
Public Sector Economics

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DANIJELA MARTINOVIĆ: The analysis of perceptions and attitudes
related to ageing in the Federation of Bosnia and Herzegovina

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Introduction to the thematic section on the Economics of Ageing

MARIJANA BAĐUN, Ph.D.
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Guest editors' introduction
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In one of his books, fantasy author Terry Pratchett wrote that “inside every old person is a young person wondering what happened.” Ageing does not seem to come as a surprise only to individuals, but to governments as well. Pension, healthcare and long-term care systems were all designed with a much smaller share of an elderly population in mind.

In the mid-twentieth century, the proportion of the world’s population aged 65 years and over was 5%, but by 2050, it is expected to reach almost 16% (UN, 2017). At the global level, life expectancy at birth was 47 years in the mid-twentieth century and is expected to rise to 78 years by the mid-twenty-first century. In the European Union (EU), the share of the 65+ population was already 19% in 2016, and it is predicted to increase to almost 29% in 2050 (EC, 2018). Life expectancy at birth in the EU is expected to rise from 78 for men and 84 for women in 2016 to 84 for men and 88 for women in 2050.

This issue of *Public Sector Economics* includes three articles that look specifically at topics linked to the economics of ageing. Topics include (a) perceptions and attitudes related to the pension system in the Federation of Bosnia and Herzegovina, (b) healthcare expenditure projections for Switzerland, and (c) informal long-term care analysis based the Survey on Health, Ageing and Retirement in Europe (SHARE) data for eleven European countries. Additionally, this issue of *Public Sector Economics* also contains a review of the book “Golden Aging: Prospects for Healthy, Active and Prosperous Aging in Europe and Central Asia”, published by the World Bank, and a paper which is not directly related to the economics of ageing: “To what extent do fiscal spending rules affect budget composition” written by Wildmer Daniel Gregori.

The first article by Velma Pijalović, Lejla Lazović-Pita, Almir Peštek and Danijela Martinović, “The analysis of perceptions and attitudes related to ageing in the Federation of Bosnia and Herzegovina (FBiH)” is based on opinion survey data, with a special focus on the fact that an ageing population might be a problem for pension systems in the future. The results indicate that more than three quarters of the respondents are aware of this problem in FBiH. An additional logit regression model reveals that pensioners, respondents who prefer a primary role for government, those with higher levels of education and reported living standards are more likely to perceive this issue. Improvements in the efficiency of pension funds, reduction in public spending and active measures aimed at the prevention of emigration from FBiH are the most “popular” solutions in survey results. Interestingly, more than three quarters of citizens oppose raising the retirement age.

The second article “Healthcare expenditure and fiscal sustainability: evidence from Switzerland”, written by Carsten Colombier and Thomas Braendle, looks into growing healthcare expenditure in terms of public finance sustainability. Switzerland has one of the most expensive healthcare systems among OECD countries. According to the authors’ projections up to 2045, population ageing

puts a growing pressure on public budgets and the mandatory healthcare insurance in Switzerland. However, healthcare expenditure is not only spurred by demographic change but also by non-demographic drivers such as the increasing national income, medical advances and Baumol's cost disease (lower productivity development in healthcare that leads to additional cost pressure). The authors find that long-term care is more strongly influenced than healthcare excluding long-term care. This result indicates that population ageing affects public finance to a larger extent than the mandatory healthcare insurance. Measures directed at prevention and efficiency would be the most helpful in alleviating the pressure on public finance and mandatory healthcare insurance.

The third article, by Andrej Srakar and Mateja Nagode, "Why are older informal carers in better health? Solving a causality problem" focuses on informal care, an important segment of long-term care. The authors look into the relationship between the health status of the SHARE respondents and the decision to provide informal help to others and the intensity of such assistance. SHARE is a multinational and multidisciplinary panel database of micro data on health and well-being, socioeconomic status and social and family networks of the population aged 50 and over. Interestingly, the authors find that the correlation of health and informal caregiving is negative, particularly for help provided within a household. However, once they apply regression analysis with instrumental variables from previous waves of the SHARE survey, they determine the causal effects of health on informal care, provided within and/or outside a household. The authors find that older people in better health tend to provide more help to others. Furthermore, giving help has negative effects on health of the provider. Adopting measures to stimulate the health of potential and actual caregivers would raise the level of provided help.

The report "Golden Aging: Prospects for Healthy, Active and Prosperous Aging in Europe and Central Asia (ECA)" discusses both the main challenges and opportunities of demographic trends in the countries of ECA, a region with the oldest populations in the world. The authors of (and contributors to) this report invested a tremendous effort in analysing one of the most striking topics of modern societies – population ageing. At the very beginning of this report, there is a crucial graph, indicating how the demographic drivers and economic consequences of aging create both challenges and opportunities. The report reveals not only the disadvantages but also many opportunities consequent upon demographic ageing in ECA countries. A journey towards "Golden Ageing" in ECA countries is within reach. However, it will require coordinated actions among different actors, including the government, the private sector, and societies, and across many areas, ranging from labour markets to health care to education and pensions.

The three segments (healthcare, long-term care and pension systems) covered in this issue of *Public Sector Economics* are naturally not the only topics under consideration in the economics of ageing, even though they are very important. Ageing

poses many economic challenges, but Harper (2017) argues that we are trying to tackle the twenty-first century phenomenon of very long lives with twentieth century institutions. Additionally, as pointed out by Leeson (2017), redefining old age is necessary in order to realize and release the potential of ageing. In his opinion, people are constrained from contributing to their families, communities and workplaces for much longer, in their 70s, 80s and even 90s, by legislative and administrative age barriers. Let us conclude with another quotation: “Is old age really so terrible? Not if you’ve brushed your teeth faithfully” (Woody Allen). Ageing has its gloomy side, but it also creates many opportunities.

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The analysis of perceptions and attitudes related to ageing in the Federation of Bosnia and Herzegovina

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Article**

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Abstract

The problem of an ageing population has only recently gained attention in Bosnia and Herzegovina (BIH). Adequate pension reforms cannot be expected if most citizens are unaware of the issues or even oppose the reforms necessary. The primary research is based on opinion survey data collected in the Federation of Bosnia and Herzegovina (FBIH) with a special focus on the fact that the ageing of the population might pose a problem for pension systems in the future. The results show that more than three quarters of the respondents are aware of this problem in FBIH. The logit regression model shows that pensioners, respondents who prefer the primary role of government, those with higher levels of education and reported living standard are more likely to recognise this issue. Improvements in the efficiency of pension funds, reduction in public spending and active measures aimed at the prevention of emigration from BIH are the solutions most widely recognised.

Keywords: ageing population, pension reforms, survey, FBIH

1 INTRODUCTION

Demographic changes and the challenges of an ageing population are not a novelty in Europe. If Europe were divided into four geographic areas – Northern, Western, Eastern and Southern Europe (Population Reference Bureau, 2017), on average 20 per cent of all people in Northern and Southern Europe are 65 or older. This is an especially worrying fact in Southern Europe, to which BIH belongs. The BIH share of population older than 65 in total population in 2017 amounted to 16 per cent, which is below the Southern average, but is almost twice as high as the world average (9 per cent, Population Reference Bureau, 2017).

The socio-economic aspects of an ageing population are an issue that used to be associated only with rich countries (the OECD countries since the 1950s) since in those countries citizens were provided with high national incomes and better personal health. However, the most recent research from Lee, Mason and Cotlear (2010) indicates that developing and middle-income countries are facing a similar problem, largely without the economic means to cope with the social and economic challenges and hence an inability to adjust to this growing phenomenon. This phenomenon can be particularly seen in Southern and Eastern European countries to which BIH belongs (Cerami, 2008; 2010).

Recent economic issues and interventions associated with the so called Graying Revolution are attracting increasing interest and have been affecting several policy areas. Studies and research provided by international organisations such as the World Bank, the United Nations, the OECD and the European Commission deal with different aspects of policy areas related to the impact of the ageing population, in which the most common policy areas are health, pensions, long-term care services and employment policies. In this paper, the focus is on the pension system.

The purpose of the research is to analyse perceptions and attitudes of FBIH respondents in connection with the ageing population and possible associated

problems. The research survey is based on Eurobarometer 56.1. Survey (Pension Policy and Pension reform 161/wave 56.1 in 2001). No such survey has been conducted in any of the Western Balkan countries or in BIH. The questions have been slightly adjusted to correspond to (F)BIH specifics and especially relate to the non- introduction of a three-pillar pension system in BIH.

Similar to recent research that deals with the phenomenon of ageing population, the first chapter provides a literature overview of the effect of the ageing population on pension systems in Southern and Eastern European countries. We highlight the fact that very little research has been done with respect to BIH in the past. The second chapter focuses on the analysis of demographic trends and the pension system in Bosnia and Herzegovina, primarily in the FBIH, providing an overview of the most recent pension reforms. In the first part of the final chapter a multi-level binomial logit regression on opinions of whether the ageing population will pose a problem has been developed. The results of the opinion survey conducted are analysed, together with the necessary proposals for possible solutions to this issue. Survey results correspond to the main findings of the situation in the pension systems of the developed countries and the Western Balkans, but certain peculiarities are also noted that indicate that “one size fits all” cannot be applied. The results should be included and evaluated in the future research and policy proposals in this area in BIH.

2 LITERATURE REVIEW

The European Commission (EC) attempts to highlight the issue of an ageing population and its implications for economic and, specifically, the long term budgetary effects and projections in a document called the Annual Ageing Report. The current Report for 2018 is the sixth of the kind and it shows projections for each member state in terms of separate budgetary (expenditure) projections that are carried out for five government expenditure items (pensions, health care, long-term care, education and unemployment benefits). The report highlights the fact that within each policy the objectives and solutions cannot be of the “one size fits all” kind, but must be adjusted to the specific circumstances of each member state (European Commission, 2017). Since 2000, EU members have conducted a number of pension system reforms with a wide range of measures aimed at tackling the fiscal pressures caused by the ageing phenomenon. Holzmann, MacKellar and Repansek (2009) summarise the discussions related to the impacts that demographic challenges could have on public finances. Discussions relate to the drivers of necessary pensions reforms, the challenges countries have been facing (for example Augusztinovics, 1999; Fultz and Ruck, 2000; Bredenkamp, Gragnolati and Ramljak, 2008; Cerami, 2010; or Bloom et al., 2011) and possible solutions to this important issue focusing on changes in the labour market and financial market reforms as possible ways to resolve pension issues.

The relevance that ageing has on the pension system has been recognised for more than two decades. Authors such as Fischer and Reisen (1994), Hviding and Merette

(1998) and Kohl and O'Brien (1998) analyse the effects that pension reforms have on accumulation of savings in public and private pension funds. Others, such as Roseveare et al. (1996), Verbič and Spruk (2014) or Žokalj (2016) evaluate the effects that pension policies have on public expenditures, budget deficits and public debt accumulation.

Most Central and South-Eastern European countries, except for BIH (Bartlett and Xhumari, 2007; Cerami, 2008, 2010; or Bartlett, 2012), have transformed their pension systems into three-pillar pension systems through the transition process. However, the introduction of the three-pillar pension system alone was usually not enough to solve the burning issues in the pension system and therefore most Central and South-Eastern European countries that are EU members have planned and conducted several other activities, especially since the outbreak of Global Financial Crisis of 2008-2009 (Guardiancich, 2013). Carone et al. (2016:7) provide a summary of pension measures in the EU since 1990s which have been decomposed in five broad categories: eligibility measures (e.g. pension ages, required contributory period), pension formula (e.g. definition of pensionable earnings, accrual rates, valorisation), indexation (calculation of the first pension in payment, and then the way it is valued over time), resources (e.g. social contributions, taxes) and schemes (merge or closure of pension schemes).

The most common measures relate to increasing retirement ages or reducing relative pension benefits. Central and South-Eastern EU member states have been applying a mix of measures within their three-pillar pension systems (public pension schemes, private occupational schemes and private individual schemes), where the final two include mandatory and voluntary status. Most have introduced mandatory private individual schemes (e.g. Bulgaria, Croatia, Hungary, Poland, Romania and Slovakia) and Slovenia adopted a mandatory private occupational scheme. Slovenia, a former Yugoslav country that inherited the Yugoslav PAYE pension system, was the first country within Yugoslavia that faced issues related to the ageing of the population and the need to reform the pension system. Authors such as Verbič, Majcen and Van Nieuwkoop (2006), Verbič (2007) and Verbič (2008) used a dynamic OLG general equilibrium model to provide an analysis of the ageing population in Slovenia and the associated challenges for the Slovenian pension system. Current research for the case of Slovenia (for example, OECD, 2015) further investigates the effects of demographic trends and the effects that ageing has on public finances as well as possible means of solving such issues.

In Central and South-Eastern EU member states, public pension schemes are all financed by the PAYE system and in Slovenia they are also pre-funded. In terms of types of pension applied, four options are available: flat-rate, defined benefits (DB), notional defined contributions (NDC) and points system (PS). Croatia, Romania and Slovakia converted their old DB public pillar to a points system (PS). An NDC system has been applied in some other Eastern European countries (such as Latvia and Poland). An important element is that the pre-funding of the new

private pension schemes has often been financed through the reallocation of part of the social contributions – taxes raised for the statutory PAYE public scheme (Carone et al., 2016:16-17).

In terms of systematic reforms and progress in pension reforms, the EU tracks the implementation of mechanisms aimed at automatically adjusting key pension parameters to changes in life expectancy. These are: automatic balancing mechanisms that ensure that the pension system will be able to remain financially sustainable by adjusting benefits' indexation and/or by social contributions when needed, sustainability factors (i.e. a factor that changes the size of the pension benefit depending on the expected demographic changes, such as life expectancy at the time of retirement) and the automatic link between retirement ages and life expectancy. Very recently, Slovakia introduced the mechanism of linking the retirement age to life expectancy in 2012.

An interesting piece of research related to ageing problems by Bussolo, Koettl and Sinnott (2015) including 46 countries in Europe and Central Asia provides an analysis of policy challenges that ageing populations entail. Three main areas were included in the analysis: demography, economic consequences of an ageing population and the political economy challenge and then aggregated into eight indicators. The results are published in a country specific average indicator revealing a country's position and policy challenge in relation to other countries. The higher the indicator, the greater the policy challenge; countries were then grouped into four categories: young and adapting, young but lagging behind, old but adapting and old and lagging behind. BIH belongs among the Western Balkan countries, most of which are unfortunately in the last group. Countries such as BIH, Serbia and Montenegro together with Croatia (an EU member) are all presently facing this urgent problem and reforms are necessary (Koettl, 2016). For the case of BIH, the indicator is the second largest of all the analysed 46 countries (right after Moldova) and followed by Albania and Serbia (Bussolo, Koettl and Sinnott, 2015:322-323). The Western Balkan countries are becoming old before they have developed the necessary economic and fiscal capacities to tackle this issue.

Lack of necessary resources has been recognised in the pension policy studies in Western Balkan countries. Most research for Western Balkan countries in the analysis of necessary pension reforms highlights the urgent need to reform such funds primarily due to the ageing of the population, and hence the financial instability of funds in the mid and long term. Authors such as Bošnjak (2016) for BIH; Stanić (2009) for Serbia; Shehi, Shahini and Dragoshi (2016) for Albania; Urban, Mundar and Bejaković (2011) or Nestić and Tomić (2012) for Croatia; and Borna-rova, Bogoevska and Trbojević (2013) for Macedonia have analysed the pension system and the challenges of an ageing population.

Research including opinion surveys concerning the effects that an ageing population has on a pension system was conducted in 2001 and results were presented in

2004 for EU members (European Commission, 2004). The research examined the views of EU citizens about pension issues in the special Eurobarometer survey – Pension Policy and Pension Reform 161/wave 56.1. Views were assessed across the EU and results were presented as aggregated at the level of EU and individual member states (European Commission, 2004). Authors such as Kohl (2003), Janky and Gál (2007) and Draxler and Mortensen (2009) either participated in the survey (Kohl, 2003) or used the results to assess the effects that an ageing population has on pension systems. No research including opinion surveys concerning the effects of an ageing population on the pension system in BIH has been conducted. Such research has not been conducted in any other Western Balkan country either. Hence, the research conducted could help policy makers in BIH in the creation of policy proposals.

3 AGEING POPULATION AND PENSION REFORMS IN BIH

The transition process and the expected speed of social reforms in BIH have both been very slow. As an unfortunate legacy of war in BIH (1992-1995) pension reforms and issues related to possible demographic challenges ahead have mostly been put aside. Additionally, lack of official data has postponed this process since official results of the Consensus from 2013 were officially published only in 2016, twenty-five years after the publication of the last Consensus in 1991. The war in BIH has left a drastic demographic legacy in BIH with a fall in the population from 4.3 million to the current 3.7 million. Under such circumstances and due to additional post-war pressures on social and health funds, BIH has faced additional problems. Table 1 provides a brief overview of the main macroeconomic and demographic indicators for BIH over the 1995-2016 period.

TABLE 1

Main macroeconomic and demographic indicators for BIH¹, 1996-2016

BIH	1996	2002	2010	2016
GDP, per capita, current prices, US\$	983,1	1,753.1	4,404.3	4,298.4
Inflation, % change	n/a	-0.4	3.0	-0.29
U/E rate, % of labour force	50.0	31.1	27.2	25.4
General government total expenditure, % of GDP	n/a	47.6	49.5	43.0
General government gross debt, % of GDP	n/a	31.2	42.7	44.7
Population ages 65 and above, % of total population	6.0	12.1	13.9	16.1
Pensioners/contributors ratio	1988	2002	2010	2016
FBIH	0.3	0.7	0.8	0.9
Republika Srpska (RS)		0.8	0.9	1.0
Total public pension spending, % of GDP	6.5 (2010, RS ^a)	9.4 (BIH, 2012 ^a)

^a Latest officially available data.

Source: FAS (1989); FBIH&RS Statistics Office (2016); The World Bank (2016; 2017); IMF (2017).

¹ Brčko District is excluded from the analysis.

Data presented in table 1 show a recovery in all macroeconomic indicators from 1996 until 2016 (except the rise in general government gross debt shown as a percentage of GDP until 2010). However, BIH, unlike any other transition country, entered the transition process war torn and with significant human and infrastructural losses, and it should therefore be noted that the starting point of all macroeconomic indicators was very low. For example, by 1995, BIH GDP² had shrunk to less than a third of its pre-war level (World Bank, 1997:3). International aid for reconstruction and development speeded up the process in the first years of transition; however, migration and demographic changes made the social and mostly pension and health funds especially vulnerable. The share of total public pension spending as a percentage of GDP has increased from 3.3 per cent in 1996 (The World Bank, 1997) to 9.4 per cent in 2012.

Due to its specific post-war constitutional organisation, BIH has two pension funds (one in each BIH entity – FBIH and RS), which further hinders the implementation of an efficient pension policy. In FBIH, the necessity to reform the pension system was recognised some time ago, but has not been fully accomplished, and the FBIH still implements the PAYE system. As of 2013, more serious steps towards pension reforms have begun, so the government of FBIH published a proposal of the Pension System Reform Strategy in FBIH (FBIH Government, 2013). This document included the status and prospects of the pension system in the FBIH with suggestions for reform.

The document briefly analyses the demographic trends in FBIH in 2012 and expectations for the next twenty years considering the very low fertility (without migration at the end of projected period). Under such circumstances, it is expected that in FBIH, the share of population older than 65 years of age would grow to 25.2 per cent while the share of the young population (below the age of 15) would fall from 17.1 per cent to 11.7 percent (FBIH Government, 2013:9). As in almost all European countries, even with a slight increase in fertility rates, FBIH population will decrease in the next 40-50 years by about 10 per cent and by an additional 11 per cent by 2073 (FBIH Government, 2013:9-10).

In terms of size and structure of pensions in BIH, the analysis is conducted separately for the two BIH entities. Table 2 provides information regarding the share and the structure of pensions in both BIH entities for 2016.

Apart from the types of pensions provided in table 2, in FBIH, in terms of payment structure, there are four statutory (legal) groups of pension payments. Within each group, war veterans, different groups of armed forces/Ministry of Defence, members of the police and those who were militarily disabled, members of their families and other specific groups are eligible to receive pensions under special regulations in BIH. The Law on Service in the Armed Forces of Bosnia and Herzegovina provides detailed information related to old-age pensions and early retirement pensions under special conditions for these different groups.

² Bearing in mind that pre-war levels of GDP were expressed as GNP.

TABLE 2

The size and the structure of monthly pensions in FBiH and RS for 2016 (in %)

Pensions in FBiH	December 2016/ share of beneficiaries	Pensions in RS	December 2016/ share of beneficiaries
Old-age	52.6	Old-age	54.9
Disability	18.4	Disability	15.3
Family	29.0	Family	29.7
		Other	0.1

Source: Federalni zavod PIO/MIO and Fond za penzijsko i invalidsko osiguranje Republike Srpske, 2016.

The highest share of paid-out pensions in both entities in 2016 was that of old-age pensions followed by family pensions. In fact, the situation in pension funds is very similar in both entities even though the FBiH had 401,335 beneficiaries and the RS 257,609 in 2016. The financial structure is similar to data presented in table 2. For example, approx. 58 per cent of all funds available in FBiH is paid out to old-age pensions, 16 per cent to disability and 25 per cent to family pensions (such data are not available for the RS). If we observe the period from 2010 until 2016 the share of old-age pensions has been increasing in both entities (from 45.9 per cent to the current 52.6 per cent in the FBiH and from 48.3 per cent to the current 54.9 per cent in the RS). We can assume a similar financial trend occurring in both entities. The average size of pensions in both entities is very low. In fact, average pensions in FBiH and RS in December 2016 amounted to 369 BAM (approx. 189³ EUR) and 342 (approx. 175 EUR) BAM respectively. From 2010 to 2016 average pensions have mostly been stagnating and the number of pension beneficiaries has been increasing.

Pension and disability insurance in the FBiH is regulated by law based on principles of reciprocity and intergenerational solidarity. This insurance includes: age, disability, death and physical disability caused by work. Pension rights deriving from these risks are the right to old age, disability and family pensions, and the right to financial compensation in the case of work-related physical incapacity. The pension fund in the FBiH is a social contributions fund and pension contributions are thus the main source of revenues. Apart from revenues from pension contributions, the law allows other payments such as contributions from voluntary insurance, self-employment, budget and other sources. Current pension contribution rates are 17 per cent and 6 per cent calculated on the gross wage and paid by employer and employee respectively.

The presented increase in the population aged 65 or older has more than doubled since the end of the war in BIH (table 1). Also, there is an increasing trend in the number of pensioners in FBiH, and this number has been rising by approx. 3.8 per cent per year on average (FBiH Government, 2013:12). The pensioners to con-

³ 1 EUR = 1.95583 BAM (fixed exchange rate).

tributors' ratio has been deteriorating over the past thirty years in (F)BIH (table 1). Under the status quo in pension reforms, the projections of 2013 indicate that the ageing population and low activity rate will dominate the FBIH pension system. The number of pensioners is expected to increase by 2040, even at a faster rate if the abolition of the early retirement program is postponed. Still, this activity would be insufficient to mitigate unfavourable demographic trends. On the contributors' side, the number of insured persons is expected to continue to be affected by low activity rates, especially among women, significant emigration and high levels of grey economy. Hence, the pensioners to contributors' ratio in the FBIH is expected to reach 100 per cent by 2024 and a maximum of 146 per cent is expected by 2054. By 2075, a fall in this ratio is expected (FBIH government, 2013:14).

The Reform Agenda for the period 2015-2018 in BIH highlighted the need to act fast in the pension system and pension funds. Due to the fact that pension reforms in the FBIH have been only slightly tackled in the past twenty years, this reform was assessed as necessary. In this sense, the new Law on Pension Insurance in the FBIH was enacted on the 1st March 2018 and replaced the former FBIH Law on Pension and Disability Insurance passed twenty years ago. Even though this law brings new ways of solving long-term fiscal sustainability problems in the pension system, the PAYE system still prevails. Basic changes are related (but not limited) to:

- a) Replacement of the DB system and introduction of the PS of pension calculation, whereby the amount of the pension would depend on the amount of the contributions paid.
- b) The minimum age requirement for retirement is 65 years with a minimum of 15 years in service and minimum 20 years of paid pension insurance for both genders. In the prior law, the minimum age requirement for retirement was 65 years with a minimum 20 years of paid pension insurance.
- c) Requirement for early old-age pension will change from year to year and will be significantly stricter than it was before. The requirement for early retirement in 2018 for men is 35.5 years of paid pension insurance and 60.5 years of life, while for women the condition is 30.5 years of paid pension insurance and 55.5 years of life. This limit will be shifted every year by half a year of life and half a year of paid pension insurance before reaching the 40-year limit of paid pension insurance.
- d) A more rigorous set of penalties was introduced, which acts as a disincentive for early retirement (4 per cent annual reduction compared to prior 0.5 per cent reduction for each year below the necessary age limit of 65 years, Law on Pension and Disability Insurance, Official Gazette of FBIH no. 13/18).

In the first months after the adoption of the new law on pension insurance in FBIH, pension amounts increased (this increase covered 54,785 pensioners whose pensions increased by ten percent and 53,454 who received an increase of five percent); the deficit of the pension insurance fund was reduced and now stands at 103 million BAM.

4.1 SURVEY METHODOLOGY AND STRUCTURE OF THE SAMPLE

The research design, including the questionnaire used in this empirical analysis, was principally developed on the basis of Eurobarometer survey, Pension Policy and Pension Reform 161/wave 56.1. In order to avoid possible misinterpretation, original questions from the Eurobarometer survey were translated into the local language and then translated back to English. Hence, the original questionnaire was only marginally modified and adopted to reflect FBIH specifics – such as legal and cultural characteristics, based on a pilot survey and comments and suggestions of two public sector experts. In addition to the standard set of socio-economic background variables such as age, education, and income, the questionnaire included a set of questions related to the information and preferences about the current pension system, potential reform options as well as current self-reported lifestyle standard.

The data used in this analysis have been collected in February 2018. A self-administrated online survey was carried out using the exponential non-discriminative snowball sampling technique. The total sample size is 623 responses.

Frequency tests were conducted to provide descriptive information regarding variables, including demographics. The sample of respondents included more females than males and more respondents who are not retired (table 3). That the sample is predominantly composed of non-retired females is a consequence of the sampling method selected. However, as this research is at an initial stage of the exploration, the sample is considered relevant for the research aim, with no robustness.

In terms of respondents' level of education, the largest number of respondents have finished undergraduate studies (39.5 per cent) whereas 18 per cent of respondents have finished master studies. The youngest respondent in the sample was 20 years old and the oldest 92 years old. Most respondents (31.4 per cent) were in the 35-44 year-old cohort. Respondents were asked to estimate and report the average monthly net household income from all sources. Most respondents (27.1 per cent) reported that the monthly income of the household was above 2,500 BAM, while almost 4 per cent of the respondents stated that they live in the household where the net monthly income is 350 BAM or less. As a response to the subjective feeling of their living standard, out of the total of 599 respondents who answered this question, almost a half assessed their current standard of living as average. According to the data of the Federal Bureau of Statistics, the minimum pension in the FBIH in 2017 amounted to 326.17 BAM and the average net salary in the FBIH amounted to 888.00 BAM.

TABLE 3

Sample description

Factor	Category	%
Status	Not-Retired	76.5
	Retired	23.5
Gender	Male	39.4
	Female	60.6
Age	15-24	3.3
	25-34	16.2
	35-44	31.4
	45-54	16.2
	55-64	14.4
	65+	18.5
Education	Without primary education	0.3
	Primary education	0.5
	Secondary education	19.8
	Qualified worker	2.7
	Short-cycle tertiary education	9.8
	Bachelor or equivalent	39.5
	Master or equivalent	18.0
	Doctor or equivalent	9.4
Self-reported net monthly income	350 BAM or less	3.9
	351 – 700 BAM	11.6
	701 – 1,000 BAM	12.2
	1,001 – 1,500 BAM	16.3
	1,501 – 2,000 BAM	16.1
	2,001 – 2,500 BAM	12.8
	More than 2,500 BAM	27.1
Self assessed standard of living	Very poor	1.0
	Poor	1.5
	Just getting along	12.7
	Average	49.2
	Comfortable	25.6
	Very comfortable	9.6
	Rich	0.4

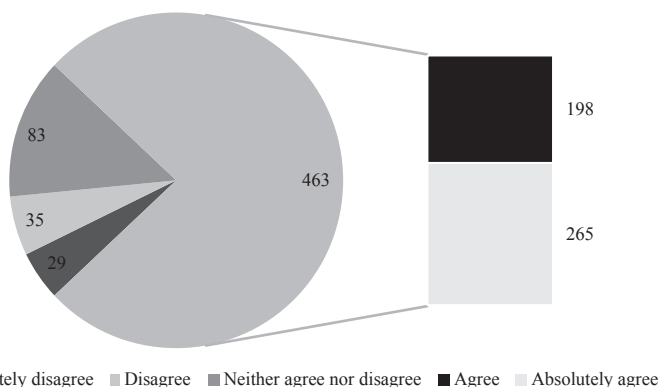
Source: Authors.

4.2 WILL THE AGEING OF POPULATION POSE A PROBLEM FOR THE PENSION SYSTEM IN THE FUTURE? THE RESULTS OF LOGIT REGRESSION MODEL

The responses related to the statement “The ageing population in our country will pose a problem for the pension system in the future” were assessed by using a five-point Likert-type scale (1 – “absolutely disagree”, 2 – “disagree”, 3 – “neither agree nor disagree”, 4 – “agree”, 5 – “absolutely agree”). Most respondents in the sample are aware of the problems caused by ageing population since 75.9 per cent responded positively to the former statement (32.5 per cent “agreed” and 43.4 per cent “absolutely agreed”). Only 4.8 per cent and 5.7 per cent of respondents absolutely disagreed or disagreed respectively while 13.6 per cent were neutral (“neither agreed nor disagreed”).

FIGURE 1

Summary of responses to the statement: the ageing population in our country will pose a problem for the pension system in the future, number of respondents



Source: Authors.

In order to separate the effects of the explanatory variables such as gender, age, income, education and standard of living on the attitudes towards the ageing population, logit regression analysis was conducted. The five-point Likert scale⁴ presented in the answers related to the statement that the ageing population would pose a problem for the pension system in the future was used in a variable as follows: answers 1 and 2 are summarised as “no” answers, answer 3 is “neutral” and it is not included in the analysis, and answers 4 and 5 are summarised as “yes” answers. Bearing in mind the former criteria, the size of the sample was reduced to 527 responses.

TABLE 4

Regression coefficients of multilevel binomial logit regression on opinions of whether ageing population will pose a problem

	Ageing population in our country will pose a problem for pension system in the future
Education	.291*
Pensioners	1.295*
Gender	.194
Age	-.321
Self-reported income	-.049
Role of government	1.343**
Living standard	.734**
Const.	- 2.347

* $p < 0.05$, ** $p < 0.01$.

Source: Authors.

⁴ The results from the Likert scale (1 to 5) were interpreted as follows: answers 1 and 2 are summarised as “I disagree”, answer 3 is “neutral”, and answers 4 and 5 as “I agree”.

Dependent variable is a response to the statement: “The ageing population in our country will pose a problem for the pension system in the future”. It is a dichotomous variable whereby responses “I absolutely disagree” and “I disagree” were coded as zero (0), neutral responses were not considered and responses “I absolutely agree” and “I agree” were summarised as one (1).

Independent variables in this model are:

- *Education*: ordinal variable where “without primary education” was coded by “1”, “primary education” by “2”, “secondary education” by “3”, “qualified worker” by “4”, “short-cycle tertiary education” by “5”, “bachelor or equivalent” by “6”, “master or equivalent” by “7” and “doctoral or equivalent” by “8”;
- *Pensioners*: dichotomous variable (zero or one) where retired respondents were coded by “1” and non-retired coded by “0”;
- *Gender*: dichotomous variable (zero or one) where male respondents were coded by “1” and women coded by “0”;
- *Age*: ordinal variable where 15-24-year-old coded by “1”, 25-34 year-old = coded by “2”, 35-44 year-old coded by “3”, 45-54 year-old coded by “4”, 55-64 year-old coded by “5” and 65 or older coded by “6”;
- *Self-reported income*: ordinal variable where 350,00 BAM or less = “1”, 351-700 BAM = “2”, 701-1,000 BAM = “3”, 1,001-1500 BAM = “4”, 1,501-2,000 BAM = “5”, 2,001-2,500 BAM = “6” and more than 2,500 BAM = “7”;
- *Role of government*: dichotomous variable (zero or one) as a response to the statement: “The state should be the most important participant in the economy” whereby responses “I absolutely disagree” and “I disagree” were coded as zero (0), neutral responses were not considered and responses “I absolutely agree” and “I agree” were coded as one (1);
- *Standard of living*: ordinal variable where “very poor” = 1; “poor” = 2; “just getting along” = 3; “average” = 4; “comfortable” = 5, “very comfortable” = 6 and “rich” = 7.

The regression results show that the retirees are more likely to see problems in demographic trends than respondents who are not retired. This is expected considering that the pensioners’ living standard depends on the sustainability of the pension system. Respondents’ financial situation is a very interesting factor shaping opinions; although household income does not affect their attitude to the problem of ageing, respondents with a high current self-reported living standard, who also pay more taxes, are more likely than others to see population ageing as a problem. Citizens who are better educated are also more likely to be aware of the problems of an ageing society. The difference is especially noticeable at lower levels of education. The results of the logit marginal effects analysis indicate that the likelihood that a person who has finished secondary education will see ageing as a problem is 1.36 times higher than for a person who has completed only primary education. Although other differences exist, they are less drastic for those who are more educated. Respondents who are in favour of a stronger role of government

in the economy are more inclined to be aware of the ageing problem. A possible explanation for this lies in fact that those who believe that the state should be the main participant are more interested in the functioning and financing of the public sector in general, and the pension system in particular. Contrary to the expectations, the age variable was not significant, and therefore another model was developed with squared age but again, it was insignificant. Values of variance inflation factors (VIF) indicate that there are no serious problems with multicollinearity between the variables.

4.3 ATTITUDES TOWARDS PROPOSALS FOR SOLVING THE AGEING POPULATION PROBLEM IN FBiH

There are various proposals available to both government and private sector to deal with the ageing problem. Although the implementation of each of the proposals requires deeper economic, social and political analysis, knowledge of the respondents' attitudes can provide policymakers with an important insight into this issue. In the questionnaire, based on the Eurobarometer 161/wave 56.1, respondents were offered eleven proposals as statements on a five-point Likert-type scale, (responses were grouped as previously noted).

Eleven proposals could be grouped into:

- Three changes in parameters of pensions systems (raising the age of retirement, improving pension insurance funds, maintaining contribution rates).
- Three proposals related to increasing labour force participation (giving priority to fighting unemployment, improving integration of foreign workers, and reducing emigration).
- Two family policy proposals (giving financial support to families with more children and facilitating a reconciliation between the demands of work and family).
- Two proposals related to encouraging people to save part of their income for retirement age (providing financial tax incentives to encourage people to save more money and allowing people to invest their own contributions into private pension funds or life insurance of their choice).
- And a change in public expenditure as a way of reducing spending in other areas to make more money available for pensions.

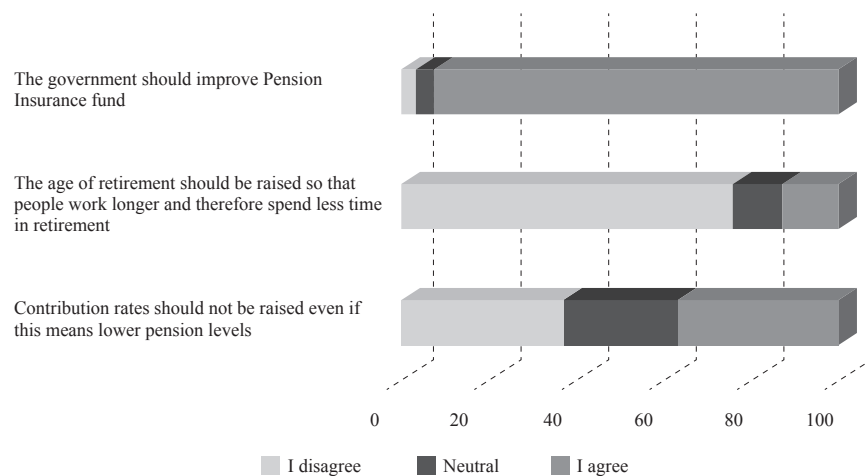
Some of these changes require pension system reforms, others change in the labour market, migration policy or fiscal reforms. The results from the FBiH survey were compared to results published in the special Eurobarometer 161/wave 56.1 (The European Commission, 2004), but the interpretation requires special caution. Namely, results are only partly comparable because there is a large time-span between the two surveys and different surveys' sampling techniques have been used in the research (Eurobarometer included random sampling method while in BIH, due to financial constraints, the exponential non-discriminative snowball sampling technique was used).

4.3.1 Changes in parameters of pensions systems

A proposal related to increasing the retirement age is very often suggested as a way of solving the ageing population problem. However, it is also considered an economically and politically controversial proposal, which public opinion usually opposes. The research provided similar results where 72 per cent of respondents disagreed with the statement that “The age of retirement should be raised so that people work longer and therefore spend less time in retirement”. This proposal is also unpopular among European citizens, where 69 per cent disagreed with the statement. Moreover, less than one third of respondents have a positive view of this issue in all of the member countries, except in Ireland where slightly more than 40 per cent of respondents agree with the proposal (European Commission, 2004:62). In the sample, 88 per cent of the respondents agreed with the statement that the problem of the ageing population should be solved by improving the efficiency of pension funds. This is expected, given the complex institutional structure of the pension system in the country. Respondents were indecisive when it comes to the issue of preventing the rise in contribution rates even if it means lower pension levels, since 34.7 per cent agreed with this statement and 35.3 per cent disagreed. In the EU, this opinion is supported by less than one third of respondents and disapproved of by a majority of citizens (more than fifty per cent of respondents). Furthermore, this proposal was not supported by more than 40 per cent of adult citizens in any of the member countries (European Commission, 2004:60). The number of people who are indecisive is relatively high in the FBiH (one quarter) and in the EU countries (16 per cent).

FIGURE 2

Attitudes towards changes in parameters of pensions systems (in %)



Source: Authors.

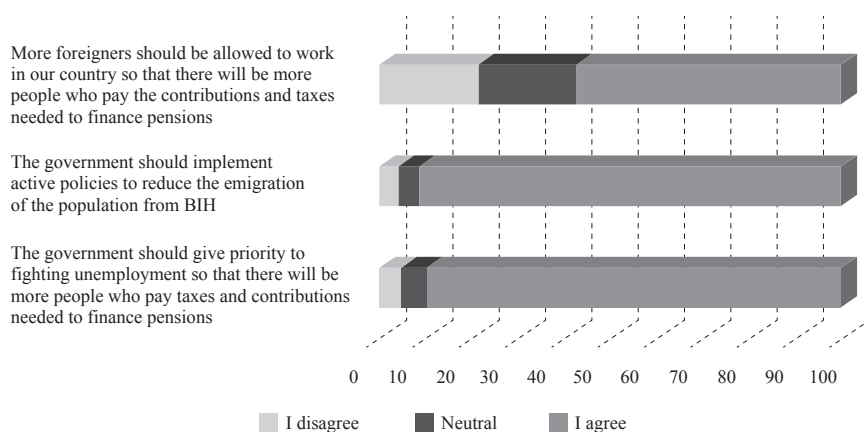
4.3.2 Increasing labour force participation

The situation in the labour market in (F)BiH is characterized by high unemployment (20.5 per cent in 2017, FBiH Statistics Office, 2016) with a very high youth

unemployment rate, and in line with this 85 per cent of respondents agree with the statement that the government should give priority to fighting unemployment so that there will be more people who pay the taxes and contributions needed to finance pensions. Nevertheless, this proposal has received less support from the FBIH than from the EU citizens according to the results of the Eurobarometer survey, where 87 per cent of EU citizens were in favour of this proposal. In addition, general support for this strategy reached more than 80 per cent in all member states (European Commission, 2004:66). Although immigration of skilled labour is often proposed as a solution to the problems of the pension system caused by ageing, a larger number of FBIH respondents see the solution in implementing active policies to reduce the emigration of the population. Thus, the proposal that “more foreigners should be allowed to work in our country so that there will be more people who pay contributions and taxes needed to finance pensions” was strongly supported by more than one fifth of respondents and one third of respondents also agreed, so that more than fifty per cent in total had positive views. In comparison to the EU responses, where the total rate of agreement to this statement remained below 40 per cent, this proposal reached a high level of support among FBIH respondents. In fact, this statement revealed extreme cross-national differences among the EU members: while it was favoured by a majority of citizens in the Scandinavian countries (Sweden, Denmark and Finland), disapproval was the strongest in the United Kingdom, Belgium and France, with rates around 60 per cent (European Commission, 2004:70). It should be noted that the EU survey was conducted prior to the recent migration crisis so that the support data related to this policy would probably be very different nowadays. Unlike some European countries, BIH has not yet faced migrant problems, and the explanation for a greater support to reducing emigration (88 per cent) than for increase of immigration of foreign workers (52 per cent) can be sought in the emigration trend in the past few years, not in an anti-migrant mood.

FIGURE 3

Attitudes towards increasing labour force participation (in %)



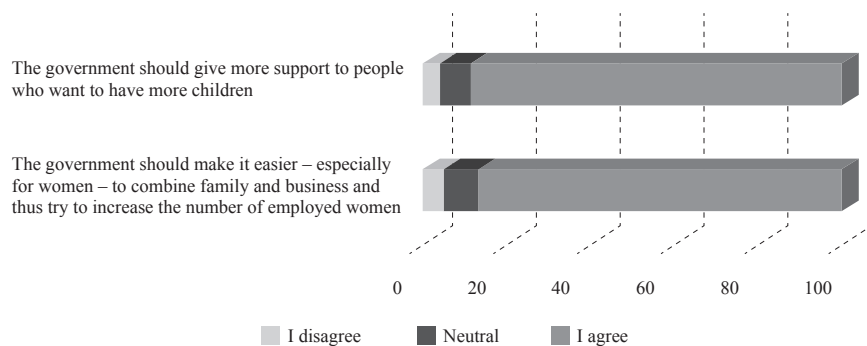
Source: Authors.

4.3.3 Attitudes towards family policies

The key family-related policy instruments are aimed at trying to accommodate work and family life especially for women and to provide support for people who want to have more children. According to the data from the Labour Force Survey for BIH in 2017, women account for almost 40 per cent of the total labour force, which indicates the presence of gender inequality. The respondents are aware of this problem since more than 80 per cent support improving the position of women in the labour market and increasing birth rates through giving support to people with more children. The proposal that the government should make it easier – especially for women – to combine family and work and thereby attempt to increase the number of women in employment was supported by 81 per cent of respondents and the proposal that “the government should give greater support to people who want to have more children” by 84 per cent of respondents. Increasing the labour force participation of women is also a widely supported proposal in the EU since more than 80 per cent agreed with this proposal. The support was especially strong in Greece (94 per cent), Spain, Portugal and Ireland (89 per cent 82 per cent respectively) where women’s employment rate has been traditionally low so far, but also in Sweden (88 per cent) and Denmark (86 per cent) – countries with the highest rates of female employment (The European Commission, 2004:68).

FIGURE 4

Attitudes towards family policy (in %)



Source: Authors.

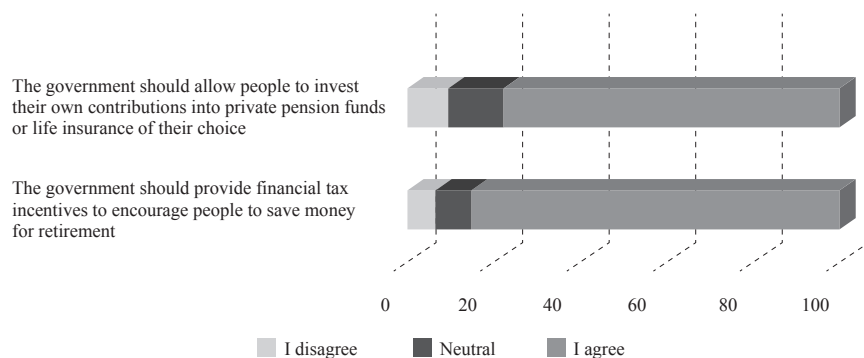
4.3.4 Encouraging people to save part of their income for retirement age

Considering the very low standard of living of retired persons in the FBiH, it is not surprising that respondents strongly support the proposal that encourages people to save a part of their income for retirement. Hence, the proposal that “the government should provide financial tax incentives to encourage people to save/make private provisions for their retirement” gained support by 81 per cent of respondents and only six per cent disagreed with proposal. In the context of FBiH with PAYE system, where three pillars of pension insurance have not been implemented, it is interesting to look at the answers of respondents related to private pension funds and life insurance as alternatives to pensions. The proposal that “the govern-

ment should allow people to put their contributions into private pension funds or life insurance policies of their choice” was endorsed by more than three quarters or respondents.

FIGURE 5

Attitudes towards encouraging people to save part of their income to retirement age (in %)



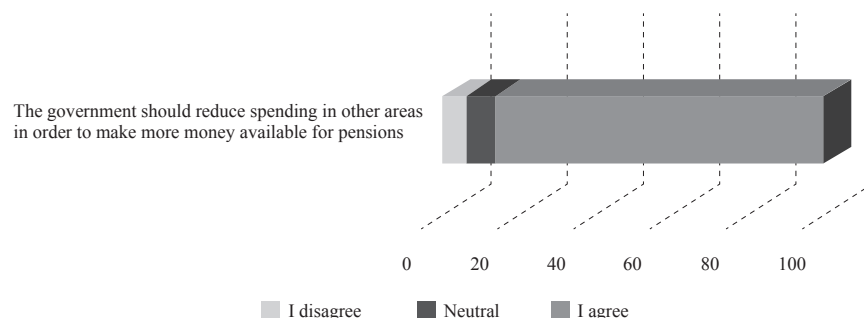
Source: Authors.

4.3.5 Changes in public expenditures

Considering the high levels of public spending in BIH, expressed as a share of public expenditures to GDP (table 1) it is expected that 83 per cent of respondents in FBIH think that the government should cut spending in other areas in order to make more money available for pensions. In the EU slightly more than three quarters of respondents agreed with this proposal whereas the Portuguese and Greeks agreed the most with 90 per cent respondents supporting this measure. In four countries (United Kingdom, Sweden, Finland and Denmark) one quarter of respondents disagree with this change in public spending (European Commission, 2004:63).

FIGURE 6

Attitudes towards changes in public expenditure structure (in %)



Source: Authors.

5 CONCLUSION

The share of persons aged 65 and older in total population is increasingly becoming a problem in European countries, including BIH. Since the end of the war in BIH, the share of persons aged 65 and older in total population has risen from 6 per cent to more than 16 per cent. This trend causes many changes, where the most important ones are related to the pension system, health system and labour market.

The problems of ageing in BIH put additional pressures on the fiscally unsustainable pension system in BIH, and the policy makers have in the past few years recognised this issue, which led to the adoption of the Reform Agenda for the period 2015-2018. The Reform Agenda resulted in a new Law on Pension and Disability Insurance in FBIH in 2018. The growing problem of the ageing population was also recognised in the primary survey conducted in FBIH, where 75.9 percent of all respondents believed that the ageing population in our country would pose a problem for the pension system in the future. The results from the logit regression model indicate that pensioners and respondents with higher levels of education are more likely to support this statement than those who are not retired and those who have less formal education. Furthermore, those who believe that the government should have the primary role in the economy and those who have reported a better standard of living are also more inclined to answer positively to the statement related to the problems of the ageing population in the pension system in the future.

In order to determine the attitudes of respondents toward possible solutions, eleven proposals were provided and grouped into five related policy areas. Within changes in the parameters of the pensions system, respondents agreed on the statement related to improving pension insurance funds, disagreed on the statement related to raising the age of retirement and were indecisive about maintaining contribution rates even if it meant lower pensions. Respondents agreed to all the statements related to increasing labour force participation (giving priority to fighting unemployment, improving integration of foreign workers, and reducing emigration) as well as family policy (giving financial support to families with more children and facilitating a reconciliation between the demands of work and of family). Encouragement of savings for retirement age in terms of financial tax incentives and private pension funds also elicited a positive response, together with public expenditure policies in terms of reduction of public spending.

Although the analysis carried out in the FBIH provides policy makers with an insight into the attitudes and perceptions of the public regarding the implementation of measures aimed at addressing the problem of an ageing population, this is a question that requires further analysis and further research into the impact that ageing population has on pension systems. The main limitation of the survey conducted relates to the sampling method and geographical coverage. Field research covering the whole of BIH was constrained for financial reasons so the next ques-

tionnaire should include fieldwork and a random sampling method similar to Eurobarometer practice.

Disclosure statement

All authors state that they do not have any financial or other substantive conflict of interest.

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Healthcare expenditure and fiscal sustainability: evidence from Switzerland

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Abstract

Growing healthcare expenditure is of major concern for the sustainability of public finances. In order to better explore the fiscal sustainability challenge and to inform the debate, we draw up a new set of healthcare expenditure projections for the particularly interesting case of Switzerland. According to our projections up to 2045, population ageing exerts a growing pressure on public budgets and mandatory healthcare insurance. However, healthcare expenditure is not only driven by demographic change but also by non-demographic drivers such as the increasing national income, medical advances and Baumol's cost disease. We find that long-term care is more severely affected than healthcare excluding long-term care. This finding implies that population ageing affects public finances to a greater extent than the mandatory healthcare insurance. Our sensitivity analysis suggests that the strongest cost pressure comes from alternative assumptions about the future state of health and Baumol's cost disease. Accordingly, measures aiming at prevention and efficiency would help most to ease the pressure on public finances and mandatory healthcare insurance.

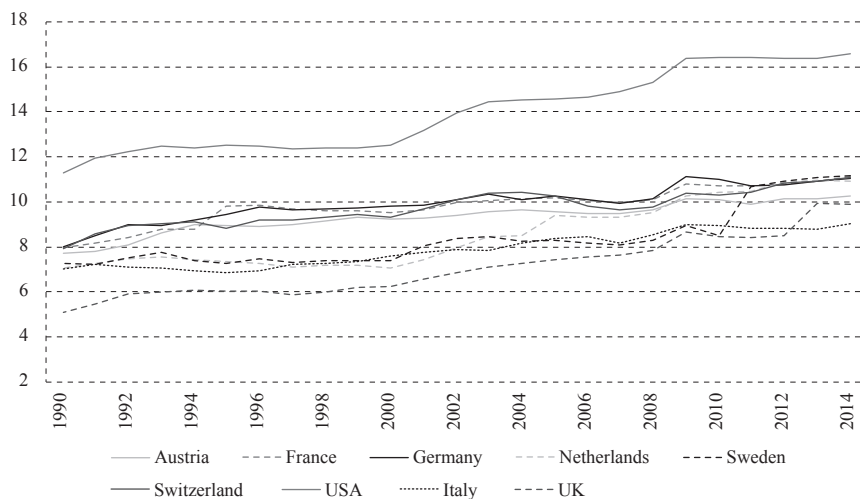
Keywords: healthcare expenditure growth, population ageing, long-term projections, sustainability, public finances, social insurance

1 INTRODUCTION

Across most advanced economies, health care expenditure has clearly outpaced economic growth in recent decades. This development is particularly evident in the US and in several European countries. While the US notably spends almost 17% of its income on healthcare, several European countries follow with the GDP share in question currently being at 12.1% in Switzerland, 11.2% in Germany and 11.1% in France (see figure 1).

FIGURE 1

Healthcare expenditure in an international comparison, 1990-2015 (in GDP %)



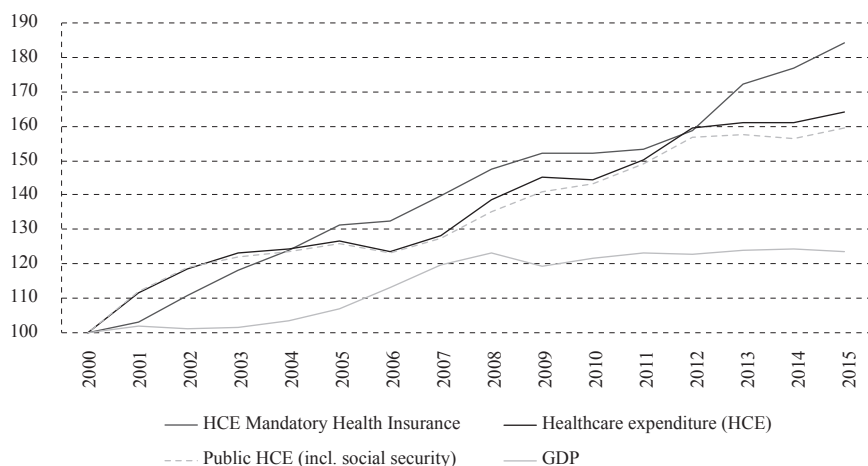
Source: OECD.

In order to better explore the fiscal sustainability challenge and to inform the policy debate about measures to contain healthcare expenditure, we present a net set of projections focusing of the particularly interesting case of Switzerland. Switzerland has one of the most expensive healthcare systems among OECD countries and features a highly decentralized healthcare system. Moreover, the Swiss healthcare system is characterized by a particular financing scheme, i.e. a mixture of a mandatory (private) health insurance scheme and a relatively high share of public financing and private cost sharing.

Healthcare expenditure (HCE) in Switzerland has more than doubled over the last half-century or so, rising from 5.2% of GDP in 1960 to 12.1% of GDP in 2015. While the annual average growth rate of GDP per capita amounted to 1.5%, HCE per capita grew at a rate of 3.4%. A decomposition of HCE by funding source shows that public finances and, in particular, the expenditure of the mandatory healthcare insurance (MHI) have come under increasing pressure from the rise of HCE (see figure 2).

FIGURE 2

Per-capita healthcare expenditure by funding source and per-capita GDP from 2000 to 2015 in Switzerland (2000=100)



Source: Federal Statistical Office and Federal Finance Administration.

In this paper, we include a set of important drivers of HCE, i.e. ageing, income, medical progress as well as Baumol's cost disease for the projections. In all likelihood, population ageing increases the pressure on healthcare funding. Although the relative importance of population ageing as a determinant of HCE has been contested by some health economists (Zweifel, Felder and Meiers, 1999; Werblow, Felder and Zweifel, 2007), there is growing evidence for the relevance of population ageing as a driver of HCE (Gregersen, 2014; Breyer, Lorenz and Niebel, 2015; Colombier, 2018). Smith, Newhouse and Freeland, (2009:1281) explain "Demographics appear to have played a small role in the historical growth of

spending but will loom larger with the ageing of baby boomers". An ageing population does not only exhibit greater demand for healthcare services and greater need for care services, but it also causes GDP growth to slow down because of the diminishing labour force. These developments are reflected in the "Reference scenario" of the Swiss Federal Statistical Office (FSO). The proportion of people over the age of 80 relative to the population is set to double from the current level of 5% to 10% by 2045. A closely related question is how changes in life expectancy affect the health status of the population, thereby impacting HCE. Moreover, we take account of income development, advances in medical technology, and Baumol's cost disease – all determinants viewed as crucial by the literature (Martín et al., 2011; de la Maisonnette and Oliveira Martins, 2013; Hartwig and Sturm, 2014). We apply income elasticity as a proxy for demand-side as well as supply-side effects, such as the demands of the population and advances in medical technology. Baumol's cost disease (Baumol, 1967) concerns the lower productivity development in healthcare that leads to additional cost pressure.

We draw up long-term projections of HCE that cover the period from 2013 to 2045. We use the latest demographic scenarios for Switzerland (FSO). In accordance with the practice of international institutions such as the OECD (de la Maisonnette and Oliveira Martins, 2013; Marino et al., 2017) and the Ageing Working Group of the European Union (AWG, 2015), we apply a cohort approach and project HCE as a percentage of GDP. For the purposes of these projections, it is assumed that the currently prevailing health policies and institutions will not change ("no policy change"). Accordingly, while (cross-country) differences in the organization of the healthcare sector, e.g. different insurance and financing regimes, different compensation systems for providers and the role of general practitioner models, are likely to matter for healthcare cost growth, we take the existing institutional framework of the Swiss healthcare system as given.

Our projections show that population ageing exerts a growing pressure on public budgets and MHI. This development poses a threat to the sustainability of public finances (Braendle, Colombier and Philipona, 2016). However, not only does demographic change impact HCE but also non-demographic drivers such as the increasing national income and medical advances as well as Baumol's cost disease play a significant role. The results of this paper are comparable to those of the OECD (de la Maisonnette and Oliveira Martins, 2013) and the EU AWG (2015). In particular, we find that long-term care (LTC) from the age of 65 is more severely affected than healthcare excluding long-term care (HeL). This finding implies that population ageing affects public finances to a greater extent than it does affect MHI. A side-effect of continuously rising MHI premiums is undesirable distributional consequences. The financial burden of lump-sum per capita premiums is increasing for an ever-larger part of the population. Public finances are also adversely affected by premium increases through rising social benefits, i.e. individual premium reductions (IPR) to guarantee equal access to healthcare services for lower income households. Our findings suggest that cost-containment meas-

ures that increase the efficiency of healthcare provision such as the avoidance of medically unnecessary treatments, a stronger reliance on capitation-based remuneration schemes, the introduction of E-health, allocation improvement between outpatient and inpatient care and fostering ambulatory and informal care can mitigate the pressure on MHI and public budgets. In addition, preventive measures and strengthening of the population's health competencies can contain HCE and ease, in particular, the pressure on public budgets. The projections are characterised by significant uncertainties such as the magnitude of the cost effects, and the modelling of non-demographic determinants in the healthcare system. The latter is particularly true for advances in medical technology. The objective is to provide a rough orientation for expenditure development and to highlight how sensitively expenditure development reacts to various cost drivers. For that reason, scenarios have been drawn up with differing assumptions regarding the impact of the relevant cost drivers.

This paper is organised as follows. Section 2 discusses the key cost drivers and describes the various scenarios. Section 3 sets out the projection methodology. Section 4 presents the main results of the projections for the total healthcare sector, the public sector and the mandatory insurance. Moreover, a comparison is drawn with the results for EU member countries. In concluding, section 5 discusses policy options to contain cost development in healthcare.

2 DETERMINANTS AND SCENARIOS

2.1 COST DRIVERS

In addition to the immediate repercussions of demographic change for healthcare expenditure, we include those effects that can have an expenditure impact as a result of a change in the health status (morbidity) due to increasing longevity. A number of different competing hypotheses have emerged in this respect. According to the thesis of pure morbidity extension, so-called “pure ageing”, the additionally gained years of life are not spent in good health (Gruenberg, 1977). The state of health of the population deteriorates on average. The thesis of a relative reduction in morbidity, so-called “healthy ageing”, states that the amount of time spent in a state of illness or in need of care does not change. However, it is also claimed that the extra years of life gained are spent in a good state of health (Manton, 1982). The thesis of an absolute reduction in morbidity in the event of rising life expectancy is put forward by Fries (1980, 1989), who argues that as a result of better technology and better prevention, the amount of a person's lifetime spent in sickness or in need of care can actually be reduced. The amount of time spent in good health rises more strongly than life expectancy. As there is no clear consensus in empirical studies with respect to the interaction of rising life expectancy and morbidity development, scenarios with different assumptions regarding the change in morbidity have been drawn up.

Aside from the effects of demographic change, the projections also include the effects of important non-demographic cost drivers. The first non-demographic

factor to be taken into consideration is the empirically observable relationship between national income development and healthcare expenditure growth. This relationship covers both supply-side and demand-side effects, such as advances in medical technology and the demand of the population for healthcare services.

As advances in medical technology are very difficult to quantify from an empirical standpoint, it is assumed that the cost effect of advances in medical technology can be indirectly captured through the change in national income development. According to Smith, Newhouse and Freeland (2009), close interdependencies exist between advances in medical technology and national income: as a society becomes more prosperous, it may be assumed that its demand for medical innovations will rise (“demand pull”). At the same time, as a society becomes increasingly prosperous, so too is there an increase in selling opportunities for healthcare services, which has the effect of increasing the incentive to invest in research and development (“supply push”). Chandra and Skinner (2012) emphasize that medical advances can be converted into productivity gains if innovations are highly cost effective and effective new procedures are not overused. At the same time, treatments with uncertain and ineffective outcomes decelerate productivity growth and lead to increasing costs.

A key question is whether the demand for healthcare services (and therefore healthcare expenditure) rises disproportionately to income, thereby making healthcare services a so-called “luxury good”. Early empirical analyses suggest that healthcare expenditure represents a so-called “necessary good” at an individual and a “luxury good” at an aggregated level (Gerdtham and Jönsson, 2000). However, there is no clear consensus on a precise assessment of income elasticity at aggregated level. Underlying problems are the comparability of the definitions of healthcare expenditure categories or the possible correlation of input prices and national income. Recent studies are often based on more comprehensive databases and use advanced empirical methods in order to address problems such as the omitted variable bias and endogeneity. These studies typically suggest an income elasticity of slightly below 1 (Baltagi and Moscone, 2010; Moscone and Tosetti, 2010; Costa-Font, Gemmill and Rubert, 2011; Acemoglu, Finkelstein and Noto-widigdo, 2012; de la Maisonneuve and Oliveira Martins, 2013; Medeiros and Schwierz, 2013; Hartwig and Sturm, 2014). In the case of Switzerland, Colombier (2018) uses a time series analysis for total HCE to show a systematic, positive partial correlation with national income, whereby the corresponding income elasticity is around 1. For a cantonal panel dataset for the period 1970-2012, Braendle and Colombier (2016) find – in keeping with the results of the latest research literature – a robust partial correlation between income and cantonal healthcare expenditure, whereby the estimated income elasticity lies around 0.7 to 0.8. Vatter and Rüefli (2003), who investigate the determinants of healthcare expenditure for a cross-section of cantons and communes for the years 1994-1999, find a positive partial correlation between cantonal income and public healthcare expenditure. Where MHI expenditure is concerned, the authors find a positive but not signifi-

cant partial correlation. Crivelli, Filippini and Mosca (2006), and Reich et al. (2012) investigate the sum of cantonal healthcare expenditure and MHI expenditure at cantonal level. For a significantly shorter timeframe, namely 1996 to 2002 or 1997 to 2007 (due to the incorporation of MHI data), these studies do not find a statistically significantly positive correlation between cantonal income and HCE.

Another factor concerns productivity development in healthcare. This is difficult to measure empirically, and may indeed differ among healthcare sectors. For example, productivity advances in labour-intensive long-term care may be minimal, whereas in the more capital-intensive and technology-intensive hospital sector, productivity gains could reasonably be expected. Lower productivity growth relative to the overall economy results in cost pressure if healthcare wages keep step with wage growth in the remainder of the economy in the longer term. Given a relatively inelastic demand for healthcare services, healthcare prices accordingly rise more strongly than prices in the remaining economy. This price effect is known as Baumol's cost disease (Baumol, 1967). Empirical studies provide evidence that the Baumol effect is an important determinant of HCE (Colombier, 2017). However, the evidence regarding the extent of the Baumol effect is mixed. Some panel data analyses for OECD countries come to the conclusion that healthcare is completely contracted by the cost disease (Hartwig, 2008; Hartwig and Sturm, 2014). Based on a refined approach, Bates and Santerre (2013) for the US federal states and Colombier (2017) for OECD countries show that the cost disease is only partially relevant in healthcare. The same conclusion is reached by Colombier (2018) who uses time-series data from Switzerland.

Studies based on micro data provide evidence for the primary relevance of the proximity to death for healthcare costs (Zweifel, Felder and Meiers, 1999; Felder, Meier and Schmitt, 2000; Werblow, Felder and Zweifel, 2007). They suggest that population ageing per se barely affects HCE. While the proximity to death is relevant at the microeconomic level, its relative importance at macroeconomic level and, thus, for projection HCE is contested for the following reasons (e.g. de la Maisonnette and Oliveira Martins, 2013). First, empirical evidence shows that the results of HCE projections do not substantially change if the proximity to death is included (Colombier and Weber, 2011; van Baal and Wong, 2012). Second, methodological concerns have been raised, such as the endogeneity between the explanatory variable proximity to death and HCE (Gregersen, 2014). Furthermore, ageing as a determinant becomes more relevant if a time-series dimension is added and ageing over time, a rising longevity, is included (Breyer, Lorenz and Niebel, 2015).

Differences in the organization of the healthcare sector, e.g. different insurance and financing regimes, different compensation schemes for providers, different regulations of healthcare markets and the role of general practitioner models, are likely to matter for healthcare cost growth (Bodenheimer, 2005; Hartwig and Sturm, 2014; de la Maisonnette et al., 2017). However, under the no-policy

change assumption, we take the existing institutional framework of the Swiss healthcare system as given.

2.2 SCENARIOS

We draw up different scenarios for the sectors of HeL and LTC from the age of 65 to take the uncertainties regarding the cost impact of the determinants into consideration.

With respect to the change in the population's state of health, it is assumed for the sector of HeL that the extra years of life gained are spent half in a good state of health and half in a poor state of health in the "Reference scenario". In addition, the increase in national income has a disproportionately high impact on the increase in healthcare expenditure through demand and supply-side effects. Leaning on the "AWG reference scenario" by AWG (2015:124-25) and empirical results for Switzerland (Colombier, 2018) an income elasticity of 1.1 is assumed. The Baumol effect is not factored into the considerations. Population growth is extrapolated in accordance with scenario A-00-2015 of the FSO. In the "Pure ageing" scenario, by contrast, it is assumed that the population spends the additional years of life gained in a poor state of health (extension of morbidity). In the "Healthy ageing" scenario, the population spends the extra years of life gained in good health (relative decrease in morbidity). In contrast to the "Reference scenario", the "Migration" scenario is based on demographic scenario A-06-2015, which assumes a higher net immigration rate. Due to the sharper increase in the working-age population, economic growth is stronger than in the reference scenario. In the "Baumol" scenario, unlike in the reference scenario, it is assumed that productivity advances in healthcare (excluding the long-term care sector) are some 40% lower than in the economy as a whole. In the "Expanded Baumol" scenario we assume for the sector of HeL a Baumol effect of 60%. The productivity advance in the sector of HeL lags behind overall economic productivity advance by 60%. The long-term care sector experiences a low advance in productivity (25% of the overall economic average). Only 75% of the Baumol effect manifests itself in the long-term care sector. This figure is based on the level of staff costs as a proportion of overall costs in the care-home sector (Christian et al., 2015). In the "Cost pressure" scenario, it is assumed that non-demographic cost determinants gain in importance: advances in medical technology, an increase in doctor densities with a higher risk of supplier-induced demand given the asymmetric information between doctors and patients, and the increasing degree to which the population draws on healthcare services – trigger significantly stronger expenditure growth than in the "Reference scenario". This in turn translates into expenditure rising more strongly in the event of rising income. Based on the corresponding European Commission scenario, an income inelasticity of 1.4 is assumed (AWG, 2015).

The same assumptions regarding demographics and morbidity (i.e. the need for care) used for the sector of HeL are also applied to the scenarios for LTC from the

age of 65. However, other than in the “Expanded Baumol” scenario, it is assumed in the scenarios for long-term care that no productivity advances are achievable, and that the Baumol effect is therefore fully effective. This is a standard assumption for projections of HCE (de la Maisonneuve and Oliveira Martins, 2013). In addition, no income effect comes into play in the long-term care sector, as the need for care is not voluntary and is independent of income. Accordingly, a no “Cost pressure” scenario is drawn up for the long-term care sector.

3 METHODOLOGY¹

In accordance with the practice of international institutions such as the OECD and the European Commission, we apply a cohort approach and project HCE as a percentage of GDP.²

As a number of different cost drivers (or in some cases the same cost drivers) exercise their influence to a differing extent in different sectors of the healthcare system, the expenditure projections for healthcare expenditure are broken down into the sectors of HeL and LTC from the age of 65. The residual sector is therefore that of long-term care for persons aged under 65. On the basis of this breakdown, the total expenditure of each sector is projected in a first step. In the next step, the proportion of healthcare expenditure financed by both the public sector and MHI are extrapolated along with the expenditure projected for the total healthcare sector.

The figures for healthcare expenditure are taken from the FSO’s “Costs and Services of the Healthcare System” statistics. The most recent data available at the time the projections were drawn up date back to 2013, which is why this year forms the base year for the projections. The graphic illustration of expenditure per capita of population by age is described as the expenditure profile for a given year. For example, in figure 3 the expenditure profile for outpatient treatment in HeL for women is shown for the base year and for the year 2045 under the “Healthy ageing” scenario. In order to project expenditure for the HeL and LTC sectors, the expenditure profiles are further divided up by gender as well as by outpatient and inpatient treatment. Expenditure per capita of population can effectively be viewed as the price of supplying the population with healthcare services at a given level. This expenditure per capita of population can then be broken down into the price of services per patient on the one hand, and the scope of service (e.g. treatments, medications) per capita of population on the other.³ It is therefore assumed that demographic changes affect neither the cost side nor the scope of service per resident side. As a consequence, the cost effect of demographic change expresses

¹ For a detailed description of the projection methodology and the expenditure profiles, see Braendle and Colombier (2017:18-25).

² For a review on projection methodology see Pryzwara (2010).

³ The expenditure per capita by age cohort can be broken down into a price effect and volume effect per patient treated on the one hand, and the probability of falling ill on the other: expenditure per service (“price”) x utilisation per patient x patients per capita of an age cohort, whereby the product of utilisation per patient and patients per capita of an age cohort results in the scope of service per capita of an age cohort.

how a change in the ageing structure of the population and the number of residents in Switzerland changes total demand for healthcare services. For simplicity's sake, expenditure on long-term care for those aged below 65 is extrapolated on the basis of the change in GDP.

FIGURE 3

Expenditure profile for outpatient treatment of women in HeL by age in the base year and in 2045 under the “Healthy ageing” scenario (CHF) – in thousands



The starting point for the projections is the expenditure profiles broken down by age, gender, and outpatient or inpatient services (see figure 3). If the state of health of the population improves over the projection period, the expenditure per capita of an age cohort falls, and the expenditure profile shifts to the right (see figure 3). Here it is assumed that the probability of falling ill or requiring care declines. At the same time, this means that a change in morbidity influences neither the expenditure on a medical or care service, nor the degree of utilisation per patient. As the probability of falling ill or requiring care falls, however, so too does the scope of service per capita for an age cohort. The cost pressure exerted by non-demographic cost drivers such as advances in medical technology expresses itself in rising expenditure per capita of an age cohort. As a similar effect of non-demographic cost drivers is assumed for all age cohorts, the expenditure profile accordingly shifts upwards.⁴ This increase in expenditure is either caused by rising expenditure per service or by an increasing degree of utilisation per patient, or by a combination of the two, and has the effect of increasing the price of providing healthcare services. Changes in quality in the provision of services are not taken

⁴ There are a number of indications to the effect that the expenditure profile steepens with time, and that the age cohorts are therefore affected to different degrees by the cost pressure of non-demographic cost drivers such as advances in medical technology (Gregersen, 2014). This could imply, for example, that research efforts to develop new medications are particularly focused on medications for the older age cohorts, as old people are disproportionately affected by serious illnesses such as cancer and cardiovascular disease.

into account in this approach.⁵ Furthermore, in the sector of HeL, it is assumed that expenditure per capita remains constant for the age cohort “96 and over” due to limited data availability. In light of major differences in life expectancy at different ages, as well as between women and men, morbidity effects are determined not by the change in average life expectancy of the overall population, but by the change in life expectancy based on age and gender.

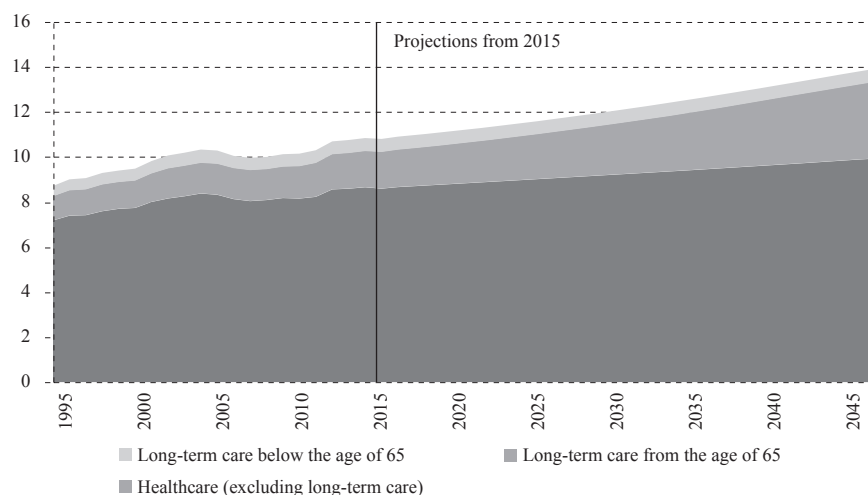
4 RESULTS

4.1 TOTAL HEALTHCARE EXPENDITURE

According to the “Reference scenario”, expenditure will continue to rise from 10.8% of GDP in 2013 to 14.0% of GDP in 2045 (see figure 4). For the years 1995 to 2013, health expenditure rose by around 2 percentage points of GDP (whereby GDP is cyclically adjusted). The average annual growth rate of total HCE amounted to 3.7%. What is striking is that the annual growth rate of expenditure on LTC from the age of 65 outpaced expenditure on HeL by over 1 percentage point, i.e. 4.8% vs. 3.6%.

FIGURE 4

Healthcare expenditure by sector from 1995 to 2013 and in the “Reference scenario” up to 2045 (in % of GDP)



According to the “Reference scenario”, the trend towards significantly higher expenditure growth for long-term care (from 65 years of age) than for healthcare excluding long-term care will continue in the future. Measured as a percentage of GDP, expenditure on long-term care (from the age of 65) more than doubles (rising from 1.6% to 3.4% of GDP), while healthcare expenditure rises from 8.6% to 9.9%. On the one hand, demographic change (ageing, including the associated

⁵ In the case of a price rise as a result of advances in medical technology, the extent to which the level of provision rises as a result of quality improvements is not clear. Potential quality improvements would have to be offset against the price effect in order to capture the effective price rise. This is an extremely challenging task even for past developments in HCE, and goes beyond the methodological approach selected here.

change in the average state of health) feeds through into the long-term care sector to a much greater extent (72% of the rise in expenditure) than it does in the remaining healthcare sector (just under 60% of the rise in expenditure).⁶ On the other hand, expenditure on long-term care rises by 2.2% annually as a result of the Baumol effect, whereas expenditure on healthcare as a result of rising income per capita rises by just under 1.9% annually.

4.2 PUBLIC HEALTHCARE EXPENDITURE

Public expenditure on healthcare comprises all contributions of the federal government, cantons and communes, as well as the social security funds for financing healthcare. For each of the three levels of government, the expenditure figure in question is that contained under the “Health” section of the public finance statistics by the Federal Finance Administration (FFA). Also included are government transfers to private households designed to finance healthcare benefits, such as individual premium reductions and cantonal supplementary benefits for the old-age pensions. Furthermore, HCE of the social insurances for old-age (AHV) and disability (IV) are included. Just like overall expenditure, public healthcare expenditure is broken down into the sectors of healthcare excluding long-term care, and long-term care from the age of 65. Other public sector contributions to healthcare, such as preventive measures and administration, are extrapolated in line with GDP.

The public sector devotes the greatest proportion of its healthcare expenditure to hospitals (40%), followed by individual premium reduction (IPR) (19%), AHV supplementary benefits for care (9%), care homes (7%), and ambulatory care (4%). The remaining contributions come from the social security funds and encompass the AHV allowance for the physically disabled (2%) and IV expenditure on healthcare (9%). A striking point to note according to the “Reference scenario” is that in 2045 the public sector will have to spend a far greater proportion of its budget on long-term care from the age of 65. Instead of the current level of 23%, the share of expenditure accounted for by care is projected to rise to 34% in 2045. Accordingly, the proportion of expenditure accounted for by healthcare excluding long-term care is lower in 2045, having declined from 68% to 61%.

According to the “Reference scenario”, general government expenditure rises over the projection timeframe continuously, namely from 3.5% of GDP to 4.2% of GDP in 2030, and up to 5.0% of GDP by 2045. The lion’s share of general government expenditure here is borne by the cantons, namely 68%. For example, a good two thirds of the increase in public healthcare spending up to 2045, or 1.1% of GDP, is shouldered by the cantons. Table 1 gives an overview of the projected healthcare expenditure growth by source of financing in the “Reference scenario”.

⁶ For a decomposition of the relative importance of HCE determinants in the various scenarios see appendix, figures A1 and A2.

TABLE 1

Expenditure on healthcare by area and source of financing in reference scenario (in GDP %)

Level	2013	2030		2045	
		Ratio	Change 2013-2030	Ratio	Change 2013-2045
Total healthcare	10.8	12.2	+1.4	14.0	+3.2
Healthcare excluding long-term care	8.6	9.3	+0.7	9.9	+1.3
Long-term care (from the age of 65)	1.6	2.3	+0.7	3.4	+1.8
Long-term care (below the age of 65)	0.6	0.6	0.0	0.6	0.0
Source of financing					
Government (incl. soc. sec. funds)	3.5	4.2	+0.7	5.0	+1.5
Confederation	0.4	0.5	+0.1	0.5	+0.1
Cantons	2.4	2.9	+0.5	3.5	+1.1
Communes	0.3	0.4	+0.1	0.5	+0.2
AHV/IV*	0.4	0.3	-0.0	0.4	+0.0
Mandatory health insurance**	3.3	3.7	+0.4	4.1	+0.8
Other expenditure***	4.0	4.3	+0.3	4.8	+0.9
of which: private households****	2.6	2.9	+0.3	3.3	+0.7

* Allowances for the helpless, contributions to medical services and therapeutic equipment.

** Excluding public expenditure on individual premium reductions, which are attributed to the general government sector.

*** Other expenditure contains the expenditure of private households, mandatory accident insurance (SUVA) and military insurance, supplementary insurances, private foundations and supplementary benefits of IV, which are not driven by ageing.

**** Cost contribution of OKP and out-of-pocket payments (OOP).

FIGURE 5

Public healthcare expenditure in various scenarios (in % of GDP)



It can be seen in figure 5 that the rise in public healthcare expenditure works out differently depending on the scenario applied. The span between the most opti-

mistic “Healthy ageing” scenario and the most pessimistic “Pure ageing” scenario amounts to a good 0.7% of GDP in 2045. This is the equivalent of 15% of all expenditure of the public sector in the reference year 2045, or an inflation-adjusted CHF 7.7 billion.

The strongest impact on the development of public healthcare expenditure can be seen with a change in hypotheses concerning: (i) the relationship between the increase in the population’s life expectancy and its state of health, and (ii) the assumption of a Baumol effect in the HeL sector. If it is assumed that while the population may be older in the future, it will be neither healthier nor less in need of care than the present population (“Pure ageing” scenario), expenditure as a percentage of GDP rises by almost a third compared to the “Reference scenario” in 2045 (+0.4% of GDP). By contrast, if the population lives out its additional years of life in good health and does not require care during these years (“Healthy ageing” scenario), the increase in expenditure is around a third lower than in the “Reference scenario” (-0.4% of GDP). Government expenditure rises slightly more than in the “Pure ageing” scenario if a substantial Baumol effect of 60% is assumed for HeL, together with lower productivity advances in the sector of long-term care from the age of 65 (25% of average advance in productivity (“Expanded Baumol” scenario). The rise in expenditure works out almost as strong if a slightly weaker Baumol effect in the HeL sector is assumed, namely 40%, together with a complete Baumol effect in long-term care (“Baumol” scenario). A rise in expenditure compared to the “Reference scenario” is likewise evident (+0.2% of GDP) if stronger cost pressure on the part of non-demographic determinants is assumed (“Cost pressure” scenario), such as advances in medical technology. A higher net immigration rate than in the reference scenario (“Migration” scenario) has a slightly cost-restraining effect.

Overall, demographic change is more significant for public healthcare expenditure than it is for total healthcare expenditure. The reason for this is that the proportion of public expenditure accounted for by long-term care from the age of 65 is 23%, much higher than in the overall healthcare sector (just under 15%). Accordingly, a change in the state of health against a backdrop of increasing life expectancy has significant repercussions for general government expenditure. A change in non-demographic cost drivers (Baumol effect, income effect) has a particularly strong impact on general government expenditure in the hospitals sector. At around 40%, the share of public sector expenditure accounted for by hospitals is currently relatively high when compared to the equivalent percentage of hospital expenditure for healthcare as a whole (just under 28%).

4.3 MANDATORY HEALTHCARE INSURANCE (MHI) EXPENDITURE

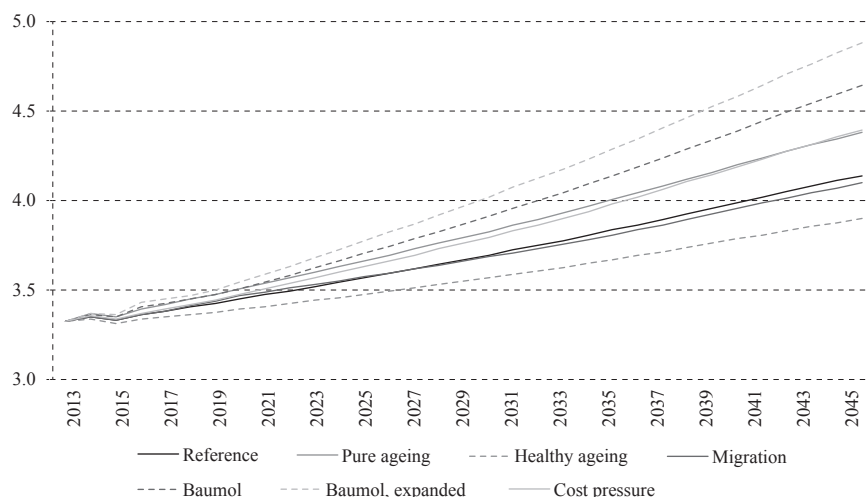
For the purposes of the projections, MHI expenditure in the sectors of healthcare excluding long-term care and long-term care from the age of 65 is broken down into outpatient and inpatient services. For the base year, the breakdown of expenditure has been taken from the statistics of the Federal Statistical Office “Healthcare costs and financing by service and financing regime 2013”. In order to avoid the

problem of duplicating general government expenditure, MHI expenditure is presented after the deduction of individual premium reduction (IPR) expenditure. In addition, the cost contributions of private households (deductible, co-payments) has been deducted.

Although the starting level is at roughly the same level as for public healthcare expenditure (3.3% vs. 3.5% of GDP), MHI expenditure rises only half as much by 2045 (+0.8% vs. +1.5% of GDP). The latter is attributable to the fact that the proportion of dynamically developing long-term care expenditure is much lower for MHI (9%) than it is for the general government (23%) in the reference year 2013. When viewed by sector, the lion's share of the rise in expenditure in MHI by 2045, or +0.5% of GDP, is attributable to the HeL sector. The remaining increase of +0.3% of GDP is accounted for by long-term care from the age of 65.

Due to the high proportion of expenditure on healthcare excluding long-term care, MHI expenditure reacts very sensitively to changes in assumptions regarding the Baumol effect and other non-demographic cost drivers such as advances in medical technology (see figure 6). The stronger the Baumol effect in the HeL sector, the higher the rise in expenditure vis-à-vis the "Reference scenario". Accordingly, the increase in MHI expenditure in the "Expanded Baumol" scenario is 0.7% of GDP higher than in the "Reference scenario", while in the "Baumol" scenario it is 0.5% of GDP higher than in the "Reference scenario".

FIGURE 6
MHI expenditure in various scenarios (in % of GDP)



Higher pressure on costs, as would be the case as a result of advances in medical technology ("Cost pressure" scenario), for example, leads to a rise in expenditure of 0.3% of GDP. Expenditure rises similarly strongly if the assumptions regarding the development of the population's state of health and its need for care ("Pure ageing") are more pessimistic. The assumed morbidity development in the

“Healthy ageing” scenario has an impact on the projections of a similar magnitude as in the “Pure ageing” scenario, but in this case it has a cost-restraining impact.

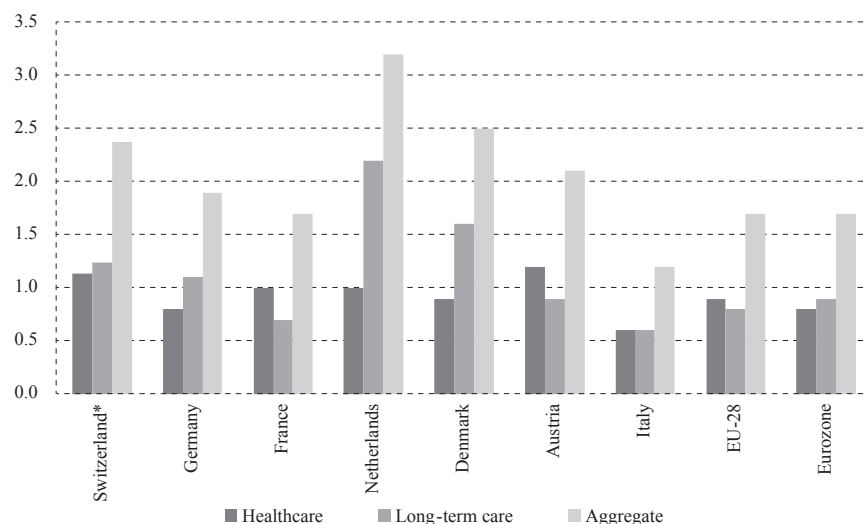
4.4 COMPARISON WITH OTHER STUDIES

The OECD presents projections of public HCE including the social health insurance for the member states of the OECD including Switzerland (de la Maison-neuve and Oliveira Martins, 2013). Whereas the OECD’s projections of public expenditure on LTC from the age of 65 are very similar to the projections of this paper, the OECD projects a stronger rise in expenditure in the HeL sector. The OECD shows a rise in public HCE from 6.9% (average of years 2006-2010) to 9.5% of GDP for the year 2030 in the “Cost pressure” scenario, which assumes “no-policy change” (de la Maisonneuve and Oliveira Martins, 2013). In contrast, we project an increase in public HCE including MHI from 6.8% to 7.9% of GDP for the period from 2013 to 2030 in our “Reference scenario”. A key aspect for the upward deviation is the modelling of medical advances. While medical advances are tied to the economic development through income elasticity in our projections, the OECD uses a residual approach and assumes that the unexplained part of the regression with public HCE as dependent variable is caused by the costs for medical advances. Moreover, the OECD uses an older more pessimistic population scenario and the base years differ.

With respect to the methodology and the selected scenarios, our projections are even closer to the work of the EU AWG (2015). For example, in the “AWG reference scenario” the assumptions concerning the morbidity of the population are the same as in our “Reference scenario” (see AWG, 2015:124-25).

FIGURE 7

Increase in public expenditure on healthcare and long-term care in an international comparison, 2013-2045 (in GDP %)



Note: * including mandatory healthcare insurance expenditure.

Source: AWG (2015).

The increase in public HCE including MHI by 2.4% of GDP works out higher in Switzerland than the average increase of the EU-28 and the Eurozone with 1.7% of GDP respectively (see figure 7). In both sectors, HeL and LTC from the age of 65 the expenditure increase in Switzerland outlast the one in the Eurozone by 0.3% of GDP. The growth of public HCE including MHI is higher than in Germany, and puts Switzerland between Austria and Denmark. The comparatively lower increase of public HCE in EU countries may be explained by the fact that EU AWG assumes that the income elasticity in HeL initially starts at 1.1 but converges to 1.0 and that only a proportion of LTC services is affected by Baumol's cost disease. In contrast, we assume a constant income elasticity of 1.1 and a full Baumol effect. Additionally, one should bear in mind that country-specific demographic scenarios, the expenditure profiles in the base year and the national health-care systems differ.

5 DISCUSSION: MEASURES FOR COST CONTAINMENT

Our projections show that population ageing adds to the unrelenting pressure on public budgets and MHI. However, in particular, in the sector of HeL, non-demographic determinants such as medical advances and national income growth contribute substantially to the dynamics of HCE. Demographic change affects the sector of LTC to a much greater degree than it does HeL. Since the LTC expenditure share of the public sector substantially outweighs the share of MHI (23% vs. 9%) population ageing affects the public sector stronger than MHI. As a result, a change in morbidity caused by an increasing life expectancy has a stronger impact on public finances. Therefore, the healthy ageing of the population is a crucial factor in alleviation of the cost burden on, particularly, public budgets. Accordingly, preventive measures such as improving nutrition and mobility habits and the strengthening of the population health's competencies that contribute to reducing chronic conditions are particularly important measures for cost containment. In addition, the different scenarios suggest that the pressure deriving from Baumol's cost disease is high. In such cases, efficiency-enhancing tools can prove particularly effective in reducing the pressure on MHI and public budgets.

Measures that help to avoid medically unnecessary treatments, improve the allocation of resources between outpatient and inpatient care and foster ambulatory and informal care to reduce the overcrowding of nursing homes can be effective. Given the coming demand for healthcare professionals, forward-looking personnel planning and the corresponding training of a sufficient number of healthcare professionals will be needed if costs are to be contained and the level of supply maintained (Merçay, Burla and Widmer, 2016).

Recent studies on cost-containment policies by Moreno-Serra (2014) and Schwiertz (2016) suggest that supply side reforms such as more reliance on capitation-based fees, introducing budget caps and pharmaceutical policies can contribute to the mitigation of HCE growth. Budget caps can be introduced sector-wise or global-wise. In the first case the providers have more opportunities for cost-shift-

ing. The main advantage of budget caps is that providers assume a budget responsibility that currently does virtually not apply to Swiss healthcare providers. However, budget caps may increase the risk of rationing and increased waiting times or increased referrals for secondary level healthcare institutions instead of treatment (e.g. Mihaljek, 2006; 2008 for specific country experiences). While in 2012 the per-diem rates in hospitals were replaced by diagnosis-related groups (Swiss DRG), practicing physicians are still remunerated by fee-for-services. This creates incentives for an over-supply of medically unnecessary treatments and reinforces the problem of supplier-induced demand due to asymmetric information between providers and patients. The introduction of capitation-based fees can reduce these incentives. On the demand side, a stronger role of the general practitioner as gatekeeper and the introduction of preferred drug lists have some success with respect to cost savings (Moreno-Serra, 2014). Ultimately, health technology assessment (HTA) that reviews treatments and drugs systematically may help to enhance the efficiency of healthcare and, as a result, curb costs.

Disclosure statement

No potential conflict of interest was reported by the authors.

FIGURE A1

Contributions to inflation-adjusted rise in healthcare expenditure 2013-2045 (in %)

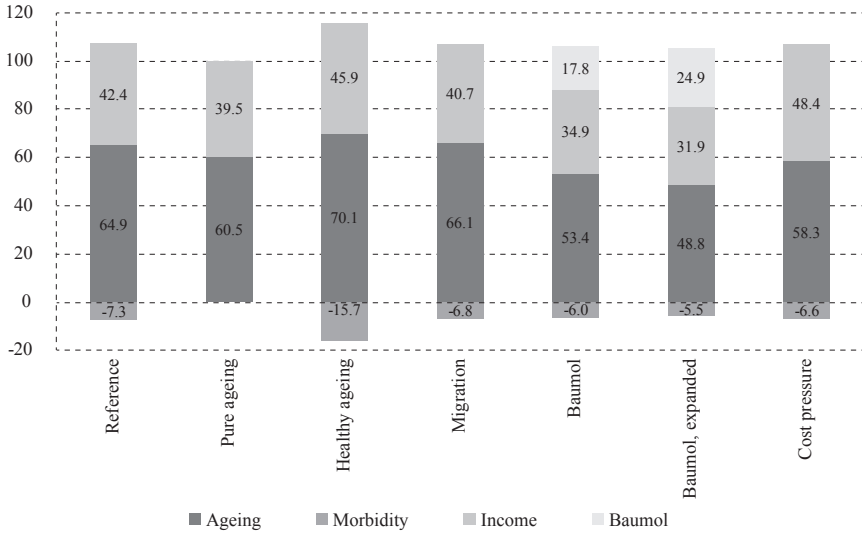
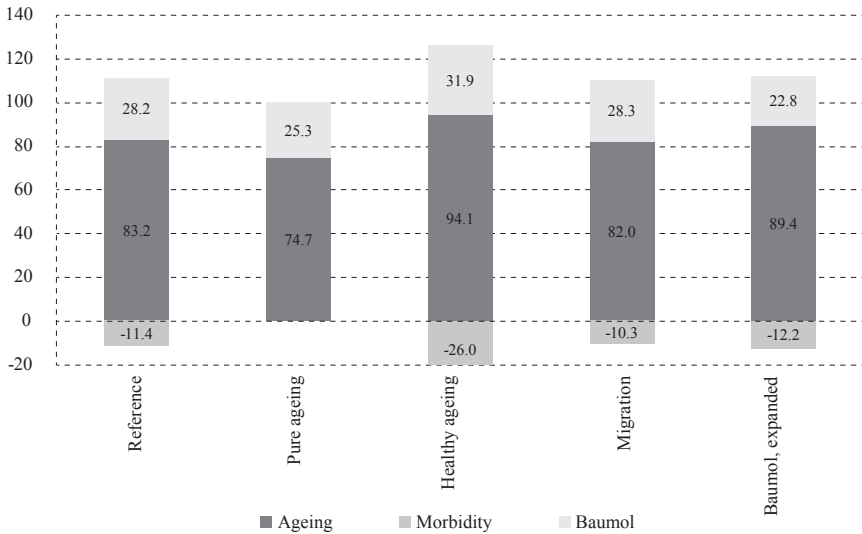


FIGURE A2

Contributions to the inflation-adjusted rise in expenditure on long-term care (from the age of 65) 2013-2045 (in %)



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Why are older informal carers in better health? Solving a causality problem

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Abstract

Informal care is a widespread and important segment of long-term care, which is carried out independently of or in parallel with formal care, i.e. as a complement or replacement. Informal caregivers represent the backbone of long-term care, as has been witnessed by numerous international studies. In our article we focus on the relationship between the health status of the respondent and the decision to provide informal help to others as well as the intensity of the care. We show that this relationship is endogenous (reverse causality), using different measures of health and instrumental variables from Wave 5 and Wave 3 of SHARE Survey, and determine the causal effects of health on informal care, provided within and/or outside household. We also model the effect of various different covariates on informal caregiving. In conclusion we provide reflections on the research and discuss the policy relevance of the study.

Keywords: informal care, caregivers, health, reverse causality, instrumental variables, SHARE

1 INTRODUCTION AND LITERATURE REVIEW

The causal relationship between informal caregiving and (poor) health has been established in several studies (e.g. Schulz and Sherwood, 2008; Schulz and Beach, 1999; Pinquart and Sörensen, 2003; Roth et al., 2009; Vitaliano, Zhang and Scanlon, 2003). Yet, what still remained under-researched is the effect of health on informal caregiving. As we show in the article, the results of basic correlations using common datasets on ageing in Europe (like SHARE) often confirm the negative sign of the relationship: particularly for caregivers within a household, those with worse health tend to give help more often. The question that motivating this article therefore, is: *what is driving this relationship*.

As stated in Hlebec, Srakar and Majcen (2017), long term care is considered an emerging key issue in discussing the social inclusion or exclusion of the older population in modern European society (e.g. Theobald, 2005; Motel-Klingebiel, Tesch-Roemer and von Kondratowitz, 2005). Cross-national econometric studies of the relationship between formal and informal care for older adults in western European countries have become a booming field (Suanet, van Groenou and van Tilburg, 2012).

Organizing care for older people is one of the most important issues in European countries which are characterized by a rise in the share of the elderly, which is caused by longer life expectancy and declining fertility rates. The share of the population aged 80 years and over, which is the most likely to need care, grew from 1.5% in 1960 to nearly 5% in 2010 in Europe as a whole, and is expected to rise to 11% by 2050 and 12% by 2060 (OECD, 2013; The Ageing Report, 2015). The share of people aged 20-64 will decline substantially from 61% in 2013 to 51% by 2060 (ibid.). Thus, we can expect a big increase in the need for care on one hand, and a smaller number of potential informal carers on the other.

Both trends are likely to place greater demands on formal care systems across Europe.

The majority of older people wish to age and receive care in their own homes (Cantor, 1979; Iecovich, 2014). In 2011, in OECD countries 8.7% of people aged 65+ received care in their own homes as against 4.1% in institutions (OECD, 2013). For people living at home, care can be provided by different parts of informal social networks like family members, friends or neighbours (Cantor, 1979; Wenger, 1994; Allen, Goldscheider and Ciambone, 1999; Blomgren et al., 2008). Care can also be provided by formal care workers such as providers of health and social care or migrant care workers (Iecovich, 2010; Walsh and O'Shea, 2010; Shutes and Chiatti, 2012; Stevens, Hussein and Manthorpe, 2012; Williams, 2012). Very often, older people combine care from different sources: private and public care, formal and informal care, informal care by spouses, children and other informal sources (Litwin and Attias-Donfut, 2009; Gannon and Davin, 2010).

The type of care older people use depends on their preferences and their individual and social contexts (Andersen and Newman, 2005). Some people prefer only informal care (Cantor, 1979; 1991) and seek care first from their partners and children, then other family members, friends and neighbours. Only in cases where no informal caregivers are available will they accept formal care, provided they can afford it financially and depending on the range of services provided by the community. Formal care, therefore, may compensate for a lack of informal care and complement informal care when needs grow (Chappell and Blandford, 1991; Denton, 1997).

Informal carers provide a vast amount of care to older people in Europe as shown by data from the European Quality of Life Survey. About 6.4% (Denmark) to 20.1% (Lithuania) of the adult population in Europe provides care to their elderly or disabled relatives at least once or twice a week. On average, these family members deliver 12.5 hours of care to dependent family members. Care is frequently provided by spouses or children, sometimes also by friends and neighbours (Cantor, 1979; Stoller and Pugliesi, 1988; Allen, Goldscheider and Ciambone, 1999; Barrett and Lynch, 1999). Most European countries support informal carers with specific policy measures (Mestheneos and Triantafillou, 2005; Saraceno and Keck, 2010; Colombo et al., 2011). Support for informal carers encompasses a variety of services in cash and in kind, services specified for working carers and others (e.g. a carer's allowance, an allowance for the person being cared for, tax credits, additional benefits, paid leave, unpaid leave, flexible work arrangements, training/education, respite care, counselling).

There is a lot of literature (primary and meta-analysis) on the impacts of informal caregiving on caregivers' health (e.g. Roth et al., 2013; Hiel et al., 2015; Vlachantoni, 2013; Schulz and Sherwood, 2008; Pinquart and Sorensen, 2003; 2006; 2007). Interdisciplinary research has provided different research designs, sam-

pling procedures, statistical methods of a heterogeneous nature. Health has been studied as psychological health and physical health (separately or simultaneously). Meta-analyses and other systematic reviews typically conclude that caregivers are more likely to experience depressive symptoms and have poorer physical health outcomes when compared with various samples of non-caregivers (Pinquart and Sörensen, 2003; Schulz and Sherwood, 2008; Vitaliano, Zhang and Scanlon, 2003). Recent review (Bauer and Sousa-Poza, 2015) pointed out that caregiving tends to lower the quality of the caregiver's psychological health, which also has a negative impact on physical health outcomes. Some studies (Schoenmakers, van Tilburg and Fokkema, 2015; Bauer and Sousa-Poza, 2015) noted that: (a) literature reviewed is very heterogeneous – minimally comparable; (b) most studies are cross-sectional and thus do not/cannot account for endogeneity; (c) research often omits important controls (e.g. pre-existing illness).

However, insufficient attention has been paid to estimating and explaining the (reverse) causal relationship between health and caregiving, i.e. the effects of health *on the* provision of caregiving. The aim of the article is to explain this relationship in detail, including the heterogeneous behaviour across different types of care provision (within or outside a household).

In a recent article, Kaschowitz and Brandt (2017) provided a longitudinal analysis of the health effects of informal caregiving across Europe. Using data from the Survey of Health, Ageing and Retirement (SHARE, waves 1, 2, 3 and 5) and from the English Longitudinal Study of Ageing (ELSA, waves 2-5) they examined the connection between informal caregiving and self-perceived as well as mental health in a country-comparative perspective. They were able to show distinct differences in the relationship between reported health and the provision of informal care depending on whether individuals give care to someone inside or outside the household. Caregivers inside the household reported worse, while caregivers from outside the household reported better, health than non-caregivers. Their explanation is largely related to selection into caregiving: according to their findings, people in worse health take up care inside while people in better health take up care outside the household. Their results also show that the health consequences of caregiving vary not only between different welfare regimes but also among countries of similar welfare state types.

Based on the above, in our article we test three main hypotheses:

- H1: Older people in better health tend to provide more help to others¹.
- H2: The relationship between informal caregiving and health is of an endogenous, reverse causal nature.

¹ All of those hypotheses relate to decision of providing care and not to quality or type of care.

H3: There are significant differences in the relationship of health and informal caregiving or help-giving² within and outside a household³.

The main method we use to verify the above hypotheses is regression analysis, using instrumental variables models to appropriately model the assumed reverse causality in the relationships studied.

The article is structured in the following way. In the next section, we will present basic considerations about the data and method used. In the third section, we will present the main results and robustness tests. In the final section, we will conclude with reflections on the research findings and policy implications.

2 DATA AND METHOD

We use dataset derived from Wave 5 of the SHARE survey⁴. The Survey of Health, Ageing and Retirement in Europe (SHARE) is a multidisciplinary and cross-national panel database of micro data on health, socio-economic status and social and family networks of approximately 123,000 individuals (more than 293,000 interviews) from 20 European countries (+Israel) aged 50 or older⁵. SHARE is centrally coordinated by the Munich Centre for the Economics of Aging (MEA), the Max Planck Institute for Social Law and Social Policy. It is harmonized with the U.S. Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA) and has become a model for several ageing surveys worldwide. In the analysis, we also use data from Wave 3, SHARELIFE, which provides data on life-histories of the respondents.

SHARE data collection is based on computer-assisted personal interviewing (CAPI). Exceptions are the drop off and vignette questionnaires, which are conducted via paper & pencil as well as the end-of-life interviews that can be conducted via CATI (computer-assisted telephone interview), too. The SHARE study is subject to continuous ethics review. During Waves 1 to 4, SHARE was reviewed and approved by the Ethics Committee of the University of Mannheim. Wave 4 and the continuation of the project were reviewed and approved by the Ethics Council of the Max Planck Society. In addition, the country implementations of SHARE were reviewed and approved by the respective ethics committees or institutional review boards whenever this was required (Börsch-Supan and Jürges, 2005).

² In the article, we use the terms caregiving and help-giving as synonymous.

³ The studies also report a noticeable difference in respondents' answers about the type of help received from other people (e.g. personal care vs. practical household help, see Hoefman, Meulenkamp and de Jong, 2017). In providing care within the household, assistance is related to personal care. Help-giving outside a household refers to personal care and practical care.

⁴ This paper uses data from SHARE Wave 5 (<http://doi.org/10.6103/SHARE.w5.100>), see Börsch-Supan et al. (2013) for methodological details. The SHARE data collection has been primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: N°227822, SHARE M4: N°261982). Additional funding from the German Ministry of Education and Research, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

⁵ For more details, see Börsch-Supan et al., 2013; 2015; Malter and Börsch-Supan, 2015; Börsch-Supan, 2016.

After including instruments from SHARE Wave 3, our final sample consists of 14,564 respondents from 11 European countries (Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, Czech Republic).

We include three main help-giving variables:

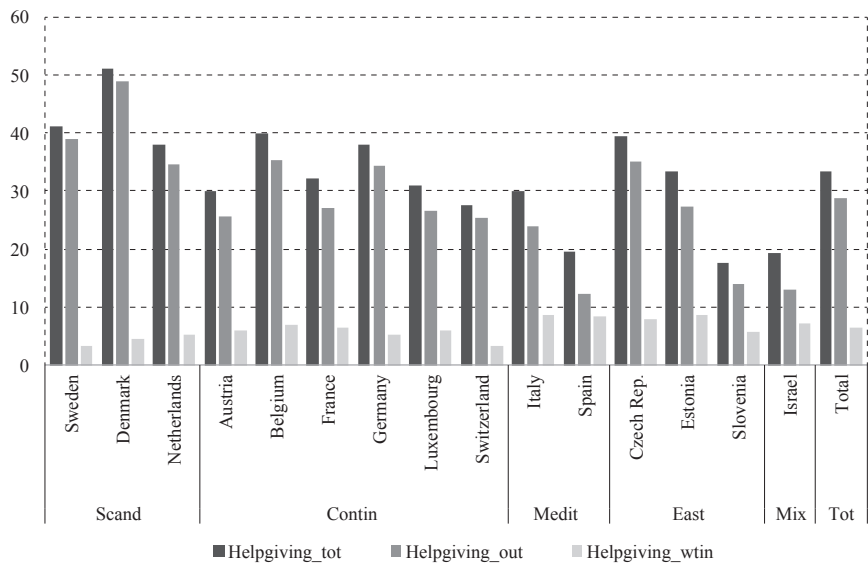
Help-giving_out: binary variable for providing help outside a household.

Help-giving_wtin: binary variable for providing help within a household.

Helpgiving_tot: joined variable of Help-giving_out and Help-giving_wtin⁶.

Graph 1 presents the distribution of the three variables over the countries and welfare regimes. We can see that the countries with the highest percentage of total help-giving and help-giving outside household are the Social Democratic/Scandinavian countries. They are followed by continental countries and some Eastern European ones, while, in particular, Mediterranean countries and Israel fall quite behind. Interestingly, those are the countries that, on the other hand, have the largest percentages of help-giving within a household.

GRAPH 1
Distribution of the help-giving variables (%)



Source: Own calculations.

Table 1 provides the actual quantities of people in the population providing help. Most of the relationships observed in graph 1 can be seen here as well, in particular the large number of people providing help within the household in Mediterranean countries.

⁶ For the explanation of the two variables, see descriptions above

TABLE 1

Estimation of total help-givers, Deville-Särndal's procedure

	Country	Helpgiving_tot	Helpgiving_out	Helpgiving_wtin
Scand	Sweden	1,527,567	1,460,927	113,159
	Denmark	1,048,569	1,005,553	92,927
	Netherlands	2,376,857	2,163,370	315,709
Contin	Austria	953,164	833,773	177,566
	Belgium	1,637,570	1,426,540	331,931
	France	8,371,773	7,252,966	1,507,020
	Germany	12,648,003	11,455,470	1,745,328
	Luxembourg	52,710	45,376	10,395
	Switzerland	839,445	790,900	90,097
	Medit	Italy	7,153,458	6,053,197
	Spain	3,572,164	2,512,323	1,268,977
	Czech Rep.	1,483,696	1,341,115	298,467
East	Estonia	172,302	150,356	36,329
	Slovenia	131,627	106,774	39,095
Mix	Israel	306,143	198,250	119,050
Tot	Total	42,275,048	36,796,889	7,837,273

Source: Own calculations.

The main health variables we use in the analysis are:

- Physical health: number of chronic diseases (dummy: 1 if a respondent has two or more chronic diseases; and 0 otherwise).
- Mental health: depression (dummy: 1 if a respondent has a score of 4 or more on the Euro-D Depression scale; and 0 otherwise).
- Subjective assessment of health: self-rated health status (dummy: 1 if less than very good; and 0 otherwise).

As control variables we use:

- Gender: gender of the respondent, 0 for male, 1 for female.
- Age: age of the respondent in years.
- Education: education of the respondent in years of his/her schooling period.
- Income: nominal household income (variable *thinc2* from the generated SHARE variables), winsorised to prevent the impact of outliers and transformed into tertiles (by country).
- Employment status: categorical variables, describing whether the respondent is employed, retired or in any other status (e.g. unemployed).
- Household size: size of the household of the respondent.
- Physical inactivity: binary variable, defined as never or almost never engaging in either moderate or vigorous physical activity.
- Memory: number of words, recalled after reading a list of ten words⁷.

⁷ In SHARE, there is also the variable of delayed recall of words which is not used here – but robustness checks have been done using this variable as a control as well with no significant changes in the results.

- Welfare regimes: classification of the country of the respondent, based on Esping-Andersen (1990), into four types: 1 – continental (Austria, Germany, Netherlands, France, Switzerland, Belgium, Luxembourg); 2 – social democratic (Sweden, Denmark); 3 – Mediterranean (Spain, Italy); 4 – Eastern European (Czech Republic, Slovenia, Estonia).

We also use the following auxiliary variable:

- Receiving help: 1 if the respondent is receiving informal care within the household and 0 otherwise.

As instruments we use the following variables, all from Wave 3 of SHARE – SHARELIFE:

- As instrument for the number of chronic diseases: sl_hs006: “childhood health: in hospital for 1 month+”.
- As instrument for mental health (depression): sl_hs009d3: “childhood illness 2: emotional, nervous, or psychiatric problem”.
- As instrument for self-rated health: sl_hs003_: childhood health status.

All instruments satisfy the two instrumental variable restrictions (see e.g. Wooldridge, 2010), the second and the third are also very strong.

Instrumental variable (IV) estimation faces three perils of its own (Murray, 2006):

- IV estimation is inconsistent if the instruments are correlated with the disturbance term. This is the problem of “bad” or “invalid” instruments.
- IV estimation suffers persistent biases and size-of-test biases in even very large samples if the instruments used are only weakly correlated with explanatory variables responsible for bias in an OLS estimation. This is the problem of “weak” instruments.
- Interpreting the economic meaning of IV estimates can become problematic if the slope coefficients in one’s model are heterogeneous across observations. This is the problem of “ugly” instruments.

In our case, we face the problem of “ugly” instruments (this was confirmed by initial modellings not presented here) and to derive the proper results we have to model help-giving within and outside a household separately to model the heterogeneity in the model appropriately.

The main formal model we use is instrumental variables probit which fits models with dichotomous dependent variables and endogenous regressors. Formally, the model can be stated as:

$$y^*_{1i} = y_{2i}\beta + x_{1i}\gamma + u_i \quad (1)$$

$$y_{2i} = x_{1i}\Pi_1 + x_{2i}\Pi_2 + v_i \quad (2)$$

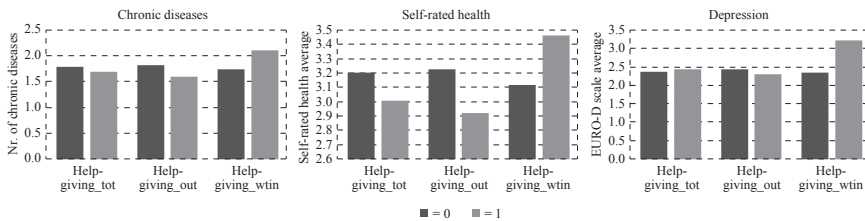
We do not observe y_{1i}^* , instead, we observe

$$y_{1i} = \begin{cases} 0 & y_{1i}^* < 0 \\ 1 & y_{1i}^* \geq 0 \end{cases} \quad (3)$$

Graph 2 provides the basic picture we want to explore. It provides the distribution of health variables for those that provide help in total, outside and within a household. We can clearly see that for all three health variables, the providers of help in total and outside a household face lower problems with health, while those within a household face even higher health problems. This is a puzzle we will solve and provide an explanation for in our analysis.

GRAPH 2

Distribution of the main three health variables (left: number of chronic diseases; middle: self-rated health; right: EURO-Depression scale), based on help-giving within and outside the household and total help-giving



Source: Own calculations.

3 RESULTS AND ROBUSTNESS CHECKS

Table 2 shows the results when using the “ordinary” econometric models with no endogeneity provided for (all models all of probit variety). Interestingly and surprisingly, it is apparent that the more health problems there are (i.e. the more chronic diseases, worse self-rated health and more depression symptoms) the greater the provision of help to others.

What is driving these results? This is of course the main research question of the article, elaborated in the introductory section. An apparent possibility is consideration of the reverse causality in the model. The supposed and basic causality structure imposes health as influencing informal caregiving. Yet, as we noted at the start when reviewing the evidence from the literature, informal caregiving can have (adverse) effects on health indicators as well.

To properly provide for this observation, we include instrumental variables for each of the three health variables. We instrument for number of chronic diseases by childhood health (whether the respondent was in a hospital for 1 month or more during his/her childhood); for mental health by having an emotional, nervous, or psychiatric problem in childhood; and for self-rated health by childhood health status.

TABLE 2

Results of the models with no endogeneity provided for

Probit: Help_									
<i>outside</i>	Coeff.	z	P>z	Coeff.	z	P>z	Coeff.	z	P>z
Gender	0.0095	0.84		0.0104	0.91		-0.0016	-0.14	
Age	-0.0239	-28.51	***	-0.0234	-28.12	***	-0.0233	-27.80	***
Edu_Years	0.0190	13.59	***	0.0190	13.61	***	0.0191	13.63	***
Income_Middle	0.0371	2.67	***	0.0373	2.69	***	0.0392	2.81	***
Income_Upper	0.1028	7.19	***	0.1026	7.16	***	0.1077	7.48	***
Retired vs. Employed	0.0789	4.76	***	0.0818	4.94	***	0.0789	4.75	***
Other vs. Employed	-0.0225	-1.20		-0.0162	-0.87		-0.0260	-1.38	
Hh_Size	-0.0514	-8.12	***	-0.0513	-8.11	***	-0.0510	-8.02	***
Physical_Inactivity	-0.3691	-16.73	***	-0.3638	-16.52	***	-0.3883	-17.27	***
Memory	0.0377	13.23	***	0.0369	12.91	***	0.0384	13.33	***
Continental	0.1064	7.68	***	0.1045	7.51	***	0.1037	7.43	***
Socialdemocratic	0.4534	25.15	***	0.4553	24.65	***	0.4624	25.46	***
Mediterranean	-0.1866	-9.79	***	-0.1893	-9.93	***	-0.1897	-9.90	***
Chronic diseases	0.0404	3.50	***						
Self-rated health				0.0077	0.60				
Depression							0.1052	7.93	***
Constant	0.5855	8.89	***	0.5676	8.53	***	0.5541	8.35	***
Observations	62257			62330			61547		
LR Chi2	5073.81	***		5032.93	***		5001.36	***	
Pseudo R2	0.0673			0.0667			0.0670		
Log Likelihood	-35168.70			-35221.55			-34847.12		

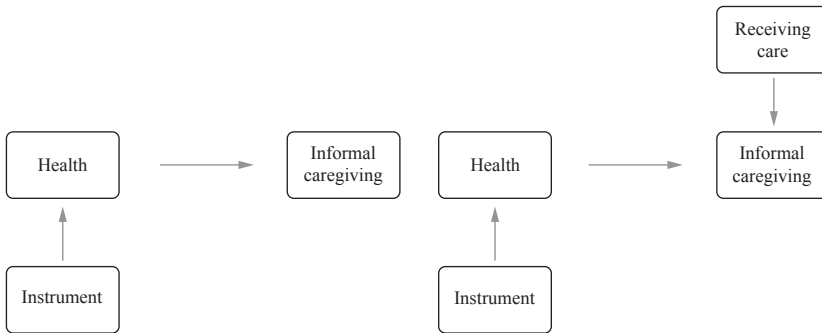
Source: Own calculations.

Furthermore, as is shown on the right side of graph 3, we also need an additional intervention in the case of caregiving within a household. We need to include an additional, auxiliary variable for “receiving care” within a household, as we assume that care within a household is mutual (see e.g. Kaschowitz and Brandt, 2017) and, therefore, it is likely that the health conditions of the members of the same household are connected with each other. The final causality structure is shown in graph 3 – at the left is the causal structure for help-giving in total and outside a household, where only reverse causality is present, while on the right is the causal structure for help-giving within a household, where beside reverse causality an auxiliary variable of receiving care within a household also needs to be included to provide consistent results.

As it turns out, all the models work very well when taking into account endogeneity and causal problems. Firstly, in table 3, we provide results for total help-giving where it is apparent that with the inclusion of the instrument (the endogeneity tests confirm the presence of reverse causality in all cases) all coefficients on health variables, which are of our main interest, are now of the expected, negative sign and significant.

GRAPH 3

Modelling of reverse causality in the model



Source: Own elaboration.

TABLE 3

Results of models, endogeneity controlled for, total help-giving

<i>Help_total</i>	Coeff.	z	P>z	Coeff.	z	P>z	Coeff.	z	P>z
Gender	0.0246	2.72	***	0.0183	2.11	**	0.0282	2.82	***
Age	-0.0071	-10.03	***	-0.0078	-12.34	***	-0.0079	-12.62	***
Edu_Years	0.0030	2.86	***	0.0028	2.64	***	0.0032	3.07	***
Income_Middle	0.0133	1.33		0.0108	1.09		0.0132	1.33	
Income_Upper	0.0161	1.45		0.0124	1.10		0.0174	1.57	
Retired vs. Employed	0.0258	1.69	*	0.0159	1.16		0.0068	0.52	
Other vs. Employed	0.0112	0.60		-0.0013	-0.08		-0.0088	-0.56	
Hh_Size	0.0026	0.48		0.0022	0.40		0.0021	0.37	
Physical_ Inactivity	-0.0391	-2.30	**	-0.0504	-3.29	***	-0.0439	-2.62	***
Memory	0.0061	2.69	***	0.0060	2.60	***	0.0065	2.86	***
Continental	-0.0140	-0.77		-0.0042	-0.25		0.0037	0.22	
Socialdemocratic	0.0652	3.42	***	0.0512	2.40	**	0.0784	4.36	***
Mediterranean	-0.0669	-3.41	***	-0.0553	-3.00	***	-0.0471	-2.53	**
Chronic diseases	-0.1309	-2.49	**						
Self-rated health				-0.0936	-2.46	**			
Depression							-0.0739	-1.97	**
Constant	0.7908	14.58	***	0.8617	14.07	***	0.7942	14.63	***
Observations	13232			13179			13149		
Wald Chi2	650.65	***		660.09	***		654.60	***	
Log Likelihood	-17116.06			-15074.79			-14999.20		
Test of endogeneity	7.04	***		4.87	**		8.52	***	

Source: Own calculations.

Also in table 4, we show the results for help-giving outside a household. Here, the significance of the relationship becomes even stronger, confirming the problem of the ugly instrument we have been discussing previously. All the other considerations (signs and significance of the coefficients on main and control variables) from table 3 are almost the same.

TABLE 4

Results of models, endogeneity controlled for, help-giving outside a household

<i>Help_outside</i>	Coeff.	z	P>z	Coeff.	z	P>z	Coeff.	z	P>z
Gender	0.0136	1.57		0.0055	0.66		0.0235	2.5	**
Age	-0.0083	-12.56	***	-0.0093	-15.51	***	-0.0095	-15.75	***
Edu_Years	0.0039	3.92	***	0.0038	3.81	***	0.0041	4.14	***
Income_Middle	0.0096	1.00		0.0070	0.74		0.0077	0.8	
Income_Upper	0.0163	1.53		0.0144	1.35		0.0165	1.55	
Retired vs. Employed	0.0333	2.34	**	0.0156	1.21		0.0086	0.68	
Other vs. Employed	0.0131	0.76		-0.0092	-0.59		-0.0103	-0.68	
Hh_Size	-0.0275	-5.19	***	-0.0277	-5.23	***	-0.0288	-5.39	***
Physical_Inactivity	-0.0488	-3.07	***	-0.0690	-4.78	***	-0.0465	-2.94	***
Memory	0.0086	3.97	***	0.0092	4.28	***	0.0082	3.77	***
Continental	-0.0139	-0.81		0.0033	0.21		0.0131	0.83	
Socialdemocratic	0.0780	4.31	***	0.0727	3.74	***	0.0965	5.6	***
Mediterranean	-0.0799	-4.30	***	-0.0624	-3.56	***	-0.0491	-2.75	***
Chronic diseases	-0.1749	-3.92	***						
Self-rated health				-0.0839	-2.74	**			
Depression							-0.1404	-4.24	***
Constant	0.9109	17.49	***	0.9716	17.21	***	0.9227	17.71	***
Observations	13236			13183			13153		
Wald Chi2	1036.86	***		1062.89	***		1053.86	***	
Log Likelihood	-16505.67			-14463.15			-14398.63		
Test of endogeneity	14.92	***		5.08	**		18.90	***	

Source: Own calculations.

Finally, table 5 presents the results for the modelling of help-giving within a household. Here, one does not observe the expected relationships even after the endogeneity is provided for by the instrumental variable correction. On the other hand, the final intervention, inclusion of the auxiliary variable of receiving care within household finally solves the issue and provides the (negative) sign and significance of all of the coefficients (except for depression, where the coefficient is not statistically significant) which is in accordance with the expectations and our hypotheses.

TABLE 5

Results of models, endogeneity controlled for, help-giving within household

<i>Help_within</i>	Coeff.	z	P>z	Coeff.	z	P>z	Coeff.	z	P>z
Gender	0.0297	2.63	***	0.0136	1.34		0.0281	2.76	***
Age	0.0018	2.36	**	0.0013	1.86	*	0.0019	2.91	***
Edu_Years	-0.0010	-0.74		-0.0014	-1.12		-0.0004	-0.33	
Income_Middle	0.0042	0.34		-0.0083	-0.73		0.0002	0.02	
Income_Upper	-0.0237	-1.65	*	-0.0407	-3.15	***	-0.0131	-1.09	
Retired vs. Employed	0.0682	3.56	***	0.0382	2.23	**	-0.0008	-0.05	
Other vs. Employed	0.0833	3.96	***	0.0509	2.70	***	0.0030	0.18	
Hh_Size	0.0182	3.01	***	0.0188	3.25	***	0.0273	4.19	***
Physical_ Inactivity	0.0518	3.32	***	0.0389	2.77	***	0.0086	0.62	
Memory	-0.0055	-1.97	**	-0.0055	-2.21	**	-0.0011	-0.46	
Receiving_help	0.1061	7.36	***	0.0819	5.88	***	0.0902	5.87	***
Continental	-0.1043	-5.39	***	-0.0729	-4.20	***	-0.0532	-3.32	***
Socialdemocratic	-0.1090	-4.92	***	-0.1615	-8.06	***	-0.0792	-4.32	***
Mediterranean	-0.0548	-2.54	**	-0.0404	-2.09	**	-0.0260	-1.41	
Chronic diseases	-0.4332	-34.91	***						
Self-rated health				-0.4326	-36.13	***			
Depression							0.0119	0.36	
Constant	0.2021	3.08	***	0.3982	6.60	***	-0.0962	-1.68	*
Observations	4656			4634			4615		
Wald Chi2	1318.33	***		1397.63	***		136.85	***	
Log Likelihood	-3592.05			-2002.05			-3583.52		
Test of endogeneity	299.29	***		525.46	***		0.38		

Source: Own calculations.

In table 6, we provide results of several robustness checks to verify our main findings. Firstly, we exclude the additional health variables (physical inactivity, memory) which influence the provision of help-giving but could be related also to our three main health variables. The results do not change in any manner – indeed, the coefficient becomes of even stronger significance.

Secondly, we restrict the age of the respondents to 65+⁸. Once again, there are no changes, furthermore, now even the coefficient on depression for the help-giving within a household becomes significant and of the expected sign.

Finally, we include an additional instrument (presence of formal care) to control for possible reverse causality between providing and receiving help within household. Again, no significant changes can be observed in the main relationship under study.

⁸ An additional check for the group of 80+ has been done with no changes in results.

TABLE 6

Results of robustness tests, top: exclusion of additional health variables due to additional endogeneity problems; middle: restricting the age of the respondents: 65+, bottom: including an additional instrument to control for reverse causality between providing and receiving help within a household

	Help_total		Help_outside		Help_within	
Chronic diseases	-0.1545	***	-0.1837	***	-0.5459	***
Self-rated health	-0.1095	***	-0.1108	***	-0.5537	***
Depression	-0.0939	**	-0.1559	***	0.0130	

	Help_total		Help_outside		Help_within	
Chronic diseases	-0.1493	***	-0.1924	***	-0.6022	***
Self-rated health	-0.1264	***	-0.0915	**	-0.5451	***
Depression	-0.0806	*	-0.1685	***	-0.0687	*

	Help_total		Help_outside		Help_within	
Chronic diseases	-0.0904	*	-0.0910	*	-0.1170	*
Self-rated health	-0.0243		-0.0352	*	-0.3504	**
Depression	-0.0569	*	-0.0857	*	0.0025	

Source: Own calculations.

4 CONCLUSION

In conclusion, let's firstly summarize the findings by the set of initial three hypotheses and present the main results of the paper. The latter are summarized in table 7.

TABLE 7

Summarized main results of the paper by type of help-giving

	Effects of health variables	Effects of confounders	Reverse causality issues
Help-giving Total	All coefficients on health variables, which are of our main interest, are of the expected, negative sign and significant; but only after controlling for reverse causality	Significant and of expected sign: gender, age, education, physical inactivity, memory, welfare regimes	Only with the inclusion of the instruments for each health variable, are the results as expected
Help-giving Outside	All coefficients on health variables, which are of our main interest, are of the expected, negative sign and significant; but only after controlling for reverse causality	Significant and of expected sign: age, education, household size, physical inactivity, memory, welfare regimes	Only with the inclusion of the instruments for each health variable, are the results as expected

	Effects of health variables	Effects of confounders	Reverse causality issues
Help-giving Within	All coefficients on health variables, which are of our main interest, are of the expected, negative sign and significant; but only after controlling for reverse causality and including an auxiliary variable	Significant and of expected sign: gender, age, income, employment status, household size, physical inactivity, memory, welfare regimes	One does not observe the expected relationships even after endogeneity is provided for by the instrumental variable correction. Only with the final intervention, inclusion of the auxiliary variable of receiving is care within household the issue solved, providing the (negative) sign and significance of almost all of the coefficients on health variables.

Source: Own calculations.

H1: Older people in better health tend to provide more help to others.

The hypothesis is clearly confirmed. In all three cases we were able to confirm it and provide strong reasoning for the somewhat strange results that could be observed by basic descriptive statistics and basic econometric modellings not taking into account the specific causal relationships in the model. Indeed, the solution to this problem is the main contribution of the article and an important resource for future research in this area. It contributes significantly to the previous findings in e.g. Kaschowitz and Brandt (2017) and relates to the recent analysis in Calvó-Perxas et al. (2018).

H2: Relationship between informal caregiving and health is of an endogenous, reverse causal nature.

We confirm the hypothesis on the basis of the testing as reported in tables 3, 4 and 5. All the tests confirmed the expected reverse causality, which is in line with the findings of the literature, standing for the presence of the negative effects of help-giving on the health of the provider. As noted in the introductory section of our article, it is widely accepted that caregiving has an impact on caregivers' health (Zarit, Reever and Bach-Peterson, 1980; Hiel et al., 2015), and most caregivers have to deal with their own chronic illnesses as well (Jowsey et al., 2013; Stacey et al., 2016). Support measures are thus necessary to keep caregivers in good health, to maintain their quality of life, and to keep costs down, so that the informal caregiving system is maintained (Kaschowitz and Brandt, 2017; Verbakel et al., 2017).

H3: There are significant differences in the relationship of health and informal caregiving between help-giving within and outside a household.

We confirm the hypothesis, which is clearly demonstrated by the descriptive statistics visualized in graph 2. Furthermore, we manage to provide an econometric/causal solution that is able to explain the difference and control for it when modelling for our main relationship between health and informal help-giving. The findings strongly relate to the recent analysis of Calvó-Perxas et al. (2018) which finds that “the poorest health was reported by those giving care inside their households, which may be due to the fact of being emotionally closer to the recipient of care and to the fact that they cannot evade the care situation easily as those giving care outside their household” (Calvó-Perxas, 2018).

The link to theory, presented in the initial section of the article, seems strong. We were able to connect the relationship of health and caregiving to theoretical expectations, but demonstrated that the usual positive link is to be found only after some econometric corrections and additional controlling variables. Also, we were able to confirm the findings of Kaschowitz and Brandt (2017) about the heterogeneity in the provision of care, with care provided within and outside a household having very opposite characteristics. Based on our findings, one would be tempted to ask for this heterogeneity in the provision of care to be explored to an even greater extent and in more detail, to find and explain the distinctions using, e.g. latent class modelling or cluster analysis of any other type.

Limitations of the analysis relate to the sample used, methods and theoretical background. In terms of the sample, the analysis is based on a cross section and should be extended in future also to a dynamic context. Also, constraints on respondents included could be imposed, related to their health and social condition. Also, the dataset allows us only to include help to a family member living outside one’s own household, a friend or neighbour. This should be extended also to people the respondent does not know, although SHARE does not allow such an extension. In terms of methods, other causal inference methods like directed acyclic graphs (possibly, using Bayesian networks), structural equation modelling and even mediation analysis could be used. If put in a dynamic context, more consistent causal analysis could be performed, using difference-and-differences, changes-in-changes and similar methods. Also, heterogeneity in the results could be analysed using latent class methods, quantile methods or cluster analysis. Finally, in terms of theoretical background and variables used, it could be interesting to extend the analysis to other health characteristics, linking the results also to limitations of daily life (ADL, IADL, GALI or functional limitations) or similar indicators.

The scientific contributions of the paper are clear. On the one hand, the article provides what seems to be a conclusive explanation for some “puzzles” in the data, observed previously by, e.g. Kaschowitz and Brandt (2017). The explanation is novel in particular for the help-giving provided within a household and is sup-

ported by some recent findings of Calvó-Perxas et al. (2018). Secondly, we provide some novel instruments to control reverse causality where health variables are included, based on Wave 3, i.e. the retrospective life histories of respondents. Finally, we provide a reflection on the policy recommendations to support the help-giving measures being implemented in many European countries.

There are some important pathways for future research. Firstly, improvements in the instrumental variable models used could be made, using additional variables, including social and material deprivation, relationship to the person receiving help, frequency of the help provided (some of this has been tried and the results are, again, very robust). We also confirm that Wave 3 of SHARE is a rich and interesting source for the construction of instrumental variables, something confirmed by the literature in the field. Possibly, additional instruments based on Wave 5 (the cross section used) could be tried and tested as well. It would also be interesting to model more deeply which is the more important predictor of informal caregiving: physical, mental or self-rated health? According to our results, physical health performed the best, but this question remains to be studied in future research. Finally, it would be interesting to model also the longitudinal aspects of the studied relationship and explore if it is dependent upon the contextual variables in the country studied.

Regarding the practical and policy recommendations, adopting measures to stimulate the health of potential and actual caregivers would tend to raise the level of help provided significantly, which was proven by our analysis. Although the finding might sound trivial, we observed that it could lead to absurd (opposite) conclusions if observed only by basic descriptive statistics or correlations. To this end, it was important to provide an explanation which is novel in the literature and differs quite significantly from the previous explanations, found, e.g. in Kaschowitz and Brandt (2017). In policy terms, measures used to stimulate health would contribute to the welfare of caregivers and by this to a better system of (informal) long term care which should be the desire of all. The question remaining for study here is how the effect we observed and studied is distributed among the studied population and whether it significantly differs not just by the type of provided help (outside or within a household) but also by some other characteristic of the respondent, the care receiver or context/country under study.

Disclosure statement

The authors declare there is no conflict of interest related to this article.

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To what extent do fiscal spending rules affect budget composition?

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Article**

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Abstract

The aim of this paper is to investigate the extent to which local budget composition reacts to variations in fiscal spending rules. It looks at Italian subnational governments and specific changes in the institutional framework, implementing a difference-in-discontinuities strategy. Results show that when a reduction in current spending is imposed, local authorities direct the cuts towards services. Furthermore, when an increase in capital spending is allowed, there is an increase in spending on infrastructure and local public debt.

Keywords: fiscal rules, public spending, difference-in-discontinuities, local governments

1 INTRODUCTION

Rules for coordinating the financial relationship among different government levels have the purpose of guaranteeing both macroeconomic stability and financial sustainability. Fiscal rules are generally justified because they act as a substitute for reputation when government policy is discretionary and time-inconsistent. Poterba (1996) compares the “institutional irrelevance view”, where budget rules can be circumvented, with the “public choice view”, where fiscal institutions represent important constraints on the behaviour of political actors, suggesting the predominance of the latter.

The European Stability and Growth Pact, adopted in 1997, is a set of rules designed, among other goals, to ensure sound public finances.¹ In order to be compliant with the Stability and Growth Pact, member states can implement subnational fiscal rules, imposing fiscal discipline on subnational governments. For instance, in 1999 the Italian government implemented subnational fiscal rules under the so-called Domestic Stability Pact (hereafter DSP) to coordinate and control subnational budget balances. In contrast to the attitude to national fiscal rules, there has been a controversial debate about the necessity of subnational rules. Authors such as Eichengreen and von Hagen (1996), Rodden (2002) and Rodden (2004) are in favour of these rules, arguing that the scope for subnational fiscal rules is higher when there are severe fiscal imbalances, possibly exacerbated by the decentralization process. In fact, when more functions are delegated to local governments, their spending power rises, and imbalances may worsen. In addition, local governments have incentives to free-ride on fiscal discipline because they can rely on a common pool of national resources (Weingast, 2009) or they are “too big to fail” (Wildasin, 1997). On the other hand, Milesi-Ferretti (2004) argues against subnational fiscal rules, suggesting that local rules might lead to “ugly outcomes” for local governments, such as creative accounting and window dressing. Ter-Minassian (2007) affirms that fiscal rules should only be implemented when finan-

¹ For further information about the Stability and Growth Pact see: https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/stability-and-growth-pact_en.

cial markets and cooperative arrangements across government levels cannot reach financial discipline.

Fiscal rules may also be implemented to foster virtuous behaviour. DAVIS and Kirpalani (2017) investigate whether subnational fiscal rules correct the local incentives to over-borrow, due to their expectations of bailouts by central governments. They suggest that fiscal rules can be welfare-reducing if the reputation of the central government is low enough, leading to even more debt accumulation. Debrun et al. (2008) suggest that certain rules, such as those targeting the budget balance or general government debt, have a significant effect on deficits, but expenditure rules do not by themselves have a significant impact on budget balances. In a survey of recent studies, Wyplosz (2012) finds that fiscal rules are often too easily dismissed when they are in conflict with political goals. However, Glaeser (2013) shows that fiscal rules at the local level are more likely to be observed than rules at the level of the national government. Poterba (1994) studies the dynamics of state taxes and spending during the late 1980s, pointing out that more restrictive state fiscal rules, such as “no-deficit-carryover” rules and tax and expenditure limitations, are linked to faster fiscal adjustment to unexpected deficits. Heinemann, Moessinger and Yeter (2018), using a meta regression analysis on 30 studies, find that there is a consensus that fiscal rules influence fiscal aggregates, particularly for deficits but less for debt, expenditures and revenues.

In relation to the compositional consequences of fiscal rules for public budgets, Foremny (2014) examines EU15 regional and local governments over the period 1995-2008. They suggest that subnational fiscal rules are effective in unitary countries, specifically in limiting deficits and large debts, while there is no clear evidence in federal countries, due to the larger legal fiscal autonomy. The fact that subnational fiscal rules reduce public deficits is also found by Burret and Feld (2018) in the case of Swiss cantons, while Bergman, Hutchison and Jensen (2016) show that fiscal rules foster sound public finances in a panel of EU countries. Grisorio and Prota (2015) study Italian regional administrations over the period 1996-2008 and show that an increase in fiscal decentralization affects public expenditure composition, specifically through a reduction in the share of capital to total expenditure.

The aim of this paper is to assess empirically the extent to which fiscal spending rules are able to affect local behaviour, and for this purpose the specific features of the DSP allows for implementing a natural-experiment strategy through a difference-in-discontinuity analysis. More specifically, this work targets two main research questions:

- 1) Are fiscal rules able to do what they are supposed to do? If the central government is able to enforce the subnational rules, the answer should be positive and not really surprising, considering that the legal design is confirmed. Nevertheless, a positive answer would support the finding that subnational fiscal rules are effective.

- 2) Are budget items equally affected by fiscal rules? For instance, in the event of a budget cut, a local government could decide to focus the budget reduction not on all budget expenses proportionally, but only on specific items.

The Italian DSP has already attracted the attention of different authors. Patrizii, Rapallini and Zito (2006) addressed the ability of subnational governments to meet the DSP requirements, whereas Brugnano and Rapallini (2009) evaluate the effects of the DSP on local public borrowing requirements from 1999 to 2005. Bartolini and Santolini (2009) conduct a panel data analysis on the current expenditures of 246 Italian municipalities to capture the impact of the DSP, showing that the introduction of the DSP significantly reduces the level of public spending. Other authors focus on the impact of fiscal rules on the ability of local administrations to achieve fiscal discipline and sustainability. In particular, Balduzzi and Grembi (2011) check whether the adoption of fiscal rules has been accompanied by an increase in window dressing as measured through the level of budget fiscal residuals, without finding a variation in the level of budget residuals connected to the adoption of the DSP. Grembi, Nannicini and Troiano (2016) analyse Italian municipalities between 1999 and 2004, implementing a difference-in-discontinuities approach. They show highlight that relaxing fiscal rules increases deficits and lowers taxes, generating a deficit bias from zero to 2% of the total budget. This variation is mainly driven by adjustment on the revenue side.

The contribution of this paper is twofold, underlined by the two research questions. Firstly, in relation to the first question and in line with the literature on the effectiveness of fiscal rules, it confirms that fiscal rules are effective. In particular, there is evidence that when fiscal rules that impose a reduction in consumption and an increase in investment simultaneously, budget expenses react accordingly.

In relation to the second question, results show that: (a) when the fiscal rule imposes a reduction in current spending, not all items are equally affected and the most penalized is spending on services. This evidence shows that current spending is composed of different items, and a general rule that imposes a drop in spending may affect only a specific subcategory. Therefore, policy-makers may consider not targeting current spending with fiscal rules in general, but specific subcategories of current spending in a case in which a certain behaviour from local government is required. For instance, the central government could induce local authorities to decrease current spending by lowering wage expenses, while maintaining the service levels and keeping expenditures constant; (b) when the fiscal rule allows for an increase in capital spending, there actually is an increase in spending on infrastructure and in local public debt. This result is not surprising because of the so-called “golden rule”, which states that debt can be used to finance only investment. The link between an increase in investment and debt is therefore not surprising. However, the increase in public debt could be an unwanted outcome that goes beyond the initial willingness of the policy-maker, which possibly aimed to decrease current spending in favour of capital spending,

but without the intention to increase public debt. In this case, the policy-maker could design fiscal rules that directly target subcategories of budget items able to foster the desired local behaviour, possibly also limiting the use of debt to finance investment.

As the focus is mainly on economic explanatory variables, this study is not related to the vast amount of political economy research on local public finance.

The remainder of this paper is organised as follows. Section 2 analyses the normative framework of local Italian budget rules, while section 3 focuses on the theoretical background. Section 4 illustrates the empirical analysis and results and section 5 concludes.

2 NORMATIVE FRAMEWORK AND PRELIMINARY EVIDENCE

Italian municipalities are subject to the Law for Local Authorities,² in which the goals and duties of local government are stated. Moreover, starting from 1999, the central government imposed the DSP to honour commitments taken with European Institutions.³

Since its introduction, the DSP has implemented different types of rules, such as: (a) a balanced budget, whereby the total amount of revenue has to be equal to the total amount of expenditure; (b) expenditure caps, through which there might be ceilings on total current expenditure or specific expenditure items; (c) ceilings on revenue, which enable the central government to limit local authorities' ability to increase revenue; (d) limits on the stock of debt or the issuance of new loans; (e) restrictions on the type of expenditure that can be funded by debt (the so-called "golden rule" stating that new loans can finance only capital investments); (f) indicators of the ability to service the debt.

Among Italian municipalities, the amount of consumption (current) compared to investment (capital) spending has changed over time. As shown in figure 1, the overall consumption over GDP of municipalities was 3.96% in 1990, whilst investment was 2.47%. The distance between these two types of spending decreased in the following years: in 2005, consumption and investment over GDP reached 3.32% and 3.01% respectively. However, from 2006 onwards, whilst consumption remained stable, investment constantly decreased, falling to 1.62% in 2010.⁴

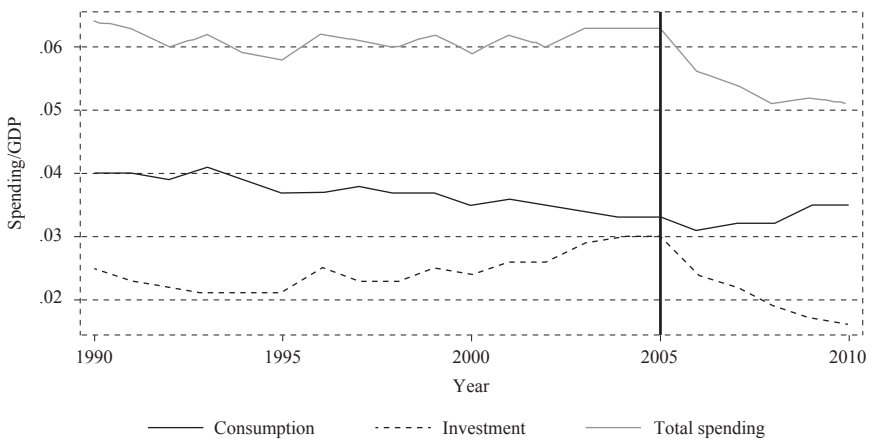
² Law no. 367/2000. In particular, the specific functions are presented by the 167/1996 Presidential Decree and cover a wide range of subjects, such as general administration, justice, local police, state education (up to primary school and part of secondary school), culture, sport, tourism, local public transportation, urban development, social sector, economic development, productive local services.

³ Ambrosiano and Bordignon (2007) discuss the internal application of the European Stability Pact with local governments in some selected European countries (i.e. Germany, Belgium, Spain and Italy), showing that there is not necessarily a link between decentralisation and financial instability.

⁴ This study focuses on the years 2004-2006 and therefore the decline in investment spending after 2007 goes beyond the findings detailed in section 3.

FIGURE 1

Italian municipalities' consumption, investment and total spending as a percentage of GDP



Source: Istat, own elaboration.

As stated in the introduction, the Stability and Growth Pact was adopted to ensure that EU countries pursue sound public finances, also controlling public spending at both the central and local level. Different types of public spending are able to generate dissimilar effects on the economy. Ganelli and Tervala (2010) state that the reallocation of consumption in favour of investment spending might generate welfare gains. Acconcia, Corsetti and Simonelli (2014) show that in Italy local investment spending on infrastructure has a multiplier of 1.5 on impact and 1.9 in the medium term.

Consequently, there could be an incentive by the central authority to direct local spending more towards investment. Is this goal achieved through the domestic stability pact? Since its introduction, the pact has been revised yearly. In fact, the representatives of local governments bargain each year with the central government about the way in which the pact should be designed. On the one hand, there are local needs to be addressed and, on the other hand, national and macroeconomic circumstances that the central government has to address. The outcome is that since 1999 there have been many changes. During the first years, all local governments were subject to the pact, while since 2002 municipalities under a certain threshold were exempt and special rules have been applied to the autonomous provinces of Trento and Bolzano and to the special-statute regions.⁵ In the first two years of its application (i.e. 1999 and 2000), the Pact required a decrease of the aggregate deficit on a current programmes basis. From 2001 to 2006, the rule targeted the budget balance, which has to be corrected from one year to the other, also imposing limits, expressed as a ceiling with respect to historical values, on the growth rate of current expenditure.

⁵ The special-statute regions are Sicily, Sardinia, Aosta Valley, Trentino-Alto-Adige and Friuli-Venezia-Giulia.

Interestingly, in 2005 and 2006 the central government devoted specific attention to local public spending through the DSP. The national government had to control the overall growth of general government spending and the Pact was modified, imposing a constraint on subnational expenditure, defined by a ceiling on the spending growth rate. Unlike in the previous period, for the first time the limit also included capital spending. Indeed, in 2005, a cap was set on total expenditures, which could not be higher than the average spending of the previous three years augmented by 11.5%.⁶ In 2006, the limit on overall spending was removed, while different ceilings on current and capital expenditures were added. Consumption was penalized, because the rule imposed a cut of 6.5% on current spending, while investment could increase by 8.1%.⁷ Before, the main target rule was based on the fiscal gap,⁸ while from 2007 the main constraint was on a target balance calculated on both a cash and an accrual basis.⁹ The number of municipalities subject to the pact has changed since the introduction of the DSP: during the first two years, all municipalities were subject to the DSP, while since 2001 those with fewer than 5,000 inhabitants have been exempt.¹⁰

In order to study the effect of fiscal spending rules, the analysis focuses on the period 2004-2006, as summarised in table 1, comparing municipalities subject to the DSP with those that are exempt. As shown in figure 2, from 2005 to 2006, municipalities with more than 5,000 inhabitants (Group B) slightly decreased the consumption over investment ratio (from 1.75 to 1.73), while an upward trend is found for Group A (from 1.50 to 1.76). This may be due to a budget composition effect caused by the DSP.

TABLE 1

Fiscal rules imposed by the Domestic Stability Pact on Italian municipalities

Year	Municipalities with inhabitants:	
	Up to 5,000 (Group A)	More than 5,000 (Group B)
2004 (t_1)	None	Fiscal gap: zero growth
2005 (t_2)	None	Total expenditure cap
2006 (t_3)	None	Consumption and Investment caps

Source: Ministry of Economics and Finance – Financial laws.

⁶ Further details are shown in the Finance law no. 311, December 30, 2004 and Document of Ministry of Economy and Finance “Circolare della Ragioneria Generale dello Stato” no. 4, February 8, 2005.

⁷ Further details are shown in the Finance law no. 266, December 23, 2005 and Document of Ministry of Economy and Finance “Circolare della Ragioneria Generale dello Stato” no. 8, February 17, 2006.

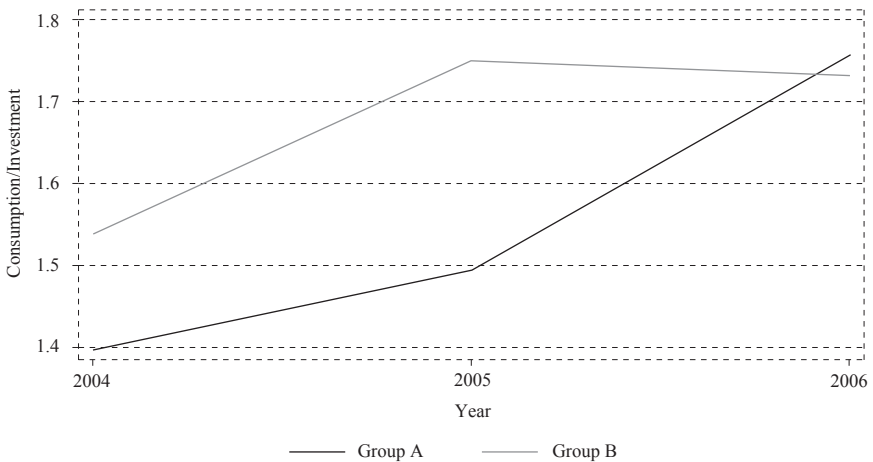
⁸ The fiscal gap had to be equal to zero in 1999-2000, while it could grow for a maximum of 3 and 2.5 per cent in 2001 and 2002, respectively, and again had to be equal to zero in 2003 and 2004.

⁹ Giurato and Gastaldi (2009) summarise the evolution of the DSP in Italy and the fiscal items included by the different DSPs. For an extensive review of different fiscal rules, see Budina et al. (2012) and Cordes et al. (2015).

¹⁰ In any case, all the municipalities are subject to the Law for Local Authorities.

FIGURE 2

Level of consumption over investment for municipalities under 5,000 inhabitants (Group A) and above (Group B)



Source: Italian Ministry of the Interior, own elaboration.

This normative framework provides an opportunity to study the extent to which fiscal rules can affect budget spending decisions at a local level through a natural experiment, as further detailed in the following section.

3 THEORETICAL BACKGROUND

The institutional framework analysed in section 3 shows that decisions related to the DSP are made by the central government and are therefore exogenous with respect to local dynamics. Considering that municipalities up to 5,000 inhabitants (Group A) are not subject to the DSP, they will form the control group, while the treated group includes municipalities with more than 5,000 inhabitants (Group B). The treatment is the fiscal rule variation imposed by the DSP and the cut-off is the population level at 5,000 inhabitants.

To assess the causal effect of each fiscal rule (the treatment) on the treated group, it is necessary to consider a minimum set of assumptions with which to perform the analysis (Angrist and Pischke, 1996). Potential budget outcomes Y are the variables of interest and the actual treatment D depends on the variable Z , which is equal to 1 when a municipality is assigned to the treatment, while $Z=0$ when it is assigned to the control group. The potential budget outcome of municipality m at time t depends on Z and D , which can more formally be expressed as $Y_{mt} = Y_m(Z_t, D_t)$. Therefore, the outcome $Y_{mt}(1)$ is when the municipality is treated and $Y_{mt}(0)$ otherwise. The following assumptions should be considered:

- 1) Stable unit treatment value assumption. The potential outcomes and treatments of unit m are independent of the potential assignment, treatments and outcomes of $n \neq m$. Consequently, a municipality subject to the treatment should not influence the others (no general equilibrium effects).

- 2) Non-zero average causal effect of Z on D . The probability of treatment must be different between the two groups. Therefore, it is required that whoever is assigned to the treatment actually gets the treatment, or at least part of the component of the treated group. In other words, some level of compliance is necessary.
- 3) The exclusion restriction should hold. Consequently, the assignment only affects the outcome through the treatment.
- 4) Monotonicity. No one does the opposite of its assignment, regardless what the assignment is. Thus, the absence of defiers is required. Specifically, a defier would be a municipality that follows the DSP rules without any formal obligation.
- 5) Random assignment. All municipalities have the same probability of getting the treatment.

It should be noted that assumption (5) cannot hold due to the fact that the assignment is not random, but rather conditioned to the population level. In this case, a sharp regression discontinuity design (SRDD) could be implemented, imposing the following assumptions:

- 6) Assignment to treatment must only depend on observable pre-intervention variables (i.e. the population level).
- 7) Identification of the mean treatment effect is only possible at the threshold.
- 8) The continuity of potential outcomes. Limits of the expected values have to be identical at the cut-off. In other words, the budget outcomes of municipalities just before and after the cut-off level should be equal.

Under these assumptions, the SRDD can be written as (Angrist and Pischke, 2008):

$$\lim_{\delta \rightarrow c} E[Y_m | P_c < P_m < P_c + \delta] - E[Y_m | P_c - \delta < P_m < P_c] = E[Y_m(1) - Y_m(0) | P_m = P_c]$$

where P_c is the population at the cut-off level, δ represents a small number, Y_m and P_m are the potential budget outcome and population of municipality m . The estimand of this nonparametric estimation strategy is the average causal effect, $E[Y_m(1) - Y_m(0) | P_m = P_c]$.

However, assumption (8) raises some issues. In order to identify the causal effect at the cut-off point, any discontinuity in the relationship between the outcome of interest and the variable determining the treatment status must be fully attributable to the treatment itself. However, there is a confounding discontinuity policy at the cut-offs, due to a change in the wage level of local politicians. In fact, the two groups of municipalities guarantee different wages in relation to the population level, with a jump at 3,000 and 5,000 inhabitants (exactly at the cut-offs). As shown by Gagliarducci and Nannicini (2013), better-paid politicians are able to improve internal efficiency, sizing down the government. Consequently, there is a confounding policy that might alter the identification strategy. To overcome this issue, the approach described in the following subsection can be implemented.

3.1 DIFFERENCE-IN-DISCONTINUITIES

The confounding policy that inhibits the effectiveness of the SRDD strategy is constant over the analysed period. In order to remove the constant confounding discontinuity (i.e. different wage policies among municipalities), we can combine the difference-in-difference strategy with a regression discontinuity design, implementing a difference-in-discontinuities (DiDisc) framework (Grembi, Nannicini and Troiano, 2016).¹¹ The assumptions that should hold are as follows:

- 9) The confounding discontinuity needs to be time invariant. This assumption requires that the effect of wage variations on budget outcomes among groups not vary with time.
- 10) The interaction between the treatment and the confounding discontinuity has to be irrelevant. Therefore, different wage policies should not generate a different reaction than the fiscal rules introduced by the DSP.

Under these assumptions, there is an estimator, the DiDisc estimator $\hat{\delta}_0$, that identifies the local treatment effect δ_0 :

$$\hat{\delta}_0 \equiv \left(\lim_{P_m \uparrow P_c} E[Y_{mt} | P_m, t = t_1] - \lim_{P_m \downarrow P_c} E[Y_{mt} | P_m, t = t_1] \right) - \left(\lim_{P_m \uparrow P_c} E[Y_{mt} | P_m, t = t_0] - \lim_{P_m \downarrow P_c} E[Y_{mt} | P_m, t = t_0] \right) \quad (1)$$

where Y_{mt} is the potential budget outcome for municipality m at time t , P_m is the population level, t_1 is the year of the treatment and t_0 is the previous one. For each case, the assignment to the treatment is given by the dummy D_{mt} which takes the value:

$$D_{mt} = \begin{cases} 0 & \text{if } t = t_0 \\ 0 & \text{if } P_m \leq P_c, t = t_1 \\ 1 & \text{if } P_m > P_c, t = t_1 \end{cases} \quad (2)$$

where P_c is the cut-off level. Having described the DiDisc strategy, we can now proceed with the empirical analysis.

4 EMPIRICAL ANALYSIS

4.1 DATA

Data related to municipalities' budgets and population levels are obtained from the Ministry of the Interior website.¹² Budget values refer to year 2004, 2005 and 2006, deflated by the inflation considering 2006 as the reference year, and divided by the population of each municipality to obtain per-capita values. All the budget values represent the accrual basis of accounting. Municipalities in provinces and regions with "special autonomy" cannot be included in the analysis. In fact, sub-national governments with "special autonomy" have the power to bargain fiscal rules directly with the Central Government. Consequently, municipalities of the autonomous provinces of Trento and Bolzano and the autonomous regions of Sic-

¹¹ The DiDisc approach is also implemented, as a robustness check, by Asatryan et al. (2017).

¹² See: <http://finanzalocale.interno.it>.

ily, Sardinia, Aosta Valley, Trentino-Alto-Adige and Friuli-Venezia-Giulia are excluded from the sample. Presumably, small and large municipalities might exhibit different behaviours in terms of budget policies and therefore a specific distance from the cut-off level (5,000 inhabitants, as detailed in the next subsection) is imposed ($d = 2,000$).¹³ Consequently, the municipalities included are those between 3,000 and 7,000 inhabitants. Summary statistics are reported in table 2.

TABLE 2

Descriptive statistics. Budget items used in the analysis by group, average of the period 2004-2006 (euro per capita)

	Group A				
	Obs. per year	Mean	Std. dev.	Min.	Max.
Revenue side					
Taxes	916	199.24	114.70	1.31	2252.18
New loans	916	128.95	246.93	0.00	3744.68
Expenditure side					
Current spending – total	916	664.42	221.14	344.79	2780.25
<i>Wages</i>	916	205.57	73.29	58.15	902.95
<i>Services</i>	916	254.79	126.03	7.15	1040.88
Capital spending – total	916	434.80	607.00	3.58	15810.63
<i>Infrastructure</i>	916	340.97	430.53	0.00	5905.50
	Group B				
	Obs. per year	Mean	Std. dev.	Min.	Max.
Revenue side					
Taxes	495	204.18	118.19	2.24	1754.92
New loans	495	115.52	183.34	0.00	2529.52
Expenditure side					
Current spending – total	495	609.24	232.99	317.67	3349.18
<i>Wages</i>	495	194.07	71.76	76.32	677.60
<i>Services</i>	495	236.77	123.16	21.18	1899.68
Capital spending – total	495	363.59	374.37	10.20	5496.12
<i>Infrastructure</i>	495	285.91	290.17	0.00	5468.95

Notes: In Group A, there are municipalities with a number of inhabitants in the range 3,000-4,999, while in Group B the range is 5,000-7,000.

¹³ The Diff-in-disc approach needs comparable groups of municipalities (treated vs. not-treated). It may be affirmed that small and large municipalities might have different behaviours in terms of budget policies, therefore a specific (and not excessively wide) distance from the cut-off level needs to be imposed. Nevertheless, a robustness analysis is performed at different threshold to support the results (table 4).

4.2 ECONOMETRIC MODEL

The “local linear regression” (LLR) model may be used to estimate the DiDisc estimator, as suggested by Imbens and Lemieux (2008), which fits the data with linear regression functions in a specific sample range. The interval is limited, considering a distance d from the cut-off point, thus $P_m \in [P_c - d; P_c + d]$. The estimated model is:

$$Y_{mt} = \alpha_0 + \alpha_1 \tilde{P}_m + G_m (\beta_0 + \beta_1 \tilde{P}_m) + t_1 [\gamma_0 + \gamma_1 \tilde{P}_m + G_m (\delta_0 + \delta_1 \tilde{P}_m)] + \varnothing X_m + \omega Z_{rt} + \varepsilon_{mt} \quad (3)$$

where Y_{mt} is the budget outcome for municipality m at time t , \tilde{P}_m is the normalized population size, with $\tilde{P}_m = P_m - P_c$, G being a dummy equal to 1 when a municipality is part of the treated group and 0 otherwise, t_1 is the treatment year. X is a vector of time-invariant controls (i.e. area size, sea level and geographical macro-area) and Z is a vector of time-variant controls (i.e. per-capita GDP, inflation and unemployment) at the regional level r .¹⁴ \varnothing and ω are the coefficients related to the controls, while α_0 is the intercept and ε is the error term.¹⁵

The assignment to the treatment is given by the dummy $D_{mt} = G_m t_1$, as explained in the previous subsection.

4.3 RESULTS

Table 3 shows the main results, where the local treatment effects δ_0 are reported for the relevant budget items.

Case A shows no effects due to the variation in the fiscal rule from budget balance to total expenditure cap. The latter rule does not affect budget composition (columns 1-3), as expected. In fact, considering that this rule allows for an increase in the overall spending, a difference in the budget composition would have been a surprise. This result is also confirmed by the visual. Figure 3 graphically shows the difference-in-discontinuities for consumption and investment in Case A (upper figures). There is no evidence of different trends between the two groups, suggesting that the fiscal rule variation was not able to affect the budget.

Case B studies the variation of the fiscal rule from total expenditure cap to two different caps, one specific for consumption and a different one for investment. As detailed in section 3, the cap on consumption imposes a drop on its spending level, while the investment rule allowed for more capital spending. Local governments faced two major decisions. Firstly, they had to choose which budget item of current spending should be decreased. Secondly, they could decide to increase investments. Considering that the budget data represent the accrual basis of accounting,

¹⁴ Both time-invariant and time-variant characteristics are obtained from the Italian National Institute of Statistics (Istat, see: <http://www.istat.it/en/>).

¹⁵ Standard errors are clustered at the provincial level in order to have a sufficient number of municipal units to avoid unreliable standard errors, as it would with clusters at the municipal level (Angrist and Pischke, 2008).

the investment decisions made in a specific year are accounted for in the same year, even if the investment is not completed. Results (columns 4-6) show that consumption decreased by 33.40 euro (column 6), which represents about 3% of the total budget. In addition, the current spending item affected is the one related to services. On the other hand, capital spending has been significantly increased by 114.55 euro per capita (about 8% of the overall budget), mainly due to higher infrastructure spending. It should also be noted that there has been an increase in new loans of 62.21 euro per capita (about 4% of total budget), in line with the so called “golden rule”, which states that new loans can be taken out only to finance investments. Therefore, it is not surprising that infrastructure spending and new loans have the same sign.

However, the fact that fiscal rules designed to increase investment also lead to an increase in debt could be beyond the initial goal of the policy-maker. In fact, a higher debt level could be seen as a threat to overall macroeconomic stability, specifically in a country where the general government debt is already particularly high, as in the Italian case.

TABLE 3
Effects of the Domestic Stability Pact on budget items

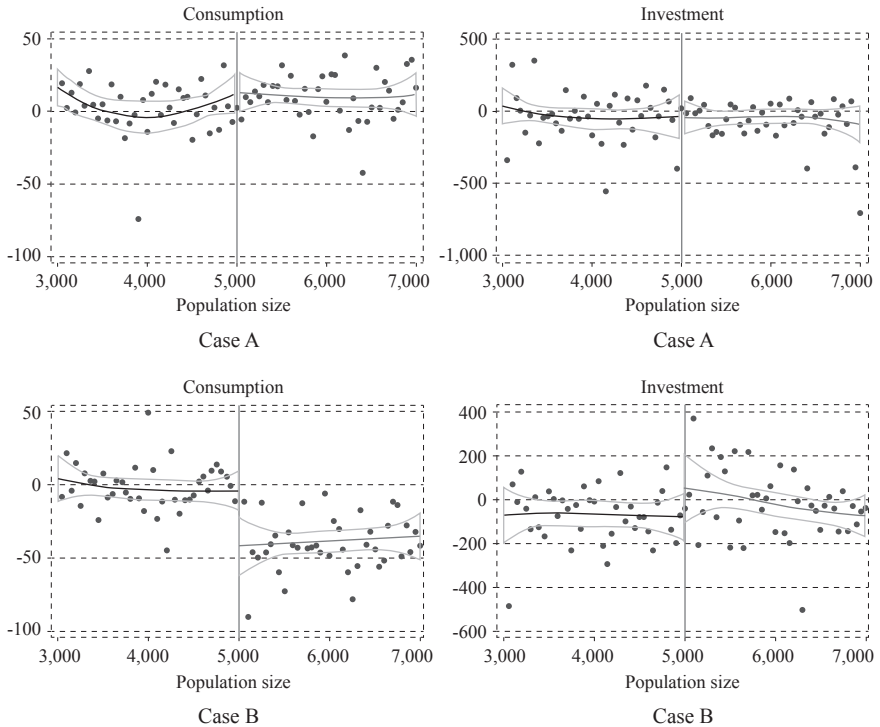
Budget item	Revenue					
	Case A			Case B		
Taxes	-0.50 (1.84)	0.11 (1.78)	0.10 (1.75)	-1.86 (1.39)	-1.34 (1.41)	-1.51 (1.43)
New loans	-42.03 (37.06)	-43.26 (36.68)	-43.75 (36.69)	62.98** (30.93)	62.28** (30.86)	62.21** (30.95)
	Expenditure					
	Case A			Case B		
Current – total	-3.99 (12.53)	-0.76 (9.89)	-0.71 (9.93)	-30.38*** (10.58)	-31.45*** (10.94)	-33.40*** (10.82)
<i>Wages</i>	-1,66 (3.91)	-2,14 (3.58)	-2.33 (3.60)	4.31* (2.35)	2.81 (2.56)	2.11 (2.66)
<i>Services</i>	-10,03 (7.63)	-6,38 (7.04)	-6.37 (7.05)	-22.84*** (6.82)	-22.32*** (6.67)	-22.66*** (6.75)
Capital – total	25.81 (67.11)	16.70 (65.07)	14.97 (64.17)	126.96** (62.97)	114.87* (64.79)	114.55* (65.29)
<i>Infrastructure</i>	-21,28 (36.68)	-25,92 (35.94)	-24.30 (47.55)	93.08* (48.72)	84.21* (50.14)	84.01* (50.06)
Time-invariant controls (X)	No	Yes	Yes	No	Yes	Yes
Time-variant controls (Z)	No	No	Yes	No	No	Yes
Obs.	2,822	2,822	2,822	2,822	2,822	2,822

*Notes: Case A considers t_1 and t_2 while Case B analyses t_2 and t_3 . The estimations are performed implementing a local linear regression method. Values are in euro per capita. Robust standard errors are reported in parenthesis, clustered at the provincial level. *** (**, *) indicates statistical significance at the 1 (5, 10) percent level.*

Figure 3 gives the visual evidence for Case B (lower figures), highlighting a drop in consumption and an increase in investment for the treated group (right-hand side of figures c and d), due to the variation in the DSP rule. Deepening the analysis, figure 4 shows the effect on the specific budget items for case B. The lower consumption level is generated by a decrease in spending on services, while investment increases due to higher infrastructure spending. On the revenue side of the budget, there is also an increase on the new loans level with respect to the control group.

FIGURE 3

Difference-in-discontinuities on consumption and investment spending, Case A (t_1 and t_2) and Case B (t_2 and t_3)

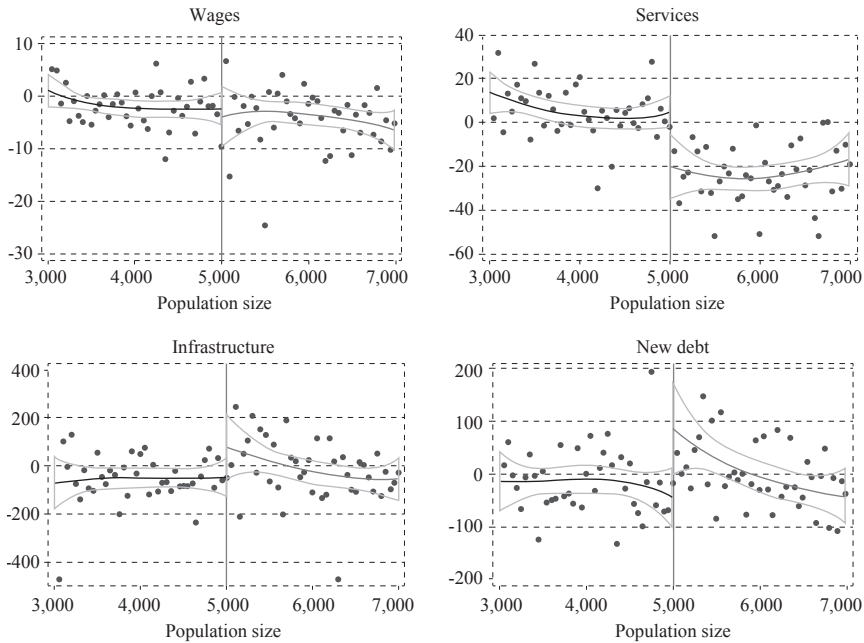


Notes: Threshold at 3,000 inhabitants. The central line is an SPA of order 2 and the upper and lower lines represent the 95% confidence interval. Scatter points are averaged over intervals of 50 inhabitants. On the vertical axis, there are the t_0 - t_1 budget values. Actual population size is on the horizontal axis.

It is also worth noticing that a substantial portion of current expenditures (around 30%) at the local level is absorbed by civil servants' payrolls (wages). The civil servants' payroll is kept out of the target of the DSP in 2005 and 2006 (Gastaldi and Giurato, 2008) and results confirm that this item did not react to DSP rule variations. Considering that current spending is mainly driven by services (around 40%), it is not surprising that they reacted significantly to local fiscal rules. More interestingly, both services and infrastructure spending variations were already implemented in the very short run, denoting a quick budget composition reaction to local rule changes.

FIGURE 4

Difference-in-discontinuities on wages, services, infrastructure and new debt, Case B (t2 and t3)



Notes: Threshold at 5,000 inhabitants. The central line is an SPA of order 2 and the upper and lower lines represent the 95% confidence interval. Scatter points are averaged over intervals of 50 inhabitants. On the vertical axis, there are the t_0-t_1 budget values. Actual population size is on the horizontal axis.

It may seem unlikely that a newly implemented rule is able to affect the budget in the following year. However, this study considers accrual data of the budget. This approach allows one to consider the moment in which a certain project/budget decision is taken (such as a new investment or a budget cut), which may differ with the moment in which the payment is made (cash data) or the project is actually finalized. As a consequence, accrual information is better able than cash data, to detect budget variations due to changes in fiscal rules.

4.4 ROBUSTNESS ANALYSIS

Results shown in subsection 4.3 and related to Case B are further analysed, performing a series of robustness checks.¹⁶

¹⁶ Results have been tested for outliers, trimming values greater than 97.5th percentile. Another check has been done considering fixed effects at the regional level. In both cases results still hold (results available upon request). Furthermore, a test for the parallel trend assumption has been implemented considering the three year of the analysis, 2004-2006. Specifically, given that the fiscal rules' variation in 2005 is not effective, it is possible to test the parallel trend assumption for 2005 using as baseline 2004, and the outcome is that the assumption holds. Repeating the test for the years 2005-2006, the outcome is, as expected, that when the fiscal rules variations is proven to be effective, the assumption does not hold (Bellucci, Pennacchio and Zazzaro, 2018; Angrist and Pischke, 2009; Cerulli, 2015).

Firstly, a robustness analysis is performed, implementing a different bandwidth, therefore varying the parameter d . The Local Linear Regression model used imposes a distance from the cut-off point equal to 2,000. The regressions are now performed using a distance equal to 1,500 in order to be closer to the cut-off point. As shown in columns 1 and 2 of table 4, results are confirmed. Consumption decreases thanks to a decrease in spending on services, while both infrastructure spending and new loans increase.

Secondly, the empirical analysis is repeated with a different model, specifically the spline polynomial approximation (SPA). This approach relaxes the linearity assumption of the previous method and uses polynomial functions of order 2 to draw the relationship between budget values and the population level. The estimated model is:

$$Y_{mt} = \sum_{n=0}^{\eta} (\alpha_k \tilde{P}_m^n) + G_m \sum_{n=0}^{\eta} (\beta_k \tilde{P}_m^n) + t_1 \left[\sum_{n=0}^{\eta} (\gamma_k \tilde{P}_m^n) + G_m \sum_{n=0}^{\eta} (\delta_k \tilde{P}_m^n) \right] + \emptyset X_m + \omega Z_{rt} + \varepsilon_{mt} \quad (4)$$

where the variables and the DiDisc estimator are defined as in the LLR method. Columns 3 and 4 of table 4 show that the DSP effects are in line with the previous findings.

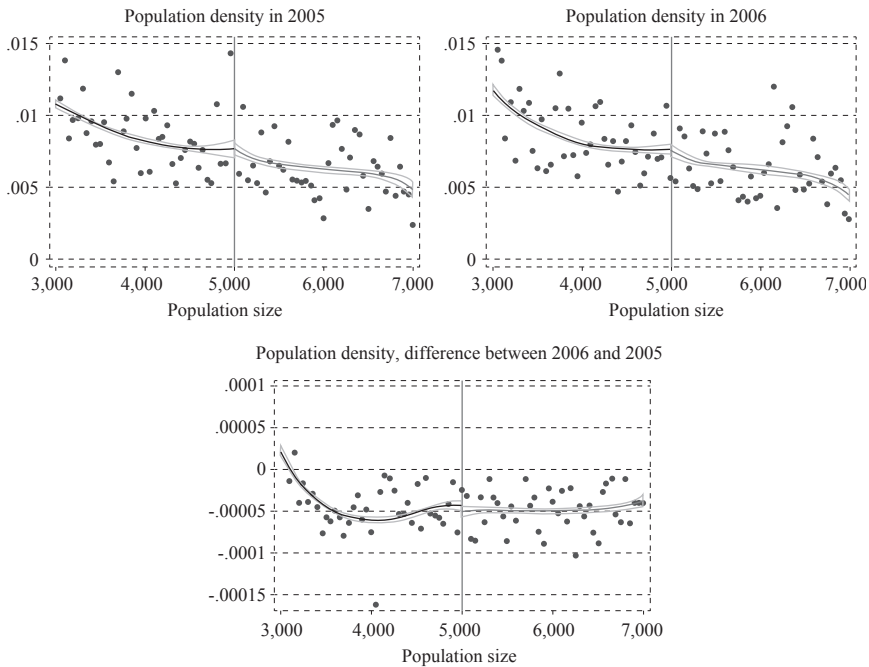
TABLE 4
Effects of the Domestic Stability Pact on budget items, robustness analysis in Case B

Budget item	LLR (b=1,500)	LLR (b=1,500)	SPA (order 2)	SPA (order 2)
Revenue				
Taxes	-1.57 (1.90)	-1.07 (1.93)	-0.98 (2.64)	-1.33 (2.64)
New loans	70.42** (35.16)	67.70* (35.17)	77.48* (44.46)	78.59* (44.42)
Expenditure				
Current – total	-24.17* (13.37)	-27.33* (13.79)	-24.29 (18.70)	-20.77 (17.73)
Wages	6.51** (2.80)	3.66 (3.23)	3.48 (4.45)	4.81 (4.93)
Services	-21.44** (8.24)	-21.44** (8.05)	-18.73* (10.78)	-19.08* (10.65)
Capital – total	154.72** (68.98)	134.62* (70.88)	156.01* (87.34)	149.20* (88.65)
Infrastructure	118.53** (52.15)	102.25* (52.85)	115.51* (64.02)	111.83* (64.93)
Controls (X and Z)	No	Yes	No	Yes
Obs.	1,976	1,976	2,822	2,822

Notes: Case B refers to municipalities between 3,000 and 7,000 inhabitants in the period t2 and t3. The estimations are performed implementing a local linear regression (LLR) method with a bandwidth (b) equal to 1,500. SPA is the spline polynomial approximation method of order 2 and the analysis is performed considering municipalities between 3,000 and 7,000 inhabitants. Values are in euro per capita. Robust standard errors are reported in parentheses, clustered at the Provincial level. *** (**, *) indicates statistical significance at the 1 (5, 10) percent level.

Furthermore, it could be affirmed that mayors of treated municipalities have an incentive to manipulate the population size in order to be below the cut-off point for DSP exemption. Considering that fiscal rules are decided year by year at national level (and generally in the last quarter of the year), the anticipation behaviour (i.e. the local government could not counter-react to a decrease in the population level) cannot be implemented. In addition, given that moving from above to below 5,000 inhabitants would lead to a drop in local government wages and that the threshold under which municipalities are exempted by the pact may vary, anticipation effects are discouraged. Figure 5 shows the density level in t_2 , t_3 , and the density variation between the two periods. There is no evidence of a different pattern between control and treated groups, supporting the absence of manipulation behaviours.

FIGURE 5
Density tests



Notes: Threshold at 5,000 inhabitants. The central line is an SPA of order 2 and the upper and lower lines represent the 95% confidence interval. Scatter points are averaged over intervals of 50 inhabitants. On the vertical shows population density. Actual population size is on the horizontal axis.

5 FINAL REMARKS

Coordination rules between state and local government levels are important in order to guarantee overall sound public finances. In 1999, under the Stability and Growth Pact, the Italian government implemented the Domestic Stability Pact to coordinate and control subnational public finance. This paper studies the effects of the Pact's fiscal rule variations on Italian municipalities' budget composition, performing a natural experiment through a difference-in-discontinuity design.

The novelty of this study stems from the analysis of specific fiscal rules designed to influence local public spending, in an attempt to answer two main research questions: (1) are the newly introduced fiscal rules able to do what they are supposed to do? (2) within current and capital spending, is there a budget composition effect? In relation to the former, results show that fiscal rules are able to affect budget composition significantly. This result may be seen as an unsurprising outcome, considering that it confirms that the central government is able to enforce subnational fiscal rules and therefore the legal design is confirmed. More interestingly, within a specific budget category (such as current and capital spending), not all items are equally affected. The reduction in current spending leads to a decrease in services, while an increase in investment generates higher infrastructure spending.

The policy implications are twofold. Firstly, fiscal rules are able to do what they are supposed to do, but within a specific budget category (such as current and capital spending) not all items are equally affected. Therefore, if the policy-maker is interested in affecting a specific item, the fiscal rule should be even more precise and directly target that item. Secondly, the fact that fiscal rules designed to increase investment also lead to an increase in debt could go beyond the initial goal of the policy-maker. In fact, a higher debt level could be seen as a threat to overall macroeconomic stability, specifically in a country in which general government debt is already particularly high, as in the Italian case. Therefore, the policy-maker may consider a fiscal rule able simultaneously to foster the desired local budget behaviour and to limit an increase in public debt.

Disclosure statement

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Golden Aging: Prospects for Healthy, Active, and Prosperous Aging in Europe and Central Asia

MAURIZIO BUSSOLO, JOHANNES KOETTL and EMILY SINNOTT
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In the next few decades, we will witness an intensive process of ageing in Europe, a phenomenon that has been mainly supported by lower fertility rates. Our societies will have to face many challenges and opportunities created by demographic drivers and the economic consequences of a demographic shift. The authors of *Golden Aging: Prospects for Healthy, Active, and Prosperous Aging in Europe and Central Asia* analyse in depth both the main challenges of and the opportunities provided by demographic trends countries of Europe and Central Asia (ECA), a region with the oldest populations in the world. In this report, 27 countries of ECA are divided into the Western Balkans, Eastern Partnership and Russian Federation, Central Europe and Youth Countries (Central Asia and Turkey). They also say that this is not the first time that demographic trends raised concerns about social welfare, productivity, savings and so on. A very similar if quite opposite situation was present during the 1970s when high fertility rates were blamed for raising concerns about growth welfare and fiscal sustainability. The ideal situation for many ageing societies is just to fit in with the idea of the “Golden Age”, defined in Greek mythology as a time of peace, harmony, stability, and prosperity when humans lived to a very old age. However, transition to more balanced demographic profiles, with fewer young people and higher share of elderly, for some countries could be a difficult or even unattainable process.

In the *Introduction (Overview)*, the authors compare the demographic situation of ECA countries and that of the rest of the world. They use the average number of years of life remaining or the median age as more precise indicators to describe ageing populations. Fertility decline is described as the most important driver of ageing in the countries of ECA. In addition, in these countries they observe a modest increase in life expectancy if in some of them an increase in mortality rates in older age groups. Thus, more changes in mortality are expected (and needed) in some countries from this region especially in the field of health care efficiency, and the changes in health risk behaviours. When it comes to the economic consequences, they use the illustrative example of the ageing population of Japan, and do not find ageing itself as the most important contributor to the economic slowdown in this country. Indeed, they continue to state that most ECA countries could experience positive effects from ageing in the macroeconomic perspective. They conclude this part by questioning what impact ageing could have on labour force participation, productivity, capital and economic inequality. To reach the golden demographic age, countries of ECA region should implement wide-range reforms especially in the area of health care, pension system, education, and labour market.

Apart from the Introduction, the book consists of three parts divided into seven chapters. In Part I, demographic transition in Europe and Central Asia is analysed in two chapters: “The drivers of aging in Europe and Central Asia”, and “Improving health outcomes in the transition to the Golden Age”. The first chapter presents the model of demographic transition; explores the effects of declining fertility on ageing and population growth, and tries to answer the reason for the decline in fertility. Examples presented are revealing the extent of demographic changes

in ECA countries. When comparing total fertility rate decline in France and Albania they say that the “...the shift from an average fertility rate of over five children per woman to below the population replacement rate took two centuries in France but only 34 years in Albania” (page 42). An interesting discussion tackled the effects of economic crisis of 2008 on fertility, and another one answered the question of why fertility is higher in France than in Germany. As for life expectancy and mortality, the ECA region has recorded a smaller improvement in life expectancy than all other regions of the World. Since 1960s, life expectancy in this region increased by 10 years only, while in Latin America people gained 18 and in East Asia and Pacific more than 27 years. Gains in male life expectancy were extremely limited in Eastern European countries (Czech Republic, Hungary, Moldova, Poland, Romania, Russia, Slovakia), and mortality in middle age (mid-40s to early 60s) has hardly improved in the ECA region. In general, it is concluded that women live longer than men in ECA, and people in richer socioeconomic groups also live longer.

The second chapter discusses the high incidence of disease and disability in the ECA region, and the challenges that need to be overcome to achieve a healthy aging population, and the implications of demographic developments for caregivers. Several striking conclusions stem from this chapter. For example, in many countries of the ECA region a man in 2009 was not in better health than a man in 1959 (page 79). Another is the high burden for elderly caregivers due to high levels of disease and disability in this region. Authors point to the limited availability of formal services in the region as the main reason why the bulk of eldercare, as well as childcare, is provided often by female family members (page 81). In addition, there is a note on “sandwich generations”, i.e. people who are expected to provide care to multiple generations at the same time, normally to their parents, children or grandchildren. Earlier research suggests that “married women who are out of the labour force, and better-educated women earning greater incomes, are at the highest risk of becoming trapped in a care sandwich”. Cardiovascular diseases and health risk behaviours are found to be the most important factors affecting the health outcome gap between ECA region and Western Europe countries. Longer and healthier lives for people in ECA region are possible if they succeed in solving the problem of the excess of morbidity and mortality that has been driven by cardiovascular and other noncommunicable diseases (page 92).

“The Economic Consequences of Aging” is the title of Part II, and three chapters are employed to discuss the most important consequences of ageing. Chapter 3 mainly focuses on the macroeconomic impact of population ageing, in particular how ageing will influence income and growth, labour participation and savings, and government balances. Authors use the overlapping generations (OLG) model to explore the economic impact of ageing through two simulations – declines in fertility and increases in longevity, the two major drivers of demographic change. Their conclusions about GDP per capita growth are positive in both simulations, e.g. GDP per capita will increase by 6 percent in the next forty years in a simula-

tion with a decline in fertility (page 113). They also explain the macroeconomic mechanisms behind this increase of GDP per capita, and conclude that “as people live longer they also work until older ages. And with slower population growth, it can become easier to increase capital-to-labour ratios and boost worker productivity”. Increased longevity they say could change decisions on savings and labour participation by people who anticipate a longer time in retirement being likely to save more during their life. Authors present many valuable analyses based on the EU Labour Force Survey (LFS), The Survey of Health, Ageing and Retirement in Europe (SHARE), International Labour Organization (ILO), and ECA countries fiscal databases.

Chapter 4 analyses the effects of ageing on productivity due to changes in the age structure of the workforce. An important observation here is the adjustment for educational differences when making cross-country comparisons of younger and older workers today. Adjustment should be made for the occupational distribution of the employed population. The finding is that “...younger generations entering the labour markets of Europe and Central Asia (and over the past 20 years) have (and have had) much higher levels of educational attainment than the generations exiting the labour market because of age” (page 170). Moreover (e.g. looking at scores from the PISA International Database), the quality of the education has risen in recent years, and the skills of labour market entrants too. The skills of older workers are not declining due to the ageing process, while some inevitable decline in cognitive functioning is compensated with better functioning in other functions (page 178). There is evidence that companies in ageing countries have responded by shifting their export patterns as they become more productive in sectors relying more on skills that improve with age (page 185).

In the Chapter 5, the authors question whether inequality and poverty increase in ageing societies. At the very beginning, they say that answering these questions would be a complex task. Nevertheless, we can draw some conclusions about poverty and inequality in ECA region: elderly are not the poorest group in ECA region, nor does ageing necessarily lead to higher poverty rates. Pensions and transfers have an important role in addressing the financial situation of the elderly. When looking at the trends in poverty and inequality in the region, authors observe two distinct phases: the first covers the decade from the mid-1980s to the mid-1990s; the second extends from the mid-1990s to the present. During the first period, poverty and inequality rose sharply as countries transitioned to market economies. In the next fifteen years, absolute poverty dropped to less than 10 percent on average across countries. Inequality stabilized after the transition and even decreased in some cases (page 218). When it comes to poverty and ageing, the higher share of elderly does not necessarily imply higher overall poverty rates (page 220).

Part III covers the policies related to ageing societies, both policies already in the process of implementation and those policy areas that deserve much more atten-

tion in stabilizing demographic structure and dealing with the negative economic consequences of demographic ageing. In Chapter 6, demographic ageing is discussed in the context of the baby-boomers who hold significant electoral power and do not support (needed) radical reforms. They prefer the status quo, and while some reforms, e.g. education or health care systems could pass without major opposition, any attempt at a reform of the pension system could be a challenge for many governments. In the situation of ageing of voters, authors analyse the emergence of pensioners' parties in Europe, and their relative success in influencing important decisions as compared to the percentage of votes gained at the parliamentary elections. A big challenge for ageing countries can be observed in the competition between pensions and education for spending (page 269). The last part of this chapter explains the attitudes toward migration in ageing societies. While attitudes toward immigration could become positive as the whole society ages, this does not mean that they will become positive in ECA countries over time. One very good predictor of anti-immigrant sentiment is labour market performance, i.e. as unemployment increases, positive attitudes towards immigrants tend to decrease (page 276).

Chapter 7 discusses several key policy areas relevant to achieving “Golden Ageing” in Europe and Central Asia. Here we can find policies supporting a rebound in fertility to near replacement rates, improved healthy life expectancy, and increases in net immigration rates (page 282). Balancing family and work life, especially for women, would help bring fertility closer to the replacement rate. Provision of formal childcare from an early age is the most effective means for achieving this goal. Another field for action is long-term care including care for the elderly that should shift from informal caregiving to formal, more extensive and sustainable approaches.

The authors of this report and their contributors have invested a very great effort in analysing the most striking topic of modern societies – population ageing. At the very beginning of this report, there is a crucial graph indicating how the demographic drivers and economic consequences of aging create both challenges and opportunities. The report reveals not only the disadvantages of but also the many opportunities arising from demographic ageing in ECA countries. “Golden Ageing” is within reach in ECA countries. However, it will require coordinated actions among different actors, including the government, the private sector, and societies, and across many areas, ranging from labour markets to health care to education and pensions.



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