Labor utilization in aging populations: a comparison of age-specific weekly working hours in seven European countries.

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Motivation

Europe's population is aging. A lot of research has been devoted to study the potential economic consequences of demographic change on the labor force, social security, savings, investment, and health care. A recurrent topic is the expected shrinkage of the labor force and the possible negative consequences this might have on the economy of a country. The general argument is that a decreasing number of people of working-age will have to produce enough output to support themselves and an increasing number of non-workers.

Some studies extend the focus beyond the sheer size of younger and older population groups to include information on past and present developments of age-specific labor force participation. This depiction is more meaningful since not everyone who is of working age is actually working. Moreover, labor force participation varies significantly between countries, so that countries that have similar population structures can do significantly different when it comes to labor force participation. Various authors (Holzmann 2005; OECD 2000; Reday-Mulvey 2005, Börsch-Supan 2002) call for and discuss the possible effects of increasing labor force participation to counteract the expected negative economic consequences of demographic change. Due to the changing age structure, the share of the working population would decrease during the next decades in many countries if employment rates stayed at current levels.

Another branch of economic literature deals with the impact of labor productivity on economic output and how a change in the age-composition of the labor force will influence aggregate labor productivity (e.g. Prskawetz and Fent 2007, Skirbekk 2004, Lazear 1990).

However, I argue that this focus on population structure, age-specific labor force participation and productivity profiles is too narrow, since these are only three aspects to consider when analyzing potential changes in output due to demographic

change. To represent the effects of labor utilization and labor productivity on economic output in a complete way, it is necessary to also pay attention to the age-specific number of working hours supplied by each worker (see figure 1). In economic terms, this means to look not only at the extensive margin but to consider the intensive margin as well. The distinction is crucial; for example, it makes a difference whether the often demanded increase in employment of women and the elderly involves mainly part- or full-time employment.

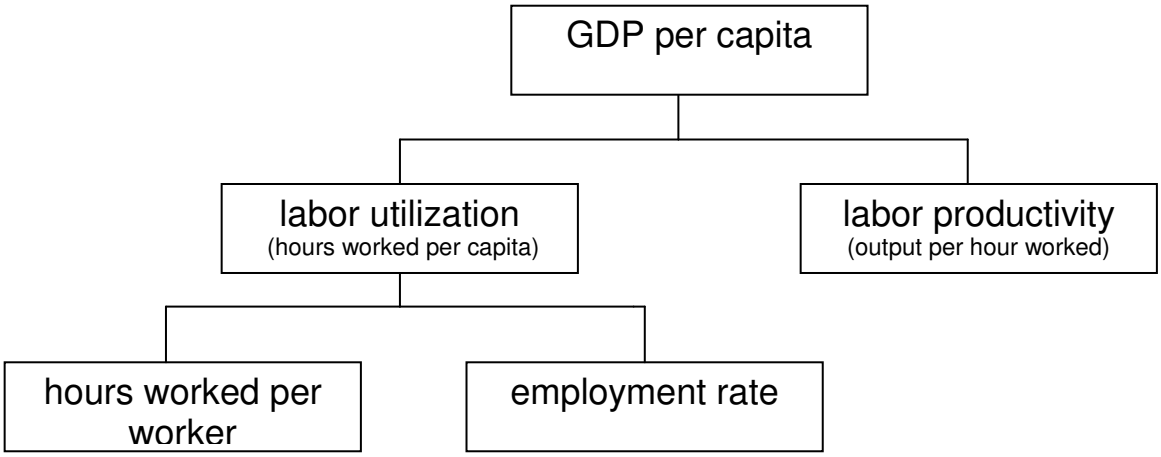


Figure 1: Determinants of GDP per capita (Leibfritz and Roeger 2008, p. 41, modified)

A more formal representation of the relationship between output, labor force, and population can, for example, be found in Leipfritz and Roeger (2008, p. 36):

$$Y \equiv \frac{Y}{L} \cdot \frac{L}{E} \cdot \frac{E}{N_{LF}} \cdot \frac{N_{LF}}{N_{WA}} \cdot \frac{N_{WA}}{N} \cdot N \qquad (1)$$

where:

L = total hours worked

E = employment

N_{FL} = labor force

N_{WA} = population at working age

N = total population

Y/L = labor productivity per hour

L/E = hours worked per worker

E/N_{FL} = employment rate

N_{FL}/N_{WA} = labor force participation rate

N_{WA}/N = share of working age population in total population

Any change in GDP is the result of the summation of changes in labor productivity, the number of hours worked, the employment rate, the labor force

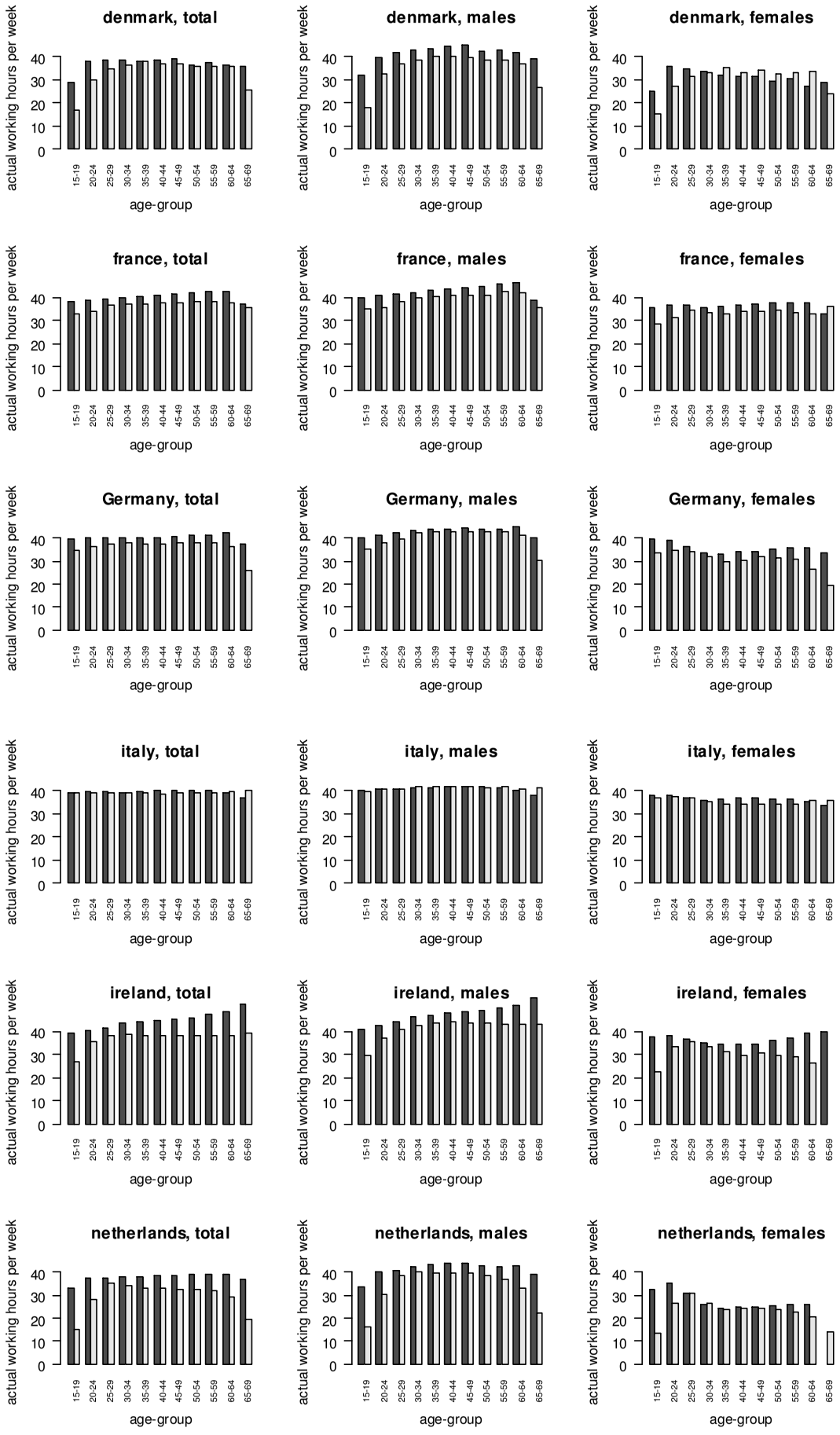
participation rate, and of changes in the composition of the population. The focus of past research on the labor market consequences of aging has been on four of these five parameters. The number of age-specific hours worked has not (yet) been the focus of attention in the context of an aging labor force. The goal of the analysis at hand is to fill this gap.

Methodological approach and data

This project compares the development of individual labor input across seven European countries (Denmark, France, Germany, Ireland, Italy, Netherlands, United Kingdom). The selection of countries is based on their distinctly different labor market policies during the last two decades. Data for employment information, demographic and socio-economic characteristics, and actual weekly working hours are taken from the European Labor Force Survey, 1983 to 2003.

Preliminary results

The variables in the dataset allow for a detailed descriptive analysis by age and sex. As the graphs in figure 2 show, there is a lot of variation between countries when it comes to the development of weekly working hours by age and gender over time. In general, the shape across age-groups is more similar for males than for females in every country. Italy stands out as the country with the smallest variation across ages, between males and females, and over time.


denmark, total
denmark, males
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france, total
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Germany, total
Germany, males
Germany, females
italy, total
italy, males
italy, females
ireland, total
ireland, males
ireland, females
netherlands, total
netherlands, males
netherlands, females
actual working hours per week
age-group
0
10
20
30
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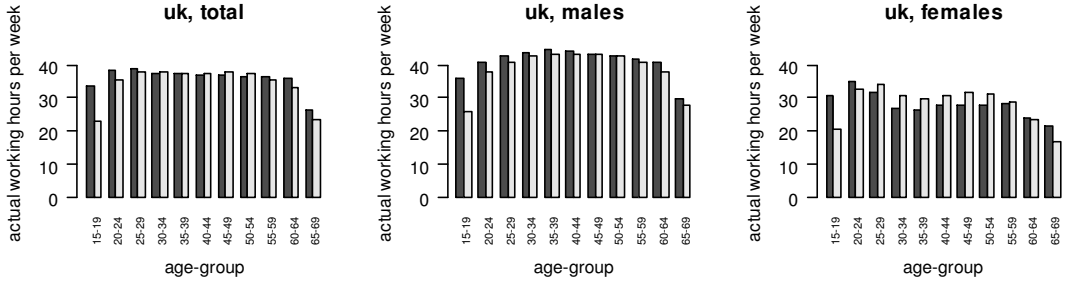

Figure 2: Actual weekly working hours for selected European countries, 1983 (dark bars) and 2003 (light bars), for males and females, ages 15 through 69 (source: EU LFS).

Combining age- and sex-specific working hours with the respective employment rates allows the analysis of per-capita labor utilization (e.g. Denmark in fig. 3). Again, variation across countries, over time and across age and sex is striking, but at the same time, there are interesting similarities. Moreover, countries can show similar patterns for hours worked per capita, with these patterns being the result of a very different combination of working hours and employment rates (fig. 4).

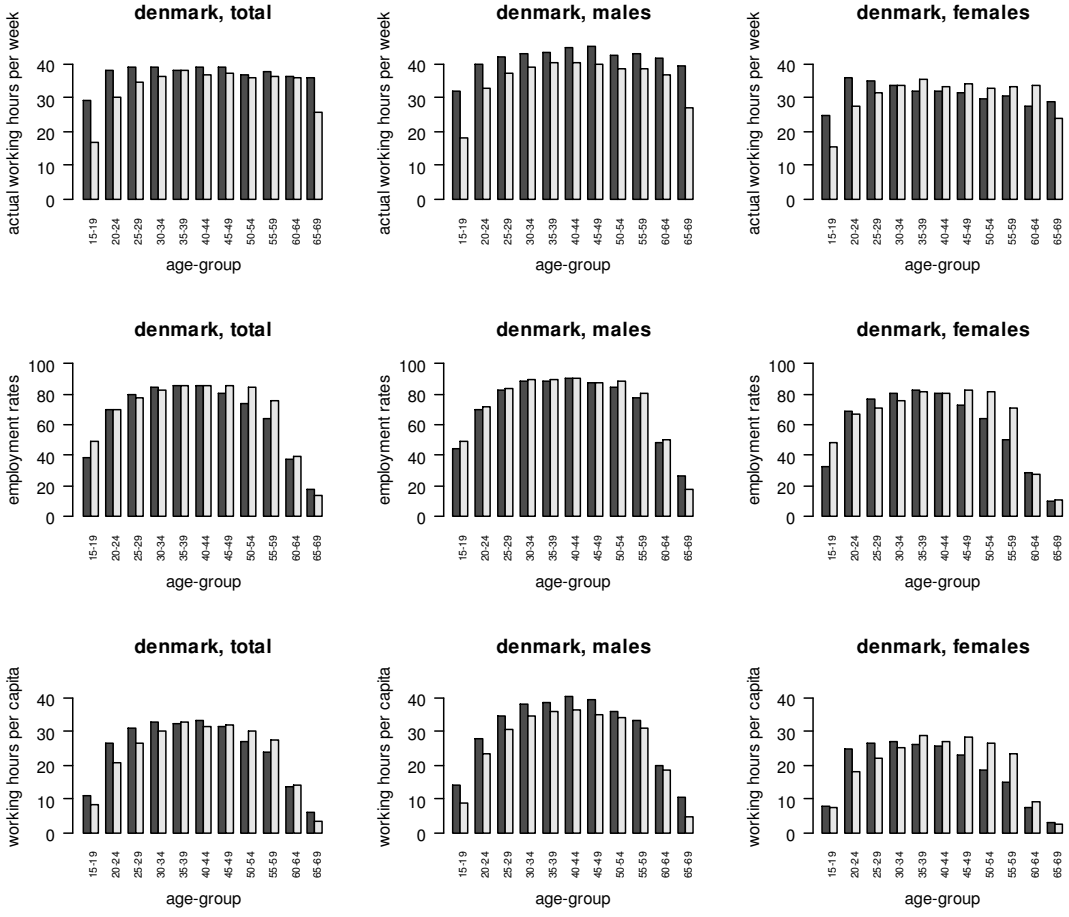

Figure 3: Weekly working hours, employment rates, and working hours per capita for Denmark, 1983 (dark bars) and 2003 (light bars), for males and females, ages 15 through 69 (source: EU LFS).

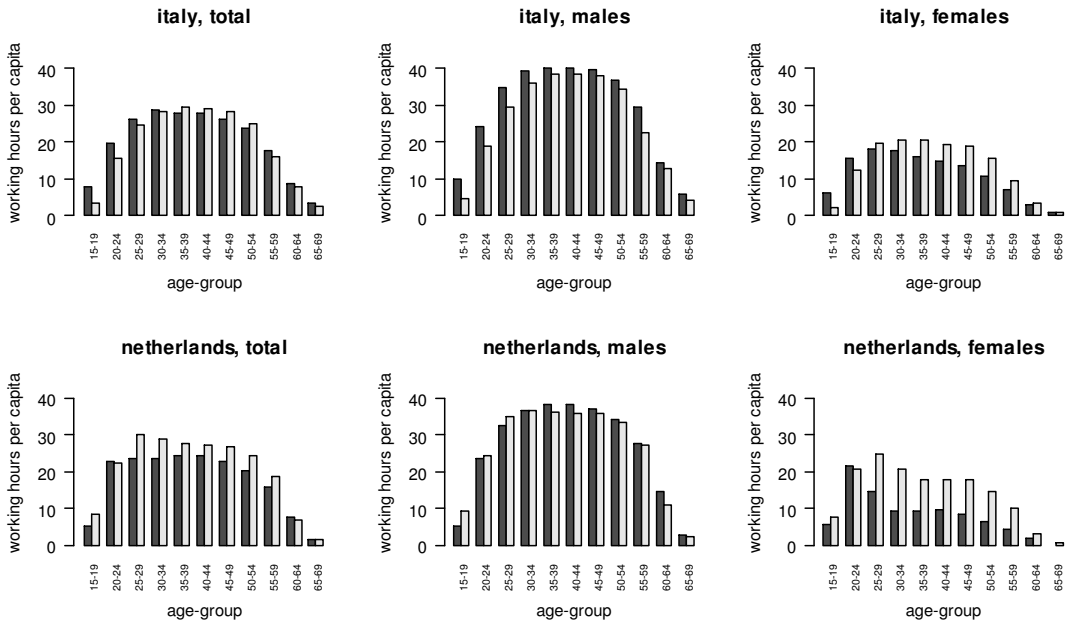

Figure 4: Working hours per capita for Italy and the Netherlands, 1983 (dark bars) and 2003 (light bars), for males and females, ages 15 through 69 (source: EU LFS).

A preliminary analysis of age-specific working hours including other variables than just age and sex showed significant differences across e.g. levels of educational attainment and occupational sectors.

The results will be discussed in the context of conceptual frameworks like e.g. standard economic models of labor supply and demand or the three welfare state regimes by Esping-Andersen.

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