our approach is slightly different from the one originally proposed by Auerbach et al. (1991b), in which the generations currently alive are separated from those not yet born. The proposed factor allows it to be insensitive to growth, the discount rate and the initial public debt and to depend mainly on the dynamics of the projected population.

The well-being sub-dimension of the welfare system is divided into indicators of financial coverage and the division of years of active life and years of retired life.

8.3. Indicators

The sub-dimensions considered in public finance are translated into four different indicators, which are presented below:

$\boldsymbol{\theta}$	the factor by which all taxes, in per capita terms, would have to increase or decrease to guarantee the sustainability of
$\mathbf{p}$	difference between the long-term primary balance and the primary balance consistent with the (modified) rule of reducing the weight of debt in GDP.
$\frac{\Xi}{\Pi}$	ratio of contributions currently paid (denoted by Ξ) to pensions currently paid (denoted by Π) .
$\boldsymbol{\eta_{\xi\mu}}$	Ratio of average retirement age to average life expectancy at age 65.

Table 9- Summary of Public Finance indicators

The meaning of each indicator is explained next.

Long-Term Sustainability: Intergenerational Accounting The first indicator chosen to assess the sustainability of public finance measures the factor by which public revenue as a whole would have to increase or decrease to ensure that the intertemporal budget constraint, defined as the sum of the state's budget constraints over several periods in the future, is respected. It is a counterfactual measure, in the sense that it assumes that all the different components (personal income tax, VAT, etc.) increase at the same rate and for all age groups. For example, a factor of 1,2[43] indicates that revenues will have to increase by 20% for public finance to be sustainable in the long term for the same level of per capita benefits provided by the state today. The indicator has been available since 2010 and can be calculated for each year[44].

The indicator shows that since the great recession the sustainability of public finance has improved in terms of intergenerational sustainability, only to deteriorate rapidly during the pandemic. In 2021 the indicator improved and we expect it to continue improving in 2022.

43 Intuitively theta (θ) is the adjustment factor that allows the budget constraint to be respected intertemporally: $B_t = G_t - \theta T_t + (1 + i_t)B_{t-1}$,
Where B_t is the government debt in period t, G_t is actual public expenditure net of interest payments (primary expenditure), T_t is the total revenue received in period t and i_t is the implicit interest rate paid on the debt during period t. Generational accounting makes it possible to project G_t and T_t over the long term, taking demographic dynamics into account.

44 This exercise uses microdata until 2017. The distributions obtained from microdata show substantial stability, but to obtain more accurate estimates, we suggest that the underlying distributions using microdata should be updated every 5 years.

Years	Long-Term Sustainability: Intergenerational Accounting	Long-Term Sustainability: Intergenerational Accounting (3-year moving average)	Medium-term sustainability: Stability Pact	Coverage of pensions by Social Contributions	Retirement age and life expectancy
2012	1.25	1.32	-0.04	0.91	3.22
2013	1.23	1.26	-0.04	0.87	3.19
2014	1.29	1.26	-0.06	0.87	3.17
2015	1.22	1.25	-0.04	0.86	3.15
2016	1.17	1.23	-0.01	0.87	3.14
2017	1.22	1.21	-0.03	0.92	3.12
2018	1.15	1.18	-0.002	0.94	3.15
2019	1.15	1.18	0.001	0.97	3.14
2020	1.32	1.21	-0.06	0.96	3.14
2021	1.25	1.24	-0.04	0.99	3.17

Table 10- Non-standardized indicators of Intergenerational Justice in Public Finance: long series.

Medium-term sustainability: Stability Pact

The second indicator refers to the medium-term sustainability of public finance as defined by European rules on the adjustment of public debt. The indicator calculates the difference between the actual long-term primary balance[45] and the primary balance required to meet a (modified[46]) debt adjustment rule. If the difference between the actual primary balance and the primary balance consistent with the rule is positive, current taxpayers are bearing a greater burden of the adjustment than future taxpayers. If the difference is negative, future taxpayers will bear a greater burden of the adjustment than current taxpayers. The indicator can be calculated for the period 2012 to 2022 (see Table below). Its value has always been negative (implying a greater burden for future taxpayers), but the trend has been towards a marked improvement. This indicator can be interpreted as the difference in the primary balance needed in GDP points to comply with the modified rule in a certain year.

Coverage of pensions by social contributions

The third indicator proposed, the ratio of contributions currently paid to pensions, is based on two assumptions:

A1. All other things being equal, an increase in the welfare burden of future generations increases the level of capital *per capita*;

A2. All other things being equal, an increase in the level of debt *per capita* decreases the level of capital *per capita*;

45 The primary balance is the difference between actual revenue and primary expenditure (expenditure excluding interest on the debt). Since we use two concepts of primary balance here, we use the term long-term primary balance as the 15-year moving average of the primary balance recorded.

46 The modification is to use long-term average nominal GDP growth rates and long-term average interest rates (1995-2022 average) instead of using the current GDP growth rate and interest rate. In practice, the SGP rule and

$$b_t = b_{t-1} - \beta(b_{t-1} - b^*)$$

Where b_t is the debt to GDP ratio, b^*=60% and β=1/20. We calculate the primary surplus compatible with this rule and the budget constraint $b = -p_t + \left(\frac{1+\bar{\imath}}{1+\bar{\gamma}}\right) b_{t-1}$ with long-term rates (average from 1995 to 2022).

The ratio of social contributions currently paid to finance pensions (indicated by Ξ) to pensions currently paid (indicated by Π) is then given by the indicator Ξ/ Π[47] . If the ratio is less than 1[48], the financing of pensions is unbalanced and implies in our model that, *ceteris paribus*, the level of public debt *per capita* increases. In turn, an increase in public debt *per capita* implies that the level of capital *per capita* transferred to new generations *decreases*. A decrease in the level of capital *per capita* corresponds to a reduction in the welfare burden of future generations.

The indicator for which we have the longest series shows a deterioration in terms of intergenerational equity from 2000 to 2015. It reflects, in a simpler and more direct way, that the ratio of social contributions intended to fund pensions to pension expenditure has been deteriorating over this period, which clearly has a negative impact on future generations. Since 2015, the indicator has improved, albeit slightly, for future generations.

Retirement age and life expectancy

The fourth indicator - retirement age and life expectancy - is based on the following assumptions:

A3: all other things being equal, an increase in the welfare weight of future generations increases the retirement age.

A4: all other things being equal, an increase in life expectancy increases the retirement age.

The indicator we propose is the 3-year moving average of the ratio of the average retirement age to the average life expectancy at age 65. A stable or decreasing ratio implies that the retirement age is adjusting to maintain or increase the welfare burden of future generations. On the other hand, an increasing ratio suggests a decrease in the welfare burden of future generations. Another interpretation of the above relationship is that the retirement age is not adjusting to maintain a fair rate of return. We used a three-year window to calculate the ratio.

The indicator deteriorated from 2005 to 2017. It reflects, in a simpler and more direct way, that the ratio of average retirement age to average life expectancy at 65 has been decreasing. Since 2017 the indicator has increased due to an increase in the average retirement age and a decrease in life expectancy during the pandemic.

8.4. Results

Here we present the results of the four indicators, after normalization, chosen to form part of the general index of intergenerational justice, as well as the final value for the index of intergenerational justice in the budgetary dimension of public finance. Normalization does not allow us to interpret the value of the indicator, but it does allow us to understand the *evolution over time* of the degree of intergenerational equity in budgetary justice.

The choice of normalization was that each index should be between zero and one (considered as an open interval), and that an increase to one indicates a slope that favors future generations. To normalize the indicators we applied a logistic transformation. To obtain indexes with a comparable scale before the logistic transformation, we transformed each indicator into a

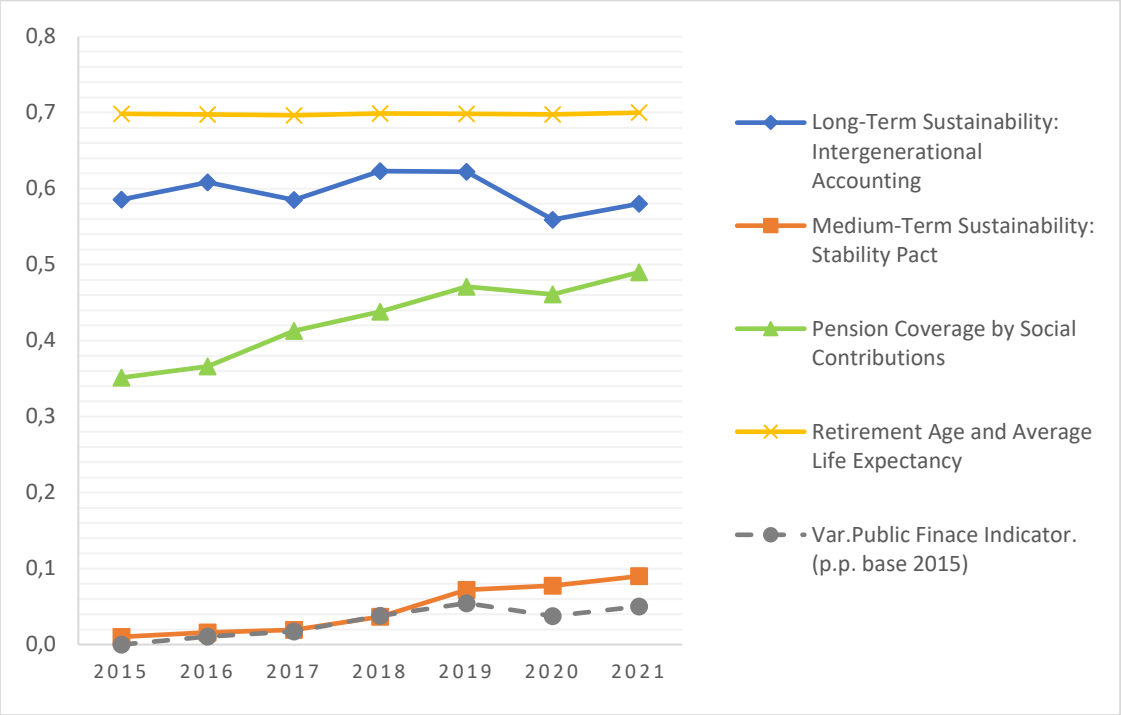
48 The unity threshold is true for the model presented in the appendix of the policy paper. In reality, the threshold is not unity, as pensions are also financed by general taxation. However, what matters for our analysis is the change in the value of the ratio, regardless of the threshold.

percentage and scaled it by its standard deviation[49]. Finally, the weighting of each indicator is clearly subjective. In the absence of any argument to support different treatment, the four indicators are weighted equally.

Years	**Long-Term Sustainability:** Intergenerational Accounting	**Medium-Term Sustainability:** Stability Pact	**Pension Coverage by Social Contributions**	**Retirement Age and Average Life Expectancy at 65**	**IJI Public Finance**
2011	0,575	0,011	0,407	0,704	0.44
2012	0,582	0,012	0,367	0,702	0.42
2013	0,567	0,009	0,360	0,700	0.42
2014	0,586	0,010	0,351	0,699	0.41
2015	0,608	0,016	0,366	0,698	0.41
2016	0,585	0,019	0,413	0,697	0.42
2017	0,623	0,037	0,438	0,699	0.43
2018	0,622	0,072	0,471	0,698	0.45
2019	0,559	0,078	0,461	0,698	0.47
2020	0,576	0,086	0,490	0,701	0.45
2021	0,575	0,011	0,407	0,704	0.46

Table 11- Indicators of Intergenerational Justice in Public Finance: normalized long series.

49That is $\boldsymbol{\theta^{scaled}} = \frac{\boldsymbol{\theta - 1}}{\boldsymbol{std(\theta)}}$, $\boldsymbol{p^{scaled}} = \frac{\boldsymbol{p}}{\boldsymbol{std(p)}}$, $\frac{\Xi}{\Pi}^{scaled} = \frac{\frac{\Xi}{\Pi} - 1}{std\left(\frac{\Xi}{\Pi}\right)}$ and $\eta_{\xi\mu}^{scaled} = (\eta_{\xi\mu} - 1)/std(\eta_{\xi\mu})$. The standardized indicators are $I_i = \frac{1}{1+exp(-x_i)}$ where $x_i = \left\{\frac{1}{\boldsymbol{\theta^{scaled}}}, p^{scaled}, \frac{\boldsymbol{\Xi^{scaled}}}{\boldsymbol{\Pi}}, \frac{\eta_{\xi\mu}{}^{\boldsymbol{scaled}}}{\eta_{\xi\mu}^{scaled,2005}}\right\}$.



Graphic 7-Sub-dimensions of intergenerational justice considered in Public Finance

8.5. Public policies and intergenerational justice

An index like the one proposed in this paper can only be suggestive of a symptom. It does not allow for the identification of the causes of the disease or, above all, the ways to treat it. For example, the fact that the non-standardized indicator of the long-term sustainability of public finance is consistently above 1 suggests that long-term imbalances in public finance due to worrying demographic trends should be tackled. However, it does not say how to tackle these imbalances. Public policy choices, whatever the ideological leanings of policymakers, must be based on detailed and scientific analysis and ultimately the effects of these policy choices, if appropriate, will show up as an improvement in the indicator. Therefore, any list of public policies to improve indicators should only be taken as a suggestion to encourage a detailed impact analysis study.

Long-Term Sustainability: Intergenerational Accounting

Regarding the long-term sustainability indicator, we recommend policies that improve demographic projections by counteracting the fall in fertility. Pro-natalist policies[50] combined with increased immigration is probably the most effective approach[51]. However, there is no clear evidence for policymakers on which policies are most likely to increase fertility rates at the lowest budgetary cost. An important aspect is that policies that will come into force in the future (but are already announced), such as reducing future benefits or increasing the retirement age associated with increased life expectancy, help to ensure intergenerational budget balance. It remains to be seen whether they are fair to the different generations and whether they are

50 These should be interpreted broadly to include everything from tax incentives for children to pre-school care and the ease of obtaining a home. The aim is to promote the desired birth rate, particularly by mothers, which, as several existing studies for Portugal show, is higher than the observed birth rate.

51 Although migration can only be a medium-term solution and a definitive one.

politically sustainable. If they are not, the question remains open as to which alternative policies are most appropriate.

Medium-term sustainability: Stability Pact

The medium-term primary surplus in the public accounts can be improved through structural measures on both the expenditure and revenue sides. The improvement must be structural to make it permanent. The obvious candidates on the revenue side are decentralization, simplification, digitalization and education. To improve the efficiency of public spending, policies must strengthen budget management and systematically reassess spending priorities through reviews and evaluations, to ensure the best balance between spending on social programs and investments in infrastructure, education and health. Finally, structural improvement should be achieved by higher revenues or lower spending (or a combination). This choice should not only reflect political preferences, but also their effects on productivity.

Retirement age and life expectancy

This indicator is based on a welfare analytical framework. It indicates that working more years is expensive in terms of well-being, but that, from the point of view of social security, this cost must be equated to the utility of the pension received during retirement time which, in the current financing model, in turn depends on the contributions paid by workers. This indicator can only be improved by raising the retirement age while keeping longevity constant.

Coverage of pensions by social contributions

Policy options to improve the sustainability of social security are well known and are also related to policies to improve the long-term sustainability of public finance indicator (indicator 1). In fact, the indicator on the coverage of pensions by social contributions is a subset of indicator 1, as it focuses only on the pension system. For this indicator in particular, consideration should be given to refining and respecting the specific and mandatory rules to allow automatic adjustment mechanisms (AAMs) for the pension system, as set out in the current law. AAMs contribute to improving solvency at any time without discretionary political intervention, thus avoiding the need for major changes to the program made in crisis mode. The implementation of AAMs requires not only direct and clear choices about intergenerational transfers, but also strong social acceptance.

Generally, the sustainability of the welfare system will also depend on political choices regarding the model for financing social security (which can be based more or less on the work factor), which is beyond the scope of this study.

9. Conclusion

As we mentioned at the beginning of this study, theoretical interest in the subject of intergenerational justice is long-standing. If we consider, as Thomas Jefferson said, that the generations alive on Earth at any given time should consider themselves only as temporary usufructuaries of planet Earth, then we can extend this idea not only to the environment and natural resources, but to all kinds of "capital" assets. Present generations have obligations towards past and future generations. However, democracy biases political choices towards present generations, and within them increasingly towards the interests of older ones. While this phenomenon has already been clearly identified in the literature, the response to it varies greatly from country to country.

The most advanced countries are dealing with this problem on two different levels. On the one hand, in the production of indicators that attempt to measure intergenerational equity or justice in various dimensions and how these indicators evolve over time. Observing and measuring means being able to monitor and thus assess the extent to which certain public policies are or are not having an impact on intergenerational justice. This study fits precisely into this perspective: it is necessary to identify dimensions, sub-dimensions and indicators to assess how we are evolving or regressing from the point of view of intergenerational justice. We should move towards building an observatory of intergenerational justice and the analysis developed in this study is a contribution in this direction. Portugal already has several sectoral observatories (e.g. inequalities), but none that simultaneously addresses several areas relevant to public policy. On the other hand, the variables that are monitored in official statistics are often short-term variables and not from the perspective of the impact on present and future generations. Every year we know the change in the debt to GDP ratio (e.g. a reduction of x percentage points). But there is no information or monitoring of whether the current cohorts' efforts to reduce the debt burden are adequate or excessive. An indicator such as the one suggested in this study would make it possible to achieve this goal.

Portugal has approved strategic documents in almost all areas of public policy (forests, energy and climate, waste management, housing, etc.). Several of these documents are aligned with European strategies and Portugal's international commitments. When well prepared, in addition to the public policy measures, there is a timetable and targets associated with specific years. Rather than announcing and listing policy measures, we should look more at indicators (e.g. net greenhouse gas emissions, municipal solid waste recycling rate, etc.) and see to what extent we are implementing the announced strategy or whether we are moving away from it.

An important conclusion of this study is the availability of statistical information. In several of the dimensions studied, we were able to calculate intergenerational justice indices up to 2021. This was not possible in certain areas due to the lack of up-to-date information, such as health, due to mental health data not being available in time. Other times the relevant variables we want to analyze are not available. In particular, this study shows the importance of making indicators available by age group.

This analysis shows that there has been a positive variation in the Intergenerational Justice Index - Portugal in recent years, i.e. there has been a slight relative improvement for today's young cohorts and future cohorts in relation to today's older cohorts. This is the result of opposite effects in various dimensions. This improvement is largely explained by the poverty and living conditions dimension, the labour market dimension and, to a lesser extent, public finance. On the other hand, both the housing dimension and the environment and natural resources dimension are worse off in 2020 than in 2015.

This study has identified some critical aspects that can harm intergenerational justice and the variables that should be monitored annually to avoid harming future generations. All the indicators we have presented are relevant, but in particular attention should be paid to the following: in the environment, the production and recycling of urban waste, forest management and forest fires; in the labour market, fixed-term contracts, unemployment and youth emigration; in housing, accessibility to housing, as well as the degree of autonomy of young people; in the dimension of poverty and living conditions, the incidence of poverty and material deprivation and finally in public finance their medium and long-term sustainability, namely the budgetary effort borne by each generation in the process of adjustment and reduction of public debt.

There is, however, another, more structural level that has been used by some countries to deal with the problem of a possible disregard for the sustainability of the planet and the interests of future generations, whatever they may be. This involves creating institutions that look after the interests of future generations, in other words, institutions that defend the sustainability of assets in the future. Here too, Portugal can learn a lot from the pioneering projects being developed and practiced in other countries.

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