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# The Impact of Population Aging on Fiscal Policies in Germany

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## Abstract

This paper will make effort to answer the question how population aging affects the different layers of government in Germany. I use detailed profiles for public transfer in- and outflows by single years of age, obtained from the National Transfer Accounts project, and decompose them by level of government. In doing so, I am able to assess the need for restructuring allocation rules for government revenues and expenditures. Even in case of an overall balanced government budget, new allocation rules will inevitably be needed. State and local governments being responsible for education expenditures or childcare are due to the lower number of children likely to achieve a balanced budget while the federal budget will face increasing expenditures for the elderly.

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# 1 Introduction

Population aging is of high concern in Germany as it is one of the more advanced countries in the demographic transition. 30 years of low fertility rates and insufficient immigration led to an old age structure combined with welfare state elements being highly dependent on paid work to generate government inflows. The outflows are mainly dominated by public pensions and health care, items predominantly consumed by the elderly. While the labor force potential is going to decrease (Börsch-Supan, 2004) leading to a decline in government inflows *ceteris paribus*, public transfer outflows are going to increase on the other hand due to the increasing number of elderly. Consequently, the question arises if the social security system in the present form is sustainable and if not, to give an order of magnitude of the future gap.

Figure 1 depicts the dependency ratios and economic support ratio for Germany during the period from 1950 to 2050. We observe an increase in the youth dependency ratio during the 1960s and early 1970s babyboom period when the value was around 40 percent. Afterwards a sharp decrease in the youth dependency ratio can be observed, reaching a value slightly over 20 percent after 2000. It remains stable in the future according to the 12<sup>th</sup> coordinated population projection (Statistisches Bundesamt, 2009). The old age dependency ratio started from 24 percent in 1950 and will jump to over 70 percent in 2030 and afterwards. Thus the total dependency ratio is going to near 100 percent in the next decades. This is only taking into account the pure number of persons in each age group relative to the working age population (15-60 years old). Another way to show the effects of population aging is to calculate the economic support ratio, the ratio of the effective number of producers relative to the effective number of consumers. The age profiles of consumption, income and transfers are taken from the NTA project database and are assumed to stay constant over time. At the same time the demography develops according to the 12<sup>th</sup> coordinated population projection (Statistisches Bundesamt, 2009). The support ratio in Germany was relatively stable from 1950 to 2010 and about 80 producers had to work for 100 consumers. A decline can be witnessed in the near future, when the ratio will drop to 60 to 100. This together with the knowledge that it is an increasing number of elderly that is causing the decrease in the support ratio and the increase in the total dependency ratio hints to severe financing problems of the social security system as it is the elderly that are heavily dependent on public transfers in Germany. Longer working lives due to shorter education periods or delayed retirement entrance and better health of the elderly can decrease this burden.

Germany is organized into 16 states and more than 11.000 local authorities, additionally the social security is financed via social contributions receiving additional payments from the federal government in case of budget shortages. The way the German welfare

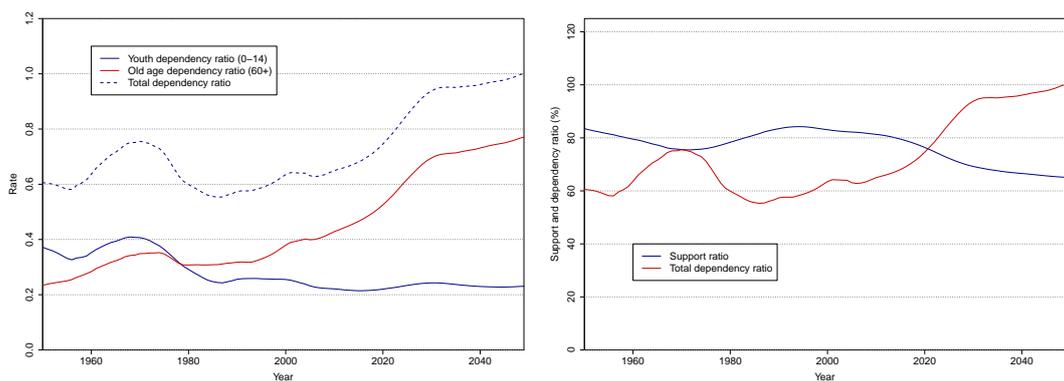


Figure 1: Dependency and economic support ratio, Germany 1950-2050  
 Source: author's own calculations based on population estimates (Federal Statistical Office)

state is designed, population aging affects federal, state and local governments to a different extent, as the layers finance different expenditures. Herein, the federal government mainly finances expenditures that are equally distributed per capita such as national defense or environmental protection. In addition, the federal government subsidizes the social security system in years when the contributions are insufficient. In 2003, the transfers to social security already added up to 90 billion euros, mainly for pensions (81 billion euros). The state and local governments have to finance education and sub-categories of social security such as housing allowances or basic social welfare payments. The government inflows for all layers of government are classified into combined Federal and Länder taxes such as income taxes or VAT. The federal government receives the inflows from insurance, alcohol and tobacco taxes while the states get the revenues from inheritance and asset taxes and local governments receive mainly excise tax and land taxes. These rules of tax distribution and expenditures result in different political challenges in the future. Especially the layers paying for the elderly and receiving taxes from paid labor or social contributions will be mainly affected by population aging.

Earlier studies on this topic estimated the fiscal impact of population aging for the U.S. (Lee and Edwards, 2002; Lee and Tuljapurkar, 1998; Edwards, 2010). Edwards (2010) uses the age-specific utilization information obtained from the National Transfer Accounts project. For Germany, comparable studies were carried out, see for example Seitz et al. (2005), Seitz and Kempkes (2007), and Seitz (2008). They use 7 broader age groups to answer the question how the layers of government are affected by population aging. Bach et al. (2002) and Werding and Blau (2002) focus on sub-aspects such as the government inflow side or the pension system. The main advantage is to provide age-specific utilization by single years of age for the layers of government in Germany including government revenues and expenditures. This approach offers new and more detailed information about

the budgets of the different layers of government and their development when the population ages.

## 2 Methodology and Data

The estimates are based on National Accounts and population data, both provided by the Federal Statistical Office (FSO) and the German Income and Expenditure Survey (Einkommens- und Verbrauchsstichprobe, or EVS). Macro control totals are provided by the statistical offices of the German Länder (Statistische Ämter der Länder, 2008).<sup>1</sup> The macro control totals are used as an anchor to adjust the micro profiles to fit National Accounts estimates and are available by the different layers of government.

The population estimates are available in one-year age groups provided by the German Federal Statistical Office, and are based on an extrapolation of census data. The last census conducted in the former Federal Republic of Germany was in 1987, and the final census in the former German Democratic Republic was carried out in 1981.

The microlevel survey data were obtained from the EVS of 2003. The EVS is conducted every five years by the FSO, and is based on a representative quota sample of Germany's private households. The EVS includes a detailed account of income by source, consumption by type, saving flows, and asset stocks by portfolio category. The EVS of 2003 includes around 50,000 households made up of some 127,000 individuals. The survey is representative of households with a monthly net income of less than 18,000 euros. The EVS does not include very wealthy households (70,000 of 38.1 million households), persons with no permanent residence, or the institutionalized population (For a methodological overview, see Statistisches Bundesamt (2005)). For three months, participating households kept a detailed book of household accounts that covered every kind of potential income and expenditure.

The National Transfer Accounts methodology<sup>2</sup> will be used to construct the estimates. The flow account identity is given by

$$\underbrace{Y^l(a) + Y^a(a) + \tau^+(a)}_{Inflows} = \underbrace{C(a) + S(a) + \tau^-(a)}_{Outflows}, \quad (1)$$

where  $Y^l(a)$  is the labor income,  $Y^a(a)$  is the asset income, and  $\tau^+(a)$  are the transfers received at each corresponding age  $a$ .  $C(a)$ ,  $S(a)$ , and  $\tau^-(a)$  are consumption, savings and transfers paid at each age. The inflows need to equal the outflows on the aggregate

<sup>1</sup>This is a joint publication of the 16 statistical offices of the German Länder, the Federal Statistical Office and the Bürgeramt, Statistik und Wahlen, Frankfurt a. M.

<sup>2</sup>For further information see [www.ntaccounts.org](http://www.ntaccounts.org).

level of Germany. Rearranging the equation 1 leads to

$$\underbrace{C(a) - Y^l(a)}_{\text{Lifecycle Deficit}} = \underbrace{\underbrace{Y^a(a) - S(a)}_{\text{Asset-based Reallocations}} + \underbrace{\tau^+(a) - \tau^-(a)}_{\text{Net Transfers}}}_{\text{Age Reallocations}} \quad (2)$$

which is taken from Mason et al. (2008). In this analysis, I will focus on the public transfer in- and outflows.

The age profiles for all kinds of public cash transfers (e.g. maternity leave, housing allowances, public pensions, etc.) are drawn from survey data, and are then smoothed and adjusted to the corresponding macro control. For public in-kind consumption the necessary information about utilization by age can be obtained from the Federal Ministry of Education and the Federal Ministry of Health. The obtained age profiles are then adjusted to the corresponding macro control of the respective layer of government that is financing it.

### 3 Results

In a first step we computed the age profiles of public consumption for the different layers of government. Figure 2 depicts the separate profiles for the 416 billion euros of public consumption that are granted in-kind. I separated expenditures for education, health care, other social security in-kind and other public consumption. The Federal government mainly pays for expenditures that are equally distributed per capita. Population aging only becomes relevant for this layer of government when the subsidies to social security are regarded as well, which is not yet the case here. State and local governments' expenditures are concentrated on the young. The state pays for universities which is the reason for the higher per capita values until around age 30. Afterwards the profile remains flat.

For our future projections we use simple comparative statics. The obtained NTA age profiles are assumed to remain constant over time and we contrast them with the projected population in the years 2020 and 2030 in Germany. By doing this, we can isolate the impact of age structure changes on our NTA estimates for the aggregate values. Figure 3 shows the expected expenditures for federal, state and local governments as well as for social security separately. The federal expenditures decrease from 58 billion to 54 billion due to a lower number of inhabitants in 2030. State and local governments can expect a 10 percent decrease in their expenditures in 2030 which is explained by a lower number of children in school-age. Social security will witness an increase in expenditures from 161 billion to 184 billion only due to health care costs for the elderly.

A first evaluation reveals that mainly the social security system with its four pillars health, pensions, unemployment and long-term care will face an unbalanced budget as

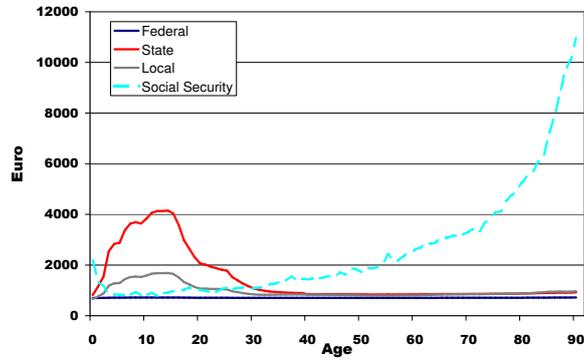


Figure 2: Public consumption expenditures by layers of government per capita in 2003  
 Source: author's own calculations based on Federal Statistical Office data

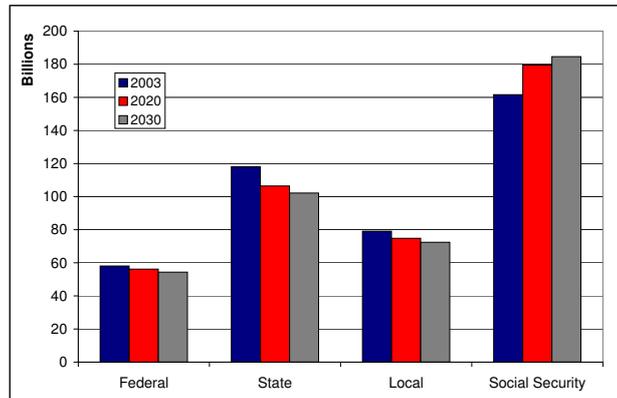


Figure 3: Public consumption expenditures by layers of government over time  
 Source: author's own calculations based on Federal Statistical Office data

social contributions are likely to decrease due to a lower number of persons in working ages. Against this background, it is likely that the federal subsidies for the social security system increase dramatically pointing to a more tax financed social security system. In our analysis we will further include cash benefits and government revenues in form of labor, asset and consumption taxes to complete the picture.

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