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Assessing the future fiscal sustainability of health spending in Ireland

Luca Lorenzoni*, Pietrangelo de Biase**, Sean Dougherty*** and Tiago McCarthy****

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Authorised for publication by Stefano Scarpetta, Director, Directorate for Employment, Labour and Social Affairs

(*) OECD, Directorate for Employment, Labour and Social Affairs, Health Division
(**) OECD, Directorate for Financial and Enterprise Affairs, Competition Division
(***) OECD Network on Fiscal Relations across Levels of Government
(****) Irish Government Economic & Evaluation Service (IGEES) - Department of Health, Ireland.

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Abstract

This working paper uses a new method to assess the fiscal sustainability of the Irish health system by considering the effects of population change and income growth on both government revenue and health spending. By coupling health spending projections with government revenue projections, we explore how changes in population age structure and income would result in changes in the share of health spending in government revenues over time.

Spending on healthcare is comparatively high in Ireland, representing one fifth of government spending, accounting for 8.4% of GNI*[1] in 2019. Growth in health spending from public resources is projected to average 3.4% per year over the next two decades (as compared to 2.6% across the OECD) reaching 10.9% of GNI* by 2040 in our central scenario and 11.4% of GNI* in our 'Resilient' scenario. Irish government revenues are projected to grow at 2.6% per year during the same period (as compared to 1.3% across the OECD) reaching 44.6 % of GNI* by 2040. Health spending from public sources is projected to account for 24% of government revenues in 2040 (up from 20% in 2019). The fiscal balance is projected to slightly deteriorate in Ireland by 2040.

Population change is projected to be a much greater driver of future health spending in Ireland over the next 20 years as compared to the OECD average. Changes in the size and structure of the population are projected to increase health spending by 1.7% per year on average over the next 20 years (baseline scenario). This accounts for half of the annual growth in health spending as compared to a quarter for the OECD. This is due to the relatively young population in Ireland at present and the significant projected population change set to occur.

By drawing attention to the effects of ageing and income growth on both government revenues and health spending, our approach provides policymakers with a broader set of options to consider when addressing financing shortfalls. Analyses that give equal attention to both health expenditure and government revenues better captures the need for a whole-of-government set of policies, in particular when addressing the consequences of ageing, ranging from those targeting price and utilisation of services to those that can make government revenues more robust to population ageing.

[1] 'Modified Gross National Income' - this measure, and the rationale for its use, is described in section 2 of this working paper.

Résumé

Ce document de travail utilise une nouvelle méthode pour évaluer la viabilité budgétaire du système de santé irlandais en tenant compte des effets du vieillissement de la population et de la croissance des revenus sur les recettes publiques et les dépenses de santé. En associant les projections des dépenses de santé aux projections des revenus du gouvernement, nous explorons comment les changements dans la structure par âge de la population et les revenus entraîneraient des changements dans la part des dépenses de santé dans les revenus du gouvernement au fil du temps.

Les dépenses de santé sont relativement élevées en Irlande, représentant un cinquième des dépenses publiques et 8,4 % du RNB* en 2019. La croissance des dépenses de santé à partir des ressources publiques devrait atteindre en moyenne 3,4 % par an au cours des deux prochaines décennies (par rapport à 2,6 % dans l'ensemble de l'OCDE) atteignant 10,9 % du RNB* d'ici 2040 dans notre scénario central et 11,4 % du RNB* dans notre scénario « Résilient ». Les recettes publiques irlandaises devraient augmenter de 2,6 % par an au cours de la même période (contre 1,3 % dans l'ensemble de l'OCDE) pour atteindre 44,6 % du RNB* d'ici 2040. Les dépenses de santé provenant de sources publiques devraient représenter 24 % des recettes publiques en 2040 (contre 20 % en 2019). Le solde budgétaire devrait se détériorer légèrement en Irlande d'ici 2040.

Le vieillissement de la population devrait être un moteur beaucoup plus important des futures dépenses de santé en Irlande au cours des 20 prochaines années par rapport à la moyenne de l'OCDE. L'évolution de la taille et de la structure de la population devrait entraîner une augmentation des dépenses de santé de 1,7 % par an en moyenne au cours des 20 prochaines années (scénario de référence). Cela représente la moitié de la croissance annuelle des dépenses de santé contre un quart pour l'OCDE. Cela met en lumière le rôle beaucoup plus important que devrait avoir le vieillissement de la population sur les dépenses de santé en Irlande que la moyenne de l'OCDE. Cela s'explique par la population relativement jeune de l'Irlande à l'heure actuelle et par l'important vieillissement prévu de la population qui devrait se produire.

En attirant l'attention sur les effets du vieillissement et de la croissance des revenus sur les recettes publiques et les dépenses de santé, notre approche offre aux décideurs un ensemble plus large d'options à prendre en compte pour remédier aux déficits de financement. Les analyses qui accordent une attention égale aux dépenses de santé et aux recettes publiques rendent mieux compte de la nécessité d'un ensemble de politiques whole-of-government, en particulier lorsqu'il s'agit de lutter contre les conséquences du vieillissement, allant de celles qui ciblent le prix et l'utilisation des services à celles qui peuvent rendre les recettes publiques plus résistantes au vieillissement de la population.

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In Brief

- Across the OECD, average annual growth in health spending from public sources is projected to be twice the average annual growth in government revenues (2.6% versus 1.3%) over the next two decades (all results in constant prices). Changes in the size and structure of the population are projected to increase health spending by 0.6% and government revenues by 0.1% per year on average across OECD countries over the next 20 years. This accounts for one fourth of the growth in health spending and less than one tenth of the projected growth in government revenues, respectively. The majority of the projected increases in health spending and government revenue will come from income growth and increases in prices (wage and non-wage) as well as technological changes.
- Spending on healthcare is comparatively high in Ireland, representing one fifth of government spending, accounting for 8.4% of GNI* in 2019. Growth in health spending from public resources is projected to average 3.4% per year over the next two decades (as compared to 2.6% across the OECD) reaching 10.9% of GNI* by 2040 in our central scenario and 11.4% of GNI* in our 'Resilient' scenario. Irish government revenues are projected to grow at 2.6% per year during the same period (as compared to 1.3% across the OECD) reaching 44.6 % of GNI* by 2040. Health spending from public sources is projected to account for 24% of government revenues in 2040 (up from 20% in 2019). The fiscal balance is projected to slightly deteriorate in Ireland by 2040.
- Population change is projected to be a much greater driver of future health spending and government revenues in Ireland over the next 20 years as compared to the OECD average. Changes in the size and structure of the population are projected to increase health spending by 1.7% and government revenues by 1% per year on average over the next 20 years (baseline scenario). This accounts for half of the growth in health spending and over a third of the growth in government revenues, respectively.
- This highlights the much greater role population change is projected to have on health expenditure and revenue in Ireland than in the OECD average. This is due to the relatively young population in Ireland at present and the significant projected population change set to occur.
- Around two thirds of the additional resources needed to strengthen health systems resilience may come from policies that support prevention and promote healthy lifestyles as well as policies that enhance efficiency and care integration. Policies should also aim to make government revenues more robust to population ageing.

1 Introduction

1. Even before COVID-19, many OECD countries had predicted challenges regarding the financing of their health systems in the decades to come. The pandemic has made this outlook even more complex. If high quality health services for all are to be sustained and improved, and societies are to be better prepared for health shocks with less dramatic impacts than those experienced during the COVID-19 pandemic, health systems need to be better prepared for the future. This includes not only being responsive to several "mega-trends" emerging in OECD economies that will affect health - such as population change, technological developments and changes in labour markets and family structure - but also potential future health shocks from repeated pandemics, anti-microbial resistance, the effects of climate change as well as disruptions to digital infrastructure.

2. In addition to these considerable challenges, the COVID-19 pandemic has made it clear that health system resilience must be improved as a necessary component of fiscal sustainability. In 2020, the COVID-19 pandemic contributed to a reduction of 3.4% in the size of the world economy, as measured by GDP, with some OECD countries experiencing reductions as large as 10.8% (OECD, 2021[1]). Looking to the future, repeated health shocks have the potential of affecting economic growth through cumulative impacts if not contained and mitigated effectively by health systems. Resilient health systems should be able to plan for the occurrence of shocks, absorb and recover from these shocks while minimising the extent of their impacts, and adapting to become even more prepared for future shocks.

3. In this paper we use a new method to assess the fiscal sustainability of health systems by considering the effects of population change and income growth on both government revenue and health spending. By coupling health spending projections with government revenues projections, we explore how changes in population age structure and income would result in changes in the share of health spending in government revenues over time. By drawing attention to the effects of ageing and income growth on both government revenues and health spending, our approach provides policymakers with a broader set of options to consider when addressing financing shortfalls. Analyses that give equal attention to both health expenditure and government revenues better captures the need for a whole-of-government set of policies, in particular when addressing the consequences of ageing, ranging from those targeting price and utilisation of services to those that can make government revenues more robust to population change.

To obtain an order of magnitude of the long-term fiscal sustainability of the Irish health system, this paper firstly projects government revenues to 2040 (de Biase, Dougherty and Lorenzoni, 2022[2]). The following section projects health spending from public sources to 2040 (Lorenzoni, 2019[3]), with consideration also given to additional spending requirements associated with resilient health systems (Morgan and James, 2022[4]). Using these projections, the share of health spending in government revenues in 2040 is estimated, and policy options to meet the coming challenges (Sicari and Sutherland, 2023[5]) are discussed. The second section of this of this paper puts the projections for Ireland in an international context. [2]

[2] The analyses presented in this paper focus on 33 OECD countries as potential GDP projections from the OECD Economics Department are currently not available for Chile, Colombia, Costa Rica, Mexico and Türkiye.

2 The future fiscal sustainability of the Irish health system

2.1. Demography

4. With regard to total population size, Ireland is projected to experience much greater relative growth than the OECD overall. Between 2019 and 2040, Ireland's total population is projected to increase by 20.3% while the OECD is projected to increase by 7.3%. In 2019, the share of the population aged 65 and over was 14.1% in Ireland as compared to the OECD rate of 17.1%. By 2040, Ireland's rate is projected to increase by 7 percentage points to 21.2% while the OECD rate is projected to increase by just over 6 percentage points to 23.4%. Therefore, Ireland will experience population change at a relatively greater rate than the OECD, with the rate of those aged 65 and over increasing by a half while the OECD rate will increase by over a third.

5. In 2019, Ireland's working age population[3] made up 65.4% of the total population, compared to the OECD rate of 65.0%. Over the next 20 years, considering the OECD population projection scenario,[4] Ireland's working age population share will decrease to 62.1% while the OECD rate will decrease even further to 60.9%. These values do not change much when using the publicly available population projection scenarios from the Irish Central Statistics Office (CSO) of M1F1 (optimistic), M2F2 (central) and M3F2 (pessimistic) resulting in a working age population share in 2040 of 61.9%, 62.5% and 61.5%, respectively.[5]

6. Therefore, in relative terms, Ireland is expected to have a larger working age population than most OECD countries until 2040. One of the main reasons for this is that the portion of the population younger than 20 years of age accounts for 26.5% of Ireland's total population, the 7th highest in the OECD. This relatively high number of young people is related to the also comparatively high fertility rate in the country, even though in absolute values, each Irish woman has, on average, only 1.7 children, which is below the replacement rate[6]. In addition, Ireland has the 10th highest number of migrants' inflow as a share of total population (1.3% against the OECD average of 1% in 2019) and the 8th highest number of foreign-born people as a share of the population (17.8% against the OECD average of 13%).

[3] Working age population is defined as people aged between 15 and 64 years.

[4] Over the forecasting period, this scenario keeps fertility rates of 2019 roughly constant, reduces the migration rate to one third of its 2019 value and assumes an increase of 3 years in life expectancy.

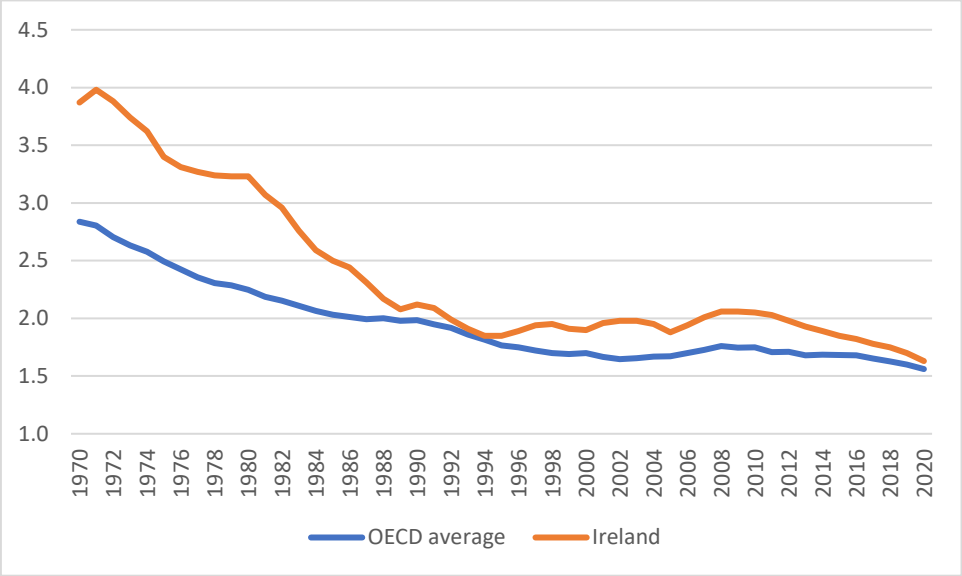
[5] M1F1 maintains the Total Fertility Rate at 1.8 over the entire period, coupled with annual net inward migration of 30,000 persons. M2F2 assumes annual net inward migration of 20,000 and a declining fertility rate. M3F2 assumes annual net inward migration of 10,000 and a declining fertility rate. https://www.cso.ie/en/releasesandpublications/ep/p-plfp/populationandlabourforceprojections2017-2051/populationprojectionsresults/ While CSO population projections using the results of Census 2022 are not yet available at the time of writing, summary results show that Census 2022 recorded a 0.8% greater population that what was projected using Census 2016 as a base under the M1F1 (Optimistic) scenario.

[6] Replacement level fertility is the level of fertility at which a population exactly replaces itself from one generation to the next. In developed countries, replacement level fertility can be taken as requiring an average of 2.1 children per woman (Craig, 1994[17]).

7. Even though Ireland's fertility rates have been higher than the OECD average since 1970, the decrease between 1970 and 1990 was more acute than the average (Figure 2.1, panel A). As a result, the number of Irish people aged between 15-64 years is expected to decrease sharply as a share of the total population roughly 20 to 25 years after their peak in 2007 (Figure 2.1, panel B). The working age population share in Ireland is expected to shrink more than the projected average decrease across OECD countries from 2031 and by 2045 its working population share is projected to be below the OECD average. Therefore, population change is likely to affect Ireland with higher intensity beyond the projection period of this analysis (2040). [7]

Figure 2.1 Fertility rates and decrease in working age population after its peak.

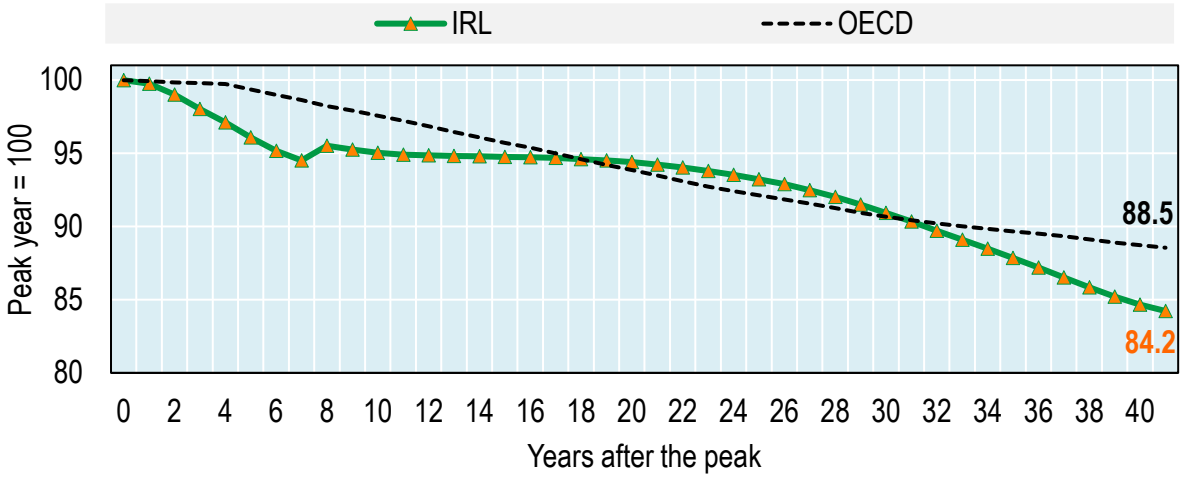
Panel A. Fertility rates (children per woman aged 15 to 49 years old)



Source: OECD Statistics.

[7] See further charts in the Appendix showing total population growth, working age population growth, working age population shares for the period 1970-2021 and projection to 2060 for Ireland and the OECD.

Panel B. Decrease in working age population after its peak.



Note 1: Past values and projected values are shown. Ireland's peak year was in 2007 while the OECD average was in 1996.
Note 2: Working age population is defined as people aged between 15 and 64 years.
Source: OECD Population Projection

2.2. Government revenues

8. In Ireland, the taxes that raise the most revenue are, in order, personal income taxes (PIT[8], 32% of total tax revenues), goods and services tax (GST/VAT[9], 31%), social security contributions (SSC[10], 17%) and corporate income taxes (CIT[11], 14%). On average, OECD countries' tax mix consists of GST/VAT (33% of tax revenues), SSC (26%), CIT (10%) and PIT (24%). Therefore, Ireland relies more on PIT (8pp) and CIT (4pp) and less on SSC (9pp) and GST/VAT (2pp) than the OECD average. Ireland's reliance on labour income related taxes (PIT and SSC), which are more exposed to population change, is roughly the same as the OECD average. PIT and SSC combined, account for 49% of Ireland's total revenue while the average rate for the OECD is 50%.

9. Ireland's tax mix has changed moderately over the last 30 years (Figure 2.2). Notably, there was a substantial increase in the share of revenues that comes from CIT (9 pp.) with an almost proportional decrease in the share that comes from GST/VAT (11 pp.).[12] Other minor movements happened with property taxes (1 pp. growth), SSC (2.7 pp. growth) and PIT (1.4 pp. fall). These

[8] Personal Income Tax (PIT) refers to 'Taxes on Incomes, Profits and Capital Gains of Individuals' (code 1100). OECD Global Revenue Statistics - https://stats.oecd.org/.

[9] In OECD data, 'Value Added Taxes' (code 5111) is a subcategory of 'Taxes on Goods and Services' (code 5000). 'Taxes on Goods and Services' also includes 'Excises' (code 5121) 'Customs and Imports Duties' (code 5123) and 'Taxes on Specific Services' (code 5126 - Duty on Betting, Bank Levy and 'Other'). OECD Global Revenue Statistics - https://stats.oecd.org/.

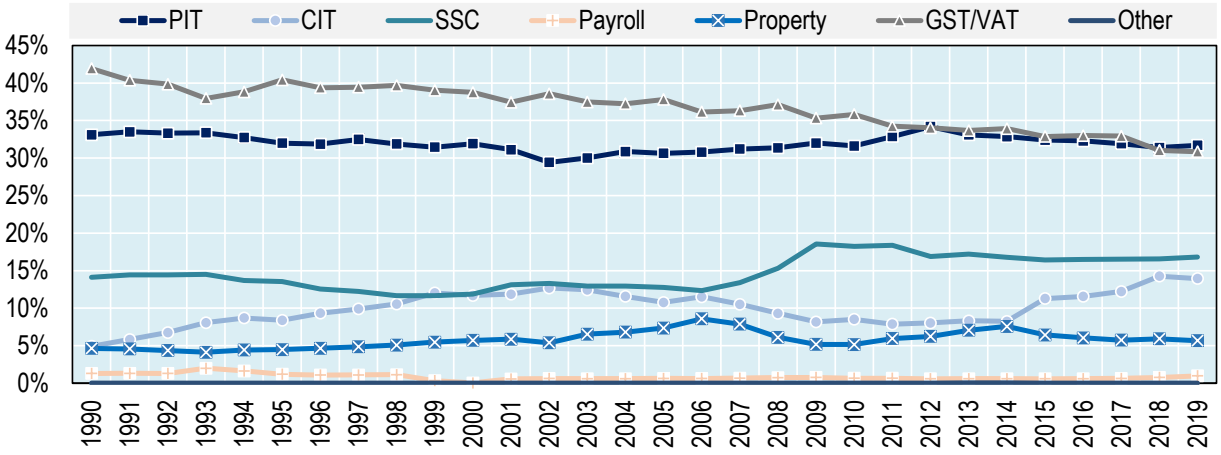
[10] Social Security Contributions (code 2000). OECD Global Revenue Statistics - https://stats.oecd.org/.

[11] Corporate Tax (code 1200). OECD Global Revenue Statistics - https://stats.oecd.org/.

[12] Figure 2.2 highlights the substantial increase in the share of Corporation Tax in Total Revenue. It is important to highlight the high degree of uncertainty with regard to the ability to forecast Corporation tax receipts in Ireland in recent years. In its 2023 Summer Economic Statement, the Irish Department of Finance estimated *"'windfall' corporation tax receipts – that is the amount that cannot be explained by underlying drivers and, therefore, may be more vulnerable to a shock – amount to almost €12 billion or approximately half of the corporate tax-take this year" (p.15)* https://www.gov.ie/en/publication/cfde8-summer-economic-statement-2023/

movements were in the same direction but with a higher magnitude than those experienced by the OECD average, where SSC revenues and CIT revenues experienced the largest relative increase (4.2 and 1.6 pp., respectively) while PIT and GST/VAT experienced the largest relative decrease (3.1 and 1.1 pp., respectively). A growing reliance on property taxes could be useful with regard to addressing the challenges presented by population change as recurrent taxes on immovable property are growth friendly and not directly affected by a reduction in the working age population. CIT revenues , while also not directly linked to labour income, are considered as distortionary and might reduce output growth (Cournede, Fournier and Hoeller, 2018[6]).

Figure 2.2 Tax revenue structure for Ireland



Source: OECD *Revenue Statistics*

10. Buoyancy is an estimate that captures the sensitivity of government revenues to economic activity based on historical data. Buoyancy coefficients capture both the tax elasticity with respect to economic activity and the changes in the tax system made in the past, which are assumed to be repeated in the projection period. A unitary buoyancy means that government revenues will increase in line with economic activity in a way that government revenues are going to experience the same growth rate as the economy.

11. Ireland's total revenue's long-run buoyancy, estimated using data from between 1995 and 2018[13], is 1.09, slightly higher than the OECD average of 1.01. Therefore, in the long run, this buoyancy implies that government revenues will account for a slightly higher share of economic activity (here proxied by GNI*), improving government finances if government expenditures grow at the same rate as economic activity. It is worth noting that this buoyancy coefficient is very different from the coefficient that is estimated when GDP is used as a proxy for economic activity (it falls to 0.58). In Ireland, GNI* is a more realistic proxy for economic activity due to the significant impact multinational companies have in the country's GDP statistic and, in addition, estimates using GDP as a proxy for economic activity have a very wide confidence interval.[14]In order to analyse the reliability of the estimate, we used

[13] The selection of the initial year of analysis was informed by data availability on government revenues from OECD Revenue Statistics and the System of National Accounts.

[14] Different from other OECD countries, the revenue buoyancy for Ireland in this paper is estimated with respect to modified GNI (GNI*) instead of GDP. According to Ireland's Central Statistics Office, GNI* is designed to be a supplementary measure of the level of the Irish economy and excludes globalisation effects related to highly mobile economic activities that disproportionately impact upon the measurement of the size of the Irish economy. This is particularly relevant for Ireland as GDP counts money that is made in Ireland but does not stay there, which is substantial given the relevance of foreign companies based in Ireland.

bootstrapping to estimate the confidence interval of the estimated buoyancy coefficients and used four different estimate methods: error correction model (ECM), using an outlier-robust regression to remove effects from large movements in tax revenues that are unlikely to be repeated, ECM controlling for tax rates of PIT and CIT (which proxies an elasticity instead of buoyancy), and using an ordinary least square log-regression [15].Figure 2.3, panel A, shows the confidence interval for the buoyancy coefficient estimated through an ECM and the log-regression. This panel shows that Ireland's buoyancy coefficient likely lies between 1.02 and 1.20 for the ECM estimate, and between 1.04 and 1.08 for the log-regression (these values refer to the first and third quartiles, respectively).

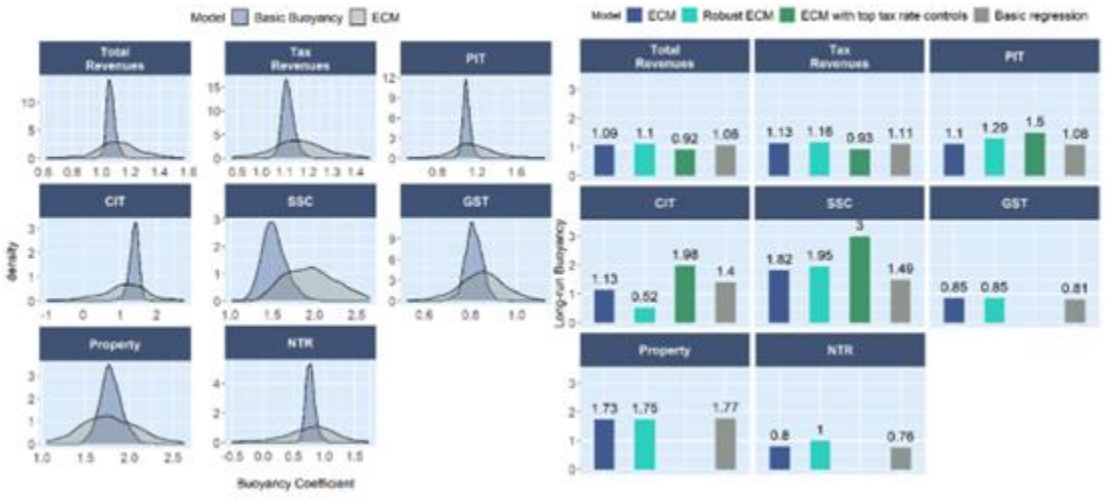
12. Figure 2.3 panel B, which cover the coefficient estimated by four different models, shows that there are only mild differences in the coefficient estimated depending on the model, with the exception of a coefficient below 1 when controlling by top tax rates. The buoyancy estimate is robust to outliers (as the robust ECM's coefficient is almost identical to the coefficient of the regular ECM) and does not vary much when using an ECM or log-regression. Nevertheless, controlling for tax rates moderately affects the buoyancy coefficient, which indicates that changes in tax policy might have influenced the relationship between government revenues and economic activity. Despite the wide range of the distribution of buoyancy coefficients in the ECM, given the similarity of the total revenues' buoyancy coefficients across models and narrow range of the distribution of buoyancy coefficients in the log-regression, it can be concluded that Ireland's total government revenues long-run buoyancy is slightly above unity.

For more details, see https://www.cso.ie/en/interactivezone/statisticsexplained. However, with regard to Corporation Tax, as a significant portion of receipts stem from multinationals' globalised activities, it is likely more appropriate to use GDP with regard to estimating the buoyancy of that particular revenue source. This is not carried out in this paper and certainly warrants further research.

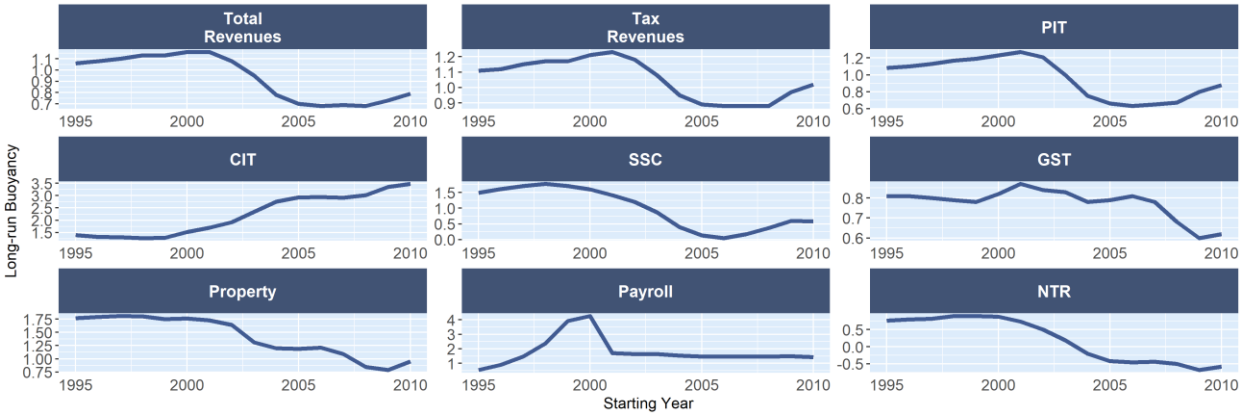
[15] Using the logarithmic and first differences. This simple method follows more closely the definition of elasticity but does not take into account the dynamic relationship between government revenues and GDP (or GNI* in this case)

Figure 2.3 Buoyancy coefficients and uncertainty

Panel A. Confidence interval *Panel B. Model's coefficients*



Panel C. Buoyancy computed with varying starting year



Note 1: The basic regression in panel B refers to a log-regression of the differences. For panel C a simple OLS was used to estimate buoyancy. PIT, CIT, SSCs, GST and NTR refer to personal income tax, corporate income tax, social security contributions, goods and service tax (or value added tax) and non-tax revenues.

Note 2: Different from other countries in this report, the revenue buoyancy here computed is respect to the modified GNI (GNI*) instead of GDP. According to Ireland's Central Statistics Office, GNI* is designed to be a supplementary measure of the level of the Irish economy and excludes globalisation effects related to highly mobile economic activities that disproportionately impact upon the measurement of the size of the Irish economy. This is particularly relevant for Ireland as GDP counts money that is made in Ireland but does not stay there, which is substantial given the relevance of foreign companies based in Ireland.

Note 3: Panel C displays buoyancy coefficients from varying starting years up until the year 2018. The analysis is truncated in 2010 to prevent the computation of buoyancies based on an extremely limited set of observations, mitigating the potential for excessive volatility in the coefficient caused by outliers within this small subset of data.

Source: Authors' compilation based on OECD Revenue Statistics, OECD System of National Accounts and Ireland's Central Statistics Office.

13. Another source of uncertainty in buoyancy coefficients stems from the period used to 'train' the model. Risk arises if buoyancies or elasticities vary a lot from year to year. If so, using estimated buoyancy/elasticity may give a poor forecast to revenue. That is what Figure 2.3, panel C reveals: the buoyancy coefficient variability if the starting year of the period used in the estimation shifts. Although,

in most cases, the coefficients do not vary much when the starting period does not change much, they might vary significantly if the starting date changes substantially.

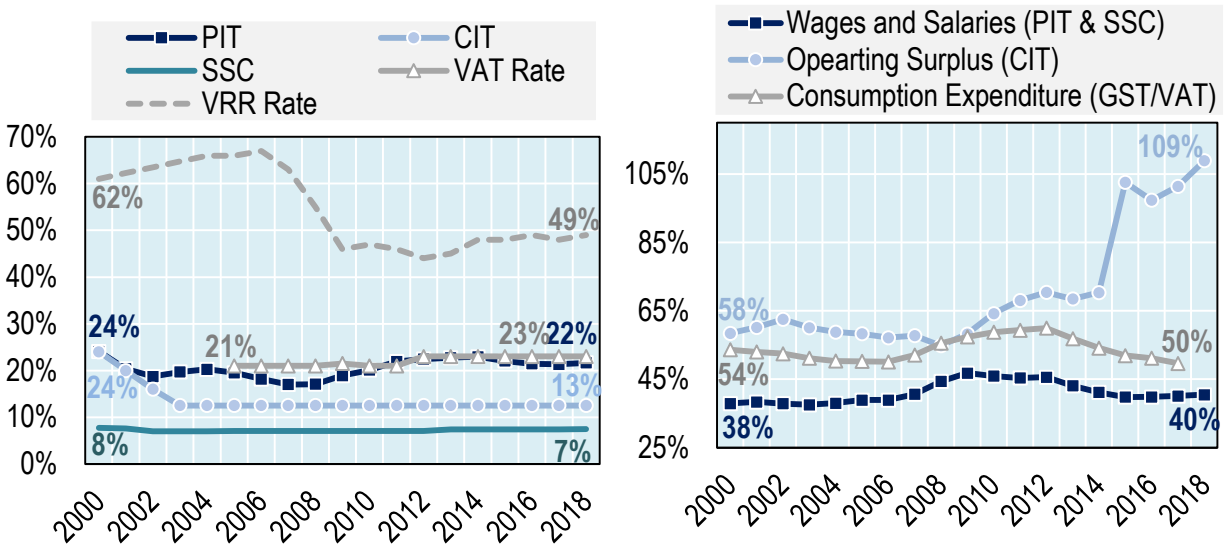
14. These variations might reflect underlying differences in tax policies and movements in the tax base, which typically changes across periods. In the Irish case, total revenues buoyancy is above unity when we 'train' the model using data starting in the early 2000s and, afterwards, it decreases until it becomes below unity. Aside from CIT, whose revenues as a share of total tax revenues increased the most in the past decades, all other taxes' buoyancy coefficients followed, by and large, a downward trend. In addition, it is impossible to ignore the impact of the Great Financial Crisis (GFC) on the relationship between government revenues and economic activity. The closer the starting period is to the GFC, the greater the share of the model's 'training period' comprises the GFC, and, thus, the greater the estimated impact of the crisis on buoyancy coefficients.

15. Now we investigate whether movements in tax rates and bases can explain Ireland's buoyancy coefficients. When using elasticity/buoyancy models, economic activity works only as a proxy for the tax base of government revenues. Aggregates that measure economic activity as a whole are too broad and most taxes are levied only on a portion of this aggregate. Hence, when analysing some specific type of taxes, better aggregates can be used to proxy the tax base. Here, we use household consumption as a proxy for GST/VAT; wages and salaries for PIT and SSC; and the operating surplus for CIT. These three types of taxes make up 93% of Ireland's total tax revenues. In addition to analysing the movement of these tax bases, it is important to analyse movements in tax rates, which directly impact revenue collection. Figure 2.4 presents how Ireland's main tax bases, rates and revenues varied in comparison to economic activity (proxied by GNI*), and the main movements in the average tax rate for different types of taxes [16].

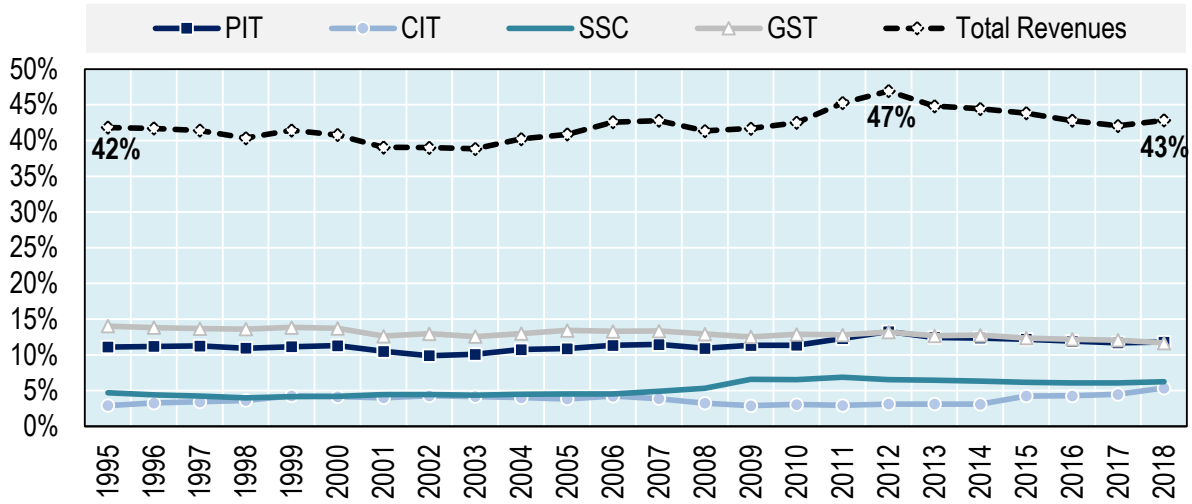
[16] It is worth noting that the first two panels of **Error! Reference source not found.** only cover the period between 2000 and 2019 and, therefore, they lack data from 1995 to 1999, which were used in the computation of buoyancy coefficients.

Figure 2.4 Trends in tax base in tax rates

Panel A. Average tax rates and VRR *Panel B. Tax base to GNI* ratio*



Panel C. Revenues to GNI ratio*



Note 1: There is no data for tax rates and base before the period displayed here. These tax bases are just proxies and, thus, do not capture the full structure of the underlying taxes. The same can be said for tax rates, which usually have different thresholds that are based on the characteristics of the taxpayers, not to mention specific and conditional tax benefits. VRR stands for VAT Revenue Ratio and measures revenues that could be collected if its VAT were applied to the entirety of its tax base.
Note 2: In Panel B used GDP as the denominator as values using GNI* were above unity for operating surplus.
Source: Authors' compilation based on OECD Revenue Statistics, OECD System of National Accounts and Ireland's Central Statistics Office.

16. Firstly, Figure 2.4, panel A and B show that PIT and SSC slightly higher than unity buoyancies might be explained by the increase in their tax bases as a share of GNI*, which more than offset the small reduction in their average tax rates. Likewise, CIT's high buoyancy also seems to be an outcome of an increase in the tax base and a reduction in tax rates, nevertheless, in this case, both movements were of a remarkably larger order of magnitude. Operating surpluses alone went from 58% to 109% of GNI*, revealing how large net income from abroad is in the Irish context, which inflates GDP but does not affect GNI*. Finally, GST/VAT below unity buoyancy is the outcome of a decrease in consumption and in their VAT Revenue Ratio, which means that a smaller portion of the VAT's tax base is being taxed at the statutory rate.

17. Figure 2.4, panel C reveals that the buoyancy coefficient above unity correctly captured the increase in total revenues as a share of GNI*. In addition, the buoyancy coefficients for PIT, SSC, CIT and GST/VAT followed the respective movements in their tax revenues to GNI* ratio (below unity when these ratios shrank and above unity when they expanded). It is particularly revealing to look at Ireland's total government revenues in the aftermath of the Great Financial Crisis (GFC) when it decreased steadily as a result of a reduction in labour income and consumption expenditure (Figure 2.4, panel B). The government increased PIT and VAT tax rates in this period (Figure 2.4, panel A) to offset the decrease in their tax bases, but the overall result was a significant decrease in government revenues. This likely explains why buoyancy coefficients shrank when the model was 'trained' with predominantly more recent data (refer to Figure 2.4, panel C).

18. Therefore, in summary, the slightly higher than unity buoyancy coefficient estimated for Ireland was likely caused by increases in their main tax bases (labour income and operating surpluses) that more than offset slight reductions in tax rates in the last decades. In addition, the GFC affected Ireland's revenue buoyancy considerably.

19. Going forward, it is difficult to predict whether a crisis of the magnitude of the GFC might impact Ireland again, and, thus, hard to predict whether these observed trends will continue. Recent reforms (disregarding those temporary reforms aimed at tackling the COVID-19 crisis), point in the direction of a reduction in tax revenues (see Box 2.1). In contrast, one of the core messages from the recent report of the Irish Commission on Taxation and Welfare was that given Ireland's demographic profile, level of public debt, and a number of other fiscal risks, the overall level of taxation as a share of national income will have to increase over time (see Box 2.2).

Box 2.1. Example of recent tax reforms in Ireland[17]

Since 2016, Ireland has made numerous tax reforms. Here are some examples:

- With regard to taxes on business, Ireland introduced a Knowledge Development Box which offers a reduced CIT rate for certain income from intellectual property; it introduced a cap on its capital allowances for intangible assets, limiting the capital allowances on specified intangible assets and deductions for related interest expense that can be claimed every year to 80% of trading income from specified intangible assets; accelerated capital allowances for employer-provided fitness and childcare facilities and for gas-propelled vehicles and refuelling equipment; extended CIT relief for film production and raised the stamp duty on non-residential property.
- Concerning consumption/excise taxes, Ireland raised tobacco, alcohol and electricity (for business) taxes; removed tourism activities from its lower reduced VAT rate; introduced a VAT for food supplements; and increased the rate of its carbon tax (applied per tonne of CO2).
- With regard to taxes applied to personal/labour income or gains, Ireland increased the home carer tax credit; introduced inheritance tax reductions; reduced the tax rate at various bands of its Universal Social Charge (an income tax) and raised some band's thresholds; increase from employer contributions for the National Training Fund while increased the threshold for the higher rate of employers pay related social insurance (PRSI); and increased the mortgage interest deduction for rental properties to 100%.

Source: (OECD, 2016[7]) (OECD, 2017[8]) (OECD, 2018[9]) (OECD, 2019[10]) (OECD, 2020[11]) (OECD, 2021[12])

Box 2.2. The Irish Commission on Taxation and Welfare - 2022

The Commission was established by the Minister for Finance in 2021 with terms of reference which asked for an overall appraisal of the suitability of the taxation and welfare systems to Ireland's present and future needs, and the consideration of a number of specific policy matters.

The members of the Commission were drawn from a variety of backgrounds and brought a range of expertise to the Commission's work from relevant areas, including taxation, social policy, economics, public administration, business, enterprise, law and broader civil society.

In its report the Commission stated that it was "*mindful of the scale of the challenges the taxation and welfare systems are facing. Chief among these is the pressure on* ***long term fiscal sustainability, from Ireland's ageing demographic profile*** *but also from other acute demands, including those related to the carbon transition"* (p. x).

The Commission also noted that "the longer it takes to address the cost of ageing and other fiscal risks, the more drastic and costly future measures will be, unfairly transferring the burden of adjustment to future generations." (p. 6)

Of the 116 Recommendations made by the Commission, below present themselves as most relevant in terms of this working paper:

- **Recommendation 4.1** - The Commission recommends that given the medium to long-term threats to fiscal sustainability, the overall level of revenues raised from tax and Pay Related Social Insurance as a share of national income must increase materially to meet these

[17] Does not include temporary measures in response to the COVID-19 crisis.

challenges. These increased yields should be obtained in a manner that minimises economic, social and environmental costs.

- **Recommendation 5.1** - The Commission recommends that Government continue to focus on broadening the base of taxation across all categories of taxation.
- **Recommendation 5.5** - The Commission recommends that overall yield from wealth and capital taxes, including property, land, capital acquisitions and capital gains taxes should increase materially as a proportion of overall tax revenues.
- **Recommendation 15.1** - The Commission supports the use of taxation in promoting public health in Ireland. In particular, it supports the levying of Excise Duties/taxes at high rates related to the social cost arising from the consumption of alcohol, tobacco and sugar sweetened drinks. The Government should seek to strengthen the link between the public health rationale and design of these taxes over time.
- **Recommendation 18.2** - The Commission recommends that Government departments should build on existing long-term fiscal analysis capabilities to develop a system of scenario modelling and associated stress testing. The system should be used to examine different future public finance scenarios and how well the State could react to them. It should also analyse whether there are adequate policy tools and administrative systems in place to address potential outcomes.

Source: (Government of Ireland, 2022[13])

20. Population change can affect government revenues by changing the aggregates to which tax rates are applied to. An age profile for many economic aggregates was developed by the United Nations and the European Union (National Transfer Accounts – NTA, (see Box 2.3), which allows for an analysis of how population change might affect the tax bases. Three relevant aggregates covered by the NTA are: labour income (a proxy for PIT and SSC tax bases), private asset income (a proxy for CIT tax base)[18] and private consumption (a proxy for GST/VAT tax bases). [19]

21. Figure 2.5 contrasts these overall figures for Ireland with the "average age profile" for OECD countries. Panel A shows that Ireland's labour income is slightly more concentrated in the group of people aged between 30 and 40 (same peak as the OECD average). The difference is not substantial for those older than that age but is moderate for those younger (that is, young people tend to earn relatively less than when they are aged 30-40s in comparison to the OECD average). Therefore, Ireland's labour income age profile is neither significantly more nor less resilient to population change than those that refer to the OECD average, which will likely neither attenuate nor amplify the impact of population change on labour income and, thus, on PIT and SSC revenues.

22. When it comes to private asset income, Figure 2.5, panel B reveals that these are moderately more concentrated in the age group aged 65 years or older. It also peaks in people's 70s instead of the OECD average of 65s. As a consequence, asset income might increase more when the population ages than if Ireland had the average age profile for the OECD, leading to a relatively higher rise in CIT tax base and, therefore, revenues if compared to the OECD average with the same demography as Ireland.

[19] It is worth noting that, particularly in the Irish case, private asset income may not be the most appropriate proxy for the CIT tax base. This is because, as previously mentioned, the globalised nature of the business that underpins receipts likely means that a lot of private asset income from corporations based in Ireland, occurs outside of Ireland. Furthermore, the globalised nature of the business' underpinning presents a challenge in finding an appropriate proxy measure and warrants further research. It is also worth noting that private asset income also contains income not derived from business and for example includes income derived from the renting out property.

Box 2.3. European National Transfer Accounts

The European National Transfer Accounts are a central output of the AGENTA[20] project, which aims at explaining the past and forecasting the future of public transfers in the light of demographic change in the European Union.

National Transfer Accounts (NTA) measure important aspects of age-specific economic behaviour, in particular the generation of income, the redistribution of income between age groups and its use for consumption and saving.

As argued by the AGENTA project, understanding the age patterns of production, consumption and intergenerational reallocation of resources is necessary for analysing the effectiveness of alternative policies. Systems such as the System of National Accounts (SNA) do not offer information on age and the generational aspect of the aforementioned changes. The ability to assess the consequences of population change is therefore very limited and the NTA have been developed in an attempt to fill this gap.

AGENTA follow the below process in calculating age profiles:

1. Derive the so-called macro controls for each economic activity they are looking to estimate. The macro controls are aggregate measures of different economic categories, as defined and measured in the SNA and other related sources. Among the most important macro controls are total labour and asset income, total consumption, saving, total taxes and social contributions and public benefits.
2. Calculate the age-specific averages of different economic categories, using survey and/or administrative data. For example, the private consumption age profiles are mainly based on the Household Budget Survey (HBS) while the age profiles for labour income are estimated using the EU-SILC survey data.
3. To ensure that age profiles are representative of the population, they sample weights to calculate accurate age-specific averages from the sample.
4. Eliminate random variation by applying a smoothing procedure.
5. Adjusted the age profiles proportionally, so that the NTA aggregate estimates match the value of previously calculated macro controls. This is done by calculating the necessary adjustment factors that are used to multiply the age profiles.

It is important to note, as highlighted by AGENTA, that the age profiles do not represent individuals over their lifetime, but rather how individuals are involved in the system of intergenerational reallocations in a given year. Therefore, one should be careful when interpreting the NTA results since important differences exist between a longitudinal analysis and the NTA methodology.

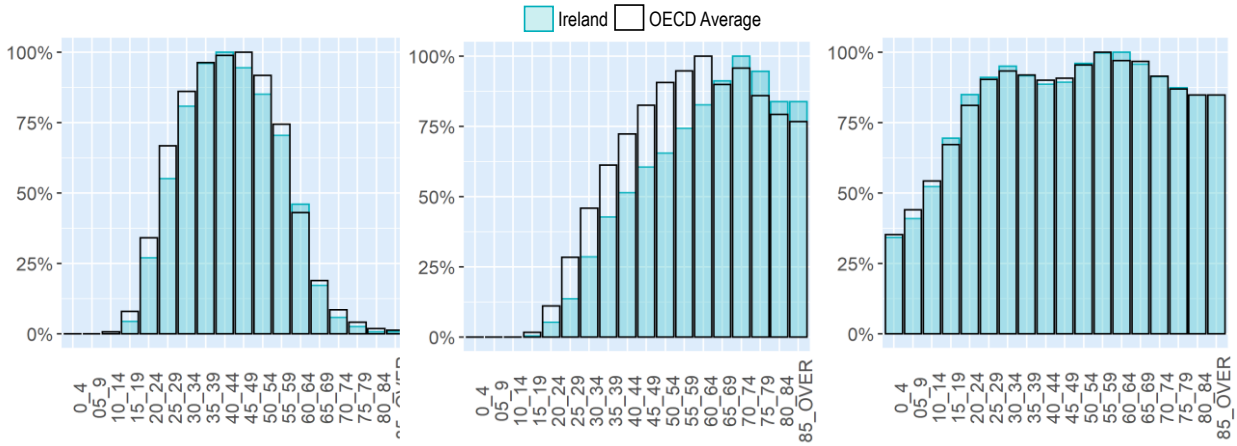
Source : (Istenič et al., 2016[14])

http://dataexplorer.wittgensteincentre.org/nta

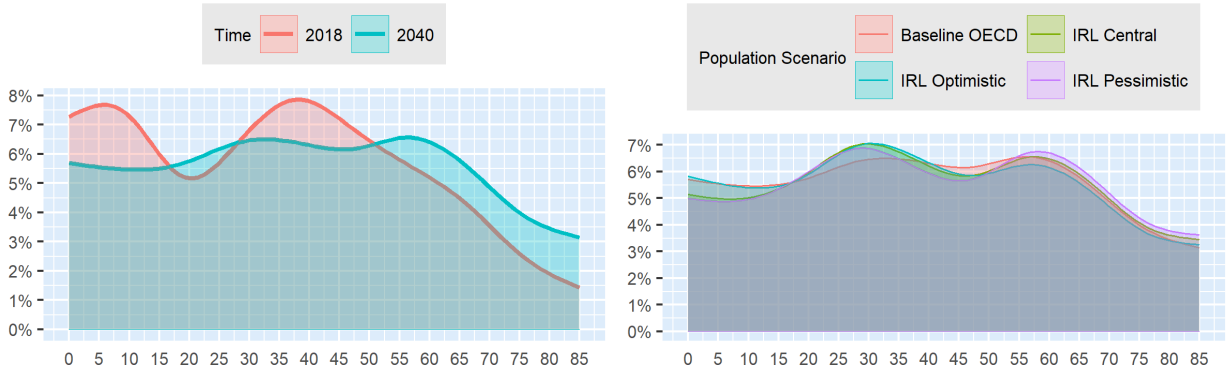
[20] Acronym combines 'Age' and National Transfer Accounts (NTA)

Figure 2.5 Age profile for most relevant tax bases (as a % of the highest value across age profiles) and population distribution by age

Panel A. Labour Income *Panel B. Private Asset Income* *Panel C. Private Consumption*



Panel D. Share of Population across time (OECD baseline scenario) *Panel E. Share of Population across scenarios in 2040 by age group*



Source: Authors' calculations based on United Nation's and European Commission's National Transfers Accounts, OECD Population data and data provided by Ireland's officials.

23. Despite peaking roughly at the same time as the OECD average, private consumption (Figure 2.5, panel C) in Ireland is, overall, more uniform across age groups than the OECD average. Therefore, the decline in private consumption when people age might also be less attenuated than if Ireland had the average age profile for the OECD. As the population ages, this will likely translate to a lower decrease in GST/VAT revenues than the country would experience if it had the average profile.

24. Lastly, Figure 2.5, panel D, reveals how the country's population distribution across age groups is expected to change between 2018 and 2040. In the Irish case, there is a clear tendency towards population change, with significant reduction in the share of the population below 15 years old and an increase in the share of those aged 50 years or older. It is notable, though, that the share of the population between 50 and 60, which still is in its working age, will also increase moderately. This is the age group that consumes more (refer to panel C) and that still has some labour income (refer to panel A). In addition, people aged 70 or older have the highest private asset income and this group is also increasing. Looking at different scenarios for Ireland's demography (Figure 2.5, panel E), it can be concluded that differences are not substantial. Interestingly, the OECD scenario is, in some regards,

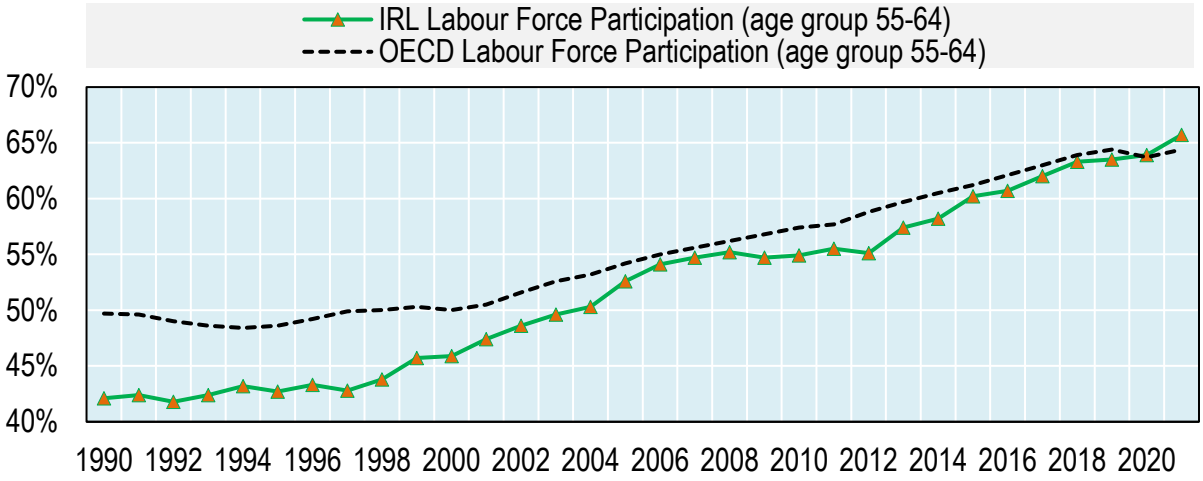
more optimistic than Ireland's optimistic scenario (e.g., it has relatively more people in their 40s and also less old than 85 years old).

25. Because of these demographic shifts, Ireland's labour income is projected to decrease (in per capita terms) between 4.4% to 5.8%. Interestingly, the lowest decrease occurs in Ireland's central scenario – that is because in this scenario there still is a high number of working age people and a lower number of children, whose labour income is the smallest across age groups. In the future, though, as these children age, they will replace the people getting old and, thus, the optimistic scenario will face a lower decrease in labour income. This interesting outcome is a consequence of the obvious fact that higher fertility rates only affect labour income with a delay. The worst scenario is, as expected, Ireland's pessimistic one. Private asset income, on the other hand, is expected to grow (in per capita terms) by 11.3% to 16.7%, with the highest growth happening in the pessimistic scenario and the lowest in the optimistic one. Likewise, private consumption is projected to increase by 2.1% to 3.4% and these values refer, again, to the optimistic and pessimistic scenario, respectively.

26. As Ireland relies significantly more on CIT than most OECD countries (14% vs 10%), the decrease in labour income is virtually offset by the growth in private asset income, resulting in a net neutral per capita impact on Ireland's tax bases in all four scenarios.[21] There are two major caveats to this conclusion, though. First, is that this analysis only considers the revenue side – on the health expenditure side, these differences are not meagre. Second, the projected impact is roughly zero because of the relatively short forecasting period (20 years) and because Ireland has the 7th youngest population in the OECD (with an average age of 38 years). When lower fertility rates start to impact the working age population and when the bulk of the population gets older than 65 years old, then the impact on tax bases are significantly larger.

27. In addition to a reduction in labour income, most OECD countries should expect a reduction in the tax rate applied to that income, resulting in an even further decrease in revenue collection. All these can affect the relative labour force participation of people aged 55-64 years (Figure 2.6).

Figure 2.6 Labour force participation of people aged 55-64



Source: OECD Employment Data.

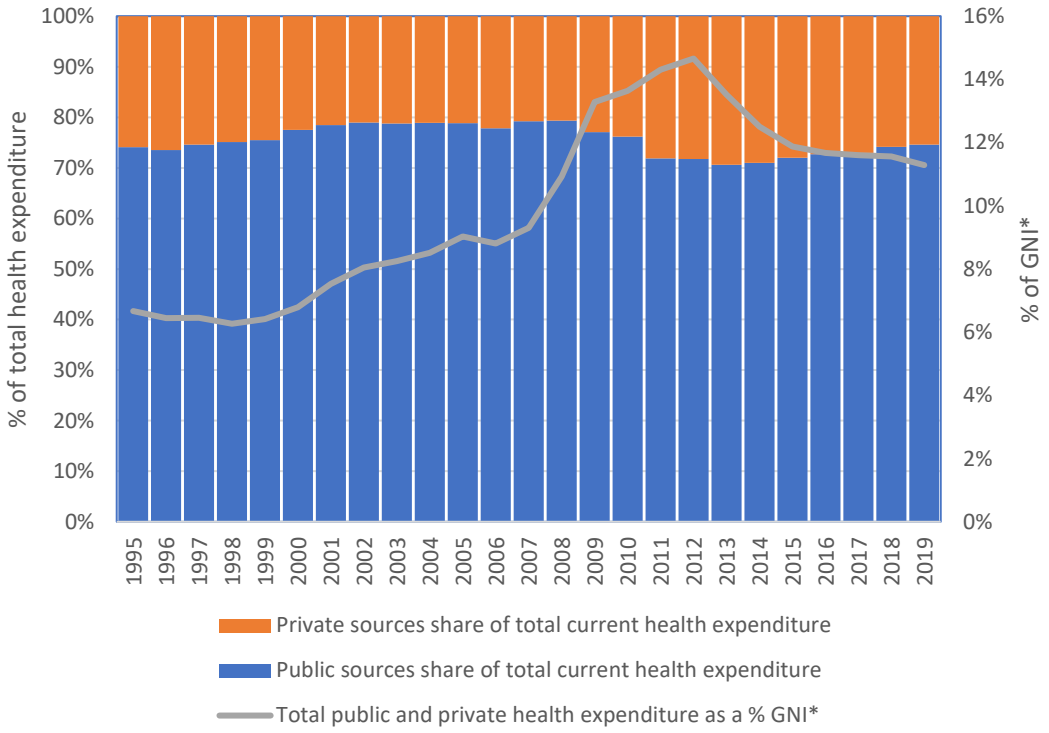
[21] The difference in the total growth rate between all four scenarios in the forecasting period – between 2018 and 2040 – is in the third decimal place and, thus, virtually non-existent.

28. Overall, Ireland is, now, better than the OECD average in terms of labour force participation of the people aged between 55-64 years old. As of 2021, 65.7% of the people aged between 55-64 are in the labour force in Ireland, compared to the OECD average of 64.4%. This value only surpassed the OECD average in 2021 and this trend is beneficial to Ireland and ideally should continue.

2.3. Healthcare expenditure

29. In 2019, total current health spending[22] (from public and private sources) in Ireland accounted for 11.3% of GNI*, 2.5 percentage points more than the OECD average[23]. This ratio more than doubled between 2000 and 2012 (going from 6.8% to 14.7%) but decreased to 11.3% in 2019 (Figure 2.7). This recent decline in healthcare expenditure as a share of GNI* was mainly due to an increase in GNI* as total health spending increased in the same period by 13% in real per capita and 21% in real terms.

Figure 2.7 Funding sources of healthcare expenditure



Source: OECD Health Statistics, 2023.
Note: The left axis refers to total health expenditure as a share of GDP (or GNI) while the right one to the relative share of government and out-of-pocket schemes.*
Source: Authors' elaboration based on OECD Health Statistics and Ireland's Central Statistics Office.

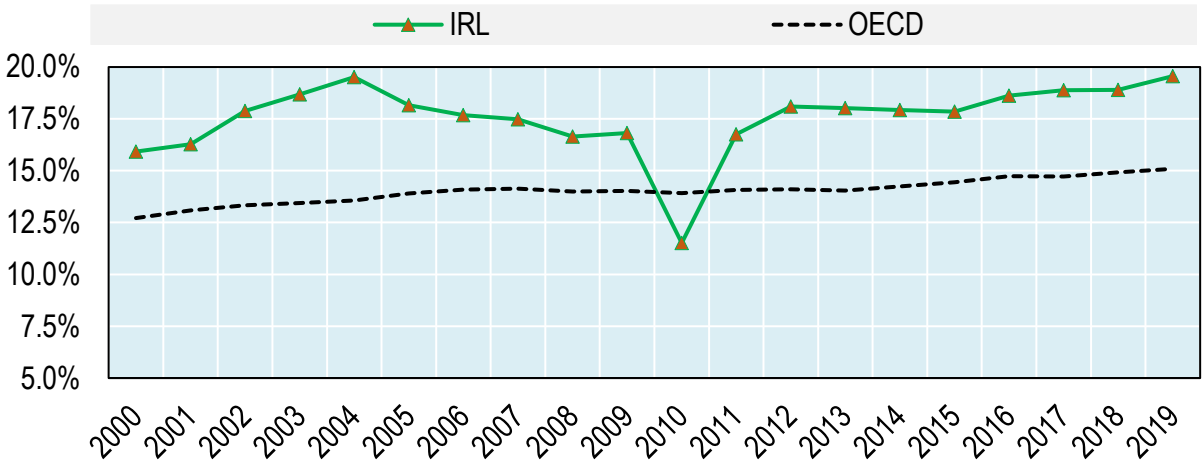
30. Figure 2.7shows that most of health expenditure is funded by the government or compulsory schemes (from 71% to 79% depending on the year). The government role (as measured by expenditure on Government or compulsory schemes) is, therefore, in line with the OECD average (75% of total current health spending is from public sources). The country's general government is among those that

[22] As opposed to capital expenditure. Capital expenditure is not considered in this paper.

[23] When using GDP as the denominator with regard to the rest of the OECD countries.

spend the most on healthcare as a share of its total expenditure – 19.6%, only below Japan and the United States. Figure 2.8 shows that government health spending as a share of total government spending has always been higher than the OECD average (except in 2010) and that this share increased in particular from 2015-2019. Finally, it is worth noting that virtually the entirety of the government expenditure on healthcare is funded through taxes – therefore the social security system in the country is not a funding stream to healthcare.

Figure 2.8. Government healthcare expenditure as a percentage of total government expenditure



Source: OECD System of National Accounts, COFOG dataset

31. The starting point of analysis is to disaggregate healthcare expenditure by five-year age groups, using 'age-expenditure curves' to model differences in average expenditures by age. These allow demographic effects to be modelled, projecting the impact on expenditure of changes in the age structure. Age-expenditure curves are country-specific and derived from data available for OECD countries (Box 2.4). Age-expenditure curves are used to project individual expenditure (which across the OECD constitutes around 93% of total spending), and not collective expenditure (e.g. disease prevention programmes). This assumption is made as collective expenditure is generally not driven by yearly changes in the age structure, and therefore does not need to be split across age groups.

32. Government current healthcare expenditure is then projected based on four different scenarios - base, cost pressure, cost control and healthy ageing (Figure 2.9).

33. A "base" policy scenario projects health spending under the assumption that policies remain similar to how they were before the COVID-19 pandemic, except for an increase of 10% in the productivity in the health sector as compared to the general economy, which reflects historical trends. The base scenario also models healthy ageing through a reduction in expenditure, on average, for survivors, which can be interpreted as a survivor being healthier in the future. In the baseline scenario, a partial dynamic equilibrium is adopted, whereby only half [24] of the gains in life expectancy translate into a reduction of future spending across all age groups.

[24] The partial dynamic equilibrium coefficient does not have either a mathematical constraint or a largely consistent body of literature behind its estimation. While this means there is no clear recommendation on its plausibility range, it is also the parameter that can be most easily interpreted in terms of scenarios and sensitivity analysis. The parameter can either be estimated or assumed – in the case of 0.5, we assume that half of the gains in life expectancy are translated into DRC growth across all age groups.

34. Three additional policy scenarios are analysed: “cost control”, “cost pressure” and “healthy ageing”. A “cost control” scenario estimates a feasible extent to which effective cost containment policies can offset health spending drivers. In particular, it assumes a 20% increase of productivity in the health sector, and a 10% decrease in the income elasticity of health spending compared to the baseline scenario - reflecting that as countries become richer, health systems become more efficient and health outcomes improve. Harnessing new technologies through a better use of Health Technology Assessment, task-shifting and increased generics uptake are some policy examples that best reflect this scenario. A “cost pressure” scenario assumes a 10% increase in income elasticity and a constant productivity. Here, ineffective cost containment policies, combined with rising expectations on healthcare, lead to the introduction of expensive new technologies, with insufficient consideration of their cost-effectiveness. While in this scenario quality of care may increase, such gains will come with considerable cost pressures. Finally, a “healthy ageing” scenario assumes that all life expectancy gains translate into years in good health over time, therefore lowering healthcare expenditure for survivors compared to the baseline scenario. Here, an assumption of implementation of effective policies that strengthen prevention and promote healthy lifestyles is made.

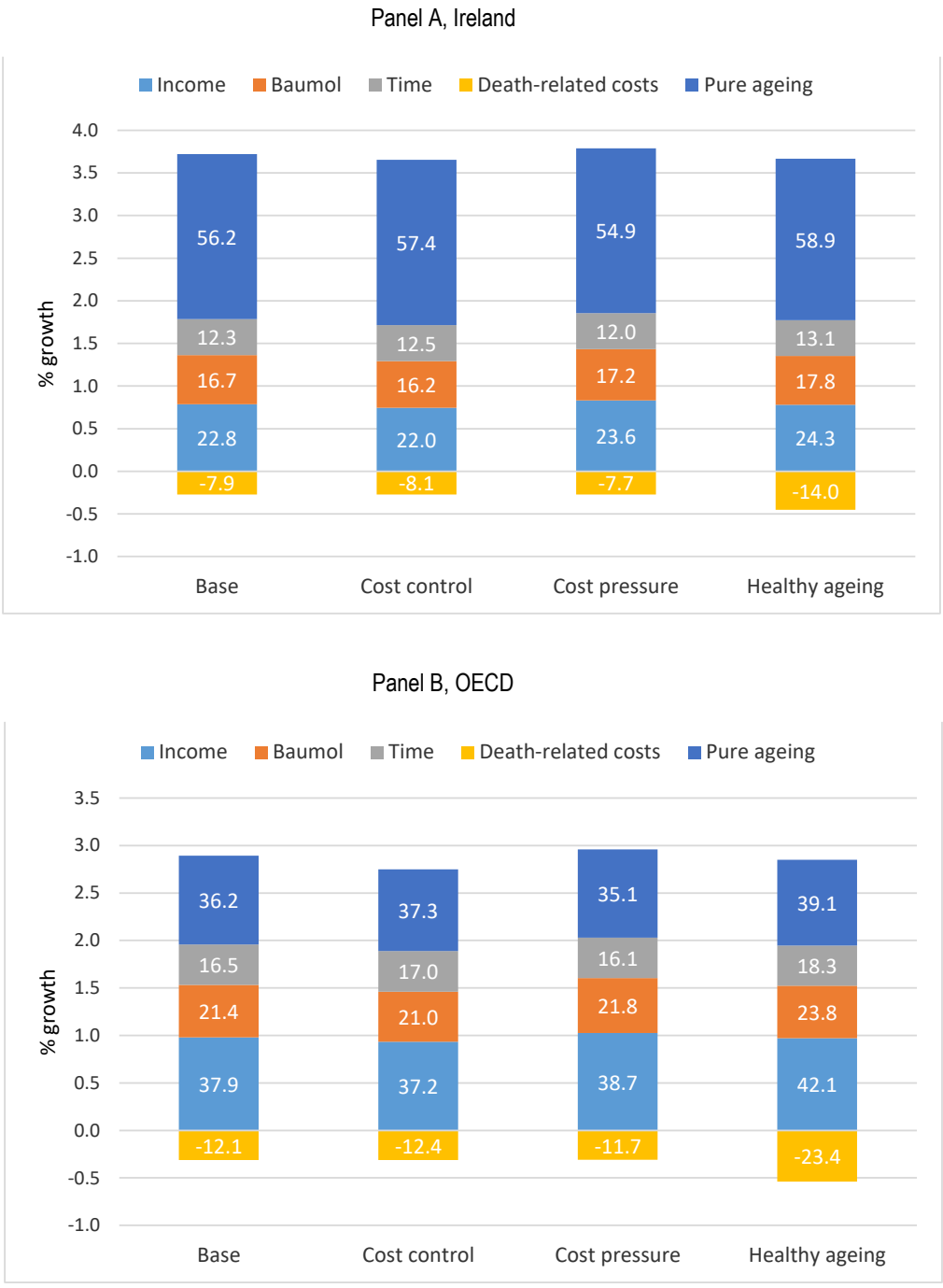
35. The methodology used to arrive at these projections comes from previously published OECD work on health expenditure projections. See (Lorenzoni, 2019[3]) for a detailed description on methodology and assumptions used, which in the interest of brevity - are not replicated here[25].

36. Panel A shows that healthcare expenditure from public sources is projected to increase by around 3.4 % in the base and cost control scenarios per annum, while it is projected to increase by 3.5 % in the cost pressure scenario and 3.2 % in the healthy ageing scenario.

37. Figure 2.9, panel B shows that Ireland’s health expenditure is projected to grow faster than the OECD average in the next two decades. This can be explained by the population change effect – that is, the increase in size and changes in the structure of the population.

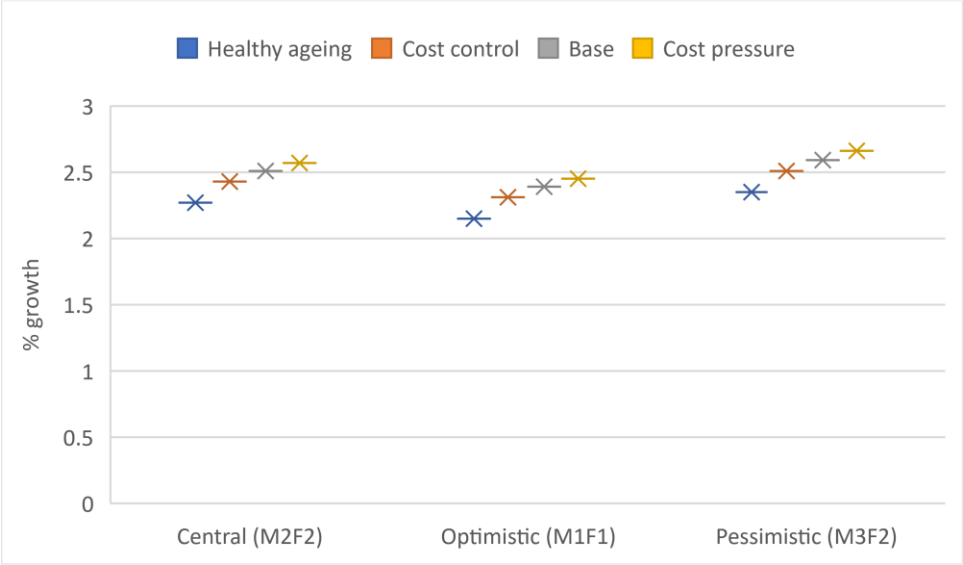
[25] In particular, see Annex A – ‘Technical specification of the projection and regression models’.

Figure 2.9 Mean annual percent growth in healthcare expenditure from public sources by scenario and driver, 2019-2040.



38. Lastly, Figure 2.10 shows how the annual growth rate in the projected health spending per capita from public sources vary by driver and scenario. More specifically, regardless of the scenario, health expenditure per capita from public sources is projected to grow, annually, 0.15% more and 0.18% less in the demographic pessimistic and optimistic scenario in comparison to the central scenario, respectively. Although the demographic scenarios did not have a significant impact on government revenues projections up to 2040, they are important for the health spending projections.

Figure 2.10. Average annual percent growth in per capita healthcare expenditure from public sources by projections scenario by demographic scenario, 2019-2040



Note: M1 – Net inward migration of 30,000 per annum; M2 - Net inward migration of 20,000 per annum; M3 – Net inward migration of 10,000 per annum; F1: Total fertility rate to remain at the 2016 level of 1.8; F2: Total fertility rate to decrease from 1.8 to 1.6 by 2031 and to remain constant thereafter.
Source: Authors' calculations based on OECD Health Statistics and Ireland's Central Statistics Office

39. In addition to the four scenarios described above, spending requirements associated with resilient health systems are factored into the projections by adding to the base scenario the expected increase in current health spending due to the investments needed to strengthen health system resilience. Previous estimations considered seven areas of investments for more resilient health systems (Morgan and James, 2022[4]). Given that two out of these seven areas – that is core equipment and health information – may be classified as capital costs, this paper uses estimates of additional spending by country for the remaining five areas, namely enhanced preventive care, infection control, effective testing and vaccination, strengthened service delivery and medical reserve. These five areas represent – on average – 1.12% of GDP.

40. The amount of additional investment needed will vary by country, depending on existing capacities, with each country having specific areas where they will need to invest more, and other areas where additional investment may not be needed. The assumption in this paper is that this additional investment, computed based on 2019 data, is fully deployed in 2040.

Box 2.4. Age - Cost Profiles

Like the European Commission's (EC) Ageing Report, the analysis in this working paper uses Irish healthcare expenditure from public sources as measured by the System of Health Accounts (SHA).

Despite different modelling techniques, both the EC's Ageing Report and this working paper arrive at very similar healthcare expenditure projections for their respective central scenarios as a share of GNI* in 2040 (both estimated at 11% of GNI* by 2040).

With regard to the age-cost profiles used to estimate the impact of population change on expenditure, Ireland submitted age-cost profiles to the EC for the first time in 2021 for its Ageing Report.

Due to data availability, the profiles used in this working paper was an average of the profiles of Finland, Germany, the Netherlands and Switzerland. These profiles were selected on the basis of age-cost profile availability and similar % share of spending on LTC - health to Ireland.

The application of these average profiles to Irish SHA expenditure data resulted in the 11% of GNI* projection by 2040 outlined.

To test the difference between the results from using this average and the Irish specific profiles used in the 2021 Ageing report, the Irish Department of Health provided the OECD with the profiles used in the 2021 Ageing report . Rerunning the model with the Irish specific age-cost profiles used in the 2021 Ageing report, resulted in a 0.76% pp. increase as a share of GNI* by 2040. This indicates that Ireland does exhibit very similar age cost profiles to those countries that have similar shares of LTC as a % of total expenditure.

As highlighted by (Lindberg and McCarthy, 2021[15])Ireland has relatively limited age specific data - approximately 40% of operational service areas in the health budget that can be linked to direct service utilisation. However, work is currently underway on the Health Information Bill which will legislate for the use of a fit for purpose individual health identifier. This would enable more robust patient-level data and assist in the development of better age specific data to encompass more of the Irish health system.

2.4. Estimating the fiscal impact of future trends in government revenues and healthcare expenditure

41. Figure 2.11 shows the projection results considering the full range of estimated buoyancies, the impact of population change on government revenues and different healthcare expenditure from public sources scenarios.

42. Figure 2.11 panel A shows the percentage points increase in the government healthcare expenditure to revenue ratio by 2040. In the Irish case, there is a moderate difference between the scenario that considers healthy ageing for its population but only a meagre difference between all other health expenditure policy scenarios. In the baseline scenario, an increase in the government health expenditure to revenue ratio from 20% to 23.5% is projected, which would see Ireland still investing on health 3.3 percentage points more of their government revenues as compared to OECD average by 2040.[26]

43. Figure 2.11, panel B, on the other hand, depicts the impact on the government fiscal balance as a percentage of GNI*. It therefore contrasts the projected absolute growth in government revenues with the absolute growth in health expenditure as a percentage of GNI*. Government revenues are significantly larger than health expenditures (roughly four times larger in Ireland) and are projected to increase more than GNI* in most cases.[27] Therefore, despite government health expenditures being projected to grow more than revenues, in some scenarios the absolute growth in government revenues are projected to be higher than the growth in health expenditures and, thus, fiscal balances are expected to improve until 2040 (all values are positive in panel B). This positive outcome is, though, moderately more likely if a healthy ageing assumption is adopted: 54% against 24% across all other scenarios.

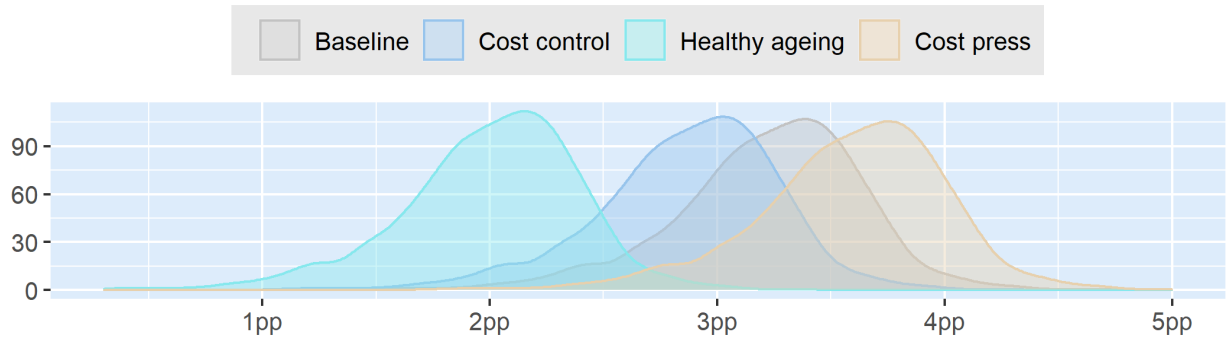
44. In summary and considering the central population projection and the baseline scenario for health expenditure, Ireland's government revenues and health expenditures to GNI* ratios are projected to increase 1.2 and 1.7 percentage points, respectively. This projected growth is similar to the one experienced by Ireland from 1995 to 2018, when they increased by 1.0 and 1.6pp of GNI*, respectively. Although in some scenarios the net effect of Ireland's fiscal balance is positive (i.e. government revenues are projected to grow in the next 20 years more than enough to fund the additional pressure on health expenditure), in all projected scenarios Ireland's government health expenditure would account for a larger share of its revenues, which means that expenditures with other government functions (e.g., education, security, social protection, among others) would have to grow less than the projected increase in government revenues. Lastly, it is worth highlighting that most of these scenarios are conditional on the government keeping revenues growing more than GNI* (buoyancy a bit higher than unity), as it did in the past, which might be feasible but not desirable. However, refer to Box 2.2 on the recommendations of the Commission on Taxation and Welfare.

[26] In the "resilient" scenario, the health spending to revenue ratio is projected to 24.9% for Ireland and 22.2% for OECD by 2040.

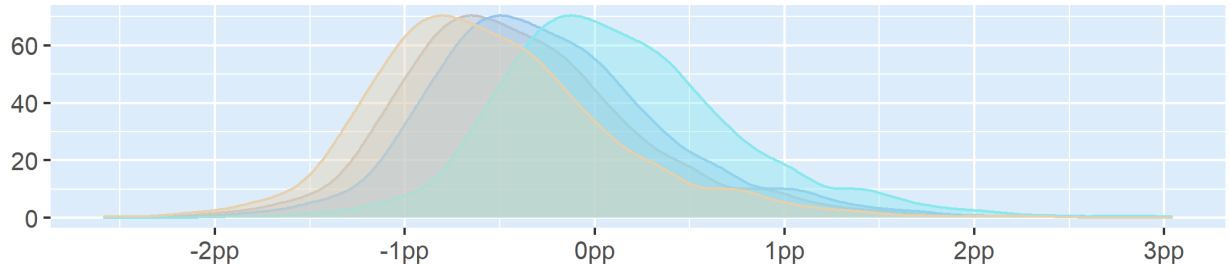
[27] Range of bootstrapped buoyancy coefficients vary from 0.96 and 1.20 and, thus, most of the coefficients are above unity, meaning that its government revenues are projected to grow more than GNI*.

Figure 2.11 Projection results considering the full range of estimated buoyancies, the impact of population change on government revenues and different government healthcare expenditure scenarios

Panel A. Percentage points increase in the government healthcare expenditure to revenue ratio



*Panel B. Impact on government fiscal balance as a percentage of GNI**



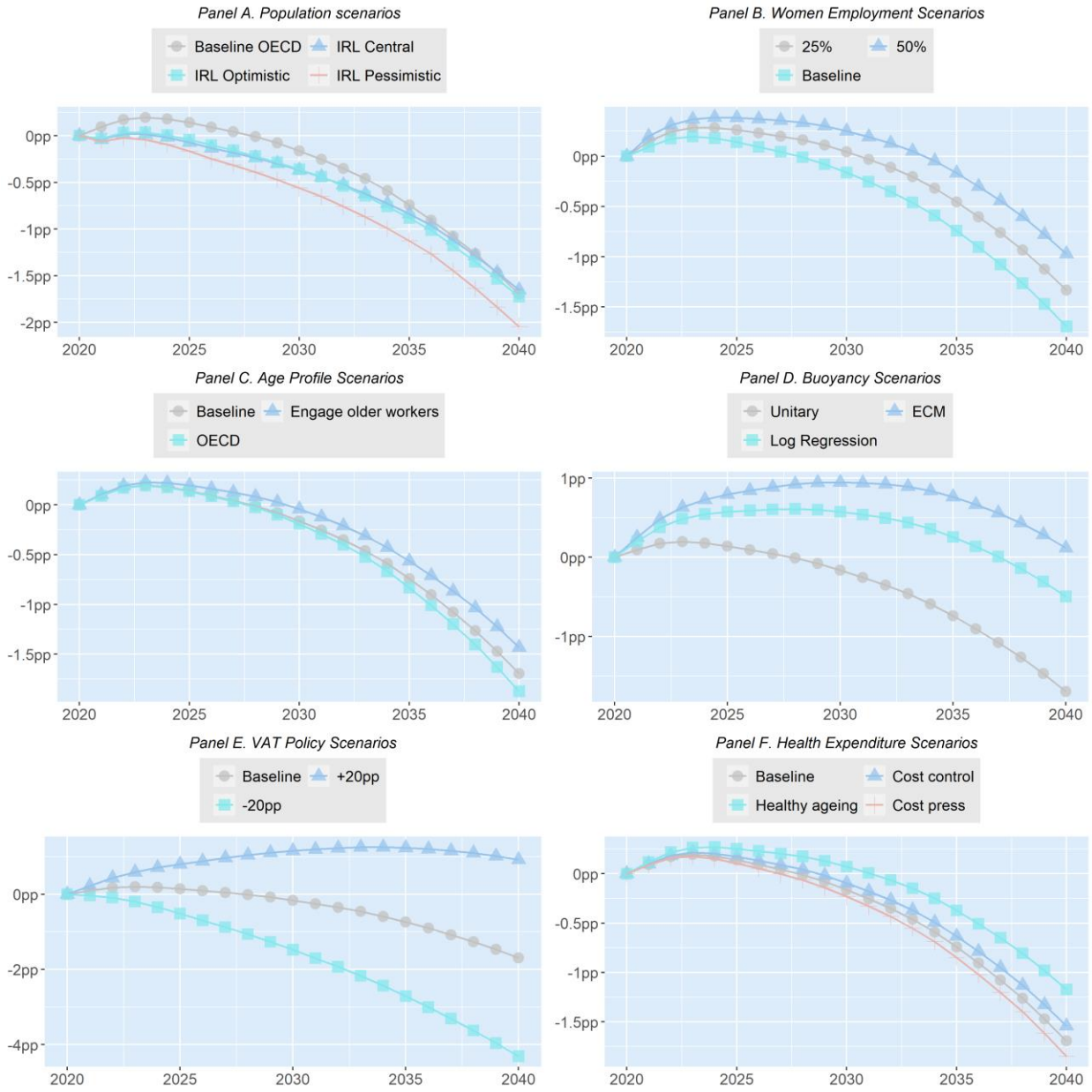
Note: Buoyancy coefficients were estimated by a log-regression model – the estimated coefficient was 1.06. The Y axis is the density of the distribution (dimensionless variable).
Source: Authors' elaboration based on OECD Revenue Statistics, OECD System of National Accounts, OECD Health Statistics, OECD Population Projections and National Transfer Accounts.

45. As both healthcare expenditure and government revenues depend on many variables (e.g. demography, tax and health policies, consumption patterns, among others), it is worth exploring multiple policy and input scenarios to analyse under uncertainty what could happen to Ireland's government finances as a consequence of population change. In order to perform this sensitivity analysis, we varied six inputs, some of which are commonly recommended as policies aiming at reducing the fiscal impact of population change (migration, women's participation in the labour force, consumption and income age profiles, revenue buoyancy, tax policy with regard to VAT, productivity in the health sector, healthcare services' demand and healthy ageing).

46. Before analysing the full distribution of outcomes (that is, the full range of possible impact of population change on government revenues and health expenditure), let's primarily analyse the overall impact of each input/policy leaver (Figure 2.12), which projects the marginal effect of population change on the general government fiscal balance if each policy lever is put to use in isolation to others (all other variables are set to the baseline scenario). For this figure, the baseline forecast (all panel's grey line) considered the assumption that Ireland will not implement health cost pressure/mitigating measures, no specific additional labour or migration policies and the buoyancy of a unity (government revenues are kept constant as a ratio to GNI* if it wasn't for the impact of population change on tax bases). Baseline

forecast's results suggest that Ireland's government health expenditures would increase 1.7 percentage points of GNI* more than government revenues, with government revenues remaining roughly constant as a share of GNI* (as the impact of population change on government revenues is roughly zero) while its health expenditures are projected to rise by 1.7pp of GNI* (as explored in the previous section). Therefore, under the assumption of a unitary buoyancy, Ireland's public finances are projected to deteriorate more than when using the computed buoyancy.

Figure 2.12 Impact on government fiscal balance in 2040 as a percentage of GNI*



Note: ECM's buoyancy coefficient is 1.09 while the log regression's is 1.06. For the purposes of this figure, the unitary buoyancy was used in all panels (aside from Panel D, where all three scenarios for the buoyancy coefficient are displayed).
Source: Authors' compilation.

47. Looking at the other lines in Figure 2.12 panels, one can conclude that there are two policy levers that, in isolation, can revert the projected fiscal imbalance in 2040. Both are related to tax measures. The first policy lever is the government revenues' buoyancy, and the scenario is those that consider the ECM buoyancy, of 1.09. In this scenario, the impact of population change on government's finances is roughly zero (the growth in government revenues would be above GNI* and, in absolute values, approximately equivalent to the growth in government health expenditures).28 The second policy lever is the VAT Revenue Ratio – an increase in 20pp in this ratio would lead to an improvement in the fiscal balance of 1.7pp of GNI*. This ratio is particularly impactful as Ireland's VRR is the 11th lowest in the OECD and, thus, there is substantial margin to increase it.29 Amongst policy scenarios examined in this paper, the VRR Revenue Ratio has the largest effect and is large enough on its own to offset the projected increase in government health expenditure.

48. With regard to other policy levers, the differences between the best and the base scenario for population projection, female participation in the labour force, age profile and health expenditure are 0, 0.7, 0.3, and 0.5 percentage points of GNI*,[30] respectively. These policy levers may, therefore, have an impact on future fiscal balance, especially if put to use together.

49. With regard to women's employment, Ireland has an employment gap of 11.4pp, roughly 4.3pp below the OECD average but far away from Iceland's 3.4pp gap.[31] Decreasing 20% of this gap seems, therefore, viable. Ireland has still more margin to its age profile by engaging people aged 55-64 to join the labour force as the participation of the people aged 55-64 in the labour force is 63.5%, below the OECD average of 66% and moderately below 83%, which is the value for Iceland, the best OECD country in that regard.[32] Lastly, a healthy ageing scenario can also be pursued by improving health risk factors, notably reducing alcohol consumption and obesity rates.

50. Finally, Figure 2.13presents the full distribution of the forecast results for Ireland The left hand side of Figure 2.13 displays the impact of different population, buoyancy, VAT policy and health expenditure scenarios on the impact of the government fiscal balance to GNI* ratio. It is apparent that uncertainties are substantial as the impact of population change on fiscal balances range from - 4.4pp to 5.0pp of GNI*. With regard to policy levers, there is only one policy lever that alone (regardless of the other scenarios) can balance the absolute growth of government health expenditures and revenues (*i.e.,* the full distribution/box plot is above zero in the charts) – the increase in the VRR by 20pp. Having a buoyancy of 1.09 (ECM) or of 1.06 (log-regression) does balance revenues and expenditures in the majority of scenarios 60% and 47% of the scenarios, respectively.

51. Most scenarios where the projected impact on fiscal balances is positive until 2040, the population projection scenario used was not the pessimistic one. A combination of a pessimistic population projection with any scenario that does not include an increase of 20pp in the VRR very likely leads to an imbalance in 2040 (in less than 10% of all of these scenarios the fiscal balance is not deteriorated under these circumstances). Another particularly impactful scenario is the one that considers a decrease of 20pp in the VRR. Although this seems unlikely, Ireland's VRR decreased from 67% to 49% (18pp) from 2006 to 2018.

[28] In this scenario, health expenditure continues to increase more rapidly than government revenues, but as the latter is four times larger than the former, the revenues growth rate is applied to a larger base and, thus, in absolute values become equivalent to the growth in government health expenditure, also in absolute values.

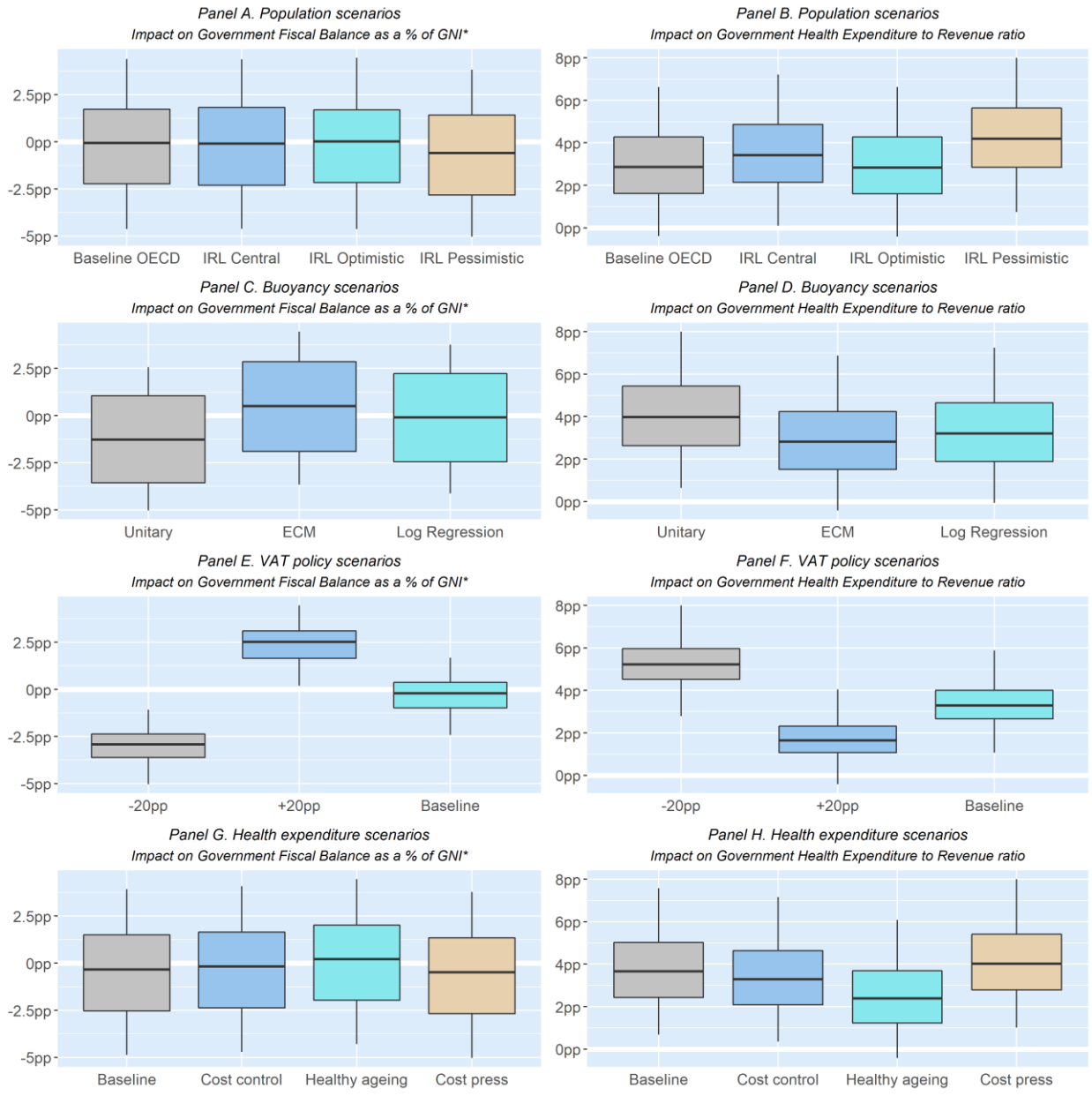
[29] Values as of 2018.

[30] Policy inputs do not have an independent effect and, thus, their impact cannot be simply summed. Results might, though, coincide by chance.

[31] As of 2019, prior to the COVID-19 pandemic.

[32] Values as of 2021.

Figure 2.13 Full outcomes of the projected impact of population change on government finances



Note 1: Boxplot shows selected statistics that summarises a distribution. The lower (Q1) and upper (Q3) quartile are the bottom and upper part of the box. The vertical line below the box represents observations greater than or equal to lower hinge minus 1.5 times the interquartile range (IQR = Q3-Q1) while the vertical line above the box represents observations smaller than or equal to upper hinge plus 1.5 times the IQR. The diagram also shows the median with a horizontal line inside the box.
Note 2: Although this figure displays the full distribution of outcomes (including the variations in all six input variables), it only depicts the impact by input value for four categories of inputs. These four inputs are the most relevant in terms of fiscal impact.
Note 3: ECM buoyancy coefficient was 1.09 while the log regression was 1.06.
Source: Authors' compilation.

52. Now, looking at the right-hand side of Figure 2.13, which displays the impact on government health expenditure to revenue ratio, one can note that it is very unlikely that government revenues will increase more than health expenditure (boxplot's whiskers are below zero only in a very few cases – more precisely in 15 out of 1,296 cases). These cases necessarily assume 1) buoyancy higher than unity (ECM's buoyancy of 1.09 in 13 and log-regression's buoyancy of 1.04 in 2 of them), 2) an increase in VRR of 20pp, 3) a healthy ageing government expenditure scenario and, 4) in most cases reduction in women employment gap by 20%.

53. Given the improbability of all these assumptions combined, the most likely scenario is for Ireland to have either a slight deterioration in its fiscal balance (around 0.5pp of GNI* if it increases its revenues more than GNI* or around 1.7pp if they grow at the same rate as GNI*). This outcome would imply a reduction in the share of government revenues that is spent in areas other than healthcare (from 3pp to 4pp of revenues in the most likely scenarios).[33] To keep the expenditures in other government functions growing in line with GNI*, it would be important for Ireland to balance the growth of government revenues and health expenditures.

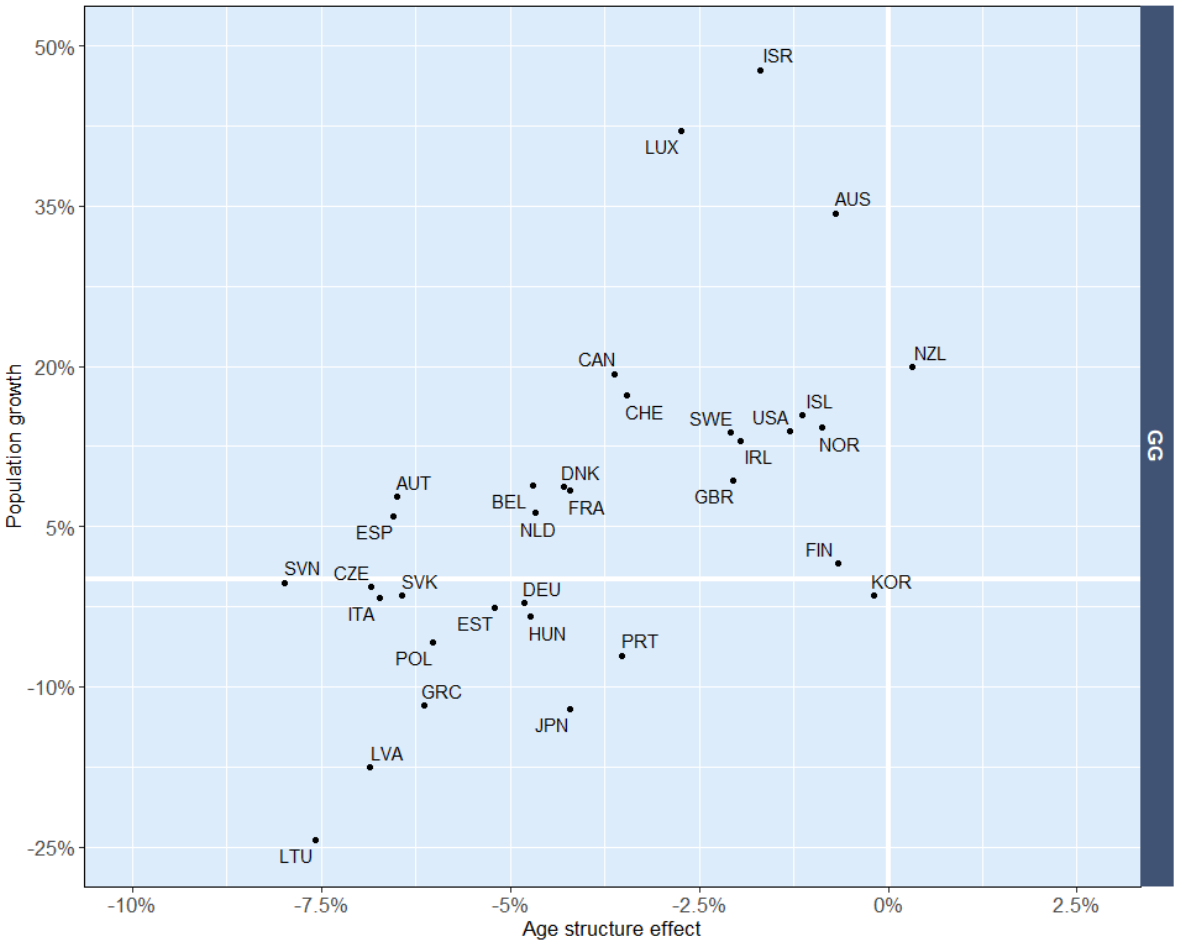
[33] The full range of the impact of population change on the government expenditure to revenue share is from -1.4pp to 7.9pp of revenues.

3 Ireland in the OECD context

3.1. Projection of government revenues to 2040 across the OECD

54. Figure 3.1 shows the impact of population growth and of the change in the structure of the population across OECD countries. Only for New Zealand, an increase in government revenues from both an increase in the size of the population and changes in the structure of the population is estimated. In 18 OECD countries, including Ireland, changes in the structure of the population are projected to lead to a decrease in government revenues, but population size growth is estimated to be positive. Finally, in 14 OECD countries a reduction of government revenues due to both population size and changes in the structure of the population is estimated.

Figure 3.1 Government revenue cumulative growth rate due to population ageing, 2019-2040

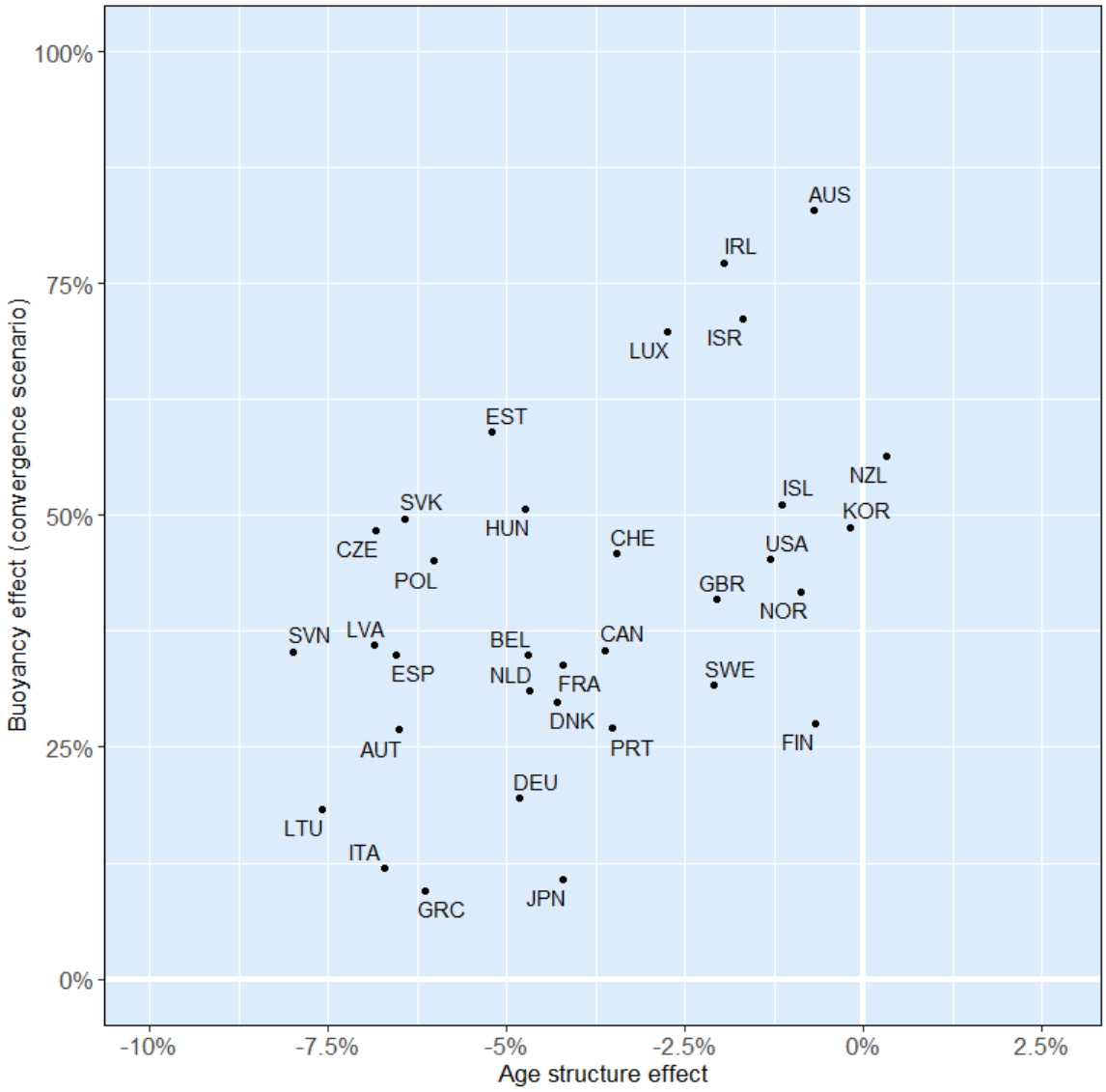


Source: Authors' compilation.

55. Figure 3.2 breaks down the government revenues projections into two effects: the revenue buoyancy effect (including population growth) and change in the structure of population. The buoyancy effect is always positive, which was expected given that the GDP growth rate is expected to be positive.[34] The buoyancy effect varied from 9.5 % to 82.9 %, with an average of 40.6 %. Ireland value – 75.2 % - is among the highest.

56. In contrast, the age structure effect is only positive for New Zealand (a relatively "young" country) and is projected to be negative up to 8% in Slovenia. As a result of changes in the structure of the population, government revenues are expected to decrease – on average - by 3.9% through 2040.

Figure 3.2. Government revenue cumulative growth rate due to population ageing and buoyancy, 2019-2040



Source: Authors' compilation based on NTA UN, NTA EU. OECD population and GDP projections, *OECD Revenue Statistics* and SNA.

[34] See (Guillemette and Turner, 2021[18]) for details on GDP per capita growth, and OECD population projections for the expected population growth.

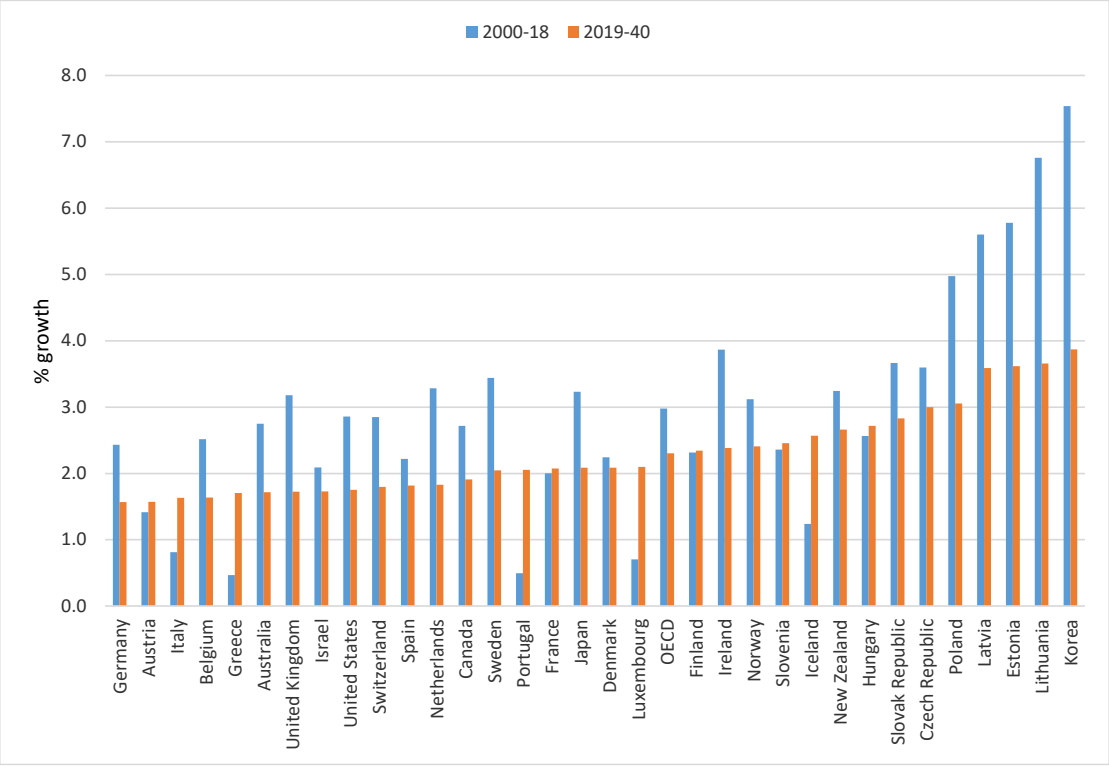
3.2. Projections of healthcare expenditure from public sources to 2040 across the OECD

57. Healthcare expenditure per capita across the OECD is projected to grow at an average annual rate of 2.3% for 2019-2040 for the base scenario (all results in constant prices, accounting for inflationary effects). This compares with 2.2% for the 'full cost control', 2.4% for the 'cost pressure' and 2.1 % for the "healthy ageing" scenarios. With an average historical annual growth of 3 % for the period 2000-2018, base projections indicate a slowdown in health spending growth compared to the past (Figure 3.3).

58. Nevertheless, growth in health spending is likely to be significantly higher than GDP growth at 1.2% from 2019-40. Health spending generally trends GDP growth in terms of its shape, but other spending drivers push it above GDP growth, particularly in the 'cost pressure' scenario. This partial relationship between health spending and GDP is consistent with previous OECD analysis of historical spending, which found that cyclical fluctuations in the economy accounted for less than half of the slowdown in health spending during the 2005-2013 period, with the remainder accounted for by policy effects (Lorenzoni et al., 2017[16]).

59. Health spending per capita for 2019-40 is projected to grow above 3.5% per year in Estonia, Korea, Latvia and Lithuania. These are all countries with relatively high GDP growth forecasts over the period studied. In contrast, the projected growth in Austria and Germany is around 1.5%. In Ireland, per capita health spending from public sources is estimated to grow at 2.3% on an annual basis, a value slightly higher than the OECD average.

Figure 3.3. Comparison of observed (2000-2018) and projected (2019-2040) average annual growth rates of per capita health spending by country



Source: OECD Health Statistics and authors' compilation.

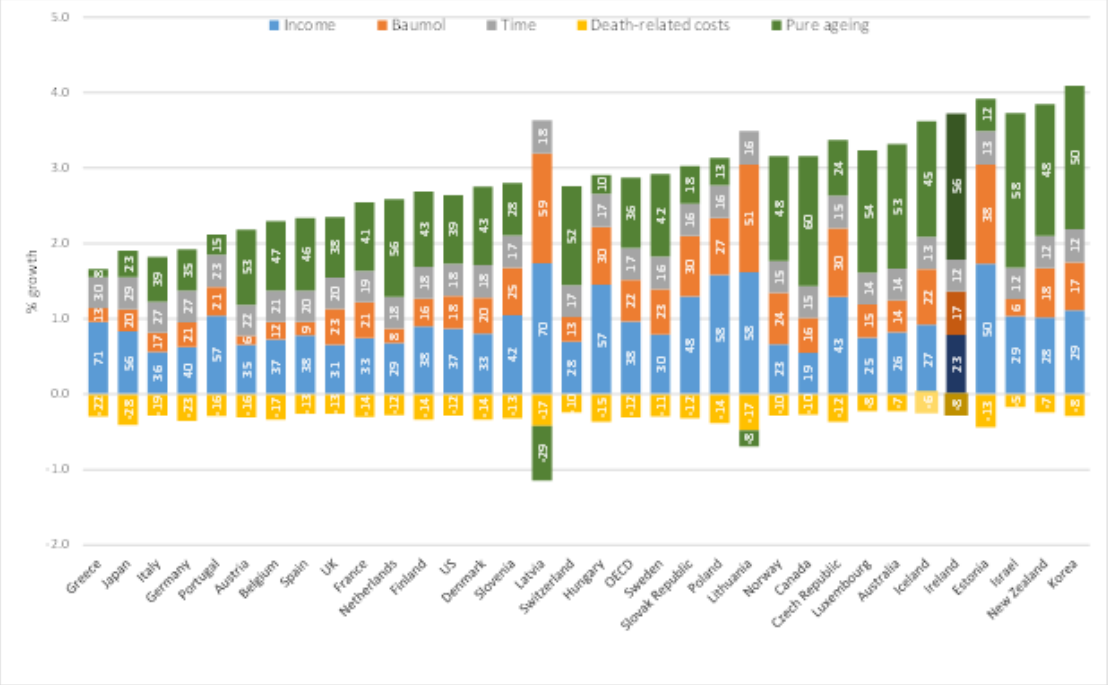
60. In the base scenario, the demographic effect increases health spending by 0.6% per year, on average across the OECD. This amounts to a quarter of overall projected growth. Note that the demographic effect comprises a "pure age" effect of 0.9% growth. This is moderated by a degree of compression of morbidity which decreases spending growth by 0.3% (modelled through dynamic DRCs). Income is the most important driver, accounting for four tenths of annual health spending growth. Productivity constraints (the Baumol effect) account for about one fifth of overall spending growth. Time-specific effects account for one sixth of health spending growth.

61. Analysing the impact of drivers on spending on a country-by-country basis provides further insights (Figure 3.4). Income effects account for more than 1.5% average annual growth in Estonia, Latvia, Lithuania and Poland, whereas it accounts for less than 0.6% growth in Canada and Italy. Countries with the highest levels of forecast GDP growth exhibit the largest income effects in absolute terms, but the relative share of the income effect is naturally dependent on the magnitude of all other effects in any given country.

62. The Baumol effect, which measures the effect of wages and productivity growth in the economy, is largest and accounts for more than 1% growth in Estonia, Latvia and Lithuania. In contrast, Austria, Greece, the Netherlands and Spain show effects of 0.2% growth or lower. In Ireland, the Baumol effect accounts for 0.6% growth, close to the OECD average. Countries showing a large Baumol effect have experienced wage growth substantially in excess of productivity growth in the general economy – implying that a larger share of health expenditure would need to be allocated to wages in the health sector so to be on par with wages in the general economy.

63. Demographic effects are largest in Ireland, Israel, Korea and Luxembourg – all countries with an absolute growth of 1.5% or more. In contrast, in Latvia and Lithuania demographic change has a negative effect on spending of around 1%. This is largely explained by projected decreases in population numbers in these four countries.

Figure 3.4. Annual average percent growth in health spending by driver by country, 2019-2040. Base scenario



Note: the contribution relative contribution of each driver to growth is reported in percentage within each bar.

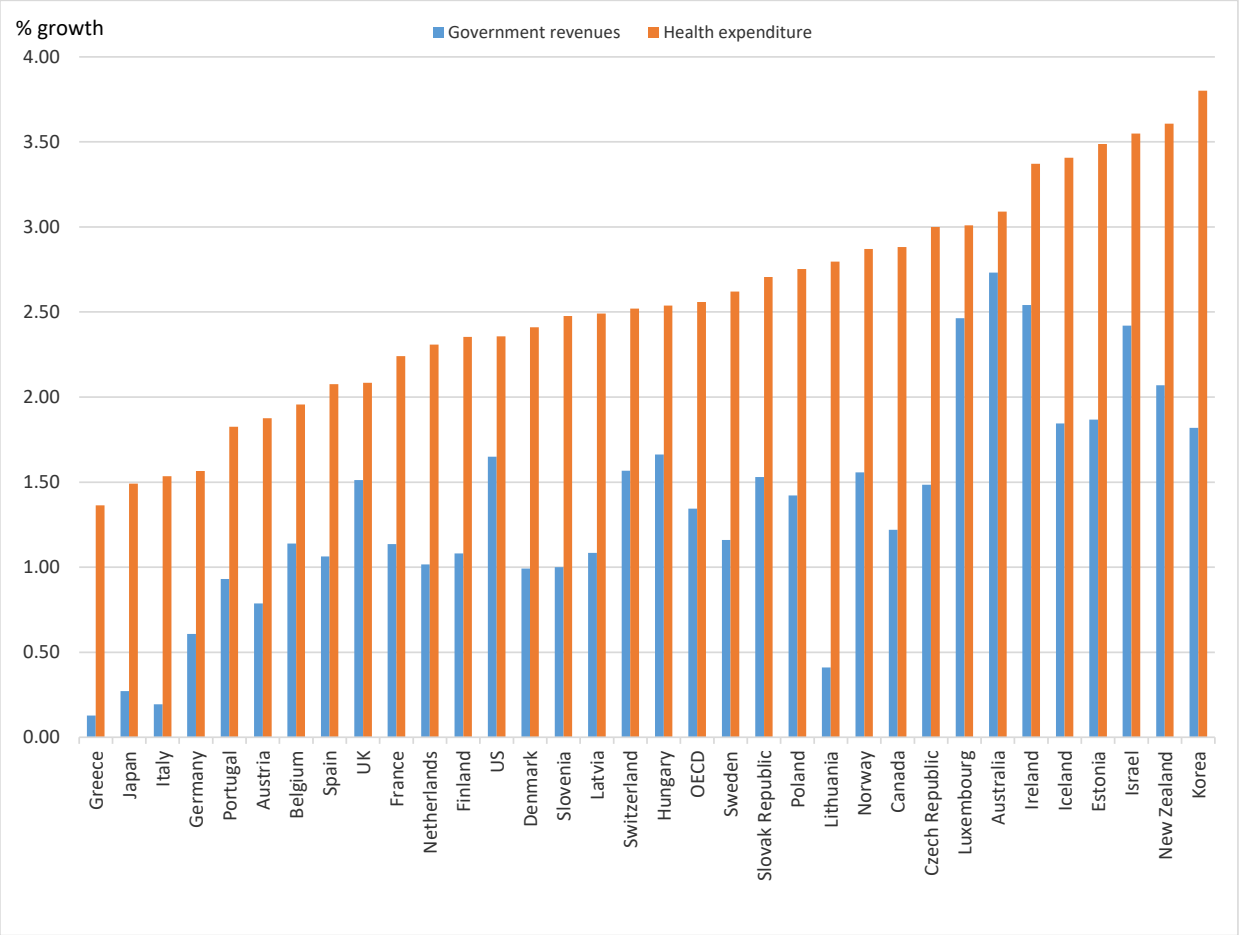
Source: Authors' compilation.

3.3. Fiscal sustainability of healthcare expenditure across the OECD

64. Across the OECD, the mean annual change in health spending in the baseline scenario will be twice as high as the mean annual change in government revenues from 2023 to 2040 (2.7% versus 1.3%). From 2023 onwards, the growth in health spending is expected to decrease, whereas the decrease in the growth of government revenues is expected to begin in 2025. As expected from model specifications, future trends of the growth in health spending and government revenues are similar to the projected trend in GDP growth.

65. Health spending is expected to rise at a faster pace than government revenues in all OECD countries. The annual average percent growth in government revenues is projected to be particularly low in Greece, Italy and Japan at less than 0.3%. In Australia, Ireland and Luxembourg, the annual average percent growth in government revenues is projected to represent more than three fourths of the annual average percent growth in health spending (Figure 3.5).

Figure 3.5. Annual average percent growth in healthcare expenditure (base scenario) and government revenues by country, 2023-2040

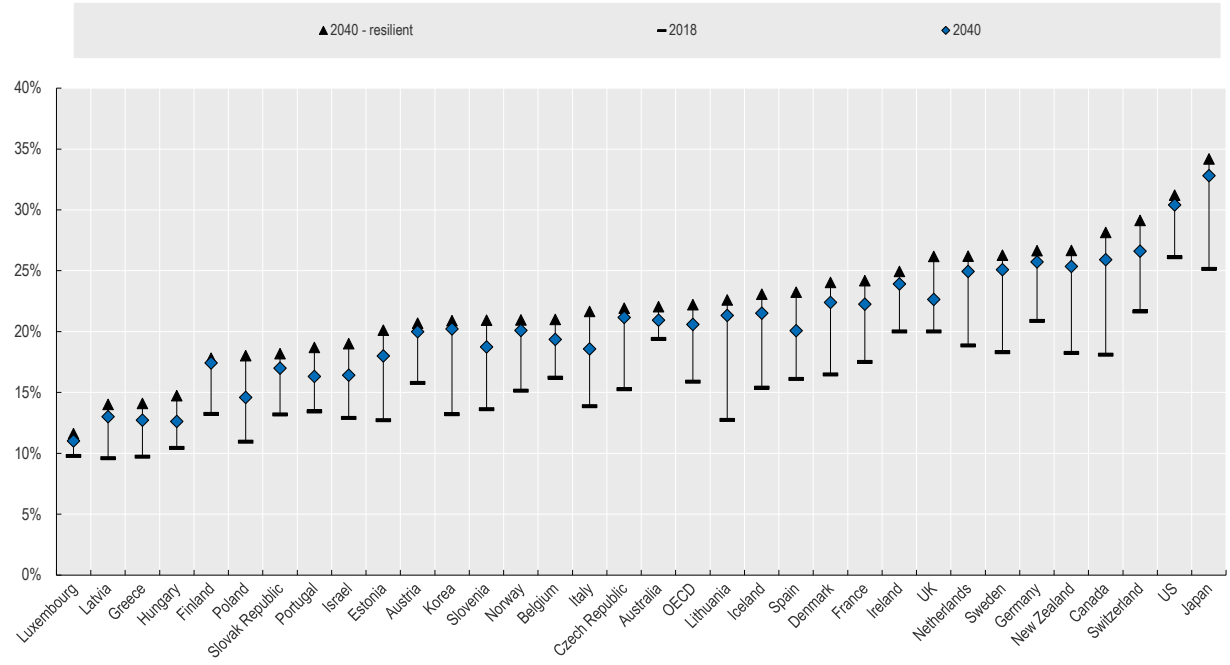


Source: Authors' compilation.

66. For all OECD reporting countries, health spending is projected to account for a larger share of total government revenues in 2040 as compared to 2018. On average across the OECD, health spending is projected to represent 20.6 % of government revenues in 2040, an increase of 4.7 percentage points from 2018.

67. To strengthen health systems resilience to shocks, 1.6 additional points of government revenues should be invested in the health sector – on average - in 2040 by, in particular, enhancing preventive care, infection control, effective testing and vaccination, and strengthening service delivery and medical reserve (Figure 3.6). Health spending is projected to represent 22.2% of government revenues across OECD countries. The relative importance of these investments is higher in Italy, Poland, Spain and the United Kingdom, where it is estimated that more than 3 additional percentage points of government revenues should be invested in health in 2040 to strengthen resilience to shocks. In Ireland, one in four euros of government revenues is projected to be invested in health by 2040.

Figure 3.6. Change in the percent share of healthcare expenditure (base scenario) in government revenues by country, 2018 and 2040.



Source: Authors' compilation.

68. Based on scenario analyses, policies related to enhance productivity and to improve healthy lifestyle can rein in health spending by 0.3 and 1.1 percentage points of revenues in 2040 respectively. This equals two thirds of the additional resources needed to strengthen health systems resilience.

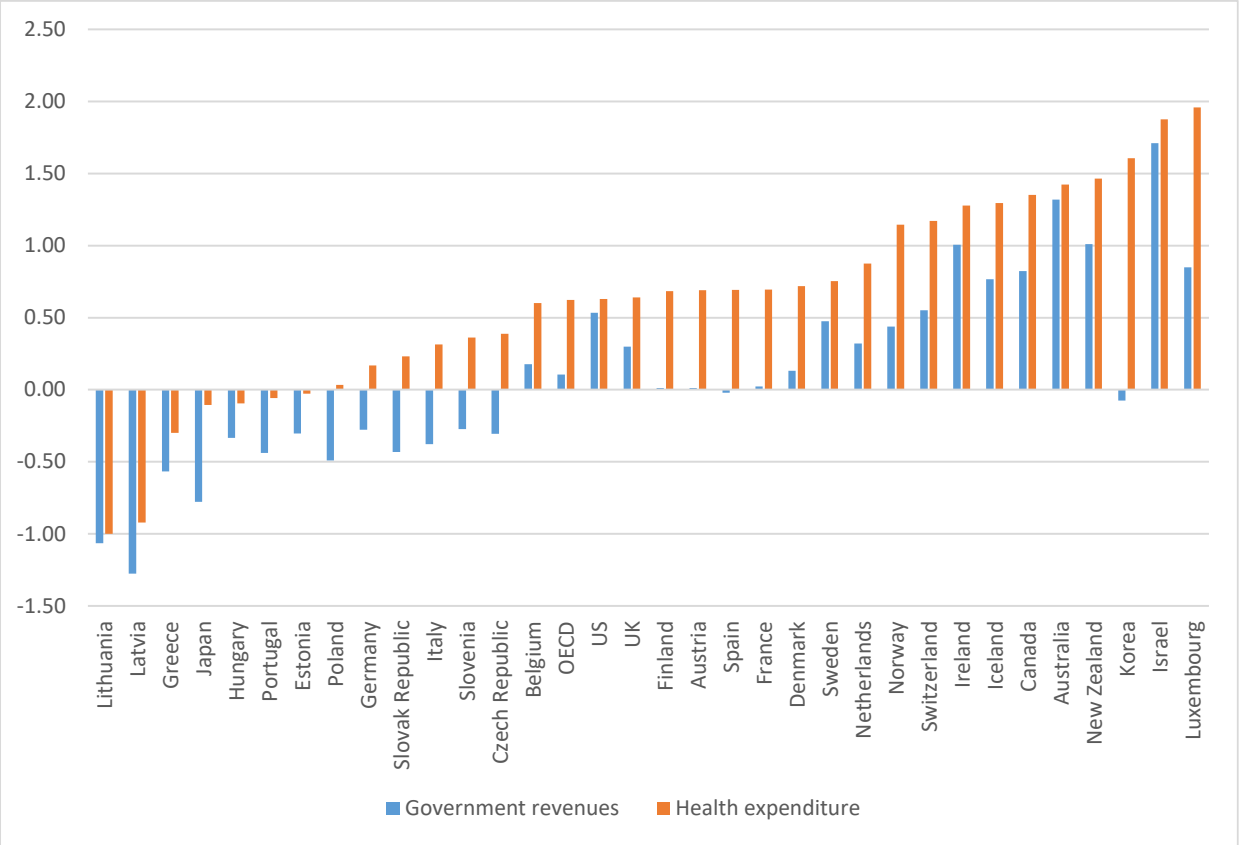
3.4. The impact of changes in the size and structure of the population on healthcare expenditure and government revenues across the OECD

69. Across OECD countries, a decrease in the growth of government revenues due to changes in the size and structure of the population is projected up to 2040. In particular, as from 2028 government revenues – on average – are projected to stabilise. Changes in the size and structure of the population are projected to account for 0.6 - 0.7% of health spending growth between 2023 and 2026. Afterwards, the growth in health spending due to the demographic effect is expected to decrease to 0.5%, mainly due to a reduction in the growth rate of the size of the population.

70. In 15 OECD countries, the change in the size and structure of the population is expected to result in a decrease in government revenues from 2023 to 2040 (Figure 3.7). In seven of these 15 countries, the change in the size and structure of the population is expected to result in a decrease in health spending too. Korea and Spain are expected to see an increase in health spending and a decrease in government revenues due to demographic changes, mainly due to a decrease in the size of the population from 2023 to 2040, and to the highest increase across OECD countries in the share of population aged 65 years or more (+ 18.3 and + 12.2 percentage points in Korea and Spain, respectively). As a consequence, around one in three people are projected to be aged 65 years or more in Korea and Spain in 2040.

71. In four OECD countries – Australia, Ireland, Israel and the US – the change in the size and structure of the population is projected to result in a growth of government revenues of 80% or above relative to the projected growth in health spending. This is due to the highest increase across OECD countries in the population size from 2023 to 2040, and to a share of the population aged 65 years and above lower than OECD average in 2040.

Figure 3.7. Annual average percent change in health spending (baseline scenario) and government revenues due to changes in the size and structure of the population, 2023-2040



Source: Authors' calculation/compilation

4 Discussion

72. This working paper uses a new method to assess the fiscal sustainability of the Irish health system by considering the effects of population change and income growth on both government revenue and health spending. By coupling health spending projections with government revenues projections, we explore how changes in population age structure and income would result in changes in the share of health spending in government revenues over time.

73. Results show that population change is projected to be a much greater driver of future health spending in Ireland over the next 20 years as compared to the OECD average, accounting for half of the annual growth in health spending as compared to a quarter for the OECD. This is due to the relatively young population in Ireland at present and the significant projected population change set to occur.

74. Growth in health spending from public resources is projected to average 3.4% per year over the next two decades (as compared to 2.6% across the OECD) reaching 10.9% of GNI* by 2040 in our central scenario and 11.4% of GNI* in our 'Resilient' scenario. Irish government revenues are projected to grow at 2.6% per year during the same period (as compared to 1.3% across the OECD) reaching 44.6 % of GNI* by 2040. Health spending from public sources is projected to account for 24% of government revenues in 2040 (up from 20% in 2019). The fiscal balance is projected to slightly deteriorate in Ireland by 2040.

75. By drawing attention to the effects of ageing and income growth on both government revenues and health spending, our approach provides policymakers with a broader set of options to consider when addressing financing shortfalls. Analyses that give equal attention to both health expenditure and government revenues better captures the need for a whole-of-government set of policies, in particular when addressing the consequences of ageing, ranging from those targeting price and utilisation of services to those that can make government revenues more robust to population change.

76. It is important to note that while the impact of policies required to strengthen system resilience were modelled, this paper uses System of Health Accounts expenditure in 2019 as a base and does not model the implementation of any specific planned reform in the Irish context that could increase or reduce projected expenditure. For example, it does not model any potential primary care expansion nor any savings that could potentially be derived from such an expansion.

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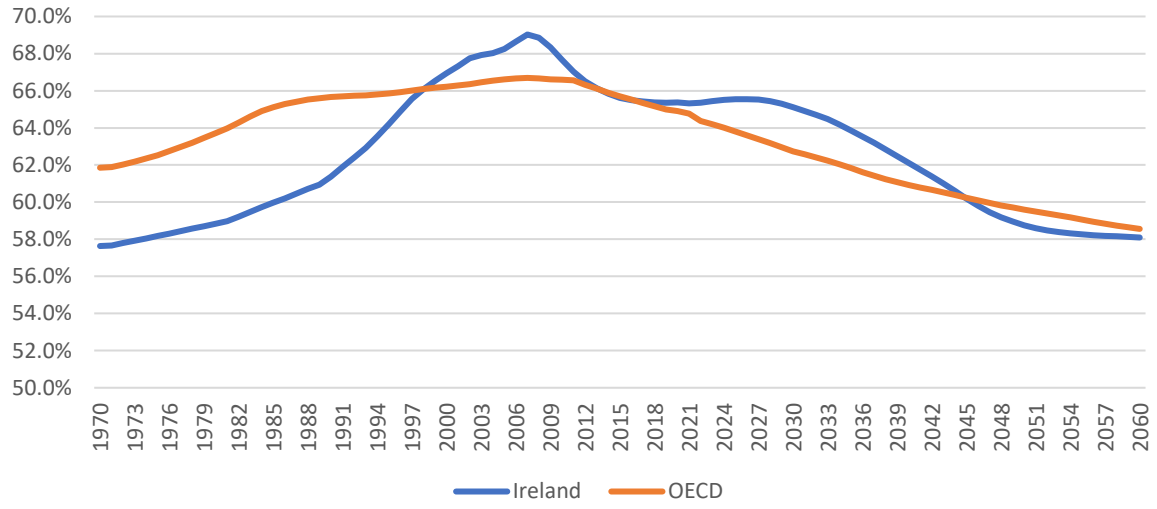
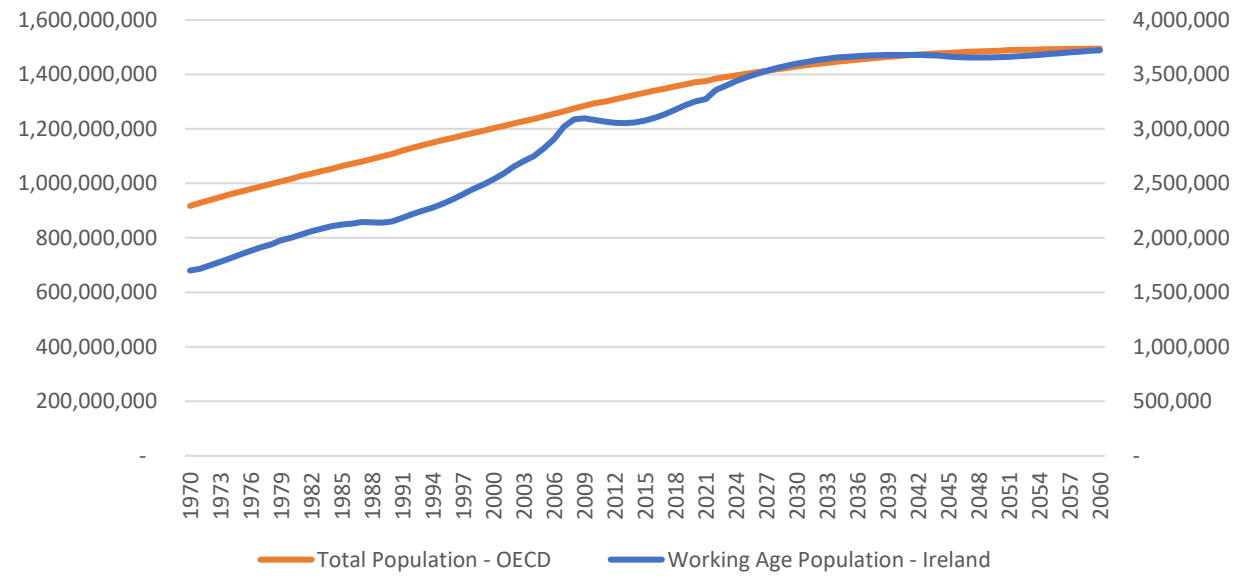
Appendix

Figure A1 – Ireland and OECD Working Age Population Share (1970 -2021) and Projections (2022 - 2060)



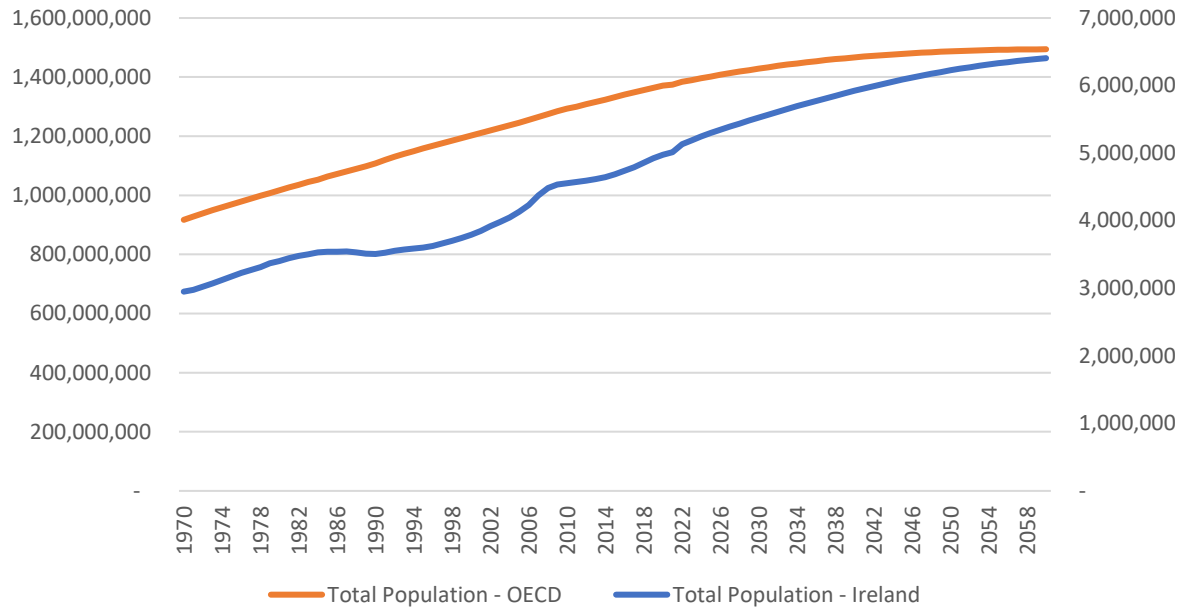
Source: OECD Population Estimates and Projections

Figure A2 – Ireland and OECD Working Age Population (1970 - 2021) and Projections (2022 - 2060)



Source: OECD Population Estimates and Projections

Figure A3 – Ireland and OECD Total Population (1970 – 2021) and Population Projections (2022-2060)



Source: OECD Population Estimates and Projections