OECD Fiscal Federalism Studies

Ageing and Fiscal Challenges across Levels of Government

Edited by Junghun Kim and Sean Dougherty

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KOREA INSTITUTE OF PUBLIC FINANCE

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Junghum Kim and Sean Dougherty

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Preface

Populations in many OECD and emerging economies are ageing rapidly and this will have significant macroeconomic impacts, including on public expenditures and tax revenues. The rules and practices that govern fiscal relations among different levels of government, such as their responsibilities for taxation, spending and debt management, have a bearing on economic efficiency and ultimately on growth. Understanding how demographic changes interact with these practices to affect fiscal risks at multiple levels of government is critical for policymakers to prepare for and improve outcomes.

The consequences of population ageing at subnational government levels can be particularly intense, with many local governments vulnerable to the ageing of their populations from a fiscal perspective. The economic and fiscal challenges of an ageing population go beyond intergovernmental boundaries and require complex policy responses. In order to make fiscal frameworks "ageing resilient", countries require coherent fiscal strategies that focus on tax and spending reforms, with a whole-of-government approach that brings together central governments, as well as sub-central governments. Re-designing fiscal frameworks to deal with these vulnerabilities is essential to make our economies more sustainable going forward. These policy challenges continue to be discussed at the G20 and among OECD members, and are particularly difficult in light of the on-going COVID-19 crisis.

The present volume on ageing and fiscal challenges across levels of government brings together cross-country analyses of fiscal policy, demographics and spatial productivity, as well as country studies of Brazil, Canada, China and Germany. The collection of analyses also builds upon prior joint studies that have been produced between the Network on Fiscal Relations across Levels of Government and the Korea Institute of Public Finance (KIPF). Known as the OECD Fiscal Federalism Series, these joint studies have had an important impact for policymakers.

Angel Gurría

OECD Secretary-General

Foreword

The collection of analyses in this volume draw from an expert workshop in Paris of the OECD Network on Fiscal Relations across Levels of Government in 2019, organised jointly with the Korea Institute of Public Finance (KIPF). The Network is a unique body at the OECD that "horizontally" brings together the expertise of multiple fields and four substantive departments – the Centre for Tax Policy and Administration (CTP), the Economics Department (ECO), the Public Governance Directorate (GOV) and the Centre for Entrepreneurship, SMEs, Regions and Cities (CFE) – as well as their respective committees (the CFA, EPC, PGC and RDPC). The Network, chaired by Junghun Kim of Korea, addresses a wide range of challenges for intergovernmental fiscal relations, whether macroeconomic, structural and administrative, and seeks to contribute to stronger, fairer and more stable economies as well as improving the well-being of citizens.

This volume seeks to address multiple aspects of the Ageing issue across levels of government, examining fiscal risks as well as policy responses in a range of economies. Beyond all of the individual chapter authors, we would like to thank the OECD's Chief of Staff, Juan Yermo, for his strong encouragement, as well as the workshop discussants: Philipp Päcklar (Austria Ministry of Finance); Clara Welteke, (German Ministry of Finance); Anne Line Helsø (Denmark Ministry of Finance); Olli Kangas (University of Turku, Finland); Delphine Moretti (OECD Public Budgeting Division); Herwig Immervoll (OECD Division for Social Affairs and IZA); Jens Arnold, Andrew Barker and Dorothee Rouzet (OECD Economics Department). The editors would also like to extend their special appreciation to Peter Hoëller, who gave his constructive feedback on all of the chapters. Extensive support was also received from Julie Harris, who thoroughly copy-edited the manuscript, and from Meral Gedik, who did a smooth final formatting and typesetting. Thanks are also due to Violet Sochay and Nikolina Johnsson for their efficient help with administrative and logistical aspects of the workshop. Finally, the workshop was made possible through the generous financial support of the Korea Institute of Public Finance.

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Executive summary

All OECD economies are undergoing population ageing – an increase in the share of older persons in the population – reflecting a combination of increasing longevity and declining fertility rates. The process and pace are, however, far from uniform, with ageing much more advanced in some countries than in others. Moreover, the implications on public spending, revenues and debts vary not only across countries, but also within countries, across levels of government, with many local and regional governments facing particularly heavy spending burdens as their revenue bases decline. Such burdens are especially intense in the context of the COVID-19 pandemic that puts extreme pressure on shared health systems, public safety, social care and many other locally delivered public services.

The first chapter, by Bert Brys and Céline Colin, analyses the consequences of population ageing at the sub-central government levels and introduces a "sub-central fiscal vulnerability to ageing" indicator. This indicator identifies the countries in which these government levels are vulnerable to the ageing of their populations from a fiscal perspective, both from the expenditure and revenue sides. Notable expenditures at the regional or local levels include healthcare and old-age social care in most OECD countries. The chapter finds that in order for countries to make their fiscal frameworks more "ageing resilient", they require coherent fiscal strategies that focus on tax and spending reforms that take a whole-of-government perspective.

The second chapter, by Federica Daniele, Taku Honiden and Alexander Lembcke, examines how ageing interacts with productivity growth in OECD regions. In principle, the negative impact of ageing on the growth rate of per capita GDP could be offset by increases in productivity. However, for many regions, productivity growth rates have been insufficient. One reason for this is that ageing also has a direct negative impact on productivity growth, with the effect concentrated in urban areas. Cities specialise in sectors such as tradable services, where the content of tasks makes it difficult to automate many stages of the production process, while at the same time, a key driver of productivity growth, business dynamism, is negatively affected by demographic change.

The third chapter, by Fanny Kluge and Tobias Vogt, looks at the fiscal impact of population ageing within Germany. The analytical results show the long-term fiscal implications caused by different ageing patterns, and find considerable differences among states or municipalities. While some metropolitan areas are attracting younger inhabitants and even growing, certain regions and peripheral areas are suffering from out-migration and rapid ageing. While in general, the expenditure burdens of state and local governments are not increasing, revenues in many regions are decreasing markedly, due to a decline in the working-age population under existing retirement schemes. Extending retirement ages or reforming the fiscal equalisation system could help to address these gaps.

The fourth chapter, by Christine Wong and Randong Yuan, looks at China's ageing challenges. The country is facing a "population ageing tsunami", with the share of the population aged over 65 expected to double between 2010 and 2030. The chapter examines the workings of the main pension programme currently covering more than 400 million workers and retirees. The fragmentary programme is managed mostly at the city and county

levels. The system has stymied previous consolidation efforts, although recent central government reforms have strengthened its governance. To improve equity and the long-term sustainability of the programme, it will need to be extended to cover younger migrant workers and strengthen their incentives for participation.

The fifth chapter, by Fernando Filho, Cássio M. Turra, and Afonso Arinos de Mello, presents future public spending projections for Brazil from its demographic transition. The end of the demographic dividend will affect spending on education, health, social security, social programmes and long-term care services. Education expenditure is expected to decline as the population ages, while health and long-term care spending will increase significantly. However, the chapter finds that the biggest overall challenge will be the payment of social security benefits, putting at risk the sustainability of government finances. Thus, the most urgent task for all levels of government is to pursue comprehensive social security reforms that will ensure basic government functions in the coming years.

The sixth and final chapter, by William Robson and Alexandre Laurin, examines inter-governmental fiscal arrangements in Canada. Transfers from Canada's federal government to provinces, territories and local governments account for about one-fifth of the revenues of those governments, and about one-third of federal programme spending. The chapter argues that such large transfers can undermine accountability and foster unsustainable fiscal policies. Demographic change will dampen the growth of government revenues in Canada and push programme spending up, particularly at the provincial level. Responding effectively will require a mix of tax increases and spending restraint from provinces, ideally combined with pre-funding of some programmes.

Chapter 1. Population ageing and sub-central governments: Long-term fiscal challenges and tax policy reform options

by Céline Colin and Bert Brys

Populations in OECD countries are ageing rapidly, which will have significant macroeconomic impacts, including on public expenditures and tax revenues. This chapter analyses the consequences of population ageing at the sub-central government (SCG) levels and introduces the "SCG fiscal vulnerability to ageing" indicator. This indicator identifies the countries in which SCGs on average are vulnerable to the ageing of their population from a fiscal perspective (both from the expenditure and revenue side). The chapter posits that the economic and fiscal consequences of an ageing population go beyond the central-SCG boundaries. Therefore, in order to make fiscal frameworks "ageing resilient", countries require a coherent fiscal strategy that focuses on tax and spending reforms, with a whole-of-government approach that brings together central governments and SCGs.

This chapter was originally prepared for the OECD Network on Fiscal Relations' Workshop on Ageing and Long-term Challenges across Levels of Government. The authors are thankful for comments received from Network delegates – notably from Austria and Belgium – as well as from David Bradbury, Sean Dougherty, Peter Hoeller, Gioia de Melo, Michael Stemmer and Sarah Perret. The authors wish to thank Dorothée Rouzet in particular for her insightful suggestions. The authors also wish to thank delegates from the OECD's Working Party No. 2 on Tax Policy and Tax Statistics of the Committee on Fiscal Affairs for their useful feedback and comments.

Introduction

Populations are ageing rapidly across advanced economies and many emerging market economies because of rising life expectancy and declining fertility. While in 1950 only 8% of the population in OECD countries was older than 65, this share will increase to 17% by 2020. Over the same period, the share of people younger than 25 will decline from 43% to 31% of the population. United Nations projections show that these trends will continue and that by 2100, 31% of the population in OECD countries will be older than 65 and the share of people younger than 25 will have dropped to 25%. The old-age dependency ratio, defined as the number of people aged 65+ as a percentage of the number of people in the 20-64 age category, will jump from 30% in 2015 to more than 50% in 2050 on average across OECD countries. The ageing of the population will be particularly strong in Germany, Greece, Italy, Japan, Korea, Portugal, Slovenia and Spain.

The ageing of the population will have a significant macroeconomic impact, although the views in the literature of the impact on the level of the interest rate, consumption and inflation, saving and investment, and economic growth vary significantly (Lu and Teulings, 2016[1]; Goodhart and Pradhan, 2017[2]). There is, however, consensus on the direct impact of the ageing of the population; it will result in higher old-age spending and a fall in the share of the working-age in the total population (Rouzet et al., 2019[3]).

Ageing of the population will result in additional old-age expenditure. On average across OECD countries, projections indicate that public health and long-term care (LTC) spending could increase by up to, respectively, 6.3 and 1.3 percentage points of gross domestic product (GDP) by 2060 (Rouzet et al., 2019[3]). Demographic change will also be the main driver of public pension expenditure in the future: pension expenditure is projected to increase in the majority of G20 countries by 2060. Countries will also face higher old-age care spending, and they might face increases in other types of expenditure, such as local transportation and community services for the elderly.

Population ageing will affect both central and sub-central governments' (SCGs) spending. The extent to which SCGs will be affected by population ageing, and the opportunities they face to mitigate the corresponding impact, cannot be seen in isolation from the ageing-related expenditure challenges at the central government level. The degree to which SCGs will be affected by the ageing of their population also depends on the size and types of spending that SCGs are responsible for.

For instance, SCGs may run or sponsor pension plans for their civil servants. This may create ageing-related challenges, particularly when these funds are pay-as-you-go or only partially funded defined-benefit systems. Under-funded pension liabilities might require structural reforms in order to prevent SCG pension liabilities becoming a drag on other types of SCG spending, or will require SCGs to increase taxes significantly.

In addition, the ageing of the population will reduce direct tax revenues as a result of the decrease in the number of people that are active in the formal labour market. As tax systems in OECD countries are tilted towards taxes on labour income, the drop in the workforce will reduce personal income taxes and social security contributions (SSCs) significantly. A reduction in direct tax revenues may lower the capacity of central governments to continue providing transfers and grants to SCGs. It may strongly affect SCG funding in countries where the personal income tax (PIT) is an important source of SCG revenue.

In many countries, the financing of the welfare system will be put under severe pressure over the decades to come. This will be particularly the case in countries where pension, health and long-term care systems have a significant pay-as-you-go component. The drop in labour supply may induce businesses to shift towards more capital intensity, but may also result in an increase in average wage levels, which may offset, to some extent, the negative direct revenue impact of ageing.

The ageing of the population is coinciding with the automation and digitalisation of the economy. Technological innovation can offer solutions to a reduction in the labour force. However, it might put government budgets under further pressure, as the automation of the economy will imply a shift in the tax mix away from taxes on labour, which are often levied at high rates, towards taxes on capital, which are often levied at lower rates.

In order to assess the extent to which countries and their SCGs are affected by the ageing of their population, this chapter introduces the "SCG fiscal vulnerability to ageing" indicator. This indicator identifies the countries in which SCGs on average are vulnerable to the ageing of their population from a fiscal perspective (i.e. both from the expenditure and revenue side). It consists of a "SCG expenditure vulnerability" and a "SCG revenue vulnerability to ageing" indicator. As is the case with any indicator, the assumptions upon which the SCG fiscal vulnerability indicator are based could be further refined, in particular, if more and better data were to become available. Indeed, more work is necessary to improve the scope and timeliness of data for sub-central levels of government.

In particular, the SCG fiscal vulnerability to ageing indicator focuses on averages across SCGs, but does not differentiate between SCGs within a given country. Ageing, however, might vary across regions within a country, and so will SCG vulnerability to ageing. Ageing might be more pronounced in rural than in urban areas, for instance, and certain regions within a country might be ageing considerably faster than the national average. In fact, ageing may exacerbate existing divergences in economic trajectories across regions because it may, for instance, induce young active workers to move away from regions that are ageing rapidly. Hence, the vulnerability indicators presented in this chapter are likely to mask significant differences within countries and even in the countries where, on average, SCGs are not vulnerable to the ageing of their population; there may still be regions and communities that will face ageing-related challenges.

This analysis aims to encourage central and SCGs to analyse the implications of ageing within a fiscal framework and to make their fiscal framework "ageing-resilient". The economic and fiscal consequences of an ageing population go beyond the central-SCG boundaries and require a coherent fiscal strategy that focuses on tax and spending reforms. SCGs have a vital role to play in structural reforms to make welfare systems resilient to the ageing of their population. In order to be effective, those reforms require a whole-of-government approach that brings together central government and SCGs. This chapter concludes with recommendations for tax policy reforms at both the central and SCG levels and puts forward options for adjustments to the fiscal relations across levels of government.

Because of data limitations, the scope of the analysis has focused on a selection of OECD countries (in particular, EU countries). The analysis does not necessarily apply to all OECD countries (such as the United States). Moreover, the analysis has used data that was available for as many countries as possible but did not include country-specific factors in relation to the ageing of the population. As a result, the country results should be interpreted with caution and should be complemented with additional analysis before country-specific conclusions and recommendations can be drawn from the indicator presented in the analysis. Finally, there are other factors that might mitigate the impact of the ageing of the

population that are outside the scope of this analysis, such as the impact of migration, competition among SCGs to attract citizens (through the tax system or other public provisions, etc.), policies to increase fertility rates or social security reforms.

Population ageing increases government expenditure and puts downward pressure on tax revenues

The fiscal implications of ageing are shared, both in terms of expenditure and revenues, across all levels of government. SCGs are financed partly through grants and transfers from central governments, and old-age public expenditure responsibilities are often assigned across different levels of governments. As a result, a discussion of the fiscal consequences of population ageing for SCGs needs to go hand-in-hand with a discussion on the impact on general (i.e. combined central and sub-central) government.

Old-age expenditure will increase significantly in most OECD countries

Ageing will create direct pressure on public finances through additional pension, health and long-term care expenditure. These expenditure categories already account for one-third to one-half of primary expenditure in OECD countries (Guillemette and Turner, 2018[4]). Previous projections (2013) indicated that health care expenditure for OECD countries would reach 9.5% of GDP in 2060 (in a cost-containment scenario, i.e. assuming that policies act more strongly than in the past to rein in some of the expenditure growth), to 14% of GDP (in a cost-pressure scenario, i.e. assuming no stepped-up policy action to slow down the increase in spending) (de la Maisonneuve and Oliveira Martins, 2013[5]). New projections (2018) indicate that health expenditure will increase by about 4.75 percentage points of GDP between 2018 and 2060 in a cost-pressure scenario (Figure 1.1), and public pension expenditure by about 0.75 percentage point of GDP. Significant variation can be observed across countries.

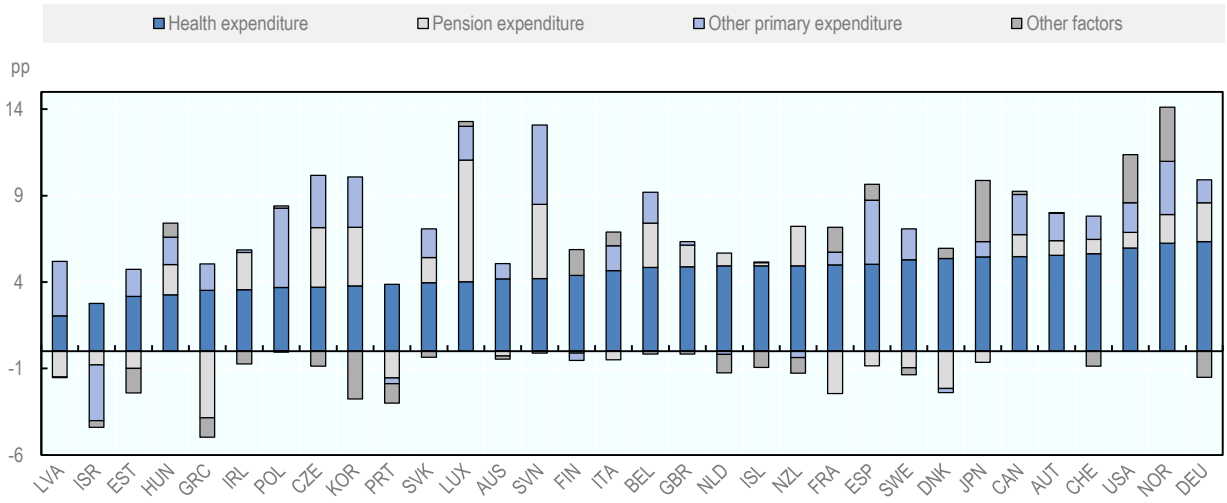
Declining employment rates will further increase pressure on public finances (Figure 1.1). Maintaining "other" primary expenditure (i.e. primary expenditure excluding health and pensions) constant on a per capita basis means that government finances are sensitive to the employment rate in their country, as tax revenue is increasing in the level of employment, whereas spending is linked to the size of the population and decreases in the employment rate (through lower unemployment benefits, for instance). This introduces an additional channel through which public finances respond to demographic developments and also means that structural reforms that boost employment – i.e. reforms that increase the participation of people of working age – have an additional benefit on the fiscal position of countries.

The decrease in fertility rates might put downward pressure on young-age public expenditure, but this drop is projected to be relatively small compared to the increase in old-age public spending. For instance, while infant and maternal health care expenditure might decrease (Creedy and Morgan, 1992[6]), education expenditure in the European Union is projected to remain stable on average by 2070 (European Commission, 2018[7]).

Structural reforms could alleviate fiscal pressures. For instance, reforms in the health sector could mitigate health cost inflation and labour market reforms could increase labour market participation. Health cost containment scenarios, for instance, would reduce the increase in health spending in about two-thirds of countries (Guillemette and Turner, 2018[4]). Whether such strategies will be implemented in practice, given a political economy setting where the median voter is getting older, remains an open question.

Figure 1.1. Significant increases in public health expenditure are expected between 2018 and 2060

Change in tax revenue necessary by 2060 to stabilise public debt ratios at current levels, in percentage points of potential GDP



Notes: The scenario presented in this figure seeks to stabilise the gross debt to GDP ratio at its initial value (i.e. the projected value for the last year of the OECD Economic Outlook horizon). Health expenditure projections correspond to a "cost pressure" scenario. The "other primary expenditure" category mostly captures the impact of changes to the employment-to-population ratio. The "other factors" category mostly captures the initial gap between primary revenue and the level that would stabilise the debt-to-GDP ratio but also changes in GDP growth rates over the projection period. The data used for these projections might have changed since the publication of the report in 2018 (for example, in Canada the actual increase in pension benefits has been smaller than the data used for the projection). For Norway: part of the required increase in primary revenue is due to the necessity of compensating for the recent decline in offshore revenue and appears in the "other factors" component. Even setting aside this component of the decomposition, Norway's required increases in primary revenue by 2060 would still be one of the largest. On the other hand, Norway's government has a large and positive net financial asset position so its fiscal situation is not problematic.
Source: Guillemette, Y. and D. Turner (2018[4]), "The Long View: Scenarios for the World Economy to 2060", *OECD Economic Policy Papers*, No. 22, OECD Publishing, Paris, https://doi.org/10.1787/b4f4e03e-en.

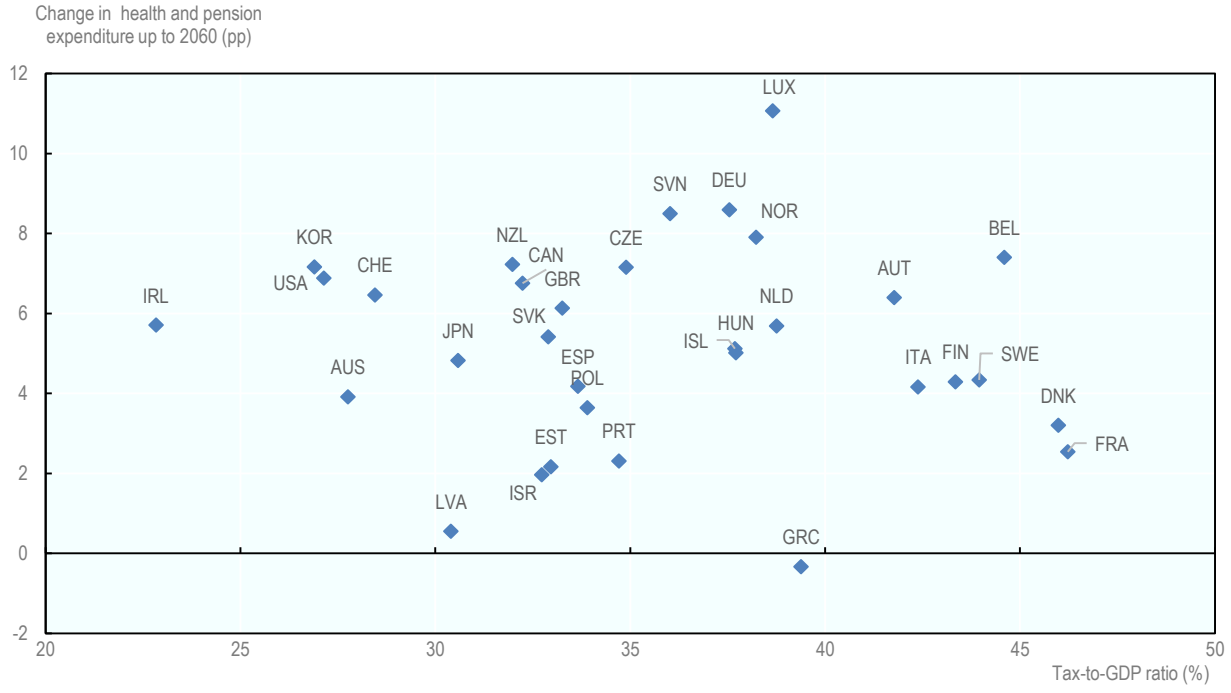
Structural reforms to deal with ageing pressures will require a whole-of-government approach that not only involves central government but also SCGs. This will be particularly the case in countries where SCGs have responsibilities in the areas that require reform, such as the labour market and the health system.

There is a broad consensus in the literature that labour market activation policies are crucial in managing the ageing of the population. Countries should ensure that their senior workforce remains healthy, that workers have the right skills to remain productive and that they are offered financial incentives to remain in the labour market. Labour market policies to activate the unemployed and improve the labour market participation of specific groups in the population that are currently under-represented in the labour force such as youth, women and immigrants, are an integral part of a policy that makes welfare systems in the OECD ready for the ageing of their population. The potential for labour activation policies to mitigate ageing-related costs varies across countries. The potential will be particularly high in countries where labour market activation rates are currently low.

Countries that have a high tax-to-GDP ratio will find it challenging to finance additional old-age expenditure merely by raising more taxes (Figure 1.2). High tax-to-GDP countries that will face high additional old-age expenditure, such as Austria, Belgium, Germany, Luxembourg, Norway and Slovenia might be particularly vulnerable to the ageing of their

population. Increasing the tax burden further to pay for the old-age expenditure, without implementing more structural reforms, might exacerbate economic distortions. These countries, therefore, have the strongest incentives to introduce structural reforms to prepare for the ageing of their populations.

Figure 1.2. Countries with a high tax-to-GDP ratio and with a significant increase in old-age expenditure have the strongest incentives to introduce cost mitigation measures



Note: for the tax-to-GDP ratios, 2017 data is used.
Source: OECD (2019[8]), *Revenue Statistics 2019*; Guillemette, Y. and D. Turner (2018[4]), "The Long View: Scenarios for the World Economy to 2060", *OECD Economic Policy Papers*, No. 22.

Population ageing will put downward pressure on tax revenues and lead to changes in the tax structure

Population ageing will reduce revenues from personal income taxes and social security contributions

Population ageing lowers revenues from labour taxes (PIT, SSCs and payroll taxes). The drop in the number of people active in the labour market will reduce labour supply and therefore, the labour income taxes paid. As pensions will be typically lower than the labour income that was earned during a worker's career, ageing will result in lower PIT revenues even in countries where pensions are taxed under the PIT. In Figure 1.1, this labour supply effect is captured by the "other primary expenditure" estimations.

Several factors may mitigate the drop in labour income tax revenues. A healthy ageing population will not only result in more retired people, but also in an increasing share of older workers in the labour force (because of demographic factors such as the fact that a large share of the workforce has reached an older age, but also to a lesser extent because some older workers prefer to continue working at an older age rather than retiring, or phase in later retirement age in some countries). As wages rise with age in some OECD countries,

the increase in the average age of workers in the labour force will result in higher labour tax revenue, which can help pay for the additional old-age expenditure. This effect will only be temporary, however, and will stop when the relatively larger baby boom generation has fully retired. Nevertheless, this may offset somewhat the negative direct tax revenue impact of the ageing of the population. Ensuring that older workers continue to be active in the labour market is, therefore, an important policy objective in order to pay for the ageing of the population.

Higher salaries can contribute to offsetting the drop in labour income taxes as a result of the reduction in labour supply. Future generations are expected to be more productive and, as a result, will earn higher wages and pay more labour taxes. A drop in labour supply as a result of the ageing of the population will increase competition for workers, which is expected to increase the wage level. It remains uncertain, however, to what extent automation, which will reduce labour demand and might put downward pressure on wage levels, will neutralise this effect. On the other hand, automation may increase productivity and therefore allow for higher wages. The impact of automation will also vary across types of professions and skill levels; the interaction with the ageing of the population thus remains an open question (Nedelkoska and Quintini, 2018[9]). Moreover, the extent to which higher wages will mitigate the increased cost of ageing will also depend on whether public pensions will increase with the average wage level or, possibly, only with inflation.

Countries where pensioners pay PIT and health SSCs, either levied as a percentage of their pension or as a lump-sum contribution, might be less vulnerable to the fiscal challenges as a result of a decline in the labour force. Indeed, countries that allow for the deduction of (public and private) pension savings from taxable personal income but tax the pension received under the PIT may be in a better position to smooth the revenue costs as a result of the ageing of the population. Similarly, countries that do not implement an SSC ceiling may benefit more from the possible increase in the wage level as a result of ageing, although an increase in SSCs paid might eventually result in higher benefits that have to be paid.

However, pensions are typically lower than the income earned during a worker's working life, which implies that the marginal income tax rates at which pensions are taxed are typically lower than the rates at which the pension savings were deductible. Tax deferral might, therefore, lower the net present value of tax revenues for government. Moreover, tax deferral is also more beneficial to higher incomes if they can deduct private pension savings at high marginal tax rates.

Analysis using microdata shows significant drops in tax revenues as a result of population ageing. The simulations, however, show that the drop in tax revenues would be significantly lower if wages rise in response to the drop in labour supply (Dolls et al., 2014[10]). Recent country tax policy work on Slovenia, for example, shows that the impact of ageing on the SSCs and PIT revenues can be significant (Box 1.1) in the absence of measures that increase labour supply. In Slovenia, the ageing of the population will not only increase public spending (Figure 1.1) but will also put tax revenues under severe pressure (Figure 1.3).

Box 1.1. The impact of ageing on social security contributions and personal income tax revenues in Slovenia

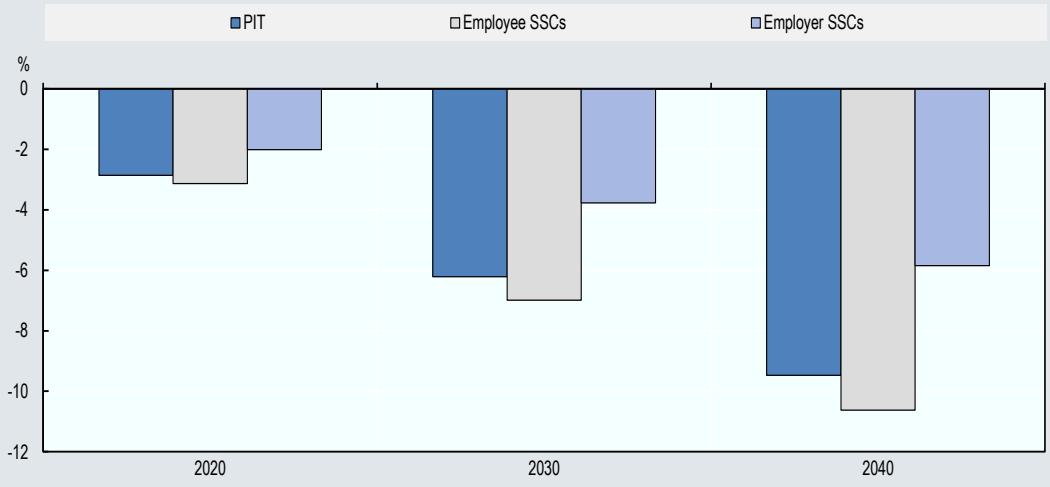
In Slovenia, the population that participates in the formal labour market currently pays the vast majority of SSCs and PIT. Therefore, the projected decline in this cohort, alongside a rise in older workers will have significant negative consequences for the revenues raised from the PIT and SSCs in the coming decades.

In Slovenia, the old-age dependency ratio (defined as the number of people aged 65+ as a percentage of the number of people in the 20-64 age category) is set to rise sharply from 18.7% in 2016 to 25.2% in 2030 and 28.3% in 2040 (European Union, 2017[11]). Over the same period, there is an expected decline in the working-age population from 66.4% in 2016 to 61.0% in 2030 and 58.2% in 2040. Among the taxpaying population, those of working age pay 97% of all PIT, 99% of all employee SSCs and 90% of all employer SSCs (the small amounts of PIT and SSC remaining are paid by those aged over 65).

By applying the projected population changes by age group (in percentage points) to the number of taxpayers in the same age groups in the taxpayer population, it is possible to estimate the PIT and SSC revenue loss associated with ageing over the period. This assumes that population changes will correspond to changes in the taxpaying population, that average PIT and SSCs by age group remain constant over the period and stable population growth to 2040. According to the analysis, PIT revenues could fall by over 9% and employer and employee SSCs by over 6% and 11%, respectively, by 2040 (Figure 1.3). These revenue declines represent 1.6% of GDP.

Figure 1.3. The impact of ageing could be significant on PIT and SSCs revenues in Slovenia

% change compared to 2016



Note: The European Commission 2018 Ageing Report projects that those aged 0–14, 15–64 and 65 and over will change (in percentage points) between 2016 and 2040 by -1.3%, -8.2% and 9.6%.
Source: OECD (2018[12]), *OECD Tax Policy Reviews: Slovenia 2018*.

Revenues from other taxes might be more resilient to population ageing

Population ageing will also have an impact on indirect tax revenues. Consumption tends to peak when people are middle-aged, while consumption is lower for older people (OECD/KIPF, 2014[13]). Consumption follows a similar pattern as income but it is smoother over time as a result of consumption-smoothing behaviour. As individuals enter the workforce, their income and net wealth are both likely to begin to rise. As individuals retire, their income often falls substantially, and their net wealth may decline if they dis-save after retirement (or grow less rapidly because of reduced saving rates) (OECD, 2018[14]). Consumption tax burdens seem to drop generally for households where the household head is aged 70 or older. Results are similar when presented as a percentage of expenditure, with a significant drop in the consumption tax burden occurring for the oldest households.

The impact of the ageing of the population on savings and consumption, and therefore on tax revenues, is uncertain. Fiscal pressure on the welfare system as a result of ageing might induce middle-aged individuals to increase saving and defer consumption. This will have a direct impact on when consumption taxes will be paid.

Revenues from recurrent taxes on immovable property and corporate income taxes will probably be less affected by population ageing. These two taxes are likely to be the most stable taxes with respect to population ageing, although in the longer run, a drop in the population may reduce investment and therefore corporate income tax (CIT) revenues[1] and may lower housing prices and tax revenues because of a reduction in the demand for housing.

Old-age expenditure trends and potential implications for sub-central governments

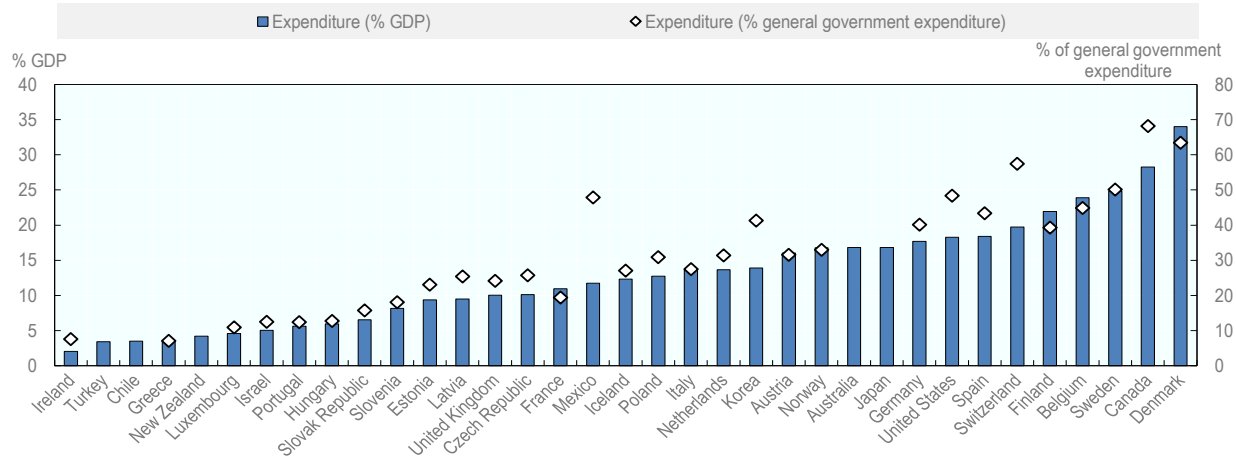
Old-age expenditure represents a small share of total sub-central government expenditure but is expected to increase significantly

On average, SCG (state and local governments) expenditure amounts to about 12% of GDP and represents a third of general government expenditure (Figure 1.4). In most OECD countries, SCGs are responsible for (partly or entirely) government expenditure on education (including childcare, primary and secondary education), health and social protection. SCGs are also responsible, to some extent, for old-age expenditure, which consists of expenditure on health in relation to old age and old-age social protection (benefits against the risks linked to old age, such as the lack of independence in carrying out daily tasks, reduced participation in social and community life, assistance provided to elderly persons to help them with daily tasks, allowances paid to the person who looks after an older adult, etc.). Pensions have typically remained a central government responsibility across the OECD.

At the state level, old-age expenditure (i.e. health expenditure and old-age social protection expenditure) constitutes 21% of total expenditure on average (2.7% of GDP), but large differences across countries exist. Note that these figures include all health expenditure, and not only health expenditure for elderly people, as no data is available that differentiates between old-age and health expenditure for younger people. These figures are therefore upper bounds. In Austria and Spain, old-age expenditure represents 31% and 44% of state expenditure, respectively (Figure 1.5, Panel B) while it is only 18%, 13% and 5% in Switzerland, Belgium and Germany, respectively.

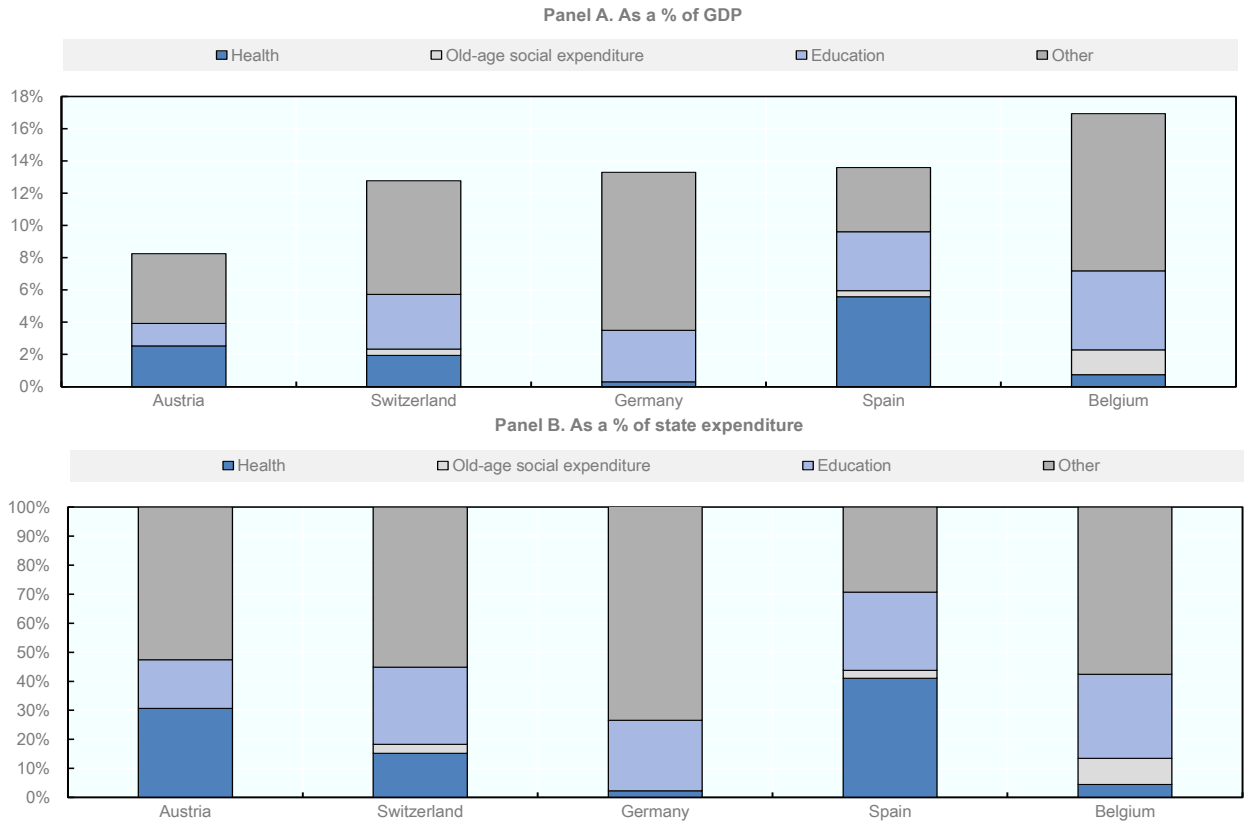
Figure 1.4. Sub-central government expenditure varies significantly across countries

All expenditure, for state and local governments



Note: Data are for 2016, except for Australia and Mexico (2015) and Korea (2012). Data were adjusted to prevent double counting.
Source: OECD (2020[15]), "Subnational government structure and finance", OECD Regional Statistics (database); OECD.Stat.

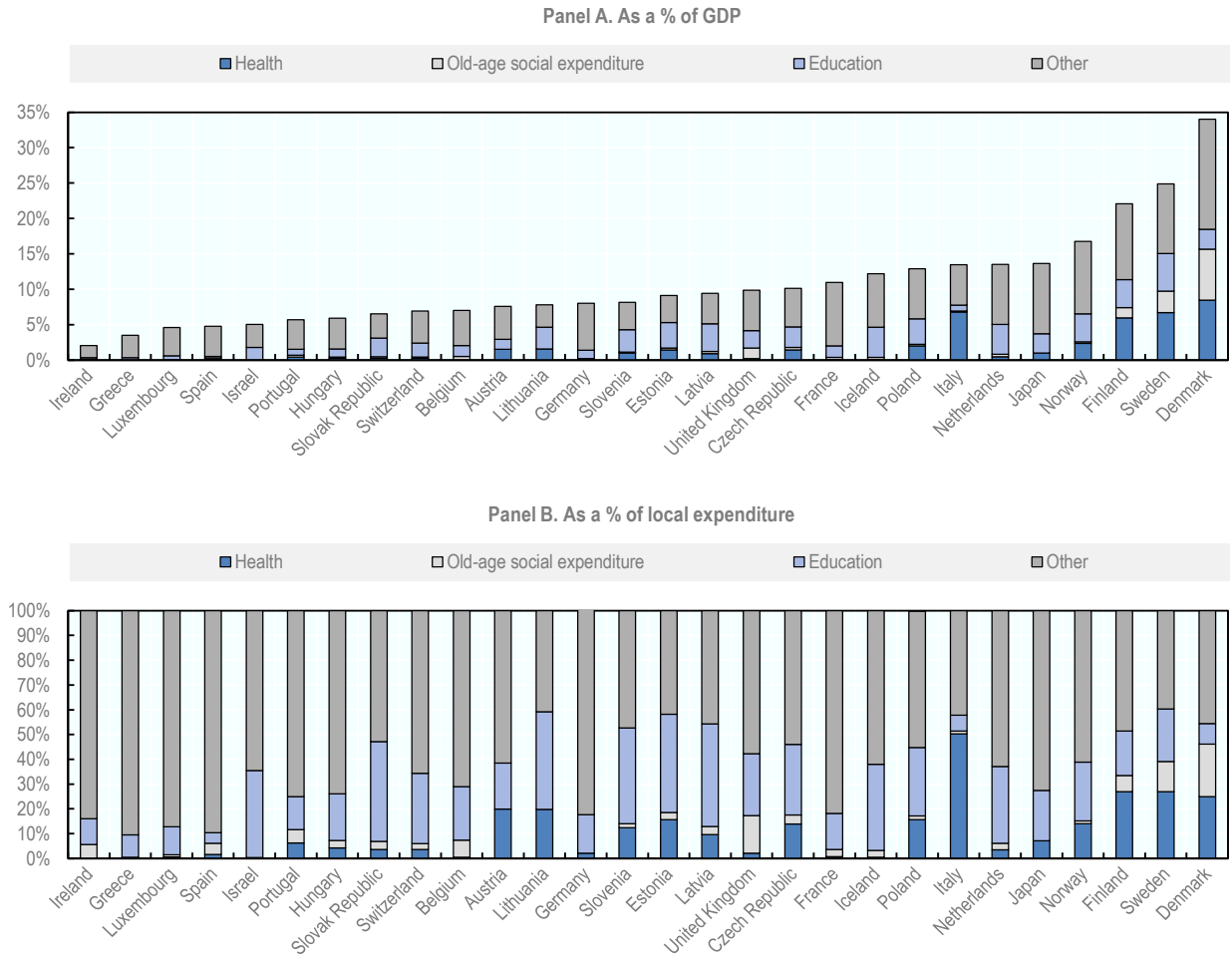
Figure 1.5. State government expenditure in 2016



Notes: This figure includes all countries for which data is available in the COFOG database at the state government level (GS1312). Only data for Germany are from Eurostat. Data for many OECD countries, including Australia, Korea and the United States are not represented in this figure due to a lack of disaggregated data in the OECD database. Data for Canada are not presented in the COFOG database. Detailed methodological information by country, including the definition of state level, can be found in the "Country notes" document associated with the database.
Source: OECD (2020[16]), Government expenditure by function (COFOG) (database); Eurostat data.

At the local level, old-age expenditure amount to 14% of local expenditure (2.2% of GDP) on average, but again large differences can be observed across countries. The highest shares can be found in Italy (51%), Denmark (46%), Sweden (39%), Finland (34%), Austria (20%) and Lithuania (20%) (Figure 1.6, Panel B). Examples of SCGs with responsibilities for specific age-related expenditure include Australia (services to assist older people's transition from hospital to home), Denmark (elderly care), Estonia (long-term care facilities for the elderly), Finland (social services for old and disabled people) and Switzerland (old-age pension system and invalidity insurance).

Figure 1.6. Local government expenditure in 2016

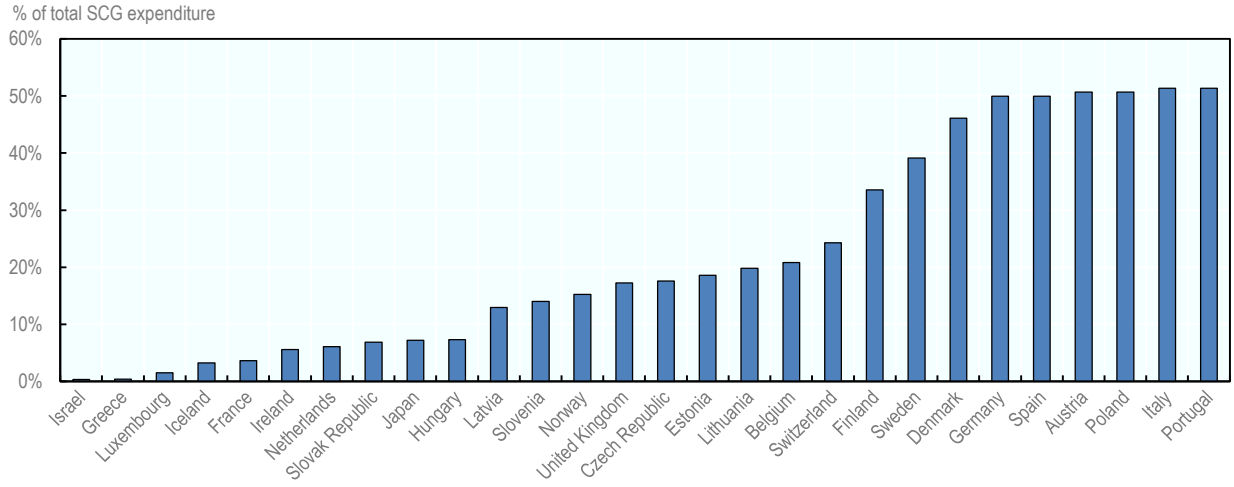


Note: Data for Germany, Poland and Portugal are from Eurostat. Other data are from the OECD database. Data for some OECD countries, including Australia, Korea and the United States are not represented in this figure due to a lack of disaggregated data in the OECD database.
Source: OECD (2020[16]), Government expenditure by function (COFOG) (database); Eurostat data.

When looking at both state and local levels of government, old-age expenditure is a relatively small part of their total expenditure except in a few countries. In Austria, Denmark, Germany, Italy, Poland, Portugal and Spain, state and local old-age expenditure reach about 50% of total SCG expenditure. In other countries, such as in France, Greece, Iceland, Ireland or Israel, this ratio is much lower (Figure 1.7). But, again, these figures are upper bounds as they include all health expenditure, irrespective of whether or not they relate to elderly people.

Figure 1.7. Old-age expenditure vary significantly across sub-central governments

Old-age expenditure at SCG levels (state and local), 2016

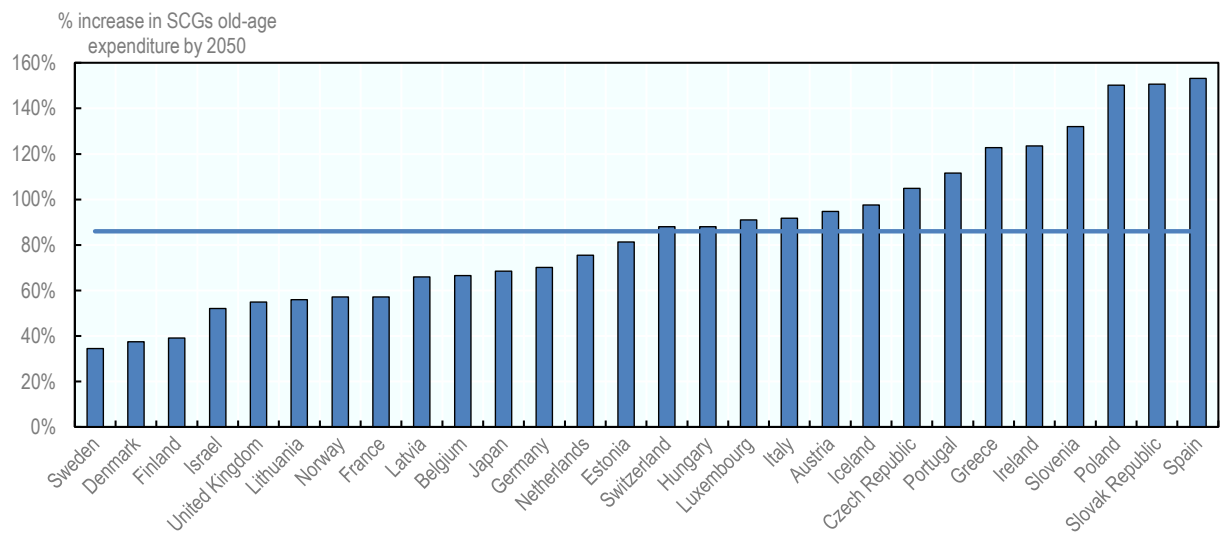


Note: For Norway, old-age expenditure figures are underestimated as expenditure related to home-based care for elderly are not included.
Source: Calculation based on OECD (2020[16]), Government expenditure by function (COFOG) (database).

SCG old-age expenditure is expected to increase significantly by 2050. On average, old-age expenditure at the SCG level will be 80% higher by 2050 than its current level. Again, large differences exist across countries (Figure 1.8).

Figure 1.8. Estimated increases in sub-central governments' old-age expenditure by 2050

Percentage increase in SCGs (state and local) old-age expenditure (health, and old-age expenditure) by 2050



Note: The level of old-age expenditure in 2050 is calculated with a proportionality assumption based on: 1) old-age expenditure in 2015 for SCGs given the current old-age dependency ratio; and 2) the future old-age dependency ratio. The horizontal bar represents the average in the OECD (86%), which can be considered as an upper band. For Norway, see Figure 1.7's note.
Source: Calculation based on OECD (2020[16]), Government expenditure by function (COFOG) (database) and United Nations (2017[17]), World Population Prospects: The 2017 Revision.

Population ageing might create new types of spending. Demand for elderly-specific services, such as accessible local transportation, community housing and cultural activities might increase. According to the benefit principle, there is a strong case to assign this type of expenditure to local governments although, from a federal perspective, there are also benefits in ensuring that services are similar across the country. These new types of old-age spending are not included in Figure 1.8.

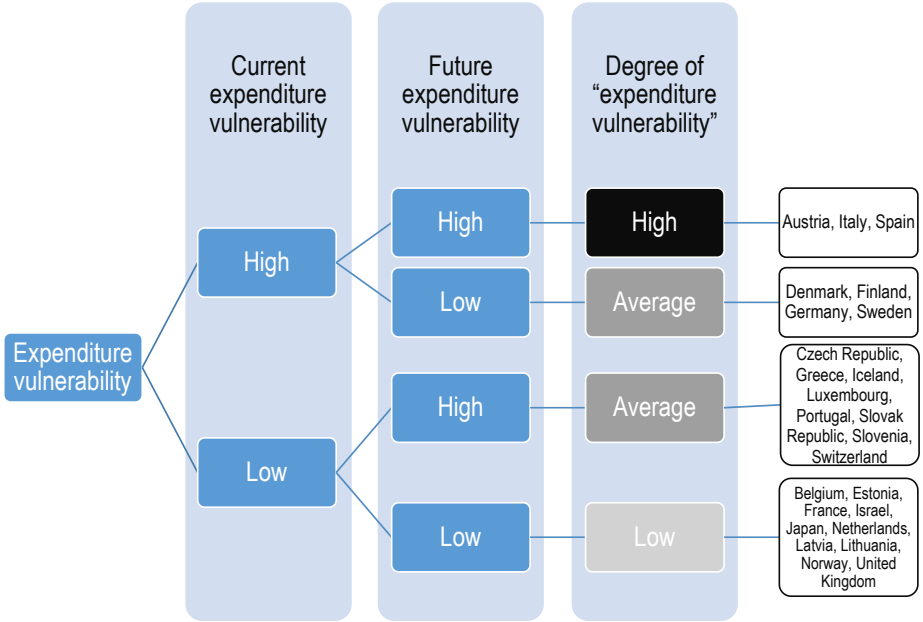
The increase in age-related expenditure might be (partly) offset by a reduction in education spending or a re-centralisation of health expenditure. For EU countries, the expected reduction in education spending varies between -0.1 and -1.6 percentage points of GDP over the 2016-70 period (European Commission, 2018[7]). For those countries, the lower SCG education spending can partly offset the increase in old-age related expenditure. Flexibility in expenditure allocation will be necessary for SCGs to reallocate funding between spending responsibilities. In recent years, some countries have re-centralised their health expenditure to increase efficiency. This has been the case in Denmark, Norway and Poland (OECD, 2017[18]).

The degree to which sub-central governments are vulnerable with respect to current and future old-age expenditure varies across countries

The vulnerability of SCGs to future ageing-related spending pressures can be gauged by the newly developed SCG "expenditure vulnerability" indicator. This concept combines vulnerability with respect to the level of current and future old-age expenditure. SCGs are considered "vulnerable" with respect to the current level of old-age expenditure if current old-age expenditure consists of at least 30% of their total expenditure (but only if total SCG expenditure exceeds 10% of GDP to exclude countries in which 30% of SCG spending reflects a small amount, as is the case in Portugal). They are considered "vulnerable" with respect to future old-age expenditure if the spending is expected to increase by more than 86% (which is the upper-band average increase across OECD countries; see Figure 1.8). These vulnerability thresholds, which can be set at different levels, are used to rank countries.

Based on data availability, Figure 1.9 identifies the degree to which SCGs in a selection of OECD countries are vulnerable with respect to current and future levels of old-age expenditure. SCGs in countries with high current levels of old-age expenditure that is expected to increase above average are identified as the countries where SCGs are the most vulnerable to ageing. These countries are Austria, Italy and Spain. The lowest overall SCG expenditure vulnerability can be observed in Belgium, Estonia, France, Israel, Japan, the Netherlands, Latvia, Lithuania, Norway, and the United Kingdom where SCGs are not responsible for a lot of old-age expenditure (i.e. which is not expected to increase above average).

Figure 1.9. Sub-central government expenditure vulnerability to population ageing



Note: The country coverage is based on data availability. Current expenditure vulnerability is considered to be high if current old-age expenditure consists of at least 30% of their total expenditure. Future expenditure vulnerability is considered to be high when it is expected to increase by more than 86% (which is the average increase across OECD countries). For Norway, see Figure 1.7's note.
Source: Authors' analysis.

Old-age revenue trends and potential implications for sub-central governments

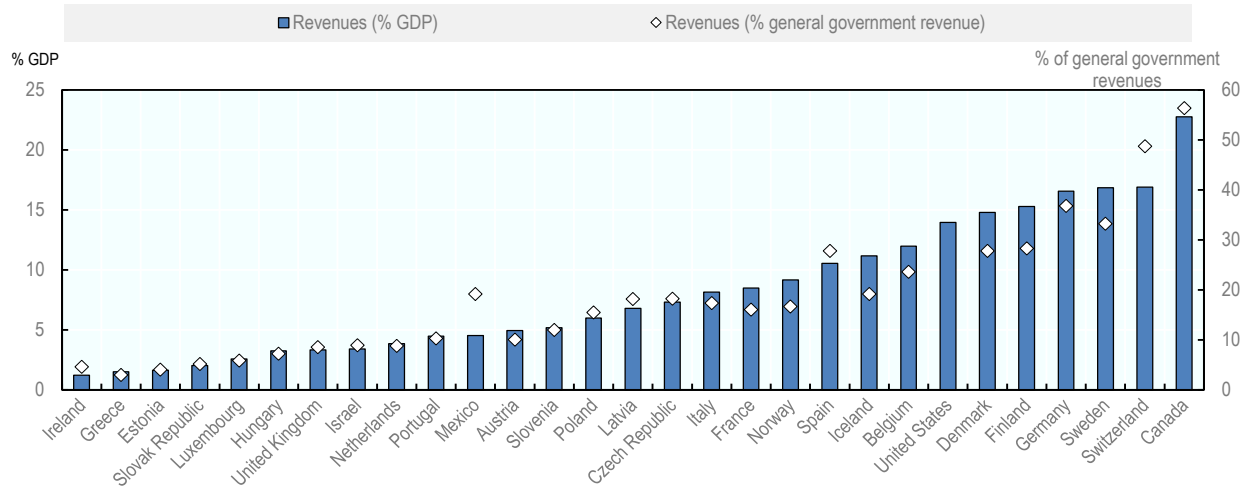
Sub-central government revenues and financing mix varies widely across countries

While in some countries, SCGs receive significant revenues, SCG revenues are very low in other countries. In 2016, SCG revenues ranged between 1.2% of GDP in Ireland and 22.8% of GDP in Canada (Figure 1.10). SCG revenues cover a wide range of sources, including grants from central governments, tax sharing, own taxes and other sources of revenues, such as tariffs and user fees, property income and social contributions. Each source of financing has pros and cons.

Central government grants and tax sharing are the most important sources of revenue for most SCGs, but there is considerable variation across countries (Figure 1.11). SCGs in Mexico rely almost entirely on grants and tax sharing (92% of total revenues), while the share of grants and tax sharing is the lowest in Iceland (11%). On average, earmarked grants represent 60% of total grants.

Figure 1.10. Sub-central governments' revenues vary significantly across OECD countries

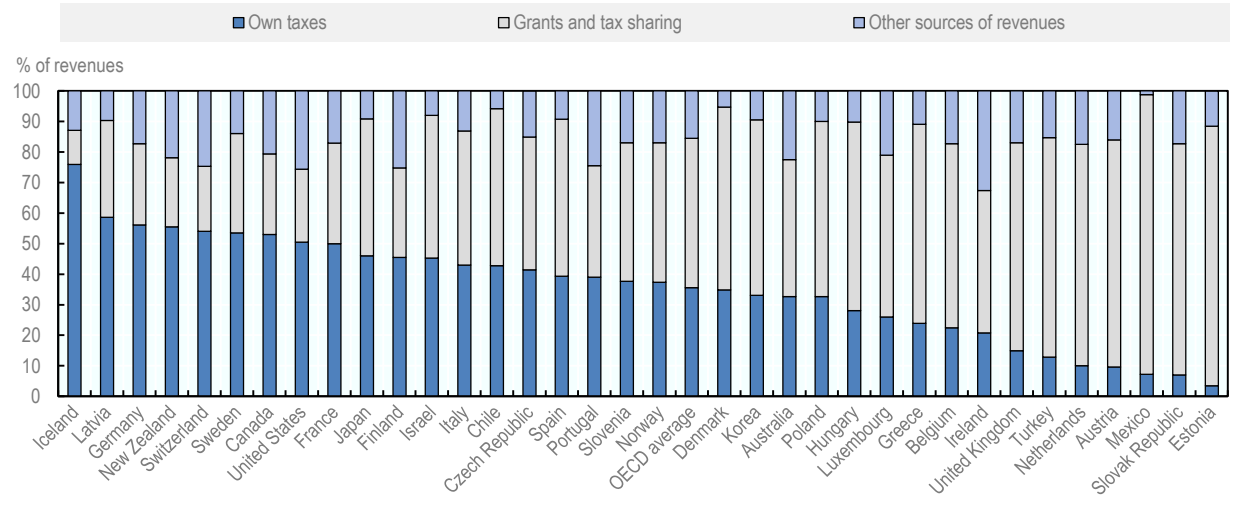
For state and local governments



Note: Data are for 2016, except for Mexico (2015). Data were adjusted to prevent double counting. An important consideration is that different sources of information have been used in this chapter, resulting in some inconsistencies in the data presented for some countries, such as Belgium.
Source: OECD (2020[15]), Subnational government structure and finance (database).

Figure 1.11. For most sub-central governments, grants and tax sharing are the largest sources of revenues

SCGs financing mix, 2015

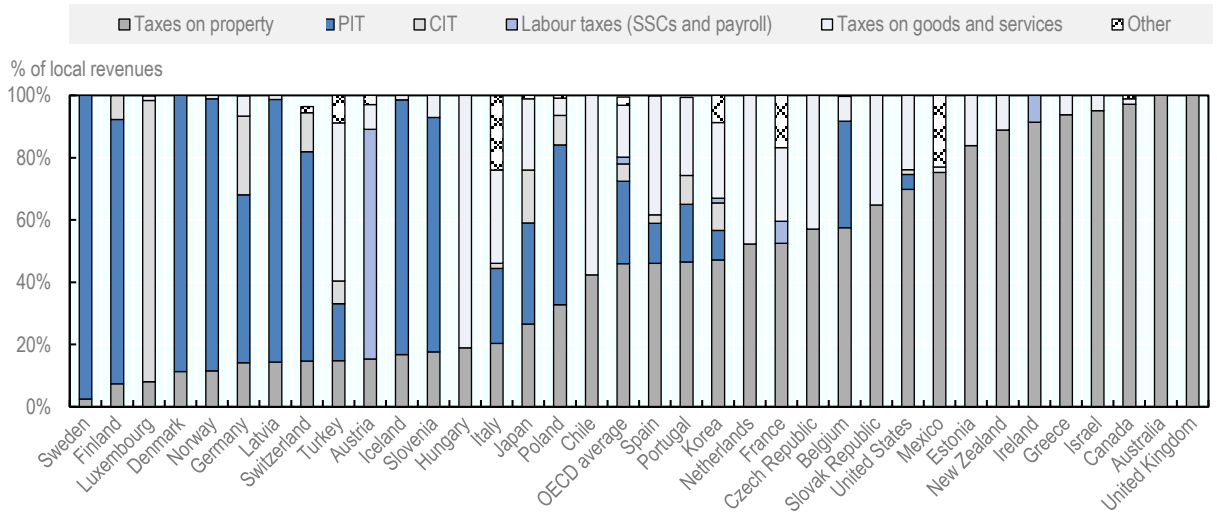


Note: In this figure, tax sharing is included in grants. Following reforms of the National Accounts (2010), some tax sharing arrangements, previously reported as tax sharing, are reported as intergovernmental grants (e.g. in Australia, Austria, Belgium and the Czech Republic). Previously, tax sharing was often classified as tax revenues.
Source: OECD (2020[15]), Subnational government structure and finance (database).

State and local governments across the OECD differ widely in the types and level of taxes they raise. While local governments collect most revenues from recurrent taxes on immovable property, state governments have a more balanced tax revenue mix (Figure 1.12 and Figure 1.13). In some countries, local governments rely almost exclusively on recurrent taxes on immovable property; this is the case in Australia, Canada, Greece, Israel and the United Kingdom. In Denmark, Finland, Germany, Norway and Sweden, on the other hand, the PIT is the most important local tax.

Figure 1.12. Local government tax revenue mix

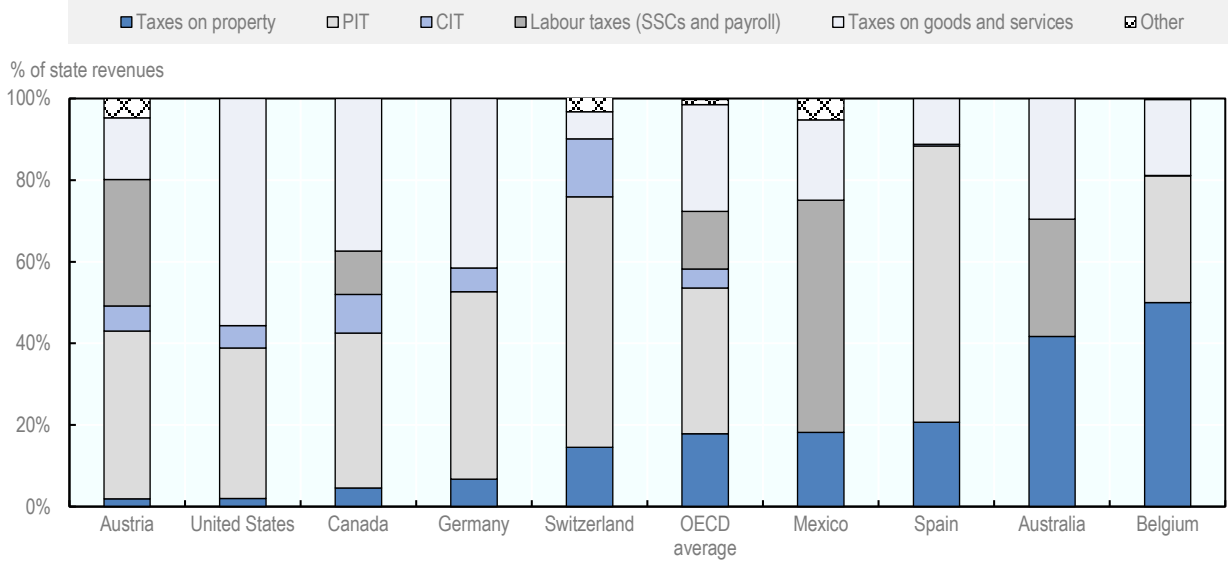
2015



Note: For Switzerland, the sum of categories 1100, 1200, 2000, 3000, 4000, 5000 and 6000 for local governments in 2015 is slightly inferior to the total amount of tax revenues.
Source: OECD (2019[8]), *Revenue Statistics 2019*.

Figure 1.13. State government tax revenue mix

2015



Source: OECD (2019[8]), *Revenue Statistics 2019*.

In many countries, tax sharing is an important source of revenues for SCGs. It accounts for a large part of sub-central tax revenues in Austria, Belgium, the Czech Republic, Germany, Italy, Mexico, Poland and Spain. Most tax-sharing arrangements cover taxes such as the PIT, CIT or value-added tax (VAT). Revenues from excise duties, property taxes, and stamp duties are less often shared across levels of government. Tax sharing and intergovernmental grants are often difficult to disentangle. Countries with tax-sharing arrangements have a smaller grant system and vice versa, suggesting some substitutability between the two fiscal arrangements.

Tax-sharing agreements are based on formulae. The components included in these formulae vary strongly across countries, and demographic criteria are not systematically included. Tax revenues can be shared depending on the SCG fiscal gap (i.e. the difference between spending and revenues the SCG is capable of raising), which means they can be designed to obtain some kind of fiscal equalisation across SCGs. Sharing formulae can be based upon different factors, such as the level of economic activity (e.g. measured by GDP, the share of employees and entrepreneurs, the private sector wage bill), SCG revenues (e.g. tax revenues collected by the SCG, tax revenue per capita, efforts at collecting taxes measured by the level and growth in sub-central government tax collection), SCG expenditure (e.g. number of beneficiaries of a service such as the number of students, current or previous level of spending in a certain sector, progress in delivering a basic benefit package to people), or geographic features (e.g. location of the SCG, presence of natural resources). Some countries also take into account demographic indicators, which are correlated with higher social spending needs.

The degree to which sub-central governments are vulnerable to the ageing of the population from a financing perspective varies across countries

To gauge the risks that ageing will have an adverse effect on revenues, a SCG "revenue vulnerability" indicator has been developed. It combines vulnerability with respect to the financing mix, on the one hand, and the types of taxes collected by SCGs, on the other hand.

SCGs within a country are assumed to be "ageing-vulnerable" with respect to their financing mix if they finance their total expenditure more with grants and tax-sharing agreements than with their own taxes. The following arguments support this assumption. Relying on grants and tax-sharing agreements makes SCGs dependent on central government transfers. These transfers can vary over time and may depend on the level of tax revenue raised by central governments, which in itself will be under downward pressure as a result of the ageing of the population. The degree to which central governments are vulnerable to ageing, and the impact this may have on the vulnerability of SCGs, is analysed in the next section. Moreover, on average across countries, grants and tax-sharing agreements do not systematically take demographic characteristics of the population in SCGs into account. On the contrary, the tax sharing might be linked to the level of income within the SCGs, thereby assigning lower shares of revenue to SCGs with large shares of low-income pensioners.

In certain countries, there might be a case for defining the financing mix "vulnerability" indicator in different ways. This might, for instance, be the case in countries where grants and tax-sharing agreements do not fluctuate strongly with central government tax revenues and include criteria that take the demographic characteristics of the population into account. This is the case, for instance, in Belgium, where the grants received by the SCGs are independent of the level of tax revenue collected by the central government. While it is true

that a high degree of grants in the SCG financing mix might not necessarily affect SCGs in the short run, the analysis assumes that in the longer run the central government revenue challenges as a result of the ageing of the population will spill over to SCGs, irrespective of the current design of the grant system.

The tax revenue vulnerability indicator is based upon the SCG tax mix and the extent to which different types of taxes will be affected by population ageing, as described in the section, "Population ageing will put downward pressure on tax revenues and lead to changes in the tax structure". SCGs within a country are considered vulnerable with respect to their tax revenue if they raise more than 50% of their total tax revenues from the PIT and SSCs.

Within this framework, SCGs are identified as being highly revenue vulnerable (see Figure 1.14) if:

- They are vulnerable with respect to their financing mix and tax revenue, as is the case for SCGs in Austria and Denmark. In those countries, SCGs finance themselves strongly with grants and tax-sharing agreements (and therefore are dependent on central government transfers), while they raise a significant amount of their own tax revenues from the PIT and SSCs.
- They finance themselves largely through their own taxes and in particular the PIT and SSCs, which are strongly influenced by the ageing of the population. This is the case for SCGs in Finland, Germany, Iceland, Latvia, Sweden and Switzerland.

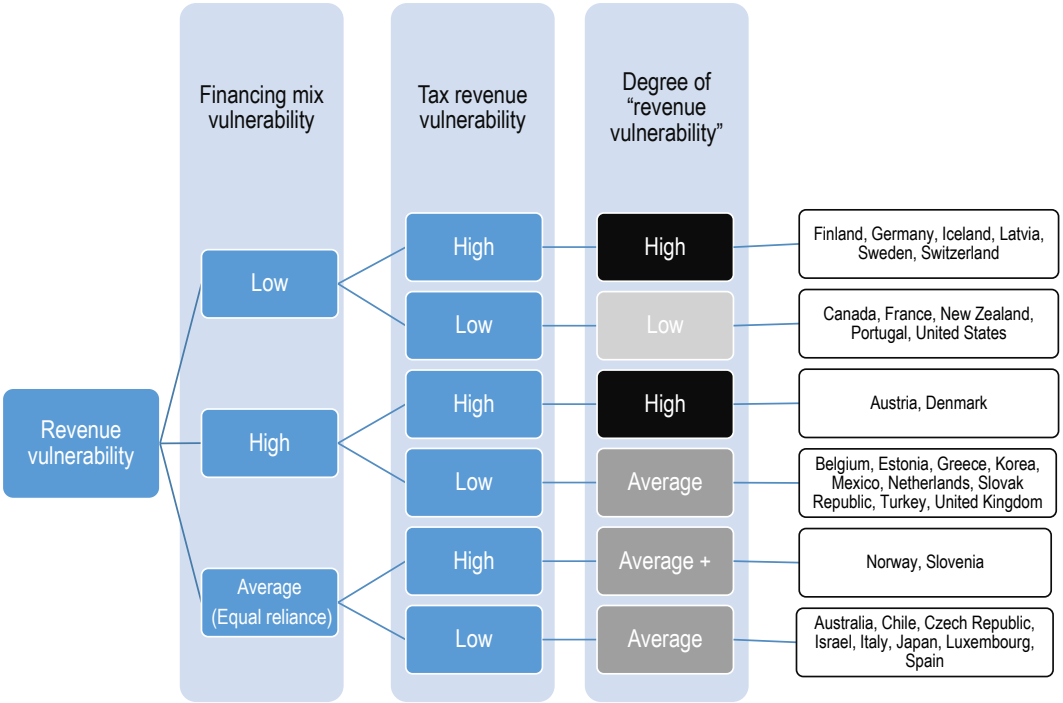
SCGs are characterised as being less revenue vulnerable if:

- They finance themselves largely through their own taxes, which are more resilient to population ageing. This is the case for SCGs in Canada, France, New Zealand, Portugal and the United States.

SCG revenue vulnerability is characterised as average if:

- SCGs are vulnerable with respect to their financing mix but not with respect to their own tax revenue. In other words, they rely strongly on grants and tax-sharing agreements (and therefore are dependent on central government transfers), but they collect own taxes, which are more resilient to the ageing of the population. This is the case for SCGs in Belgium, Estonia, Greece, Korea, Mexico, the Netherlands, the Slovak Republic, Turkey and the United Kingdom.
- SCGs rely equally on their own taxes and grants and tax-sharing agreements. This is the case for SCGs in Australia, Chile, the Czech Republic, Israel, Italy, Japan, Luxembourg and Spain. SCGs in Norway and Slovenia are somewhat more vulnerable (i.e. average +) as they are identified as being tax revenue vulnerable.

Figure 1.14. Sub-central government revenue vulnerability to population ageing



Note: The country coverage is based on data availability. SCGs in a country are vulnerable with respect to their financing mix if they finance their total expenditure more with grants and tax-sharing agreements than with their own taxes. They are tax revenue vulnerable if they raise more than 50% of their tax revenues from the PIT and SSCs.
Source: Authors' analysis.

Sub-central government fiscal vulnerability to population ageing and fiscal policy recommendations

A framework to assess sub-central government fiscal vulnerability

Whether SCGs in a country are vulnerable to the ageing of their population from a fiscal perspective will depend on the extent to which they are expenditure and revenue vulnerable (Figure 1.15). The previous analysis can be used to identify the extent to which SCGs in different countries are vulnerable from a fiscal perspective to the ageing of the population. As already pointed out, this indicator only reflects the average situation of SCGs in a country and might mask significant differences within countries.

Figure 1.15. Framework to assess sub-central governments' fiscal vulnerability to ageing

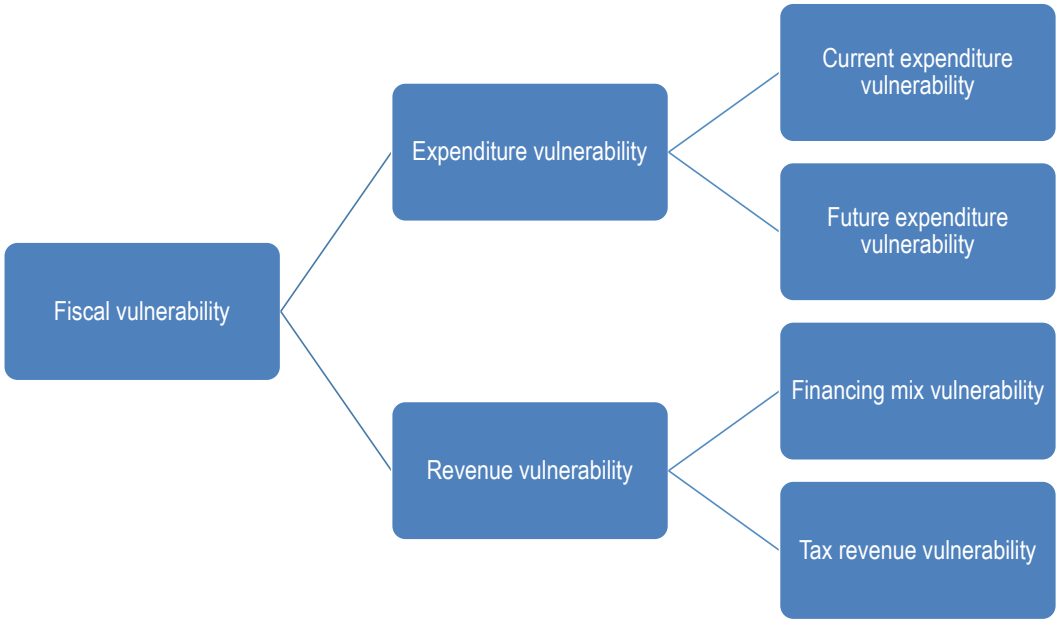


Table 1.1 identifies the extent to which SCGs, on average across the country, are vulnerable from a fiscal perspective. Several observations can be made:

- SCGs in Austria are highly vulnerable to population ageing, as they show vulnerability both on the expenditure and revenue side.
- SCGs in France seem to be in the best position to face the ageing of their population. They have low vulnerability on both the expenditure and revenue side.
- In Latvia, SCGs are highly revenue vulnerable, but they are not expenditure vulnerable, suggesting that SCG ageing-related revenue challenges should remain limited.
- SCGs in Italy, Spain, Denmark, Finland, Germany, Sweden and Switzerland can also be considered as highly vulnerable as they combine high with average vulnerability outcomes on both the revenue and expenditure indicators.
- The other countries are somewhat less vulnerable, on average, but considerable variation may exist within countries.

The results for SCG fiscal vulnerability could be combined with the challenges faced by central governments. In some countries, the general government faces significant increases in old-age expenditure on health and public pensions in a setting where the tax-to-GDP ratio is already high. In these countries, it might not be possible to increase taxes further to accommodate higher ageing-related spending without creating large economic distortions. This is the case in Austria, Belgium, Germany, Luxembourg, Norway and Slovenia, where the tax-to-GDP ratio is above 35% and the change in health and pension expenditure is expected to be more than 6 percentage points by 2060 (see Figure 1.2). These countries

have been underlined in Table 1.1. These countries have the largest incentives to introduce structural reforms to improve the resilience of their fiscal framework to population ageing.

Table 1.1. Sub-central government vulnerability to population ageing across countries

		Revenue vulnerability		
		High	**Average**	**Low**
Expenditure vulnerability	**High**	Austria	Italy Spain	
	Average	Denmark Finland Germany Sweden Switzerland	Czech Republic Greece Luxembourg Slovenia Slovak Republic	Portugal
	Low	Latvia	Belgium Estonia Israel Japan Netherlands Norway United Kingdom	France

Note: The country coverage is based on data availability. Underlining indicates those countries that have the largest incentives to introduce structural reforms to improve the resilience of their fiscal framework to population ageing.
Source: Author's analysis.

Fiscal policy recommendations

The ageing of the population will have significant fiscal implications for most OECD countries. Old-age expenditure are expected to rise significantly as a result of higher health care, pension and old-age care expenditure while, at the same time, tax revenues are expected to fall mainly as a result of the reduction of people who are active in the labour market. The overall costs will be significant and will require appropriate structural reform measures to mitigate the economic and fiscal impact of the ageing of the population. A wide range of measures could be envisaged, ranging from public pension reform, health cost-containment measures, labour market reform, reforms that increase productivity growth and tax reforms.

While more work is necessary to evaluate the impact of population ageing at the SCG level, this chapter has introduced a framework that allows for the identification of the countries in which the SCGs might, on average, be vulnerable to population ageing. Ageing, however, might vary across regions within a country, and so the vulnerability indicators presented in this chapter are likely to mask significant differences within countries.

The economic and fiscal consequences of an ageing population go well beyond the central-SCG boundaries and require a coherent fiscal strategy that focuses on tax and spending reforms, of general government as a whole. SCGs have a role to play in structural reforms to make welfare systems resilient to the ageing of their populations. In order to be effective, those reforms require a whole-of-government approach that brings together central government and the SCGs.

Central and sub-central government tax policy reforms

The design of tax systems needs to be adjusted to finance additional old-age spending and make up for the shortfall in labour income tax revenues. Overall, tax design recommendations that aim to strengthen inclusive growth (Brys et al., 2016[19]; O'Reilly, 2018[20]) can help to mitigate the fiscal costs of an ageing population. This section describes some of these tax design recommendations.

Stimulating labour market participation is among the main structural reform options that will make welfare systems "ageing-resilient". There is a broad consensus in the literature that increasing the labour market participation rate will be important to mitigate the costs of an ageing population. This includes increasing the labour market participation of younger and older workers, women, and migrants. In addition to the introduction of non-fiscal measures (e.g. an increase in the statutory and effective retirement age, training and adequate skills policies, affordable childcare provision), most countries continue to have opportunities to implement tax and benefit reforms that reduce tax-induced disincentives to work.

The reduction in labour supply might result in low levels of unemployment and upward pressure on wages. Whether in such a context, countries would want to lower PITs and, in particular, SSCs across all types of workers and income levels remains an open question. Reforms that lower labour taxes are costly and might further exacerbate the downward pressure on tax revenues. Instead, it might be more effective to introduce measures that are targeted at specific groups of workers in order to increase their labour market participation rates at minimal revenue costs.

The tax policy implications of an ageing population cannot be seen in isolation from the impact of automation on the labour market. Automation may reduce labour demand and wages, in particular for certain types of professions and skills. This effect may, therefore, offset the impact of the ageing of the population on wages and may put additional pressure on direct tax revenues. On the other hand, automation may increase productivity and therefore allow for higher wages.

However, it is not only the demand and supply of labour but also its quality that drives economic growth and productivity. Healthy workers are more productive and will stay in the labour market longer. Well-designed sin taxes (on alcohol, cigarettes, etc.) are therefore part of a tax system that makes welfare systems resilient to the ageing of their populations.

Instead of raising PIT and SSCs rates, countries should aim at broadening the tax base. Taxes on labour already represent a high tax burden in many countries. As ageing will result in a drop in revenues from the PIT and SSCs, countries may be tempted to consider increasing the rates to make up for the drop in revenues. Raising the rates further would, however, discourage labour supply and economic growth and put a disproportionate burden on younger generations. This would not be optimal tax policy, particularly in the countries where tax wedges are already high. A base-broadening approach would be a better option in those cases.

Different SSC base-broadening measures can be envisaged. Countries should ensure that they levy SSCs on different forms of non-standard work (Milanez and Bratta, 2019[21]). In addition, countries could consider levying SSCs on capital income at the individual level, as is the case in France. Countries may also want to evaluate whether they would want to levy health SSCs on pension income. The general rationale for imposing SSCs on earned income but not on pensions is that SSCs buy entitlement to future benefits and, therefore, pensioners should not pay twice. However, health SSCs do entitle workers to health

insurance in the year when the contributions are made. Hence, in countries where health SSCs are spent when they accrue but are not (partly) saved to finance future health spending, an argument exists to levy health SSCs on pension income.

A drop in revenues from SSCs as a result of the ageing of the population may require a partial shift in the funding of social welfare funds away from SSCs towards general taxation. Stronger arguments exist to finance the redistributive component of social security payments (e.g. basic and minimum pensions) partly or entirely through general taxation. However, the arguments are significantly weaker for shortfalls in the earnings-based components of welfare payments, as this may result in a regressive transfer from the general population towards higher-income pensioners.

Funding social security with general taxes will have an impact on budgeting requirements. In order to provide additional funding, Ministries of Finance typically require social security funds to present a detailed budget that stipulates how much funding is required and how this tax money will be spent. This link between taxation and budget practices, within an ageing context, is left for future work.

A well-designed PIT treatment of pensions, including third-pillar pensions, can reduce countries' vulnerability to population ageing. While the taxation of private pension schemes differs across OECD countries, they tend to be the most tax-favoured form of saving (OECD, 2018[14]). Most countries encourage retirement savings by providing very generous tax regimes for private pensions. As societies continue to age, and public pension systems come under increasing strain, there remains a case to maintain these concessionary tax regimes. These tax privileges should be designed such that they are taken up by large groups of the population, and not only by wealthier households who would save for a pension also in the absence of the tax incentive. However, the tax treatment of voluntary private pension savings should be considered in a co-ordinated way with the financial advantages and generosity of public pension systems. For example, where public pension provision is substantial, there may be less need to incentivise private pension savings through the tax system.

In theory, countries that provide a tax deduction for pension savings face strong arguments to tax the pension (when it is received) under the PIT. The upfront deduction (i.e. expenditure treatment) of the contributions will effectively result in a marginal effective tax rate (METR) of 0%. In fact, if the pension is taxed at a lower rate than the PIT rate at which the pension savings were deductible, the METR is negative and the government effectively subsidises those pension savings. Moreover, the deferral of tax revenue, while costly for governments in the short run as they forego current tax revenues, might allow countries to smooth PIT revenues over time and therefore to pay for the costs of an ageing population. But, as previously pointed out, tax deferral may lower the net present value of tax revenues as the tax rates at which pension savings are deductible are typically lower than the tax rates at which the pension is taxed.

However, changes to the taxation of pensions might be difficult to implement in practice, in particular, because pensioners no longer have the opportunity to work and save more in light of the changes in the tax rules. Moreover, ability-to-pay considerations might have to be taken into account as well. The introduction of a PIT on pensions might require increasing the pensions that are paid in order to prevent pensioners from facing a significant drop in purchasing power.

Finally, the ageing of the population strengthens the standard argument in favour of levying recurrent taxes on immovable property instead of property transaction taxes. Effective tax

rates on housing are particularly high for pensioners in countries where transaction taxes are high (OECD, 2018[14]). High property transaction taxes might prevent pensioners from downsizing their homes and buying smaller homes that offer services that are more aligned with the age of the owner. High transaction taxes might also prevent owners from freeing up cash that is invested in the house.

Adjustments to the fiscal federalism framework

Increased old-age expenditure might put pressure on the SCG fiscal frameworks that countries have put in place. A sound SCG fiscal framework requires that SCG expenditure responsibilities are adequately matched by SCG revenues. This would prevent the need to reduce other types of spending as a result of increased old-age spending.

Increased old-age expenditure might induce SCGs to use their own taxing powers more effectively. For instance, it may induce SCGs to levy more recurrent taxes on immovable property. In general, this is considered a growth-friendly tax reform. SCGs should ensure that such reforms remain fair and do not impose a disproportionally high tax burden on low-income households. Moreover, general government may want to ensure that tax reforms at the SCG level maintain the overall coherence of the tax system, both in terms of design and in practice.

Population ageing might create new types of spending, such as on local transportation for the elderly, community housing, cultural activities for the elderly, etc. As this type of spending is local in nature, the benefit principle suggests that this old-age spending could be assigned to SCGs. Additional spending requirements would, of course, require corresponding adjustments to SCG revenues.

Increased spending flexibility might allow SCGs to shift funding from spending items that are less in demand towards additional old-age expenditure. For instance, flexibility in spending decisions would allow SCGs that face a decrease in demand for education to shift some of their resources to finance additional old-age expenditure. Demographic changes might also create opportunities for SCGs to organise certain spending (like education) more efficiently. SCG fiscal frameworks should not create institutional hurdles against opportunities to increase government efficiency and the quality of spending. The call for increased flexibility might be strongest if changes in spending priorities would vary across SCGs within a particular country. Political economy arguments, on the other hand, call for limitations on SCG spending flexibility. Indeed, the young do not vote, but pensioners do, which may create political incentives to shift spending from, for instance, education to old-age expenditure.

Strong arguments exist to adjust grants and tax-sharing agreements in order to take into account the demographic characteristics of the population. This would be useful in countries where the majority of SCGs face ageing-related challenges, but also in countries where ageing varies considerably across SCGs, and the redistribution between regions and local communities across the country needs to be strengthened.

However, procedures to change sharing formulae can be complex, as they are often laid down in laws and require parliamentary approval. Moreover, instead of using earmarked grants, central governments could partly shift towards the use of block grants, which are usually considered to be more efficient. Central and SCGs could also decide to co-fund certain old-age expenditure items of projects or programmes, either on a temporary or permanent basis.

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Note

1. However, on the whole, the CIT is one of the least stable tax bases in many countries, as a result of a range of other non-ageing related factors (e.g. due to its pro-cyclical nature and the highly mobile nature of capital investment).

Chapter 2. Ageing and productivity growth in OECD regions: Combatting the economic impact of ageing through productivity growth?

by Federica Daniele, Taku Honiden and Alexander C. Lembcke

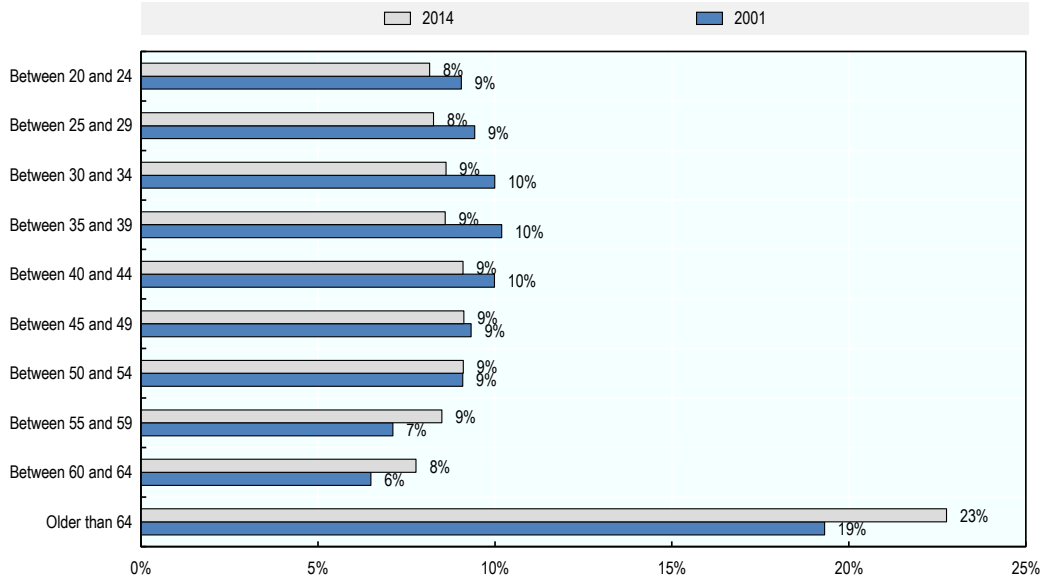
OECD countries and their regions are ageing fast. In principle, the negative impact of ageing on the growth of per capita gross domestic product (GDP) could be offset by increases in productivity. However, for many regions, the actual growth rates recorded have been lower than productivity growth required to maintain per capita GDP levels in recent years. One reason for this is that ageing also has a direct negative impact on productivity growth, with the effect being concentrated in urban areas. Part of the explanation is that cities specialise in sectors such as tradable services, where the content of tasks makes it difficult to automate the production process, and where business dynamism – negatively affected by demographic change – is a key driver of productivity growth. Finally, ageing seems to be associated with a redistribution of revenues away from workers, towards capital and firm owners.

This chapter was originally presented at an OECD-MLIT workshop on "Place-based Policies under an Ageing Society" in Tokyo on 17 April 2019, at the 36th meeting of the Working Party on Territorial Indicators held on 13 May 2019 in Paris and at a workshop of the Network of Fiscal Relations on "Ageing and Long-term Challenges across Levels of Government" on 18 June 2019 in Paris. The authors would like to thank Rudiger Ahrend, Priscilla Fialho, Jens-Christian Hoj, Joaquim Oliveira Martins and Dorothee Rouzet for helpful comments. They would also like to thank the meeting participants for their valuable feedback.

Introduction

Most OECD countries are facing a continuous increase in the share of older cohorts in the population, in other words, they are "ageing". The share of individuals aged 65 or older increased from 19% in 2001 to 23% in 2014, an increase of 21%, within only 14 years across 1 669 OECD Territorial Level Three (TL3) regions (Figure 2.1).[1] Ageing can have adverse economic consequences. For example, gains in life expectancy could be expected to be matched by an increase in the savings rate and a decline in the natural rate of interest, therefore making it harder for monetary policy to stabilise the economy (Bernanke, 2005[1]). The picture on the fiscal side is equally challenging. An increasing share of retirees means that a growing share of public spending needs to be diverted towards health and pension expenditure and away from investment.[2]

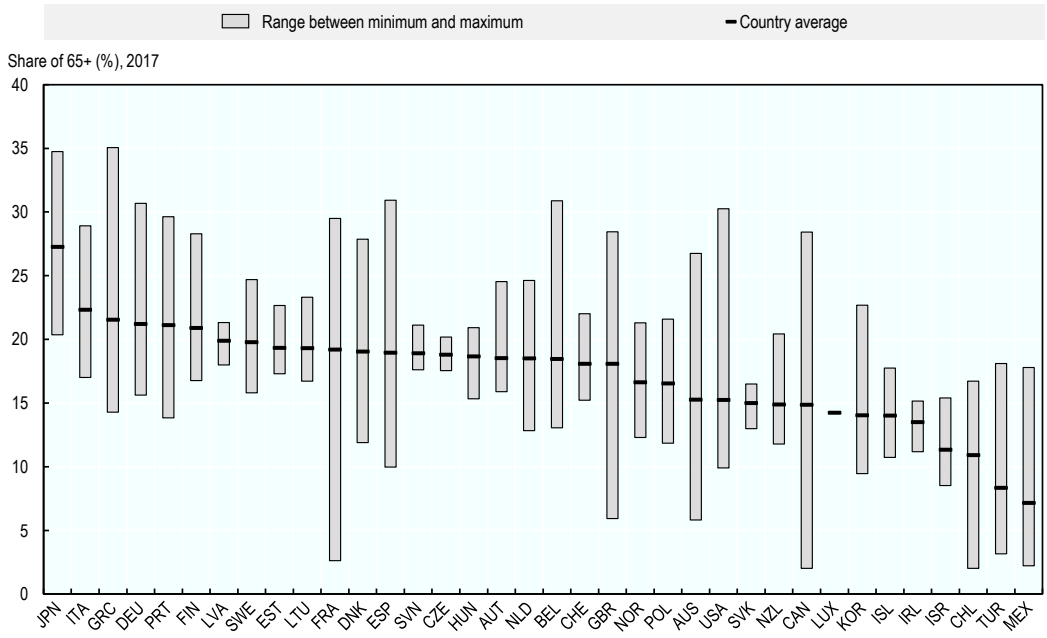
Figure 2.1. The share of individuals aged 65 or older increased between 2001 and 2014



Notes: Countries included are: AUS, AUT, CAN, CZE, DEU, DNK, ESP, FIN, FRA, GBR, HUN, IRE, ITA, JPN, KOR, NOR, NZL, POL, PRT, SVK, SVN, SWE, USA.
Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en.

While most of the public discussion focuses on the national level, addressing ageing is even more pressing at the regional level given that ageing is progressing much more rapidly in some regions than in others (Figure 2.2). In the United Kingdom, for example, 18% of residents are 65 years or older, but the share is as low as 6% and as high as 28% across the country's small (TL3) regions. Moreover, at a regional level, the outflow of working-age residents towards places with more economic opportunities either within their own countries or abroad exacerbates the impact of low fertility rates and increased longevity on the average age.

Figure 2.2. Average ageing masks the severe pressures some regions are facing



Notes: Data for TL3 regions in 2017, except for AUS, JPN, NZL, USA (2016); CAN (2012).
Source: OECD (2019[2]), *OECD Regional* Statistics (database), http://dx.doi.org/10.1787/region-data-en.

This chapter provides a quantitative analysis of the potential for productivity growth to counter the expected negative impact of ageing on per capita gross domestic product (GDP). Older workers have lower labour force participation and employment rates. Ageing will, therefore, reduce the active workforce unless employment rates adjust. In principle, policies succeeding at boosting labour productivity growth could effectively contain the negative impact of ageing on per capita GDP growth (IMF, 2016[3]). However, the potential for productivity growth to compensate for ageing might be impaired by a direct negative impact of ageing on productivity growth itself, as several cross-country studies find. Complementing existing research, this chapter explores the link between ageing and productivity growth from a regional perspective.

The rate of productivity growth required to prevent per capita GDP from falling given the current trend of population ageing in OECD regions is, however, high. Cumulative per capita GDP growth would have been 1.5 percentage points higher in the absence of ageing on average across OECD regions between 2006 and 2014, while the actual average rate of productivity growth was 2.3% over the same period. However, zooming in on individual regions, productivity growth fell short of compensating for the negative impact of ageing on per capita GDP growth in almost half (49%) of OECD regions, with the resulting implication that per capita GDP would have contracted in these regions unless compensated by other factors, such as an increase in the participation rate.

The pressure from ageing and therefore, the need for productivity growth, varies widely across regions. For example, in the absence of ageing, cumulative per capita GDP growth would have been 5.7 percentage points higher for the average Japanese region, while this number is as low as 1.9 percentage points for the average Western European region. However, while in Japan productivity growth was on average 6.4%, it was negative for the average Western European region. Productivity growth, therefore, failed to even partially compensate for the negative impact of ageing on per capita GDP growth in Western European regions.

The second contribution of this study is to ask why productivity growth failed to attenuate the impact of ageing on per capita GDP growth in many regions. It does so by considering the link between ageing, measured as the increase in the ratio of those 50 years or older in the region to those 20-49 years old, with productivity growth in itself. This link turns out to be negative and statistically significant: the results indicate that a region where ageing exceeds the country average by 10 percentage points was expected to grow cumulatively 1.5 percentage points less than the country average in terms of labour productivity between 2001 and 2014. Taking a concrete example, the productivity growth of Madrid, the capital city of Spain, was 6.5%, about 3.6 percentage points lower than for the country as a whole. At the same time, the ratio of older residents to younger ones rose 10.4 percentage points more in Madrid than in Spain as a whole. The most conservative estimates suggest that about 50% of the growth gap is associated with the ageing population in the capital city. Similarly, ageing in Kyoto was 7 percentage points lower than the country average, while at the same time labour productivity growth exceeded the country average by 2.6 percentage points, implying that about 45% of higher growth experienced by Kyoto is due to more favourable demographic trends.

A breakdown by regional typology shows that the impact of ageing on productivity growth is primarily driven by urban regions. Predominantly urban TL3 regions where the growth rate of the old-to-young ratio was 10 percentage points higher than the country average had, on average, 1.9 percentage points slower productivity growth than the country average. For intermediate regions, the effect is 1.4 percentage points lower than for urban regions, whereas the estimate for predominantly rural regions is statistically insignificant. Differences in sectoral composition offer a potential explanation for the differential impact of ageing across region types. Productivity growth in the manufacturing sector is not found to differ systematically between regions ageing faster and those ageing more slowly. In contrast, the negative association between ageing and productivity growth is strongest in knowledge-intensive, tradable services (information and communication technologies, finance and insurance), which are predominantly located in cities.

A variety of channels can lead to the differential impact across sectors. Tradable services are characterised by a prevalence of non-routine and interactive tasks, which, in the past, have been harder to substitute for, while the standardised nature of processes in manufacturing has made it easier to automate production or outsource the most labour-intensive elements.

Another channel is that the process of "creative destruction" – the notion that less profitable (or productive) business ventures are abandoned in favour of more profitable (or productive) ones – is likely to matter more in sectors where technological progress is rapid. Dynamism, measured by the "churn" of businesses, i.e. the ratio of the total newly created and closed down business to total businesses in the region, is indeed lower in regions with an older workforce. This negative relationship is more pronounced in urban regions, in line with the argument that the sectors located in cities are more dependent on "creative destruction".

Related academic literature

Several studies have analysed the consequences of ageing on productivity growth (Feyrer, 2007[4]; Aiyar, Ebeke and Shao, 2016[5]; Liu and Westelius, 2016[6]; Maestas, Mullen and Powell, 2016[7]). In line with the findings in this chapter, most of these studies find a negative association between the age structure of the population and aggregate productivity. An exception is Acemoglu and Restrepo (2018[8]), who find a positive link. Their results indicate that countries, where ageing has been faster, are also characterised by a higher rate of technology adoption, which can, therefore, be considered the market response to increasing labour shortages and upward pressure on wages.

Ageing can have an impact on productivity growth for multiple reasons. One explanation has to do with the changing composition of the workforce and the way in which individual productivity evolves during the life cycle of the worker. A few studies show that productivity tends to increase up to a certain age and levels out thereafter (Aubert and Crépon, 2007[9]), (van Ours and Stoeldraijer, 2011[10]). Skirkbekk (2004[11]) further shows that whether productivity starts declining after a certain age heavily depends on the type of tasks carried out by workers.

A second explanation stresses that an ageing population can have detrimental effects on productivity growth of all workers. Maestas, Mullen and Powell (2016[7]) show in particular how ageing has a negative impact on productivity growth of workers belonging to different age groups. In a similar vein, the relationship between the productivity and the age of workers is not identical to the one between the productivity of firms and the age structure of their employees (Grundke et al., 2017[12]).

One reason why the relationship between age and productivity at the aggregate level is not just a rescaled version of the one observed at the individual level is that there exist complementarities and spillovers across different elements of an integrated economic system, such as a firm or a region. The productivity of individual workers hinges, in fact, on the practices adopted by their managers (Bloom and Van Reenen, 2007[13]), and on the teams to which they belong (Garicano, 2000[14]). The negative consequences for firms of being located in an ageing labour market are amplified by the existence of productivity spillovers at the local level (Ahrend, Lembcke and Schumann, 2017[15]).

Alternatively, the relationship between age and productivity at the aggregate level differs from the one observed at the individual level by the way in which ageing affects the interaction and competition among individual firms. A few studies have dealt with the relationship between demographic shifts and firm dynamics and found a close link between population decline – which is closely connected with ageing – and the decline in the start-up rate, the rise in product market concentration and the decline in the labour share (Karabarbounis and Neiman, 2014[16]; Hopenhayn, Neira and Singhania, 2018[17]).

Finally, differences in productivity growth between faster and slower ageing countries might be explained by differences in the rate of capital accumulation, as opposed to differences in the growth rate of average worker productivity (Oliveira Martins et al., 2005[18]; Börsch-Supan, Ludwig and Winter, 2006[19]; Geppert, Abiry and Abiry, 2016[20]; Bárány, Coeurdacier and Guibaud, 2019[21]).

Overall, if the evidence on the nexus between the age structure of the population and labour productivity across countries appears to be scant, it is even scarcer at the regional level. An exception is a study by Zaninotto et al. (2018[22]) who consider the relationship between productivity and the share of workers affected by the postponement of the effective

retirement age imposed by the "Fornero reform" (2011) across Italian provinces. They also find a negative link between productivity and the share of older workers.

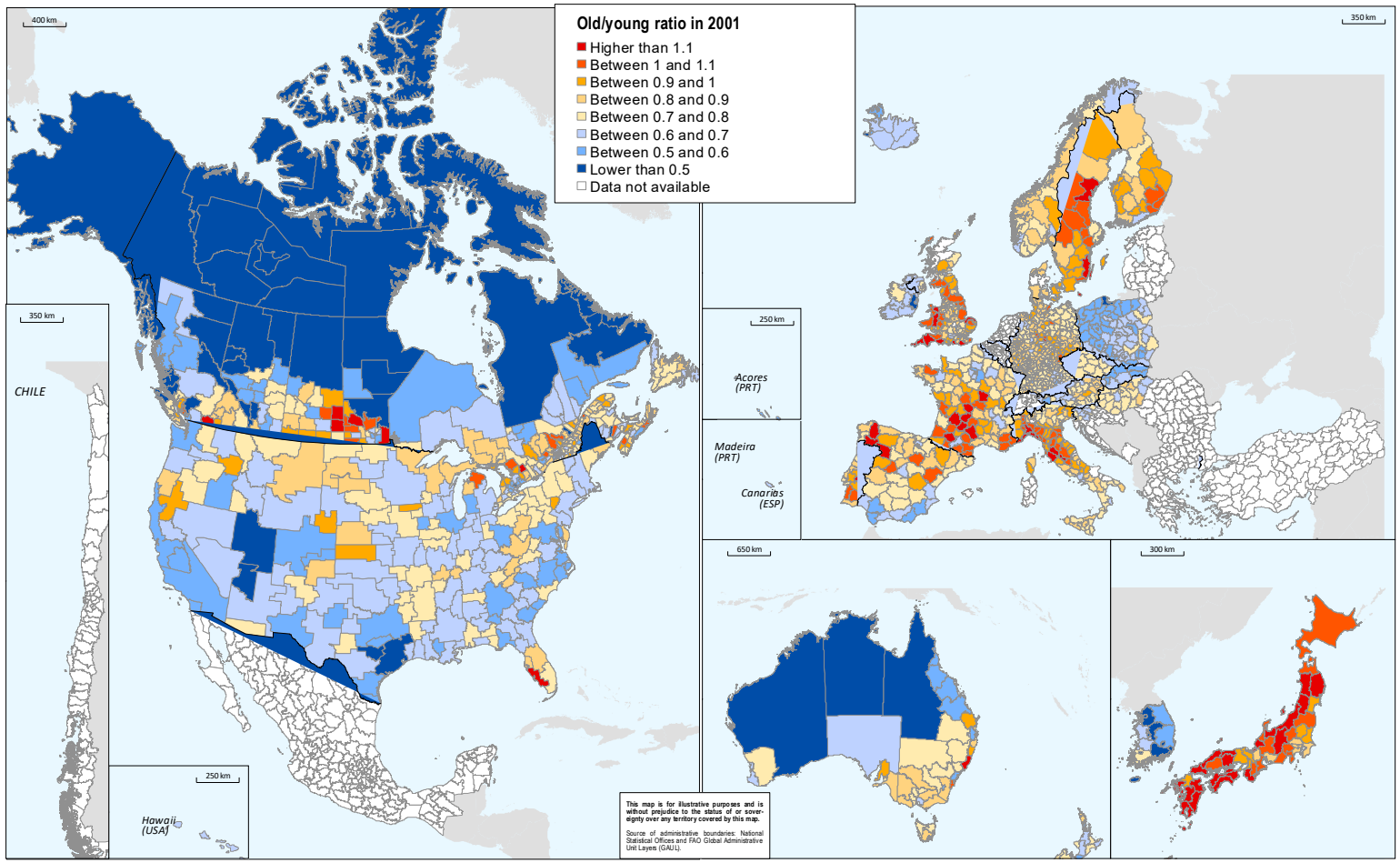
There are several reasons to depart from a national perspective and opt for a regional analysis. The main one is that ageing could reinforce existing productivity gaps (McCann, 2016[23]; OECD, 2018[24]). For instance, it could be that productivity growth is negatively affected by ageing only in the more productive regions so that ageing would act as a force towards convergence. Alternatively, a negative link might only exist for less productive regions. Within countries, public transfers might help overcome the economic decline that individual regions face. Some of these transfers are natural as retirees start drawing on their (public) pensions. As output gaps continue to increase with ageing, the need for (additional) transfers will also continue to increase. Sorting of young people into more productive (and higher cost) places and the elderly into less expensive areas reinforces these divides. This risks an increasing dependence of some regions on transfers, risking a region's capacity to leverage its growth potential and develop new economic opportunities.[3]

Demographic change across regions today and tomorrow

Ageing is progressing rapidly in OECD regions. Some regions already had a high share of elderly residents in 2001; others are rapidly catching up (Figure 2.3 and Figure 2.4). These two figures show the level and the change in the "old-to-young ratio", namely the ratio between the number of people aged 50 or more and the number of people aged between 20 and 49. In some regions, both of these factors coincide: for example, Spanish regions already had very high old-to-young ratios in 2001 and they increased during 2001-14. Other regions were "young" in 2001, but they experienced rapid ageing during 2001-14, such as in Korean regions.

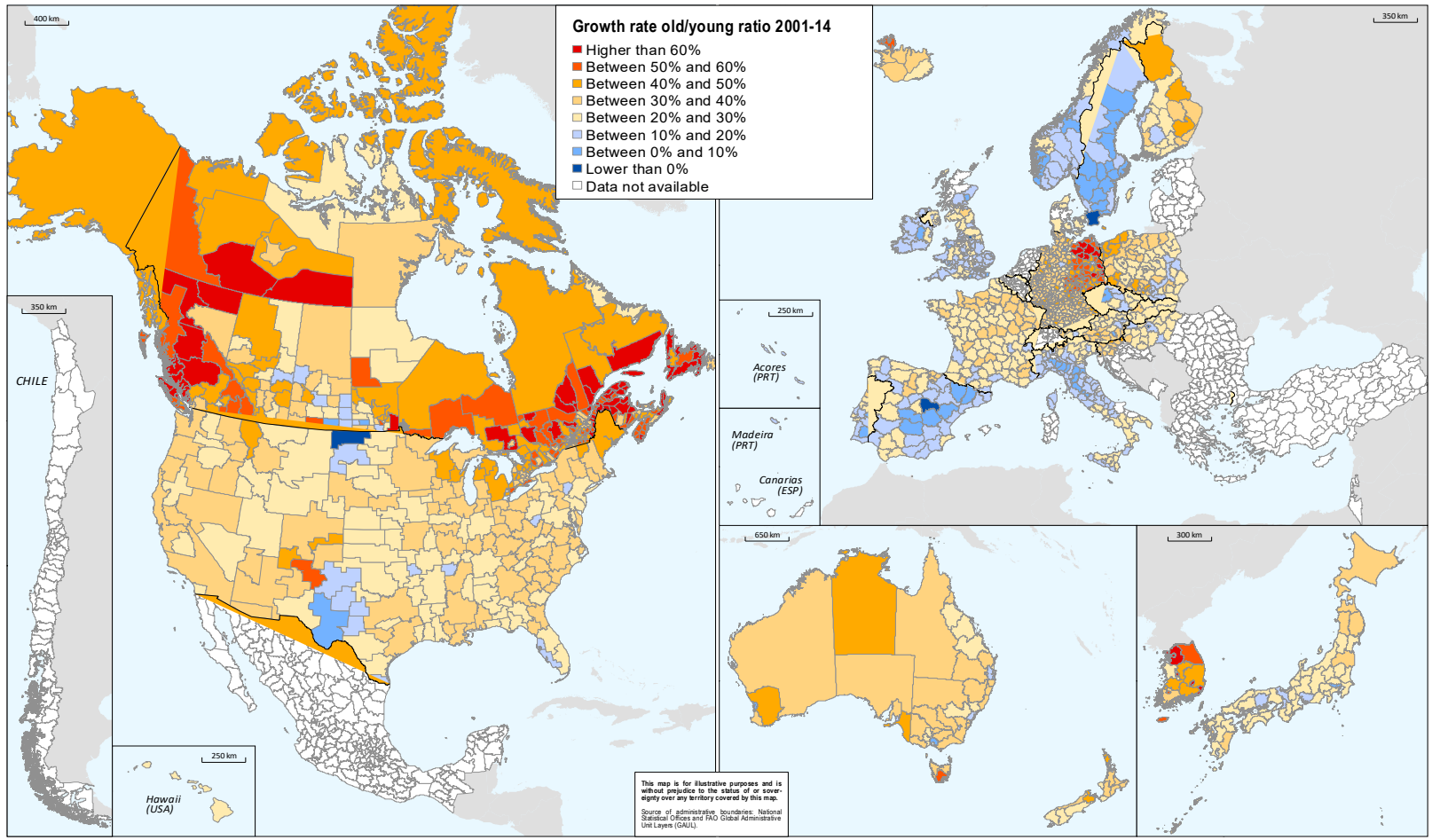
Working with the European Commission's Joint Research Centre (JRC), the OECD has adapted one of the few subnational population projections that exist, the main scenario of Eurostat's "Europop2013" model (Eurostat, 2015[25]).[4] The projections highlight a convergence in the age profiles of rural and intermediate regions, and a divergence of rural and intermediate regions with respect to urban ones (Figure 2.5). Urban regions are expected to age slower than rural and intermediate regions. Diverging trends in birth rates certainly play a role, but the economic migration of young workers is likely to be also crucial in countries where the productivity gap between slow and fast-ageing regions is increasing.

Figure 2.3. The ratio of old (50+ years) to young (20-49 years) people in 2001 across OECD TL3 regions



Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019).

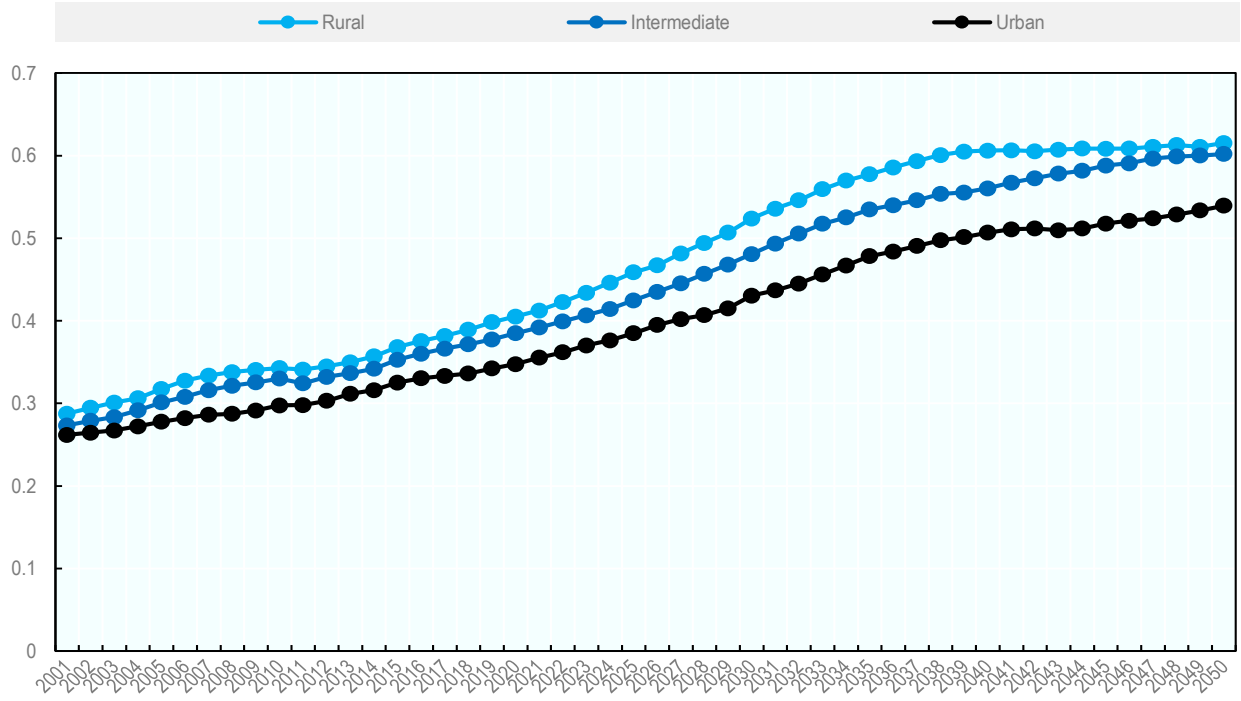
Figure 2.4. The growth rate in the ratio of old (50+ years) to young (20-49 years) people during 2001-14 across OECD TL3 regions



Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019).

Figure 2.5. The rural-urban divide in terms of demographic profiles will grow

Dependency ratio by TL3 region type: Actual values and projections



Notes: Population projections based on the Eurostat's "Europop 2013 scenario". Countries included are: AUT, CZE, DEU, DNK, ESP, FIN, FRA, GBR, HUN, IRE, ITA, NOR, POL, PRT, SWE, SVK, SVN. First year of projections: 2018.
Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019); Eurostat statistics on regional population projections in Eurostat (2015[25]), *People in the EU: Who are we and how do we live? 2015 Edition*, Eurostat Statistical Books.

The need for productivity growth

Ageing affects per capita income in regions through different channels. The most direct channel is a decline in the labour force as labour force participation eventually declines with age and people reach retirement age. Due to the declining share of individuals of working age in the population, per capita GDP growth is expected to slow or even decline in regions ageing faster unless, of course, employment rates rise for older workers or the retirement age is postponed.

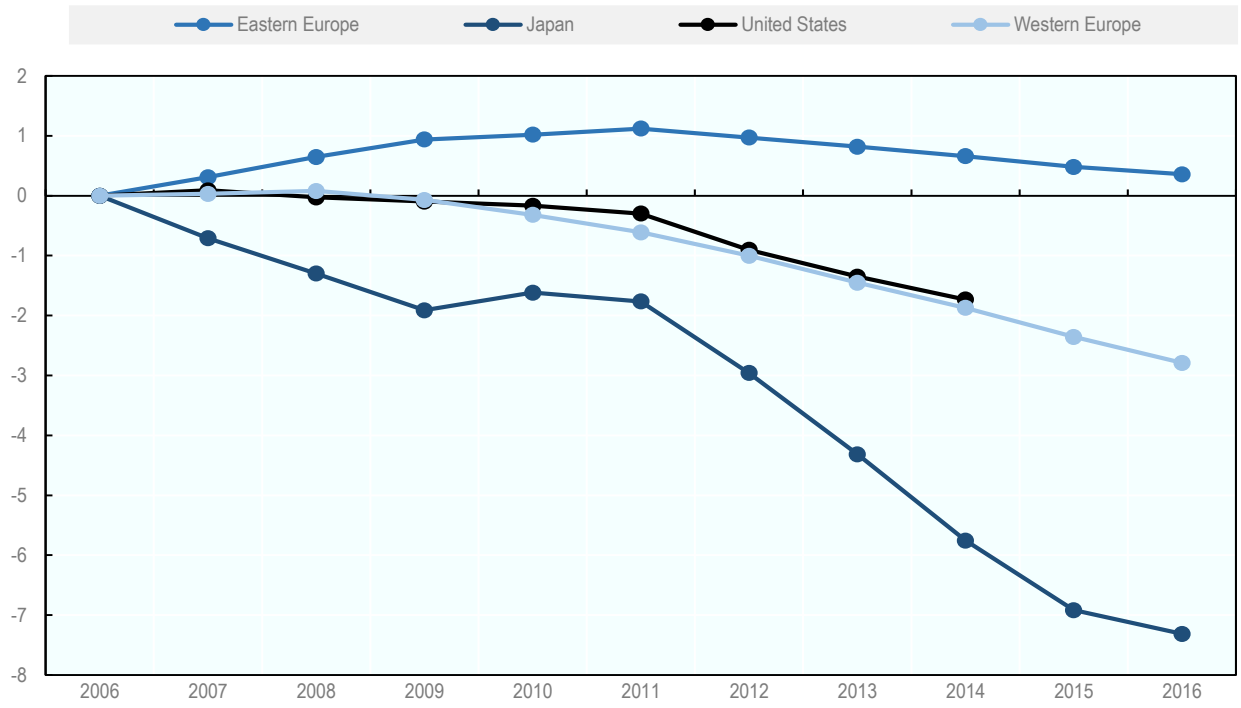
The extent to which ageing has negatively affected per capita GDP growth in regions over the period analysed also depends on whether productivity growth was sufficient to keep per capita GDP from declining due to ageing (assuming that employment rates remain constant at their 2006 value).[5] For example, if ageing in a given region has caused per capita GDP growth to be 1 percentage point lower than it would have been without a change in the population distribution, then a 1 percentage point increase in labour productivity growth could have kept per capita GDP from decreasing.

Cumulative productivity growth between 2006 and 2014 that was required to offset the negative contribution of ageing on per capita GDP growth was about 1.5 percentage points for the average Territorial Level Two (TL2) region. In some rapidly ageing regions, the value was even higher, up to 5.7 percentage points for the average Japanese region

(Figure 2.6). This need is sizeable when benchmarked against actual productivity, which was 6.4% for the average Japanese region. The impact of ageing was compensated and per capita GDP prevented from falling. About half (51%) of OECD regions raised productivity sufficiently to offset the negative impact of ageing on per capita GDP growth during the 2006-14 period (Figure 2.7). In 85% of the 49% of remaining regions, the result was a decline in per capita GDP.

Figure 2.6. Ageing reduced per capita GDP growth by 1.5 percentage points during 2006-14

Missing cumulative per capita GDP growth due to ageing 2006-16 (%)



Notes: Countries included are: AUT, BEL, BGR, CZE, DEN, GRE, ESP, FIN, FRA, HUN, IRE, ITA, JPN, NLD, NOR, POL, PRT, SWE, SVK, USA. Eastern Europe countries are: BGR, CZE, HUN, POL and SVK.
Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019); Eurostat (2019[26]), *General and Regional Statistics* (database), https://ec.europa.eu/eurostat/data/database (accessed on 5 February 2019); Statistics Japan (2019[27]), *Labour Force Survey*, https://www.stat.go.jp/english/data/roudou/index.html; US Census Bureau (2020[28]) *American Community Survey (database)*, Explore Census data (accessed 20 May 2019).

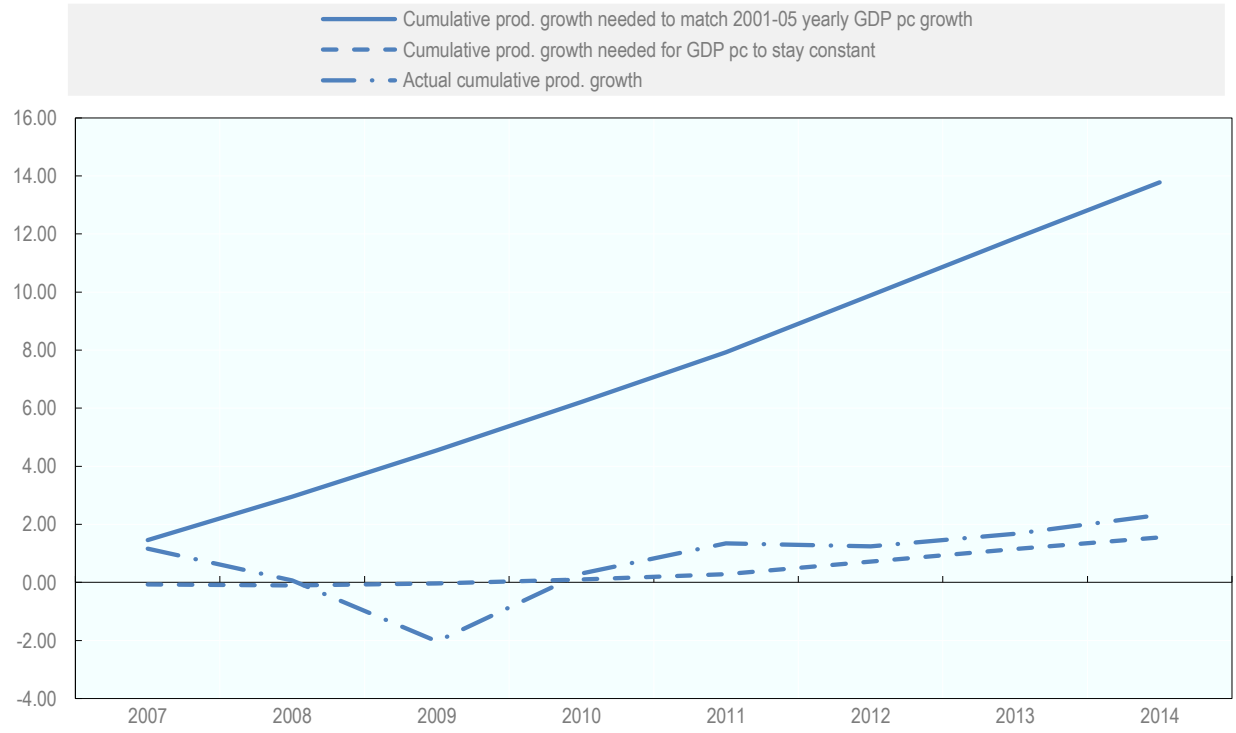
Differences in the severity with which the Great Recession hit Japanese and Western European regions can explain the different degree of compensation provided by productivity growth in the two sets of regions. In Japan, more than 50% of the regions featured enough productivity growth to offset the negative impact of ageing. Per capita GDP declined in just 50% of the remaining regions, i.e. fewer than one in four regions experienced a decline in income levels. In contrast, in Western Europe, productivity growth in less than 50% of regions was high enough to compensate for ageing, and per capita GDP declined in more than 80% of the remaining ones.

An alternative benchmark is the pre-crisis growth in the different regions. The required productivity growth to retain pre-crisis per capita GDP growth levels during the 2006-14 period is significantly higher than the growth required to simply maintain income levels (Figure 2.7). Nearly 88% of TL2 regions were not able to reach the more ambitious

productivity growth target and recorded strictly less productivity growth than the level required to maintain the same per capita GDP growth the region posted during the 2001-06 period.

Figure 2.7. In half of regions, productivity growth fell short of compensating for ageing

Actual labour productivity growth vs. needed productivity growth in TL2 regions (%)



Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019); Eurostat (2019[26]), *General and Regional Statistics* (database), https://ec.europa.eu/eurostat/data/database (accessed on 5 February 2019); Statistics Japan (2019[27]), *Labour Force Survey*, https://www.stat.go.jp/english/data/roudou/index.html.

Ageing and labour productivity growth from a regional perspective

The geographical units employed for this analysis are TL3 "small" regions. There are a total of 1 802 small regions in OECD countries. Each TL3 region is contained in a TL2 region. In most cases, TL3 regions correspond to administrative regions. This classification is largely consistent with the Eurostat "NUTS 3" classification.

As mentioned above, ageing is measured as the growth rate in the ratio of old (aged 50 or more) to young workers (aged between 20 and 49). The old-to-young ratio increased for the median region by 25% between 2001 and 2014 (Table 2.1). Behind this aggregate statistic, there is, however, a high degree of heterogeneity. The difference between median ageing in rural and urban regions is 6 percentage points and is expected to widen according to projections (Figure 2.4).

Table 2.1. Old-to-young ratio growth rates by regional typology (TL3), 2001-14

Group	5th percentiles	Median	95th percentile	Number of regions
Predominantly rural	3.30	27.37	57.92	369
Intermediate	4.53	26.00	41.08	375
Predominantly urban	-0.76	21.41	39.69	382
All regions	1.95	25.16	49.54	1 126

Notes: TL3 regions are grouped into rural/intermediate/urban typology based on the OECD classification.
Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019).

To identify the causal impact of ageing on productivity growth, the share of 0-4 year-olds in 1981 and 1991 is used as an instrument for ageing in a region.[6] The validity of this instrument is justified based on the assumption that fertility decisions taken in 1981 and 1991 do not affect productivity growth between 2001 and 2014 except through their impact on population ageing. Given data limitations, only a subset of regions can be included in the analysis. The relevant OLS (ordinary least squares) estimate is reported alongside the instrumental variable (two-stage least squares) results.

The two-stage least squares (2SLS) results indicate that 10 percentage point faster ageing causes a 1.5 percentage point decline in productivity growth within countries. Hence, for instance, productivity growth was 1.5 percentage points lower than the country average in a Korean region where ageing exceeded the country average by 10 percentage points, which corresponds to the extent of ageing for the average region in the sample between 2001 and 2007. The impact is marginally lower compared to the OLS estimates (second column of Table 2.2), and the direction of the change suggests a downward bias, which is in line with what the majority of omitted variable examples would suggest.[7]

Table 2.2. Ageing and labour productivity growth

Variables	Labour productivity growth, 2001-14	
	OLS	2SLS
Growth old/young	-0.16***	-0.15*
	(0.04)	(0.08)
Initial labour productivity	-0.03	-0.03
	(0.02)	(0.03)
Observations	461	461
R-squared	0.54	0.54
Country FE	Yes	Yes
F-test		62.81

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Countries included: ESP, FIN, FRA, GBR (only England and Wales), IRE, ITA, JPN, SWE. The set of instruments comprises the share of 0-4 year-olds in 1981 and 1991.
Source: Labour productivity and population data: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019).
Historical population: Statistics **Finland** (2019[29]), *Statistics Finland - Statistics by topic - Population structure* (database) https://www.stat.fi/til/vaerak/tau_en.html; for **France**: INSEE (2019[30]), "Estimation de la population au 1er janvier 2019 | Insee", https://www.insee.fr/fr/statistiques/1893198; for **Ireland**: Central Statistics Office (2019[31]), "Historical Reports - CSO - Central Statistics Office", https://www.cso.ie/en/census/censusvolumes1926to1991/historicalreports/; for **Italy**: ISTAT (1982[32]), "12. Censimento generale della popolazione: 25 ottobre 1981", https://ebiblio.istat.it/SebinaOpac/resource/12-censimento-generale-della-popolazione-25-ottobre-1981/IST0069127 and ISTAT (2019[33]), "Popolazione residente ricostruita - Anni 1991-2001", http://dati.istat.it/Index.aspx; Statistics **Japan**, (2019[34]), "Population estimates 1920-2000 for Japan", https://www.e-stat.go.jp/en/; for **Spain**: INE (2019[35]), "Población (1981) por provincias, edad y sexo", http://www.ine.es/jaxi/Tabla.htm?path=/t20/e245/p06/l0/&file=1981.px&L=0 and INE (2019[36]), "Censos de Población y Viviendas 1991", http://www.ine.es/censo91/es/seleccion_ambito.jsp; Statistics **Sweden** (2019[37]), *Statistical database*, http://www.statistikdatabasen.scb.se/; and for the **United Kingdom** and **Wales**: Casweb (2019[38]), "Casweb - Census Area Statistics on the Web", http://casweb.ukdataservice.ac.uk/step0.cfm.

Ageing is strongly negatively associated with productivity growth in predominantly urban and intermediate regions, once corrected for bias (second column of Table 2.3).[8] In predominantly urban TL3 regions, 10 percentage point faster ageing is associated with a 1.9 percentage point decline in productivity growth relative to other regions within the country. The concentration of the impact of ageing in cities matters for at least two reasons. The first is that the affected population is larger as more people live in cities, thus aggravating the aggregate repercussions of ageing. The second is that ageing is expected to progress more slowly in urban areas compared to rural areas (Table 2.1). The heterogeneous speed of ageing across regions, therefore, provides an hidden benefit. The adverse impact on productivity growth due to the increase in the old-to-young ratio is milder in places where this ratio will increase the most. There is a notable difference between the estimates that account for potential bias (2SLS) and those that do not (OLS), a difference that was not evident when the spatial heterogeneity was ignored. As the omitted variable is of course unobserved it is impossible to identify the channel with certainty. The most likely explanation is that the IV strategy (historic births in the region) adopted in this chapter accounts for bias created by migration flows. An inflow of migrants from other parts of the country or abroad reduces the old/young ration, i.e. it is negatively correlated with its growth. An inflow of new residents is also expected to be negatively associated with average productivity in the region (slack in the labour market lowers wages and makes less productive activities possible, the average skill and experience of migrants is below the regional average, etc.), which in combination results in an upward bias in the OLS estimates.

Table 2.3. Ageing and labour productivity growth: Breakdown by regional typology

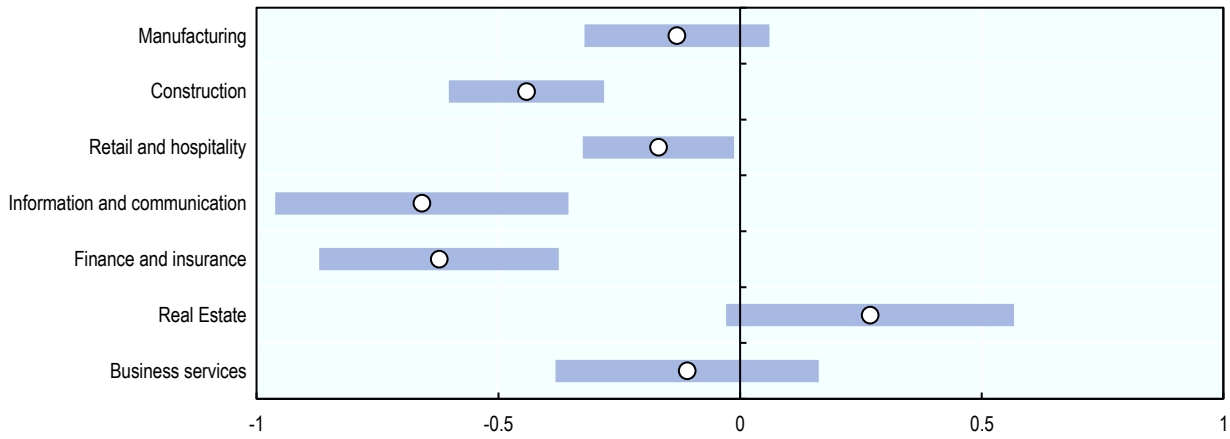
Variables	Labour productivity growth, 2001-14	
	OLS	2SLS
Growth old/young (Rural)	0.18***	0.05
	(0.07)	(0.06)
Growth old/young (Intermediate)	0.06	-0.14**
	(0.07)	(0.06)
Growth old/young (Urban)	0.05	-0.19***
	(0.05)	(0.04)
Observations	697	697
R-squared	0.58	0.77
Country FE	No	Yes

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observations are TL3 regions in the following countries: AUT, CZE, DNK, ESP, FIN, FRA, GBR, HUN, IRE, ITA, JPN, KOR, NOR, POL, PRT, SWE, SVN, SVK. The distinction between rural/intermediate/urban is based on the OECD classification. The coefficients on initial labour productivity for each group of regions are omitted from the displayed results.
Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019).

Differences in sectoral composition between rural and urban regions offer a potential explanation behind the disproportionate negative impact of ageing on productivity growth in cities. As mentioned above, the sectors in which ageing has the most negative impact on productivity growth are in knowledge-intensive, tradable services, such as information and communication, finance and insurance (Figure 2.8), which tend to be disproportionately located in cities.

One potential channel behind the heterogeneous impact of ageing on productivity growth across sectors is the existence of compensating mechanisms – in particular, capital investment – supporting productivity growth more easily in some sectors than in others. For instance, the adoption of robots in the wake of mounting labour shortages can be an effective tool for compensating for the negative consequences of ageing on productivity growth in the manufacturing sector. Existing research provides empirical evidence in support of the effectiveness of this compensating mechanism for the United States (Acemoglu and Restrepo, 2018[8]). Unlike the study for the United States that focuses on per capita GDP and finds that automation can even overcompensate the impact of ageing and create a positive stimulus for per capita GDP growth, the results for regional labour productivity suggest that the impact of ageing is, at best, absorbed through compensation mechanisms (Figure 2.8). Productivity in manufacturing or hospitality and retail is less or not at all affected by ageing, in line with tasks performed by workers in these sectors being at among the highest risk of being replaceable by automation (OECD, 2018[39]).

Figure 2.8. Ageing and labour productivity growth by sector, 2001-14

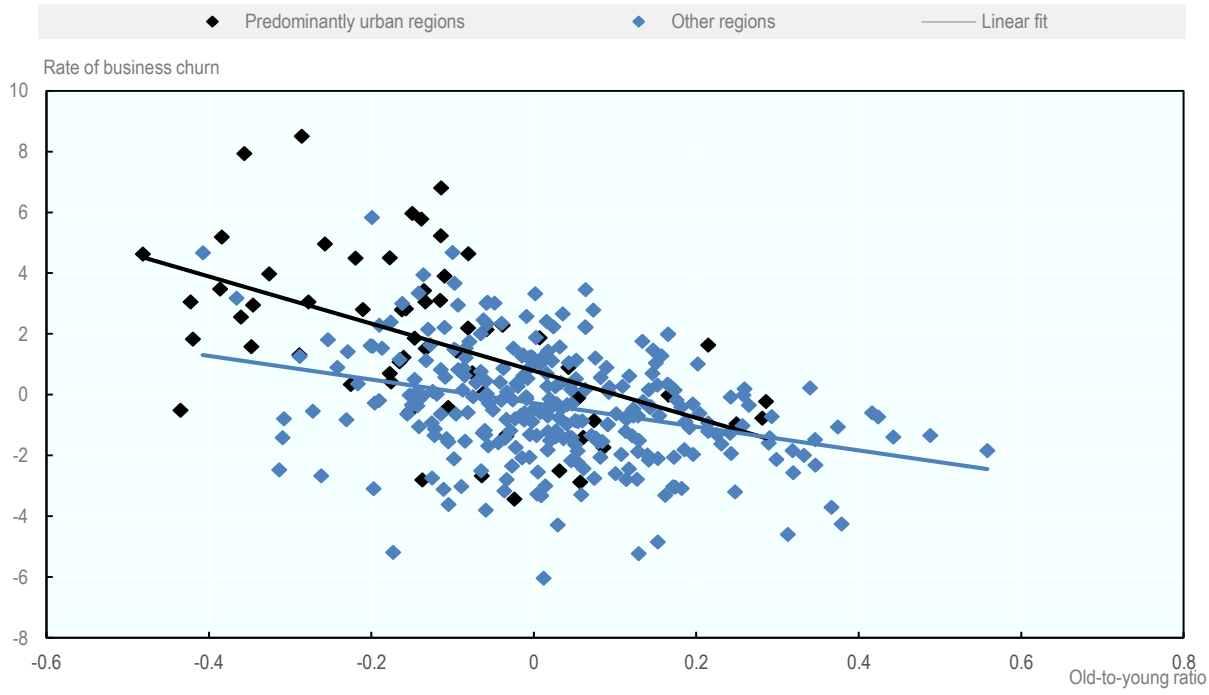


Notes: Each dot corresponds to the OLS coefficient on the growth rate of the old-to-young ratio in a regression of the growth rate of labour productivity in a specific sector with country-fixed effects and controlling for the speed of convergence. The line for each dot spans the 90% confidence interval of the corresponding coefficient. Observations are TL3 regions in the following countries: CZE, DNK, FIN, FRA, GBR, HUN, IRE, ITA, PRT, SWE, SVN, SVK, 462 regions in total. For the breakdown into tradable vs. non-tradable, see (OECD, 2018[24]).
Source: OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019).

Another potential channel behind the heterogeneous impact of ageing on productivity growth across sectors is that knowledge-intensive sectors tend to rely more on business dynamism than other ones. Business dynamism is measured by the sum of firm births and deaths over the total number of firms in a given period, and it underlies the process of "creative destruction" through which new ideas are created that replace the old ones, thus pushing the innovation frontier further. Business dynamism is lower in older regions, and the negative association between business dynamism and ageing is stronger in urban regions (Figure 2.9). The concentration of knowledge-intensive sectors in urban regions might explain the stronger impact. Another reason might be that the decline in dynamism is mainly driven by a lack of start-ups. Ageing is associated with population decline and population decline, in turn, has a negative contemporaneous impact on the start-up rate (Hopenhayn, Neira and Singhania, 2018[17]). Other explanations are of course, possible. The ambition of entrepreneurs might change with age. Evidence from the United States finds, on the one hand, that successful firms (in terms of growth) are, on average, founded by entrepreneurs in their mid-forties (Azoulay et al., 2018[40]). On the other hand, the ambition of expanding a firm tends to decline with age and only a small fraction of early-stage entrepreneurs is driven by the desire to bring a new idea to market (Hurst and Pugsley, 2011[41]).

Figure 2.9. Business dynamism is lower in "older" regions

Rate of business churn and ageing inTL3 regions, 2014



Notes: Both the rate of churn and the old-to-young ratio are demeaned within countries, such that a value of 5 for business churn indicates the region has a churn rate that is 5 percentage points higher than the (unweighted) country average across TL3 regions.
Source: Calculations based on OECD (2019[2]), *OECD Regional Statistics* (database), http://dx.doi.org/10.1787/region-data-en (accessed on 5 February 2019).

Conclusion

Ageing is gaining pace across the majority of OECD regions. The elderly dependency rate is expected to double, on average, across a large set of European regions by 2050, and other OECD countries are likely to follow suit. Ageing is likely to exacerbate existing divides further. Large metropolitan areas are expected to age more slowly than smaller cities and rural areas. More broadly, the economically stronger regions are ageing more slowly. Within Europe, the gap in the elderly share between (today's) richest 25% of TL3 regions and the poorest 25% is projected to be about 4 percentage points (OECD, 2019[42]). This means ageing is not just a challenge in selected rural regions but is more pervasive. Many urban regions are ageing as fast as rural regions, and the findings in this chapter show that the consequences in terms of productivity growth will be mostly felt in small and medium-sized cities. It is therefore important to take concrete steps to address the negative consequences of ageing in terms of economic growth.

Fiscal transfers that support local economic and public sector activity are often the first proposed option. Ageing implies a decline in the local tax base, thus forcing regions to rely more on transfers to finance the provision of public services, although it may also imply less demand for public services and therefore allow downsizing of public employment in the face of shifting demographics (Pilichowski, Arnould and Turkisch, 2008[43]). In many instances, transfers are indispensable to maintain living standards, but a compensatory approach risks displacing other economic activity or the incentive to develop

them (OECD, 2016[44]), and persistent cross-regional subsidies can lead to a perceived regional stigma and loss of pride and cultural identity (OECD, 2019[42]). Instead, the policies should leverage the local economic potential that remains, by increasing employment and productivity.

Drawing on the analysis in this study, an important set of policies that has, so far, not been associated with strategies to address the impact of ageing are those targeting productivity growth. At the individual level, initiatives promoting lifelong learning through the concerted efforts of both employers and employees can successfully reduce the risks associated with skill obsolescence during older ages, and raise productivity in general. The result that particularly knowledge-intensive occupations are most adversely affected by ageing reinforces this point. Developing skills and human capital via a place-based approach offers high potential returns, as training can be targeted to local needs, engage with existing employers and avoid (costly) migration to other places. Such a place-based approach requires that regional economic development strategies be connected with education and labour policies for local skills development (OECD, 2016[45]; OECD, 2018[24]).

Many fast-ageing countries are already adapting their economic structure through increasing labour force participation among older cohorts (Banks, Emmerson and Tetlow, 2018[46]; OECD, 2017[47]).[9] This includes measures such as indexing the retirement age to life expectancy (OECD, 2017[47]). Beyond extending the working life, the inactive working-age population can be a source of additional inflow into the labour force (Barr, Magrini and Meghnagi, 2019[48]). The challenge in both cases is that the skills of the workforce and labour market needs are not necessarily well matched. There are no quick fixes to this challenge, but interventions need to start early and ensure that the supply of skills can map into local demand. Providing measures to mid-career workers that help them adapt their skillsets to changes in the labour market and their personal capabilities is therefore as important as providing training to workers in later career stages. This might require changing the way firms produce as older workers' physical capabilities change and often decline. High productivity might, therefore, require investment into new tools and machines, but also changes in production processes that ensure that firms can get the most out of their experienced workforce (OECD, 2018[49]).

Promoting entrepreneurship among older age segments also helps prolong the working lives of older people. Nearly one-third of new senior entrepreneurs in EU and OECD countries indicated that they offered new goods and services over the 2012-16 period – the same proportion as in the adult population (OECD/European Union, 2017[50]). In particular, high-skilled workers can leverage their experience and use entrepreneurship as a tool to transition into retirement. But ageing among entrepreneurs creates additional challenges. The transfer of successful businesses is often challenging and can deter investment. As owners near the retirement age, they are less likely to take risks and forego opportunities for longer-term investments. In Japan, for instance, more than 300 000 small and medium-sized enterprises are run by owners who are at least 65 years old. Among these, about one in five micro-firms believe that discontinuing the business when the owner retires is unavoidable. In Italy, about 9% of entrepreneurs are over 70. In Canada, approximately 50-60% of current business owners will retire by 2027 (OECD, 2018[51]). The challenge is exacerbated in rural areas, as urbanisation trends make it more difficult for business owners to find eligible successors.

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Notes

1. Regions (TL2 and TL3) are classified by the OECD into two territorial levels that reflect the administrative organisation of countries.

2. See the handbook article in Lee and Mason (2017[53]) for a more detailed discussion of the macroeconomic effects of ageing.

3. See OECD (2014[52]) for a discussion of the need to move beyond transfers in regional policy and rather focus on investments that unlock growth potential.

4. Europop2013 includes a component that projects demographic change at the regional level until 2050.

5. See the full version of the working paper for details on how to compute the impact of ageing on per capita GDP growth through the reduction in the ratio of working age to total population (Daniele, Honiden and Lembcke, 2019[54]).

6. Out-migration of young workers from less productive regions towards more productive regions in the same country is one reason why regions whose productivity is growing less are also ageing faster. The instrumental variable approach is proposed precisely to eschew these concerns.

7. A downward bias as in this case occurs when the omitted variable is positively (negatively) associated with ageing and negatively (positively) associated with productivity growth. Quality of institutions, presence of good universities or of an entrepreneurship-friendly policy environment are all examples.

8. TL3 regions have been classified as predominantly urban, intermediate and predominantly rural based on the percentage of regional population living above certain thresholds of population densities, i.e. upon the share of urban dwellers.

9. One finding of the present study is that differences in the growth rate of the employment rate across countries can account, for the most part, for the positive and statistically significant relationship between ageing and per capita GDP growth found by existing research.

Chapter 3. The fiscal impact of population ageing in Germany: An unequal challenge for different levels of government

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Population ageing is a global phenomenon, and Western European welfare states, in particular, are ageing at a rapid pace. Still, not all states or even regions within a given country are ageing in the same way, and we find significant differences among them. While some metropolitan areas are attracting younger inhabitants and are even growing, peripheral areas are suffering from out-migration and rapid ageing. In federal countries, these demographic differences create challenges across levels of government, and the variation in the cost and revenue structures of these levels should be taken into account. There are also considerable differences among states or municipalities due to diverging demographic developments. In this chapter, we present age profiles of government revenues and expenditures per capita for the federal, state, and local governments, and use the population projections for the different German Länder *to examine how demographic changes affect budget gaps at each level of government. The results show the long-term fiscal implications caused by different ageing patterns. As out-migration reinforces economic fortunes, a compensatory factor in the fiscal equalisation scheme among the* Länder *is discussed.*

The authors wish to thank the organisers of the workshop on Ageing and Long-term Challenges across Levels of Government in June 2019, particularly Sean Dougherty and the participants for their valuable comments that have led to the publication of this chapter.

Introduction

Population ageing challenges the current and future fiscal arrangements of developed countries. Previous research has shown that demographic changes are having a significant impact on public spending, and on pensions and health care in particular. The changes in the population age structure call for a range of political adjustments. In a federal country like Germany, the different levels of government are unequally affected due to differences in their cost and revenue structures. While the federal government in Germany is mainly responsible for paying for national defence and general public services that are not age-varying, it also has to cover supplementary payments for social security, including retirement benefits, which are projected to increase sharply as the population ages.

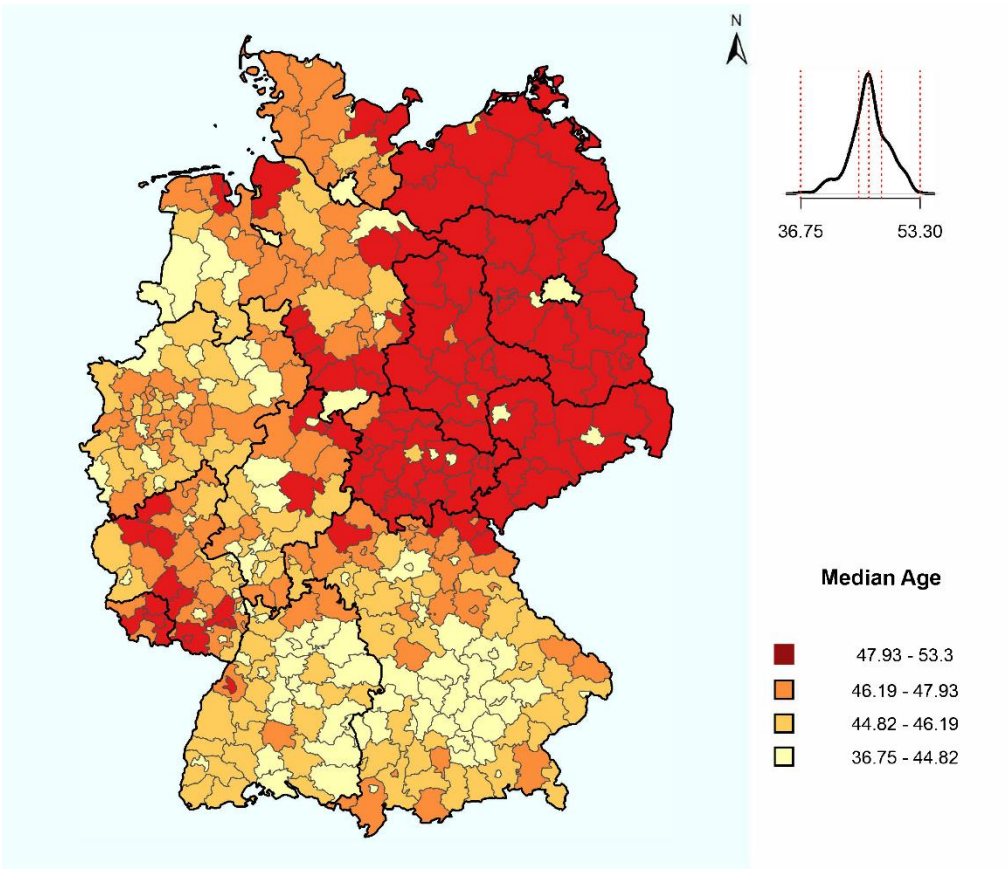
In contrast, the *Länder* (federal states) and local governments are primarily responsible for paying for education and child care, which are expenditures that are likely to decrease as the population ages. Still, all levels of government in Germany will face budget shortfalls, as tax revenues are mainly generated by a shrinking number of working-age individuals. Prosperous federal states and municipalities will be able to meet these challenges by attracting workers from less successful regions, which will, in turn, reinforce the fiscal challenges of the regions that lag behind.

The focus on specific levels of government is often neglected in research on demographic effects on public finance. Earlier work for the United States predicted the effect of this structure on government expenditures in areas such as social security and education (Lee and Edwards, 2002[1]; Lee and Tuljapurkar, 1998[2]). Edwards (2010[3]) used age-specific expenditures from National Transfer Accounts for the United States to analyse the impact of population ageing on the different levels of government. For Germany, comparable studies were carried out by Seitz, Freigang, and Kempkes (2005[4]); Seitz and Kempkes (2007[5]); and Seitz (2008[6]). Their research focused on sustainability estimations for sub-budgets of the government. Bach et al. (2002[7]) examined in detail how tax revenues are changing due to shifts in the age structure of the German population. Drawing on earlier data, Kluge (2013[8]) showed the challenges that the different levels of government face. This chapter uses the latest available data sources and acknowledges the impact of migration on state and local government expenditures.

In Germany, low fertility and increasing life expectancy have resulted in a rapidly ageing population. Currently, the median age of the German population is 46 years, which is almost four years higher than the median age of the population of the neighbouring country of France, and makes Germany one of the oldest countries worldwide (UN Population Prospects, 2019[9]). Moreover, the median age in Germany is expected to rise from 45.7 years in 2020 to 49.2 years by 2045. Thus, while Germany is already a rather old country, its population is ageing at a fast pace. However, this overall trend masks profound regional differences in the rate of ageing between rural areas that are growing older and losing population and metropolitan areas that have a younger age structure and are gaining population. This urban-rural divide is especially interesting given that, in addition to population ageing, migration reinforces the economic fortunes of different geographic areas. Younger, more skilled individuals will continue to migrate to economically strong regions with a younger age structure, and to leave regions that are already suffering from out-migration (Goldstein and Kluge, 2016[10]; Kluge, Goldstein and Vogt, 2019[11]). While population ageing is an important driver that alters the relative composition of the population, the shrinking of the population due to mortality or migration is also an important issue. Using a detailed approach to study government revenues and expenditures that acknowledges the importance of spatial variation is vital.

The German system redistributes resources not only among individuals of different income levels, socio-economic status, and age, but across regions. Demographic developments in Germany are proceeding in regional clusters. While it is true that Germany is among the oldest countries in the world, we find pronounced variation in the age structure by region. Figure 3.1 displays the median ages of German municipalities in 2013. It shows that there are areas in southern and western Germany, primarily around larger metropolitan areas, in which the median age is between 36 and 44 years; as well as regions in western and southern Germany, mainly in rural areas, in which the median age clusters around the national median age of 46 years. The figure also indicates, however, that in many municipalities in eastern Germany (except larger cities and university towns such as Berlin, Leipzig, Dresden and Jena), Saarland, and Lower Saxony, the median age ranges from 48 to 53 years. These enormous differences in the population age structure have profound implications for the budgets of the different municipalities. Older municipalities tend to have higher expenditures and lower revenues and are more likely to suffer from out-migration. These trends can, in turn, further aggravate the financial situations of these municipalities, and restrict their room to manoeuvre.

Figure 3.1. Median age by German district, 2013



Source: Authors' calculations and presentation based on Regionaldatenbank (2016) accessible via www.regionalstatistik.de (accessed on 10 October 2018).

In this chapter, the latest demographic trends for the German municipalities and the age cost profiles for the different levels of government are presented. The National Transfer Accounts data for Germany is drawn upon to provide detailed estimates for all relevant public revenues and expenditures by single years of age. In addition, it will be shown how expenditures and revenues are expected to differ across the German states in the future. This approach is not intended to serve as an economic forecast, as a representative state profile for each of the 16 German *Länder* is used. Instead, the aim is to shed light on the differences in revenues and expenditures likely to result from the demographic differences among the states. The implications of migration and the steps policy makers can take to address these gaps are also addressed.

Methods and data

The National Transfer Accounts (NTA)[1] are used as a data source for the estimations of revenues and expenditures by level of government and age. The theoretical roots for the NTA project have been provided by Samuelson (1958[12]), Diamond (1965[13]) and Lee (1994[14]). The project was established to introduce the variable age into the National Accounts. It aims to produce detailed estimates of the age dependency of income, consumption, and savings, as well as of government revenues and expenditures. Thus, the project seeks to provide answers to the question of how population ageing is affecting economic indicators. In this chapter, only the NTA results for the age dependency of government revenues and expenditures for the different levels of government are shown.

Government expenditures

In the following discussion, total government expenditures include all public in-kind and cash transfers that are provided for individuals living in Germany (Equation 1). Total government expenditures E_t are given by:

$$E_t = \sum_{j=1}^{J} TG_{j,t}^{in-kind} + TG_{j,t}^{cash} \quad (1)$$

where $TG_{j,t}^{in-kind}$ denotes all public in-kind transfers to which public monetary transfers, $TG_{j,t}^{cash}$, is added, in time t for function j. Public in-kind transfers $TG_{j,t}^{in-kind}$ consist of transfers for education, health, or other summed over all ages from 0 to 90+ in time t. The outcomes reflect public consumption. Public monetary transfers, $TG_{j,t}^{cash}$, are then added, which include pensions, disability payments, family and housing allowances, and other forms of social, financial assistance.

The approach used is comparable for all items. Suitable survey data or administrative records that provide information on the relative utilisation of a particular type of government expenditure by age are identified. For expenditures on education by age, information on the number of children by age and school type is used, as well as the corresponding costs for each individual by school type. The age profile is estimated by calculating the number of students of this age and school type, which is then used to obtain the per capita values. The relative age shares of health expenditures are estimated using the costs of diseases (Statistisches Bundesamt, 2016[15]). In the next step, the profiles are smoothed and macro-adjusted to fit the National Accounts.

Government revenues

Total government revenues are given by:

$$TGO_{j,t} = \sum_{j=1}^{J} TGO_{j,t}^{L} + TGO_{j,t}^{A} + TGO_{j,t}^{C} + TGO_{j,t}^{O} \quad (2)$$

where $TGO_{j,t}^{L}$ are the outflows on labour, $TGO_{j,t}^{A}$ denote the outflows on asset holding, $TGO_{j,t}^{C}$ include all taxes related to consumption, and $TGO_{j,t}^{O}$ denote all other revenues.

Table 3.1 shows the revenues of the levels by type and the micro profile used to allocate the tax by age. Some revenues, such as market selling, other current transfers, and second home taxes, are not easy to classify. For these revenues, the general tax profile for allocation is used.

Table 3.1. Taxes by the level of government and the micro profile used to allocate the respective tax

Joint taxes (federal/state/local)	Age profile for allocation
Income tax (42.5/42.5/15)	Compensation of employees
Accessed income tax (42.5/42.5/15)	Self-employment income
Corporate income tax (50/50/0)	Income and profits
VAT and import turnover tax (51.5/46.3/2.2)	Consumption
Federal taxes	
Insurance tax, energy tax, electricity tax, motor vehicle and air transport tax	Consumption
Tobacco taxes	Consumption of tobacco
Alcopop taxes, spirits tax, sparkling wine tax	Consumption of alcohol
***Länder* taxes**	
Property tax, inheritance tax, real estate transfer tax	Capital
Betting and lottery tax	Alcohol and tobacco
Fire brigade tax	Consumption
Beer tax	Alcohol consumption
Municipal taxes	
Land tax A (Forestry) and B (Other)	Capital
Excise tax	Self-employed income
Other	General tax profile

Note: For the joint taxes, the redistribution key between the levels is shown in brackets.
Source: Authors' considerations.

All age profiles are smoothed before the numbers are adjusted to the macroeconomic control variable. The transfer components (except expenditures for education) are smoothed with the Friedman SuperSmoother in R (supsmu package). The population of the respective year is used as a weight.

Adjustment factor

A crucial adjustment in the National Transfer Accounts is made to ensure that the estimates are nationally representative and fit the National Accounts. Therefore, all of the revenue and expenditure items are scaled to fit their corresponding macroeconomic controls. Depending on how many levels share the expenditures for an expense item, one to three macro controls (federal, state, local government) are used. The adjustment factor is given by:

$$\theta_j = \sum_{a=1}^{90+} \frac{x(a)N(a)}{X_j}, \quad (3)$$

where the age-specific expenditure share, *x(a)*, is multiplied by the population at that age, *N(a),* and is divided by the corresponding macro control by level of government, Xj.

Table 3.2. Public total transfers by level of government (COFOG classification), Germany, 2016

EUR billions

	Government (consolidated)	Federal	State	Local
General public services	182.8	114.1	102.0	39.2
Defense	30.6	31.3	0	0
Public order and safety	44.4	4.8	32.8	7.3
Economic affairs	94.1	35.1	39.7	30.6
Environmental protection	17.4	5.3	3.3	9.6
Housing and community amenities	11.7	2.2	4.1	7.8
Health	199.0	5.9	9.1	5.0
Recreation, culture, and religion	28.9	1.9	14.9	13.1
Education	120.9	5.5	93.0	33.8
Social protection	533.9	171.7	71.5	72.5
Total	1 263.7	377.8	370.3	218.9

Note: The row sums are missing the social security estimates that are disregarded in this analysis.
Source: Federal Statistical Office (2016[16]), *National Accounts 2016,* Federal Statistical Office, Wiesbaden.

For the estimation of the National Transfer Accounts or their underlying parts, such as government revenues and expenditures by level of government, an extensive amount of data is required. These data are described in the following section.

Data

To construct the accounts, a micro survey is needed to estimate age utilisation profiles, corresponding population estimates, and macro controls that allow for the adjustment of the micro profiles to fit the UN System of National Accounts. The macro controls are provided by the federal and the *Länder* statistical offices for the respective years that show detailed results in the National Accounts. Population estimates in one-year age groups are provided by the German Federal Statistical Office. The microeconomic age profiles of government monetary transfers to individuals are estimated using the Income and Expenditure Survey (EVS) 2013.[2] The EVS is conducted every five years by the Federal Statistical Office, and includes data on income, consumption, assets and transfers for 60 000 households. The survey data are representative of households with a monthly net income of less than EUR 18 000. For three months, participating households keep a detailed book of household accounts that covers all forms of income and expenditure. Per capita profiles for the different levels over time are also available. These estimates are relatively stable for the different years.

Results

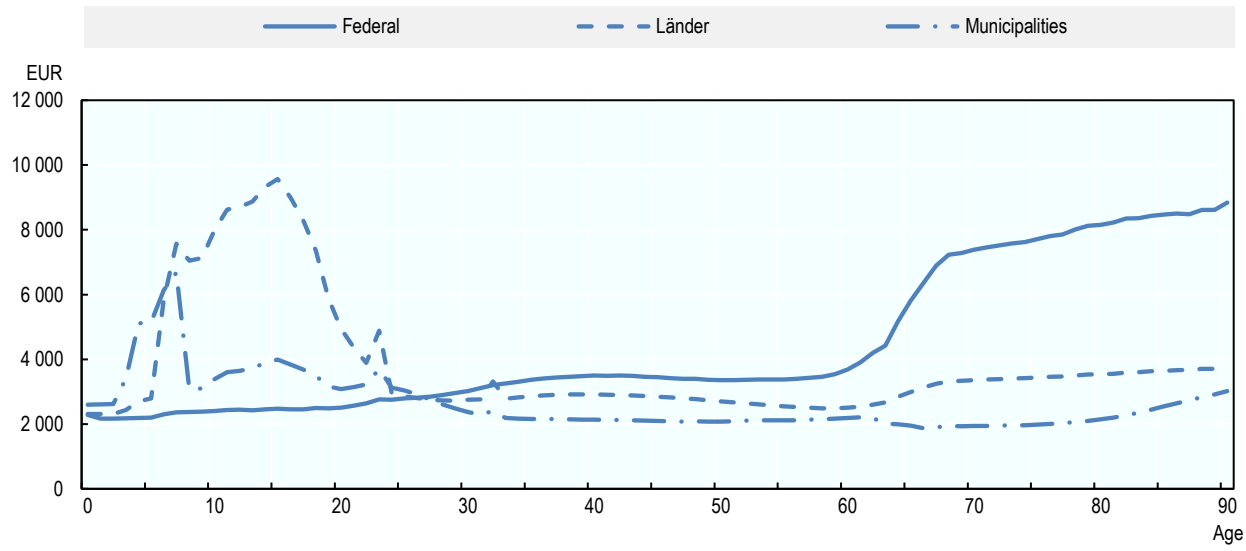
Because they have different financial obligations and revenue sources, federal, state, and local governments face different challenges. From a demographic point of view, it is especially interesting to note the differences in the age dependency of transfer variables. Both government revenues and government expenditures vary over the life cycle, with expenditures increasing more than revenues.

In Figure 3.2, the total public benefits per capita by age are provided by the different levels of government. The estimates include not only cash transfers made to individuals but in-kind transfers for health or education. The pronounced increase in transfers at older ages at the federal level is solely due to supplementary payments to the German social security

system, which are mainly in the form of public pensions, health and long-term care expenditures. If we disregard these supplementary payments, the federal profile becomes almost flat and hardly varies by age. As national population numbers decline, expenditures at the federal level are likely to be lower in the future. The federal-level expenditures on younger individuals are mainly related to national defence and public order and safety. These expenditures are evenly distributed across the population, and add up to about EUR 2 000 per capita per year. The *Länder* provide pensions for civil servants and financial support for students, which together make up a significant share of state expenditures. The municipalities provide housing allowances and certain forms of social assistance to the middle-aged population. Both state and local governments pay significant shares of the educational costs of young people. The municipalities and the *Länder* provide support for their youngest residents through expenditures on kindergartens and schools. These public transfers vary considerably by age, with most resources flowing to the young and the old. The per capita cost of supporting residents in their teens is, on average, around EUR 8 000 per year at the state level and EUR 3 000 at the municipal level. These figures are slightly higher for children attending kindergarten (up to around age six).

Figure 3.2. Public benefits by level of government and age in Germany, 2013

Per capita values in EUR



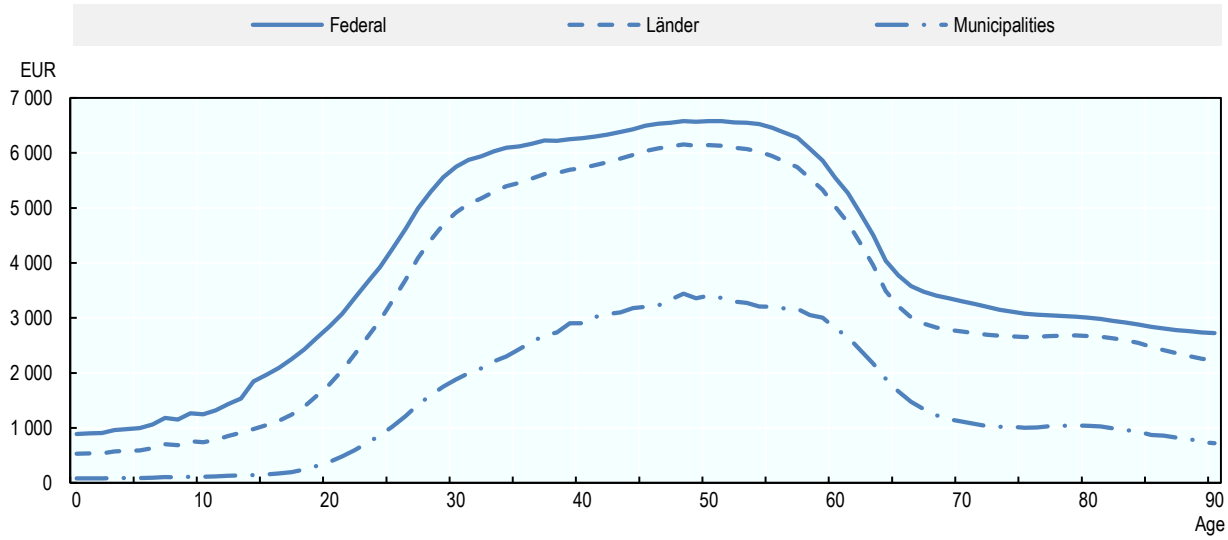
Note: These profiles include age-varying cash transfers like pensions and housing allowances and in-kind transfers like education or health care.
Source: Authors' calculations based on Federal Statistical Office (2013[17]), *National Transfer Accounts 2013,* Federal Statistical Office, Wiesbaden; Federal Statistical Office (2013[18]), *National Accounts 2013,* Federal Statistical Office, Wiesbaden. Sub-categories are available upon request.

Public revenues also vary by age and by government level. Figure 3.3 shows the per capita public revenue values at each level of government in detail. The total profile includes combined taxes shared between the different levels, such as value-added tax (VAT) as well as taxes that are collected at one level only.[3] The federal government receives all of the revenues from the solidarity surcharge and from tobacco or electricity taxes. State governments receive revenues from property and inheritance taxes and taxes on beer. Major inflows for the municipalities are generated by real estate and excise taxes. For all levels,

revenues are generated by working-age individuals. The federal government receives per capita inflows of around EUR 1 000 per year from children (due to VAT on children's estimated consumption), of around EUR 3 000 euros per year from retirees, and of more than EUR 6 000 euros per year from prime-age adults. While the *Länder* have comparable inflows, municipalities receive lower tax revenues per capita, and the age structure is slightly more skewed toward older working ages due to the underlying revenue profile of self-employed individuals used to allocate excise taxes.

Figure 3.3. Public revenues by level of government and age in Germany, 2013

Per capita values in EUR



Source: Authors' calculations based on Federal Statistical Office (2013[17]; 2013[18]), *National Transfer Accounts and National Accounts 2013,* Federal Statistical Office, Wiesbaden.

The German Länder *in 2050*

The estimated profiles of state revenues and expenditures are used to show future imbalances arising from different demographic dynamics. The same age profiles are applied to all of the German *Länder*. The results are not intended to provide an economic forecast. Instead, the aim is to uncover the differences in expenditure and revenue levels that result solely from demographic changes in age structure and migration.[4] The overall revenue and expenditure levels are expressed as percentages relative to the values in 2013. Changes are further documented in the expenditure levels for the young (under age 27) and the old (over age 57). The age brackets denote the turning points of the life-cycle deficit in Germany. This means that an individual in Germany is not earning sufficient labour income to finance his or her public and private consumption until after he or she reaches age 27. Then, after the individual reaches age 57, the life-cycle deficit again turns negative, and the person's labour income is not sufficient to finance his or her consumption. While younger individuals typically depend exclusively on transfers from other members of society, older individuals might rely on a mixture of transfers and savings.

Table 3.3 shows the expenditure and revenue levels of the 16 German states in 2050. Except for Hamburg, all states can expect lower expenditures and revenues. In some states, the decrease in revenues is moderate, such as in Bavaria or Baden-Württemberg, with revenue levels reaching over 90% of today's values. Others face revenue decreases in the magnitude

of around 20%, as for example, Brandenburg or Mecklenburg-Vorpommern. At the same time, expenditures also drop to considerably lower levels in these states. The most significant discrepancy between revenues and expenditures is in Brandenburg, with a 10 percentage point difference. For all other states, the imbalances are around 7 percentage points in 2050. As stated earlier, these results do not include political adjustments or behavioural adaptations that may alter this picture in the future.

Table 3.3. Germany's expenditure and revenue levels in 2050

Percentage of expenditures and revenues in 2013, changes in the expenditure shares of the population below age 27 and above age 60 as a percentage of total expenditures in 2013 and 2050

State	Level 2050		Expenditures <27		Expenditures 57+	
	Revenues	**Expenditures**	**2019**	**2050**	**2019**	**2050**
Brandenburg	80%	90%	36%	35%	34%	42%
Berlin	99%	107%	40%	40%	26%	33%
Baden-Württemberg	93%	98%	43%	39%	27%	35%
Bavaria	92%	98%	42%	38%	28%	36%
Bremen	91%	96%	42%	40%	28%	33%
Hesse	91%	97%	42%	39%	28%	35%
Hamburg	100%	109%	42%	42%	24%	31%
Mecklenburg-Vorpommern	77%	86%	36%	35%	34%	40%
Lower Saxony	88%	93%	42%	39%	29%	36%
North Rhine-Westphalia	88%	93%	42%	39%	28%	35%
Rhineland-Palatinate	87%	93%	41%	38%	30%	37%
Schleswig-Holstein	87%	92%	41%	37%	30%	38%
Saarland	78%	85%	38%	37%	33%	38%
Saxony	83%	90%	37%	39%	34%	37%
Saxony-Anhalt	71%	79%	35%	37%	36%	40%
Thuringia	73%	81%	36%	37%	35%	40%
Germany	**89%**	**95%**	**41%**	**39%**	**29%**	**36%**

Source: National Transfer Accounts for the levels of government 2013; Federal Statistical Office (2019[19]), *Fourteenth Coordinated Population Projection*; authors' calculations.

The differences for expenditures on the young that are depicted in Table 3.3 are minor. For most states, expenditures on the young decrease slightly or remain stable. For eastern German states like Saxony or Saxony-Anhalt, there are even slightly higher shares for 2050. Here, in recent years, the fertility rates were among the highest in Germany.

The expenditures for individuals above age 57 are increasing in all states as a share of total expenditures. In almost all states, these shares increase by 7 to 8 percentage points. Interestingly, the increases for eastern German states such as Saxony or Saxony-Anhalt are much lower (only 3 to 4 percentage points). This does not show that these states are younger, but rather that they are already old today, due to out-migration, and that ageing continues in these regions.

Discussion and outlook

The results show the different cost and revenue structures of the three levels of government in detail. The federal government's financial obligations are mainly age-independent expenditures related to national defence or economic affairs, and are not increasing as the population ages. However, because it provides additional funds for social security, the expenditures of the federal government will likely increase in the long run. By contrast, as

the population ages, the expenditures of state and local governments are expected to decrease in the long run. The biggest challenge facing all levels of government is generating sufficient revenue while the population is ageing. All levels of government rely heavily on revenues that come from the working-age population. Given that the fraction of the population who are of working ages is expected to decline in the coming decades, it is likely that revenues will decrease significantly. A broader age base for tax revenues would be desirable.

The differences among the levels of government are also affected by differences between states or municipalities. Large discrepancies in the demographic developments of different places will mean that the challenges they face will vary. We estimated long-run differences in the revenues and expenditures of the 16 German *Länder* that are solely due to demographic differences. In some states, benefits and revenues will decrease moderately, by around 6-8 percentage points; while in other states, benefits and revenues may decline by as much as 20-30 percentage points. The latter states are mainly in eastern Germany and peripheral western German regions that have an older age structure and high levels of out-migration. The budget gaps of the different German states range between 4 and 10 percentage points. The time horizon of 2050 seems to leave sufficient time for adjustments to be made.

These different demographic realities seem to suggest that regions that are already ageing and are economically disadvantaged will continue to lose inhabitants through out-migration. Studying the implications of these population losses is vital given that migration tends to be highly selective. Levels of out-migration from eastern Germany to the prosperous regions in the west have been particularly high. This east-west migration occurred in two bigger waves in 1990 and 1997 and continued in the decades that followed (Heiland, 2004[20]). Today, internal migration in Germany occurs mainly from economically weak districts and *Länder* to prosperous urban areas (Sander, 2014[21]). Younger individuals, and especially young women, are especially likely to emigrate. These patterns worsen the situations of the out-migration regions. When young adults leave, these regions face a heavy double burden, i.e. they do not fully benefit from their educational investments, and they lose future tax revenues.

The problem of migration reinforcing economic inequality could be addressed in several ways. One solution could be to transfer age-variable expenditures to the federal government. In the current situation, states and municipalities that suffer from out-migration finance kindergartens and schools for all young inhabitants. A large share of these skilled individuals will likely migrate as young adults to metropolitan areas or more prosperous rural areas in southern or western Germany. The receiving states and municipalities gain skilled workers without having to make the corresponding investments in human capital. A second potential solution is to implement a demographic factor in the fiscal equalisation scheme of the German *Länder*. The state that educated a migrating individual could receive financial compensation from the state that collects the individual's taxes. This could be a fraction of the tax revenue based on, for example, FIFA-type (Fédération Internationale de Football Association) compensation rules. Under these rules, when a soccer player is sold to another club, the club that trained the player receives a fraction of the transfer fees.

In addition, more general solutions are needed to deal with the impact that demographic changes are expected to have on the fiscal relationships among the federal, state, and local levels of government. The economic life-cycle needs of individuals will have to be adjusted as people live longer. One of the most prominent proposals for dealing with this issue is to

promote longer working lives (Vaupel and Hofäcker, 2009[22]), as even a slight increase in the number of years each individual works would have an enormous impact at the population level. If the comparatively long period of time Germans spend in education is shortened or the period of time Germans spend working is extended by just one year, all of the individuals in this age group would immediately convert from being beneficiaries to being contributors. These reforms are expected to save money, as governments would be receiving positive net flows from individuals who, in prior years, would have been receiving benefits. This approach may prove particularly attractive given that in addition to living longer, individuals are spending more years in good health than they were in the past (Christensen et al., 2009[23]). Calculations from the National Transfer Accounts life cycle for Germany show that in 1970, an employee who retired at age 64 had a mean life expectancy of 70 years. This means that around 9% of a person's lifetime was spent in retirement. Later, and especially in the 1990s, early retirement programmes expanded even as life expectancy rose. While the average retirement age is again at around 64 years after decades in which early retirement was the norm, individuals currently have a mean life expectancy of 80 years. Thus, Germans now spend around 21% of their lifetime in retirement. These positive outcomes of demographic change should be communicated.

Another proposal is to redesign the individual life cycle so that people work roughly the same number of years as they did in the past, but that the time spent working is distributed differently. The idea is that people could reduce their working hours while young in order to pursue alternative life goals like raising a family, and make up for these reductions by working additional hours after reaching retirement age (Vaupel and Loichinger, 2006[24]). However, the retirement age could be linked to remaining life expectancy (Fenge and Peglow, 2014[25]). It has, for example, been suggested that if we use modified government revenue and expenditure profiles that shift the retirement age by five years, all of the German *Länder* could finance their expenditures through their revenues. In this scenario, revenues would increase to 105% of the original level, while expenditures would be reduced to about 98% in even the most disadvantaged German states. How these developments play out in the future depends on how expenditures for the oldest old change. Studies have shown that the highest expenditures for health and long-term care are focused on the two years before death (Breyer and Felder, 2006[26]). If this continues to be the case, expenditures will not increase dramatically, as the largest financial obligations are also shifted to older ages, even as the number of oldest-old people living in Germany is expected to quadruple by 2050.

A shortcoming of this study is that a representative state profile for all German *Länder* has been used. This is suitable for estimating the demographically induced differences described in the chapter — still, this approach masks differences among the states in individual economic life cycles. Therefore, in future work, it would be interesting to estimate real state profiles for two representative states. The analysis could be adapted to estimate government revenues and expenditures for an economically sound and an economically weak German state, and their differences and similarities could be studied with a focus on their human capital investments and old age expenditures. In addition, it would be interesting to update the estimates when the latest Income and Expenditure Survey is released in late 2020. Already having state and municipality profiles for 2003 and 2013 that provide rather stable per capita estimates, these findings could be investigated to see if they hold for the most recent years. Such an outcome would strengthen the argument that the per capita values of revenues and expenditures can indeed contribute to efforts to predict future budgets.

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Notes

1. For a more detailed overview, see www.ntaccounts.org.

2. The 2013 survey data are the latest available estimates from the Income and Expenditure Survey. The consumption questionnaire and the corresponding scientific use file for the Income and Expenditure Survey 2018 will not be available until late 2020.

3. A detailed overview of the different taxes collected by level of government can be found in the "Methods and data" section.

4. For future research, it would also be interesting to estimate and compare the age profiles for two representative states in order to show what details the overall *Länder* profile masks. In addition, political or behavioural adjustments could be evaluated.

Chapter 4. Managing across levels of government: The challenge of pension reform in China

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The People's Republic of China is facing a "population ageing tsunami", with the share of the population aged over 65 expected to double between 2010 and 2030. Reforming the social security system to improve coverage, sustainability and equity is an urgent task for the government. This chapter examines the workings of the Urban Employee Scheme (UES), the main pension programme currently covering more than 400 million workers and retirees. Although nominally a national programme, the UES is a patchwork of pension pools, managed mostly at the city and county levels. Under fragmented management and weak oversight, the system is rife with underpayment and evasion and has stymied previous efforts by the central government to promote consolidation. This may finally change under top-down reforms implemented since 2013 that have strengthened governance and enforcement capacity. Improving equity and the long-term sustainability of the UES will also require extending coverage to younger migrant workers and strengthening their incentives for participation.

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Introduction

The People's Republic of China (hereafter 'China') is facing a "population ageing tsunami",[1] with the share of the population aged over 65 expected to double between 2010 and 2030. This has already led to a surge in public pension expenditures, with a near-quadrupling of outlays in the Urban Employee Scheme (UES), the largest scheme by expenditure, from CNY 1.05 trillion in 2010 to CNY 3.8 trillion in 2017, an annual growth of nearly 24% (National Bureau of Statistics, 2018[1]). This alarming demographic trend coincides with a broadening of public pension coverage in China's recent effort to improve public services, reinforcing the urgent need for reform to find a way to render pension programmes sustainable in the long term.

This chapter examines the issues and challenges facing the pension system in China. The focus will be on the public pension system, particularly the Urban Employee Scheme – often called the Basic Old Age Insurance Scheme – that provides coverage for 400 million urban employees and pensioners. While the pension system in the wider sense would include employer-based annuity funds and commercial annuity insurance programmes to provide supplementary sources of retirement income, these non-public elements have received little policy support and have seen little development in China (Fang and Feng, 2018[2]).

This chapter is organised as follows: the next section provides a brief description of the current public pension system and recent progress in broadening coverage. This is followed by an overview of the Urban Employee Scheme and its operations. The fourth section examines the problems of fragmentation and managing across levels of government. The final section describes current reforms and the way forward.

The current public pension system

China's public pension system consists of three schemes: the Urban Employee Scheme (UES); the Public Employees Scheme (PES); and the Basic Residents Scheme (BRS). All three schemes have two pillars – a defined benefit pillar funded by pooling contributions from employers and fiscal subsidies, and a defined contribution pillar funded by employee contributions. The first two schemes are compulsory, while the third is voluntary. A summary of their main features and current status are presented in Table 4.1.

The Urban Employee Scheme was launched in 1997 to provide coverage for urban employees (State Council, 1997[3]). As China urbanised rapidly over the next two decades, this scheme has grown with the size of the urban labour force, and its scope was expanded to take in self-employed urban residents. In 2017, the UES had a total enrolment of 402.9 million, comprising 292.7 million active employees and 110.2 million retirees (National Bureau of Statistics, 2018[1]).

The Public Employees Scheme was launched in 2015 as part of public service reform and provides coverage to the estimated 40 million employees working in government and public institutions (State Council, 2015[4]).[2] Before the PES was launched, these pensions were funded on a pay-as-you-go basis from the current operating budgets of government agencies and public institutions – a carryover from the planned economy that had applied to state-owned enterprises (SOEs) as well. Without a formal scheme, public employees did not pay contributions and enjoyed generous retirement benefits that were 80-100% of final salary, with adjustments pegged to current civil service pay. From the inception of the UES, public employee pensions diverged increasingly from urban employee pensions, growing

to nearly double the level of UES pensions. These costly pensions were widely resented and perceived to be a barrier to reforms to devolve public services to market provision.

Table 4.1. Key features of China's three pension schemes

	Urban Employee Scheme	Public Employees Scheme	Basic Residents Scheme
The official name of the scheme	Basic Old-Age Insurance for Urban Employees	Old-Age Insurance for Civil Servants and Public Institutions Employees	Basic Old-Age Insurance for Urban and Rural Residents
Eligibility for enrolment	Urban employees and self-employed	Civil servants and employees in public institutions	Urban and rural residents above 16 years old
Enrolment (millions)	402.9	40-45*	512.5
Compulsory enrolment	Yes	Yes	No
Contribution rates (% of salaries)	20% from employers; 8% from employees; 20% from self-employed	20% from employers; 8% from employees	Government subsidies + contributions to individual accounts
Vesting period	15	15	15
Retirement age	50-55 for women; 60 for men	50-55 for women; 60 for men	60
Average monthly benefits (CNY)	2 876	4 888	127
Target replacement ratio	59.2% with 35 years of employment	80-100% of final salary in 2015, to move toward the same level as UES	15-30%

Notes: *Enrolment for the Public Employees Scheme is estimated. Note that at the inception of the New Rural Pension programme, the government waived the 15-year vesting requirement for all those reaching retirement age before 2029.
Source: National Bureau of Statistics (2018[1]), *China Labour Statistical Yearbook 2018*, China Statistics Press, Beijing; Fang and Feng (2018[2]), "The Chinese Pension System", *NBER Working Papers* 25088, National Bureau of Economic Research, Cambridge; State Council (2005[5]), "Decision of the State Council on Improving the Basic Old-Age Insurance System for Employees of Enterprises", http://www.gov.cn/zwgk/2005-12/14/content_127311.htm; State Council (2014[6]), "Opinion of the State Council on the Establishment of a Unified Basic Old-Age Insurance System for Urban and Rural Residents"; State Council (2015[4]), "Decision of the State Council on the Reform of the Old-Age Insurance System for Civil Servants and Public Institutions Employees".

The PES is a transitional scheme toward integrating public employees into the main Urban Employee Scheme. Under the PES, public employees and their agencies pay contributions under the same rules that apply to the UES (see Table 4.1). At the inception of the scheme, civil service and public employee salaries were augmented to ensure the same level of take-home pay. Under the PES, retirement benefits will converge to those under the UES. To preserve some differentiation, public pension benefits will also be supplemented with an annuity financed by an annual 8% payroll contribution from the employers and 4% of contributing wage from the employees. A ten-year transition period guarantees that those retiring in this period will not see their pension benefits reduced due to the reform.[3] For now, the financing and management of the PES remain separate from the UES.

The Basic Residents Scheme was created in 2014 through the merger of the New Rural Pension Scheme and the Urban Residents Scheme (State Council, 2014[6]). The scheme is designed to provide coverage to urban and rural residents without formal employment. In practice, it also acts as the default scheme for a large number of migrant workers not covered under the UES – an issue discussed later in this chapter. Thanks to its residual status, it is the largest of the three schemes, with over 500 million participants.

Recent progress in improving coverage

As of 2008, only around 40% of the labour force was covered by government-sponsored pension arrangements – the UES, a rural pension system existing in some counties (covering 28.3% of the labour force),[4] and pension plans of government agencies (covering 7.2% of the labour force) and public institutions (covering 5.2% of the labour force) (Impavido, Hu and Li, 2009[7]). In the decade since, pension coverage was greatly expanded under the aegis of the Harmonious Society programme when the government began in the mid-2000s to re-orient budget spending toward public services (Wong, 2010[8]).

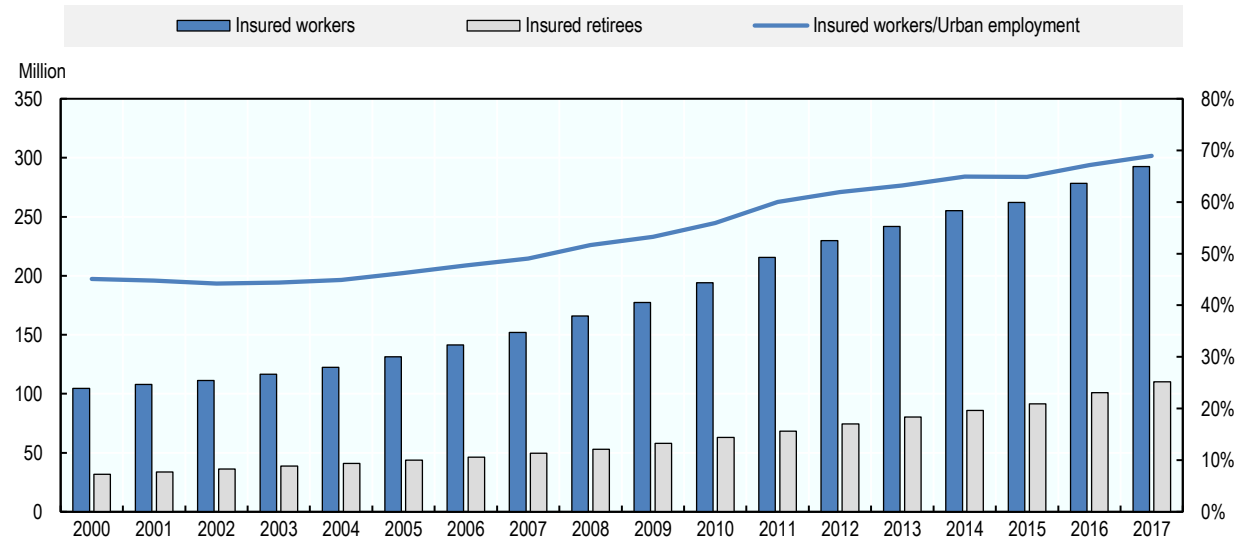
The New Rural Residents programme was introduced in 2009, offering eligibility to all rural residents regardless of employment status (State Council, 2009[9]). This was followed in 2011 by the Urban Residents Pension programme. With these programmes, the government extended public pensions to the non-employed and the labour force outside the formal sector, filling a huge gap in coverage. Although the schemes are voluntary, they are popular because they are heavily subsidised, and the threshold for joining is a contribution of as little as CNY 100 per annum to qualify for a basic pension. By 2010, over 100 million were enrolled, and participation jumped to 332 million in 2011 when the programmes were in operation in all provinces (National Bureau of Statistics, 2018[1]).

In 2014, the two residents' programmes were merged into the Basic Residents Scheme, and enrolment now exceeds 500 million. The scheme has a basic pension component funded by the central government for the central and western provinces (which together comprise two-thirds of China's population), and jointly with local governments for the eastern provinces. In some provinces, this basic pension is topped up by local government contributions. The scheme also has a defined-contribution component funded by individual contributions.

The Urban Employee Scheme has also seen significant progress in coverage in recent years. During 2000-17, the number of workers contributing to the scheme grew from 104.4 million to 292.7 million, when the coverage rate rose from 45% of the urban workforce to 69% (National Bureau of Statistics, 2018[1]; Zuo, 2014[10]) (see Figure 4.1). Figure 4.2 shows the growth in participation under the UES and the BRS. When the 40 million in PES are added, a total of 955 million people were covered under public pensions in 2017, nearly 90% of the population over age 16.[5]

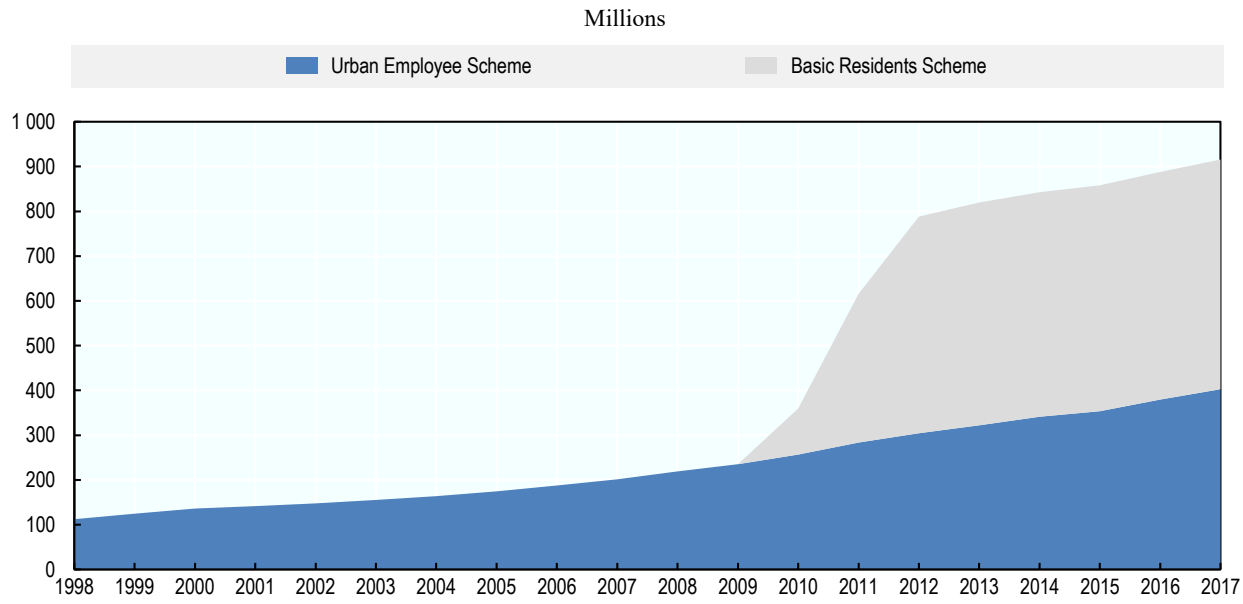
The recent expansion of pension coverage has made China stand out among emerging economies. Indeed, the Chinese government was given the International Social Security Association's Award for Outstanding Achievement in Social Security, which the association gives every three years, in recognition of China's "unprecedented progress in the development of its social security system in the past decade" (ISSA, 2016[11]). However, much work remains to achieve full social welfare coverage in China. As shown in Table 4.1, at present the benefit levels differ significantly across the three schemes, with average monthly pensions of nearly CNY 5 000 in the PES, almost CNY 3 000 in the UES, and only CNY 127 in the BRS. The reality is that more than half of the covered population are on the BRS, which will provide a pension that covers only a fraction of living costs in retirement, at a level that is far below the official poverty line.[6]

Figure 4.1. Number of participants in the Urban Employee Scheme, 2000-17



Source: National Bureau of Statistics (2018[1]), *China Labour Statistical Yearbook 2018*, China Statistics Press, Beijing.

Figure 4.2. Participants in the Urban Employee Scheme and the Basic Residents Scheme, 1998-2017



Source: National Bureau of Statistics (2018[1]), *China Labour Statistical Yearbook 2018*, China Statistics Press, Beijing.

An overview of the Urban Employee Scheme

The basic framework for the UES was set in the 1997 document, "Decision of the State Council on the Establishment of a Unified Basic Old-Age Insurance System for Employees of Enterprises". The scheme moved the financing of pensions out of state-owned enterprises into pension pools at the county or city level. The document called for a three-part pension system. The first part is a defined benefit plan called the basic pension funded

by enterprise contributions. The second part is a defined-contribution component funded jointly by employer and employee contributions into individual employee accounts. The third part would comprise voluntary, private pensions such as annuities or individual retirement savings plans. In practice, there has been little take-up of the third part of the policy, and private pensions remain underdeveloped in China.

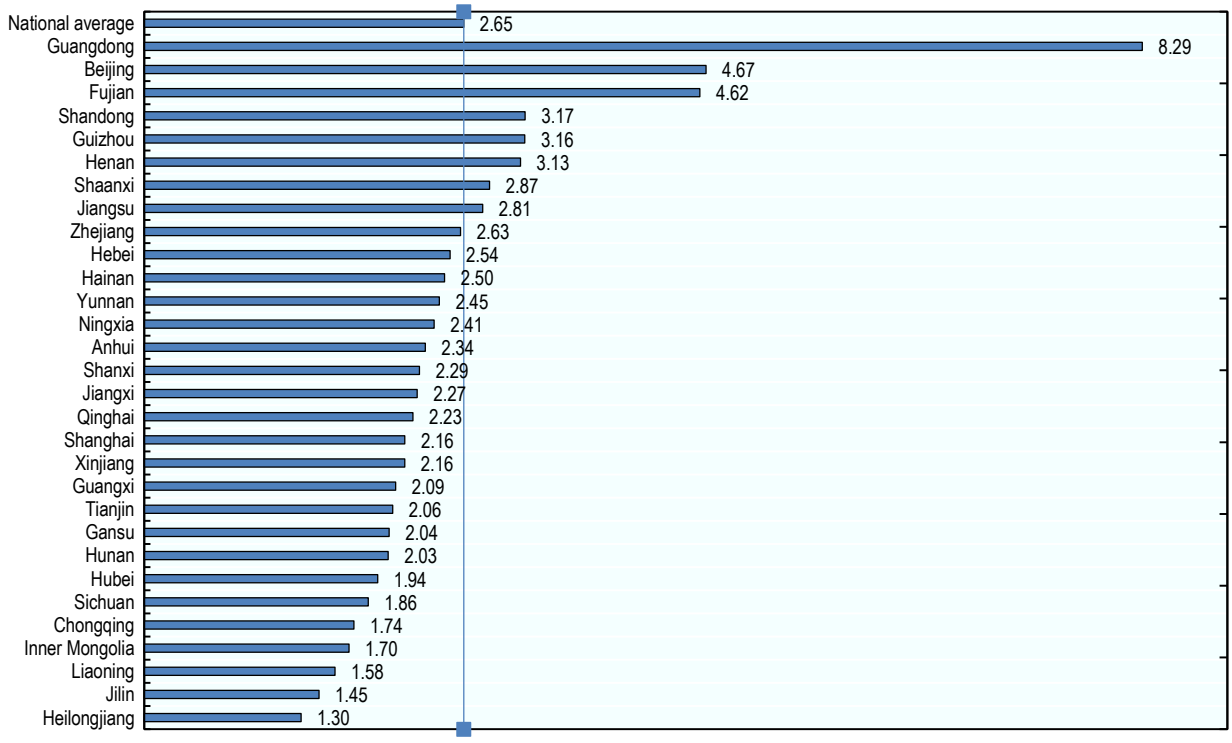
With subsequent tweaks to the basic design (State Council, 1998[12]; 2000[13]; 2005[5]) and the 2010 Social Insurance Law, the UES calls for enterprises to contribute up to 20% of payroll into the social pension pool. With an accrual rate of 1% per annum, it is designed to offer a basic pension of 35% of the city's average wage after 35 years of work. This basic pension would be supplemented with benefits from the individual account, to which employees contribute 8% of salary, and is designed to yield a target of 24.2% of the city's average wage.[7] Together, the target retirement benefit is 59.2% under the UES.

Although nominally a national scheme directed by the State Council and placed under the administration of the Ministry of Human Resources and Social Security (formerly the Ministry of Labour and then the Ministry of Labour and Social Security), at the operational level the UES is managed as local pension pools under city and county governments. This decentralised management feature is a legacy of the economic and political circumstances of the 1990s, as the scheme's inception coincided with the prolonged fiscal decline during the first two decades of transition when market reforms undermined the traditional support of state-owned enterprises provided by central planning mechanisms (Wong, 1993[14]). With the budget falling from one-third of the gross domestic product (GDP) in the late 1970s to only 10% of GDP during 1995-96, the central government was unable to commit fiscal support to public pensions. At the same time, the rollout of a public pension programme was urgently needed as a precondition to the reform of SOEs, whose deepening losses were further draining fiscal resources.

At inception, then, the UES left in place the pooling and management of pensions at the city and county level that were characteristic of pilot reforms at the time in Guangdong, Shanghai, etc.[8] Because of the differences in economic and demographic structures across localities, the contribution rates required to meet pension expenditures varied substantially across pools. In Guangdong province they reportedly ranged in the mid-1990s from 12% in Zhuhai (a newly emerging hub of labour-intensive exports) to 26% in Guangzhou, the provincial capital. Within the province of Hubei, contribution rates ranged from 19% to 32% across 70 counties and cities (West, 1999[15]). In light of these differences, the State Council launching document had expressly allowed provinces to set contribution rates in accordance with local needs, albeit in consultation with the Ministry of Finance and the Ministry of Labour (State Council, 1997[3]).

Today the UES remains a patchwork of thousands of local pension pools, some with as few as 30 000 participants. The differences in the economic and demographic conditions they face have only grown through the past two decades, as urbanisation accelerated, and young migrants moved in increasing numbers to growth centres where the jobs are located. This is reflected in the data presented in Figure 4.3, which shows the disparities in the ratio of workers to pensioners in the UES across provinces. At the top, Guangdong, whose export industries are magnets drawing young workers from other provinces, has more than eight workers to support each retiree. At the bottom are seven provinces that have fewer than two workers per retiree. The worst-off are Liaoning, Jilin and Heilongjiang, the three north-eastern provinces in China's "rust belt", which are burdened with declining heavy industries and aged workforces. Between 2014 and 2017, Heilongjiang reportedly added 640 000 retirees and only 165 000 workers to the province's UES (Guo, 2018[16]).

Figure 4.3. Disparities in support ratios across Chinese provinces, 2017

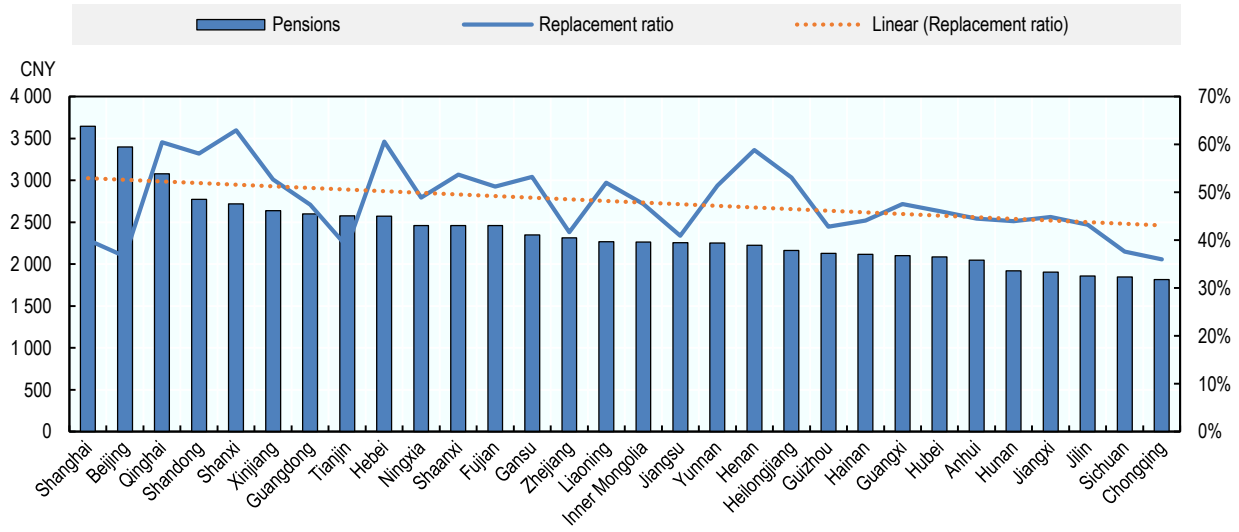


Notes: The support ratio is defined as the ratio of workers to pensioners. Tibet is removed as an outlier.
Source: National Bureau of Statistics (2018[1]), *China Labour Statistical Yearbook 2018*, China Statistics Press, Beijing.

To gauge the size of disparities across the UES, ideally, data at the city and county levels should be examined, where the pension pools are located. Unfortunately, such data are not available in the public domain. Instead, data on provincial-level data are primarily used. However, aside from the four provincial-level municipalities of Beijing, Shanghai, Tianjin and Chongqing, an average province has around 100 cities and counties, with the largest – Sichuan, having 204 – provincial-level data are highly aggregated and mask many inter-local differences (National Bureau of Statistics, 2018[17]). Whenever possible, information from local pension pools collected during fieldwork is used to supplement them.

Under the decentralised UES, pension benefits differ substantially across regions. In 2015, the average monthly pensions ranged from CNY 1 816 in Chongqing to CNY 3 644 in Shanghai, although their replacement ratios (derived as average benefits divided by the provincial average wage) were less dissimilar: 36% in Chongqing and 40% in Shanghai. As can be seen in Figure 4.4, however, there are substantial variations in the replacement ratio across provinces, ranging from 36% in Chongqing to a high of 63% in Shanxi. While the trend line suggests a positive relationship between pension benefits and the replacement ratio (with higher wage areas providing pensions at a higher replacement ratio), there are significant deviations, with the rich, coastal provinces of Beijing, Tianjin, Guangdong, Zhejiang and Jiangsu offering some of the lowest replacement ratios. Death benefits, too, can differ significantly across localities, ranging from around CNY 4 000 in the Gansu province in the west to more than CNY 50 000 in the coastal Shandong province.[9]

Figure 4.4. Provincial disparities in pension benefits and replacement ratios, 2015



Source: National Bureau of Statistics (2016[18]), *China Labour Statistical Yearbook 2016*, China Statistics Press, Beijing.

Even with the substantial variations in benefit levels that could help to alleviate pressures, many pension pools are unable to cover their costs. In 2010, it was reported that 14 provinces were in deficit and required subsidisation, including the rich coastal city of Shanghai (Fang and Feng, 2018[2]). In 2017, data from provincial budgetary accounts showed that among the 13 provinces reporting, 8 had expenditures exceeding receipts in their UES accounts before subsidies. In Jilin province, expenditures were nearly double what they took in from contributions (Table 4.2). At the sub-provincial level, the gaps may be larger still. In one fieldwork county, annual receipts from contributions are able to cover only one-third of pension outlays.[10]

Table 4.2. The financial status of urban employee pension schemes in a sample of Chinese provinces, 2017

	Contributions (CNY billions)	Expenditures (CNY billions)	Surplus/shortfall (% of expenditures)
Beijing	186.1	115.4	61%
Tibet	2.8	1.8	56%
Guangdong	276.4	204.5	35%
Shanghai	203.7	190.7	7%
Shandong	151.5	171.8	-12%
Xinjiang	31.7	36.1	-12%
Hainan	12.1	15.2	-20%
Tianjin	49.3	64.6	-24%
Gansu	26.9	36.2	-26%
Hunan	62.0	89.6	-31%
Sichuan	120.0	194.8	-38%
Hubei	84.3	138.8	-39%
Jilin	38.5	75.3	-49%

Source: Provincial final accounts for social insurance funds in 2017.

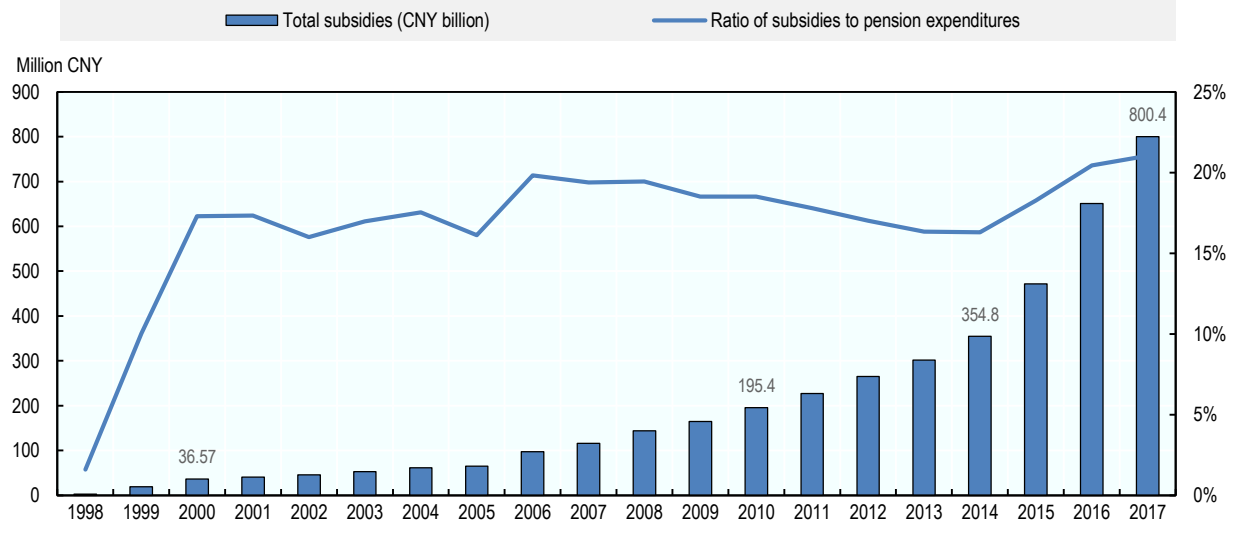
Problems of fragmentation and management across levels of government

Several studies have noted fragmentation as a salient feature of China's pension system and identified many problems that stem from it (World Bank, 1997[19]; West, 1999[15]; Zhao and Xu, 2002[20]; Cai and Cheng, 2014[21]; Zhang and Li, 2018[22]; OECD, 2019[23]; OECD, 2019[24]). Fragmentation of the pension system, especially in the presence of significant income disparities, places barriers on inter-regional and social mobility in the labour market (Zhang and Li, 2018[22]). It hinders the system from capturing the gains of increased risk sharing or taking advantage of the economies of scale that could be achieved in administration. Administrative costs are high, estimated by the Ministry of Finance (2016[25]) to be almost 4% of collections. Supervision and regulation are complex and challenging, and the lack of accurate information about local pools hinders long-term, strategic planning for social protection (Lou, 2019[26]).

In many respects, the deep problems of the UES are intergovernmental in nature, of managing across levels of government. The UES is a social insurance programme that is mainly managed by the cities and counties, with some provincial-level involvement but ultimately guaranteed by central government. This disarticulation between central policy making and fiscal responsibility from local policy implementation and fiduciary management has created serious agency and moral hazard problems.

One manifestation is the trend of growing budget subsidies to the UES, which is shown in Figure 4.5. Since 2010, subsidies have more than quadrupled, from CNY 195.4 billion to CNY 800.4 billion in 2017. Even since 2014, it has more than doubled in size and now covers 21% of national outlays in the programme. Mr Jiwei Lou, the just-retired Chairman of the National Social Security Fund and former Minister of Finance, pointed to this rapid growth in subsidisation as indicative of "too many defects in the system" and attributed them to the moral hazard arising from decentralised and fragmented management (Lou, 2019[26]).

Figure 4.5. The rapid growth of budget subsidies to the Urban Employee Scheme, 1998-2017



Source: National Bureau of Statistics (2018[1]), *China Labour Statistical Yearbook 2018*, China Statistics Press, Beijing; Statistical Bulletin on the Development of Human Resources (Labour) and Social Security (various years).

Non-compliance is a pervasive feature of this disarticulated system, and it comes in many forms. The first and most glaring is the fragmentation itself – the persistence of pension management at the county and city level, long after it ceased to be the government's model of choice.

From the start of pension reform, policymakers were concerned that disparities in contribution and benefit levels would place unequal burdens on enterprises across pension pools, creating an un-level playing field that could perpetuate and exacerbate long-term regional inequalities. To tamp down these disparities, the government began to promote a two-pronged strategy: consolidation of pools at the provincial level as a first step toward eventual national integration, and harmonising contribution rates across pools.

As early as 1991, official documents called for the UES pension pools to be consolidated to the provincial level and eventually to the national level (State Council, 1991[27]). These calls have been reiterated periodically, but have found little traction (State Council, 1995[28]; State Council, 1997[3]; Ministry of Labour and Social Security and Ministry of Finance, 2007[29]; National People's Congress, 2010[30]). The explicit redistributive intent of consolidation makes the effort unpopular with rich pension pools. When threatened with consolidation and losing their reserves, local governments reduced collection efforts, down-sized surpluses and even created deficits. Zhao and Xu (2002[20]) attributed two waves of early retirements to local government resistance to consolidation efforts – the first in the early 1990s after the State Council 1991 document called for moving pension pooling to the provincial level, and the second in the late 1990s, following the closure of industry pension programmes and merging them with local pension pools.[11] Similar tactics can be seen in recent times. Over the past decade, under the growing threat of consolidation since the promulgation of the 2010 Social Insurance Law, local governments have adopted a variety of ways to reduce surpluses and accumulate future liabilities. For example, it was learned in fieldwork that some of the cash-rich pension pools in Guangdong province are busy enrolling local residents in the UES regardless of their employment status and eligibility, thereby shifting pension liabilities from the budget-funded BRS to soak up some of the surpluses in the UES. Even in deficit counties, officials are promoting "buy-ins" to the UES to collect an upfront payment in exchange for future liabilities (see Box 4.1).

Box 4.1. Moral hazard and the "buy-in" option in the Urban Employee Scheme

The "buy-in" allows a person who has not made 15 years of pension contributions, the minimum vesting period required for earning pension benefits, to pay a lump sum fee to make up the difference. The "buy-in" option was introduced in the 1990s to allow former workers of collective enterprises who had been left out of state-sector benefits, to enrol in the UES. We learned in fieldwork in July 2019 that the option is alive and well and used by rich and poor pension pools alike.

In a poor county in central China where contributions to the UES have been able to cover only one-third of pension outlays in recent years, accepting "buy-ins" is embraced by local officials to help the county meet its revenue quotas for the UES. According to a deputy director of the county social security bureau, the buy-in fee for both female and male residents with no prior contribution history is CNY 94 000 to qualify for benefits that start at age 55 for females and 60 for males. In 2018, the monthly pension was

CNY 1 050, and benefits include a final lump sum death benefit of CNY 42 000 payable to the family. With an estimated actuarial present value of around CNY 632 000 for women and CNY 436 000 for men (Yuan, forthcoming[31]), the buy-in option is creating significant future liabilities for the UES, while providing short-term relief for the county's present financial needs.

In a rich prefecture of a coastal province, the buy-in option has been used liberally since 2011 to enrol local residents in the UES regardless of their employment status, and the government has gone so far as to provide subsidies and bank loans to help the poorer residents meet the costs of their buy-in fees. The results are reflected in the prefecture's statistics, which show that by 2018, an absolute majority of local residents were covered under the UES – a share much higher than the national average. The buy-ins serve two purposes for the prefecture. First, they help to effectively shift the prefecture's pension liabilities from the BRS, a budget-funded scheme, to the UES, whose large surpluses are expected to be transferred elsewhere. In the meantime, the government is also able to significantly raise the average pension benefits for its residents.

Whether it was due to such resistance or the lack of fiscal capacity or political will, to date the effort to promote consolidating pension pooling has been largely stymied. As of 2017, only six provinces have unified the collection of premium contributions, benefit payments, and management of reserves. Of the six, four are provincial-level municipalities (Beijing, Tianjin, Shanghai, and Chongqing), leaving only two provinces that are managing pension pools. Another 13 provinces have set up provincial risk funds that hold reserves by collecting a contribution from the local pools, to be used to bail out shortfalls when necessary (Zhang and Li, 2018[22]). In 12 provinces, cities and counties remain entirely on their own in managing their pension programmes.

The effort to harmonise contribution rates to eliminate unfair inter-regional competition, which intensified from 2006 onwards, has met with a similar fate, albeit in a more subtle way. The 2010 Social Insurance Law stipulates contribution rates of "not more than 20%" from employers, 8% from employees, and committed central and local government subsidies to meet shortfalls. Official data seem to show pension pools mostly complying with rates that are at or near the targeted levels, except for the Guangdong and Zhejiang provinces (Table 4.3). Data available on cities, though, show that within provinces there are some differences in reported rates. In Fujian, for example, Xiamen, which has a special status as a semi-provincial level city, has a reported rate of 12%, compared to 18% in Fuzhou, the provincial capital of Fujian. In all cases, though, the provincial governments appear to play a role in setting contribution rates for the lower level pools (State Council, 1995[28]; 1997[3]).

Table 4.3. Reported enterprise contribution rates by Chinese province, 2016

	Contribution rate (%)		Contribution rate (%)		Contribution rate (%)
Beijing	19	Anhui	19	Chongqing	19
Tianjin	19	Fujian	18	Sichuan	19
Hebei	20	Jiangxi	19	Guizhou	19
Shanxi	19	Shandong	18	Yunnan	20
Inner Mongolia	20	Henan	19	Tibet	20
Liaoning	20	Hubei	19	Shaanxi	20
Jilin	20	Hunan	19	Gansu	19
Heilongjiang	20	Guangdong	14	Qinghai	20
Shanghai	20	Guangxi	19	Ningxia	19
Jiangsu	19	Hainan	20	Xinjiang	19
Zhejiang	14				

Source: 51-HR (2017[31]), *Human Resources Management Commonly Used Standard Data Query* (database), http://hr.51labour.com/data/list-17.html, accessed in March 2017.

Problems of compliance

These official contribution rates, however, are undermined by the existence of widespread and serious problems of underpayment that are found in more granular data and from fieldwork investigations. Nyland, Smyth and Zhu (2006[32]) reported that 71% of a sample of 2 600 firms audited in Shanghai in 2001 were found to have paid less than their mandated social security contributions.[12] Recent studies have similar findings. Zheng (2016[33]), for example, found that nationwide, 70% of firms had paid less than the prescribed levels of contributions in 2015.[13]

Under-reporting wages is a common tactic for getting around mandated contribution rates. One version of this is deliberately choosing the wrong basis for calculation. For example, in 2015 employers in Beijing were found to have paid only 64% of their mandated contributions because they used imputed wages based on the previous year's "local average wage", rather than actual payroll, in making pension contributions (China International Economic and Exchange Center, 2017[34]). In fact, using imputed wages based on the "local average wage" is widely adopted even though the Social Insurance Law stipulates that "the employer shall pay the UES insurance premium in proportion to the total wages of the employees of the unit" (National People's Congress, 2010[30]). In Hunan, provincial authorities go further, by allowing local pension pools to use the 2016 local average wage as the pension contribution basis for three years in a row in 2017, 2018 and 2019, thus increasing the amount of underpayment each year.[14]

The practice of using imputed rather than actual wages and applying a band of 60–300% of the local average wage as the contributing basis was introduced in the 1990s. It was applied to the employees' contributions to their individual accounts – as distinct from employer contributions, and the 60% minimum was meant to prevent firms from under-reporting and using artificially low wage figures (West, 1999[15]). Over time, however, imputed wages came to be widely adopted in calculating employers' contributions as well. Deviating from actual wages allowed for further distortions in the calculation of pension contributions, by grouping employees into a few tiers. For example, a 2018 document from the Beijing Social Security Bureau specified the contributing base wages to be applied for four categories of employees, those paying at 300% of the local average wage, and at 70%, 60% and 40%.[15] A 2018 survey conducted by 51Shebao, a social insurance information service provider, found that only 27% of companies have made full payment of their social

insurance contributions, while 31% paid at 60% of the local average wage (Cheng, Yu and Han, 2018[35]).

Local governments condone these underpayments. In one small county visited by the authors in a central province, officials in the social security bureau admitted that even though it violates the Social Insurance Law's mandates, most private companies in the county are allowed to pay social insurance premiums at 60% of the local average wage, if at all. According to one official, "We do want to collect the right amount of pension contributions, but we can't kill these companies only for the sake of doing that." In that county, most, but not all, state-owned enterprises pay pension contributions according to the real level of salaries. One of them, a local branch of China Tobacco, the highly lucrative state monopoly for tobacco products, pays pension contributions at the upper end, at 300% of the local average wage.[16]

In China's decentralised system, where local governments compete fiercely for economic growth and investment, firms with mobile capital have significant bargaining power. Indeed, the officials in the visited central provincial county lamented a lost opportunity in 2017, when a large heavy machinery manufacturer was considering building a plant in the local industrial zone. The company demanded a concessionary pension contribution rate of 14%, which the county government supported. However, the provincial government turned down the special request, and the firm went elsewhere.

In this environment, it comes as no surprise that a large employer like Foxconn, which employs more than 350 000 workers to make iPhones in Zhengzhou, can operate with impunity in its labour practices. China Labour Watch, an international watchdog non-governmental organisation (NGO), reported that it found the workforce in the Foxconn facilities in Zhengzhou to comprise about 50% of temporary workers in August 2019, in gross violation of the 10% upper limit imposed by the Chinese Labour Law. This came after it had been condemned in 2018 for using temporary workers to fill 55% of the workforce, including high school students and student interns, and vowed to do better under pressure from Apple (Gurman, 2019[36]). Many of these temporary workers may not be covered under social insurance.

As for the fiscal backstop for the UES, the 2010 Social Insurance Law stipulates that subsidies would be provided in cases of a shortfall in the social insurance accounts, shared between the central and local governments. However, it is silent on the basis for the allocation and apportionment of responsibility between the central and local governments. In practice, the annual allocation is *ad hoc* for nearly all transfers in the central government budget.[17] Their distribution across provinces appears to be similarly *ad hoc* and negotiated. For example, to cover the large deficit and to meet social security payments obligations in 2016, the province of Heilongjiang had to negotiate for a special loan from the central government on top of the subsidy it received.[18]

In provinces that have set up provincial risk pools, the coverage of pension shortfalls may be treated more systematically, but there is little public information about the arrangements. In the other provinces, case-by-case negotiations appear to permeate the system at all levels. A Hunan provincial government document on pension policy explains that the province shares the responsibility for pension subsidies with prefectural and county-level governments "based on factors of the local economy and society such as medium-to-long-term socio-economic development planning, economic development status, demographic structure, employment situation, fiscal capacity, number of participants in the pension insurance schemes and dependency ratio" (People's Government of Hunan, 2019[37]).

Lacking accurate information on the local pension pools and given weak enforcement capacity, the system often falls back on a form of contracting.[19] In the poor central China county visited, officials explained that the county is given an annual quota for pension contributions, which they must fulfil before higher levels will provide assistance, and then only after much pleading and sometimes theatrics.[20] This echoes a report from the Chongqing Municipality, where a deputy director in the social security bureau explained that they treat each county or district differently depending on how the targets for pension revenues and expenditures are met each year (Xinhua Net, 2019[38]).

Current reforms and the way forward

Over the past decade and especially since 2013 under Xi Jinping, China has rolled out a co-ordinated programme of reform and institution building aimed at creating a more centralised and rules-based system of governance and public service delivery (Wong, 2016[39]; Wong, 2018[40]; Gruenberg and Drinhausen, 2019[41]). To combat the longstanding weaknesses in policy implementation, especially in monitoring and enforcement at the local levels, reforms have over the past six years focused on strengthening top-down vertical controls, boosting the legal framework and monitoring capacity, with inspections being the hallmark of monitoring efforts in recent years.[21] Examples include reforms in public financial management processes that have greatly improved the information content and reporting of budgets at all levels of government, assigned responsibilities to various agencies and levels, built performance evaluations into the budgeting process, and subjected all public spending to regular, external audits. In environmental protection, another key policy area prioritised by the top leadership, laws, regulations and action plans have proliferated to support climate goals. Reforms have also assigned more resources and elevated the status of environmental agencies, and created inspection mechanisms to strengthen monitoring and enforcement capacity to ensure implementation at the lower levels (Wong, 2019[42]).

Social security reform is part of this agenda, with a co-ordinated and highly ambitious programme aimed at addressing critical issues in financing, incentives, and administration of the UES. The efforts began with the introduction of stricter rules for accounting and transparency in 2010, when the State Council called for the creation of a "Social Insurance Fund Budget" (SIFB), and laid out the principles, scope and methods of compilation (State Council, 2010[43]). The SIFB would include the accounts of the public pension schemes (the UES and, at the time, the New Rural Pension Scheme), the medical insurance schemes, and the unemployment insurance, disability insurance, and maternity insurance programmes.[22] The Social Insurance Law, passed in October 2010, stipulated that financial accounts for each of the social insurance programmes must be reported in the SIFB using a uniform system of national accounting standards (National People's Congress, 2010[30]).

When the revised Budget Law was promulgated in 2015, the SIFB came to be included as one of four budgets that governments at all levels are required to compile and publish on-line within 30 days of their approval by the People's Congress (Wong, 2016[39]; Wong, 2018[40]).[23] As the National Audit Office has expanded authority to conduct regular, rather than *ad hoc*, audits of the budget, its oversight responsibility extends to the social insurance funds as well (Wong, 2019[44]).

More dramatic reforms came only recently. For the UES, one of the most important changes is an overhaul of the system of collecting social insurance levies. In March 2018, the government announced that starting from 1 January 2019, tax bureaus would be responsible for the collection of all social insurance premiums nationwide, replacing the previous

arrangement where they were collected either by the social security bureaus or local tax bureaus (CPC Central Committee, 2018[45]). Significantly, an announcement soon followed that implementation is put off temporarily to allow for preparations, and the State Council called for a phased, step-by-step, province-by-province transition (State Council, 2019[46]).

This is a dramatic change. Although many provinces had turned over the collection task in recent years to the local tax bureaus, this change is significant because it comes on the heels of the consolidation of tax administration under the central government in June 2018 (CPC Central Committee and State Council, 2018[47]).[24] When implemented, it will potentially remove local governments from the assessment and collection of pension contributions and transform the social security contributions into a tax obligation – closing a loophole and plugging a significant gap in compliance.

To improve incentives, and betting that improved collection will enable the government to reduce contribution rates while maintaining solvency of the system, in April 2019, the State Council issued a document allowing provincial governments to reduce the pension contribution rate to 16% for employers (while keeping employee contributions unchanged at 8%) (State Council, 2019[46]). This follows a 1% reduction that had been allowed in 2016 for nine months as a stimulus measure in response to a slowing economy (Ministry of Human Resources and Social Security and Ministry of Finance, 2016[48]), and which had been extended for another year in 2018 (Ministry of Human Resources and Social Security and Ministry of Finance, 2018[49]).

Other reforms outlined in the 2019 State Council document include a call for the consolidation of the UES at the provincial level to be achieved by 2020. It also called for the creation of a Central Adjustment Fund (CAF) as a risk-sharing mechanism managed at the central level to boost the central government's capacity to provide funding to bail out ailing local pension pools.

The CAF began operation in July 2018. It is designed to draw from each province a set percentage of UES pension revenues, with the pooled funds returned to the provinces by a formula taking into account the number of retirees in each province (State Council, 2018[50]). At the start, the fund drew 3% of "base revenues" from each province, with formulas set as follows:

- Contribution from province *i* = 3% * (90% of the average wage in province *i* * number of UES participants in province *i*)[25]
- Disbursement to province *i* = the number of retired persons in province *i* * national disbursement per retiree; with
- National disbursement per retiree = total in CAF / total number of retirees in UES

In April 2019, the first accounting of the CAF was published, showing a total CAF pool of CNY 484.5 billion collected and disbursed. Guangdong, the richest provincial pool, contributed CNY 74.2 billion and drew CNY 26.8 billion from the CAF. At the low end, Liaoning contributed CNY 13.1 billion and received CNY 34.7 billion (Table 4.4). Even at this initial rate of 3% contribution, the CAF is already comparable in size to the central government's current subsidies to the UES, which totalled CNY 528.5 billion in 2019 (Xinhua Net, 2019[51]). With the contribution rate raised to 3.5% in 2019 and further in the future, the CAF is designed to alleviate fiscal pressures. Equally important is that the CAF is seen as the first step toward the eventual integration of the pension system at the national level.

These are early days, and much work remains to be done, including the verification of the parameters underlying the CAF calculations, but this appears to be an important foundational first step towards building a nationally integrated system of social insurance for urban employees.

In summary, after a long lag, the pace of reform in the pension system accelerated sharply in 2018. As many of the changes were only introduced in 2018 and 2019, and are therefore just underway or are still under preparation, it is much too soon to assess their impact, especially given the long history of reforms that have been thwarted by local resistance.

Table 4.4. Central Adjustment Fund accounts, 2019

CNY 100 million

	Remittance	Receipt	Surplus/deficit
Guangdong	741.6	267.6	474.0
Beijing	394.0	131.2	262.8
Zhejiang	381.8	273.2	108.6
Jiangsu	478.8	371.2	107.6
Shanghai	330.4	228.0	102.4
Fujian	157.8	71.4	86.4
Shandong	338.6	259.8	78.8
Yunnan	74.6	74.6	0
Guizhou	72.6	72.6	0
Tibet	6.4	6.4	0
Xinjiang	49.2	51.8	-2.6
Qinghai	12.2	16.8	-4.6
Hainan	24.4	30.2	-5.8
Ningxia	19.2	26.4	-7.2
Tianjin	84.6	96.4	-11.8
Xinjiang Military Corps	18.0	31.0	-13.0
Henan	168.4	183.4	-15.0
Shaanxi	85.4	103.2	-17.8
Gansu	41.4	62.0	-20.6
Anhui	108.8	138.0	-29.2
Guangxi	73	102.2	-29.2
Jiangxi	101.2	133.4	-32.2
Shanxi	65.4	100.6	-35.2
Chongqing	130.4	169.4	-39.0
Hebei	116.4	176.0	-59.6
Inner Mongolia	55.0	116.0	-61
Hunan	106.4	175.2	-68.8
Hubei	153.0	245.4	-92.4
Jilin	59.0	157.2	-98.2
Sichuan	197.2	375.0	-177.8
Heilongjiang	68.4	252.2	-183.8
Liaoning	131.0	346.8	-215.8
Total	4 844.6	4 844.6	

Source: Ministry of Finance (2019[52]; 2019[53]), "2019 Central Transfer Fund Expenditure & Revenue Tables".

What is different this time is the co-ordinated nature of the reform measures. When completed, the accounting and public financial management reforms will improve the uniformity and veracity of reporting on social insurance accounts. Including the Social Insurance Budget in the annual budget report to the National People's Congress and sub-national congresses has elevated the issues of social insurance on the policy agenda. Moving the collection of social insurance contributions from the social insurance departments to the State Tax Administration will remove local government meddling and improve compliance with contribution requirements, and the creation of the CAF has enlarged the risk pooling. When implemented, these reforms will bring far-reaching changes and, in the aggregate, go a long way toward strengthening the governance and sustainability of the programme.

To strengthen the financial sustainability and fairness of the pension system further, reforms must improve the incentives for attracting and retaining the younger migrant workers and service sector workers – important concerns that are beyond the scope of this chapter.

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Notes

1. This is a term coined by Cai and Cheng (2014[21]).

2. There are no public accounts of the PES, so the actual enrolment in the PES is unknown. Estimates run from 37 million to nearly 50 million. Our estimate is based on current public employment of around 41 million, but among whom many of the staff at public institutions had been moved to the UES over the past decade, and they are offset by the retirees in the system.

3. During the transition period, benefits will revert to those under the old rules if benefits calculated under the new rules are lower.

4. In the 1990s, there were in some localities rural pension schemes funded by contributions from rural households and subsidised by rural collectives, set up under an initiative by the Ministry of Civil Affairs, but they were largely unsuccessful.

5. The potential target population consists of the population aged 15 and above, excluding full-time students in high schools, colleges and universities. In 2017, the population aged 15 and above in China was 1 156.6 million (National Bureau of Statistics, 2018[17]), while the number of full-time students in high schools, colleges and universities was 77.5 million (Ministry of Education, 2018[54]), resulting in a target population of 1 079.1 million.

6. The national poverty line in 2017 was CNY 3 335 for annual disposable income per capita (People's Government of Chongyi County, 2016[55]). The average pension for the BRS was less than half of the poverty line.

7. From 2006 onwards, the individual accounts are funded only by employee contributions.

8. For the history of the Chinese pension system and reasons for its fragmentation, see (Hussain, 1994[56]; West, 1999[15]; Cai and Cheng, 2014[21]).

9. According to a document issued by the Department of Human Resources and Social Security of Gansu, the amount of death benefits for the UES was increased to CNY 3 676 in 2014, which was the latest adjustment to the death benefits in Gansu (Department of Human Resources and Social Security of Gansu, 2016[57]). According to the website of the Department of Human Resources and Social Security of Shandong, the amount of death benefits for the UES was set to equal to 10 months of the average monthly wage in the province in the previous year since 1993 (Department of Human Resources and Social Security of Shandong, 2019[58]). Therefore, in 2017, the death benefits were CNY 3 676 in Gansu and CNY 52 970 in Shandong, as the 2016 average monthly wage in Shandong was CNY 5 297 (Department of Human Resources and Social Security of Shandong, 2017[59]).

10. Fieldwork interviews in a central province in July 2019.

11. At the time the UES was created, 11 industries were allowed to set up their own social pension pools. These were shut down by order of the State Council in 1998.

12. The audit had covered only 2 600 firms out of 100 000.

13. Cited in Fang and Feng (2018[2]).

14. Fieldwork interviews in 2019.

15. For more information, see Bureau of Human Resources and Social Security of Beijing (2018[60]).

16. Fieldwork interviews in a central province in July 2019.

17. The exceptions are tax rebates, which are specified by law; and the funding for the equalisation transfer, which comes from a portion of the corporate income tax.

18. Interview with an expert on Chinese pension reform in Beijing in July 2017.

19. This situation is highly reminiscent of the revenue-sharing system before the Tax Sharing System reform was implemented in 1994, when the central government had little information about local tax bases and tax effort, and resorted to fiscal contracting to ensure it could extract at least some revenue from local governments (Wong, 1992[61]).

20. In one episode recounted in a poor county visited, the director of the Human Resources and Social Security Bureau said that he had to write special reports to the Provincial Department of Human Resources and Social Security to plead for the transfers needed, and forced the whole team in his bureau to work until midnight of the day before pension payments were issued, to collect enough to narrowly avoid a delay in payments (Fieldwork interviews in a central province in July 2019).

21. For other aspects of institution building in the Xi Jinping administration, see (Wong, 2018[40]).

22. There are currently eight programmes in the Social Insurance Fund Budget: the UES, PES, BRS, the Urban Employees Basic Medical Insurance, the Basic Residents' Medical Insurance, and the Disability, Maternity and Unemployment insurance programmes.

23. The "four budgets" includes the general budget, the "government fund budget" comprising earmarked "funds" including revenues from land conveyance, the "state capital operating budget" of profit remittances from SOEs, and the SIFB.

24. The central and local tax administrations were merged in June 2018 under the State Tax Administration.

25. The document calls for using the total number of workers (all of whom should be enrolled) rather than the actual UES participants. As a compromise, the average of the two is used for the transition period.

Chapter 5. Brazil's demographic transition and its effect on public spending

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This chapter presents future public spending projections for Brazil as a result of the demographic transition. The end of the demographic dividend, which will be followed by population ageing, will affect spending on health, education, social programmes and social security, including pensions. Health spending will increase significantly in absolute terms but should maintain its share as a proportion of gross domestic product (GDP). Education expenditure will decline. As education spending in Brazil is determined by the level of education, the reduction in spending will not be linear, and will affect all levels of government. The biggest challenge will be the payment of social security benefits, putting at risk the sustainability of the government finances. Therefore, the most urgent task for federal, state and municipal governments is to pursue comprehensive social security reforms that will guarantee basic government functions in the coming years.

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Introduction

Since the 1930s, Brazil has been facing a rapid demographic transition, characterised by both mortality and fertility declines with consequences for the size, growth and age profile of its population (Carvalho and Wong, 2008[1]). The United Nations projections indicate that demographic growth rates will decline from 1.26% in 2000-05 to -0.60% in 2100 (United Nations, 2019[2]). In the same period, the dependency ratio (i.e. the ratio between dependents – youth and elderly – and the working-age population) will change significantly. It will have declined from 129 per 100 adults in 1970 to 60.6 in 2025 because of the reduction in the proportion of youth but will recover again, reaching 106.7 in 2100 due to population ageing. Families, markets, and the public sector will have to adapt to the changes in demand brought about by a rapidly ageing population.

The pressures of population ageing on the public pension system have been at the centre of debate in academia and the press. However, the demographic transition also represents critical challenges for the provision of public services, including education and health, and other public transfer programmes. The demographic transition affects not only public expenditure, but also public revenues because it affects labour supply and the growth rate of gross domestic product (GDP), as shown in Barbosa Filho (2014[3]).[1]

During the second phase of the demographic transition (after the 1960s), the working-age population increased sharply, leading to growth in public spending. However, compared to other high and middle-income countries, there was relative neglect of public investment (education, health and nutrition) in children and young people, while the share of the elderly in the population was still small. It was only after the promulgation of the new national constitution in 1988 that public investment in younger age groups started to expand, whereas transfers to the elderly increased further, owing to more extensive coverage and and more generous benefits (Turra, Queiroz and Rios-Neto, 2011[4]). Demographers and economists have documented, that public spending is elderly-biased since the 1990s with the help of intergenerational accounting models (see Turra (2000[5]); Turra and Queiroz (2006[6]); Turra, Queiroz and Rios-Neto (2011[4])). Recently, Turra, Queiroz and Mason (2016[7]) showed that the ratio between per capita net public transfers to people over 65 years and those under 19 years had remained higher in Brazil than in any other country over the last two decades, despite having declined since the 2000s, due to increased spending on education and the implementation of transfer programmes to low-income children.

With an increasing fraction of the population at older ages, larger transfers of the public pension system compromise public investment and raise fiscal risks. The demographic changes have not only had an impact on the Brazilian pension system but also the public provision of health services. A declining working-age population will limit labour supply and thus potential output (Barbosa Filho et al., 2014[3]), heightening public budget constraints. Since labour productivity growth will probably not be enough to compensate for the declining supply, imbalances will require reforms in order to maintain budget solvency.

It is crucial to estimate the impacts of the demographic transition on public spending in order to plan public budgets over time. In this chapter, the evolution of public spending is estimated until 2060 as a result of changes in the age structure of the Brazilian population. The evolution of public expenditure of the pension (both private-sector workers and public servants), public health and education system and of social transfers, both in real terms and as a percentage of GDP, at the federal, state and local level will be discussed. The chapter

is organised into eight sections in addition to this introduction. The next section estimates the impacts of the demographic transition on the Brazilian GDP. The third to the seventh section discuss the consequences of population ageing, respectively, on health, education, pensions, other types of public transfers, and long-term care programmes. The penultimate section summarises the results and the final section presents conclusions.

The demographic transition and potential GDP growth

This section provides estimates of potential GDP growth rates for Brazil, considering the demographic changes that are expected to occur in the next few decades, using the methodology described in Barbosa Filho et al. (2014[3]). The authors combined economic and demographic variables in a single model to forecast the GDP growth trajectory. The estimates show that the growth rate of the working-age population will decrease over time, dropping to less than 1% per year after 2022. The decline in the working-age population growth will limit the expansion of Brazil's potential output to a rate below 2% until 2050. The increase in female labour force participation will mitigate this, but it will not offset the adverse effects on potential output. To maintain the current potential working-age population growth rate constant in the face of the demographic changes, Brazil would need an immigrant inflow of around 2 million people per year, a figure that is a hundred times higher than the current rate.

GDP potential forecast methodology

Following Barbosa Filho et al. (2014[3]), we estimate GDP growth rates based on the evolution of the working-age population (WAP) and labour-force participation rates (LFP), under the hypothesis that the occupied population growth rate reflects the variation of LFP, i.e. unemployment is assumed to be constant. The potential GDP growth estimates are presented in two ways. The first method uses the aggregate production function employing capital and labour, while the second method assumes constant labour productivity. It follows Barbosa Filho et al. (2014[3]), adopting a Cobb-Douglas production function and simplifying assumptions on depreciation and total factor productivity. According to a Cobb-Douglas technology, the potential GDP growth $\left(\frac{\dot{Y}}{Y}\right)$ is given by (1):

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \alpha\frac{\dot{K}}{K} + (1-\alpha)\frac{\dot{L}}{L} \qquad (1)$$

where $\frac{\dot{A}}{A}$ is TFP growth, $\frac{\dot{K}}{K}$ is the capital stock growth (which depends on the investment rate, considered to be equal to 16% ($\frac{I}{Y} = 0{,}16$)); $\frac{\dot{L}}{L}$ is labour supply growth and α is the labour income participation rate, assumed to be equal to 40% ($\alpha = 0{,}4$), consistent with Brazilian data.

The second method follows Dang, Antolín and Oxley (2001[8]), who adopted a methodology that decomposes potential GDP growth rate into two components: labour productivity growth and labour supply growth. Accordingly, potential GDP growth $\left(\frac{\dot{Y}}{Y}\right)$ follows equation (2):

$$\frac{\dot{Y}}{Y} = \frac{\dot{P}_T}{P_T} + \frac{\dot{L}}{L} \tag{2}$$

where $\left(\frac{\dot{L}}{L}\right)$ represents labour supply growth and $\left(\frac{\dot{P}_T}{P_T}\right)$ the labour productivity growth rate.

Empirical evidence shows that labour productivity growth in Brazil was around 1% per year between 1982 and 2016. Therefore, for the simulations, a labour productivity growth rate equal to 1% per year is adopted.

Results

Table 5.1 presents the potential output growth estimates based on the two methodologies discussed above. The demographic transition will lower labour input growth to negative rates after 2037, adversely affecting potential output growth. Both methods indicate a monotonic decrease in potential output until 2052.

Table 5.1. Projected labour and potential output growth rates in Brazil, 2017-2052

Percentage

Year	Labour supply	GDP (Barbosa Filho et al.)	GDP (Dang, Antolín and Oxley)
2017	1.8	2.5	2.8
2022	1.3	2.3	2.3
2027	0.9	2.0	1.9
2032	0.4	1.7	1.4
2037	0.0	1.4	1.0
2042	-0.3	1.1	0.7
2047	-0.4	0.9	0.6
2052	-0.6	0.8	0.4

Projected public health expenditures

In many countries, the empirical evidence suggests a non-monotonic relationship between health spending and age. Health expenditure is typically higher among children (especially toddlers) and the elderly. Estimates of the National Transfer Accounts (NTA) project (www.ntaccounts.org), which compares generational accounts in more than 40 countries, as well as other national studies, e.g. Reis, Noronha and Wajnman (2016[9]), confirm that the public health spending age profile also has a "J" shape in Brazil. The age patterns vary across societies, depending on population health standards, mortality profiles, health systems, available technology, habits, culture and other national characteristics (Noronha and Turra, 2013[10]; Berestein and Wajnman, 2008[11]). Age is indeed a proxy to many observable and non-observable variables that affect health expenditure in several indirect ways (Evans, 1985[12]; Zweifel, Felder and Meiers, 1999[13]; Werblow, Felder and Zweifel, 2007[14]; Brockmann and Gampe, 2005[15]). For instance, estimations suggest that the time

until death explains large differences in health care spending and can be the reason why spending on the elderly is higher (Raitano, 2006[16]; Miller, 2001[17]). In addition, increases in health spending at older ages are higher in higher-income countries, suggesting that the age profile of spending shifts with GDP growth (Mason and Miller, 2017[18]).

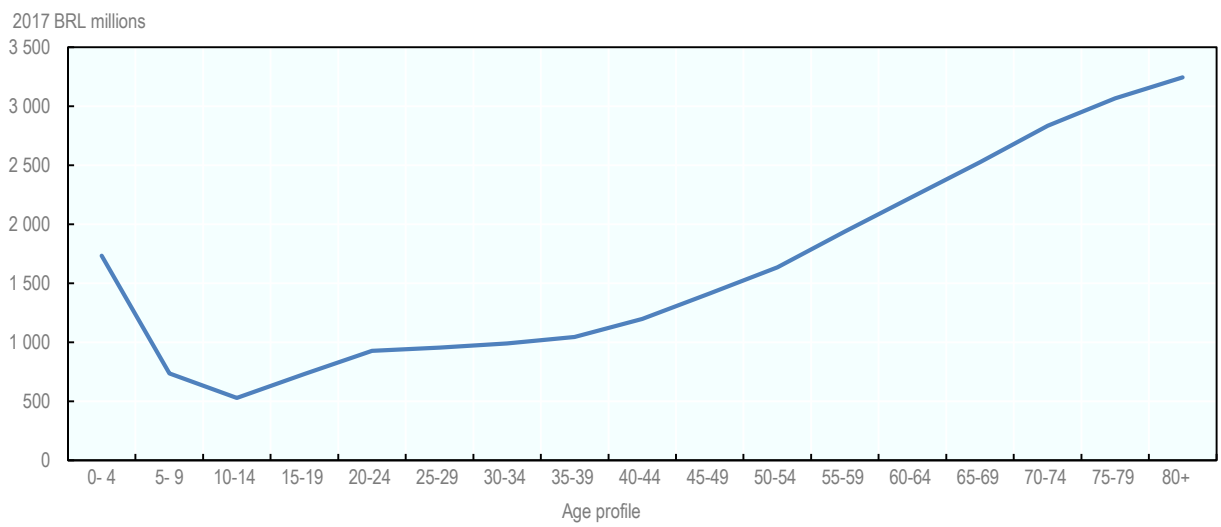
Methodology

Total health spending projections depend on population size per age group j in year t $(Pop_{j,t})$ and per capita expenditure per age group j $(\bar{s}_j)$. Thus, total health spending S_t is estimated by equation (3):

$$S_t = \sum_{j=1}^{J} Pop_{j,t} \times \bar{s}_j \qquad (3)$$

Equation (3) provides the estimation of total health spending under the hypothesis of a fixed age profile of public spending on health $(\bar{s}_j)$. Therefore, projected total health spending reflects exclusively demographic changes. The health spending age profile estimated by Turra, Queiroz, and Mason (2016[7]) is used. The authors combined 2003 Brazilian household data (PNAD) on out-patient utilisation rates with public data on hospitalisation rates (Unified Health System, SUS) to compute the age spending profile. The per capita spending was adjusted according to the 2014 total public spending on health. The age profile is presented in Figure 5.1 and shows the typical "J" shape: after the first years of life, it declines with age and reaches a level three times lower in the group aged 10-14 years. It increases afterwards at a slow pace until the group aged 35-39 years. At ages older than 40, per capita spending increases faster, reaching values for the group aged 50-54, which are similar to those of the age group 0-4 years. The per-capita value keeps increasing until it doubles by the end of the life cycle.

Figure 5.1. Per capita public health spending by age in Brazil, 2014



Source: Authors' calculations based on Turra, Queiroz, and Mason (2016[7]), "New estimates of intergenerational transfers for Brazil: 1996-2011", NTA project, WP16-03, https://ntaccounts.org/web/nta/show/Working%20Papers.

Results

Table 5.2 shows that health spending is projected to increase substantially over time due to demographic changes in Brazil. Estimates point to a 40% increase until 2050, assuming per capita spending by age remains fixed at the current levels.

Table 5.2. Projected public health expenditures in Brazil, 2014-2060

2016 BRL millions

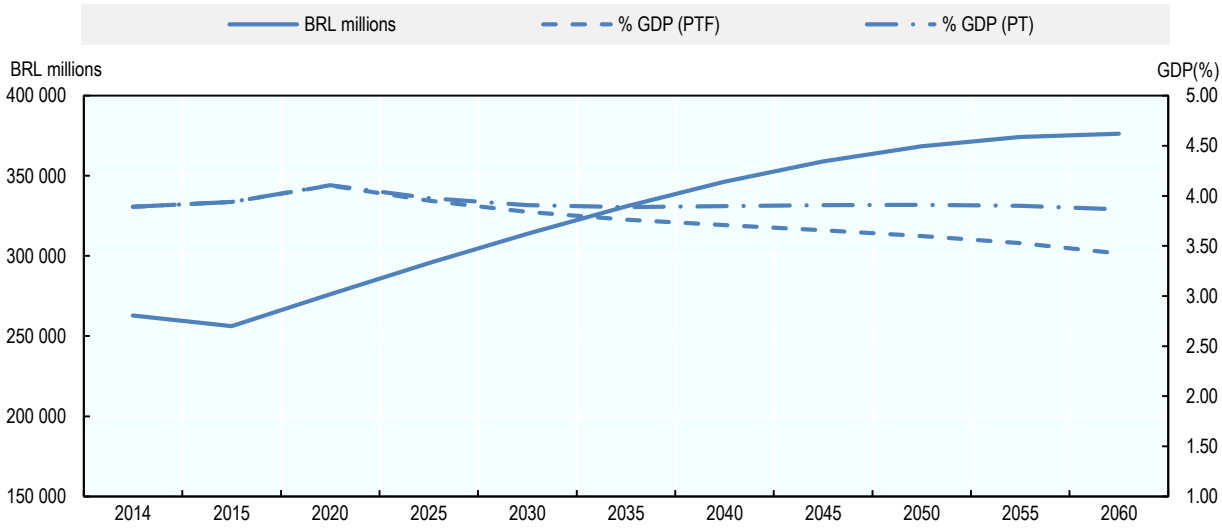
Year	Total
2014	262 777
2015	256 123
2020	276 112
2025	295 517
2030	313 843
2035	330 977
2040	346 309
2045	358 996
2050	368 428
2055	374 257
2060	376 281
% change 2014-60	43.2

Source: Authors' calculations.

Figure 5.2 shows the results for the evolution of health spending in 2016 BRL millions and as a percentage of GDP. The estimates indicate that total public health expenditure, as a share of GDP, will peak in 2020 and later decline, due to the potential GDP growth. These projections are lower than other estimates published earlier, such as those by Miller and Castanheira (2013[19]), because of assumed GDP growth. Caution is necessary when interpreting these results since, as mentioned before, the age profile of health spending may change over time as the economy grows. Public health spending in Brazil is still low when compared to other countries and may increase faster than predicted by population ageing if the per capita age profile becomes relatively older. Currently, Brazil spends a lower share of GDP compared to OECD countries because of its use of less advanced (and cheaper) medical technology, the absence of long-term care (LTC) provision, and the different roles played by public and private health systems.

Figure 5.2. Projected public health expenditures in Brazil, 2014-60

2016 BRL millions and as a percentage of GDP



Source: Authors' calculations.

Projected public education expenditures

The projection of public education expenditures combines three different components: public spending per student and educational level, enrolment rates and demographic projections.

Public spending per student

The Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (INEP) periodically publishes data on direct public spending per student. According to Table 5.3, spending on primary and secondary education more than doubled between 2006 and 2014 in real terms. However, the values for lower levels of education still represent only a fraction of the expenditure per student on tertiary education. In these projections, it is assumed that spending per student remains fixed in real terms.

Table 5.3. Direct public spending per student in Brazil, 2006-14

2016 BRL millions

Year	Pre-primary	Primary	Secondary	Tertiary
2006	2 391	2 985	2 123	18 023
2007	2 899	3 452	2 576	19 044
2008	3 097	3 999	2 980	17 602
2009	3 101	4 466	3 142	19 769
2010	3 808	5 005	3 958	21 013
2011	4 507	5 181	4 906	22 389
2012	5 313	5 466	5 582	20 335
2013	5 783	5 842	5 902	22 753
2014	5 878	5 918	6 021	21 875

Source: Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (INEP)/MEC.

Enrolment rates and excluded students

The proportion of individuals by age group, who are enrolled in each school level, and the government enrolment targets, set out in the Plano Nacional de Educação (PNE), are two important determinants of the enrolment rates, the second component in our projections. One standard measure of the proportions enrolled is the gross enrolment rate for each education level, as computed by the number of students of all ages enrolled at the educational level, divided by the official age group's total population for that level. An alternative measure, which is also frequently employed is the net enrolment rate for each level, given by the number of enrolled students in the official age group for the educational level, divided by the total population of the official age group for that level. According to Table 5.4, only primary education has become universalised in Brazil, with a 93% net enrollment rate. The net enrolment rates are significantly lower in early childhood (pre-primary), at around 56%, and secondary education, at 57%.

Table 5.4. Gross and net enrolment rates for different education levels in Brazil, 2001-15

Year	Pre-primary		Primary		Secondary	
	Gross	Net	Gross	Net	Gross	Net
2001	63.9%	57.1%	121.3%	93.1%	73.9%	36.9%
2002	64.9%	58.4%	120.8%	93.7%	75.9%	40.0%
2003	66.6%	59.9%	119.3%	93.8%	81.1%	43.1%
2004	67.1%	60.8%	117.6%	93.8%	81.4%	44.4%
2005	68.6%	62.9%	117.1%	94.4%	80.7%	45.3%
2006	70.2%	64.8%	116.2%	94.8%	82.2%	47.1%
2007	49.3%	47.2%	116.0%	94.6%	82.6%	48.0%
2008	73.4%	59.6%	104.5%	90.1%	85.5%	50.4%
2009	62.2%	50.6%	105.7%	91.1%	83.0%	50.9%
2011	69.7%	54.2%	106.9%	91.9%	82.2%	51.6%
2012	62.8%	46.2%	105.5%	92.5%	83.2%	54.0%
2013	63.4%	46.2%	105.7%	92.5%	83.5%	55.1%
2014	62.4%	46.6%	105.2%	93.0%	84.5%	56.4%
2015	72.0%	55.9%	105.8%	93.3%	83.3%	56.9%

Source: INEP and Pesquisa Nacional por Amostra de Domicílios (PNAD).

Differences between gross and net enrolment rates represent children outside the official school age group. Table 5.5 shows the number of children who should be enrolled in school, given their ages, but who are not. The data show that the most significant demand pressure will be to incorporate the 7.7 million children between birth and three years old into the system. Other significant challenges will be to include 1.6 million teenagers (15 to 17 years old) in secondary education, as well as to increase tertiary enrolment rates. The proportion outside school is much lower at ages 4-5 (less than a million), and among children between the ages of 6 and 14 (only 390 000).

Table 5.5. Number of children out of school in Brazil, 2015

	Ages					
	0–3 years	4-5 years	0-5 years	6–14 years	15-17 years	18-24 years
Population	7 676 135	821 592	8 497 727	390 927	1 604 447	16 030 788
Percentage out of school	74.4%	15.7%	54.6%	1.4%	15.1%	71.5%

Source: PNAD.

Methodology

The number of students projected for each educational level *i* in year *t* $(A_{i,t})$ is obtained by multiplying the net enrolment rate in 2015 (Table 5.5) by the demographic growth rate of each age group, represented by the ratio $\frac{D_{i,t}}{D_{i,t-1}}$ (where $D_{i,t}$ is the population of age *i* in date *t*).

With no further adjustments, the projected number of students per education level would be given by:

$$A_{i,t} = A_{i,t-1} \times \frac{D_{i,t}}{D_{i,t-1}} \tag{4}$$

However, considering a foreseeable increase in net enrolment rates with the reduction of out-of-school children and of children outside the official school age groups, the enrolment targets of the PNE are incorporated, represented in the equation by the target number of students for each education level *i* in the period *t* $(M_{i,t})$, as an additional factor. Therefore, equation (4) becomes:

$$A_{i,t} = A_{i,t-1} \times \frac{D_{i,t}}{D_{i,t-1}} \times \frac{M_{i,t}}{M_{i,t-1}} \tag{5}$$

The PNE envisages the universalisation of education for ages 4 to 14. It also plans to increase net enrolment rates to 85% for youth aged 15-17. The PNE applies to public education. Therefore, a target of 10% at the tertiary level for the population between the ages of 18 and 24 is chosen. Finally, total spending in public education is obtained by multiplying the projected number of students per education level by the respective spending per student and level (Table 5.3), as follows:

$$E_t = \sum_{i=1}^{I} A_{i,t} \times C_i \tag{6}$$

Results

Table 5.6 shows the projection of education spending in 2016 until 2060 (in real terms). The total amount will decrease in the next decades due to the decline in birth rates. However, the projected spending will vary for each education level, depending on the combination of projected net enrolment rates and demographic growth by age. Tables 5.7 to 5.9 break down the projected public spending on education into the different government levels: federal, state, and local (municipalities).

Table 5.7 shows that the reduction in education spending, driven by demographic changes, will be significant for the federal government, reaching about 22% by 2060.

Table 5.8 shows state-level spending on public education. State spending will be reduced by 18% between 2014 and 2060. Secondary enrolment rates are higher in state institutions, allowing a more substantial reduction in spending due to the demographic changes at these levels. The only exception is kindergarten spending, which will increase by 63% because of the much lower initial coverage.

Table 5.6. Projected public expenditures on education in Brazil, 2014-60

2016 BRL millions

Year	Kindergarten	Primary	Secondary	Tertiary	Total
2014	33 813	193 729	52 091	58 115	337 748
2015	35 235	190 268	47 984	60 646	334 132
2020	49 791	190 775	47 604	63 256	351 427
2025	72 104	191 284	47 229	66 002	376 619
2030	68 730	189 703	47 548	62 228	368 209
2035	65 358	182 809	47 615	61 891	357 673
2040	62 475	173 923	45 756	61 932	344 086
2045	60 187	165 885	43 494	59 927	329 493
2050	58 350	159 318	41 422	57 027	316 116
2055	56 476	154 107	39 724	54 337	304 644
2060	54 253	149 329	38 408	52 114	294 105

Source: Authors' calculations.

Table 5.7. Projected public expenditures on education by Brazil's federal government, 2014-60

2016 BRL millions

Year	Kindergarten	Primary	Secondary	Tertiary	Total
2014	215	34 203	28 905	42 812	106 135
2015	74	30 649	25 778	44 486	100 987
2020	105	30 729	25 574	46 400	102 808
2025	152	30 809	25 373	48 415	104 748
2030	144	30 557	25 544	45 646	101 892
2035	137	29 453	25 580	45 399	100 569
2040	131	28 023	24 581	45 429	98 165
2045	127	26 727	23 366	43 958	94 178
2050	123	25 668	22 253	41 831	89 874
2055	119	24 827	21 341	39 858	86 144
2060	114	24 057	20 634	38 227	83 032

Source: Authors' calculations.

Table 5.8. Projected public expenditures on education by Brazil's state governments and the federal district, 2014-60

2016 BRL millions

Year	Kindergarten	Primary	Secondary	Tertiary	Total
2014	965	31 128	22 088	13 729	67 910
2015	1 021	31 417	20 961	14 663	68 062
2020	1 443	31 501	20 796	15 294	69 034
2025	2 090	31 585	20 631	15 958	70 265
2030	1 992	31 324	20 771	15 046	69 133
2035	1 895	30 184	20 800	14 964	67 843
2040	1 811	28 716	19 988	14 974	65 490
2045	1 745	27 389	19 000	14 489	62 623
2050	1 692	26 305	18 095	13 788	59 879
2055	1 637	25 445	17 353	13 138	57 573
2060	1 573	24 656	16 778	12 600	55 608

Source: Authors' calculations.

Finally, Table 5.9 shows the projections for public spending at the local level. Municipalities will have the lowest reduction in public spending on education across the different government levels (only 5%) because of the sharp mandatory increase in kindergarten coverage.

Table 5.9. Projected public expenditures on education by Brazil's local government, 2014-60

2016 BRL millions

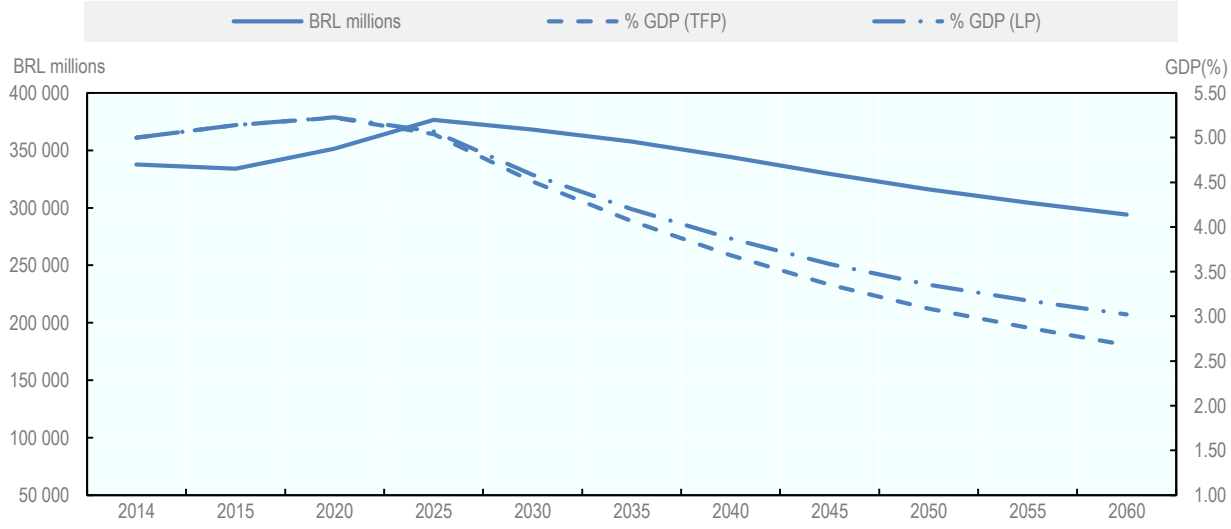
Year	Kindergarten	Primary	Secondary	Tertiary	Total
2014	32 633	128 398	1 098	1 575	163 703
2015	34 139	128 202	1 244	1 497	165 083
2020	48 243	128 545	1 235	1 562	179 585
2025	69 862	128 890	1 225	1 630	201 606
2030	66 593	127 823	1 233	1 536	197 185
2035	63 326	123 172	1 235	1 528	189 261
2040	60 533	117 184	1 187	1 529	180 432
2045	58 316	111 768	1 128	1 480	172 691
2050	56 536	107 345	1 074	1 408	166 362
2055	54 721	103 834	1 030	1 342	160 927
2060	52 566	100 616	996	1 287	155 465

Source: Authors' calculations.

Figure 5.3 shows that spending on education will drop after 2020, particularly as a percentage of GDP, due to the projected economic growth. Therefore, public education expenditure may not be a critical restrictive factor on government budgets in the future.

Figure 5.3. Projected public education expenditures in Brazil, 2014-60

2016 BRL millions and as a percentage of GDP



Source: Authors' calculations.

A larger decline in spending on public education in Brazil is projected than the decline projected by Dang, Antolín and Oxley (2001[8]) for OECD countries, despite total expenditure as a share of GDP being about the same size in Brazil and OECD countries (Table 5.10). The difference reflects the fact that Brazil is in an earlier stage of demographic

transition, which implies more substantial reductions in the size of its young population in the decades to come.

Table 5.10. Public spending on education, as a percentage of GDP, in selected countries, 2015

	% of GDP
Australia	4.0
Brazil	5.0
Chile	3.4
France	4.5
Germany	3.6
Italy	3.3
Japan	2.9
Mexico	4.2
Spain	3.5
United States	4.1
OECD average	4.2
EU22 average	4.1

Source: OECD (2018[20]), *Education at a Glance 2018: OECD Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/eag-2018-en

Projected social security spending

The high share of social security spending by the federal government, combined with the rapid demographic transition, motivated several studies on the financial sustainability of the pension systems in Brazil. There are several papers on the topic, such as Cechin and Cechin (2007[21]), Caetano (2008[22]; 2013[23]; 2014[24]), Costanzi (2017[25]), Giambiagi and Cechin (2011[26]), Tafner (2017[27]) and Tafner, Botelho and Erbisti (2013[28]). The social security projections developed in this chapter are based mainly on the transition of the age structure and accounts only partially for other factors. This simplification does not lead to a significant loss of realism in the long run. We will separately project expenditures related to the Social Security General System (RGPS) for private-sector workers, and the Social Security Systems for Public Servants (RPPS). The methodology is similar for both and based exclusively on demographic projections, retirees' age profiles and the distribution of pensions by age.

Accordingly, for simplicity, the share of retirees by age (ap_j) is assumed fixed over time, projecting the number of beneficiaries in year t (Ben_t) by multiplying this share, obtained with 2015 PNAD data, to the number of individuals of age j in year t $(Pop_{j,t})$:

$$Ben_t = \sum_{j=1}^{J} Pop_{j,t} \times ap_j \tag{7}$$

Assuming that the average value of social security benefits remains constant over time, the total social security expenditure in each period (GP_t) is projected proportionally to the number of beneficiaries in each period, as given by:

$$GP_t = GP_{t-k} \times \frac{Ben_t}{Ben_k} \tag{8}$$

Social Security General System (RGPS) for private-sector workers

Table 5.11 shows the results of the projections for the outlays of the Social Security General System. Expenditures will increase by 203% between 2014 and 2060. Considering that under the current model, some workers can retire under the age of 65 (men) and 60 (women), which are the thresholds for retirement by the age criteria, the projection results reflect the high growth rates of the population below these ages. Therefore, for a counterfactual comparison that would reflect the evolution of spending in a scenario where everyone retired exclusively by age, Table 5.11 also presents the projected rise in spending considering only the increase of the population above 65. The comparison of the two projections shows that the increase in spending, if all retirement happens according to the age criteria.

Table 5.11. Projected expenditures on Brazil's Social Security General System (RGPS), 2014-60

2016 BRL millions

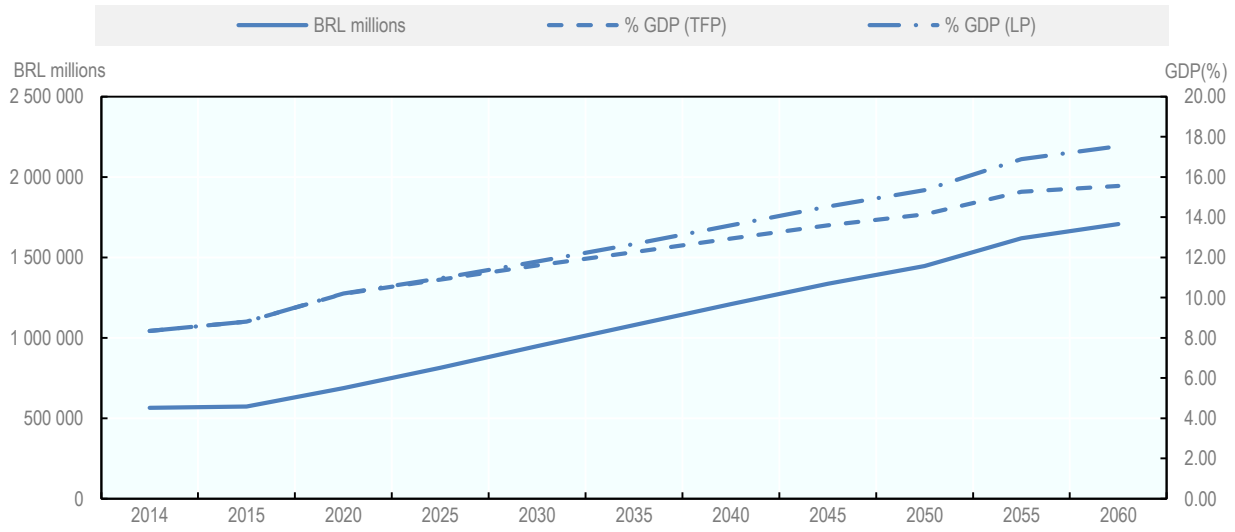
	Share of retirees in total population and demographic changes	Demographic changes only
2014	563 761	563 761
2015	573 030	573 030
2020	686 268	696 972
2025	814 156	848 875
2030	947 516	1 019 634
2035	1 078 537	1 190 838
2040	1 208 504	1 351 795
2045	1 335 269	1 528 672
2050	1 447 192	1 705 570
2055	1 620 128	1 847 924
2060	1 708 152	1 785 028
% change 2014-60	**203.0**	**216.6**

Source: Authors' calculations.

The projection for RGPS expenditures as a share of the GDP (Figure 5.4) shows an increase from 8.3% in 2014 to 15.5% in 2060, revealing the enormous pressure that population ageing will soon pose on the federal budget.

Figure 5.4. Projected expenditures on Brazil's Social Security General System (RGPS), 2014-60

2016 BRL millions and as a percentage of GDP



Source: Authors' calculations.

Social Security System for Public Servants (RPPS)

The Social Security System for Public Servants (RPPS) is not exclusively pay-as-you-go, unlike the RGPS. Recent constitutional reforms have partially changed the system to individual accounts (mostly defined contribution plans), particularly for the new generations of workers in the federal government and some state and local governments. Therefore, projecting expenditures based solely on the age structure changes may imply an upward bias and should be taken cautiously. Future revisions of this study will account for the new structure of pensions brought about by upcoming reforms. Table 5.12 shows that RPPS expenditures would increase, under this simplistic scenario of no reforms, by more than fourfold due to population ageing, and RPPS spending could increase from 4.0% of GDP in 2014 to 9.7% by 2060 (Figure 5.5).

Table 5.12. Projected expenditures on Brazil's Social Security System for Public Servants (RPPS), 2014-60

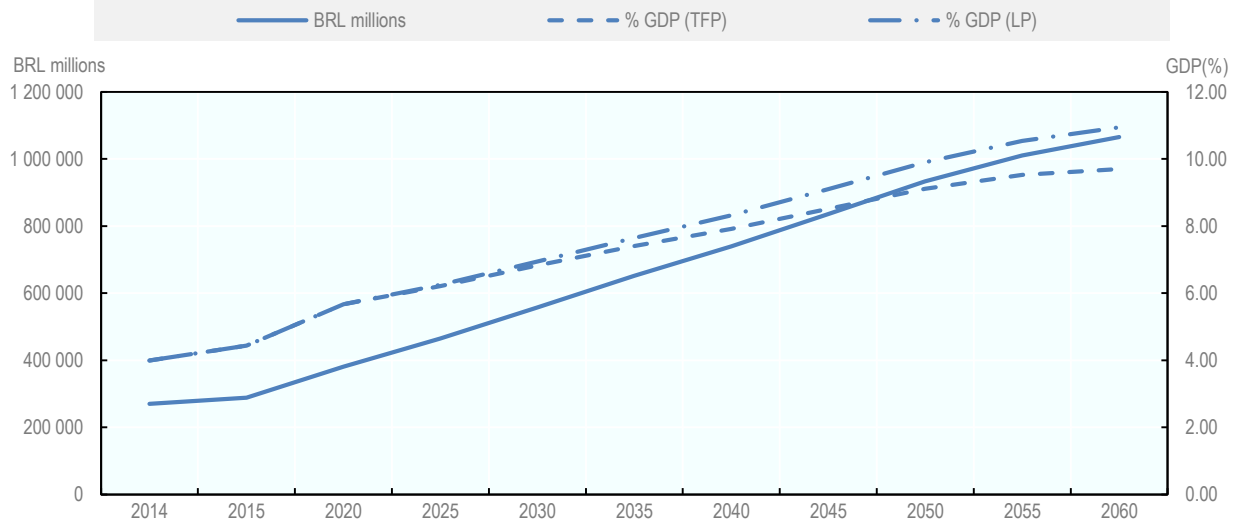
2016 BRL millions

	Federal	State	Local	Total
2014	96 106	133 538	40 209	269 853
2015	104 231	142 442	41 764	288 437
2020	139 035	191 483	50 797	381 315
2025	169 337	233 217	61 868	464 422
2030	203 401	280 130	74 313	557 844
2035	237 553	327 166	86 791	651 511
2040	269 661	371 387	98 522	739 571
2045	304 946	419 982	111 413	836 341
2050	340 234	468 582	124 306	933 122
2055	368 631	507 692	134 681	1 011 004
2060	388 659	535 275	141 998	1 065 933

Source: Authors' calculations.

Figure 5.5. Projected expenditures on Brazil's Social Security System for Public Servants (RPPS), 2014-60

2016 BRL millions and as a percentage of GDP



Source: Authors' calculations.

Dang, Antolín and Oxley's (2001[8]) projections for the increase in social security spending for OECD countries range from 3% to 4% from 2000 to 2050. The projections here point to increases in total social security spending in Brazil (RGPS + RPPS) that is about twice as large as the OECD rates. Total social security expenditure could reach 25.4% of GDP in Brazil by 2060, considering only demographic changes (and no effects of recent changes to the RPPS), a number that highlights the urgency for new reforms.

Projected expenditures on other income transfer programmes

This section measures the impact of the demographic transition on two large public income transfer programmes: Bolsa Família (BF) and Benefício de Prestação Continuada, also known as Lei Orgânica de Assistência Social (BPC-LOAS). The BF is an income transfer programme directed at poverty reduction for families with children and teenagers, with the conditions of obligatory school enrolment and primary health care attendance (e.g. immunisation). The BPC is an unconditional transfer programme that guarantees basic income to Brazil's elderly population, aged 65 and older, and disabled individuals of any age, whose household per capita income is less than one-quarter of the minimum wage. The projections measure the impact of changes in the population between 0 and 17 years old (for the BF programme) and the population above 65 years old (for the BPC-LOAS programme) on future expenditures for both programmes. For each transfer programme $j \in \{BF, BPC-LOAS\}$, total spending in year t $(Tr_{j,t})$ is projected by adjusting for the growth of each age group that is targeted by the programme $(Pop_{j,t})$:

$$Tr_{j,t} = Tr_{j,t-k} \times \frac{Pop_{j.t}}{Pop_{j.t-1}}; 0 \qquad (9)$$

Bolsa Família

The demographic transition reduces the number and percentage of young age groups in the total population. Thus, a pronounced decline is expected in the *Bolsa Familia* spending, from 0.5% in 2015 to 0.25% of the GDP in 2060 (Table 5.13).

Table 5.13. Projected expenditures on Brazil's *Bolsa Família* programme, 2014-60

BRL millions and as a percentage of GDP

	BRL millions	% of GDP (TFP)	% of GDP (LP)
2014	31.780	0.47	0.47
2015	32.321	0.50	0.50
2020	31.050	0.46	0.46
2025	30.425	0.41	0.41
2030	29.855	0.37	0.37
2035	28.844	0.33	0.34
2040	27.538	0.29	0.31
2045	26.340	0.27	0.29
2050	25.337	0.25	0.27
2055	24.472	0.24	0.26
2060	23.633	0.23	0.25
2014-2060 variation			-25.6

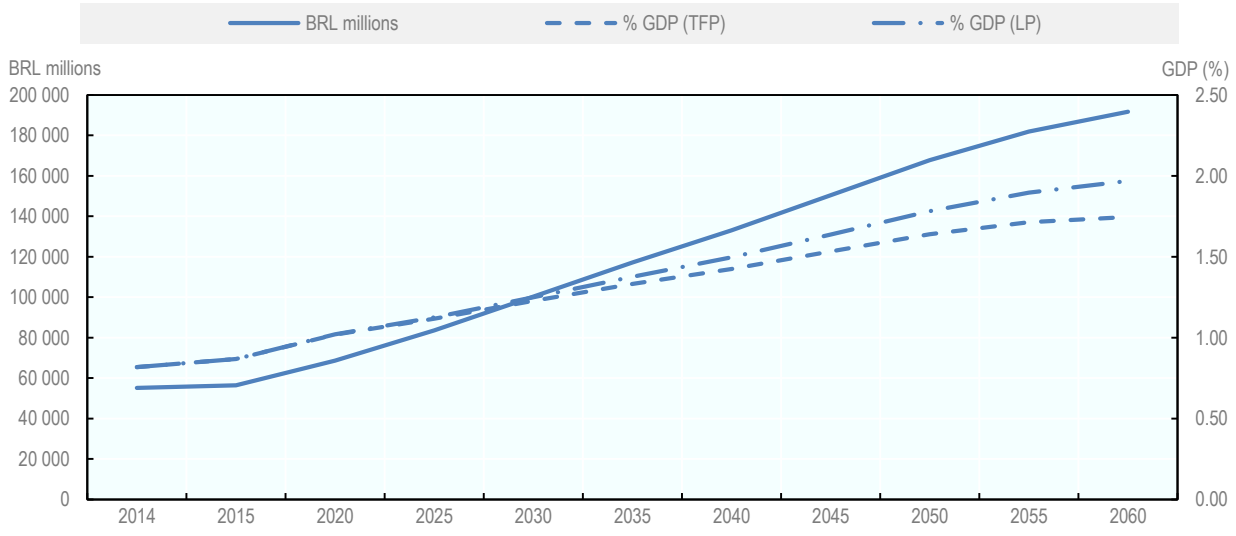
Source: Authors' calculations.

Benefício de Prestação Continuada (BPC-LOAS)

The spending on the BPC-LOAS programme will follow a different path than the one predicted for the *Bolsa Familia* Programme since it is focused mainly on the elderly population. From 2014 to 2060, the share of the population aged above 65 will triple, and the total spending will follow a similar path. Figure 5.6 shows that BPC-LOAS expenditures will probably more than double in GDP terms, reaching 1.75% of GDP in 2060.

Figure 5.6. Projected expenditures on Brazil's Benefício de Prestação Continuada (BPC-LOAS) programme, 2014-60

2016 BRL millions and as a percentage of GDP



Source: Authors' calculations.

Long-term care projections

Population ageing will increase the demand for health and social services related to the care needs of the older population. In addition, the demand for the provision of health services to treat chronic diseases and health treatment for those who are in the final years of life will also increase. These trends will increase the demand for qualified personnel to assist those who require care in daily activities. There is virtually no policy of assistance or government expenditure funding long-term care (LTC) needs in Brazil nowadays; this responsibility is relegated mainly to family members. This kind of care costs will grow more expensive over time as the demographic transition reduces the number of siblings per family. In this section, a preliminary estimate of the costs to comply with the foreseeable demand for such services is provided. Introducing long-term care will require the development of a proper structure and institutions specifically designed for its provision.

According to the existing literature on this subject, e.g. de la Maisonneuve and Oliveira Martins (2014[29]), long-term care differs from health services in general by its very nature. Health care services are services that improve the quality of life, while long-term care services' primary objective is to provide a comfortable environment for those who have lost their autonomy due to a health condition. Long-term care includes nursing care, social services and services related to the improvement of the patient's domestic and social tasks. In general, the conditions that determine LTC eligibility are chronic diseases, which lead to health conditions that affect the patient's mobility and autonomy. These conditions do not allow the patient to perform the basic activities of daily live, including feeding, dressing, or taking a bath, as well as some other basic activities, such as cooking or cleaning the house.

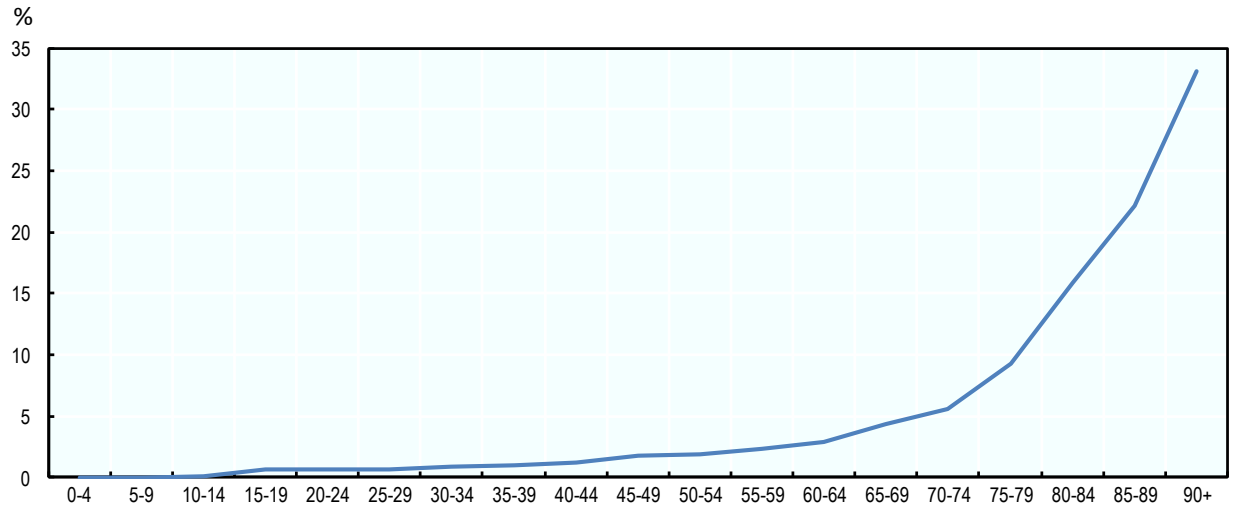
Therefore, the demand for LTC is determined by the occurrence of health conditions that leave the patient dependent on personal care, such as accidents or diseases. In general, there is a higher probability of dependency among elderly populations (Rocha, 2015[30]), which

underscores the critical effect that ageing has on family costs. The costs of LTC programmes depend on factors associated with the degree of dependency of the patient, the technology and inputs available, as well as the average income of the country.

Methodology

To project LTC expenditures over time, LTC provision costs are simulated by age and demographic projections. The LTC demand age profile is kept constant in the projections despite indications from other estimations that some variables (e.g. health changes) may transform the age profile in the future (see, for example, Rocha (2015[30]) and Nepomuceno and Turra (2015[31])). The health supplement of the 2008 household survey (PNAD) data is used to measure the degree of dependence of the population. Specifically, we estimate demand by the share of answers to the survey question that asks, "Do you have any difficulty, because of a health condition, to eat, take a shower or go to the bathroom?" *("Normalmente, por problema de saúde, tem dificuldade para alimentar-se, tomar banho ou ir ao banheiro?")*. The individuals who answered that they "are not able to" *("não conseguem")* or "have great difficulty" (*"tem grande dificuldade"*) are considered as those who require long-term care. Figure 5.7 shows the distribution of the population that needs long-term care to perform the activities mentioned above. It shows a sharp increase with age. For those who are 40 years old or younger, the proportion is lower than 2%; it reaches 30% for the population older than 90. Therefore, population ageing will increase the demand for LTC.

Figure 5.7. Percentage of the Brazilian population that will need long-term care

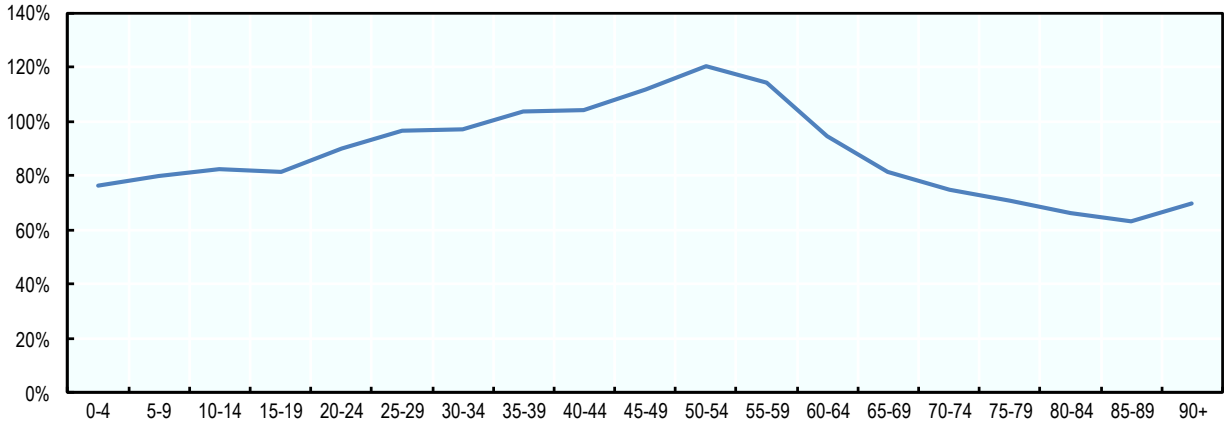


Source: Authors' calculations based on PNAD 2008.

The second component for the projection is the LTC costs per age. In that dimension, age will also be an important variable to determine LTC spending. As direct costs by age estimates are not available for Brazil, those available from other countries are used. Figure 5.8 shows the annual average cost of LTC by age for individuals that need long-term care, as a function of per capita GDP, for the countries of the European Union.

Figure 5.8. Per patient long-term costs by age in EU countries, 2015

% per capita GDP



Source: European Union (2015[32]), The 2015 Ageing report: Economic and budgetary projections for the 28 EU member States (2013-2060), European Economy 3|2015, Publications Office of the European Union, Luxembourg, https://ec.europa.eu/economy_finance/publications/european_economy/2015/pdf/ee3_en.pdf.

The average LTC cost per patient younger than 20 years old in the European Union is around 80% of GDP per capita. The value increases gradually until the 50-54 age group, reaching 120% of per capita GDP. It then declines to 60% of per capita GDP at the 85-89 age group. The LTC costs for young adults are associated with accidents and diseases that require expensive treatments, while specialised care for the elderly is related to old age limitations and, thus, comparatively cheaper.

Table 5.14 shows the same data presented in Figure 5.8, as well as LTC costs per patient measured in 2017 BRL thousands, based on 2017 GDP per capita and the Instituto Brasileiro de Geografia e Estatistica (IBGE) projected population. LTC costs per patient would range from BRL 24 667 for the 0-4 age group to BRL 38 858 for the 50-54 age group. Among the elderly, the costs are slightly higher than BRL 20 000.

Table 5.14. Projected per patient long-term costs by age in Brazil, 2013-60

% of per capita GDP and in 2017 BRL

Age group	% per capita GDP	2017 BRL
0-4	76.5%	24 667
5-9	79.9%	25 766
10-14	82.4%	26 564
15-19	81.3%	26 204
20-24	89.9%	28 989
25-29	96.5%	31 110
30-34	97.1%	31 314
35-39	103.4%	33 330
40-44	103.9%	33 484
45-49	111.9%	36 085
50-54	120.6%	38 858
55-59	114.4%	36 875
60-64	94.7%	30 536
65-69	81.3%	26 210
70-74	74.8%	24 118
75-79	70.7%	22 782
80-84	66.4%	21 411
85-89	63.1%	20 340
90+	69.5%	22 404

Source: European Union (2015[32]), *The 2015 Ageing report: Economic and budgetary projections for the 28 EU member States (2013-2060)*, European Economy 3|2015, Publications Office of the European Union, Luxembourg, https://ec.europa.eu/economy_finance/publications/european_economy/2015/pdf/ee3_en.pdf; data from Instituto Brasileiro de Geografia e Estatísticas (IBGE).

Using the notation φ_i for the share of the population that requires LTC by age, cld_i for the LTC average cohort cost, and $POP_{i,t}$ the projected population by age, the total LTC cost for year *t* is computed as:

$$CLD_t = \sum_{i=1}^{I} POP_{i,t} \times \varphi_i \times cld_i \qquad (10)$$

It is important to note that, as before, the demographic changes are exclusively relied on to project LTC costs, without considering other factors that could affect the average age profile of LTC costs.

Results

Table 5.15 shows the results of the projections in 2017 BRL based on the values of the second column of Table 5.14 as φ_i in equation (10). Table 5.16 shows the same results using LTC costs per age cohort in per capita GDP terms, using the values of the second column of Table 5.14 as φ_i in equation (10). Table 5.15 shows that spending on LTC in 2014 was about BRL 87 billion, based on the 2014 population age profile. Demographic changes until 2060 would raise LTC total costs to BRL 207 billion.

Table 5.15. Projected spending on long-term care, by age group, in Brazil, 2014-60

2017 BRL billions

Age group	2014	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
10-14	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
15-19	2.9	2.9	2.6	2.5	2.4	2.5	2.4	2.3	2.2	2.1	2.0
20-24	3.4	3.4	3.4	3.1	2.9	2.9	2.9	2.8	2.7	2.6	2.4
25-29	3.6	3.6	3.6	3.6	3.3	3.1	3.0	3.0	3.0	2.8	2.7
30-34	4.5	4.6	4.6	4.5	4.5	4.1	3.9	3.8	3.9	3.8	3.6
35-39	5.3	5.4	5.8	5.9	5.7	5.8	5.3	4.9	4.9	4.9	4.8
40-44	5.7	5.8	6.5	7.0	7.0	6.9	7.0	6.4	6.0	5.9	5.9
45-49	8.1	8.1	8.6	9.7	10.5	10.5	10.3	10.4	9.5	8.9	8.8
50-54	8.2	8.4	9.0	9.6	10.8	11.7	11.7	11.5	11.6	10.6	10.0
55-59	8.4	8.6	9.8	10.7	11.3	12.8	13.8	13.9	13.7	13.8	12.7
60-64	6.7	6.9	8.2	9.4	10.2	10.8	12.2	13.3	13.4	13.2	13.3
65-69	6.6	6.9	8.3	9.9	11.4	12.4	13.2	15.0	16.3	16.4	16.2
70-74	5.7	5.9	7.4	9.0	10.8	12.4	13.6	14.5	16.5	17.9	18.1
75-79	6.4	6.6	7.6	9.7	11.9	14.4	16.7	18.3	19.6	22.3	24.3
80+	14.9	15.5	19.2	23.4	29.6	37.4	46.7	56.5	65.4	73.1	82.3
Total	90.9	93.2	105.2	118.3	132.8	148.1	163.2	177.2	189.0	198.8	207.6

Source: Authors' calculations.

LTC spending can also be projected based on the assumption that costs per patient will increase proportionately with GDP per capita. In this scenario, LTC spending would vary from 1.4% of GDP in 2014 to 3.2% of GDP in 2060, a significantly higher rate of increase than the case with no economic growth effects (Table 5.16, 1.9% in 2060).

Table 5.16. Projected expenditures on long-term care, as a percentage of GDP, in Brazil, 2014-60

2014	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
1.3%	1.4%	1.6%	1.6%	1.6%	1.7%	1.7%	1.8%	1.8%	1.9%	1.9%

Source: Authors' calculations.

These projections are also higher than those presented by Rocha and Turra (2016[33]), who used a benefit equivalent of 1.5 minimum wages and estimated total LTC expenditure equal to 1.3% of GDP in 2033. The projections presented in Table 5.17 are in line with OECD LTC projections for the European Union.

Table 5.17. Projected expenditure on long-term care in Brazil, assuming the age profile varies with economic growth, 2014-60

As a percentage of GDP

Age group	2014	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
10-14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-24	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-34	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
35-39	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
40-44	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
45-49	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1
50-54	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
55-59	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
60-64	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
65-69	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
70-74	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3
75-79	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4
80+	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.3	1.3
Total	1.4	1.4	1.6	1.8	2.0	2.3	2.5	2.7	2.9	3.2	3.2

Source: Authors' calculations.

Summary of projected public spending

This section presents a summary of the projected public expenditure on education, health, social security, social transfer programmes, and long-term care services. On the one hand, the projections indicate that expenditure on public education and the larger social transfer programme, Bolsa Família, tend to decline, reducing the burden for governments in the future (Table 5.18). The main explanation is the decline in the absolute and relative size of the young population. On the other hand, expenditure on social security (private workers), BPC-LOAS and LTC will most likely increase in the future because of population ageing. Spending on pensions (for private-sector workers) will rise from 8.3% of GDP in 2014 to 15.5% in 2060, a 7-percentage-point increase, under the present rules for retirement. At the same time, the BPC-LOAS will increase from 0.8% to 1.7% of GDP, and the development of long-term care provision in Brazil will add new spending ranging between 1.9% (LTC measured in real terms) to 3.2% (LTC measured in per capita GDP terms) of GDP in 2060.

Table 5.18. Projected total government spending in Brazil, 2014-60

As a percentage of GDP

Programme	2014	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Education	5.0	5.1	5.2	5.0	4.5	4.1	3.7	3.4	3.1	2.9	2.7
Health	3.9	3.9	4.1	4.0	3.8	3.8	3.7	3.7	3.6	3.5	3.4
RGPS	8.3	8.8	10.2	10.9	11.6	12.3	12.9	13.6	14.1	15.3	15.5
RPPS	4.0	4.4	5.7	6.2	6.8	7.4	7.9	8.5	9.1	9.5	9.7
BPC-LOAS	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.7
Bolsa Família	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2
Total	22.5	23.7	26.7	27.6	28.4	29.2	30.0	30.9	31.8	33.1	33.3
Long-term care	0.0	0.0	1.6	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9
Total + LTC	22.5	23.7	28.2	29.2	30.0	30.8	31.7	32.7	33.7	35.0	35.2

Source: Authors' calculations.

Total health spending tends to increase until 2020 and then decreases gradually until 2060, reaching 3.4% of GDP. It is important to emphasise that the projections for health expenditure may be too low because the changes in the age profile of per-capita spending that may occur with GDP growth, particularly at older ages, are not accounted for.

The projected impact of the demographic transition on the budget shows a trajectory of rising pressure similar to that described by Dang, Antolín, and Oxley (2001[8]) for OECD countries. However, the composition of future expenditure will be different in Brazil compared to OECD countries. The OECD estimates show a 0.9% of GDP reduction in education and child transfers, a 3.3% GDP increase in social security and a 3.3% of GDP increase in long-term care.

There are some special tendencies for different expenditure categories regarding local government levels. For the municipalities (Table 5.19), public expenditure will decrease by 0.4% of GDP from 2014 to 2060. The main driver is the reduction in the number of students and the consequent decline in spending on education by about 1 percentage point of GDP. Health spending will remain almost constant, and expenditure on social security for public servants will increase by 0.7% of GDP (assuming no effects from pension reforms).

Table 5.19. Projected local (municipalities) government spending in Brazil, 2014-60

As a percentage of GDP

Programme	2014	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Education	2.4	2.5	2.7	2.7	2.4	2.2	1.9	1.8	1.6	1.5	1.4
Health	1.2	1.2	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
RPPS	0.6	0.6	0.8	0.8	0.9	1.0	1.1	1.1	1.2	1.3	1.3
Total	4.2	4.4	4.7	4.7	4.5	4.3	4.1	4.0	4.0	3.9	3.8

Source: Authors' calculations.

Also, in the case of state (Table 5.20) and federal (Table 5.21) governments, public expenditure will increase only on the public pension system and transfers to the old. State government spending on education will be cut in half (as a share of the GDP), and health expenditure will stay about the same. Expenditure on pensions for public servants will become the main source of fiscal pressure. At the federal level, increases in total spending caused by demographic changes will be the largest. Population ageing will increase transfers to the elderly (both pension systems and other income transfers) by 9.3% of GDP until 2060. In addition, long-term care will add another 1.9% of GDP. Spending on health will show a neutral tendency, whereas the decline in education and Bolsa Família expenditure will not be enough to reduce the increasing fiscal pressure.

Table 5.20. Projected state government spending in Brazil, 2014-60

As a percentage of GDP

Programme	2014	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Education	1.0	1.0	1.0	0.9	0.8	0.8	0.7	0.6	0.6	0.5	0.5
Health	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
RPPS	2.0	2.2	2.8	3.1	3.4	3.7	4.0	4.3	4.6	4.8	4.9
Total	4.0	4.3	4.9	5.1	5.3	5.5	5.6	5.9	6.1	6.3	6.3

Source: Authors' calculations.

Table 5.21. Projected federal government spending in Brazil, 2014-60

As a percentage of GDP

	2014	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Education	1.6	1.6	1.5	1.4	1.2	1.1	1.1	1.0	0.9	0.8	0.8
Health	1.7	1.7	1.8	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5
RGPS	8.3	8.8	10.2	10.9	11.6	12.3	12.9	13.6	14.1	15.3	15.5
RPPS	1.4	1.6	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.5	3.5
BPC-LOAS	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.7
Bolsa Família	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2
Total	14.3	15.0	17.0	17.8	18.6	19.4	20.2	21.0	21.8	23.0	23.3
Long-term care	0.0	0.0	1.6	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9
Total + LTC	14.3	15.0	18.6	19.4	20.2	21.1	21.9	22.8	23.6	24.9	25.2

Source: Authors' calculations.

Conclusion

In this chapter, the effects of the demographic transition on public social expenditure in Brazil were examined. The estimates predict an increase of about 10.8% of GDP between 2014 and 2060 for all public functions together (that may reach 12.7% of GDP with the implementation of long-term care services), as a result of population ageing. The projections indicate that social security spending, together with services (including health) and other income transfers to the elderly, will represent about 32% of the Brazilian GDP in 2060. By all standards, that is a much larger share of GDP than the corresponding shares for OECD countries, which are at more advanced stages of the demographic transition. That contrasts to the relatively low level of expenditure on health services in Brazil in comparison with OECD countries, which nevertheless cannot be justified by demographic differences.

One should interpret the results with caution since there are some methodological caveats. First, income growth and the demand for better health and education services will probably increase the pressure on the government for the allocation of more resources to these areas, implying higher costs by age. Therefore, one should take the education and health spending projections as lower bounds concerning future demands. Also, pension reforms have already started to change the structure of social security in Brazil, with consequences for the distribution of beneficiaries by age. For instance, in the case of the public servants' system, the federal government has already implemented defined contribution plans for the new generations of workers. There is also a broad reform under discussion in the Brazilian Congress regarding the private-sector workers' system, which will change eligibility criteria and the calculation of the benefits. Therefore, the projections of pensions represent upper bounds for future spending developments.

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Note

1. Demographic changes affect capital demand and supply, interest rates, long-term care supply, insurance and housing markets, just to mention some other demographic transition effects.

Chapter 6. Adaptability, accountability and sustainability: Intergovernmental fiscal arrangements in Canada

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Transfers from Canada's federal government to provinces, territories and local governments account for about one-fifth of the revenues of those governments, and about one-third of federal programme spending. While central governments in federations typically raise more, and sub-central governments typically raise less, than they spend directly, large gaps and transfers to bridge them strain the federal principle that governments at each level are sovereign in their respective spheres. Transfers can help achieve national-scale public goods, address spillovers among provinces, and support minimum standards for public services and other programmes across the country – yet Canada's present system does not consistently reflect these purposes. The potential of large transfers to undermine accountability and foster unsustainable fiscal policies should inspire caution about their current size, and discourage expanding them. Demographic change will dampen the growth of government revenues in Canada and push programme spending up, particularly at the provincial level. Responding effectively will require a mix of tax increases and spending restraint from provinces and ideally partial pre-funding of programmes such as drug treatments and long-term care. Such reforms are likelier if the federal government limits growth in intergovernmental transfers, and reduces its draw on common revenue bases – the consumption base in particular – that the provinces will likely need to exploit more in the future.

This chapter draws heavily on a previous C.D. Howe Institute Commentary (Laurin and Robson, 2015[1]). We are indebted to a number of colleagues and reviewers for their contributions to that paper. We are particularly grateful to our colleague Parisa Mahboubi for projections of demographically sensitive government programmes. We also thank participants in the June 2019 OECD-KIPF Fiscal Network Workshop on Ageing and Long-term Challenges across Levels of Government for their comments and discussion. Responsibility for any remaining errors and for the views expressed is ours.

Introduction and overview

Amounts spent and raised by different levels of government in Canada have never coincided: the federal government has always raised more, and provincial, territorial and local governments less, than required for their own programmes. Accordingly, transfers from the federal government to other levels of government have been a feature of Canadian fiscal policy since Confederation in 1867.[1] Initially modest relative to Canada's economy, intergovernmental transfers grew as the role of governments in providing services and redistributing income grew through the 20th century. They now occupy a major place in the budgets of Canadian governments: about one-third of the spending of the federal government, and almost one-fifth of the revenues of recipient governments. They are correspondingly prominent in public and official discussions.

Transfers from central to sub-central governments are common throughout the world. Because they are so visible in federations, commentators in federations, including Canada, have been prominent in exploring reasons for divisions of taxing and spending powers, and intergovernmental transfers for various purposes, including closing fiscal gaps created by any given division of powers. Being informed by history and current circumstances, that literature tended to blend both positive empirical statements with more normative ones.

This chapter begins by describing the history that shaped Canada's current system, then reviews various insights about potential uses of federal-provincial transfers and comments on the degree to which they justify current practices. It next describes potential future evolution of spending and revenue at the federal and provincial levels, highlighting the extent to which demographic change will increase fiscal pressure on the provinces. It closes with comments on how different types of intergovernmental transfers may affect the efficiency, accountability and sustainability of Canadian fiscal policies and major programmes.

This survey highlights the importance of particular circumstances, including fiscal stresses at either level of government, and the political responses to those circumstances, in shaping Canada's arrangements. Notwithstanding the insights from public economics about how intergovernmental transfers can address externalities and provide public goods on a national scale, nothing in economic logic dictates that the gap between revenue and spending at the federal and provincial levels should be as large as it is, nor that the transfers that bridge it should be structured along current lines.

This discussion of current stresses draws out the tension between the key principle that federal and provincial governments are sovereign in their respective spheres and the fact that federal-provincial transfers are large and complex. A greater focus on the provincial autonomy that is desirable in a federation, responding more effectively to challenges at each level of government and limiting potentially adverse influences of intergovernmental transfers on budgetary policy, would point toward smaller, simpler intergovernmental transfers. Especially in view of looming demographic pressures, there is a strong case for more closely aligned revenue-raising and spending powers of governments at each level.

The history and current state of intergovernmental transfers in Canada

Canada's division of revenue and spending powers between the senior governments, and the transfers that reconcile gaps between revenue and spending at each level, have evolved in response to changing concerns and political pressures.

The 19th and 20th centuries

The British North America Act – now formally termed the Constitution Act, 1867 – and key political and legal decisions shortly after Confederation gave Canada a system in which the federal and provincial governments are sovereign in their respective spheres.

Looking first at responsibilities, some powers, notably related to defence, money and banking, navigation, relations with indigenous people, immigration and criminal law, became federal matters. Others, notably related to property and civil rights, natural resources, municipalities, charities, and what we now call health care and education services, became provincial matters.[2]

As for the resources to finance those responsibilities, the 1867 Act granted the federal government power to implement "any mode or system of taxation."[3] It granted the provinces "direct taxation within the province"[4] – a formulation intended partly to preclude tariffs on interprovincial trade, but which has been interpreted elastically enough to allow a variety of indirect taxes and even charges levied on products from other provinces. As a result, the tax bases of the federal and provincial governments largely overlap. Both levels have legally unlimited power to borrow to finance any activity.

The 1867 Act provided for transfers from the federal government. Originally, these included funding for public administration as well as per capita transfers to reduce regional disparities. In addition, these transfers contained an incentive to control public debt.[5]

The federal transfers were originally fixed total sums or fixed dollar amounts per head. So growth of the economy and government budgets had reduced their importance in provincial revenues by the end of the century. From nearly CAD 6 in 10 dollars of provincial revenue in 1874, federal transfers had fallen closer to CAD 4 in 10 dollars by 1896 (Perry, 1997[2]).

Federal and provincial spending and revenues changed markedly over the course of the 20th century. The 19th-century model of relatively small governments mainly providing infrastructure and internal and external security transitioned to the post-Second World War welfare state. By the end of the century, health care, education and social services – areas of provincial responsibility – were major government programmes in Canada, as in other developed democracies.

On the revenue side, Ottawa introduced personal and corporate income taxes in stages during the First World War. Many provinces started taxing corporate and personal incomes for the first time in the 1930s to finance the needs of the Great Depression. After surrendering much of their autonomy in taxation during the Second World War, provinces progressively regained tax-policy autonomy, as long as they conformed to shared definitions of the base for taxable income. As provincial spending responsibilities grew, the provincial share of personal income tax revenues increased.[6]

Changes in intergovernmental transfers accompanied these changes in revenue and spending. In 1927, long before the 1951 constitutional amendment that made income supports for the elderly a federal responsibility, Ottawa began paying half their cost. The Great Depression tested many provinces' access to credit, with Alberta defaulting in 1936. The federal government's superior borrowing capacity, backed after the creation of the Bank of Canada by the power to monetise debt, increased its attractiveness as a subsidiser of provincial programmes. In particular, Ottawa provided extensive supports for the unemployed even before getting full responsibility for unemployment insurance in 1940.

During the late 1950s and 1960s, the appeal of federal support for national social programmes was strong in most parts of Canada, and rapid growth in the economy and federal revenues made relatively open-ended support of provincial programmes, including programmes that increased provincial exposure to demographic pressures, seem affordable. Federal payments geared to half of aggregate provincial spending on publicly funded doctor and hospital care developed during those years. Ottawa replaced direct grants to universities with transfers to provincial governments, likewise geared to half of aggregate provincial spending on post-secondary education. Ottawa also supported provincial welfare programmes through the Canada Assistance Plan (CAP), which underwrote half of relevant expenditures in each province individually.[7]

An exception to this general move toward conditional grants was the 1957 establishment of the formal Equalization programme. Equalization's essence is to top up the revenues of provinces with lower-yielding tax bases.[8]

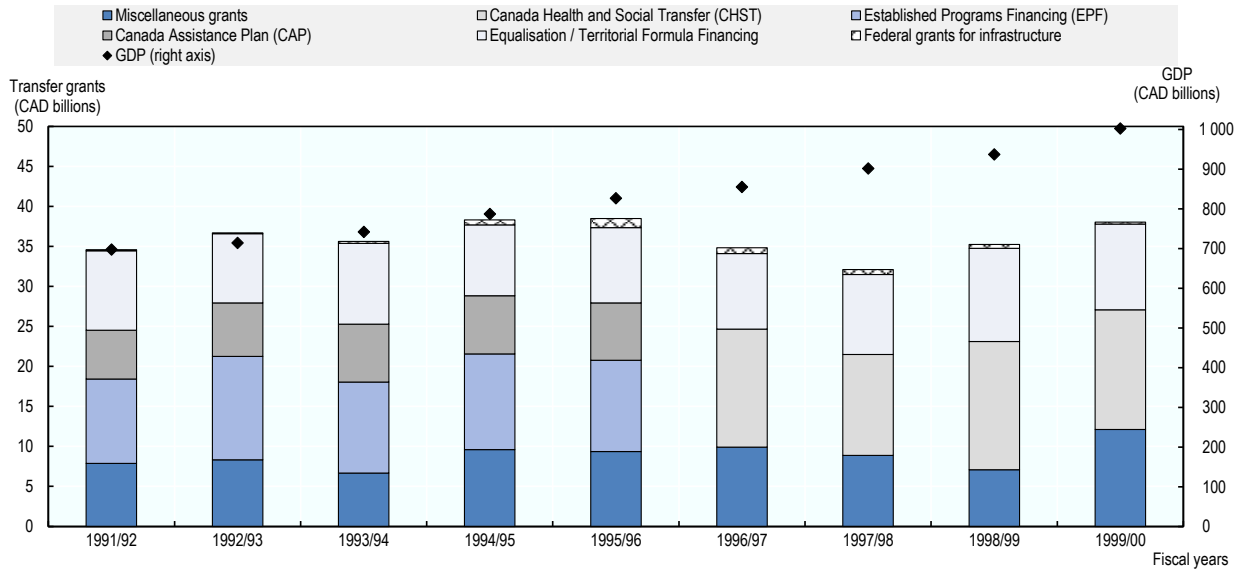
Another notable exception to the general narrative of federal inducements to provinces to expand their programmes by subsidising them was a series of federal offers, in 1964, and again in 1968 and 1973, to withdraw from certain cost-shared programmes and transfer tax room to the provinces instead. (At that time, all provinces but Quebec computed their income taxes as percentages of federal income taxes, which gave rise to the terminology of "tax points" – each percentage point being one tax point.) Most provinces preferred the shared-cost subsidies; Quebec was the exception. Since 1965, Quebec taxpayers have received a special "tax abatement" in lieu of cash transfers Ottawa would otherwise have made.[9]

The end of the rapid growth of the 1950s, 1960s and early 1970s put the federal budget under pressure and prompted changes to federal grants in support of health care and post-secondary education. New Established Programs Financing (EPF) arrangements replaced cost sharing with a formal transfer of tax base ("tax points") and a cash transfer. These changes reduced federal subsidies and exposure to provincial decisions: no longer were the provinces collectively spending "50-cent dollars" on these programmes.[10] To preserve its leverage over provincial health care policy, the federal government passed the Canada Health Act in 1984, empowering Ottawa to reduce transfers to provinces that did not adhere to the Act's principles.

Ottawa's fiscal problems intensified during the 1980s, and the economic downturn of the early 1990s pushed its deficit and debt up the national agenda. Measures to balance the federal budget in the second half of the 1990s had significant impacts on intergovernmental transfers. Ottawa first capped its Canada Assistance Plan (CAP) subsidies to several provinces. It then combined grants for health care and post-secondary education with the CAP in one block fund, the Canada Health and Social Transfer (CHST), eliminating the last of the "50-cent dollars" provinces had been spending on welfare programmes. The total CHST was initially smaller than its predecessor programmes – part of Ottawa's effort to eliminate chronic deficits.

After increasing in line with the economy in the early 1990s (Figure 6.1), federal transfers fell sharply in 1996/97 and 1997/98. Although they grew again as Ottawa's budgetary situation improved, provincial governments and other advocates were complaining of a "fiscal imbalance" as the 20th century drew to a close.

Figure 6.1. Federal transfers to sub-central governments in Canada, by major category, 1991/02 to 1999/00

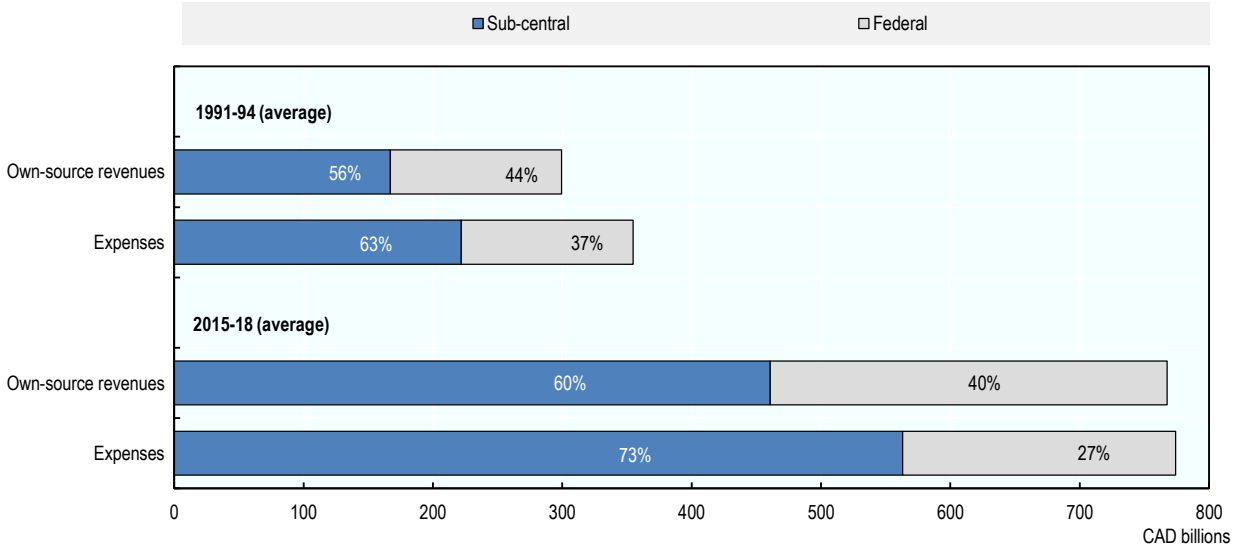


Note: Federal transfers to Quebec are increased by the value of federal income tax abated (13.5 tax points) under the Alternative Payments for Standing Programs (the Quebec tax abatement).
Source: Statistics Canada (2019[3]), "Statement of government operations and balance sheet, government finance statistics", Table 10-10-0015-01, June; Receiver General for Canada (various years[4]), Public Accounts of Canada, Vol. I and II; Department of Finance (2015[5]), "Economic Action Plan", Ottawa, April; Department of Finance (2019[6]), "Investing in the Middle Class – Budget 2019", Ottawa, March.

The 21st century

In the early 21st century, the formal division of spending and revenue-raising powers, and the intergovernmental transfers that bridge the gaps between them, changed relatively little, but the dollar amounts changed markedly. In the 20 years from the early 1990s to the early 2010s, sub-central governments increased their share of consolidated government spending – excluding intergovernmental transfers – from 63% to 72%. They also increased their share of revenue, with their own-source revenues – that is, excluding intergovernmental transfers – rising from 56% to 60% of the national total (Figure 6.2).

Figure 6.2. Consolidated revenues and spending by levels of government in Canada (excluding intergovernmental transfers), 1991-94 and 2015-18



Note: The federal transfers to Quebec are increased by the value of federal income tax abated under the Alternative Payments for Standing Programs (13.5 tax points) and the discontinued Youth Allowances Program (3.0 tax points), and Quebec's revenues are reduced by the same amount.
Source: Statistics Canada (2019[3]), "Statement of government operations and balance sheet, government finance statistics", Table 10-10-0015-01, June; authors' calculations.

Programme spending by types

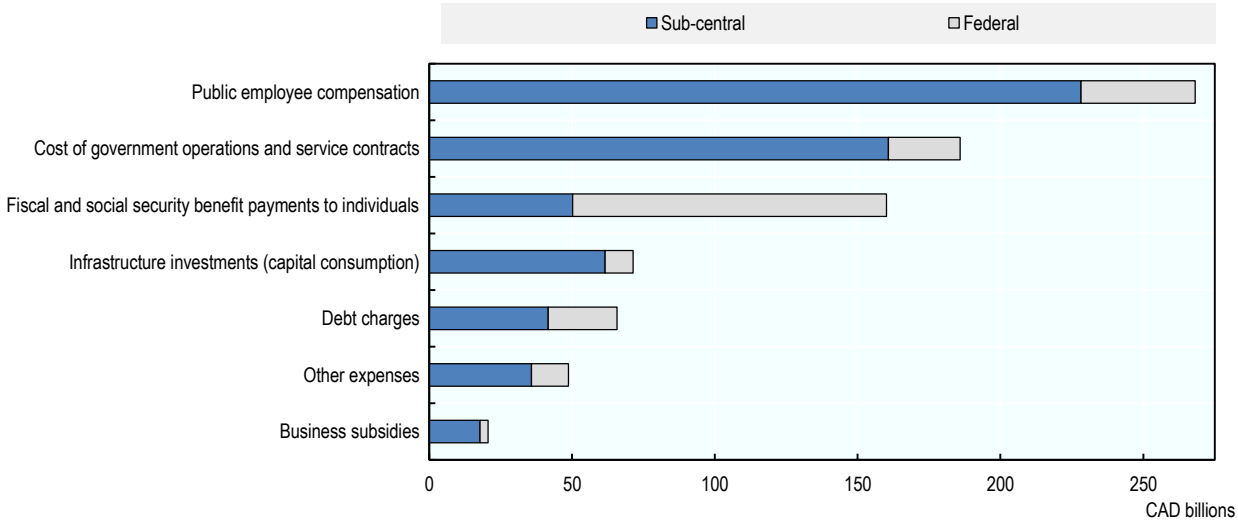
At present, and going a layer deeper, sub-central governments currently make about 85% of expenditures on operations – payments to employees, contractors, utilities, etc. – reflecting their role as public service providers. Sub-central governments also manage about 85% of public infrastructure expenses and hand out about 80 cents per dollar of business subsidies (Figure 6.3).

Ottawa continues to dominate transfer payments to households through employment insurance, benefits for seniors and families with children, and other purposes. About 70 cents per dollar of all government payments to individuals are now federal.

Revenues by tax bases

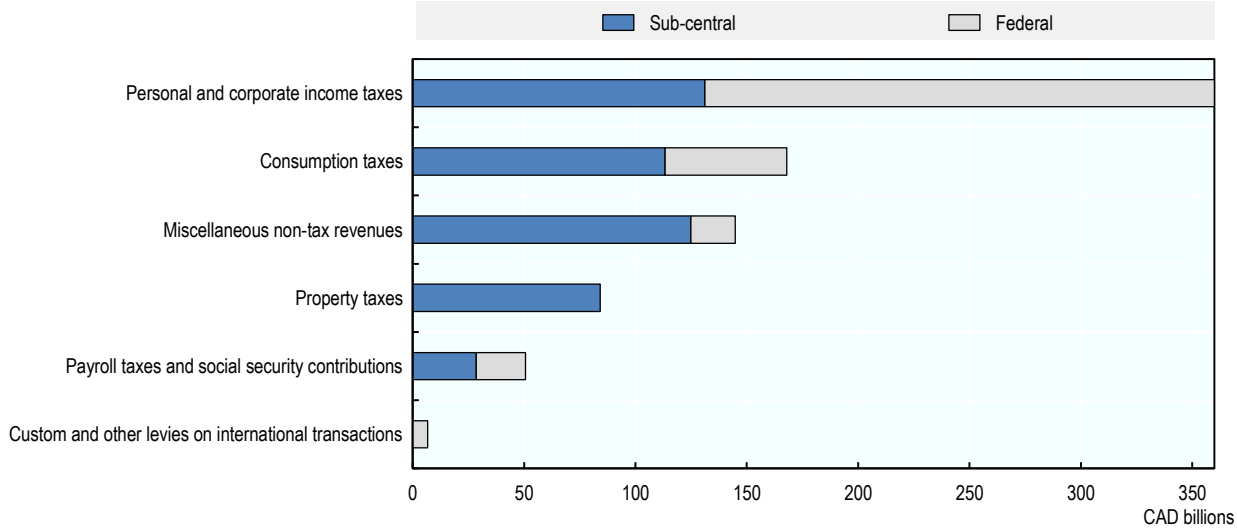
Turning to revenues (Figure 6.4), property taxes – still a field exclusive to the provinces – continue to raise a substantial amount of their revenue. By contrast, Ottawa's exclusive jurisdiction over customs and other levies on international trade and transactions has become less important as international trade has become freer.

Figure 6.3. Government spending at the sub-central and federal government levels in Canada, by category, 2018



Source: Statistics Canada (2019[3]), "Statement of government operations and balance sheet, government finance statistics", Table 10-10-0015-01, June; authors' calculations.

Figure 6.4. Government revenues at the sub-central and federal government levels in Canada, by category, 2018



Note: The federal transfers to Quebec are increased by the value of federal income tax abated under the Alternative Payments for Standing Programs (13.5 tax points) and the discontinued Youth Allowances Program (3.0 tax points), and Quebec's revenues are reduced by the same amount.
Source: Statistics Canada (2019[3]), "Statement of government operations and balance sheet, government finance statistics", Table 10-10-0015-01, June; authors' calculations.

As for shared tax fields, Ottawa is still the largest collector of personal and corporate income taxes, raising about two-thirds of the total. The provinces collect about two-thirds of consumption tax revenues, up markedly over the last 20 years, thanks to rate cuts at the federal level and rate increases at the provincial level.

Miscellaneous non-tax revenues – mainly investment incomes, profits of government business enterprises, royalties, user fees, fines and other penalties, asset sales, and various other sources – are important for sub-central governments. The federal government collected only about one-eighth of such revenues in 2018.

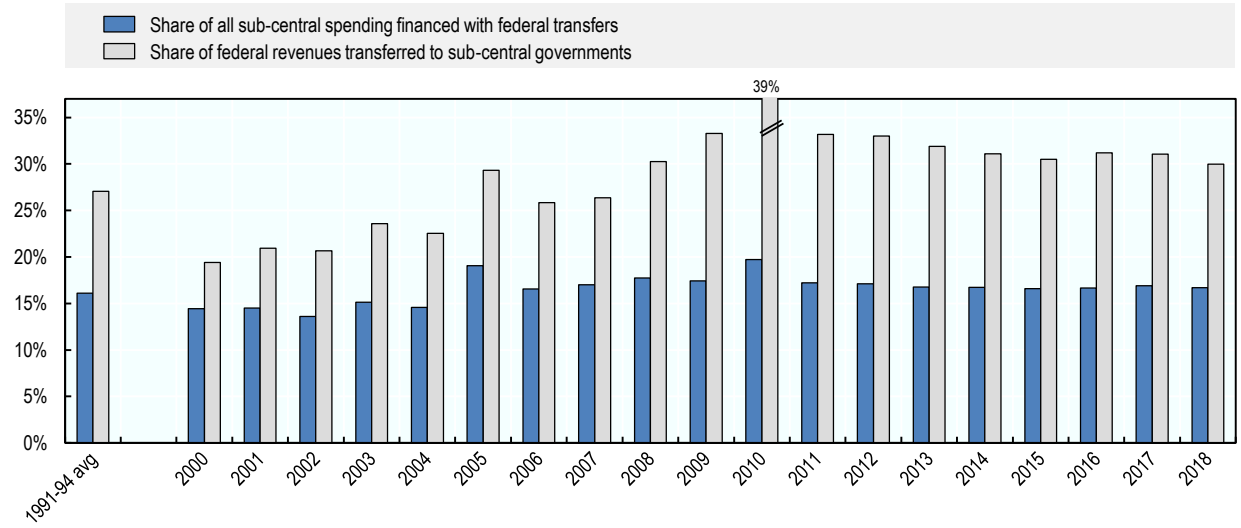
Contributions to social insurance schemes and provincial payroll taxes that flow into consolidated revenue[11] now yield roughly equal amounts to each level. Ottawa has recently collected something less than two-thirds of contributions to social insurance schemes related to employment, workplace injuries and health care, down from more than three-quarters in the early 1990s. This change reflects slower growth in federal employment insurance pay-outs and revenues than in provincial workers' compensation and drug programmes.

Intergovernmental transfers

The fact that provinces have increased their share of spending more than their share of own-source revenues since the 1990s implies that federal transfers have increased and/or that their budget balances have deteriorated relative to the federal balance. Both developments have occurred.

Improved federal fiscal health and pressure for larger transfers spurred faster growth in payments after 2004. Ottawa split the CHST into a Canada Social Transfer (CST) and a Canada Health Transfer (CHT). The former continued to grow with the economy, but the latter – responding to the higher public profile of health care spending – grew faster. The net result was that federal transfers outpaced gross domestic product (GDP). They also rose relative to sub-central spending, from about 15% after the cuts of the mid-1990s to around 17% recently. They also rose relative to Ottawa's resources: roughly one in three CAD dollars raised by federal taxes recently has financed intergovernmental transfers (Figure 6.5).

Figure 6.5. Federal transfers relative to sub-central government spending and federal revenue in Canada, 2000-18



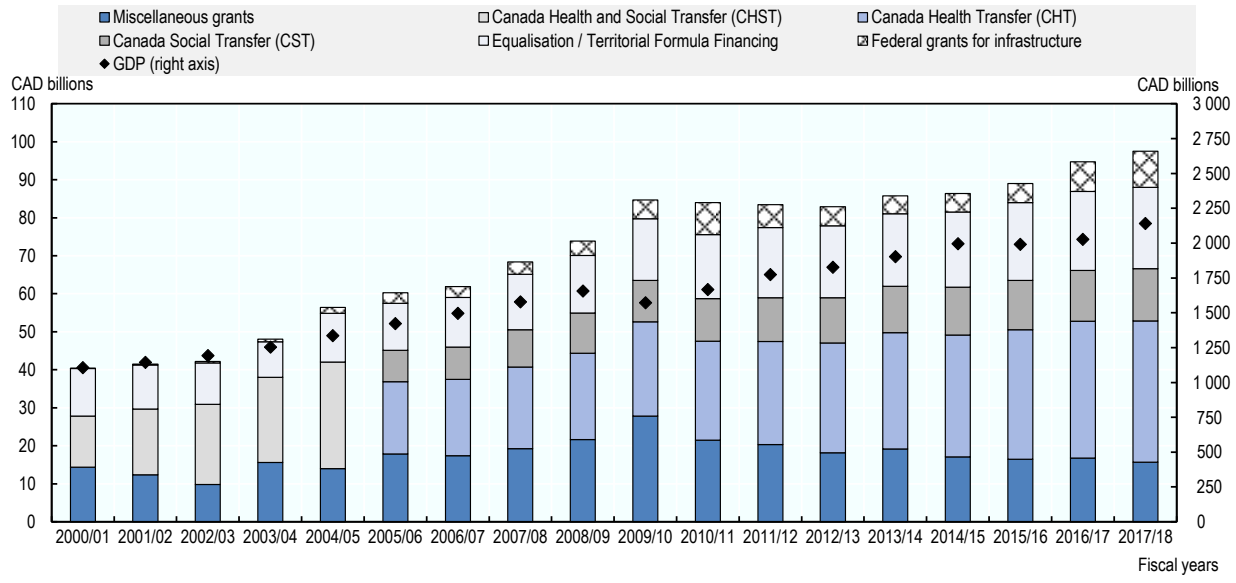
Note: The federal transfers to Quebec are increased by the value of federal income tax abated under the Alternative Payments for Standing Programs (13.5 tax points) and the discontinued Youth Allowances Program (3.0 tax points), and Quebec's revenues are reduced by the same amount.
Source: Statistics Canada (2019[3]), "Statement of government operations and balance sheet, government finance statistics", Table 10-10-0015-01, June; authors' calculations.

Current transfers and commitments

That account brings us to the present and a review of the current configuration of transfers and their likely growth.

The largest single intergovernmental transfer is the CHT – CAD 37 billion in 2017/18. The CST is also sizeable – CAD 14 billion in 2017/18 (Figure 6.6). The CHT was legislated to grow by a 6% annual escalation until the 2016/17 fiscal year and thereafter increases at least 3% annually up to the rate of growth of the economy. The CST is legislated to continue its 3% annual growth.

Figure 6.6. Federal transfers to sub-central governments in Canada, by major category, 2000/01 to 2017/18



Note: Federal transfers to Quebec are increased by the value of federal income tax abated (13.5 tax points) under the Alternative Payments for Standing Programs (the Quebec tax abatement).
Source: Statistics Canada (2019[3]), "Statement of government operations and balance sheet, government finance statistics", Table 10-10-0015-01, June; Receiver General for Canada (various years[4]), *Public Accounts of Canada*, Vol. I and II; Department of Finance (2015[5]), "Economic Action Plan", Ottawa, April; Department of Finance (2019[6]), "Investing in the Middle Class – Budget 2019", Ottawa, March.

The CHT and the CST, paid on a per capita basis, are formally earmarked to support provincial spending on health care, post-secondary education, childcare, social assistance, and other social services. In practical terms, however, they resemble unconditional transfers. The money is fungible and can help provinces spend on anything, provide tax relief, or improve their budget balances. There are no recent instances of Ottawa withholding material amounts to penalise a province for deficiencies in its programmes.

Rounding out the three largest transfers are the Equalization and the Territorial Formula Financing (TFF) programmes – a combined CAD 21 billion in 2017/18. The Equalization formula reflects differing yields of tax bases among provinces; TFF reflects differing tax yields among all 13 jurisdictions. A desire to create a predictable obligation has led Ottawa to gear total Equalization payments to GDP since 2009.

Alongside these programmes, Ottawa transfers several billion dollars annually for public infrastructure, mainly through the Gas Tax Fund, the Goods and Services Tax (GST) Rebate for Municipalities, and recently programmes such as the "Building Canada Plan" and the "Investing in Canada Plan". Infrastructure grants amounted to a few hundred million Canadian dollars per year for most of the 1990s up to the mid-2000s, after which they increased rapidly. With the multi-billion annual grants announced in phases 1 and 2 of the "Investing in Canada Plan", infrastructure grants to sub-central governments are scheduled to exceed CAD 10 billion annually over the next ten years.

The major transfers and infrastructure grants just described make up about 80% of Ottawa's transfers to other governments. The remaining grants are for a host of specific purposes, among them the Canada Quebec Accord on Immigration, Wait Time Reduction Transfers, payments to provinces regarding sales tax harmonisation and payments under Canada Job Fund Agreements.

Theories of federalism and intergovernmental transfers

Canada's historical and current division of revenue and spending powers, and intergovernmental transfers, were not guided primarily by formal theories of federalism. Economists and others have, however, illuminated forces driving the evolution of federal systems, including Canada's. We now turn to those – drawing insights from public economics about important goals that fiscal federalism can help achieve, and about the implications of practices that have evolved for other reasons.

Subsidiarity and the case for provincial/local government

It helps to start by asking why Canada, or any country, has more than one government. The high-level answer is that sub-central governments are better providers of many things people want. The division of powers at Confederation reflected a desire among many of the new country's citizens for provincial management of numerous things they wanted governments to do.

The case for sub-central provision and regulation is stronger when sub-central tastes and conditions vary (Oates, 2005[7]). In Canada's case, differences in language, religion and much else resulted in a federation that was less centralised than some founders wished, with the realities of negotiation among entities that could have remained separate if they chose making the desire for provincial control highly influential.

In a democracy with freedom of movement, organising public affairs at the most decentralised, competent level – a principle often referred to as "subsidiarity" – has a key further feature. People can move among jurisdictions in response to differences in government programmes and taxes. An influential early exploration of these dynamics by Tiebout (1956[8]) described how competition among sub-central governments levying taxes on their residents that are akin to prices for the programmes they provide could foster the efficient provision of public goods and services. Residents of one jurisdiction who prefer the benefits provided and prices charged by another one can move there, so people of differing tastes can locate in jurisdictions that suit them better.

A complementary dynamic noted by scholars who emphasise incentives and self-interest in the public sector – generally known as the "public choice" school – is that competition among jurisdictions can protect citizens from people in, and interest groups working through, government who seek to benefit themselves – see, for example, Brennan and Buchanan (1980[9]). This view sees horizontal competition among sub-central jurisdictions,

as well as vertical competition between the two levels of government, as a spur to accountability, more efficient services, and support for democratic government more generally.

National interests and the case for federal programmes and taxation

What, then, determines what gets done at a central, and what at a sub-central, level? Classical public economics – a large part of what Oates (2005[7]) terms "First Generation Theory" of fiscal federalism – tended to stress four motives for assigning functions to the central government in a federation: externalities; different scales for the provision of different public goods; regional redistribution to achieve certain standards of public services and other programmes; and mitigating potentially harmful internal migration.

An uncontroversial example is defence against external aggression: a public good primarily organised on a national scale. Others are major elements of international trade and immigration policy. In countries with small pools of talent suitable for public administration, the central government may have an advantage in delivering services – as argued, for example, by Prud'homme (1994[10]). This argument has limited applicability to Canada.

On the economic front, most major countries give central governments exclusive control of currency and related financial regulation. Because monetary policy and fiscal policy are both tools of macroeconomic management, moreover, a substantial central-government capacity to tax, spend and borrow is widely seen as helpful in counter-cyclical demand management.[12] A similar argument supports central-government responsibility for insurance against unemployment, more effectively pooling risk across sectors, and over time.

Public economics rationales for intergovernmental transfers

If subsidiarity alone dictated assignments of responsibility among different levels of government, locating responsibilities at the lowest level with the competence to discharge them and assuring that each level financed its own activities would make sense. Accountability at the sub-central level would spur sub-central governments to respond more fully to their citizens' preferences, whether expressed by voting with ballots or with feet. Accountability at the central-government level would let citizens across the country express their preferences with their ballots, knowing the taxes they paid to the central government were financing services delivered by it. Both levels would budget knowing they would need to cover their own costs, now and later, promoting sustainable fiscal policies.

In practice, however, spending responsibilities and revenue raising do not align, and examinations of why not have generated extensive literature.

Economies of scale as a public good

The attraction of assigning some revenue raising to the central government, even when the programmes those revenues will fund are sub-central, is considerable. The reduced administrative and compliance costs of uniform national taxes on income and consumption, administered by one agency, have induced many countries, including Canada, to collect centrally at least some taxes that flow directly to sub-central governments.[13]

Realising the public good of more efficient revenue collection does not, however, require formal, budgeted intergovernmental transfers. The remittances from Ottawa to the provinces in respect of personal, corporate or sales taxes attributable to activity in the provinces appear neither as a federal spending programme nor as provincial transfer income. The focus here is not mechanical allocations of revenue, but formal budgeted programmes inspired by other goals.

Externalities

One such goal relates to public goods and services that generate benefits beyond the localities where they are provided – national transportation, for example. Inter-jurisdictional spillover benefits mean that people want more investment in such goods and services than sub-central governments, responding to the costs and benefits within their jurisdictions alone, will provide.

As for negative externalities, central-government-imposed penalties, which would take the form of reductions in transfers otherwise payable, could respond to a similar logic. Provinces can adversely affect each other in many ways, such as trans-boundary pollution, inadequate law enforcement that supports cross-border criminality, or violations of international agreements that trigger retaliation by foreign governments. Penalties levied by the central government could reduce negative externalities within the federation.

Redistribution, equity and rights of citizenship

Intergovernmental transfers also respond to two related notions: that sub-central governments need resources to discharge their responsibilities; and that citizens throughout the country have certain rights.[14]

Law enforcement, for example, is often mainly managed locally but has national dimensions beyond spillovers. If the alternative is direct central provision of functions in sub-central jurisdictions, subsidies for the sub-central governments are arguably better for a healthy federation.

Notions of citizenship rights can be quite expansive, getting into areas of "positive rights". Many Canadians identify certain government programmes as coincident with citizenship. They therefore feel that Ottawa should finance them in whole or in part, to ensure that fiscal capacity to deliver those programmes exists across the country, and as a lever to punish provinces that fail to meet the standard they feel is appropriate.

Arguments around regional equity carry weight. They found expression in the Constitution Act, 1982, which expresses commitment to ensuring that provinces have "sufficient revenues to provide reasonably comparable levels of public services at reasonably comparable levels of taxation." Their principal formal expression is the Equalization programme, but per capita block transfer programmes such as the CHT and the CST also support fiscal equity in this sense.

The public finance literature that emphasises regional and citizen equity tends to argue for centralisation of taxation, especially income taxation. Mobile persons and businesses can more readily escape taxes levied by a sub-central jurisdiction; to escape central government taxes, they would need to emigrate. This dimmer view of the Tiebout model or the dynamic described by Brennan and Buchanan (1980[9]) sees centralised collection as preventing what would otherwise be a "race to the bottom" in tax rates and redistributive programmes.

Mitigating harmful migration

Another interpretation of the practice of subsidising sub-central jurisdictions with lower-yielding tax bases is that such transfers reduce incentives for internal migration by businesses or workers seeking better packages of taxes and programmes. In this view, actual or potential migration is economically inefficient – if, say, fiscal benefits differ from place to place because of unequal natural resource endowments, rather than reflecting the relative productivity of workers in the two regions (Boadway, 2006[11]).

A supporting argument rests on the observation that taxpayers move more readily among sub-central jurisdictions than across international borders. Without equalising transfers, this internal mobility could make the distortionary costs of taxation higher at the sub-central level than at the central level. So economic efficiency would justify centralising some taxation, combined with equalising transfers to sub-central governments (Dahlby, 2008[12]).

Conclusive evidence of significant differences in tax distortions between central and sub-central governments in the absence of intergovernmental transfers has been elusive, however. Even if equalising grants can reduce these distortions, moreover, they can also lower the perceived cost of taxation in recipient jurisdictions (Dahlby, 2008[12]; Dahlby and Ferede, 2011[13]). Furthermore, if underestimation of the social cost of raising additional revenues leads to higher sub-central taxes and spending, it will also lead to higher central taxes to finance the resulting higher equalisation grants.[15]

Recent experience and analysis

The experience of the very late 20th and early 21st centuries has prompted further thinking about the economics of federations and potential prescriptions.

One striking observation is the weak evidence for a race to the bottom in tax rates and public services. Even internationally, where central fiscal authority is weak or non-existent, tax rates, public services and redistribution tended to increase in the advanced democracies after the Second World War, and have been quite stable since, while rising in developing countries. Whatever the effects of competition on tax rates, the overall impact of citizens voting at the ballot box and with their feet seems to have been the convergence of taxation and spending around the levels established in the second half of the 20th century.[16] In Canada, accelerations and decelerations of spending at the provincial level seem easier to explain with reference to the fiscal condition of particular governments than trends up or down in the intensity of tax competition.

Another noteworthy development during the latter 20th and early 21st centuries is decentralisation – in Canada, in the more advanced democracies,[17] and many other parts of the world as well. Notwithstanding the economic and citizenship arguments for centralisation, other considerations, including the benefits of sub-central accountability and competition among jurisdictions – as described by Brennan and Buchanan (1980[9]), Oates (2005[7]) and Chandra (2012[14]) – seem to have forestalled any centralising trend.[18]

As for feelings of national identity and their expression in positive rights of citizenship, differences in the regional intensity of citizens' tendency to identify as citizens of the country rather than as citizens of their province or region are persistent in Canada. As previously mentioned, only Quebec accepted a transfer of tax points rather than a full subsidy in the 1960s. Many programmes most Canadians would identify as national – such as the mandatory work-related retirement and disability schemes (the Canada and Quebec Pension Plans), Employment Insurance, and Medicare – do not work uniformly across the country. These differences are sometimes controversial: many see deviations from uniform

treatment across the country as evidence that Ottawa is itself a tool for regionally based special interests to benefit themselves at the expense of Canadians elsewhere. Laudable or not, they indicate the limits of arguments based on rights of citizenship.

What about arguments for inter-regional transfers to mitigate economic shocks and inhibit inefficient migration? Recent literature underlines that regional insurance through open-ended transfers create moral hazard – among other things, reducing the incentive for sub-central governments to prepare for and adjust to economic shocks (Oates, 2005[7]). Boadway (2006[11]) argues for providing inter-regional insurance through programmes running on proper insurance principles.

Situations where fiscally induced migration into a resource-rich jurisdiction, or migration out of a resource-poor one, are economically inefficient are certainly plausible; so are situations where it is efficient. Many circumstances that let governments offer attractive fiscal packages – such as abundant natural resources, other geographic advantages or efficiency in delivering services – are likely to correlate with good job opportunities, so differences in net fiscal benefits do not necessarily induce inefficient migration.

Some dysfunctions in federations have also spurred new thinking. Inside Canada, the persistence of regional disparities, and evidence that some intergovernmental transfers create problematic incentives for recipients, showed that public choice considerations matter – see, for example, Courchene (1998[15]). Problematic behaviour by sub-central governments, in Argentina and Brazil, for example (Tanzi, 1996[16]), has directed fresh attention to the incentives intergovernmental transfers create, and negative externalities from them. Much of the provincial and local infrastructure spending supported by federal transfers in Canada, on public transit, for example, does not provide national-scale public goods or mitigate interprovincial externalities. A more straightforward explanation would be regional vote-buying.

Recent literature highlights the importance of "hard" versus "soft" budget constraints in fostering sustainable fiscal policy (Oates, 2005[7]). Decentralisation with open-ended transfers leads recipients to expect the provider to finance excesses, either because it has formally committed to do so, or because commitments not to do so will prove practically impossible to keep. If intergovernmental grants permit bailouts, the temptation will be to expand public programmes beyond levels that reflect public preferences or are sustainable over time (Rodden, 2002[17]).[19]

A key condition of efficiency and sustainability is that potential lenders must have a clear view of the creditworthiness of potential borrowers. One criterion is the ability of sub-central jurisdictions to raise the revenues they need to finance their expenditures. A second is intergovernmental transfers that are stable and consistent with budgetary discipline, rather than prone to ad hoc adjustments when a sub-central jurisdiction gets into trouble. The recent problems the European Union had with Greece, and concerns about larger sovereign debtors in the European Union, are reminders of the danger that a unit within a larger system might act on the assumption that it can force a bailout.

The outlook for federal and provincial revenue and spending

The philosophical cross-currents just discussed will continue to inform the Canadian debate, even as larger economic forces exert new pressures on the various levels of the Canadian government. Given current evidence, the biggest challenge in the coming decades will be the fiscal implications of demographic change.

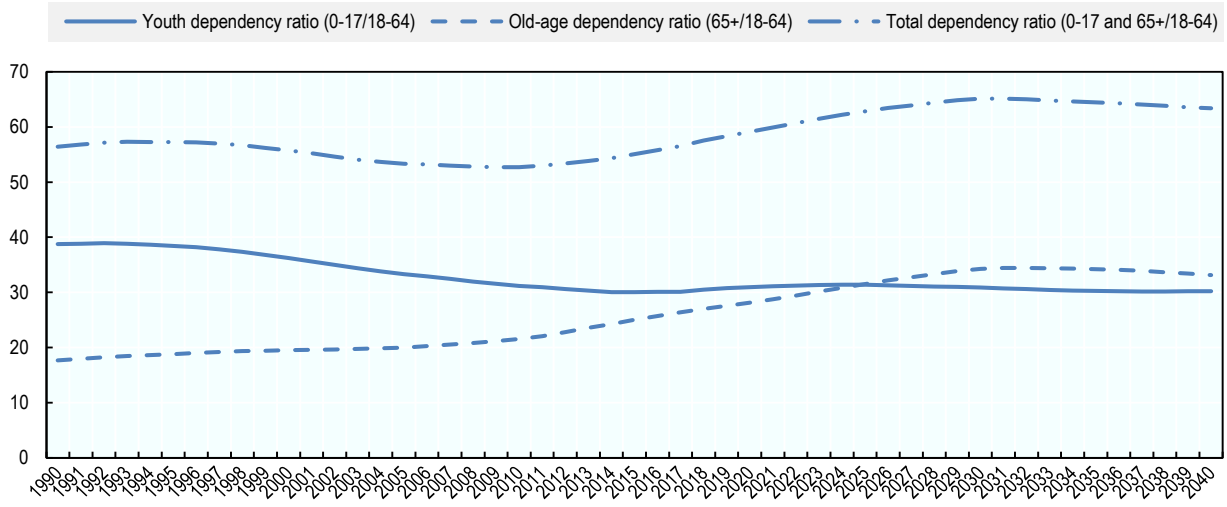
Slower revenue growth

Looking first at revenue, a country's workforce is a key determinant of its capacity to produce goods and services. Absent tax changes, total output and spending tend to affect government revenues proportionately (Drummond, 2011[18]). With the baby boomers leaving the workforce, and their descendants and immigrants barely replacing them, growth of GDP and the tax base is set to slow relative to growth of the total population.[20]

Upward pressure on spending

Demography also affects government spending. Publicly funded pensions, old-age transfers and health care will grow disproportionately as the boomers age. Publicly funded health care is strongly geared to age (CIHI, 2014[19]), and the growing importance of publicly funded drug programmes, which most provinces direct mainly toward seniors, may intensify that pressure. The population aged 65 and up relative to that of working-age Canadians is set to increase from about 1 senior per 4 potential workers today to around 1 senior per 3 potential workers in 10 years, and 1 senior for every 2.5 workers in 20 years (Figure 6.7). What is more, the youth dependency ratio – those aged 0-17 relative to the working-age population – is no longer declining. So the relief recently provided by the relative decline in the young population – on which governments spend less lavishly in any event – will not continue.

Figure 6.7. Demographic dependency ratios, Canada, 1990-2040

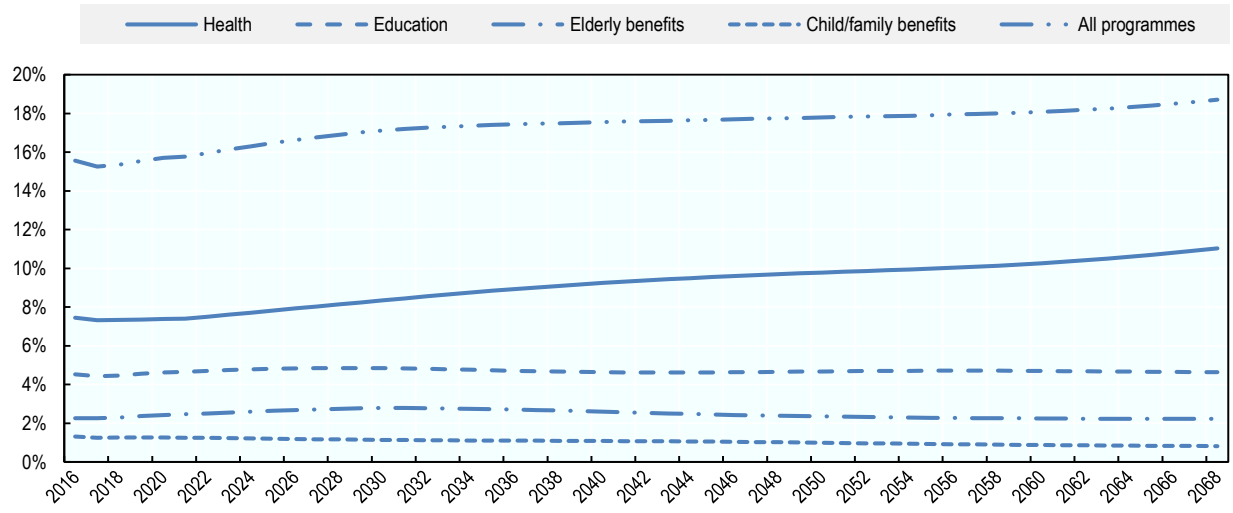


Source: Authors' calculations.

Quantifying demographic pressures on government budgets

A demographic model with middle-of-the-road assumptions for fertility, immigration and cost inflation produces some important results for age-sensitive government spending relative to GDP.[21] Our baseline shows age-sensitive spending in Canada rising from 16.2% of GDP in 2018 to 18.5% in 2038, and 19.8% in 2068 (Figure 6.8).

Figure 6.8. Demographically driven programmes relative to GDP, Canada, 2016-68



Source: Authors' calculations.

Elderly benefits rise as a share of GDP until the early 2030s but decline thereafter, because they are indexed to prices only, and productivity growth expands the tax base by comparison. Child and family benefits decline throughout the projection because the share of young people in the population does not rise, and the benefits, like those for seniors, are indexed to prices. Publicly funded education absorbs a roughly constant share of GDP over time: the population of students stays roughly constant as a share of the total, and the cost of providing the service rises with productivity, with compensation of education workers keeping pace with compensation elsewhere in the economy. Publicly funded health care, by contrast, rises relentlessly, from about 7.1% of GDP today to around 8.9% in 2038, and 10.8% in 2068: a rising share of seniors in the population, with their higher per-capita costs, and the same productivity-driven increase in compensation of health care workers, explain this projection.

These projections have markedly different implications for the two levels of government. Ottawa will need to manage a temporary rise in the cost of seniors' benefits (mainly Old Age Security and the Guaranteed Income Supplement). On the other hand, Ottawa's support for post-secondary education will decline with the relative number of students, and its child-related transfers will fall significantly. Overall, absent changes in programme parameters, demography will reduce federal government commitments.[22]

The provinces are in a very different position. Their education costs will not decline the same way the federal government's transfer programmes will because productivity growth raises those costs. Demography, mainly because older people tend to use more publicly funded health care services per capita than younger people do, will push health care costs up relentlessly.[23]

If current spending on demographically sensitive programmes, and current taxes to finance them, are thought of as two sides of an implicit political bargain, we can quantify the lower or higher future costs of these programmes as implicit assets or liabilities. The present value of the higher tax take to cover the incremental cost of all these programmes over a 50-year span – roughly the life expectancy of the average-age Canadian – is like a notional fund Canada would need to have set aside to cover the cost of this implicit bargain.[24] That liability – the funds it would take to cover those costs without raising taxes over the next 50 years – is essentially all at the provincial/territorial level: some CAD 2.7 trillion, or about CAD 72 000 per person (Table 6.1).

Table 6.1. Implicit liabilities from age-sensitive government programmes in Canada

	Health	Education	Elderly benefits	Child/family benefits	All programmes	All programmes relative to GDP (2018)	All programmes per person	Memo item: Net debt relative to GDP
	CAD billions					%	CAD	%
Provincial/ territorial	2 508	246	8	-61	2 701	122	72 200	30
Federal	N/A	-18	194	-268	-91	-4	-2 400	34
Total	2 508	1 869	203	-329	2 609	118	69 800	63

Note: Figures may not sum exactly due to rounding.
Source: Authors' calculations.

Table 6.1 also shows the net debt – debt and other obligations minus financial assets – of the provincial/territorial and federal governments, relative to 2018 GDP. For the provincial and territorial governments as a whole, the implicit liability from demographically sensitive programmes – which is essentially the implicit liability from health care – is about four times larger than their net debt. The federal government, whose net debt is roughly the same as that of the provinces and territories together, is essentially hedged against demographic change, with an implicit liability related to seniors' benefits offset by an implicit asset of child/family benefits. So it shows a small implicit net asset. For the country as a whole, the implicit liability from demographically sensitive programmes is about twice the size of the net debt of both levels of government.

Because the demographic outlook varies across the country – and, to a lesser extent, because their age-sensitive programmes are not the same – the situation of different provinces varies also. Some are ageing faster than others. The implicit liabilities tend to be larger relative to provincial and territorial GDPs and populations in the eastern provinces and the territories (Table 6.2).

Table 6.2. Implicit liabilities from age-sensitive programmes in Canada by province/territory

	Health	Education	Elderly benefits	Child/family benefits	All programmes	All programmes relative to GDP (2018)	All programmes per person (nearest thousand)	Memo item: Net debt relative to GDP
	CAD billions					%	CAD	%
British Colombia	296.4	68.9	-0.2	-1.6	363	124	73 000	14
Alberta	560.0	-24.3	8.9	-3.7	541	162	126 000	6
Saskatchewan	104.9	-18.6	0.0	0.0	86	108	74 000	14
Manitoba	74.9	5.7	-0.1	-0.1	80	110	61 000	33
Ontario	730.5	28.2	-1.2	-15.4	742	87	52 000	38
Quebec	447.2	106.6	0.0	-40.2	514	123	61 000	43
New Brunswick	40.3	11.8	-0.1	-0.1	52	141	67 000	38
Nova Scotia	56.4	21.4	0.0	-0.2	78	177	81 000	34
Prince Edward Island	22.7	2.2	0.0	0.0	25	363	162 000	32
Newfoundland and Labrador	93.9	32.5	1.1	0.0	128	390	243 000	45
Yukon	23.2	1.5	0.0	0.0	25	790	609 000	-8
Northwest Territories	24.6	1.8	0.0	0.0	26	539	592 000	0
Nunavut	32.9	8.1	0.0	0.0	41	1 512	1 066 000	-9

Note: Figures may not sum exactly due to rounding.
Source: Authors' calculations.

Table 6.2 also shows the net debt of each provincial and territorial government relative to GDP. The troubling combination of relatively large implicit liabilities and relatively large net debt is mainly in the eastern provinces, especially Prince Edward Island, and Newfoundland and Labrador.

Responding to fiscal pressure

How might provinces react to this pressure? A review of the options shows why bigger intergovernmental transfers will be attractive for them, but problematic for the country.

Provincial fiscal consolidation

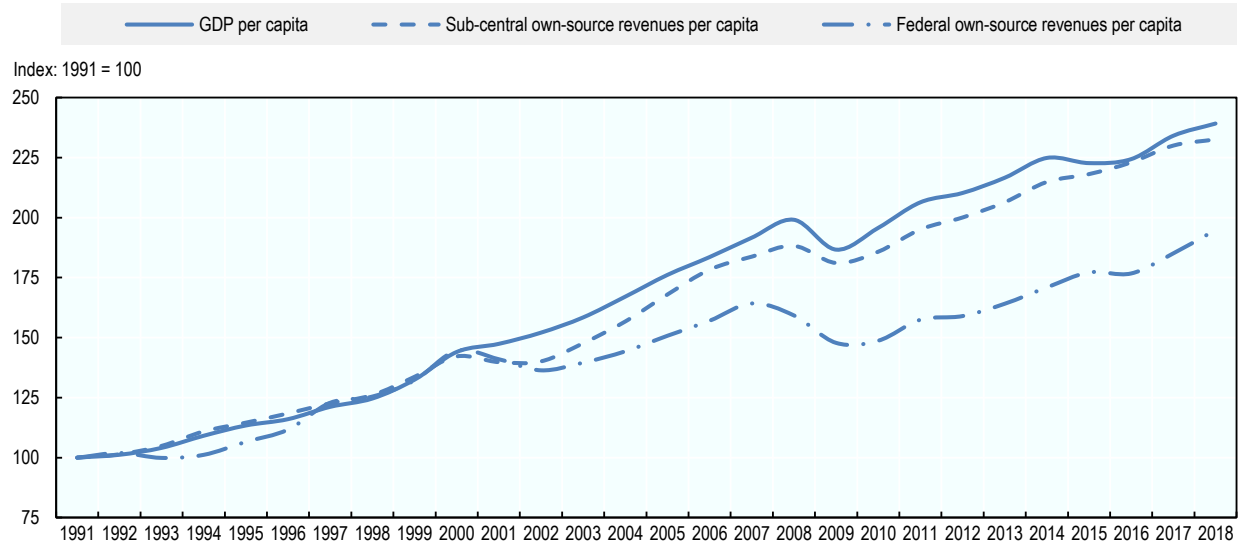
Given recent evidence, deficits are a politically acceptable way for some provinces to avoid addressing hard budget constraints. Borrowing, however, is not a feasible approach to the long-term fiscal challenge. Demographic pressure will persist for decades, and attempting to fill the gap that the implicit liability represents by issuing market debt would mean mounting interest payments, and likely exhaust the willingness of potential lenders. More durable budget management will rely on a mix of tax increases, spending control, and in some areas, potential pre-funding of programmes that involves a bit of both.

Provincial tax increases

As previously noted, provinces have increased their share of spending more than their share of revenue since the late 20th century. Provinces have access to the same major revenue sources as Ottawa, as well as exclusive jurisdiction over such sources as resource royalties, gaming and liquor profits, and property taxes. Recent slower growth of federal revenues – primarily due to consumption tax cuts and slow-growing employment insurance premiums – suggests that provinces could raise more without proportionate increases in total taxes relative to GDP (Figure 6.9). How might they do so?

In recent years, a politically attractive option to generate incremental provincial revenues has been to raise personal income tax rates on high-income earners.[25] Starting with Nova Scotia in 2010, many provinces have increased their top tax rates, followed by the federal government in 2016. Quebec, Ontario, New Brunswick and Nova Scotia now have combined federal and provincial top tax rates exceeding 53% (Table 6.3). Eight of ten provinces now have combined federal and provincial top tax rates rounding to or more than 50%.

Figure 6.9. Relative growth of sub-central and federal governments' own-source revenues and GDP in Canada, 1991-2018



Note: Federal transfers to Quebec are increased by the value of federal income tax abated (13.5 tax points) under the Alternative Payments for Standing Programs (the Quebec tax abatement).
Source: Statistics Canada (2019[3]), "Statement of government operations and balance sheet, government finance statistics", Table 10-10-0015-01, June; Authors' calculations.

Table 6.3. Selected recent provincial tax rate increases on top earners in Canada

	Year of tax change	Top income threshold (CAD)	Provincial tax rate, % (change)	Combined federal/provincial top tax rate, % (2018)
Federal	2016	200 000	(+4.00) 33.00	In eight of ten provinces, rate rounds to or exceeds 50%
Nova Scotia	2010	150 000	(+3.50) 21.00	54.00
New Brunswick	2013	126 662	(+1.77) 16.07	53.30
	2014	127 802	(+1.77) 17.84	
	2015	150 000	(+3.16) 21.00	
	2016	250 000	(+7.91) 25.75	
		150 000	(-5.45) 20.30	
Quebec	2013	100 000	(+1.75) 25.75	53.31
Ontario	2012	500 000	(+1.56) 18.97	53.53
	2013	509 000	(+1.56) 20.53	
	2014	150 000	(+1.56) 18.97	
		220 000	(-) 20.53	
Alberta	2015	125 000	(+2.00) 12.00	45.00
		150 000	(+3.00) 13.00	46.00
		200 000	(+4.00) 14.00	47.00
		300 000	(+5.00) 15.00	48.00

Source: Authors' calculations from government sources.

Shifting more of the tax burden to a relatively small number of people may be politically attractive, but it does not necessarily yield the desired revenue. Responsiveness of taxpayers to tax changes has been estimated many times in Canadian and international studies, with the highest sensitivity found among top earners. Starting from current top personal tax rates, middle-of-the-road assumptions about the impact of further increases on the tax base indicate that further rate increases would reduce revenues collected. Awkwardly, the fact that the personal income tax is a shared field creates an externality. The reduction of the base would only reduce the revenues of the government imposing the increase – a province, say – by about half relative to the projected yield with no reduction of the base. The other level of government – potentially the federal government – would see its revenues decrease by about the same amount that the first government's revenues increased.[26]

Generally speaking, a consumption tax, especially a value-added tax like the Harmonized Sales Tax (HST), has less economically harmful effects on savings, personal and business investment decisions, migration of labour and firms, and work decisions, than personal or corporate income taxes. For provinces, the lowest-cost way to increase revenues from their own sources would be to tax consumption.[27]

The recent evolution of consumption taxes and personal/corporate income taxes reveals the effect of the 2% GST cut at the federal level (Figure 6.10). Federal and provincial income tax revenues have grown pretty much in line with GDP in the last 25 years, but federal consumption taxes have grown less. So the provinces could occupy room vacated by Ottawa. Although measures to tax high-income earners have had a higher profile, provinces have made some recent moves in this direction. Quebec raised its value-added tax by 1% in both 2011 and 2012. Manitoba increased its provincial sales tax by 1% in 2013. In 2014, Nova Scotia decided not to proceed with previously announced rate cuts to its HST. Newfoundland and Labrador hiked its HST by 2 percentage points in January 2016. If Ottawa reduced its presence in the consumption tax field further, provincial opportunity in this area would grow.

Because they affect behaviour less, consumption tax increases have the key advantage of bringing in amounts closer to what static calculations – that is, calculations assuming no behavioural impact – predict. If economic activity tips more toward consumption and away from investment as the population ages, moreover, consumption taxes will rest on a relatively robust base.

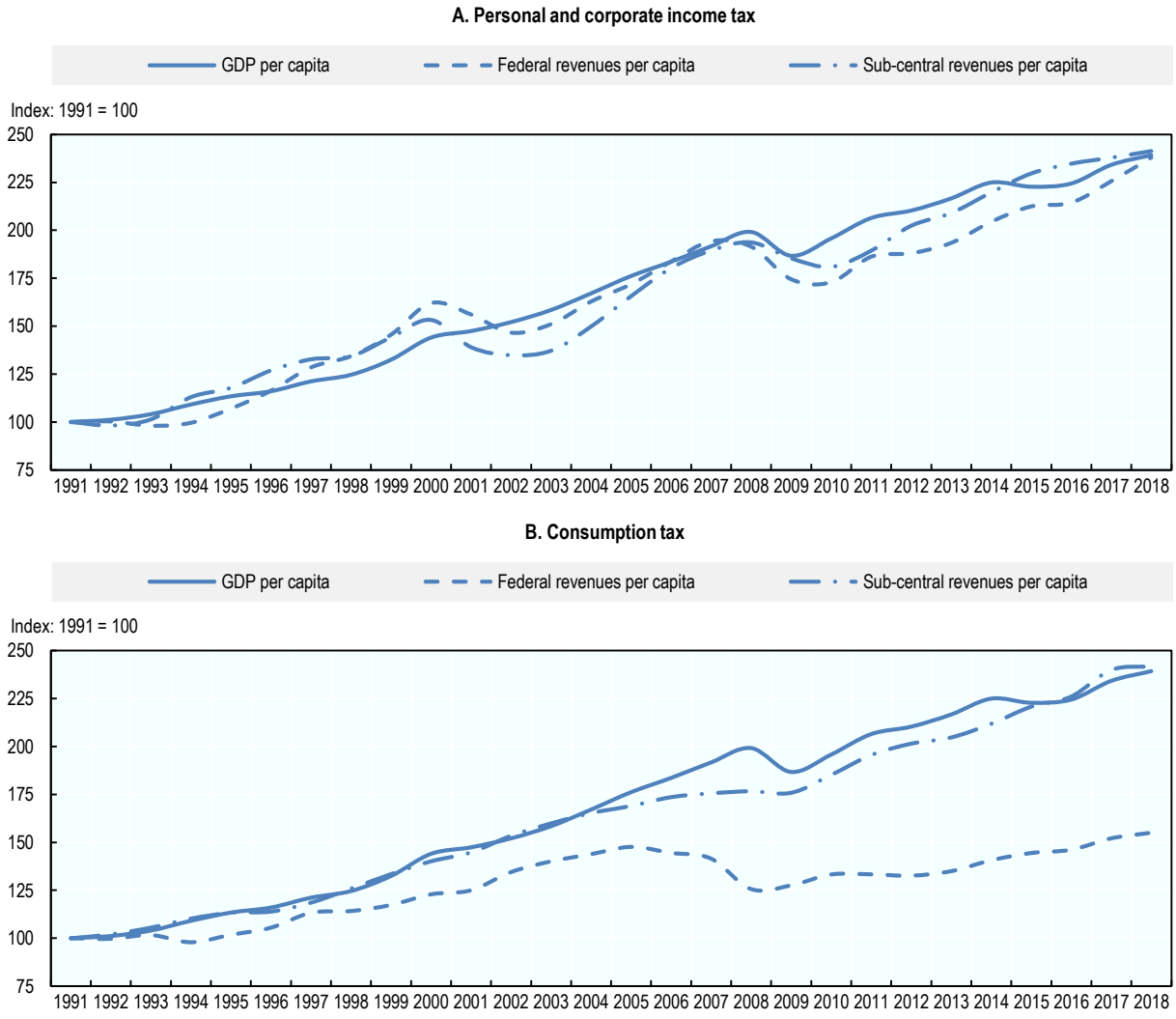
The fact that consumption taxes can be more politically awkward has a positive side. Taxpayers may require greater accountability for extra consumption tax revenues raised. So they may be the revenue source likelier to induce needed spending reforms.

Tighter spending control

Efforts to contain spending at the federal level earlier in this decade and in many major provinces more recently inspired so much commentary in Canada that the interested reader can easily pursue the details elsewhere. The key point worth underlining is familiar: containing spending is hard because of the numbers, and focused political energy of transfer recipients, and – especially at the provincial level – the power of governments' direct employees and providers of publicly funded services such as health and education.

The greater political power of groups that benefit from government spending, compared to that of current and future taxpayers, makes spending restraint easier when the hard trade-offs are relatively immediate and easy to demonstrate. Those circumstances tend to apply when what previously appeared as a soft budget constraint, the need for no more discipline on the bottom line that what is needed to induce creditors to keep lending, becomes hard – as was the case in Saskatchewan in the 1990s, for example.

Figure 6.10. Relative growth of federal and provincial taxes on incomes and consumption in Canada, 1991-2018



Note: Federal transfers to Quebec are increased by the value of federal income tax abated (13.5 tax points) under the Alternative Payments for Standing Programs (the Quebec tax abatement).
Source: Statistics Canada (2019[3]), "Statement of government operations and balance sheet, government finance statistics", Table 10-10-0015-01, June; Authors' calculations.

Sustainable social insurance reform

Provinces could respond to demographic pressure by partially pre-funding some age-sensitive social insurance programmes. An attractive model is the reforms that partially pre-funded the Canada Pension Plan (CPP) and the Québec Pension Plan (QPP) in the late 1990s to stabilise their costs over time. Those reforms combined near-term spending cuts with contribution hikes larger than needed to pay the current costs of the programme. The high profile of the projections determining whether the new contribution rate was stable over time has likely mitigated the pressure for benefit enrichment that always affects such programmes.

Analogous changes to publicly supported drug programmes or retirement and long-term care facilities would make potential future recipients pay extra in the near term, with funds not needed for current programme expenditures flowing into an investment account. Future drawdowns from that account to pay for the relevant services would supplement future tax or premium revenue, limiting the impact of ageing-related costs on the ensuing generations of taxpayers (Busby and Robson, 2011[20]). Such reforms would be challenging, but the C/QPP reforms, which were spurred by the prospect of having inadequate funding to pay benefits in a few years' time, show that a suitably hard budget constraint can make them happen.

Federal intergovernmental transfers

For provinces, the soft budget constraint offered by further hikes in intergovernmental transfers will be tempting. Indeed, the growing importance of federal transfers in most provincial budgets (Table 6.4) has likely increased their focus on Ottawa as a possible solution to their fiscal challenges.

Table 6.4. Major federal transfers and total revenue in Canada, by province, 2002/03 to 2017/18

	Federal cash transfers (CAD billions)			Total revenues (CAD billions)			Federal cash as a share of total revenue (%)		
	2002/03	2017/18	Change	2002/03	2017/18	Change	2002/03	2017/18	Change
Newfoundland and Labrador	1.6	1.2	-0.4	4.1	7.3	3.1	39	16	-22
Prince Edward Island	0.3	0.7	4	1.0	1.9	0.9	35	37	2
Nova Scotia	1.9	3.6	1.7	5.5	10.6	5.1	35	34	-1
New Brunswick	1.9	3.2	1.3	5.3	9.3	4.0	37	35	-2
Quebec*	11.8	26.3	14.5	54.6	107.2	52.6	22	24	3
Ontario	8.9	24.9	16.0	74.9	150.6	75.7	12	17	5
Manitoba	2.2	4.2	2.0	7.1	16.2	9.1	31	26	-5
Saskatchewan	1.4	2.4	1.0	7.5	14.0	6.5	19	17	-2
Alberta	2.1	7.6	5.5	22.7	47.3	24.6	9	16	7
British Columbia	3.8	9.1	5.2	27.9	52.0	24.1	14	17	4
Total	36.0	83.1	47.1	210.5	416.5	205.9	18	21	3

Note: The federal transfers to Quebec are increased by the value of federal income tax abated under the Alternative Payments for Standing Programs (13.5 tax points) and the discontinued Youth Allowances Program (3.0 tax points), and Quebec's revenues are reduced by the same amount.
Source: Department of Finance Canada, *Fiscal Reference Tables 2018,* www.canada.ca/content/dam/fin/migration/frt-trf/2018/frt-trf-2018-eng.xlsx; Authors' calculations.

At a given moment, the formulas for these transfers may make them look firm – that is, provinces may appear to face hard budget constraints that oblige them to manage revenues and spending without a federal bailout. However, the many changes in the structure and size of these transfers over time make the appearance of a hard constraint deceiving.

The experience of repeated increases in transfers inevitably affects the way provinces manage their affairs. Provincial governments choose the gap between how much they spend and how much they collect. The more federal transfers appear to respond to provincial fiscal pressures, the weaker are the incentives for provincial governments to raise own-source revenues or manage expenditures efficiently.[28] Also, the stronger are the incentives to deflect blame for any shortcomings in their programmes, or for the taxes they charge, onto Ottawa, and to devote time and energy they should devote to improving services to lobbying for bigger federal transfers instead.

It would be perverse if transfers widely seen as helping provinces perform their functions were actually undermining the provincial autonomy essential for a healthy federation. As Table 6.4 shows, however, major federal cash transfers make up two-fifths of the budget of many provinces and are in no case less than one-seventh. These average levels tell us nothing directly about the changes at the margin that affect decisions, but it is reasonable to worry that they induce provincial governments to direct too much attention towards Ottawa, at the expense of their own taxpayers and citizens.

In this context, proposals that Ottawa should establish a new pharmacare programme to subsidise, or even replace, provincial drug programmes look problematic on several grounds. One version envisions federal pharmacare replacing all drug benefits currently provided by provinces to citizens, and supplanting all employer-related drug benefits, including the relatively expensive drug benefits of provincial government employees (Morgan et al., 2015[21]; Gagnon, 2010[22]). The desirability of integrating drug programmes better with doctor, hospital and other provincially funded services, makes a comprehensive federal takeover undesirable (Wyonch and Robson, 2019[23]). Moreover, the immediate impact of a relatively fiscally healthy federal government underwriting drug costs would surely be to increase spending, rather than to support the discipline of provinces facing a harder budget constraint.

Notwithstanding arguments that federal taxes are less damaging than provincial taxes, moreover, the federal taxes that finance federal transfers are damaging, and therefore create negative externalities for provincial governments. Suppose Ottawa hiked high-income tax rates as Ontario has just done. That would shrink the relevant tax base across the country, hurting provincial revenues. Some responses to federal tax hikes are worse for the country than responses to provincial hikes. Whereas provincial hikes may induce income, and possibly taxable entities, to move from one province to another, movement of activity out of the country is a complete loss.

The problems created by soft provincial budget constraints may be worse in the future than what Canadians have experienced since the mid-20th century. The provinces that will experience above-average stresses from ageing tend to be the provinces that already have larger debt-to-GDP ratios. A heavily indebted province, especially a small one, might expect Ottawa to step in if it lost access to credit.

If a financing crisis did occur, however, the federal government would face a dismal choice. It could allow a default, risking contagion to other fiscally stressed provinces. Alternatively, it could bail the province out, setting a dangerous precedent, and potentially undermining even its own credit access, since a bailout of Quebec or Ontario would be much harder to manage than that of a small province. Far better is to ensure that each province sees its budget constraints as hard, and manages its taxes, costs and social insurance programmes to ensure that they are sustainable without additional federal help.

Considerations and conclusions

The striking changes in the practice and theory of fiscal federalism over time provide useful context for considering how spending, taxation and transfers among Canadian governments may evolve in the future. The insights from public economics about different transfers help in understanding their impact, but past changes from unconditional to conditional and back to unconditional grants reveal the importance of circumstances and the limits of normative guidance. In our view, the generally high standard of public services in the Canadian federation, even as federal grants have become less conditional, suggests that Canada would be well served by reforms that give provinces more capacity to raise their own revenues – notably by relying more on consumption taxes.

To the extent that different packages of taxation and spending in different provinces reflect different preferences among their citizens, the case for federal intervention weakens. Competition among provinces to offer – or not to offer – different packages of taxes and public programmes is a strength of a federation, not a problem Ottawa needs to offset. Intervening to reduce the tax cost of a given programme in one province at the expense of others that are charging less relative to the value they are providing reduces the incentive for each province to provide cost-effective programmes.

A focus on improving decision making at each level directs attention away from further increases in transfers from Ottawa. Measures to more closely align the revenue-raising and spending powers of governments at each level seem a more promising route to a healthy Canadian federation in the future.

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Notes

1. Our principal focus is relations and transfers between Canada's senior, sovereign governments: federal and provincial. We treat federal transfers to local governments – which are, in a traditional phrase "creatures of the provinces" – as part of federal-provincial transfers. We note instances where the data we cite also include transfers to the territories, which are wards of the federal government, but in some respects function like provinces.

2. See sections 91-95 for the complete description of provincial and federal legislative powers. Available at http://laws-lois.justice.gc.ca/eng/const/page-4.html#h-17.

3. Constitution Act, 1867, Sec. 91(3).

4. Constitution Act, 1867, Sec. 92(2).

5. Constitution Act, 1867, Sec. 112, 114-116, 118, 119.

6. One formal change in tax fields occurred in 1980 when the federal government vacated the lottery and gaming field in return for an annual payment from the provinces (Desjardins, Longpré and Vaillancourt, 2012[25]).

7. This activity, not explicitly anticipated in the constitution, was justified by a federal "spending power" inferred from sections 91(3), 91(1A) and 106. See Hogg (1997[24]).

8. The Constitution Act, 1982 included a commitment in section 36(2) to "making equalization payments to ensure that provincial governments have sufficient revenues to provide reasonably comparable levels of public services at reasonably comparable levels of taxation." This provision created a constitutional basis for the formal Equalization programme, and, arguably, for other major transfers as well.

9. The abatement was originally 23% of federal personal tax revenue. Changes to federal programmes over the years have reduced it to 16.5%.

10. For clarity, the EPF transfer was calculated with reference to aggregate provincial spending, so no single province enjoyed a 50% subsidy. The CAP transfers continued to be calculated with reference to individual provincial spending, continuing to create 50% subsidies for all.

11. The largest being the Quebec Health Services Fund Contributions and the Ontario Employer Health Tax.

12. The Euro area is an important counter example, but many argue that its separation of fiscal from monetary policy is a serious flaw that may ultimately doom the arrangement.

13. In Canada, further savings from centralised collection are likely possible. For example, the Canada Revenue Agency has estimated that tax administration costs could be more than CAD 500 million annually lower if Quebec's tax collection services were consolidated with federal ones. This

figure does not take into account the reduced compliance burden on Quebec taxpayers (Vailles, 2015[26]).

14. A classic pioneering investigation of redistribution within federations is Musgrave (1961[27]). Boadway (2006[11]) identifies three equity-related justifications for equalising transfers, in the absence of interprovincial mobility. Regional fiscal equity aims to provide citizens of different regions but in otherwise similar economic circumstances similar public services for similar tax costs. Inter-regional insurance aims to ensure sub-central governments against temporary shocks to their economies and capacities to generate tax revenues. National standards aim at uniformly high public services.

15. Smart (2007[28]) finds that equalising grants induce higher average effective tax rates by equalisation-receiving governments.

16. In OECD countries, public social spending to GDP increased from about 7.5% of GDP in 1960 to 22% in 2014 – see Figure 2 in OECD (2014[29]).

17. OECD (2013[30]) uses five measures of (de)centralisation to compare countries and over time: the ratio of sub-central to general government spending; the ratio of sub-central own-revenue to general government revenue; the ratio of sub-central tax revenue to general government tax revenue; sub-central autonomy in setting tax bases and rates; and a measure of decision-making authority over education. The OECD measures indicate that OECD countries have generally decentralised over the past 20 years. Spending decentralisation has outpaced revenue decentralisation, however, resulting in higher intergovernmental transfers.

18. Contrasts in fiscal arrangements around the world, and changes over time, have supported a great deal of empirical work – but no consensus – on whether centralisation or decentralisation has any systematic effect on the size of government (Feld, 2014[31]).

19. For a discussion of this problem as it relates to health-care-related transfers specifically, see Crivelli, Leive and Stratmann (2010[32]).

20. Immigration is not a solution to demographic woes [see Robson and Mahboubi (2018[33])]. Some mitigating factors include the possibility of labour-force participation rates rising to help offset the declining workforce population growth. Among older workers, retirement ages have been increasing in recent years as baby boomers choose to work a little longer than the traditional retirement age (Hicks, 2012[34]), but increases in participation rates by older workers sufficient to offset demographic ageing are inconceivable without radical policy changes.

21. For more detail on the assumptions and mechanics of these projections, see Busby, Robson and Jacobs (2014[35]).

22. The federal government's health expenditures are relatively small and are focused on veterans, on-reserve indigenous people and regulatory activities. These amounts are far more sensitive to changes in policies than they are to changes in demographic structure.

23. A number of research studies have come to similar overall conclusions; for example, see Drummond (2011[18]) and Dodge and Dion (2011[36]).

24. This calculation treats the current tax take, measured as a share of GDP, as the cost the population currently accepts for those programmes. If the share of GDP taxed for the programme falls such that the present value of the difference over 50 years is negative, the promise to maintain the programme as is creates an implicit asset. If the share of GDP taxed for the programme rises such that the present value of the difference over 50 years is positive, the promise to maintain the programme as is creates an implicit liability.

25. British Columbia also raised its general corporate income tax rates from 10% to 11% in 2013, while Ontario delayed in 2012 a scheduled 1.5% corporate tax rate reduction over two years, from 11.5% to 10%, until the return to a balanced budget.

26. Laurin and Robson (2015[1]) elaborate this calculation.

27. For example, recent estimates of marginal costs of public funds for provinces show that raising an additional dollar of corporate tax revenue today may end up costing from an extra CAD 1.25 in the long run in Manitoba to a cost so large in some other provinces like Ontario that a small increase in corporate tax rates would be counterproductive, yielding lower revenues. The long-term extra cost of raising another dollar of personal income tax today in various provinces range from CAD 0.45 in Alberta to CAD 2.45 in Quebec – over and above the dollar raised – while that cost ranges from only CAD 0.13 to CAD 0.21 (excluding Alberta) for an extra dollar of value-added sales tax on consumption (Dahlby and Ferede, 2011[13]).

28. Provincial government officials who object to this view should review their own recent experience with recipients of their transfers. Hospitals are a case in point. If hospitals are able, as they often have been, to over-shoot budget targets and get bailed out by provincial transfers, they will not manage their budgets as tightly as they would if deficits directly affected their resources in subsequent years. Soft budget constraints are antithetical to good management wherever they exist.

OECD Fiscal Federalism Studies

Ageing and Fiscal Challenges across Levels of Government

Populations in OECD and emerging economies are ageing rapidly, which will have significant macroeconomic impacts, including on public expenditures and tax revenues. The rules and practices that govern fiscal relations among different levels of government, such as their responsibilities for taxation, spending and debt management, have a bearing on economic efficiency and ultimately growth. The consequences of population ageing at subnational government levels are especially intense. Many local governments are vulnerable to the ageing of their populations from a fiscal perspective. The economic and fiscal challenges of an ageing population go beyond intergovernmental boundaries, and they require complex intergovernmental policy responses. This volume brings together cross-country studies of fiscal policy, demographics and spatial productivity, as well as country studies of Brazil, Canada, China and Germany.

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