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Measuring dependency ratios using National Transfer Accounts

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Abstract

It is now widely recognised that the socio-economic changes that ageing societies will bring about are poorly captured by the traditional demographic dependency ratios (DDRs), such as the old-age dependency ratio that relates the number of people aged 65+ to the working-age population. Compared to the older people of today, future older generations will be in better health, and will likely work longer. However, strictly from a public finance perspective, the extent to which the DDRs capture the challenges that stem from ageing depends on future changes in the age structure of the population, in behavioural patterns, and in age-related public transfers. Combining population projections and National Transfer Accounts (NTA) data (i.e., data on age-specific public transfers), we construct a 'transfer-based' demographic dependency ratio for seven European countries up to 2050. We then compare the quantitative impact of the transfer-based DDR with that of the traditional DDR for three different policy responses to population ageing: net immigration, healthy ageing, and longer working lives. This is done by linking age-specific public health transfers and labour market participation rates to changes in mortality. Four main findings emerge. First, the simple old-age dependency ratio overestimates the future public finance challenges faced by the countries studied, and substantially so for some countries, such as Austria, Finland, and Hungary. Second, healthy ageing (i.e., keeping health transfers constant for a given mortality rate) has a modest effect on public finances, except in the case of Sweden, where it plays an important role. Third, the long-run effect of immigration is captured well by the traditional DDR measure if the common assumption that immigrants are similar to natives is maintained. The immediate to short-term impact of immigration tends to be overstated by the traditional DDR measure. Finally, increasing the average

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length of working life is central to addressing the public finance challenge of ageing. We estimate that extending the average length of working life by three to five years over the next 25 years – roughly in line with the gain in life expectancy – will substantially reduce the impact of ageing on public transfers.

1 Introduction

European societies are ageing. According to Eurostat population projections, the median age of the EU population will increase from 41 in 2010 to 46.4 in 2040. At that time, 26.9% of the population will be aged 65 or older. The well-known causes of these trends are increasing longevity and low fertility in European populations. The challenges posed by these developments for public expenditures related to pensions and health care have often been framed in terms of the concept of the demographic dependency ratio, the old-age burden, or the support ratio; i.e., the ratio of the older population to the working-age population (World Bank 1994; Cutler et al. 1990).

Discussions of the old-age demographic dependency burden, often defined as the number of people aged 65 and older over the number of people aged 20 to 64; have sometimes been supplemented with references to the share of the very old, defined as the number of people aged 85+ over the working-age population, to illustrate that public transfers in the form of health care are particularly large for this very old age group. Thus, projections showing that people will continue to live longer are often, at least implicitly, perceived as being predictions of economic decline, smaller pensions, and lower welfare in general.

Recently, however, a growing number of authors have pointed out that a measure based on chronological age alone is misleading in societies where longevity is increasing substantially with each generation (Sanderson and Scherbov 2007, 2010 and 2013; Lutz 2009; Shoven 2010). Sanderson and Scherbov (2013) argued that it is more appropriate to use a measure such as prospective age; i.e., remaining life expectancy. Using prospective age, the ratio of old to young can be more usefully calculated. For example, we can relate the number of people with less than 15 years of remaining life expectancy to the number of people (or some subset thereof) with more than 15 years of remaining life expectancy. Other measures that account for changes in longevity in similar ways also exist (Sanderson and Scherbov 2013).

Building on this literature, Spijker and MacInnes (2013) have recently gone so far as to call ageing a 'non-problem', at least for the UK. They propose a more dynamic measure that they call a 'real old-age dependency ratio'. Instead of using chronological age, they relate the number of people with a prospective age of less than 15 years to the number of people in employment, arguing that the development in this ratio better reflects the 'old-age burden' and its associated challenges. This approach can be seen as a dynamic version of the simple head-count demographic dependency ratio, in which age cut-off points are moved in tandem with improvements in life expectancy. The authors noted that this measure indicates that the real old-age dependency ratio has been falling since the 1980s in major European countries. The finding that some public transfers depend less on chronological age and more on prospective age suggests that it could make more sense to estimate the old-age burden using a prospective measure of age, such as the real old-age dependency ratio, rather than a measure that is based on chronological age. The cost of individual health care is more closely related to proximity to death than to years from birth (Felder et al. 2000; Bjørner and Arnberg 2012).

While acknowledging the broader point, Barslund and Werder (2014) have challenged this measure, and, in particular, the value of 'backcasting' the real old-age dependency measure. They observed that the National Transfer Accounts (NTAs) (Mason et al. 2006) show that for many countries, pension transfers make up the largest share of public old-age transfers until rather late in life. Until recently, the pension ages in many countries had been unchanged for decades, with a downward trend in the average age of retirement (OECD 2013). The real old-age dependency ratio may be *too* dynamic with respect to implicitly assumed behavioural changes regarding retirement and length of working life, whereas the traditional static old-age DDR is useful for measuring the economic challenges faced by an ageing society absent behavioural changes. In addition, relying on a dynamic measure only could mask the need for policy approaches aimed at changing individual behaviour, particularly related to retirement.

Given this background, the contribution of this paper is relatively modest. In essence, our goal is to shed light on how NTAs can be used to qualify the discussion surrounding ageing and the old-age burden along three important dimensions: namely, health care spending and the concept of healthy ageing, measurements of the impact of migration, and longer working lives. These are the three central building blocks that are needed to evaluate the public finance challenges associated with ageing. In this context, we emphasise that unlike single-country inter-temporal models, which are suitable for investigating detailed budgetary effects, NTAs are especially useful for studying the relative magnitudes of the impacts on public finances of different scenarios over a range of EU countries (Storesletten 2000; Schou 2006; Hansen et al. 2015; Sánchez-Romero 2013; Lassila 2014).

For the purposes of this exercise, we rely on NTAs to provide information on age-specific government (net) transfers, which allow for a more precise assessment of dependency ratios.[1] These data enable us to take into account not just changes in the composition of the population aged 65 and older, but the composition of the working-age population and changes in the number and the composition of dependent young individuals. We call the resulting measure the 'transfer-based

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[1] Public net transfers for a given age group are calculated as the sum of monetary transfers (e.g., public pensions) and the value of publicly provided services (e.g., the portion of health care costs covered by the government, as well as other forms of spending, such as on the military or police) less taxes and fees paid for the use of public services.

demographic dependency ratio' or the 'transfer-based' DDR.[2] When looking at the effects of healthy ageing and longer working lives, we link transfers to mortality rates via the given age-transfer link provided by the NTAs. In doing so, we refer to the literature on prospective ageing and more dynamic dependency ratios (see Mason et al. 2015 for a similar approach). The former ratio is a static approach, in the sense that no behavioural changes are assumed; whereas the latter ratio is a dynamic approach, as it is based on the assumption that behaviour changes in response to changes in mortality.

Working at an aggregate multi-country level and with a static framework, we acknowledge upfront the uncertainties surrounding the results. However, as NTAs have become available for a growing number of countries, and country NTAs with different base years and more detailed breakdowns of transfers should be available soon, it is becoming easier to validate our assumptions. Thus, the present approach should yield additional insights into the policy challenges associated with ageing.

First, we find that the simple old-age DDR overestimates the public finance challenges the countries studied are likely to face in the future. In some cases – e.g., for Austria, Finland, and Hungary – this overestimation is substantial. Second, our results show that healthy ageing (i.e., keeping health transfers constant for a given mortality rate) has a modest effect, except in the case of Sweden, where healthy ageing is important. Third, we find that the long-run effect of immigration is well captured by the simple old-age DDR measure if the common assumption that immigrants are similar to natives is maintained, and that the immediate to short-term impact of immigration tends to be overstated by the simple old-age DDR measure. Finally, we show that increasing the average length of working life is essential in tackling the public finance challenges associated with ageing. By linking government transfers to mortality, we project that extending the average length of working life by around 3-5 years over the next 25 years – or roughly in line with the gains in life expectancy – substantially limits the impact of ageing on public transfers.

The remainder of this paper is structured as follows. In the next section, we briefly describe the concept of National Transfer Accounts, and note important caveats that are relevant for our application. This is followed by an outline of the methodology employed. The main results are presented in section 4. Section 5 concludes.

[2] Throughout this article, our suggested NTA-based measure of dependency ratio is called the 'transfer-based' DDR, whereas simple old-age or traditional DDRs refer to head-count measures of the demographic dependency ratio.

Table 1:
Countries covered and reference year

Country	Reference year
Austria	2000
Germany	2003
Finland	2004
Hungary	2005
Slovenia	2004
Spain	2000
Sweden	2003

Source: National Transfer Accounts Project.

2 National Transfer Accounts and population data

The population statistics used in this article are the EUROPOP2013 projections produced by Eurostat,[3] covering all 28 EU countries. We use the base scenario, but detailed assumptions on age-specific fertility, mortality, and net migration are available to facilitate alternative projections. The projection horizon goes from the base year of 2013 to 2080, although the results are presented only up to 2040. The findings are based on a convergence scenario in which the key demographic contributors – fertility and mortality – are assumed to converge towards the same value in the very long run. The central features are an increase in fertility for most countries (exceptions are Ireland, Sweden, and France) and a further increase in life expectancy for all countries, with a convergence towards the values of low-mortality countries. The migration projections are country-specific.

The population projections are paired with NTAs for the seven countries for which they are available from the National Transfer Accounts Project (Table 1).[4]

The concept of NTAs is described concisely and in-depth elsewhere (Mason et al. 2006; Prskawetz and Sambt 2014; UN 2013). Below we outline only the components that are essential to our application, together with a few caveats.

Defined succinctly, an NTA breaks down the most important aggregate economic flows on one-year population age groups for a given year. The flows include public and private consumption, income, and transfers. The flow of transfers, which is the most important component from the point of view of our analysis, is further broken down into transfers related to education, health care, pensions, and other public and private transfers. This breakdown is based on information from micro surveys. The

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[3] A detailed description of the EUROPOP2013 projections is forthcoming. A short description is available from Eurostat (2015) and European Commission (2014). Convergence is achieved in 2150.

[4] See www.ntaccounts.org and Lee and Mason (2011).

aggregates are calibrated by reference to related quantities in the system of national accounts.

Using the information embedded in the age profile of the public transfers in an NTA, it is possible to give a much more detailed description of the impact of changes in the population composition on the public budget. In particular, compared to the traditionally computed DDR,[5] it is possible to assess the effect of changes in the compositions of the populations aged 20–64 and aged 65+. Furthermore, as was emphasised in Hammer et al. (2015), the age limits on when an individual is, on average, a net contributor can be endogenously determined from the transfer profiles.

In this study, we utilise one additional advantage of NTAs: the one-year age-specific transfer profiles allow for a correspondence from mortality (or, almost equivalently, remaining life expectancy) via age to the net transfers in the base year. This allows us to link net transfers (and, implicitly, health status, retirement behaviour, and related labour market participation) to mortality rates in the projection. As an example, Figure 1 shows net public transfers for Germany as a function of (the logarithm of) mortality rates in the base year for the German NTA, together with a mortality age plot. Unfortunately, age-specific transfers are not available beyond age 90.[6] We take transfers to be constant beyond that age.

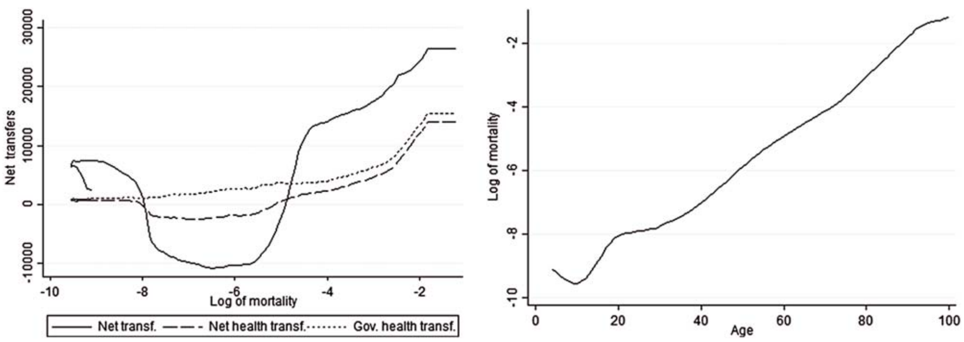
2.1 Caveats and limitations

There are important caveats to the use of NTAs. First, because NTAs build on the system of national accounts, they are only available with a time lag. This means that behavioural changes from recent reforms are not reflected in the data. For example, as the NTA for Germany is from 2003 (Table 1), it predates the Hartz reforms and later reforms to the retirement age. Second, it is important to understand that NTAs are strictly static in nature. Thus, the underlying assumption that is made when using an NTA for a given year to assess transfers in the future is that the world will ‘stand

[5] Throughout this paper, we refer interchangeably to the DDR (the number of people aged 65+ over the number of people in the age interval 20 to 64) as the simple DDR, the head-count DDR, the old-age DDR, and the traditional DDR.

[6] For Hungary, no data are available after age 80. The age-specific values for 90+ (80+)-year-olds are derived as population-weighted means of the information available for each of the ages above 90 (80). As such, total transfers will be accurate for the population structure in the base year. To the extent that the population structure of the 90+ population changes (i.e., in our projections), our measures become less accurate. Moreover, it is not clear in which direction the results are biased, as there is evidence that age-specific health care costs decline after the age of 90 (Martini et al. 2007). However, we believe that for two reasons, this will not affect our results materially. First, while the share of 90+-year-olds in the population increases by 2040, it is still small, ranging from 0.8% (Hungary) to 2% (Germany, Finland, and Spain). Second, this is only an issue if the structure of the population aged 90+ changes markedly. For our group of countries, the share of the population aged 95+ within the 90+ population increases by 10 percentage points at most (Austria).

Figure 1:
DE net public transfers as a function of mortality (2013)



Note: The RHS shows logarithmic mortality for each age in 2013. The LHS plots net transfers against logarithmic mortality based on the NTA for Germany in 2003 and the RHS plot.
Source: NTAs and Eurostat.

still'. In addition, our approach does not account for general equilibrium effects; the return to capital and labour will change in response to changes in labour supply and capital accumulation. This poses a problem when the total population changes, and particularly when there is a change in the immigration scenario. The less a small open-economy assumption applies (i.e., for Germany), the more severe the problem. Third, at present, NTAs are only available for a single year. However, because flows are subject to business cycle effects – as is the case for national accounts – measured transfers are not necessarily structural. There is clearly a need to create country NTAs for different years and at different points in the business cycle in order to assess the sensitivity of projection exercises to the base year. While these are clear limitations, some of them, like the dependence on a base year, are not fundamentally different from the challenges posed by the calibration of overlapping generations models.

3 Methodology

The primary objective of this study is to investigate to what extent NTAs enhance our understanding of the challenges to public finances posed by population ageing. While our approach to measuring demographic and economic dependency is, for the most part, standard; the innovation of our methodology lies in the coupling of transfers to mortality rates, as explained below.

Table 2:
Definition of dependency ratios and main scenarios

Name	Description	Definition
	Dependency ratios	
	Simple head count old-age DDR	$\frac{\text{Population aged 65 and older}}{\text{Population aged 20–64}}$
	NTA transfer weighted DDR	$\frac{\sum_{i=1,\dots,100} \#pop_i \times net\ transfers_i \times I\{net\ transfers_i > 0\}}{\sum_{i=1,\dots,100} \#pop_i \times net\ transfers_i \times -I\{net\ transfers_i \leq 0\}}$
		Where $\#pop_i$ indicates population at age i, *net transfers*$_i$ are net public transfer at age i,and $I\{\cdot\}$ is an indicator function taking the value one if *true* and zero otherwise.
	Scenarios	
SC1	Immigration	Comparison of the effect of immigration on the simple DDR and on the transfer-based DDR.
SC2	Healthy ageing	Health transfers are assumed to be linked to mortality changes after age 55. This allows for a projection of health transfers *from* the government given changes in age-specific mortality rates.
SC3	Longer working lives	Transfers related to labour market participation are linked exogenously to mortality changes after age 55. This shifts the net transfer curve outwards (see main text and Figure 2).

3.1 Traditional versus transfer-based demographic dependency ratios

Our baseline DDR measure is the traditional count of people above the age of 64 divided by the size of the population between the ages of 20 and 64; i.e., the population who are normally considered to be of working ages (Table 2).[7]

The transfer-based DDR, in contrast, takes into account that the older population is not only increasing in size, but that this population's composition will change as the share of people aged 85 and older grows. This trend is partly a consequence of increasing longevity, and is partly the result of baby boomers moving into this 85+ category with time. However, the transfer-based DDR also accounts for the fact that the age at which net government transfers turn negative is several years below the age of 65. In addition, the age at which contributions (in public finance terms) turn positive for young people is also endogenously determined by the NTAs. Finally, the NTA-adjusted DDR includes transfers to the young. Thus, if the size of the younger population is decreasing, the capacity to sustain a large number of older people increases from a public finance perspective. Both the relative levels of transfers and the age cut-offs differ across countries. These differences are not reflected in the simple DDR measure, but are well accounted for in the transfer-based DDR.

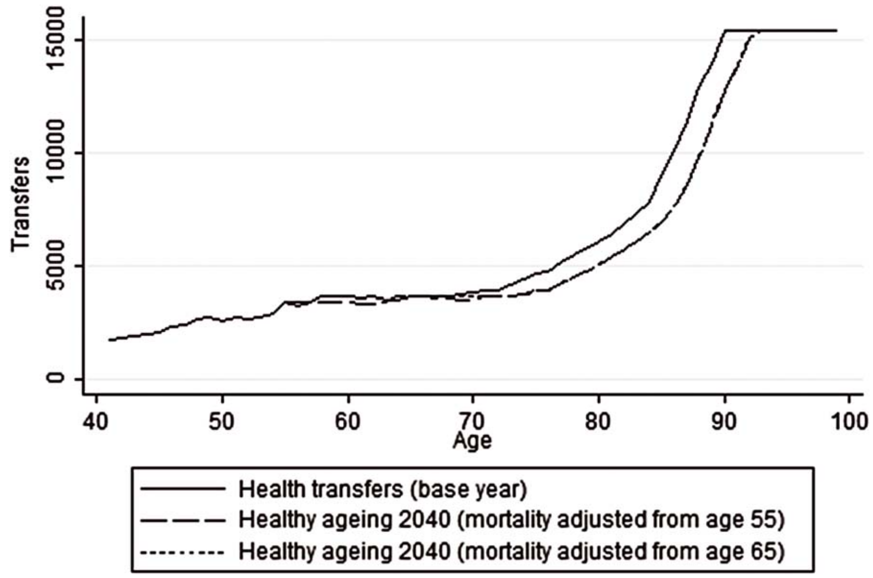
3.2 Scenario 1: Immigration

As immigrants tend to be younger than natives, they may be expected to boost the working-age population relative to the economically dependent population.[8] This improves the simple DDR measure, particularly if it is measured only as the number of older people over the working-age population (Pianese et al. 2014). However, this simpler measure omits two important issues. First, immigrants, like natives, have children, which dampens the positive effect on the transfer-based DDR. Second, the profile of net public transfers is not constant over the working life. Individuals under age 30 contribute less than 45-year-olds because they earn less on average (see Appendix A). Thus, the net contribution by a young immigrant tends to be smaller than the average contribution by the working-age population. By using NTAs to capture the net transfers at each age, we are able to examine how these two issues affect the impact of immigration on the dependency ratio.

[7] The demographic dependency ratio is often reported for other variations of the definition of the working-age population; i.e., for 15–60-year-olds or 20–60-year-olds. Changing the age cut-off makes no qualitative difference to the reported results.

[8] Under the standard assumption that immigrants are similar to natives in terms of educational composition, labour market participation, health, fertility, etc.

Figure 2:
Government health transfers for healthy ageing scenarios, Germany



Note: Government health transfers in the base year and in 2040 for healthy ageing scenarios for ages 55 and 65, respectively. Health transfers shifted by mortality from age 55 are difficult to see in the figure due to the overlap with the ages 65+ transfer shift line. The line is flat from age 90 in 2000 by design (see the main text above).
Source: NTAs and Eurostat.

3.3 Scenario 2: Healthy ageing

In this scenario, we compare two variants of the transfer-based DDR. In the first measure, the total net transfers, including general transfers and health transfers in particular, are completely age-specific. This measure is equivalent to the transfer-based DDR measure considered in scenario 1 above. In the second measure, we assume that there is one form of healthy ageing, in which healthy ageing implies that public health transfers are fixed for a given mortality rate from age 55 onwards.[9,10] This shifts the government health transfer curve outwards (Figure 2).

Two important assumptions are implicitly embodied in this formulation of healthy ageing. In shifting only the government health transfer curve rather than the net

[9] Results for healthy ageing in the 65 years scenario are also presented (see Appendix A), but they are not materially different. For most countries, the age group 55–65 is on the relatively flat slope of the transfer curve (see Figure 2).

[10] Shifting along a curve of remaining life expectancies yields qualitatively the same results as mortality.

health transfer curve (government health transfers minus privately financed health care costs), we assume that the government reaps the full benefit of lower health care costs for a given age.[11] Second, we implicitly assume that there is no age-related component in (publicly financed) health care costs. As this is likely to be a best-case scenario (Bjørner and Arnberg 2012; Bech et al. 2011; Breyer et al. 2015), it gives us an upper bound for improvement in the transfer-based DDR due to healthy ageing.

Furthermore, implicit in all of our analyses is the assumption of constant relative prices. This could prove problematic if per capita age-related health costs increase considerably due to technological progress (Breyer et al. 2015; Breyer and Felder 2006). We discuss the robustness of our results in light of this potential problem in the results section.

3.4 Scenario 3: Longer working lives

Plans to ensure the sustainability of public finances in the future rely to a large extent on people working longer. This implies that the statutory pension age will have to increase in many countries. However, the statutory pension age as such is not a good metric for assessing the average length of working life, because in many countries the average retirement age is well below the statutory retirement age. In a richer model environment that focuses on country-specific features, assumptions can be made or behaviour can be modelled to show how increases in the statutory retirement age and savings decisions will affect the average length of working life. From such estimates, it is possible to back out the increases in the number of people working, and to relate this number to the number of pensioners (see, e.g., Martín 2010; Fehr et al. 2012; Staubli and Zweimüller 2013; Lassila et al. 2014).

Unlike in much of the literature on ageing and economic sustainability, the focus here is not explicitly on the statutory retirement age. Instead, we seek to simulate a shift in the effective retirement age (or, equivalently, in the labour market employment rates at older ages) that follows projected developments in mortality. There are numerous policy challenges involved in extending the average length of working life. However, we do not consider these challenges in detail, but only note the policy changes implicit in our approach.

Instead, our focus is on determining the effect on the transfer-based DDR measure of an extension of the average working life in line with mortality increases at ages 55 and older. We address this question by linking the relevant transfers to decreases in mortality. The mechanism through which working longer alters the transfer accounts is the postponement of both pension transfers from the government (positive effect on the transfer-based DDR) and the reduction in taxes

[11] This will require policy changes. If patients are required to pay for a portion of their doctors' visits, and healthy ageing means fewer health checkups, then the size of these co-payments will have to increase for the full savings associated with fewer doctors' visits to accrue to the government.

and social contributions stemming from lower employment rates (negative effect). The important components of transfers are pension and health transfers. For pension transfers, this implies an outward shift of the *net* pension transfer curve. This assumption is somewhat in the spirit of Shoven and Goda (2010), who suggested that age limits related to retirement are linked to mortality developments.

For health transfers, only the transfers to the government (via social security contributions and taxes) are shifted outwards along with mortality changes. Health transfers from the government are kept constant at their age-specific values in the base year. These assumptions are the opposite of those made in the healthy ageing scenario. Combining the two scenarios – longer working lives and healthy ageing – would be equivalent to shifting the *net* health transfer curve.

Transfers related to education are shifted as a *net* flow. Because transfers from the government are very small or even zero at the relevant age range for the countries considered here, it makes little difference whether the net flows or the transfers to the government are shifted with mortality changes (see Figure 3). Based on the assumption that transfers to the government related to education are linked to employment rates, we shift the net transfer curve according to changes in mortality and implicit employment rates. For the last component of government transfers, or 'other government transfers', transfers *to* the government have a profile similar to employment rates for the considered age group (50+). We therefore adjust 'other transfers' *to* the government in line with mortality improvements.

Figure 3 shows how the different shifts in the curves of the transfers affect the net government transfers in the case of Germany. The predominant effect comes from shifting the pension net transfer curve as mortality declines. The combined shift in health, other transfers, and education-related transfers to the government has a smaller effect. The net effect of prolonging the average working life in line with mortality improvements from age 55 onwards is to push the age at which net government transfers to individuals turn positive by approximately five years. See Appendix B for the net transfer curves for the other countries.

While it is a somewhat arbitrary choice, age 55 is the age after which labour market participation started to drop off markedly at the time of the reference year (Table 3).[12] Furthermore, one way to interpret the proposed shift is to think of reforms that increase employment rates in line with the projected increase in mortality (life expectancy) without further pension compensation at retirement. We emphasise that this should not be interpreted as a projection since there has been no historical movement in the labour supply response following decreases in mortality (Milligan and Wise 2015). Rather, it is an estimate of the size of the policy challenge of extending the average length of working life.

[12] Labour market participation and employment rates are generally higher at the present time.

Figure 3:
Net government transfers by age, Germany

Note: Government net transfers in the base year and in 2040 for different adjustments.

Table 3:
Labour market participation at ages 50–54 and 55–59 in the reference year for the NTA

		Labour market participation rates		**Employment rate**	
	Year	**50–54**	**55–59**	**50–54**	**55–59**
Germany	2003	81.4	65.9	74.3	56.4
Spain	2000	66.5	52.7	61.8	48.9
Hungary	2005	71.1	47.4	68.3	46.0
Austria	2000	77.7	49.4	74.3	47.4
Slovenia	2004	75.3	45.4	71.2	43.9
Finland	2004	86.2	65.4	80.1	58.5
Sweden	2003	87.5	81.6	84.9	78.4

Source: EU-LFS, Eurostat.

3.5 Decomposition of changes in DDRs

To make it easier to interpret these results, we decompose changes over time into components that measure population changes between net contributors and net recipients, changes within the group of recipients (and contributors), and changes in average net transfers to and from the government. The change in the transfer-based DDR between t and t + 1 can be decomposed as follows:

$$\Delta TDDR_{t+1,t} \approx \ln\left(\frac{TDDR_{t+1}}{TDDR_t}\right) = \ln\left[\frac{\frac{pop^r_{t+1}}{pop^p_{t+1}} * \frac{avgGtrans^{out}_{t+1}}{avgGtrans^{in}_{t+1}}}{\frac{pop^r_t}{pop^p_t} * \frac{avgGtrans^{out}_t}{avgGtrans^{in}_t}}\right]$$

$$= \ln\left[\frac{pop^r_{t+1}}{pop^r_t}\right] - \ln\left[\frac{pop^p_{t+1}}{pop^p_t}\right] + \ln\left[\frac{avgGtrans^{out}_{t+1}}{avgGtrans^{out}_t}\right] - \ln\left[\frac{avgGtrans^{in}_{t+1}}{avgGtrans^{in}_t}\right]. \tag{1}$$

With pop^r_t being the total population of net recipients of government transfers, receiving an average of $avgGtrans^{out}_t$ per person. Superscript p in pop^p_t denotes the total number of net contributors; i.e., the net transfers to the government. Analogously, for *avgGtrans* a superscript *in* denotes the average amount transferred per person. The two first terms in (1) give the contribution to the transfer-based DDR based on the changes in the relative population shares. Intuitively, if the population of recipients grows faster than the population of contributors, the transfer-based DDR increases. For constant population shares of contributors and recipients, an increase in outgoing transfers (the third term) from the government (due, for example, to the average recipient being older) increases the transfer-based DDR. The opposite is the case when the average transfer to the government increases (fourth term in eq. 1). We denote the effect of the sum of the first and the third terms as the ageing effect, and the effect of the sum of the second and the fourth terms as the support effect. This terminology also facilitates comparisons across scenarios.

For the two scenarios in which we (endogenously) change the age threshold of being a net contributor to government finances – i.e., the healthy ageing and longer working lives scenarios – the decomposition can be further expanded.

Note that we can write:

$$\ln\left(\frac{\left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{changing mort}}}{\frac{pop^r_t}{pop^p_t}}\right) = \ln\left[\frac{\left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{changing mort}} * \left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{constant mort}}}{\left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{constant mort}} * \frac{pop^r_t}{pop^p_t}}\right]$$

$$= \ln\left[\frac{\left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{changing mort}}}{\left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{constant mort}}}\right] + \ln\left[\frac{\left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{constant mort}}}{\frac{pop^r_t}{pop^p_t}}\right]$$

$$= \ln\left[\frac{\left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{changing mort}}}{\left.\frac{pop^r_{t+1}}{pop^p_{t+1}}\right|_{\text{constant mort}}}\right] + \ln\left[\frac{pop^r_{t+1}|_{\text{constant mort}}}{pop^r_t}\right] - \ln\left[\frac{pop^p_{t+1}|_{\text{constant mort}}}{pop^p_t}\right]$$

$$= \ln\left[\frac{pop^r_{t+1}|_{\text{changing mort}}}{pop^r_{t+1}|_{\text{constant mort}}}\right] - \ln\left[\frac{pop^p_{t+1}|_{\text{changing mort}}}{pop^p_{t+1}|_{\text{constant mort}}}\right]$$

$$+ \ln\left[\frac{pop^r_{t+1}|_{\text{constant mort}}}{pop^r_t}\right] - \ln\left[\frac{pop^P_{t+1}|_{\text{constant mort}}}{pop^p_t}\right] \tag{2}$$

where *changing mort* and *constant mort* mean that the expression is evaluated with changing mortality and constant mortality. Focusing on the last line in (2), we see that the two last terms are equivalent to the last two terms in (1). These are the population changes in the absence of mortality adjustments of transfers. The two first terms in (2) are the additional population shifting to, recipients (positive impact on the transfer-based DDR) and ‘payers’ (negative impact on the transfer-based DDR) as a consequence of the mortality adjustment. Note that these two terms are interdependent, as the total size of the population is given. Thus, the combined impact can be seen as the effect of adjusting transfers by mortality.

The average in and out transfers per person are also affected, and a similar decomposition can be made (not shown).

The simple DDR (SDDR) measure can be decomposed as:

$$\Delta SDDR_{t+1,t} = \ln\left(\frac{SDDR_{t+1}}{SDDR_t}\right) = \ln\left[\frac{pop^{65+}_{t+1}}{pop^{65+}_t}\right] - \ln\left[\frac{pop^{20-64}_{t+1}}{pop^{20-64}_t}\right]$$

In this case, the first term constitutes the ageing effect and the second term constitutes the support effect. We report the relevant decompositions in Appendix C, and refer to the measure throughout the remainder of the text.

4 Results

4.1 Traditional versus transfer-based demographic dependency ratios

Our first main observation is that the simple old-age DDR measure based on head count overestimates the long-run impact of ageing on the public finances of all countries (until 2040); see Table 4. For some countries – namely, Austria, Finland,

Table 4:
Projected developments in traditional and transfer-based DDRs, 2013–40

		2013	2020	2030	2040
Austria	Simple DDR	1	1.09	1.39	1.69
	NTA-based DDR	1	1.13	1.40	1.53
Germany	Simple DDR	1	1.13	1.48	1.82
	NTA-based DDR	1	1.15	1.51	1.71
Finland	Simple DDR	1	1.26	1.48	1.48
	NTA-based DDR	1	1.12	1.23	1.27
Hungary	Simple DDR	1	1.20	1.39	1.59
	NTA-based DDR	1	1.05	1.15	1.40
Slovenia	Simple DDR	1	1.26	1.68	1.96
	NTA-based DDR	1	1.21	1.54	1.77
Spain	Simple DDR	1	1.17	1.52	2.05
	NTA-based DDR	1	1.12	1.46	1.94
Sweden	Simple DDR	1	1.11	1.21	1.29
	NTA-based DDR	1	1.07	1.22	1.28

Source: Own calculations based on EUROPOP2013 and National Transfer Accounts.

and Hungary – the differences between the traditional and the transfer-based DDRs are substantial. These gaps emerge because the NTA transfer-adjusted measure not only includes the younger dependent population, but takes into account the tendency of the younger dependent population to either decline (in some cases substantially), or to increase much more slowly than the older dependent population. This latter factor slows down the overall growth in the population requiring net government transfers. Another factor that is relevant for the countries considered in this study is that government net transfers turn positive between the ages of 56 and 63. The inclusion of this age group in the NTA measure (but not in the simple old-age DDR) reduces the growth in transfers, even if the share of 85+-year-olds is growing (see Table 7 below). This effect would diminish if the age limit for the simple DDR was set at 60 instead of 65. The difference in the denominator plays a smaller role, except for Spain, where negative net transfers from the working-age population decline much faster than in the head-count measure of 20- to 64-year-olds (i.e., the denominator in the old-age DDR measure).

Our second main observation is that there can be substantial differences in the short term. For example, the simple DDR underestimates the population-driven changes in government transfers for Austria and Germany, whereas the opposite is the case for other countries, particularly for Hungary and Finland. For both Germany and Austria, the denominator deteriorates faster; i.e., the support deteriorates towards 2020, as measured by the transfer-based DDR relative to the simple DDR.

Table 5:
Annual net migration assumptions in EUROPOP2013

	Avg. immigration rate 1990–2013 (% of population)	Immigration (% of population)			
		2015	2020	2030	2040
Austria	0.39	0.5	0.6	0.6	0.4
Germany	0.35	0.3	0.3	0.3	0.2
Finland	0.18	0.4	0.4	0.4	0.3
Hungary	0.15	0.2	0.2	0.2	0.3
Slovenia	0.13	0.2	0.2	0.2	0.3
Spain	0.62	–0.2	–0.2	0.2	0.5
Sweden	0.37	0.5	0.5	0.5	0.4

Source: Eurostat and EUROPOP2013.

Around one-half the difference comes from lower average contributions by those who make positive net transfers to the government.

The decomposition into ageing and support effects (Appendix C) illustrates the differences in the nature of ageing across the seven countries and across Europe in general, depending on factors such as past fertility rates (Barslund and von Werder, 2016). For the purposes of illustration, let us look at Finland and Spain: The size of the ageing effect is similar in the two countries, but for Finland, the support effect is negative. That is, the net transfers to the government will increase from the members of the population who make net positive contributions. This effect naturally reduces the rate of growth in the transfer-based DDR. For Spain, the net transfers from contributors decline, and the growth in the transfer-based DDR doubles as a result.

4.2 Scenario 1: Immigration

Our starting point is the projected net migration from the baseline EUROPOP2013. All of the countries are projected to have positive net migration over the full period until 2040 (in fact, until 2080), except Spain, where net migration turns positive around 2025. However, the magnitude of projected migration relative to population varies across countries (Table 5). Sweden and Austria have projected annual net immigration rates of around 0.5% of the population until 2040. Germany and Finland have somewhat lower net immigration rates, while Hungary and Slovenia are projected to have net immigration rates of approximately 0.2%. Spain is projected to have a net emigration rate of 0.2% until 2025, and then somewhat higher-than-average net immigration rates until 2040. These assumed rates are higher than the historical immigration rates for Austria, Finland, Hungary, Slovenia,

Table 6:
Improvements in the simple DDR and government transfer-weighted DDR (%) from immigration relative to a zero-migration scenario

		2013	2020	2030	2040
Austria	Simple DDR	0	−35	−31	−36
	DDR with NTA	0	−22	−30	−40
Germany	Simple DDR	0	−17	−17	−22
	DDR with NTA	0	−8	−14	−21
Finland	Simple DDR	0	−14	−22	−32
	DDR with NTA	0	−17	−27	−36
Hungary	Simple DDR	0	−9	−14	−19
	DDR with NTA	0	−18	−20	−20
Slovenia	Simple DDR	0	−7	−11	−18
	DDR with NTA	0	−4	−12	−21
Spain	Simple DDR	0	6	−1	−11
	DDR with NTA	0	16	7	−6
Sweden	Simple DDR	0	−31	−42	−49
	DDR with NTA	0	−25	−30	−41

Source: Authors' own calculations.

and Sweden. The age distribution of migrants is very similar across countries, with most falling in the 20–30 age bracket (Appendix A).

When we take these assumptions of the EUROPOP2013 projections into account, we see that the demographic dependency ratios of all seven countries are better than they would be without migration (Table 6).

Our main purpose is to explore to what extent the use of NTAs and associated government transfers affect the changes in the DDRs from immigration. The relevant underlying assumption for the use of NTAs is that immigrants display the same behaviour as the average national citizen (in terms of fertility, mortality, and labour market participation), and have the same average endowment with respect to human capital (i.e., the same average wages) and savings.[13]

The total impact of immigration on the DDRs of the different countries will depend on its scale. Table 6 shows the reduction in the change in the DDR due to immigration relative to a zero-migration scenario. Thus, the 35% value of the simple DDR for Austria in 2020 indicates that the growth in the DDR will be reduced by 35% relative to a situation with zero migration. A 100% reduction would mean no future growth in the DDR. These estimates are reported in order to illustrate the

[13] This is not, of course, an innocent assumption (Sébastien 2011). However, exploring the extent to which relaxing this assumption would change the outcome is beyond the scope of this study (see Schou 2006; Hansen et al. 2013 and Ruist 2014).

projected impact of immigration. The main results are the respective differences in the impact from the simple old-age DDR measure and the transfer-adjusted measure of the DDR. From a long-term perspective (up to 2040), the way in which the DDR is measured makes little difference. The simple head count DDR is a good proxy for the impact net migration will have on public finances.

From a short-term perspective (up to 2020), the simple DDR appears to overstate the impact of immigration. As the immigrants are young, their net transfer contributions are still low. But because the immigrants are in the age range in which their fertility is relatively high, negative net transfers from their children may be expected (see Appendix A). For Hungary, the results differ in the short term due to the age structure of the immigrants, as a large share of them are younger than working age.

4.3 Scenario 2: Healthy ageing

Turning to the healthy ageing scenario, we can see that when transfers from the government are shifted with changes in mortality after age 55, there is a great deal of heterogeneity across the countries studied (Table 7). The effect of healthy ageing relative to the baseline transfer-based DDR depends on the change in the composition of the population aged 55 and older, and on the share of the total transfers to the elderly that are health care-related. Since the latter value is not constant across ages, the two effects also interact. To what extent the healthy ageing scenario will reduce the impact of ageing also depends on the steepness of the mortality (age)-specific health transfer curve. A steeper curve implies that healthy ageing has a greater impact on the dependency ratio.

Of the net health and pension transfers to people aged 55 and older, health care transfers make up slightly less than one-third in Slovenia and Sweden, one-quarter in Germany, one-fifth in Hungary, and around 15% in Austria, Spain, and Finland. The change in the age distribution of the population aged 65 and older up to 2040 also varies considerably across these countries. The share of the population aged 85+ will increase by 70% in Finland and Hungary, 50% in Slovenia, and 33% in Germany and Sweden. In Austria and Spain, the age distribution will remain relatively constant, with the number of 85+-year-olds increasing slightly faster than the overall number of 65+-year-olds.

In Austria and Hungary, healthy ageing is projected to have little impact up to 2040. Health care makes up a smaller share of overall transfers in these two countries than in the other countries studied. The largest impact is found for Sweden, where healthy ageing reduces the projected increase in the DDR by more than one-third. Minor effects are found for Germany, Slovenia, and Spain. When we look at the decomposition in Appendix C, we see that healthy ageing has a negligible support effect. A small effect comes from slightly larger net transfers due to a decrease in government health care transfers (an effect that is not visible in the appendix due to rounding). Similarly, the main ageing effect comes from a decrease

Table 7:
Health care transfers (% of total transfers) and results from the healthy ageing scenario

	Average share of health care in transfers	Share of 85+ in % of 65+		Increase in transfer-based DDR (index). Healthy ageing	Reduction in transfer–based DDR under healthy ageing relative to baseline (%)
	2013	**2013**	**2040**	**2040**	**2040**
Austria	0.12	0.14	0.16	1.51	4
Germany	0.26	0.13	0.18	1.63	11
Finland	0.16	0.13	0.22	1.24	11
Hungary	0.22	0.11	0.18	1.37	7
Slovenia	0.28	0.12	0.18	1.68	12
Spain	0.16	0.15	0.17	1.84	11
Sweden	0.29	0.15	0.19	1.17	39

Source: Own calculations based on National Transfer Accounts.

in net transfers. An exception is Spain, where the threshold for the age at becoming a net contributor changes from 60 to 62 in the healthy ageing scenario. As a result, the average net transfers from the government for support recipients go up, while the number of people being supported declines.

Apart from the fact that the health transfers are (much) smaller than the pension transfers (see Appendix D), the steepness of the age-transfer curve (in the base year) also differs for pension and health transfers. For all of the countries, the net pension transfer curve has a steeper age gradient than the health curve, although the difference is less pronounced for Sweden. This implies that as countries age, net health transfers become less important relative to pension transfers.

If healthy ageing means that health care costs are reduced by less than the reduction in mortality, the impact on the transfer-based DDR is proportionally smaller.

As noted above, there is some evidence that per capita age-related health costs grow faster than income and prices in general (Breyer and Felder 2006). Such a scenario is inconsistent with our 'constant world' assumption. However, we can get some idea of how a 1% annual increase in age-related per capita costs would affect our results by shifting the government health transfer curve by 1% annually. This is a worst-case scenario relative to our assumptions, because it implies that health care contribution transfers to the government stay fixed. An annual 1% growth rate up to 2040 would mean that age-specific transfers would be around 30% higher in 2040. In this case, a healthy ageing scenario would lead to a greater reduction in the growth in the transfer-based DDR up to 2040, because health transfers would be a larger share of total transfers in 2040. Under such a scenario, healthy ageing becomes increasingly important. For Germany, Spain, Finland, and Slovenia, healthy ageing now limits the growth in the transfer-adjusted DDR by 25% to 30%. For Hungary and Austria, the equivalent figure is 20%. In Sweden, where healthy ageing has a large impact in the base scenario, the increase in the transfer-based DDR is 60% smaller.

Given these results, we are cautious about putting too little emphasis on the role of healthy ageing in the sustainability of public finances, even if in most countries the impact of healthy ageing on the transfer-adjusted DDR of pension transfers dwarfs that of health transfers.

4.4 Longer working lives

For the seven countries considered here, the shift in the transfer curve is equivalent to a shift in behaviour of around five years. Thus, in 2040, a 60-year-old is assumed

Table 8:
Increases in the length of working life, 2013–2040

	Reference Year	Labour market participation rate	Extension of working life, years	Duration of working life, base year	Shift in transfer schedule, years
Germany	2003	73.7	4.1	34.3	5.6
Spain	2000	59.6	3.3	31.6	5.5
Hungary	2005	59.3	5.1	28.0	8.6
Austria	2000	63.6	3.1	34.6	4.9
Slovenia	2004	60.4	3.7	33.2	6.2
Finland	2004	75.8	4.2	36.4	5.5
Sweden	2003	84.6	3.8	38.5	4.5

Source: Authors' own calculations.

to have the same behaviour – with respect to labour market participation – as a 55-year-old had in the base year.[14]

Based on labour market participation rates from Eurostat's labour force statistics (see Table 3 above), we make assumptions about the labour force participation of 55-year-olds for the reference year of the country's NTA (Table 8), and implicitly assume that the difference between labour force participation and employment is structural in the reference year.[15] To arrive at the implied increase in the average working life for each country, the labour market participation rate is multiplied by the implicit number of working years – i.e., between 4.5 (Sweden) and 8.6 (Hungary) – by which the transfer schedule is shifted (Table 8). For Germany, the labour force participation rate in the base year of a 55-year-old is calculated to be 73.7. Extending this rate to age 60.6 (adding 5.6 years to 55) in line with mortality improvements adds 4.1 working years to the average length of working life.

The increase in the average length of working life has a substantial impact on demographic dependency ratios. In Germany, Spain, and Austria, the expansion of the demographic dependency ratio is reduced by more than one-half (Table 9). In Finland, the transfer-based DDR will be a little larger in 2040 than it is today. In Sweden, the DDR will grow by just 15% by 2040. The effect for Slovenia is somewhat smaller. The result for Hungary arises because the transfer-based DDR not only grows more slowly as a consequence of the increase in the average working life, but is actually reduced relative to the base year transfer-adjusted DDR.

14 Informally, we think of this as the average individual maintaining his or her labour market participation behaviour between ages 55 and 60, paying taxes, and making health and pension contributions, but *without* any compensation in the form of higher pensions.

15 The employment rate at age 55 is assumed to be the average over the (average) employment rates for the age groups 50–54 and 55–59.

Table 9:
Improvement in the transfer-adjusted DDR (%) in the longer working life scenario (reduction in the growth of the transfer-based DDR)

	2013	2020	2030	2040
Austria	0	57	53	58
Germany	0	66	61	56
Finland	0	66	73	92
Hungary	0	215	173	130
Slovenia	0	28	30	35
Spain	0	65	58	57
Sweden	0	85	74	85

Note: The effect of a longer working life scenario is measured by the reduction in the growth of the DDR towards 2040.
Source: Authors' own calculations.

The decomposition of the changes relative to the baseline transfer-based DDR shows that the change (in absolute percentage points) in the ageing effect is rather uniform across the countries, with the exception of Hungary. The larger decrease in the ageing effect is due to the relatively long extension of the average working life (cf. Table 8). The support effect shows more variation (Appendix D). In particular, it explains the relatively subdued effect for Slovenia, despite the substantial prolongation of the average working life. The shift in the net transfer curve in the case of Slovenia improves the support effect only marginally (the effect is not detectable with two decimals in the table) because the net transfer contributions to the government of 55-year-olds are marginal.

The reported scenario for longer working lives builds upon the EUROPOP2020 baseline population projections, including immigration, as outlined above. If the healthy ageing scenario is added, the increase in the DDR is reduced by some additional percentage points.

To meet the fiscal challenges associated with ageing, it is essential that people work longer. For most countries, the effect of an increase in the average length of working life dwarfs the potential effect of increasing immigration or healthy ageing. Changes in retirement behaviour, and therefore in the average length of working life, do not occur automatically as longevity rises and health improves. In fact, from a life-cycle consumption model point of view, it may be optimal to spend more time in retirement as longevity increases (Bloom et al. 2014; Leinonen et al. 2015). What is presented here is a best-case scenario, in terms of both behavioural responses and the speed of policy-induced changes. In our simulation, the effect on the transfer-based DDR is roughly proportional to the assumed lengthening of the average working life as a function of mortality.

5 Conclusion

In this study, we presented a transfer-based demographic dependency ratio that takes into account a number of important features of on-going demographic changes, not least from a public finance perspective. Our measure takes into account the decline in the number of young people in many countries, and assumes that the transfers to this segment of the population will therefore be reduced. It also takes into account the large variations in the net transfers to older people depending on their age. This means that the composition of the older population is important, a factor that the simple DDR ignores. Furthermore, the transfer-based DDR explicitly acknowledges that the age range in which people are net contributors to public transfers, rather than net recipients of public transfers, varies across countries. Finally, the new measure also accommodates changes in the composition of net contributors (or the working-age population). None of these demographic developments are reflected in the simple DDR measure.

Our results suggest that care is needed when assessing the impact of population ageing using the simple head-count measure of the demographic dependency ratio. Our application of the transfer-based DDR indicates that the simple measure can significantly distort the challenges ahead in a negative direction.

The transfer-based DDR allowed us to simulate the impact of healthy ageing and extended working lives under different assumptions. The baseline definition of healthy ageing used here linked government health transfers to mortality developments for different age groups. As we noted above, this is likely a best-case scenario because it assumes no direct effect of chronological age after mortality is accounted for. Generally, however, healthy ageing was found to make little difference in the increase in net public transfers driven by demographics. If health care costs increase in relative terms, this could change the impact of healthy ageing because the health transfer component of net transfers to older people would increase in size. Of course, this result implies that the public finance challenges associated with ageing would increase as well.

For the longer working lives scenario, our starting point was the literature on prospective ageing. We implicitly assumed that labour market behaviour, and hence associated transfers, changes with mortality after age 55. Transfers related to labour market behaviour become a function of mortality. The results point to an increase in the average length of working life of three to five years. For most of the countries studied, this shift is associated with a decisive reduction in the increase in projected net public transfers.

Finally, we wish to stress the uncertainties involved in such multi-country macro projections. Nevertheless, we believe that the methods applied here can prove useful when comparing countries and when assessing the broad impact of policy initiatives. As National Transfer Accounts become available for more countries and for more years, there is further scope for the cross-validation of the assumptions made and the results generated in this study.

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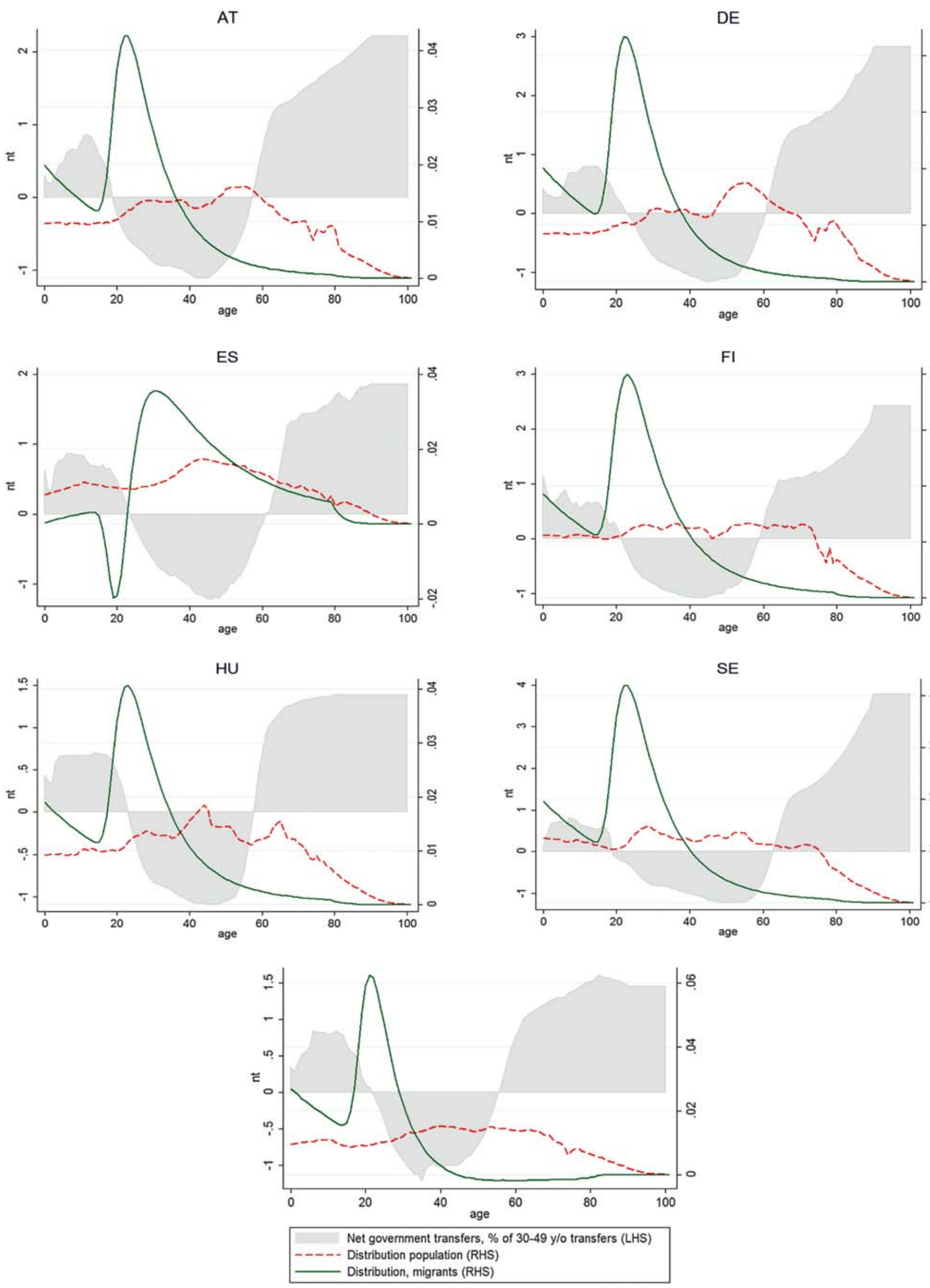
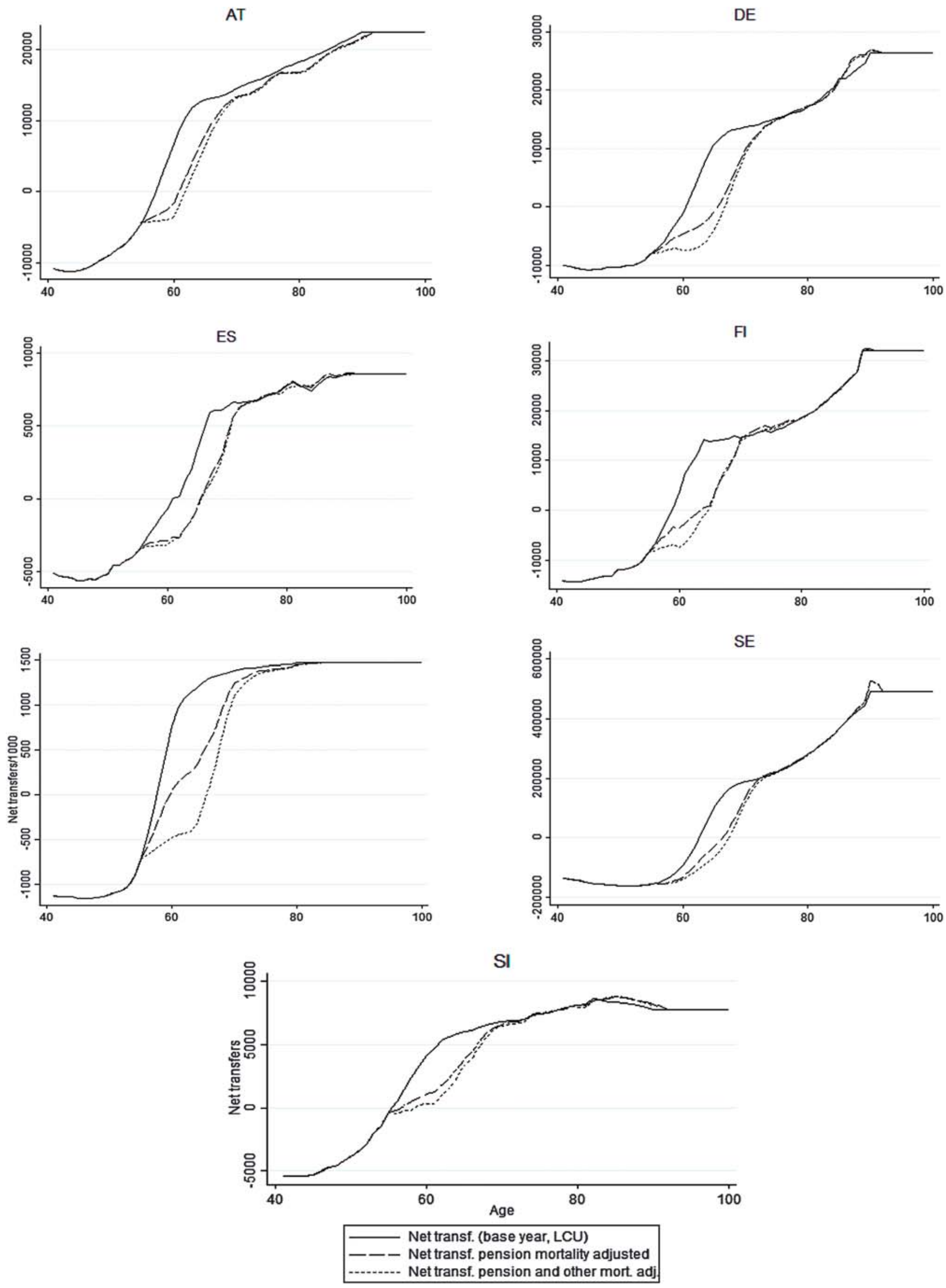
Appendices follow

Appendix A: Age structure of migrants and natives together with government net transfers (relative to average net transfers for 25–54-year-olds)



Appendix B: Net government transfers by age and scenario



Appendix C: Decomposition of the total growth in demographic dependency ratios (different scenarios)

	Δ2013–2040	Ageing	Support	Decompose Ageing		Decompose Support		Total	Ageing	Support	Decompose Ageing		Decompose Support	
		share	share	Popul.	Transf.	Popul.	Transf.		share	share	Popul.	Transf.	Popul.	Transf.
	Traditional DDR													
DE	0.60	0.37	0.22											
FI	0.39	0.41	−0.02											
ES	0.72	0.51	0.21											
SE	0.25	0.39	−0.13											
SI	0.67	0.51	0.16											
AT	0.53	0.53	0.00											
HU	0.46	0.32	0.15											
	Transfer-based DDR													
DE	0.54	0.28	0.25	0.12	0.16	0.24	0.01							
FI	0.24	0.29	−0.05	0.17	0.12	−0.04	−0.01							
ES	0.66	0.30	0.37	0.18	0.12	0.28	0.09							
SE	0.25	0.39	−0.15	0.29	0.11	−0.14	−0.01							
SI	0.57	0.31	0.26	0.19	0.12	0.22	0.04							
AT	0.43	0.40	0.03	0.28	0.11	0.02	0.01							
HU	0.34	0.17	0.17	0.08	0.09	0.18	−0.01							
	Transfer-based DDR-healthy ageing							**Relative changes of transf.-based to healthy ageing DDR (p.pt.)**						
DE	0.49	0.24	0.25	0.12	0.12	0.24	0.01	−0.05	−0.04	0.00	0.00	−0.04	0.00	0.00
FI	0.21	0.26	−0.05	0.17	0.10	−0.04	−0.01	−0.03	−0.03	0.00	0.00	−0.03	0.00	0.00
ES	0.61	0.26	0.36	0.12	0.14	0.21	0.15	−0.05	−0.04	−0.01	−0.06	0.02	−0.07	0.06
SE	0.16	0.31	−0.15	0.29	0.02	−0.14	−0.01	−0.09	−0.09	0.00	0.00	−0.09	0.00	0.00
SI	0.52	0.26	0.26	0.19	0.07	0.22	0.04	−0.05	−0.05	0.00	0.00	−0.05	0.00	0.00
AT	0.41	0.38	0.03	0.28	0.09	0.02	0.01	−0.02	−0.02	0.00	0.00	−0.02	0.00	0.00
HU	0.31	0.15	0.17	0.08	0.07	0.18	−0.01	−0.02	−0.02	0.00	0.00	−0.02	0.00	0.00
	Transfer-based DDR-longer working lives							**Relative changes of transfer-based to longer working lives DDR (p.pt.)**						
DE	0.27	0.13	0.14	−0.01	0.14	0.09	0.05	−0.27	−0.16	−0.11	−0.13	−0.03	−0.15	0.04
FI	0.02	0.16	−0.13	0.04	0.12	−0.18	0.05	−0.22	−0.14	−0.08	−0.13	−0.01	−0.14	0.06
ES	0.34	0.12	0.21	0.02	0.10	0.11	0.11	−0.32	−0.17	−0.15	−0.16	−0.02	−0.18	0.02
SE	0.04	0.27	−0.23	0.17	0.11	−0.23	0.00	−0.21	−0.12	−0.09	−0.12	0.00	−0.09	0.01
SI	0.41	0.15	0.26	0.17	−0.02	0.19	0.07	−0.16	−0.16	0.00	−0.02	−0.14	−0.03	0.03
AT	0.20	0.22	−0.02	0.19	0.03	−0.07	0.05	−0.22	−0.17	−0.05	−0.10	−0.08	−0.10	0.05
HU	−0.13	−0.17	0.04	−0.16	0.00	−0.07	0.11	−0.47	−0.33	−0.13	−0.24	−0.09	−0.25	0.12

Appendix D: Net total transfers (bn. LCU) to people aged 55+ (pension, health, and health adjusted for mortality changes)