



MODELLING THE ECONOMIC POTENTIAL OF THE SILVER ECONOMY

MIROSLAV ŠTEFÁNIK ET AL.

NEUJOBS WORKING PAPER No. D 12.3

20.8.2013

Abstract

This paper summarizes the efforts to model the effects of ageing populations on changes in consumption of households in European countries. Combining the European Household Budget Survey and Labour Force Survey data, we are able to project changes in the consumption of households caused by the demographic changes. An Input Output model translates the changes in consumption into changes in employment in economic sectors. International comparisons reveal differences in the potential for the silver economy among European countries.



NEUJOBS Working Documents are intended to give an indication of work being conducted within the NEUJOBS research project and to stimulate reactions from other experts in the field. Texts published in this series are ultimately destined for academic publishing. The views expressed in this paper are those of the author and do not necessarily represent any institution with which he is affiliated. See the back page for more information about the NEUJOBS for free downloading from the NEUJOBS website (<http://www.neujobs.eu>)

CONTENTS

Introduction.....	7
1 The Silver economy as the potential for growth.....	8
2 Overview of demographic trends and the structure of demand.....	14
2.1 Demographic trends.....	14
2.2 Structure of the demand of the elderly - cluster analysis.....	19
2.3 Quantification of the change in consumption caused by ageing.....	26
2.3.1 Modelling a dynamic structure of consumption.....	27
2.3.2 Projections of number of households.....	28
2.4 Results of the quantification.....	31
3 Future needs and perspectives of specific sectors.....	34
3.1 Data and methodology.....	34
3.2 Results and Discussion.....	37
3.2.1 Germany.....	37
3.2.2 Slovakia.....	42
3.2.3 Italy.....	46
3.2.4 Finland.....	50
3.2.5 EU.....	54
Conclusions and Discussion.....	58
References.....	62
ANNEX.....	64
ANNEX 1: Results of the cluster analysis.....	64
ANNEX 2: Aggregation of CP12 and corresponding CPA sections.....	66

LIST OF TABLES:

Table 1: The development of population EU 27 up to 2030 (Friendly scenario)	14
Table 2: Mean expenditures on COICOP 1-digit level in European countries by age of the reference person.....	20
Table 3: Mean expenditures on COICOP 1-digit level in European countries by age of the reference person - elderly.....	21
Table 4: Household's mean income, consumption, expenditure, net wealth, propensity to consume and fraction of households owning main residence by age of the reference person in € in 2009/2010	24
Table 5: Fraction of households, which have particular types of assets and conditional mean value of assets in thousands € in 2009/2010.....	24
Table 7: Shares of total consumption of households in Germany in % (based on friendly demographic projections).....	31
Table 8: Shares of total consumption of households in Slovakia in % (based on friendly demographic projections).....	32
Table 9: Shares of total consumption of households in European countries in % (based on friendly demographic projections)	33
Table 10: Transformation table linking COICOP and CPA.....	Error! Bookmark not defined.
Table 11 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Germany	Error! Bookmark not defined.
Table 11 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Poland	Error! Bookmark not defined.
Table 13 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Slovakia.....	43
Table 11 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Italy	47
Table 12 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Finland	51
Table 16 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Austria	Error! Bookmark not defined.
Table 12 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Finland	54

LIST OF FIGURES:

Figure 1: Index of growth in age groups (Friendly scenario)	15
Figure 2: Changes in the proportions of population 60+ in selected EU countries based on NIDI demographic projections	15
Figure 3: Clustering of EU 27 countries based on the extent and intensity of ageing in the period 2010-2030	16
Figure 4: Mean expenditures on COICOP 1-digit level in European countries by age of the reference person	19
Figure 5: Mean expenditures on COICOP 1-digit level in European countries by age of the reference person- elderly	21
Figure 6: Clusters of countries based on the structure of consumption of households with reference person 60+	22
Figure 7: Average household size (number of persons) by age of the reference person	29
Figure 8: Estimated and actual number of households by age of the reference person in millions	30
Figure 9 Households' structure by age of reference person, friendly and tough scenarios, Germany	38
Figure 10: Additional demand by product group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, Germany	39
Figure 11 Expansion of labour demand generated by demographic transition, jobs created (in thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Germany	41
Figure 12 Expansion of labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenarios, Germany	41
Figure 13 Households' structure by age of reference person, friendly and tough scenarios, Poland	Error! Bookmark not defined.
Figure 14: Additional demand by product group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, Poland	Error! Bookmark not defined.
Figure 15 Expansion of labour demand generated by demographic transition, jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Poland	Error! Bookmark not defined.
Figure 12 Expansion of labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenarios, Poland	Error! Bookmark not defined.
Figure 17 Households' structure by age of reference person, friendly and tough scenarios, Slovakia	42
Figure 18: Additional demand by product group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, Slovakia	44
Figure 19 Expansion labour demand generated by demographic transition, thousands of jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Slovakia	45
Figure 20 Expansion of labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenarios, Slovakia	45
Figure 25: Households' structure by age of reference person , friendly (F) and tough (T) scenario, Italy	47

Figure 26 Additional demand by product group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, Italy47

Figure 27 Expansion of labour demand generated by demographic transition, jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Italy.....48

Figure 28 Expansion of labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenario, Italy.....49

Figure 29 Households’ structure by age of reference person , friendly (F) and tough (T) scenario, Finland.....51

Figure 30 Additional demand by product group and households by age, percentage change between 2010-2025, friendly (F) and tough (T) scenario, Finland.....51

Figure 27 Expansion of labour demand generated by demographic transition, jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Finland52

Figure 27 Expansion of labour demand generated by demographic transition, total percentage change 2010-2025 , friendly (F) and tough (T) scenario , Finland53

Figure 28 Households’ structure by age of reference person, friendly and tough scenarios, Austria..... **Error! Bookmark not defined.**

Figure 29: Additional demand by product group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, Austria..... **Error! Bookmark not defined.**

Figure 30 Expansion of labour demand generated by demographic transition, jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Austria..... **Error! Bookmark not defined.**

Figure 39 Expansion of labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenarios, Austria**Error! Bookmark not defined.**

Figure 29 Households’ structure by age of reference person, friendly (F) and tough (T)scenario, EU2754

Figure 30 Additional demand by product group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, EU2755

Figure 27 Expansion of labour demand generated by demographic transition, jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, EU27.....56

Figure 31 Expansion of labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenario , EU27.....56

MODELLING THE ECONOMIC POTENTIAL OF THE SILVER ECONOMY

TOMÁŠ DOMONKOS, PETER HORVÁT, VERONIKA HVOZDÍKOVÁ, IVAN LICHNER, TOMÁŠ MIKLOŠOVIČ, VILIAM PÁLENÍK, MAREK RADVANSKÝ, MIROSLAV ŠTEFÁNIK*

NEUJOBS WORKING PAPER No. D 12.3/20.8.2013

*All authors are researchers at the Institute of Economic Research of the Slovak Academy of Sciences: Ing. **Tomás Domonkos**, PhD., Ing. **Peter Horvát**, Ing. **Veronika Hvozdíková**, PhD., Ing. **Ivan Lichner**, Mgr. **Tomáš Miklošovič**, RNDr. **Viliam Páleník**, PhD. h. doc., Ing. **Marek Radvanský**, PhD., Mgr. **Miroslav Štefánik**, PhD., Corresponding author: miroslav.stefanik@savba.sk



Introduction

Ageing is commonly perceived as one of the biggest threats EU member states will be exposed to during the 21st century. Uniquely, this study is aimed at presenting ageing as an opportunity. It focuses on the changes in consumption of households within national economies caused by ageing of the population. Population and its age structure have been shown to have had a substantial impact on the economic outcomes of countries after the Second World War. The main issue in question is whether the generation of baby boomers, born in the second half of the 20th century will continue with new consumption patterns in their post-productive age.

Our aim is the quantification of the effects of ageing on the consumption of households and, consequently on employment in particular economic sectors. This is complemented by a brief description of our theoretical perspective and an international overview of the demographic development and structure of consumption in European countries.

Changes in consumption and in the structure of consumption should both be the driving forces of what is often referred to as the 'silver economy'. This is a set of economic activities linked to the production of goods and services designed to target the elderly population. This segment of the economy is expected to grow because of the ageing of the population. The aim of this paper is to provide relevant information on the nature of the expected growth, and an assessment of how it affects particular economic sectors in terms of employment.

The text of the paper does not follow the standard structure of a research paper because of the nature of the analysis. Chapters are linked functionally. The second chapter builds on the results of the first chapter and the third chapter is based on the output of the second chapter. Parts explaining the methodology or wider theoretical context are segregated from the text and placed either into boxes or into separate subchapters.

The first chapter describes our theoretical perspective, referring to the most relevant theoretical, as well as empirical studies. The second chapter gives international comparisons among European countries of expected demographic developments, the relative structure of consumption and the quantification of proportions of households on total consumption in the country by age group and item of consumption. Cluster analysis is used to group the countries based on the selected indicators. The third chapter reports the results of the Input Output model application. Applying such a model to data for Austria, Germany, Poland and Slovakia enables us to follow the changes in consumption to the expected changes in the employment in economic sectors.

1 The Silver economy as the potential for growth

Extended life expectancy and reduced fertility are well-known key drivers of demographic change. With mortality and fertility falling, the age distribution of the European population has shifted to older age cohorts. Although many European countries are nowadays experiencing a slight recovery in total fertility rates owing to a catch-up process connected to previous childbirth postponement (the so-called tempo effect), the process of ageing is irreversible in any scenario.

Consequently, the European working age population (in total) may start to contract by the next decade, and the proportion of older people will continue to expand, with certain implications for a wide range of socio-economic aspects. Once fertility and mortality rates stabilize, the European population will stabilize as well, but its age composition will differ significantly from the one known today. Therefore, the population ageing process is likely to affect economic development in the long run.

The image of the participation of older people in society is often limited or concealed by negative stereotypes resulting from the potential burden imposed by an ageing population on governments, families, or economic resources. Initially, the theory focused almost exclusively on the implications of these changes in population size and increase for economic growth, and less attention was paid to the population age structure. Introducing age structure changes into the economic growth model was inspired particularly by the “economic miracle” (Bloom – Williamson, 1998) seen in some developing regions of the world. Primarily, the models were used to explain the input of demographic changes to higher growth rates in the second stage of demographic transition (in other words, they were used to model and calculate the size of the so-called *demographic dividend*; see for example Bloom – Canning, 2004). The dividend emanates from the positive effect of the growing share of the population that is economically active, with certain implications for productivity, saving and investment, capital and labour accumulation that offer a one-time opportunity to boost economic growth.

Box 1.1: Stages of demographic transition and economic growth

An explanation of related economic effects lies in aggregate economic behaviour; with changing proportions and sizes of particular age groups, the economic behaviour of populations (in an aggregate view) should change, following certain predictable patterns. The significant growth in the proportion of children (due to higher survival rates at lower ages) in the first stage of demographic transition potentially decreases rates of capital accumulation and dampens overall economic growth performance: with rising numbers of children and young people, the share of consumers grows faster relative to the share of producers, and children and young people consume more than they produce and their consumption relies predominantly on the income or savings of their parents. The first stage of demographic transition and its ability to act against economic growth is sometimes used to explain lower rates of growth in countries with a young age structure (e.g. sub-Saharan Africa; see Bloom – Canning – Sevilla, 2002).

The second stage of demographic transition is characterized by a reduction in fertility and consequent decline in the proportion of children accompanied by a rise in the number of working-age adults (owing to the past baby boom trends observed during the first stage). The bulge of working-age cohorts assumes that growth in the number of producers exceeds the pace of growth in the number of consumers (*support ratio*, the ratio of the effective numbers of producers to the effective number of consumers; see Lee – Mason, 2007a). The working-age population also tends to save more than other age groups, especially in the later career stages (Shackleton, R. –

Foertsch, 2005; Bloom – Canning – Sevilla, 2002); increases in individual saving and investment may push in favour of economic growth when the former baby boom generation enters the workforce. The effect of fewer children in a family also motivates longer workforce participation and widens the scope for income accumulation; a lower children/young dependency ratio means wider opportunities for (even) more saving and/or investment. The benefit connected to the second stage is transitory (typically about 50 years), but can have significant implications for the economies concerned. In theory, a bonus created by the second stage of demographic transition has become known as a *demographic dividend* (Bloom – Canning – Sevilla, 2002; Lee – Mason, 2007a; Bloom – Canning, 2004; Shackleton, R. – Foertsch, 2005; Jackson – Howe – Nakashima, 2011; UN, 2007 and others) and the period when it occurs and lasts is referred to as a *demographic window*, or a *window of opportunity*. The window of economic opportunity does not automatically guarantee economic success; however, a demographic dividend is believed to have facilitated high growth rates in some East Asian economies, some studies concluding that this demographic phenomenon accounts for as much as one third of their economic miracle (Bloom – Williamson, 1998; Bloom – Canning – Sevilla, 2002; Bloom – Canning, 2004) or between one quarter and two fifths of the growth in these countries since the mid-70s (Jackson – Howe – Nakashima, 2011; for analyses of the implications of demographic change for macroeconomic performance using simple models of economic growth incorporating demographic effects see Bloom – Canning, 2004; the authors here also compare the importance of the age structure effect in the cases of East Asia’s “economic miracle” and sub-Saharan Africa’s “economic debacle” or Ireland’s “Celtic Tiger” phenomenon). The effective employing of a demographic dividend depends on economic and social (and, in many cases, political,) conditions creating an environment for sustainable development; increases in the working-age population generate a supply side boost to potential output, but the availability of a greater workforce can be reaped only at sufficient employment rates, and physical capital accumulation will have little effect without opportunities for investment.

And finally, the third stage of demographic transition means that after a lengthy period of fertility and mortality decline, only the proportion of older population rises, the share of young cohorts and workforce population decline. The burden imposed by youth dependency is replaced by old-age dependency as the baby boom population ages. Rapid population ageing poses challenges for public policies as well as the markets – and it is not just a shrinking labour force, but also the pressure on saving rates and changing demands and consumer preferences. Generally, this stage of transition is under way in developed countries; their age structure is becoming considerably older.

The topic of the changing age distribution of the population has attained immense significance recently, as large baby boom cohorts will soon retire. . The supply of labour following on from the changing share of the working age population is not the only channel through which the ageing process may affect production and overall economic performance. People’s economic behaviour, needs and preferences vary across the individual stages of life, the shifts in the age structure may therefore have significant macroeconomic effects; the changes are likely to occur in consumption, saving and investment patterns, in the distribution of income. At the macroeconomic level, variations in demand for goods and services determine investment opportunities, change production structures, and thereby influence capital and labour allocation. Therefore, while the expected additional burden imposed on public finances is commonly at the centre of the policy debate about the economic consequences of population ageing, and policymakers focus mainly on public healthcare, family policies, labour market flexibility or education, additionally, attention is being paid to changing consumption patterns and the challenges for producers. As mentioned previously, older people consume more than they produce, but they also spend more on age-specific goods and services – contingent changes in the composition of aggregate demand is linked to presumed breaks in both, age-related income as well as age-specific consumption preferences. While the wide range of other afore-mentioned

implications for economic growth suggested by the standard economic theory go beyond the scope of this study, the latter is of particular interest to us.

Changes in age distribution appear to be a critical dimension of changes in consumption patterns – the logic behind the hypothesis is simple and can be explained by the *life cycle theory*. Each age group behaves differently and with a changing population age structure, the intensity of age group-related behaviour changes as the relative size of a certain age group rises or declines.

Box 1.2: Life cycle income and consumption hypothesis

The base theoretical insight in most studies on ageing implications for income, consumption, and saving is provided by the life cycle model and consumption-smoothing hypothesis. The standard life cycle model assumes that individuals follow an optimal trajectory of consumption throughout their lives. The idea is that people maintain (or try to maintain) a relatively stable level of living standard throughout their life. To do so, they accumulate savings during high income stages of life and draw savings down when income decreases. When labour income exceeds consumption (usually around the middle of their working age), people use the surplus either to provide transfers to dependent persons, to invest, or to accumulate savings for old age income security (saving rates vary with age, the highest rates appear between 40- and 70-year-olds; age-specific behavior hypothesis assumes that people in their early career stages prefer to invest the surplus and not to consume). Consumption is basically determined by lifetime earnings and expected longevity; intergenerational transfers come into play when labour income vanishes. Although the macroeconomic effects of demographic transition may be attenuated or overshadowed by factors like business cycles, productivity dynamics, technology changes, sudden economic shocks or policy measures, the standard economic theory proposes that increases in the working age population share is associated with higher rates of investment and savings and with higher output and wealth, while increases in the share of the youth and elderly population have the opposite implications.

The life cycle hypothesis implies an almost constant trajectory of consumption and a hump-shaped trajectory of labour income throughout the life (age groups); age profiles of consumption and income are usually based on aggregate consumption and income at the national level. The hypothesis also explains the origin of dependency ratios (youth and old-age dependency) that are commonly used to measure the dynamics of population ageing.

Empirical studies examining the implications of demographic changes for economic growth often focus on income per capita which approximates a level of living standards or stage of economic development; some of the recent studies (Mason – Lee, 2004; Lee – Mason, 2007a) introduced *income per effective consumer*, incorporating the effect of the population age distribution and different levels of consumption by age. Focusing more on how changes in population age structure influence consumption per capita rather than income per capita gave birth to “the second dividend theory” (Lee – Mason, 2007b). Modelling of *consumption per effective consumer* helped to answer the question as to whether in certain countries population ageing led to an expansion in transfer programmes or to increased assets accumulation (*second demographic dividend*). The results of the research suggest that age related consumption is not limited to individuals’ lifetime budget constraints as it may be understood from the standard life cycle hypothesis, in point of fact, rather than that *consumption is constrained by total production*. Older people retiring from work do not rely exclusively on the labour of others, in addition to using public and private transfer mechanisms; they may have acquired assets in savings, in private pension funds, in their homes. Moreover, there is some evidence of increased saving rates due to rising life

expectancy and higher needs to ensure future retirement income (Bloom – Canning, 2004). In other words, people adjust their life cycle behaviour to the likelihood that they will live longer and healthier lives (they work longer and save more for retirement and expect to spend and consume more during their retirement).

However, whether older people finance their consumption by public and private transfer or by accumulated assets, in the aggregate view, consumption by the elderly population can be expected to rise, thanks not only to the second dividend theory (and the implications for savings and capital accumulation broadly described in the economic literature) but simply because the number of retirees will increase rapidly over time (any eventual drop in their purchasing power in the future may be easily offset by unprecedented rises in their number). The most recent empirical studies, therefore, focus not only on the macroeconomic effects of their rising share in the total population and on production and consumption shifts, but on consumption by older people themselves, or expressed in another way, on the structure of their consumption and changes in consumption patterns. Recent results suggest that the elderly population tend to spend a higher proportion of their sources on housing and social services than younger cohorts (Lührmann, 2005) or that their spending on health care services may even boost their share in the overall shape of a country's consumption profile (as in the case of the U.S., see Lee – Mason, 2007a). Comparisons based on household income and expenditure survey data (UN, 2007) reveal that spending on housing, energy and health care steadily increases with age in both the U.S. and the E.U., while expenditure on entertainment and transport decline and the share of basic food and clothing in total consumption seems to be relatively constant. With these consumption patterns, it can be anticipated that demand for health care and long-term care services will rise; also expenditure on housing and utilities will increase as seniors spend more time at home. Examinations of the long-run trends (since the 1970s) in the consumer behaviour of households around retirement seem to confirm this anticipation. According to the Eurostat household consumption expenditure (COICOP Classification) by age groups, the share of food, housing, energy and health care expenditure in total tend to rise with age (based on data for the EU 27 on average), while expenditure on culture, education, transport and clothing tends to decrease with age (Dovářová, 2012). Models projecting future changes in demand prove that age effects may, in some circumstances, translate into aggregate demand composition substantially (furniture, clothing, transport, education and leisure expenditure become less important, while health spending and demand for hotels and package holidays play a weightier role in aggregate demand as in the case of Germany; Lührmann, 2005). Changes in the age structure may influence production and long-term investment planning, trigger substantial sectoral shifts with implications for inter-sector mobility of employment and, through changes in national production, it may affect international trade activities as well (Lührmann, 2005).

One may say that further research on changing consumption patterns is limited by the changes in incomes level after retirement (currently, the income replacement rate for the EU average constitutes approximately 70 %). Indeed, one has to keep in mind that there are some indications in favour of the increased purchasing power of elderly in the future (or at least new aspects of their demand that should be considered). First, we are witnessing a growing interest in innovative financial and banking products designed to spur consumption of the expanding elderly population (e. g. reverse mortgages that help retirees to convert an illiquid asset – property – into liquid ones). Secondly, in developed regions of the world, most equity share ownership is held by those over 50. Thirdly, today's older people lead more active, independent lives with the quality of their lives constantly

improving, some retirees even manage to start their own businesses. They actively seek innovative products that could meet their needs efficiently. Fourthly, the premise that older people in general are a dependent and vulnerable group loses strength. The baby boom generation is considered as one which has redefined the term "old age"; they have been used to consuming because they have grown up in a consumer society, and their expectations and demands are different and cannot be compared to their predecessors. Their attitudes towards changes in mobility and flexibility, changes in their tastes and needs will have to be reflected in the new marketing, communication and production paradigm. The new generation of seniors opens up an immense opportunity for the silver economy build-up.

Even though the timing and pace of population ageing vary across the Member States, the implications for production (and capital and labour allocation) are of a general character. Regions undergoing this transition have an opportunity to create conditions favourable for the development of the silver economy and thus stimulate economic adjustment to new consumption patterns. By the end of the 20th century, when the picture of the changing European demographic profile had become more apparent, European institutions marked the population ageing as one of the most serious challenges of the 21st century. The ageing issue has moved high up on the European policy agenda since the early 2000s, as many Member States have experienced a drop in the fertility rate below 1.3 children per woman, which led to the publication of the Green Paper on ageing in 2005. At that time, projections of future dependency ratios triggered heated debates on topics such as working age population shrinkage, additional pressure on public budgets, the need to redefine social and pension systems, or solidarity between generations. However, already in 2005, the Green Paper portrayed elderly people as perhaps wanting to live an active life, combining part-time work with retirement, people who will not only be more active, but also in better health, and who will have more savings and property. The follow-up Commission's communication from October 2006 comments that population ageing can even *represent an opportunity to enhance the competitiveness of the European economy*, on the assumption that European companies would take advantage of the opportunity created by an ageing population in terms of exploring and meeting the needs of an older clientele, producing special goods and supplying special services targeted at the older population: the first contour of "the silver economy" was outlined here. A changing approach - in accepting ageing as an opportunity not just a challenge - can be further seen in the EC's 2009 Ageing Report that says: "ageing societies bring new opportunities to innovative firms through the demand for new or adapted goods and services" (Commission of the European Communities, 2009) as well as in the Council's resolution from February 2007, which defines the silver economy explicitly as *a new economic opportunity responding to the needs of older people by making accessible specific goods and services to improve their quality of life*. The Council encourages European research in this area with the aim to "become a leading example of the silver economy" (Council of the European Union, 2007).

The silver economy is, arguably, a chance to promote employment and enhancing economic growth, an opportunity that is not limited exclusively to the European territory. Population ageing is a global phenomenon, even though the transition to old age occurs at a different time and pace in other parts of the world. Given that all the EU's main trading partners (even outside Europe) are experiencing population ageing, and some of them will age at a pace never seen before (China, above all), new solutions, products and services would have their potential in exporting to the third countries as well, especially developing countries. The leading emerging economies notwithstanding, are home to the vast majority of older populations; by 2050 as much as 80 % of the total world's senior population will live in the

developing world. Taking into account the economic power and recent economic performance of some of them, their absorption capacity can easily be illustrated by the growth rates of the import volumes exceeding the growth rates recorded in the developed countries. By the existence of rush trade relations between the EU and the main emerging economies (notably the BRIC countries which, together with the US and Japan, account for six out of seven main trading partners outside the European territory) and their rapidly changing age distribution, one can detect an immense chance for the future growth of the silver markets in these countries. This could bring an opportunity for promotion of silver production (goods and services) developed in, or provided by, the European countries, familiar with the ageing process themselves.

Finally, the concept of the silver economy needs to be seen in the wider concept of a socio-ecological transition as described in the working paper on socio-ecological transitions within the NEUJOBS project (Fisher-Kowalski, et al., 2012). The ageing of the population is only one of several trends which are observable and whose consequences can be expected in the future.

2 Overview of demographic trends and the structure of demand

Within this chapter we are going to present some features of expected demographic developments and put them together with information on the structure of consumption with respect to age. Combining this information allows us to construct a statistical variable model able to follow the impact of ageing on the consumption patterns of households in European countries.

The structure of the chapter corresponds to the content outlined in the first section, describing demographic development from the perspective of changes in the age composition of the population. The second section deals with the structure of consumption, employing evidence from European Household Budget Surveys. Cluster analysis is used in both sections to make groupings of countries based on ageing and consumption patterns. Clustering countries together makes analysed patterns easier to comprehend. Based on these analyses, we build a statistical data model able to quantify the effects of ageing on the consumption patterns of households. This model can be found in the last section of this chapter.

2.1 Demographic trends

Most recent studies dealing with ageing indicate the risks related to this trend. The perspective of this paper is, therefore, a little outside the mainstream, looking at ageing as an opportunity for potential change in the structure of production. The first determining factor when studying the consumption patterns of households is the number of people living in households - potential consumers. Within this section, we are going to present some of the main trends in the ageing of European (EU 27) population, which are relevant from the perspective of studying changes in consumption. Major trends will be described using projections calculated by one of the partners within the NEUJOBS project, the Netherlands Interdisciplinary Demographic Institute (NIDI)¹.

The following table shows the projections of population in particular age groups, together with the proportion of the age group in the total population. The figures are for all EU 27 countries pooled together.

Table 1: The development of population EU 27 up to 2030 (Friendly scenario)

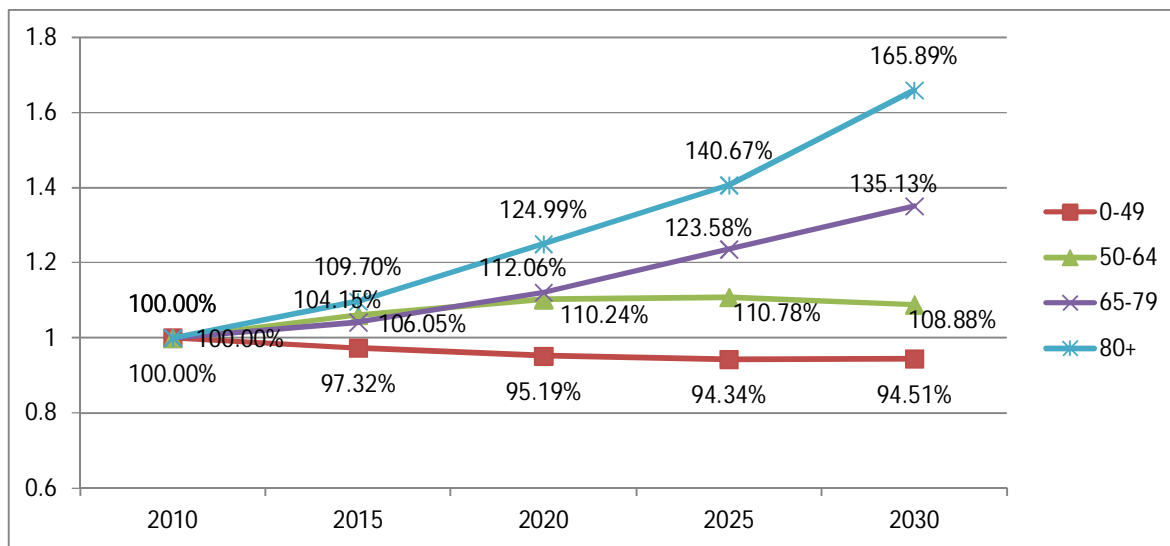
Age group	2010	2015	2020	2025	2030
0-49	394 441 218	383 867 825	375 449 598	372 111 245	372 779 537
	63.23%	61.26%	59.22%	57.68%	56.47%
50-64	119 840 034	127 095 892	132 107 213	132 761 244	130 486 663
	19.21%	20.28%	20.84%	20.58%	19.77%
65-79	80 664 196	84 015 165	90 395 638	99 687 876	109 004 221
	12.93%	13.41%	14.26%	15.45%	16.51%
80+	28 845 498	31 643 930	36 055 179	40 575 542	47 852 047
	4.62%	5.05%	5.69%	6.29%	7.25%
Total	623 790 946	626 622 812	634 007 628	645 135 907	660 122 468
	100.00%	100.00%	100.00%	100.00%	100.00%

Source: (Huisman, et al., 2013)

¹ Details about the projections can be found in a working paper (Huisman, et al., 2013) published within the NEUJOBS project at www.neujobs.eu

In 2010, the overall population of EU 27 was almost 624 million. This figure is supposed to grow during the whole reference period from 2010 to 2030. According to the friendly scenario of NIDI projections, the overall EU 27 population will grow to over 660 million. The age group 0-49 presents the dominant age group, whose share of the population is going to decline from 63.23% in 2010 to 56.47%. This decline presents clear evidence of the ageing of the population. The proportion of the age group 50-64 shows an ambivalent trend in the period 2010-2030, with initial slight growth and later slight decline after 2020. In contrast, the age groups 65-79 and 80+ show a clear growth trend. The graph below shows the index of change with 2010 as the baseline year.

Figure 1: Index of growth in age groups (Friendly scenario)

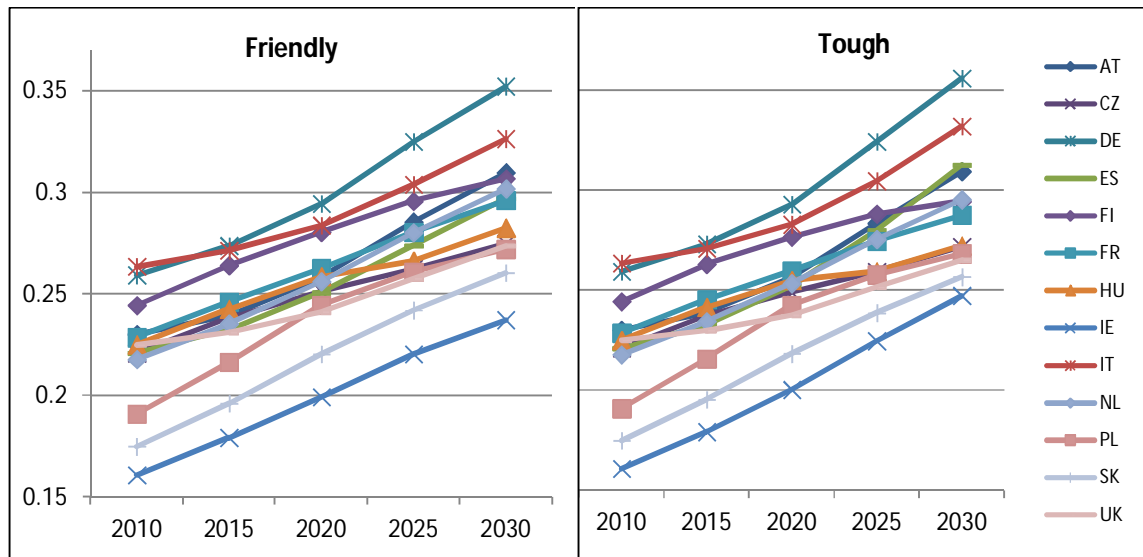


Source: (Huisman, et al., 2013)

From this graph, we can see that the most intensive growth is expected for the age group 80+, followed by the age group 65-79. These together will grow from 17.56% of the population to 23.76% of the overall population which is going to influence the shape of the overall private consumption of the population.

In attempting to answer the question on the national differences in ageing, we have restructured the analysis dividing the population only into two age groups: 0-59 and 60+. Based on this, we are able to follow changes in the proportion of the population 60+ in the overall population. The graphs below show the development of the proportion of 60+ in the population in selected EU27 countries. Figures are based on the NIDI projections and displayed for friendly (left) as well as tough (right) scenario.

Figure 2: Change in the proportion of population 60+ in selected EU countries based on NIDI demographic projections

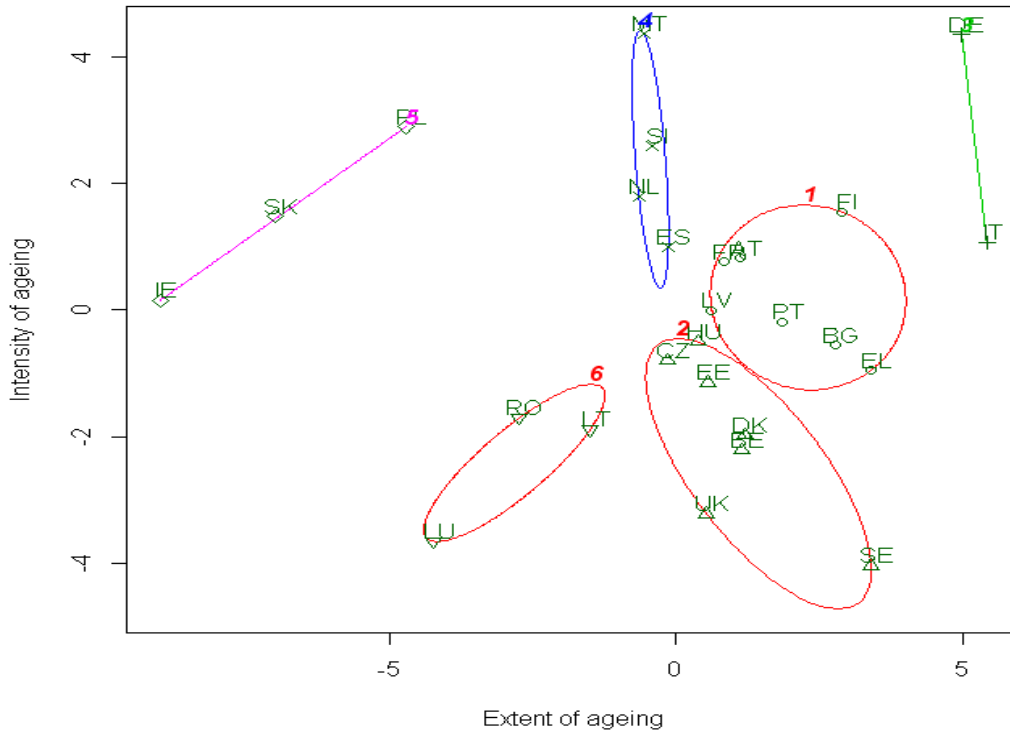


Source: (Huisman, et al., 2013)

At first glance, we can observe the uniformity of the ageing trend. All of the selected countries face an increase in the proportion of the population aged 60+. Only relatively small differences in the proportions and the pace of change exist. Ireland and Slovakia present the countries with the smallest proportion of population at 60+. At the other end of the spectrum, we find Germany and Italy with high proportions of the population 60+ with significant further increases until 2030, with figures for Germany being above 35% in 2030. Finland presents a country with a relatively high proportion of the population at 60+ but its further growth is expected to slow down, with Finland converging towards the main group of countries.

These small differences in the proportion of the population at 60+ and its changes in time can be entered into a cluster analysis as explanatory variables in order to group the countries based on the character of the ageing of their population. Based on this information, there are 10 explanatory variables, five times two, for each of the 5-year periods on 2 variables (proportion of the population at 60+ and the index of changes in the population 60+ with the baseline value from 2010). We have used non-hierarchical clustering to identify 6 clusters of countries based on the extent and intensity of ageing. The following graph shows the groupings of countries in a reduced 2-dimensional space.

Figure 3: Clustering of EU 27 countries based on the extent and intensity of ageing in the period 2010-2030



Source: Authors calculations using projections from (Huisman, et al., 2013)

The dimensions of the graph correspond, to a large extent, to the two dimensions investigated: proportions of those aged 60+ in the population and the expected change of the proportion of the 60+ section during the period 2010-2030². For this reason, we have named the axes based on their close correspondence to the extent of ageing (x-axis) and intensity of ageing (y-axis). The first two clusters shelter countries from the main tranche of the EU 27 from the perspective of ageing. The first cluster includes countries with average values in the proportion of the population aged 60+ and relatively intensive growth of this proportion. In this group we can find Austria, Bulgaria, Greece, Finland, France, Latvia and Portugal. The second cluster groups countries with an average extent of ageing and relative lower intensity of change in the proportion of those aged 60+. In this group are Belgium, the Czech Republic, Denmark, Estonia, Hungary, Sweden and the United Kingdom. Both of these first two clusters are composed of more than 4 countries meaning the heterogeneity within the clusters is quite high. Sweden is an outlier within the second cluster with a higher proportion of those aged 60+ but one of the smallest changes expected in the period 2010-2030. Finland presents the country with the highest initial values of 60+ share out of the first cluster, its growth also being above the average of the cluster, but lagging behind the countries of the third cluster in both dimensions.

The third cluster groups Germany and Italy, countries with the highest extent and intensity of ageing.

² Based on the average between friendly and tough scenario of NIDI projections (Huisman, et al., 2013).

The fourth cluster includes Spain, Malta, the Netherlands and Slovenia. These countries scored narrowly in the average proportion of those aged 60+ in their population and are expected to experience an intensive growth in this proportion.

The fifth cluster groups countries with a below average extent of ageing (the proportion of those aged 60+ being below the average) and an expected above average intensity of ageing. Such a situation can be observed in Ireland, Poland and Slovakia.

The sixth cluster groups countries with both a below average extent of ageing and average intensity of change in ageing. Lithuania, Luxemburg and Romania are in this group.

Cluster analysis helps us to see and comprehend differences in ageing between countries. These will be taken into account when looking at the structure of consumption and in our later quantifying of the effect of ageing on the total consumption of households in the EU.

2.2 Structure of the demand of the elderly - cluster analysis

After drawing a brief picture on ageing and its changes over time among European countries, a second parameter which draws our attention in modelling the potential for the silver economy is the structure of the demand of the elderly. Special attention will be paid to the differences in the structure of consumption between age groups. The central source of information on the structure of consumption is the European Household Budget Surveys (HBS). Despite the effort of Eurostat to unify these household budget surveys in the EU member states, their methodology and approaches differ substantially. Therefore, we are not able to refer to one survey, but instead, must use several surveys. The international comparability of the information acquired also suffers due to these methodological differences. Another weakness of HBS is its obsolescence with the latest figures having been published only up to 2005. Nevertheless, HBS presents the most relevant and reliable source of information on the structure of consumption available on the European level.

The following graph shows the average³ figures for the mean consumption of 12 main items⁴. The figures present the mean expenditure on particular items per €1000. The average is counted as a weighted average out of the data for countries where the information was available⁵. HBS collects data on households, not individuals as expenditure is organized within households. Mean expenditures are displayed based on the age of the reference person⁶ of the household.

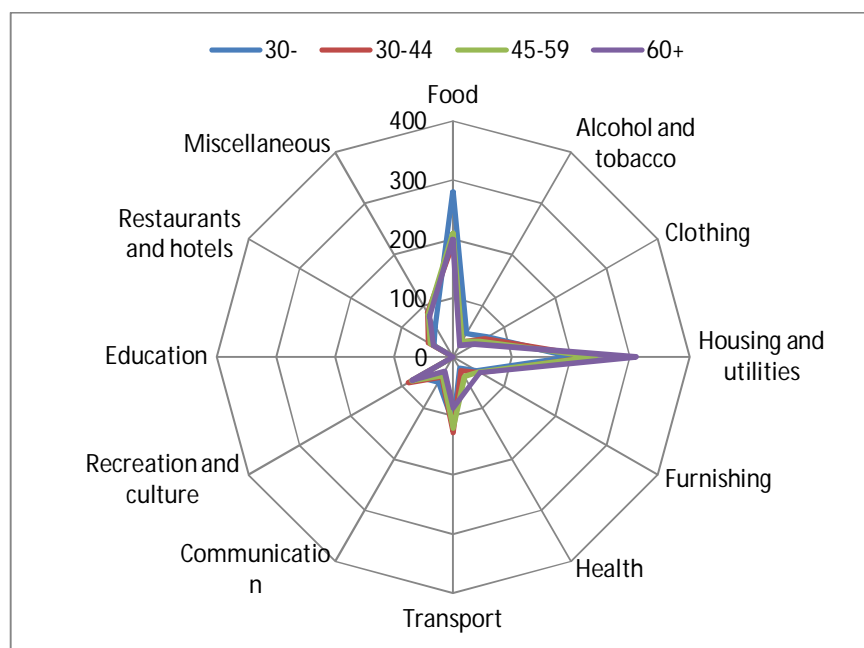
Figure 4: Mean expenditures on COICOP 1-digit level in European countries by age of the reference person

³ The average is counted as a weighted average out of the available data for countries

⁴ Classified using the COICOP statistical classification of individual consumption by purpose, the graph shows the COICOP 1-digit items of consumption.

⁵ Countries included in the calculation of the average weighted by population were: Austria, Belgium, Bulgaria, Cyprus, Germany, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Lithuania, Luxembourg, Latvia, Netherlands, Romania, Sweden, Slovenia, Slovakia and the United Kingdom.

⁶ For the definition of a reference person in HBS see: (European Commission, 2003 p. 20), at: <http://ec.europa.eu/eurostat/ramon/statmanuals/files/KS-BF-03-003--N-EN.pdf>



Source: Eurostat Database, table: hbs_str_t225

Based on HBS, the highest share of expenditure is spent on food, in the case of households with younger reference persons, and on housing, in the case of households with older reference persons. Food expenditure represent €278.81 out of every €1000 in the case of households with reference persons younger than 30. Housing expenditure represent €309.75 out of €1000 in case of households with reference persons above 60. The means used in the creation of the graph above are displayed in the table below.

Table 2: Mean expenditures on COICOP 1-digit level in European countries by age of the reference person

	30-	30-44	45-59	60+
Food	278.81	190.38	208.49	199.14
Alcohol and tobacco	45.47	29.67	31.22	22.07
Clothing	67.61	61.83	52.72	42.10
Housing and utilities	201.29	235.21	239.99	309.75
Furnishing	46.15	53.50	50.63	53.34
Health	21.68	26.64	39.23	56.60
Transport	111.54	128.32	120.67	86.69
Communication	49.25	38.26	36.03	27.80
Recreation and culture	68.25	87.38	81.15	80.06
Education	NA	NA	NA	NA
Restaurants and hotels	37.97	48.11	44.61	39.18
Miscellaneous	60.77	86.51	84.00	79.96

Source: Eurostat Database, table: hbs_str_t225

From the table several clear trends in the structure of spending in relation to age of the reference person of the household can be observed. Expenditure on food decreases with age. This is easy to understand if we realise that the size of households (in terms of the number of members) decreases in line with the increasing age of the reference person. Older people live in smaller households; therefore they do not spend so much on food. The size of the

household can also explain the increase in relative expenditure on housing with the increasing age of the reference person. The smaller the household, the higher its spending is on housing when counted relatively per €1000.

Expenditure related to health is the only one (besides housing) which clearly grows with the age of the reference person. Spending on most of the other items of consumption declines with age and especially after the reference person reaches 60. This could be linked with the decline in income related with leaving the labour market at retirement.

Clearly, the lower average expenditure of 60+ households on clothing, transport and communication could create some concerns in relation to future expansion in demand driven by private household consumption. The decline is not that clear in recreation, culture, restaurants and hotels which could create some support for the expectations behind the concept of the silver economy.

Information on expenditure related to education was not reliable; therefore we omitted it from our analysis.

The graph and table below display the same figures when examining closely the age groups of the elderly population.

Figure 5: Mean expenditures on COICOP 1-digit level in European countries by age of the reference person- elderly

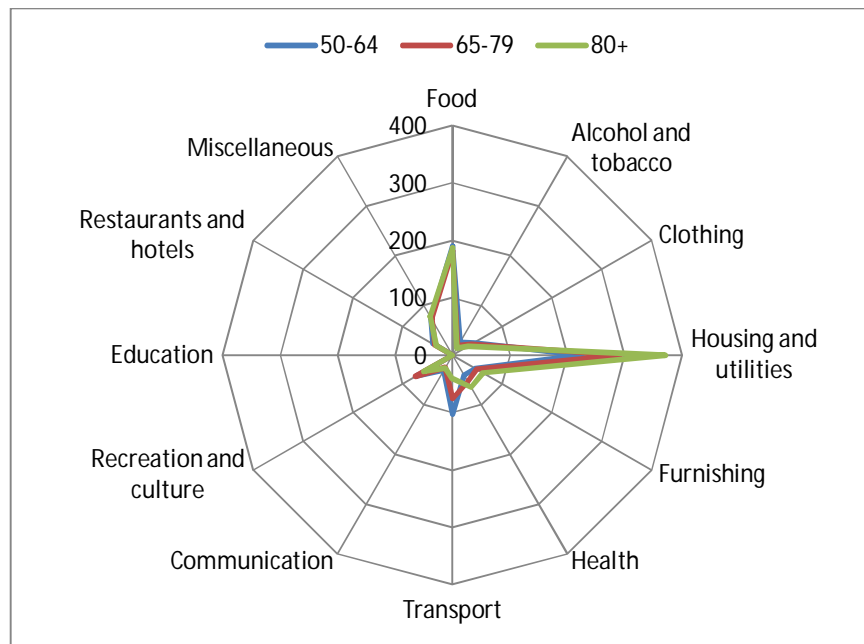


Table 3: Mean expenditures on COICOP 1-digit level in European countries by age of the reference person - elderly

	50-64	65-79	80+
Food	189.61	181.82	186.41
Alcohol and tobacco	26.78	19.57	14.73
Clothing	43.91	38.55	31.92
Housing and utilities	225.60	292.27	370.98
Furnishing	45.97	48.12	61.57

Health	40.59	53.20	64.49
Transport	102.92	75.31	40.89
Communication	30.05	24.82	25.51
Recreation and culture	71.77	74.67	58.13
Education	NA	NA	NA
Restaurants and hotels	38.92	34.96	32.18
Miscellaneous	74.58	72.09	77.88

Source: Eurostat on request, table: T225_SK_2013_March

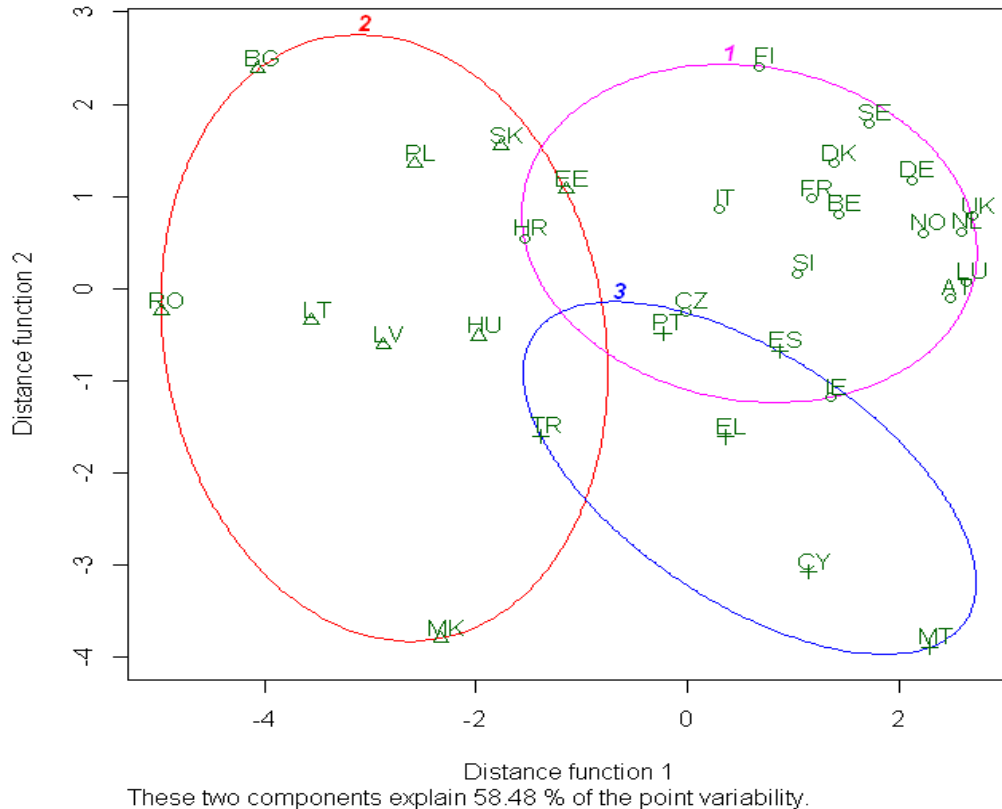
When closely examining the consumption patterns of the elderly, trends familiar from the comparison of 60+ households can be observed in a clearer form. The increase in relative mean spending on housing is much higher in the case of the 80+ group. The highest proportion of single households can be expected in this group as well⁷. Transport expenditure drop to less than half among households with reference persons in the age groups 50-64 and 80+. Health expenditure grow with the age of the reference person. Spending on food remains nearly at the same level.

The evidence presented above is based on a weighted average of European countries. There are reasons to expect significant differences in the structure of consumption between countries. Economic factors, such as the income of households or price levels in the country, can play a role, as well as cultural and social differences between countries. When looking at international differences in the consumption patterns of households, cluster analysis may help to group the countries based on similarities in the structure of consumption.

The relative (per €1000) mean expenditure of households with reference persons older than 60, on 12 COICOP 1-digit items entered the cluster analysis. Based on this, the analysis sorted countries into three clusters. These are displayed in the graph below.

Figure 6: Clusters of countries based on the structure of consumption of households with the reference person 60+

⁷ Information on consumption is gathered on the level of households while information on ageing is available from demographic projections projecting numbers of persons. For this reason, in this section, we often refer to a specific age group based on the age of the reference person in the household on which we have information on consumption. For more information on the link between demographic projections and information sources on the structure of consumption, please see the section on the projections of number of households (2.3.2).



Source: Authors calculations using table: hbs_str_t225 from the Eurostat Database

Cluster analysis sorted European countries into three groups. In the first cluster groups, high-income European countries belonging to the original EU 15 countries are complemented by some more successful new member states along with Norway and Croatia. The second cluster groups low-income countries with new EU member states complemented by the former Republic of Macedonia for which data was gathered. The third (Mediterranean) cluster covers some countries of southern Europe that differ from the countries in the first cluster, namely: Malta, Cyprus, Greece, Portugal, Spain and Turkey.

Box 2.1: Propensity to consume by age- case Slovakia

In addition to the structure of consumption patterns, the decision whether to consume also needs to be inquired into. Due to the lack of comparable data on the European level, we set out some evidence for Slovakia. This section analyzes the allocation of income and wealth of households according to savings and consumption by age. Table 5 shows the differences between income, expenditure, net wealth and propensity to consume according to the different ages of reference persons.

Table 4: Household's mean income, consumption, expenditure, net wealth, propensity to consume and fraction of households owning main residence by age of the reference person in € in 2009/2010

Age group	Mean net income	Mean consumption	Mean net expenditure	Propensity to consume	Owning main residence	Mean net wealth
16-34	12454	9502	11513	0.763	71.1%	50300
35-44	13778	10430	12680	0.757	86.5%	84900
45-54	14204	11131	12346	0.783	94.6%	88900
55-64	11652	9032	10163	0.775	96.2%	94800
65-74	7912	6327	7014	0.800	96.9%	71600
75+	5730	4429	4842	0.773	94%	76500

Source: Household Finance and Consumption Survey and authors calculations using Households Budget Survey

As can be seen, the mean household income significantly varies among age groups. Mean income grows with the age of the reference person until the age group 45-54, where it reaches its maximum at an average of €14,204 per year. Since this age group's mean household disposable income decreases, this is amplified by the overrunning retirement age. After reaching retirement age, households in the age group 65-74 consume the largest part of their income at an average of 0.8. There are no important differences between propensities to consume among other age groups. On the contrary, the part of the income spent on expenditure is decreasing with age. The largest part of income spend in households in the age group 16-34 is around 92.4% and the lowest part 75+ which is around 84.5%.

Table 5: Fraction of households, which have particular type of assets and conditional mean value of assets in thousand € in 2009/2010

Assets	Fraction	Mean value
Real assets	96%	61.8
Household main residence	89.9%	55.9
Other real estate property	15.3%	16.4
Vehicles	61.2%	5
Self-employment business wealth	10.7%	4.6
Real estate wealth	90.5%	60
Financial assets	91.7%	2.5
Deposits	91.2%	2
Mutual funds	2.7%	2.5
Bonds	1.0%	N
Shares	0.8%	N
Money owed to household	9.7%	1.1
Voluntary private pension/whole life insurance	15.0%	3.2
Other type of assets	0.9%	N

Source: Household Finance and Consumption Survey

From the above, we can see the propensities that households in each age group show in saving part of their income, which proves mean net wealth grows with age. The main part of savings is in the form of real estate wealth. 90.5% percent of households own some kind of real estate at an average value of €60,000. Financial assets are mainly made up of deposits (91.2% of households) and life insurance or private pension funds (15%) at an average value €2,000 for deposits and €3,200 for insurance.

In countries from the first cluster, in comparison with other countries, households of people

aged 60+ spend relatively less on food and health. Expenditure on food per €1000 is lower because of higher incomes and higher overall spending of households in these countries. Lower relative private spending on health can, apart from higher overall spending; also be caused by better accessibility to publically-funded health care services. On the other hand, households of people aged 60+ in the countries from the first (high- income cluster) spend relatively more on recreation, transport, housing and miscellaneous goods and services.

In the countries from the first (high- income) cluster lies the biggest part of the potential for the silver economy as these countries are already advanced and advancing faster in terms of ageing and in addition, the structure of their consumption is relatively more oriented towards luxurious goods such as recreation or transport. In this respect, Germany can be used as a perfect example with its high extent and intensity of ageing (see previous sub - chapter - 2.1) and the structure of consumption here is oriented more towards recreation.

In contrast, in countries from the second (low-income) cluster households with reference persons aged 60+ spend, relatively less is spent on restaurants, recreation, transport, clothing and furnishing. Their expenditure is relatively higher on food, health and communication.

In countries from the third (Mediterranean) cluster households, relatively less is spent on housing and relatively more on clothing, restaurants and furnishing.

When looking at international differences in consumption patterns using narrower categories (COICOP 2-digit level), countries create practically the same clusters⁸. Items can be followed on a more precise level. In countries from the first (high- income) cluster households with people aged 60+ spend relatively (per €1000) more on alcoholic beverages, rent for housing, maintenance and repairs to dwellings, furniture and furnishings, carpets and other floor coverings, tools and house and garden equipment, the purchase of vehicles, other recreational items and equipment, gardens and pets, recreational and cultural services, package holidays and insurance. On the other hand, they spend relatively less on goods and services for routine household maintenance.

Households with people aged 60+ in countries from the second (low-income) cluster spend relatively (per equipment for €1000) more on food, non-alcoholic beverages, water supply and miscellaneous services relating to the dwelling and on electricity, gas and other fuels. Their expenditure is relatively lower on out-patient services.

In countries from the Mediterranean cluster households with people aged 60+ spend relatively more on tobacco and clothing.

Cluster analysis performed on the structure of consumption of households with reference persons 60+ grouped European countries into three clusters. The differences between high-income countries and countries from the lower income cluster can be explained using mostly economic factors as the structure of expenditure is, to a large extent, determined by the total resources available for consumption. The specifics of the Mediterranean cluster can be mostly explained by cultural factors, when no clear economic explanation is at hand. Mediterranean countries are, in terms of the structure of consumption, closer to the high-income European countries, with some small, culturally determined, specifics such as higher expenditures on tobacco, restaurants and clothing.

⁸ The most significant difference is that Portugal creates a separate cluster out of the Mediterranean cluster in the way which raises questions about the reliability of data provided for Portugal.

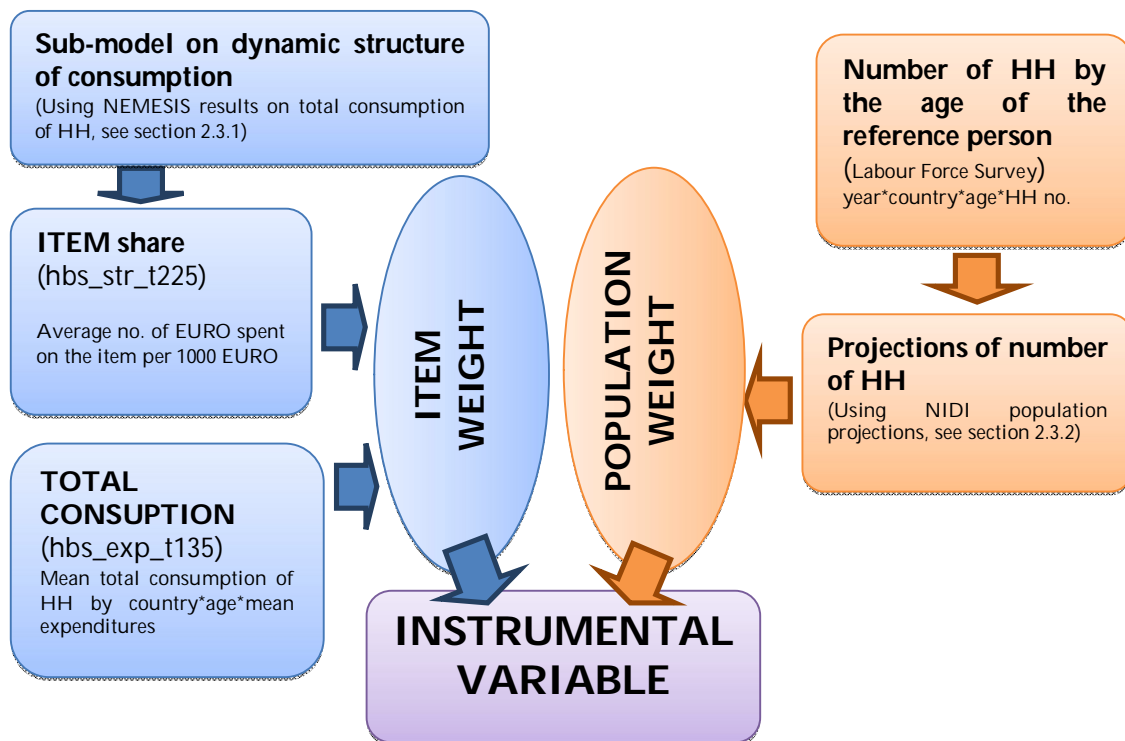
2.3 Quantification of the change in consumption caused by ageing

Based on the descriptive information provided in the previous sections on the character of ageing and differences in the structure of consumption in European countries, we may proceed to the quantification of the effect of ageing on the consumption of households. This section summarizes the evidence provided in the two previous sections by merging the information on demographic development with the information on the structure of the consumption of the elderly. Based on this, we can quantify the expected changes of the overall consumption of households caused by the ageing of the population. This will be in terms of items of consumption setting out evidence for the EU27 countries, where reliable data were provided.

In order to provide quantification of the effects of ageing on the consumption of households, we have created a simple statistical data-based model. Our calculations summarize information from 3 data sources. First is the afore-mentioned European Household Budget Survey (HBS) for which data are available in the Eurostat database wherefrom we extract information on the structure of consumption and the mean spending of households. From the Labour Force Survey we use the numbers of households broken down into age groups of the reference person and country. These will be put into a regression-based model with the NIDI population projections to project the numbers of households by the age of the reference person.

For simplification and data availability reasons, households from the chosen countries were split into 4 age groups based on the age of the reference person (30-, 30-44, 45-59, 60+). The schema below displays the basic structure of the statistical model with related data sources.

Scheme 1: Structure of the statistical model developed to quantify the effects of ageing on consumption of households



The model calculates an instrumental variable of the average contribution of each item consumed by different types of households (based on the age of the reference person) to the

total consumption of households in the country. The instrumental variable is a product of item weight and population weight. Item weight is a product of the relative spending of the type of household on each item and the total average consumption of that type of household. The calculation can be formalized as follows:

$$IV_{gac} = (SC_{gac} * TC_{ga}) * HH_{-p}_{ga} \tag{1}$$

<i>g</i> – country	<i>SC</i> -share of the item on total consumption
<i>a</i> – age	<i>TC</i> -total consumption
<i>c</i> – item of consumption	<i>HH</i> _p-Projections of total number of households by age
<i>IV</i> -instrumental variable	of the reference person

The instrumental variable gives us an approximation of the total private household consumption in each country. It is only an approximation of the macroeconomic indicator because of the differences in data sources. The Household Budget Survey is not used within the system of National accounts, when comparing its figures with officially published, aggregated macroeconomic indicators thus the figures differ because of this statistical discrepancy.

Based on the instrumental variable, shares of total consumption in the country can be calculated for each combination of type of household based on the age of the reference person and the item of consumption on which each type of household spends its money on average.

The share is calculated as follows:

$$IVS_{gact} = \frac{IV_{gact}}{IV_{gt}} \tag{2}$$

<i>g</i> – country	<i>t</i> - time
<i>a</i> – age	<i>IV</i> -instrumental variable
<i>c</i> – item of consumption	<i>IVS</i> -Instrumental variable share

Instrumental variables and their shares are calculated for each of the 5-year time periods (2005, 2010, 2015, 2020, 2025 and 2030) using the projections of numbers of households. The shares of instrumental variables tell us what proportion of total consumption is spent by households with the reference person 60+ and on what item of consumption (COICOP 2-digit).

2.3.1 Modelling a dynamic structure of consumption

The analysis of consumption shows that the average income of households in a country plays an important role in shaping the average structure of consumption of households in the country. There is also evidence available which follows a clearly comprehensible pattern when: households in countries with a lower average income spend relatively more on “necessary” goods and services and households in countries with a higher average income spend relatively more on “luxurious” goods and services. This clear relation also determined our efforts to predict future changes in the structure of consumption. As we have information on expected future developments in the average consumption of households from the NEMESIS model developed within the NEUJOBS project, we are able to follow expected future changes in the structure of consumption based on the changes in the average consumption of households in countries.

We have used evidence available from HBS using the table published in the Eurostat database under the name “hbs_str_t225”. This includes information on relative spending on COICOP items for 4 types of households, based on the age of the reference person, in every EU country. This information was complemented by the projected total consumption of households in countries up until 2025 available from the NEMESIS model. Total consumption in the country was disaggregated using the information on projected numbers of households and mean consumption of households from our statistical model. 12 regression equations were estimated for each of the COICOP 1-digit items of consumption. These equations can be formalized as follows:

$$C_{COICOP\ 1-12} = \alpha + \beta * (Country * Total\ consumption) + \beta * AgeGr + \varepsilon \quad (3)$$

Where:

$C_{COICOP\ 1-12}$ - relative consumption in one of the 12 COICOP 1-digit items

α - Intercept

β - regression coefficients

ε - error term

(Country*total consumption) - interaction of country dummy variable and projected consumption per household

AgeGr - Dummy referring to age group

These equations were estimated on a dataset of figures aggregated on the level of country and 4 types of households based on the age of the reference person, gaining $27 * 4 = 108$ observations. Equations were estimated for 12 COICOP 1-digit items for both scenarios (tough and friendly), thus 24 equations were estimated overall.

Equations in this form fitted the data quite well with values of adjusted R-squared varying from 0.78 to 0.98. Complete⁹ results of each of the 24 equations can be found in the online annex¹⁰. Based on these estimates, the values of future relative consumption on COICOP items were made dynamic, linking it to expected changes in average consumption in each country.

2.3.2 Projections of number of households

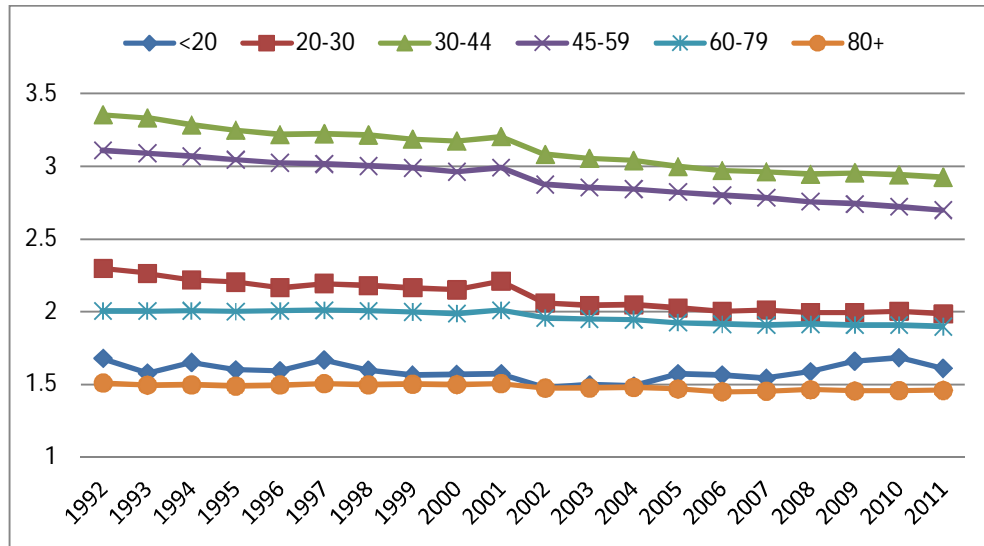
In this sub-section, the methodology and results of the prediction of the numbers of households by age of the reference person will be presented. Within the NEUJOBS project, demographic projections with respect to the type of household were prepared by NIDI. These were done at the level of individuals. Because most of the information on consumption is at the level of households, we needed to create the projections of numbers of households by the age of the reference person. For this purpose we have used the NIDI population projections as input.

The total numbers of households in each country were broken down into 4 groups based on the age of the reference person (lower than 30, 30-44, 45-59, over 60 years). It is obvious that households are not composed of members of the same age and the age of the head of household may not be the best indicator of the age composition of the household. Therefore, in the next step we have examined the dependence between the development of the number of households by age of the reference person and the evolution of the number of the related population.

⁹ Estimates were tested using the Breuch-Pagan and Cook-Weisberg test for heteroscedasticity. This was positive when estimating COICOP 4- relative expenditure on housing and utilities. In this case, for tough and friendly scenarios, we have used the corrected estimation method “vce(hc3)” implemented in Stata.

¹⁰ www.ekonom.sav.sk/neujobs/WP/annex_estimates.txt

Figure 7: Average household size (number of persons) by age of the reference person¹¹



Source: Authors' calculations using the European Union Labour Force Survey

As we can observe from the graph above, the average number of persons living in one household shows a declining trend. When excluding households with a reference person under 20, which represent an unconventional type of household, the size of the households declines with the increasing age of the reference person. If the reference person is over 80, the average size of the household drops below 1.5.

In order to perform the prediction linear regression, equations were estimated for each age group in each country for two (NIDI) scenarios (friendly, tough). The dependent variable was the number of households by age of the reference person and explanatory variables were the projected numbers of population in the 4 age groups. To ensure the best fit to the data, equations were adjusted one-by-one, selecting the best combination of explanatory variables. The equations below correspond to the results from the estimation for Austria's friendly and tough demographic scenarios.

$$NH_{AT,<30,t} = -495560 + 1.062 * POP_{20-24,t} + 0.499 * POP_{25-29,t} \quad (4)$$

$$NH_{AT,30-44,t} = 383643 + 0.776 * POP_{35-39,t} + 0.207 * POP_{40-44,t} \quad (5)$$

$$NH_{AT,45-59,t} = -58820 + 1.226 * POP_{45-49,t} + 0.606 * POP_{55-59,t} \quad (6)$$

$$NH_{AT,60+,t} = 223138 + 0.497 * POP_{60+,t} \quad (7)$$

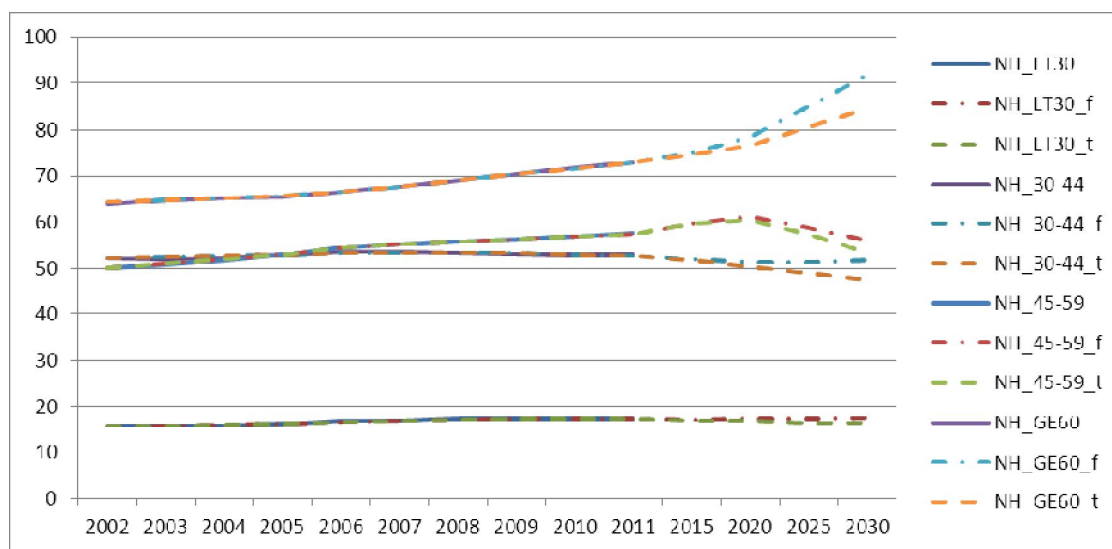
¹¹ These figures display information for EU countries where data were available including: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Germany, Estonia, Greece, Spain, France, Hungary, Ireland, Italy, Lithuania, Luxemburg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia and the United Kingdom.

$NH_{g,a,t}$ - number of households in specific country, age group
 t- time

g- specific EU country
 a- specific age group of reference person
 $POP_{a,t}$ population by age in time t

The equations above display also the coefficients estimated on data for Austria using the tough scenario from NIDI projections. Each equation was adjusted separately therefore not all equations predict the number of households aged 60+ and include only the age group 60+. In some countries 5-year age groups were used (eg. 60-64, 65-69 ...) in other countries these were aggregated as in the case of Austria. The results are displayed in the graph below.

Figure 8: Estimated and actual¹² number of households by age of the reference person in millions



Source: Eurostat and own calculations

The graph above shows the projections of the numbers of households by age of the reference person for countries where data was available (Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Germany, Estonia, Greece, Spain, France, Hungary, Ireland, Italy, Lithuania, Luxemburg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia and the United Kingdom). Denmark, Finland, Sweden and Slovenia were omitted due to a lack of data. Based on the graphical results and the values of adjusted R^2 which are, in most cases, higher than 0.9, only in a few cases are the values of the adjusted R^2 lower than 0.8, it is possible to see a high degree of correlation between the compared series. In the graph, real figures for 2002-2011 can be observed together with the predictions for 2015-2030. The predicted period is available only in 5-year time periods, which can optically boost the observed trends in comparison to the previous period 2002-2011. According to the predictions, population aging will have a significant impact on Europe's households according to the age of the reference person distribution. The number of households with a head of household aged over 60 in 2030 will significantly increase in both scenarios. The number of households aged 45-59 years reaches its peak in 2020 and will then gradually reduce to the level of the year 2006. Conversely, in the two youngest groups, there will be either stagnation or a decline in the number of households.

In the second step, we have multiplied the number of households by the age of the reference person by the mean consumption expenditure by the age of the reference person and

¹² Real figures are until 2011.

calculated its share of total private consumption. From the NEMESIS model we have predicted values of the final consumption of households and by multiplying this consumption by the previous shares we get the size of the final consumption of households by age, which are presented for the afore-mentioned countries in table 1.

2.4 Results of the quantification

Combining information from various data sources, the shares of total consumption of households were counted for households 60+ and below 60 on the COICOP 2-digit level. To make the results more comprehensive, this paper reports the results of 12 main COICOP items of consumption. In a narrower form, these data were used as input into the macroeconomic analysis based on an Input Output model, which will be presented in the following chapter. The shares were calculated based on the data for 2005 which represent the last publically accessible round of European HBS. Based on the 2005 figures, the projection in the change of the shares was done based on expected demographic changes. The predictions set out figures for 2010, 2015, 2020, 2025 and 2030.

Shares calculated for Germany as a perfect example of a high income country will be presented. In contrast, evidence for Slovakia will be presented as Slovakia represents one of the low-income countries with different consumption patterns.

Table 6: Shares on total consumption of households in Germany in % (based on friendly demographic projections)

	2005		2010		2015		2020		2025		2030	
	60-	60+	60-	60+	60-	60+	60-	60+	60-	60+	60-	60+
Food	7.55	3.61	7.25	4.45	7.27	4.40	7.24	4.41	6.53	5.18	5.95	5.75
Alcohol and tobacco	1.24	0.46	1.29	0.46	1.29	0.45	1.28	0.45	1.15	0.53	1.04	0.59
Clothing	3.34	1.40	3.60	1.07	3.56	1.06	3.52	1.05	3.20	1.24	2.94	1.38
Housing and utilities	19.20	10.48	18.84	11.27	18.93	11.18	18.88	11.22	17.27	13.15	16.04	14.61
Furnishing	3.62	1.82	3.64	1.71	3.65	1.71	3.65	1.72	3.38	2.01	3.20	2.23
Health	1.84	1.82	1.80	1.66	1.86	1.67	1.90	1.69	1.83	1.96	1.81	2.18
Transport	9.80	3.48	9.91	3.43	9.91	3.40	9.88	3.41	9.05	4.00	8.42	4.44
Communication	2.17	0.72	2.43	0.90	2.35	0.86	2.27	0.83	1.87	1.01	1.49	1.12
Recreation and culture	7.25	3.84	7.71	3.34	7.68	3.30	7.62	3.29	6.89	3.88	6.29	4.31
Education¹³	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Restaurants and hotels	2.83	1.43	3.12	0.84	3.12	0.84	3.11	0.85	2.88	0.99	2.72	1.10
Miscellaneous	7.92	3.38	7.25	3.11	7.46	3.19	7.63	3.28	7.53	3.74	7.63	4.17
Total	67.49	32.51	67.64	32.36	67.86	32.14	67.73	32.27	62.20	37.80	58.03	41.97

Source: Authors' calculations within the project

Cluster analysis on the structure of consumption, in the previous section of this chapter, displayed Germany as an example of the first group of countries named high-income countries. The fact that incomes of households in this country are higher determines also the structure of consumption of the elderly in this country. It is oriented more towards expenditure on recreation and food does not present such a high share of total consumption of households as in countries with lower average incomes. This fact, together with the extent and expected intensity of ageing, makes this country one of the most important areas from

¹³ Information on educational expenditures was not reliable in the HBS.

the perspective of potential for the silver economy. As can be seen from the table, the share of consumption of households 60+ of the total consumption of German households in 2005 was 32.51%. The importance of the purchasing power of elderly Germans will grow in general. Their spending on every item will grow because of the projected growth in population 60+. The share of elderly households will rise to 37.8% in 2025 and 41.97% in 2030.

Slovakia stands as an example of a different group of countries. It represents countries from the second cluster of low-income countries. Households in these countries spend relatively more out of each €1000 on food and less on recreation or transportation. The following table sets forth the shares of total consumption in Slovakia broken down according to the age group of the reference person of the household and the items of consumption.

Table 7: Shares on total consumption of households in Slovakia in % (based on friendly demographic projections)

	2005		2010		2015		2020		2025		2030	
	60-	60+	60-	60+	60-	60+	60-	60+	60-	60+	60-	60+
Food	18.51	6.35	18.37	6.71	18.08	7.00	17.33	7.78	16.66	8.47	16.18	8.96
Alcohol and tobacco	2.22	0.55	2.18	0.59	2.14	0.61	2.05	0.68	1.98	0.74	1.93	0.78
Clothing	4.54	0.83	4.44	0.93	4.40	0.97	4.28	1.08	4.16	1.18	4.07	1.26
Housing and utilities	22.01	9.12	22.32	9.17	21.91	9.58	20.61	10.61	19.39	11.53	18.44	12.16
Furnishing	3.22	0.92	3.16	1.00	3.13	1.05	3.03	1.16	2.93	1.27	2.85	1.34
Health	1.86	1.03	1.79	1.17	1.76	1.22	1.74	1.36	1.75	1.49	1.77	1.58
Transport	7.05	0.87	6.66	1.12	6.59	1.16	6.48	1.30	6.40	1.43	6.37	1.53
Communication	3.47	0.69	3.28	0.82	3.25	0.85	3.18	0.95	3.12	1.04	3.10	1.10
Recreation and culture	4.89	0.96	4.56	1.15	4.52	1.20	4.45	1.34	4.39	1.47	4.35	1.56
Education ¹⁴	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Restaurants and hotels	3.93	0.30	3.25	0.52	3.24	0.54	3.25	0.61	3.27	0.67	3.31	0.73
Miscellaneous	4.67	1.28	4.65	1.34	4.59	1.39	4.39	1.55	4.20	1.69	4.05	1.78
Total	77.08	22.92	75.46	24.54	74.39	25.61	71.55	28.45	68.98	31.02	67.16	32.84

Source: Authors' calculations within the project

In Slovakia, the share of consumption of households with a reference person over 60+ of total consumption will grow from 22.92% in 2005 to 32.84% in 2030, which is a more intensive growth than in the case of Germany. Despite this fast growth, this figure for Slovakia will stay below the value of Germany for 2030 and will reach values comparable to the German share of 60+ households of total consumption for 2005. In conclusion, the consumption of 60+ households will, in 2030, represent a lower share of total consumption in Slovakia than in Germany. The estimated changes in the shares only take into account the demographic changes and expected changes in the total consumption of households; the figures acquired, therefore, represent an estimation of the effect of ageing. These figures could be potentially used to adjust the results of macroeconomic projections which did not take into account this factor, or as an input into a macroeconomic model.

On the European level the data allow to pool the information on consumption for the whole EU 27¹⁵. The results for shares on consumption on the European level are displayed in the table below.

¹⁴ Information on educational expenditures was not reliable in the HBS.

Table 8: Shares on total consumption of households in European countries in % (based on friendly demographic projections)

	2005		2010		2015		2020		2025		2030	
	60-	60+	60-	60+	60-	60+	60-	60+	60-	60+	60-	60+
Food	9.74	4.35	9.53	4.72	9.50	4.83	9.45	4.95	9.11	5.39	8.74	5.82
Alcohol and tobacco	1.72	0.55	1.74	0.55	1.72	0.56	1.69	0.58	1.61	0.63	1.54	0.68
Clothing	4.47	1.21	4.42	1.17	4.38	1.20	4.37	1.23	4.23	1.34	4.08	1.45
Housing and utilities	18.99	9.28	19.00	9.80	18.85	10.01	18.56	10.22	17.61	11.14	16.62	12.03
Furnishing	4.16	1.60	4.05	1.59	4.02	1.62	3.98	1.66	3.85	1.81	3.74	1.96
Health	1.92	1.26	1.74	1.37	1.74	1.40	1.76	1.44	1.80	1.57	1.90	1.70
Transport	9.98	2.65	9.71	2.68	9.63	2.73	9.59	2.79	9.30	3.06	9.05	3.31
Communication	2.27	0.67	2.35	0.70	2.30	0.71	2.23	0.72	2.06	0.79	1.88	0.84
Recreation and culture	6.71	2.36	6.69	2.31	6.61	2.34	6.51	2.39	6.22	2.62	5.95	2.82
Education ¹⁶	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Restaurants and hotels	4.61	1.21	4.55	1.17	4.55	1.20	4.57	1.23	4.47	1.34	4.36	1.46
Miscellaneous	6.88	2.48	6.68	2.46	6.58	2.53	6.50	2.60	6.30	2.82	6.13	3.04
Total	72.34	27.66	71.37	28.63	70.77	29.23	70.09	29.91	67.39	32.61	64.77	35.23

Source: Authors' calculations within the project

The share of consumption of households with a reference person aged over 60 of total consumption will grow from 27.66% in 2005 to 35.23% in 2030. With the growing income of households, and especially elderly households in countries with lower incomes, we may assume that the structure of consumption will also shift from basic needs (food and housing) to luxurious good (recreation and culture, restaurants and hotels). This draws a promising picture for the silver economy with goods and services targeted at the elderly population in Europe.

¹⁵ For Sweden we have used the average figures on the structure of consumption in order to gain the EU figures.

¹⁶ Information on education expenditure was not reliable in the HBS.

3 Future needs and perspectives of specific sectors

In the following chapter, the results of our modeling of the potential of the silver economy to generate labour opportunities are presented. First, we discuss the methodology, the underlying assumptions of the model and the data used. Then, we analyze the results for selected countries (Finland, Germany, Italy and Slovakia) and the European Union as a whole. We try to identify the sectors with the highest growth potential stemming from changes in the age structure of the population.

This study provides additional insights into the possible impact of ageing on the future structure of employment in selected EU countries and the EU as a whole. Our aim was to gain a deeper insight into the relationship between ageing, future private consumption behaviour and resulting structural shifts in the labour markets. Due to this, a modified input output methodology, able to provide a more detailed view of the aforementioned relations, was used. This can be considered as the main strength of this research. On the other hand, the approach used provides less focus on other economic, social and environmental aspects already included in the NEMESIS model framework. Thus, this study should be considered as a complementary analysis of potential future demand in terms of an ageing population compared to the results of the NEMESIS model.

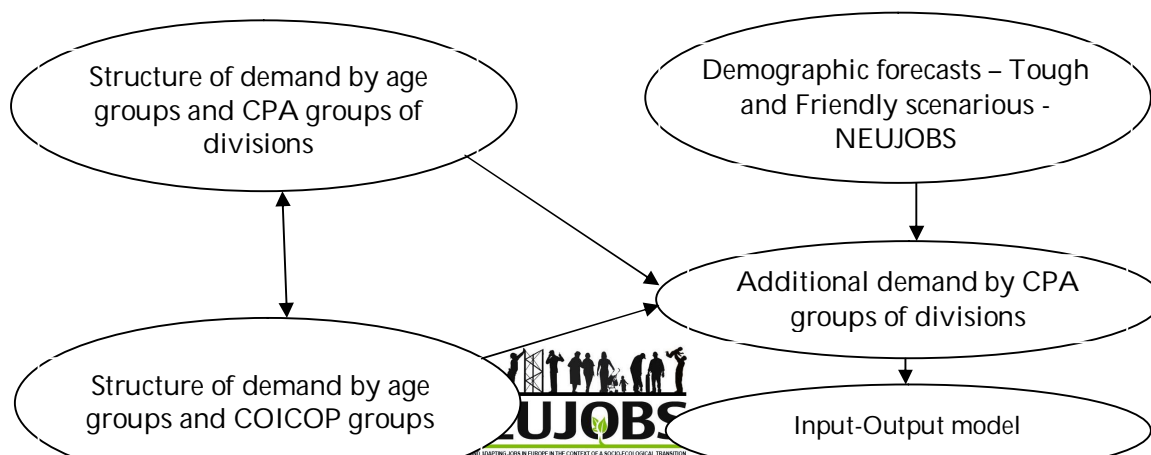
3.1 Data and methodology

To model the economic potential of the silver economy, a modeling tool capable of translating changes in the demand structure of the market for goods into labour demand was created. For this purpose, we selected the Input-Output model method. In the following part of the paper, we provide an assessment of the approach applied and the assumptions used.

Translating changes in the demographic structure of the population into impact on the economy and the labour market requires the use of several interconnected data sources. Due to discrepancies in the methodologies used when forming the original databases, the results presented in this section should be seen rather as *an approximation* of future trends generated by demographic transition rather than considering them as exact findings.

Scheme 2 shows the structure of the model and the linkages between the different types of classifications used. In the first step, it was necessary to link estimated shifts in the demand structure generated by demographic changes on the consumption of different types of products with respect to the COICOP classification with the Classification of Products by Activity (CPA) used in the Input-Output tables (IOTs). These changes in the demand structure were used as inputs into our Input-Output model. Based on changes in household demand expansion, the labour demand for selected sectors (according to COICOP classification) was estimated.

Scheme 2: Applied model structure



Linking COICOP and CPA data

To transform the estimated changes in the demand structure by COICOP groups from Household Budget Survey (HBS) into the structure of household final consumption in IOTs based on CPA, the transformation table that is shown below (Table 9) was created. This transformation table is based on the assumption that changes in demand for different types of goods and services classified by COICOP groups estimated in the previous chapter will result in similar relative changes in demand for products classified by CPA groups. The transformation table from COICOP to CPA was created on the basis of expert judgment. Thus, only CPA sectors producing corresponding products from selected COICOP groups were coupled together.

Table 9: Transformation table linking COICOP and CPA

Product group	COICOP group	CPA group
Food, beverages and tobacco	Food and non-alcoholic beverages (CP01)	Products of agriculture, hunting and related services (01)
		Products of forestry, logging and related services (02)
		Fish and other fishing products; services incidental of fishing (05)
	Alcoholic beverages (CP021)	Food products and beverages (15)
	Tobacco (CP022)	Tobacco products (16)
Clothing and footwear	Clothing and footwear (CP03)	Textiles (17)
		Wearing apparel; furs (18)
		Leather and leather products (19)
Housing and utilities	Housing, water, electricity, gas and other fuels (CP04)	Electrical energy, gas, steam and hot water (40)
		Collected and purified water, distribution services of water (41)
		Real estate services (70)
		Sewage and refuse disposal services, sanitation and similar services (90)
Furnishing	Furnishings, household equipment and routine maintenance of the house (CP05)	Furniture; other manufact. goods n.e.c. (36)
		Construction work (45)

Health	Health (CP06)	Health and social work services (85)
Transport	Transport (CP07)	Motor vehicles, trailers and semi-trailers (34)
		Trade, maintenance and repair services of motor vehicles and motorcycles; retail sale of automotive fuel (50)
		Land transport; transport via pipeline services (60)
		Water transport services (61)
		Air transport services (62)
		Supporting and auxiliary transport services; travel agency services (63)
Communications	Communications (CP08)	Post and telecommunication services (64)
Recreation and Culture	Recreation and culture (CP09)	Other business services (74)
		Recreational, cultural and sporting services (92)
		Other services (93)
Education	Education (CP10)	Education services (80)
Restaurants and Hotels	Restaurants and hotels (CP11)	Hotel and restaurant services (55)
Miscellaneous	Miscellaneous goods and services (CP12)	see Annex 3.1

Source: authors

For the analysis, we used IOTs from 2005 in CPA disaggregation of 59 groups of product by activity because this secures comparability of the results with the latest information available on the structure of consumption from the HBS that was also available from 2005. These data tables were then aggregated on the basis of 11 product groups defined above (Table 9). As input for the estimation of household demand structure by CPA groups, we used the results for COICOP groups described in chapter 2.3.2 of this study. Those were then applied to estimate the development of household demand structure by 11 defined product groups and age of reference person. By using these data, it was possible to derive the absolute changes in household demand generated by demographic transition for selected product groups. The resulting demand structure was then converted into absolute demand by households reflecting the results of NEMESIS scenarios for private consumption. To achieve this, we multiplied the resulting shares of households' demand by age of reference person and product groups of total households demand with total private consumption from NEMESIS.

The Input-Output analysis

The static Input-output model was identified as an appropriate methodological approach for the purposes of this study. The main focus of the analysis conducted was to identify the pure effects of ageing on the structure of future labour demand. The assumptions made were subordinated to this goal.

The static Input-Output model was augmented in the value added array by an employment row. This transformation allows us to identify the impact of changes in consumption on the structure of employment. The part introducing the labour market was structured according to sectors. The labour demand by sector can be then determined as $w^t = A^t x$, where w^t is the vector of labour demand required under production x in sectors, and A^t is the matrix of direct labour coefficients. By using the above mentioned relationship and Leontief's basic open static Input-Output model $x = (I - A)^{-1}y$ the required labour under certain production is than as follows:

$$w^t = A^t(I - A)^{-1}y$$

where y represents the vector of final consumption. The final consumption in the Input-Output tables is usually composed of the consumption of households, investments, government expenditure and exports. Using the formula above, when any component of the final consumption is changed, the changes in the labour demand can be determined.

To reflect the results of the NEMESIS model in the estimation of the effects of demographic transition on demand structure, we took into consideration the results of productivity growth and wage increases. To estimate these we applied the following assumptions:

- GDP per employee by country was used as a measure of productivity growth, and we expected that in all sectors productivity will grow at the same rate;
- Growth rate of average expenditures per household was used as an approximation for wage increases, i.e., we assumed that changes in households' spending will be proportional to wage raises.

In our calculations we expected that employees producing products for younger people or the elderly will continue to produce the same classes of products in future. Then we compared their potential production reflecting productivity gains with expected changes in final demand by households. When making conclusions based on this assumption needs to be kept in mind. As an example, we should mention the situation when labour demand for employees producing products for younger consumers declines and, on the other hand, labour demand for employees producing goods for elderly people increases. In such a case, when the increase is higher than the decline, employees producing for younger consumers should change the type of product produced rather than lose their job. Thus, no job opportunities will be lost. Rather, it should be reflected as lower increase in labour demand induced by a demographic transition. It is important to stress that we did not take into consideration the ageing of the labour supply, and thus, replacement demand was omitted from our analysis.

3.2 Results and Discussion

3.2.1 Germany

In the following part we discuss the results of our estimations based on the number of households and expected changes in consumption structure caused by population ageing in Germany. These results are used later to estimate the possible effects on the future expansion of labour demand.

The process of ageing in Germany is already relatively developed. In 2010, more than one quarter of inhabitants was aged over 60. Based on the demographic forecasts used (NIDI friendly and tough scenario) more than 35% of the German population will be aged over 60

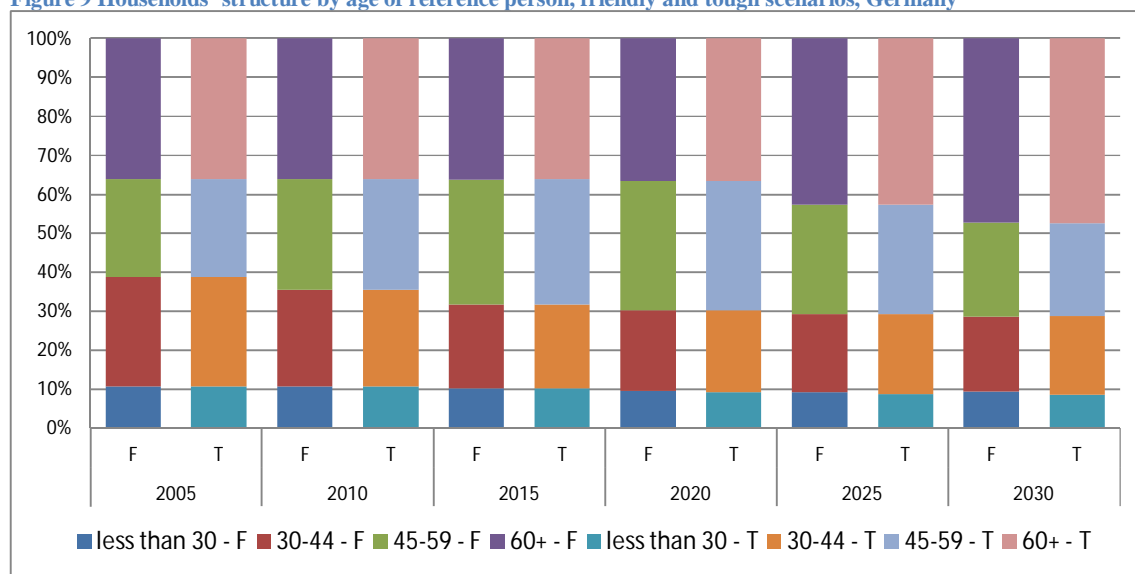
by 2030. This is among the highest expected shares in Europe. By using different scenarios - the friendly and the tough - which can be considered as scenarios on the borders of the range of future development, we are able to estimate the ranges in which future consumption patterns and labour demand in selected sectors would most probably occur. The main difference between the two scenarios is that each one considers a different population forecast - i.e a pessimistic (tough) one and an optimistic (friendly) one which are inputs to the model and make the results different. We also bear in mind the possible changes in productivity which have a significant impact on labour demand. Even the input output approach assumes constant productivity, and we had to change this assumption and incorporate changing productivity which is based on the productivity changes determined by the NEMESIS model for each analyzed country respectively. This was necessary due to the long forecast time period. Without this modification, the results would have overestimated the future expansion of labour demand.

Structure of households

As mentioned above, we used the NIDI friendly and tough demographic forecasts as inputs for the estimation of the total number of households and their structure break down by the age of reference person by 2030. When we take a detailed look at the results of the estimated number and share of households under the friendly scenario with reference person aged over 60 years of the total number of households, an increase from 36.2% in 2010 to 46.1% in 2030 can be expected. Under the tough scenario, the expected share of the over-60 -year-households on the total number of households would reach 47.4% in 2030. The increase will be most remarkable during the period between 2020 and 2030 and will be generated by an increasing share of the oldest age groups in which the number of single households is higher.

A converse development will be witnessed in the group of households with a reference person aged 44-59. Its share in 2030, compared to the year 2010, will be lower by more than 5% as a result of a transition of persons from this age group to the 60+ age cohort in both scenarios. The share of the younger 30-44 age group will decrease in 2030 compared to 2010 by almost 6% under the friendly scenario, and by 4.5% under the tough scenario.

Figure 9 Households' structure by age of reference person, friendly and tough scenarios, Germany



Source: NEUJOBS population forecasts and Household budget survey.

In the case of the tough scenario, the assumed process of ageing will influence the demographic structure of German households in a slightly different way as it was in the of the friendly scenario. The overall number of households will not increase throughout the reference period at all. These results are directly linked with the expected demographic development in the NIDI tough demographic forecast according to which a decrease in the total population of Germany by more than 9 million people during 2010 – 2030 can be expected.

Table 10 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Germany

	2005	2010	2015	2020	2025	2030
Total number of households - F	38.88	39.65	39.21	39.75	40.13	39.26
Total number of households - T	38.88	39.65	39.06	39.09	38.62	36.58

Source: NEUJOBS population forecast and Household budget survey

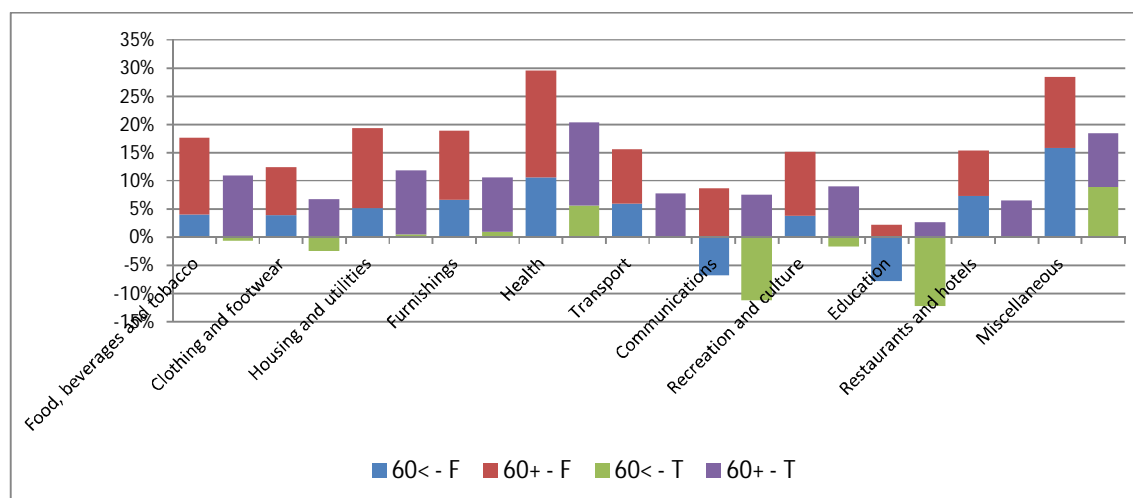
Taking a closer look at the age composition of households, it is obvious that the total number of households with younger age groups under 60 will significantly decrease over the analyzed period. On the other hand, the relative share of households with a reference person aged over 60 will increase over time and from 2025 will constitute more than 40% of the total number of households. According to the tough scenario, German population ageing will continue and Germany will face a more significant ageing population in the future. The decreasing share of the younger element of the population, along with the decreasing number of total households (tough scenario case), or at least an unchanged total number of households (friendly scenario case), may naturally lead to changes in the structure of total consumption demand. Thus, a silver economy producing specialized goods and providing specialized services to satisfy the consumption demand of the elderly may become one of the driving economic factors in this country in the near future.

The Impact of Ageing on the Structure of Consumption Demand

This is apparent for both the scenarios discussed.

Figure 10 depicts the development of changing demand patterns for different types of products based on selected age groups. As was mentioned above, we assume that the households’ consumption structure is significantly altered by changes in the age structure of these households. The highest increase in demand can be foreseen in the health and social services sector. This is caused by increased spending on these types of services for the 60+ age group compared to other age groups. In Germany, furnishing, recreation and culture, and restaurant services can also expect increased demand for their products and services as a result of the process of population ageing. This is apparent for both the scenarios discussed.

Figure 10: Additional demand by product/service group and households by age, percentage change between 2010-2025 of total demand by product group, friendly (F) and tough (T) scenario, Germany



Source: NEUJOBS friendly population forecast and Household budget survey, Input-Output analysis and authors' own calculations

The majority of additional consumption in the period 2010-2025 will be generated by 60+ consumers. The shrinking number of younger age groups (under 60), together with the decrease in the total number of households over time, cause significant shifts towards products specializing in the needs of the elderly in consumption demand for each group of services and products. Overall, the German 60+ group tends to spend more on recreation and culture than their counterparts in other countries from the analyzed sample, especially in low-income countries.

Impact of Ageing on the Structure of Employment

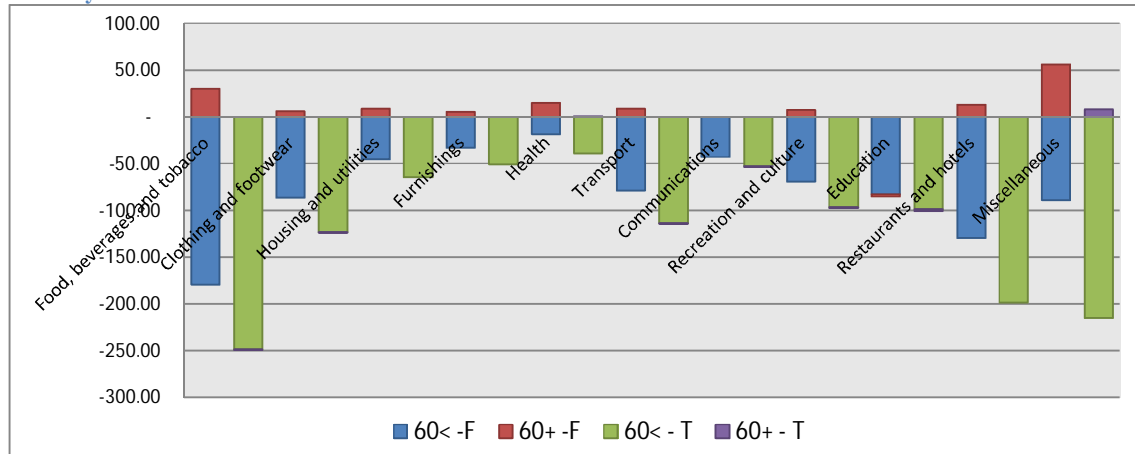
In the case of relative impacts of ageing on employment by sectors, we can expect a decrease in employment in each analyzed sector. The most remarkable decrease can be expected in the sectors of food and beverages, restaurant and hotel services and housing and utilities. In the case of Germany, new job opportunities will not be generated. One can consider unusual the increase in total consumption and sectorial consumption followed by a decrease in labour demand. This is caused mainly by a higher increase of capital productivity compared to the increase of labour productivity¹⁷.

Taking a closer look at the expansion of labour demand according to the friendly scenario generated by ageing in 2025 compared with 2010, the total number of new jobs will be negative, almost 700,000 i.e., we can expect a significant decrease in working opportunities. As can be seen from Figure 11, apart from health care, the only source of new jobs in 2025 will be generated by additional consumption by the over 60 age group. According to our results, the number of jobs generated by this group's additional consumption will be more than 150,000 based on the friendly scenario in 2025. The highest number of new jobs generated can be expected in the consumption categories of food and beverages, health and hotels and restaurant. Despite having a publicly financed health care system, the German elderly will likely spend more on products and services in their consumption. The decrease in total consumption demand of younger age groups below 60 will cause a decrease of more than 850,000 jobs which is significantly higher than the increase generated by the elderly consumption. Due to the high decrease of jobs caused by consumption changes of the

¹⁷ Older labour force tends to have lower labour productivity compared to younger work force.

younger groups, and increased productivity, the total labour demand will significantly decrease. On the one hand, this can be considered as a negative effect, but on the other, due to decreasing patterns of the total population, Germany may not experience a lack of labour force in the future.

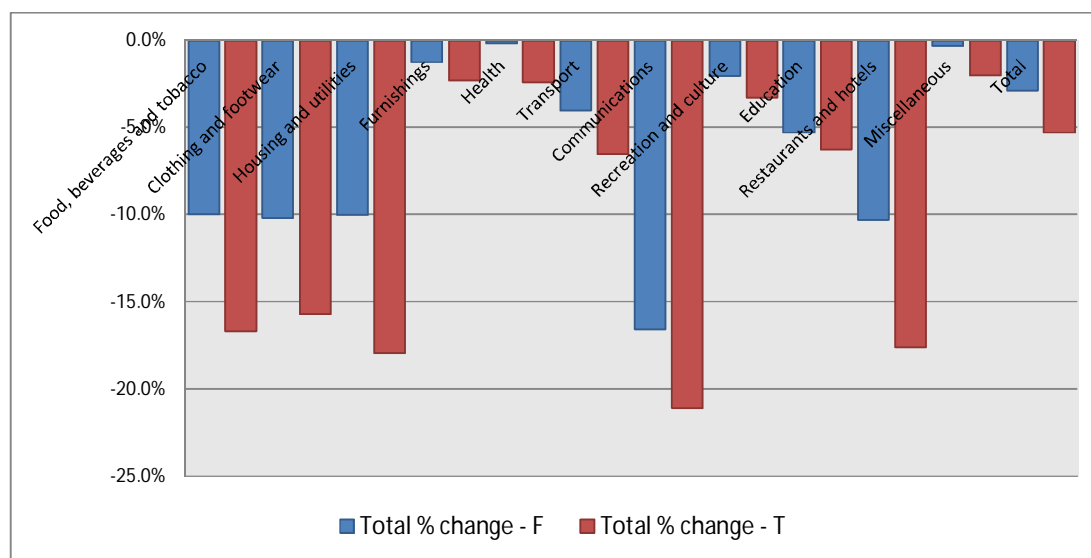
Figure 11 Expansion labour demand generated by demographic transition, thousands of jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Germany



Source: NEUJOBS population forecasts, Household budget survey, Input-Output analysis and authors' own calculations

According to the tough scenario applied for Germany, when we analyze age groups below 60 and above 60, ageing-related changes in consumption between 2010 and 2025 and productivity increase will result in an even deeper labour demand decline compared to the friendly scenario. Actually, none of the sectors can expect new job opportunities, but on the contrary, an overall dramatic labour demand decrease can be expected (negative to the extent of almost 1.3 million). Even the German elderly will spend more on almost each product group, the moderate increase in demand of younger age groups compared to their size and increasing productivity will likely generate an overall job loss in all consumption groups.

Figure 12 Expansion labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenarios, Germany



Source: NEUJOBS friendly population forecast and Household budget survey, Input-Output analysis and authors' own calculations

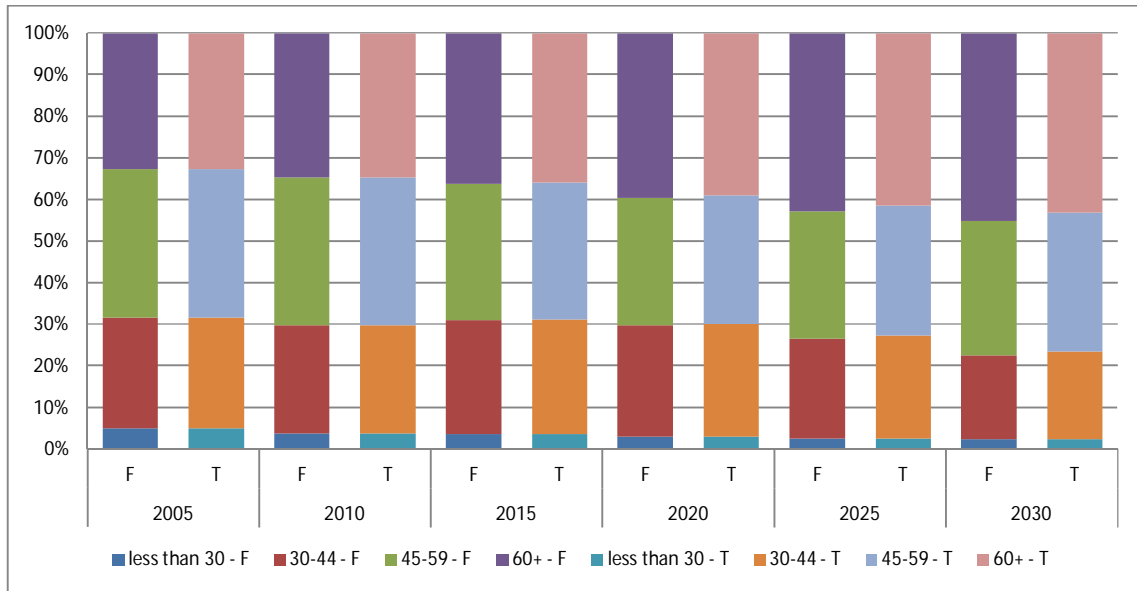
In general, as mentioned above, total consumption in Germany will increase and this increase will be covered mostly by increasing productivity instead of increasing labour demand. Thus, in the near future, satisfying the demand of the elderly can be considered as an economic opportunity. On the other hand, the decrease in the relative number of younger people and the decrease in the number of total households implies changes in the structure of consumption demand, together with decrease in the labour supply. This may lead to changes in the production structure caused by this new changed situation. It is still very likely that the decrease in labour demand will be also complemented by decreasing labour supply generated by retiring of high number of people at the same time. This may be partially offsetting the possible disequilibria created by ageing on the German labour market. Of course, we have to keep in mind that the two scenarios discussed in this paper are on the frontiers of the possible future development. Thus, the results presented should be understood in this sense.

3.2.2 Slovakia

Structure of households

According to the results of the tough and friendly scenarios, the impact of ageing in Slovakia will be apparent throughout the whole of the analyzed period. The expected share of households with an elderly reference person over the age of 60 will increase over time, and will likely reach almost 40% of all households in Slovakia by 2025 (see Figure 13). The share of households with a reference person aged 45-59 will decrease over time due to gradual ageing and a demographic shift to the over 60 age group. The share of households with a reference person below the age of 45 will remain nearly unchanged by 2020, and later an intensive decrease can be experienced.

Figure 13 Households' structure by age of reference person, friendly and tough scenarios, Slovakia



Source: NEUJOBS population forecasts and Household budget survey.

What is different in the case of Slovakia, compared to the rest of the sample, is that the total number of households will increase throughout 2010-2030 under both the considered population scenarios. Obviously, the forecast number of households in the friendly scenario shows a more remarkable increase in the share of households than the tough one. The share of households with a reference person aged over 60 will likely exceed 44% by 2030. The share of households with a reference person younger than 60 will decrease over time and in 2030 will be less than 57% of the total number of households in the case of a tough scenario and 55% of the total number of households according to the friendly scenario. Each analyzed subgroup under 60 (20-29, 30-44 and 45-59) tends to decrease over time “in favour” of the increasing share of the over 60 group.

Table 11 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Slovakia

	2005	2010	2015	2020	2025	2030
Total number of households - F	1.67	1.75	1.88	1.96	2.03	2.12
Total number of households - T	1.67	1.75	1.87	1.92	1.95	1.98

Source: NEUJOBS population forecast and Household budget survey

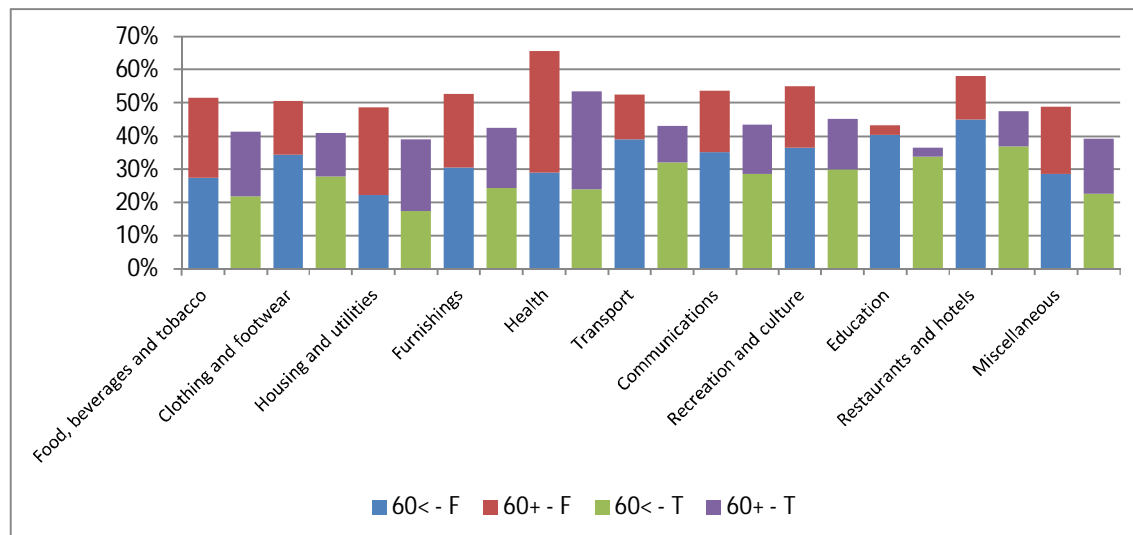
The number of households was 1.75 million in 2010. Based on the friendly scenario, their number will increase to 2.12 million by 2030. The tough scenario is slightly less optimistic and provides for only an increase to 1.98 million.

Impact of Ageing on the Structure of Consumption Demand

The figure below (Figure 14) depicts the structure of additional demand in 2025 compared to 2010. According to the tough scenario, the overall consumption tends to increase in each group of products/services. The most remarkable increase in demand can be expected for food and beverages (41%), housing and utilities (39%) and health care (54%). The majority of additional consumption is generated by the demand of the group younger than 60. This is due to the transition of younger low-income cohorts in the working age with higher incomes and, thus, also higher consumption. Due to the increased share of the 60+ group on total population, this group will also positively contribute to total consumption. Based on cultural and social behaviour, the 60+ demand in Slovakia will target mostly goods and services for everyday living and healthcare. The increase in transportation and restaurant and hotel

services are likely to be the ones with limited magnitude due to the historical, economic and social background of the Slovak population. This generates a low desire to travel during retirement and a relatively high propensity to save for “rainy days”, i.e. a preference for saving instead of consuming.

Figure 14: Additional demand by product/services group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, Slovakia



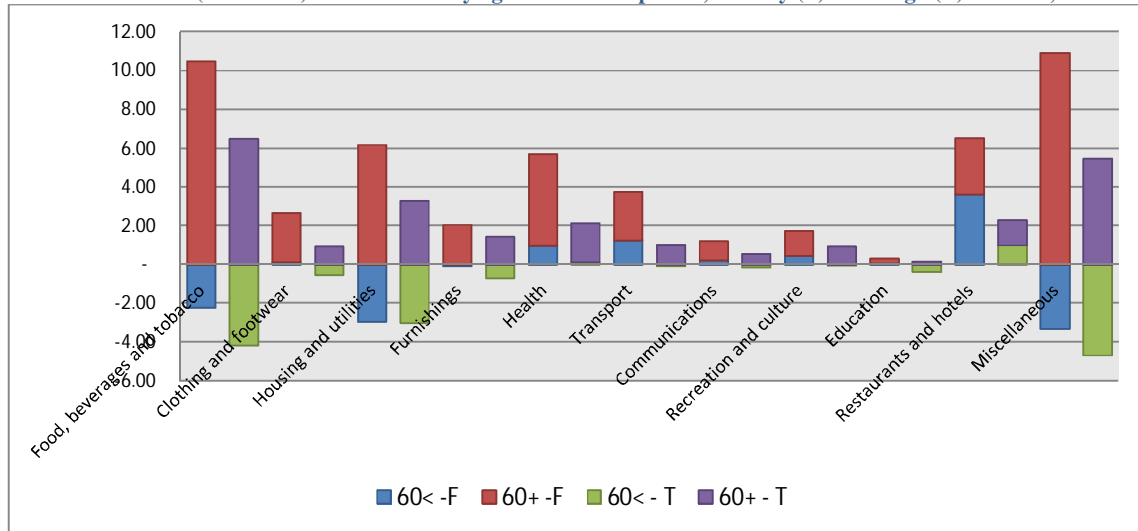
Source: NEUJOBS friendly population forecast and Household budget survey, Input-Output analysis and authors' own calculations

In the case of the friendly scenario, the share and number of 60+ consumers will positively influence the demand for all of the products analyzed. The highest additional demand can be expected in the following sectors: food and beverages 52%, housing and utilities 48%, health 66% and restaurants and hotels 58%. As was mentioned above in the tough scenario, the demand of the elderly will target mostly goods and services important for everyday living. Instead of spending on traveling, hotels and restaurants, the financial sources of elderly will be rather used to generate savings. Of course, in the future when the income of this group converges to the income of more wealthy EU member states, we may expect changes in the propensity to save and the demand structure of this group. Overall, the limited potential of the silver economy in Slovakia is determined by cultural, economic and social developments from the past which are likely to continue in the next 10-15 years.

Impact of Ageing on the Structure of Employment

The expansion of labour demand according to the friendly scenario, generated by the changed consumption structure of private households and increased productivity depicted in the figure below (Figure 15), clearly shows that aging will generate new job opportunities in the sectors producing food and beverages and supplying goods and services related to housing and utilities. Health care is also one of the driving sectors, even though it is mostly publicly financed. The expected increase in the number of jobs in sectors producing food and beverages will likely exceed 10,000. The changed composition of demand will generate more than 6,000 new job opportunities in sectors related to housing and utilities. The total national labour demand is likely to increase by more than 43,000 jobs. In the case of Slovakia, along with an increased demand of the elderly, the demand of younger age groups will also increase and generate further labour demand. It is important to note that the new jobs generated are, to a great extent, the result of increases in the consumption of 60+ groups.

Figure 15 Expansion labour demand generated by demographic transition, thousands of jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Slovakia

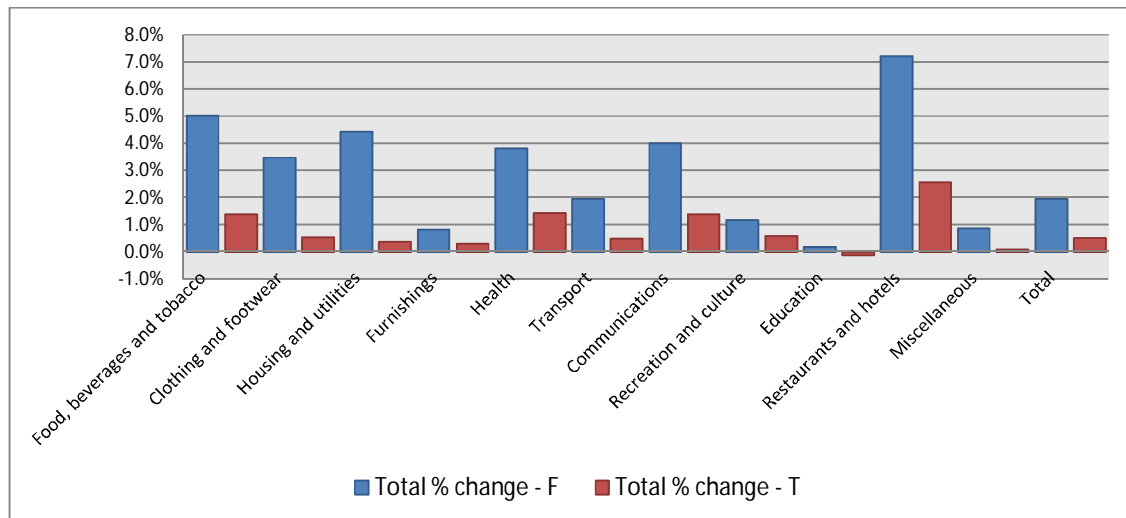


Source: NEUJOBS population forecasts, Household budget survey, Input-Output analysis and authors' own calculations

The expansion of labour demand according to the tough scenario, shows a rather pessimistic future development than the one based on the friendly scenario. Total labour demand is likely to increase by only 11,000 new jobs. Private consumption will increase employment mostly in the sector of food and beverages. This is caused by moderate increases in consumption and productivity. Other important factors are the high propensity to save for “rainy days” and lower income levels in comparison with the EU average. In general, the expansion of labour demand can be expected in sectors producing goods and services for daily life.

The additional labour demand (Figure 16) seems to be positive in the large majority of analyzed sectors according to both the scenarios considered. The results based on the friendly scenario are more optimistic than the results of the tough scenario. Sectors benefiting from ageing are food and beverages, housing and health. Restaurants and hotels will experience an expansion in labour demand generated by increased consumption among younger consumers.

Figure 16 Expansion labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenarios, Slovakia



Source: NEUJOBS friendly population forecast and Household budget survey, Input-Output analysis and authors' own calculations

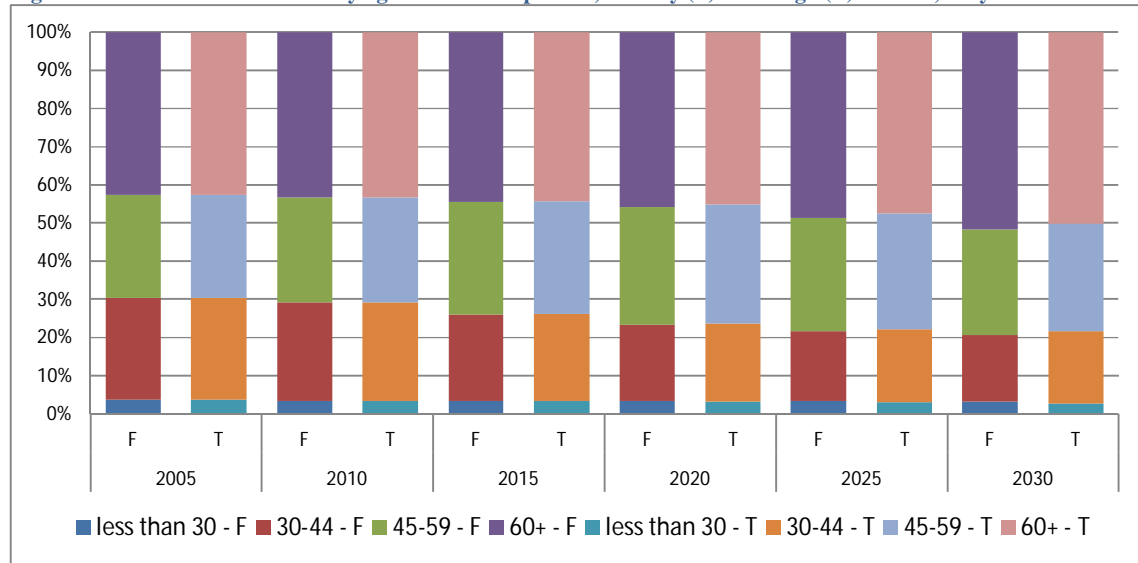
Overall, additional demand in both the friendly and tough scenarios show that in the future, households with a reference person of 60+ in Slovakia will consume mainly goods and services necessary for daily living and health care instead of spending on traveling or culture. This is caused by low income levels in comparison with the EU average in this group, and an historically-given high propensity to save for future “rainy days”.

3.2.3 Italy

Structure of Households

In case of Italy too, the effects of ageing generated by demographic transitions will have a significant impact on employment, households' composition and their future consumption. The demand of households with a reference person over 60 will likely generate new jobs, and the demand of households with a reference person under 60 will, rather, result in job losses. Thus, from this point of view, according to our estimated scenarios, population ageing in Italy could result in a slight employment change from -2.3% to 0.4% over the next 15 years. The main influence of demographic transition will be on the structure of demand, which will likely result in a changed production structure.

Figure 17: Households’ structure by age of reference person , friendly (F) and tough (T)scenario, Italy



Source: NEUJOBS population forecast and Household budget survey

The friendly scenario expects an increase in the total number of households in Italy over the reference period by approximately 1 million households every five years. In the tough scenario from 2015 onwards, the number of households is expected to be around 25.5 million. In general, the shares in the age groups remain almost equal in both scenarios. The higher population increase in the friendly scenario will create higher total private consumption and also higher additional consumption by 2025. According to the available data, the share of households in Italy with a reference person less than 30 years of age is one of the lowest in Europe. Conversely, the share of households with a reference person over 60 is relatively high and will likely increase from 42.5% in 2005 to over 50% by 2030 in both scenarios. Contrary to this trend, a decrease in the number of households with a reference person aged between 30 and 59, can be expected due to demographic transitions.

Table 12 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Italy

	2005	2010	2015	2020	2025	2030
Total number of households - F	23.27	24.88	25.53	26.30	27.31	28.07
Total number of households - T	23.27	24.88	25.34	25.59	25.73	25.30

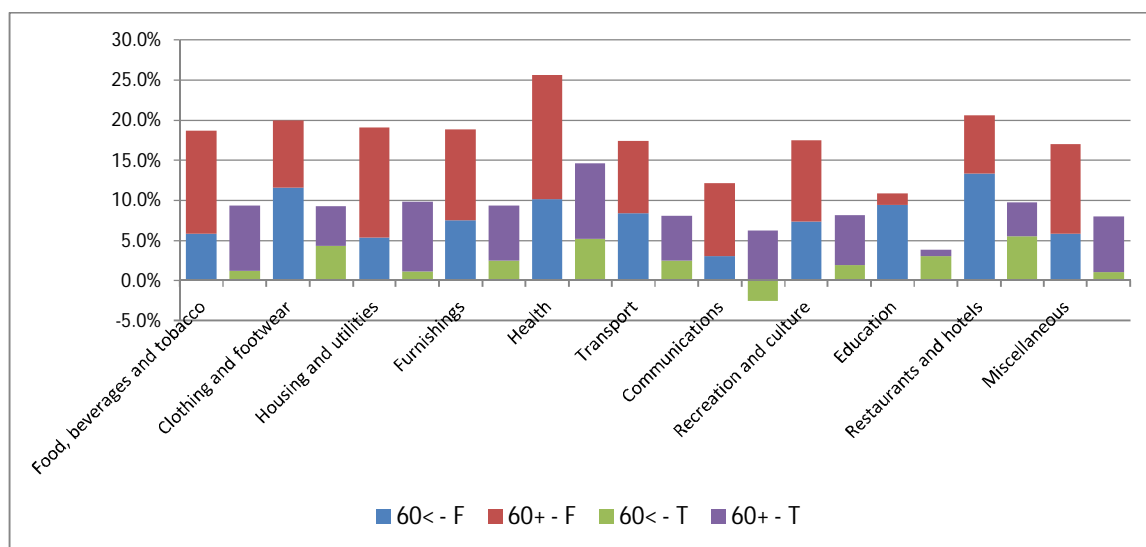
Source: NEUJOBS population forecast and Household budget survey

Impact of ageing on the structure of consumption demand

The impact of demographic transitions and estimated economic developments will result in increased private consumption demand. In the case of both scenarios, the additional demand of households with a reference person aged over 60 will be higher compared to younger households. Almost 40% of private demand will likely be generated by older households in 2025. The only negative development of the additional demand of younger customers is expected to be in the tough scenario for products and services of the communication sector.

Figure 18 Additional demand by product/services group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, Italy





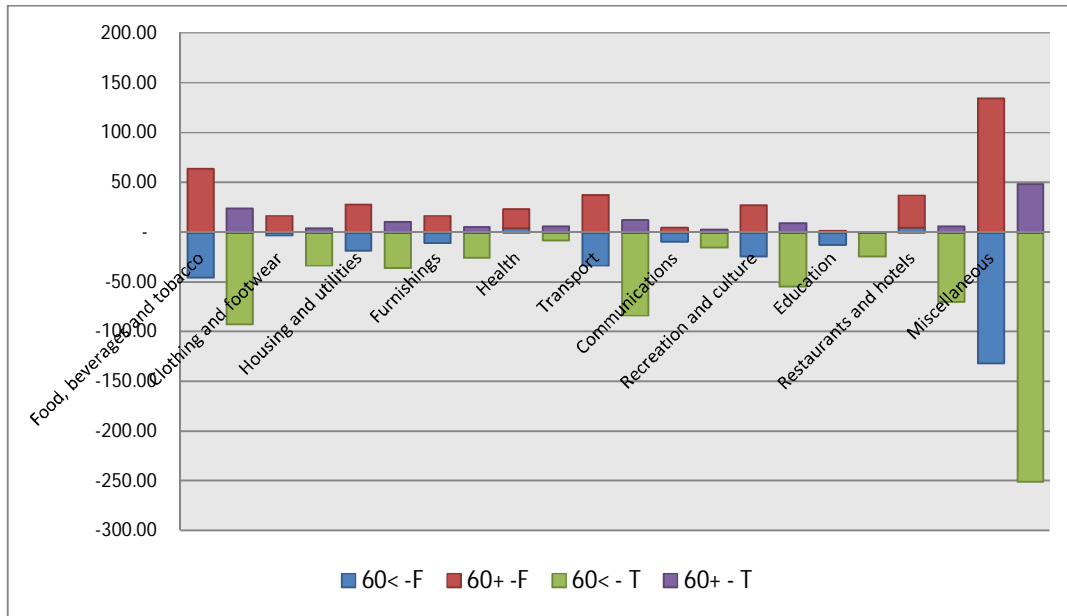
Source: NEUJOBS population forecast and Household budget survey, Input-Output analysis and authors' own calculations

The assumption of an increase in private consumption of 9% according to the tough scenario, and more than 18%, according to the friendly scenario, was translated into expected changes in the demand structure of households by age of the reference person. According to the results of both scenarios, the changes in consumption caused by ageing in 2025, compared to the levels of 2010 (see [Figure 18](#) above), are positive in all sectors. The consumption in the 60+ group will likely exceed the additional consumption generated by the below 60 age group. It is likely that the source of additional consumption demand with higher growth potential in the future will be among the group of older consumers. The expected increase in total demand due to the additional demand of the older age group in each group of products will be from almost 11% to less than 26% for the friendly scenario and from almost 4% to more than 14% for the tough scenario.

Impact of Ageing on the Structure of Employment

To estimate the level of labour demand, we assumed that productivity will increase by 15.5% in case of the tough scenario, and 16.9% according to the friendly scenarios over the reference period. Having analyzed sectors in which new jobs would be created as result of demographic and economic changes, it is clear that the additional labour demand in the friendly scenario would target mostly sectors providing services in the following sectors: restaurants and hotels, housing and utilities, and producing clothing and footwear, food, beverages and tobacco, and health care. In the sector providing restaurant and hotel services, both the defined age groups of customers will contribute positively to employment. In the tough scenario, due to relatively high productivity growth in comparison with changes in demand, a decreased level of employment should be expected in this sector. Even though in the tough scenario, the demand of the elderly will likely generate around 130,000 new jobs. This will be offset by job losses of almost 700,000 due to the lower demand dynamics of younger age groups. In this scenario, the effect of younger customers on employment in all of the sectors will likely be negative.

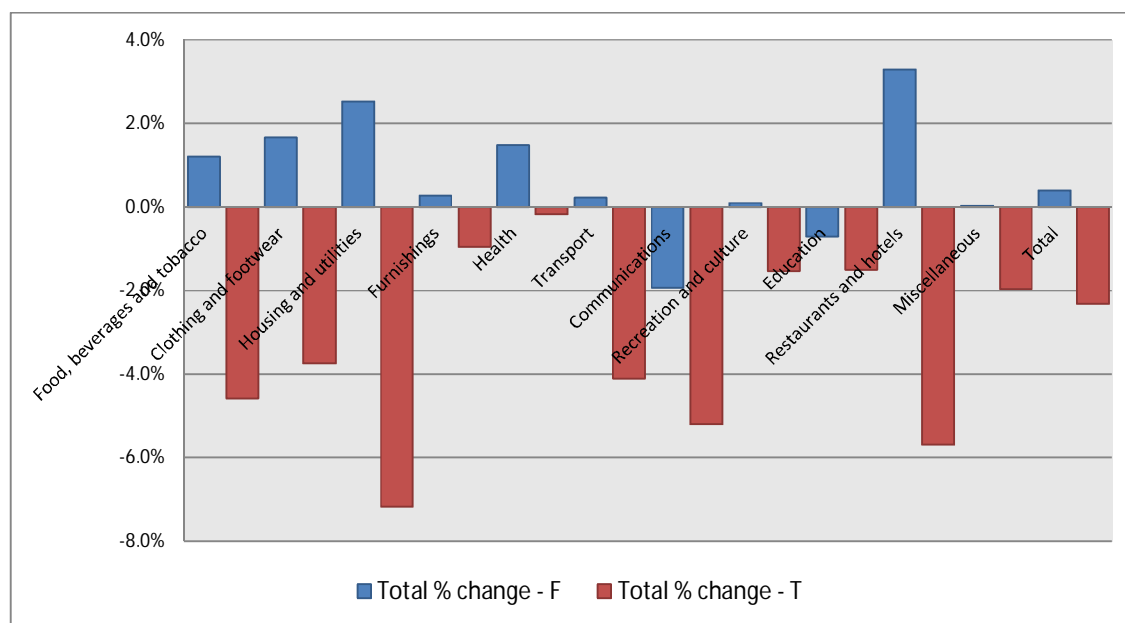
Figure 19 Expansion labour demand generated by demographic transition, thousands of jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Italy



Source: NEUJOBS population forecast and Household budget survey, Input-Output analysis and authors' own calculations

The total number of new jobs will likely vary between job losses of approximately 560,000 and 100,000, and new job opportunities according to the tough and friendly scenarios respectively. Around 130,000 new jobs (tough) and 385,000 new jobs (friendly) will be created by the additional demand of the 60+ group. The rest of the jobs will be lost as result of the lower demand dynamics of the younger groups. In sectors producing food and beverages, the number of new jobs generated by the increased consumption of the elderly will likely exceed 20,000 based on the tough scenario, and 64,000 according to the friendly scenario. Least new jobs will be created by the additional demand of the older customer group in sectors producing communication services. The friendly scenario results show a more optimistic view on the future development of the labour market in Italy than in the case of the tough scenario. Based on the friendly and tough scenarios, elderly consumers seem to have a significant impact on future consumption structure. Thus, it is important to consider them as a consumer group with a higher growth potential in the future compared to younger groups.

Figure 20 Expansion labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenario, Italy



Source: NUEJOBS population forecast and Household budget survey, Input-Output analysis and Author's own calculations

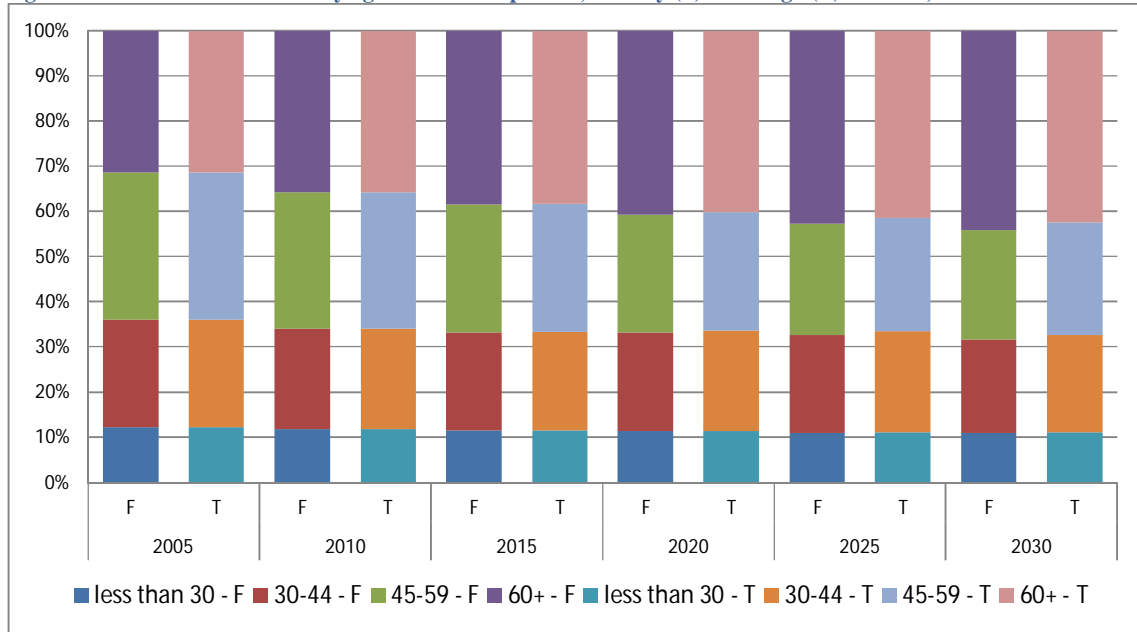
In Figure 20 above is depicted the development of employment by selected sectors. Total employment will likely stagnate or slowly decrease with the positive contribution of consumption being from the older group. Total employment will likely vary in the range from -2.3% (tough) to 0.4% (friendly) in the 2010-2025 period as a result of demographic changes. The highest potential to generate new job opportunities according to the friendly scenario can be expected in sectors providing restaurant and hotel services (3.3%), housing and utilities (2.5%), health care (1.5%) and producing clothing and footwear (1.7%) and food, beverages and tobacco (1.2%). In case of the tough scenario, a decrease in employment can be expected in all sectors, the lowest decrease of 0.2% being likely to occur in the health care sector. In Italy, as well as among goods for daily life needs (food and housing) a demand for other more luxurious products and services can be expected. Due to productivity gains, increased demand will not be translated into higher employment in all sectors. In general, we can conclude that the consumer group of people 60+ in Italy is likely to be a strong, wealthy and important one with a relatively high growth potential. Thus, satisfying their needs should be considered as an economic opportunity for domestic and, potentially, also foreign companies.

3.2.4 Finland

Structure of Households

According to the NEMESIS results, household expenditure in Finland will rise during the period 2010 – 2025 from 16.5% (tough scenario) to 20.4% (friendly scenario). Both scenarios for Finland show a similar trend of a slight increase in the total number of households with faster growth taking place under the friendly scenario. According to this scenario, the number of households in the future will likely increase to over 2.68 million in 2025. This could have positive effects on the position of younger groups under 60 and will end up in an increase in consumption for these groups, even though their share of the households' structure will slightly decrease.

Figure 21 Households’ structure by age of reference person , friendly (F) and tough (T) scenario, Finland



Source: NEUJOBS population forecast and Household budget survey

The shares of all the examined age cohorts are relatively similar in both scenarios. The main difference lies in the total number of households and share of households where the age of the reference person is over 60 and it still makes up only 1.5% of the difference between the scenarios. The increase in the number of households makes a significant difference in the total final consumption of elderly customers which in the case of Finland has the potential to generate new jobs.

Table 13 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Finland

	2005	2010	2015	2020	2025	2030
Total number of households - F	2.40	2.49	2.55	2.61	2.68	2.74
Total number of households - T	2.40	2.49	2.54	2.57	2.60	2.60

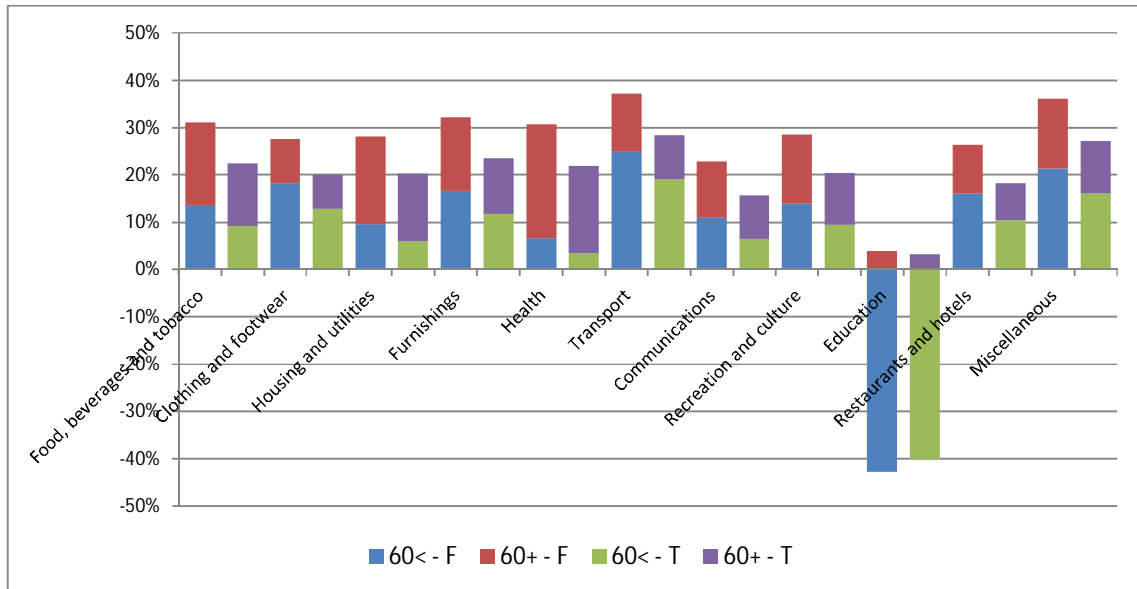
Source: NEUJOBS population forecast and Household budget survey

The expected share of older households will likely exceed 40% of the total number of households by 2020 in both scenarios. Based on the forecasts, the elderly will become an important consumer group over the next decade in Finland. In 2005, the share of elderly households was only 31.3% (which represented the second largest age group); by the end of the reference period its share will be more than 17% higher (tough) and almost 20% higher (friendly) than the second largest household group aged 45-59.

Impact of Ageing on the Structure of Consumption Demand

Changes in consumption due to demographic transitions and economic development during the reference period, according to the friendly scenario, show relatively higher growth potential for products targeted at elderly customers compared to the case of the tough scenario. In the case of tough scenario, the dynamics of the total household demand of the selected age groups is relatively similar.

Figure 22 Additional demand by product/services group and households by age, percentage change between 2010-2025, friendly (F) and tough (T) scenario, Finland



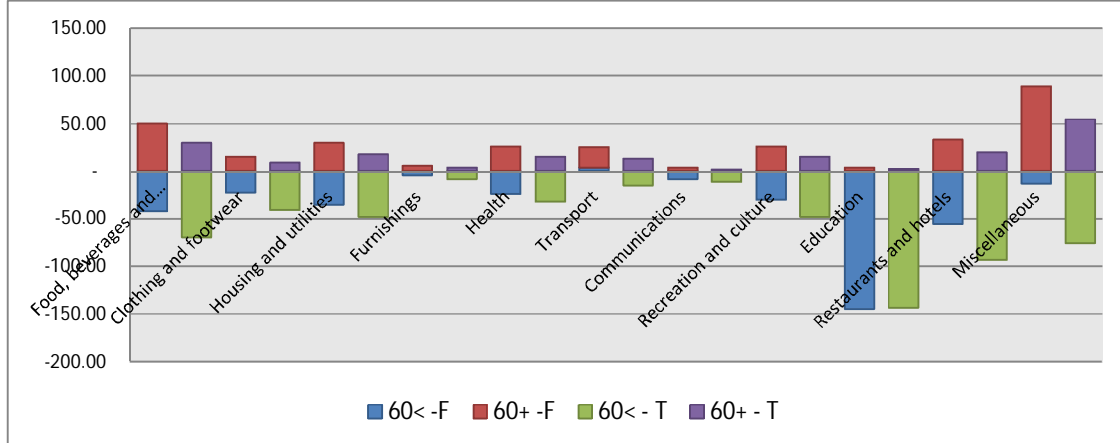
Source: NEUJOBS population forecast and Household budget survey, Input-Output analysis and authors' own calculations

The highest increase in overall consumption is expected in the case of the tough and friendly scenarios in the following sectors: food and beverages (22-31%), housing, and clothing and footwear (20-28%), furnishing (23-32%), transport (28-37%) and health (22-31%). In the case of sectors producing clothing and transport, the dominant part of the growth is generated by the demand of the younger age cohorts. In the future, an increased demand for the majority of products can be expected in Finland. Demand for education by younger consumers will decrease according to both scenarios.

Impact of Ageing on the Structure of Employment

The expansion of labour demand generated by ageing shows that the new jobs generated will be due to the increasing consumption of the over 60 age group. The majority of jobs will be generated in sectors producing food and beverages, together with housing and utilities. The number of new jobs generated by the additional demand of elderly consumers in sectors producing food and beverages will exceed 50,000. In housing it will generate approximately 30,000 new jobs.

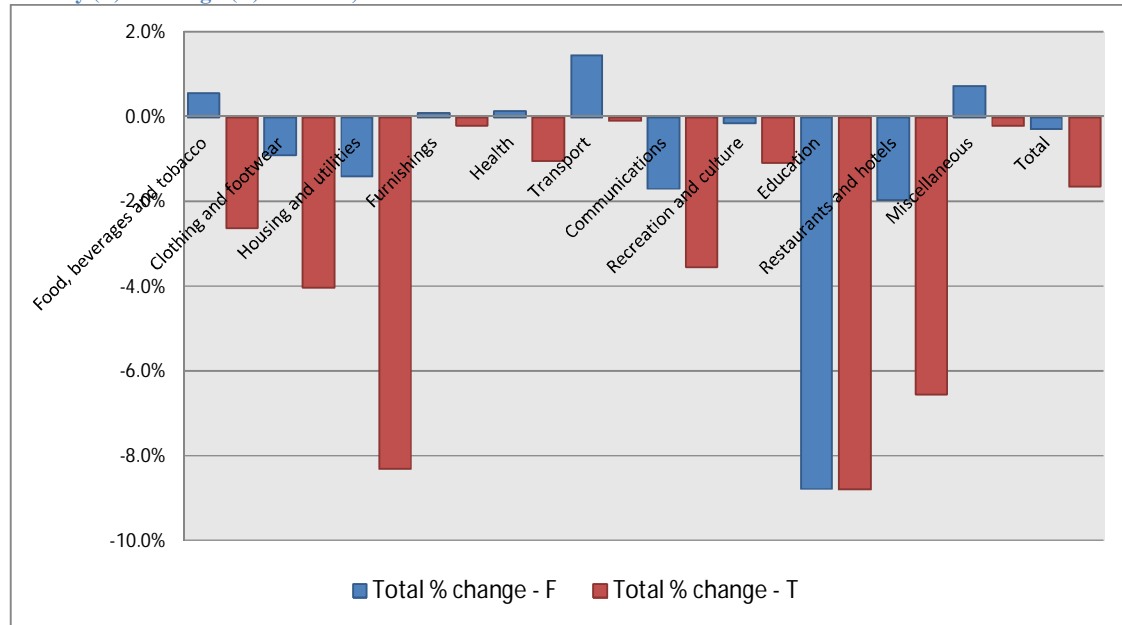
Figure 23 Expansion labour demand generated by demographic transition, thousands of jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, Finland



Source: NEUJOBS population forecast and Household budget survey, Input-Output analysis and authors' own calculations

Due to decreasing number of younger households and increased productivity new jobs generated by elderly will be partially or fully eliminated. Productivity would expectedly increase during the reference period by 28.8% (tough) - 29.7% (friendly). Additional demand of elderly will likely generate from 180,000 to 300,000 of new jobs in period 2010-2025. On the contrary, lower dynamics of demand of below 60 group will generate decrease of 375,000 (tough) and 580,000 (friendly) jobs. Increase in demand of elderly will partially offset the lower demand dynamics of younger consumers.

Figure 24 Expansion labour demand generated by demographic transition, total percentage change 2010-2025 , friendly (F) and tough (T) scenario , Finland



Source: NEUJOBS friendly population forecast and Household budget survey, Input-Output analysis and authors' own calculations

It can be seen from **Error! Reference source not found.** that the majority of sectors will experience decreases in employment due to demographic transitions. The only exceptions are to be found in the friendly scenario, and those sectors provide transport and health care, and produce food, beverages and tobacco, and furnishings. It is necessary to stress that total employment in the friendly scenario will decrease by only 0.3%. In the tough scenario, total employment will decrease by 1.6% which also represents a relatively limited effect and results from the lower number of households. The highest decrease is expected in sectors providing education due to the lower number of students and higher productivity. As this analysis only focuses on private consumption, this can be addressed by public spending. As we have not considered the ageing of employees, it need to be stressed that in the sectors where labour demand decreases, this decrease should be partially attributed to people retiring and, thus, does not cause imbalances in the labour market. Elderly consumers in Finland tend to spend their disposable income not only to satisfy their daily life needs, but also on more luxurious goods and services. The silver economy, as a domestic concept in Finland, seems to be as important an economic opportunity as it may be in Germany because the average demand dynamics of elderly consumers is higher than in the case of younger age groups.

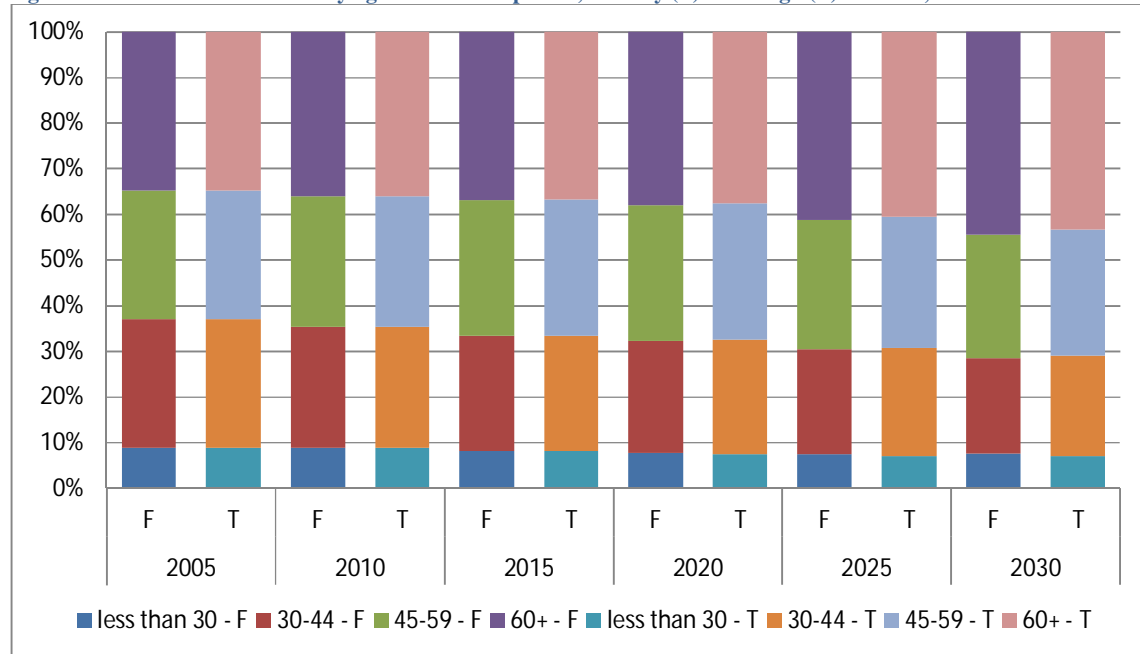
3.2.5 EU

We discuss in the following subchapter the potential effects of demographic transition on the European economy as whole. To estimate the possible effects, we will employ the same methodology as we used in the previous text when estimating the impacts at country levels. For the estimation of demographic transition, we use aggregated IOTs of the EU 27 and estimations of the number of households and demand structure by methodology discussed in chapter 2.3.2 for all the countries added together. According to NEMESIS, we can expect that total household expenditure in the EU 27 will rise during the period 2010 – 2025 by 18.8% (tough scenario) or 27.4% (friendly scenario).

Structure of Households

In terms of shares, both scenarios for the EU 27 have shown rather similar developments. The only minor difference of under 0.5% is linked with the group of households with a reference person aged over 60. The main difference is in the expected development of the total number of households that increases steadily in case of friendly scenario. In the tough scenario, the total number of households reaches its maximum level of around 213 million in 2025. This will negatively affect the level of additional demand of both younger and also elderly customers according to this scenario.

Figure 25 Households’ structure by age of reference person, friendly (F) and tough (T) scenario, EU27



Source: NEUJOBS population forecast and Household budget survey

It is clear that the share of households with a reference person aged over 60 will increase from almost 36% in 2010 to more than 43% in 2030; this applies in both scenarios. This represents a more than 20% increase and, together with an expected increasing standard of living in the EU, will be higher than in the case of younger customers. The share of households with a reference person aged 45-59 or younger will increase which confirms the demographic transition and suggests its possible further development in the period after 2030.

Table 14 Total number of households 2005-2030 in millions, friendly (F) and tough (T) scenario, Finland

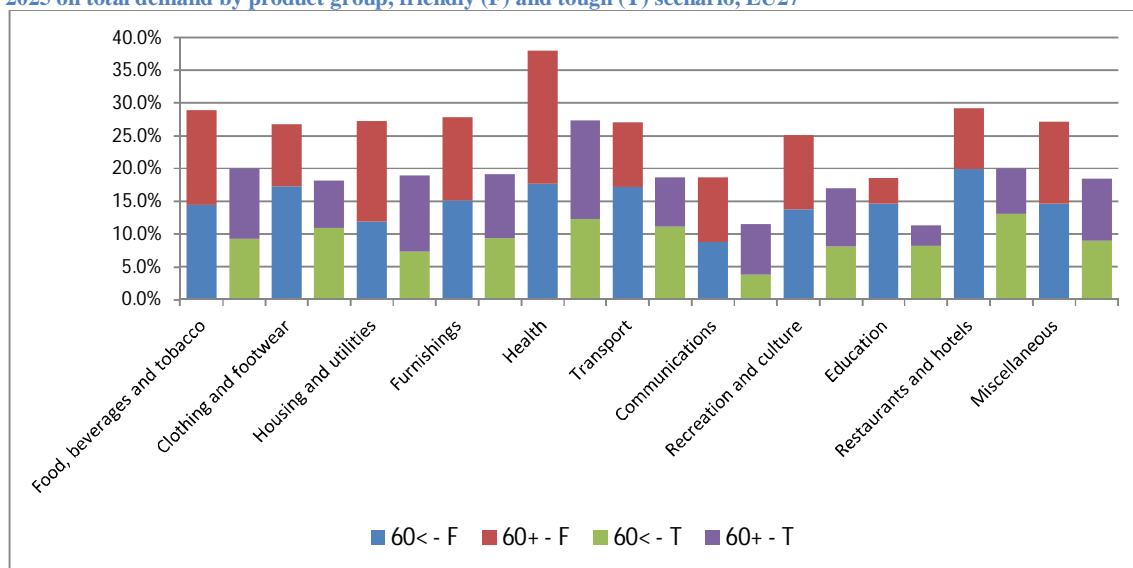
	2005	2010	2015	2020	2025	2030
Total number of households - F	194.90	204.43	209.12	216.81	222.78	225.95
Total number of households - T	194.90	204.43	208.07	212.49	213.03	208.66

Source: NEUJOBS population forecast and Household budget survey

Impact of Ageing on the Structure of Consumption Demand

According to the results achieved, the average expenditure per household in the EU27 during the period 2010-2025 will increase by 14% according to the tough scenario, and by almost 17% according to the friendly scenario. This will affect the level of demand for each product group differently depending on income elasticity, households' welfare in each individual country, the rate of convergence and several other factors. The following paragraph discusses the expected impact of demographic transition and economic development according to the results of the NEMESIS model on demand for selected types of products and services on a European level.

Figure 26 Additional demand by product/services group and households by age, percentage change between 2010-2025 on total demand by product group, friendly (F) and tough (T) scenario, EU27



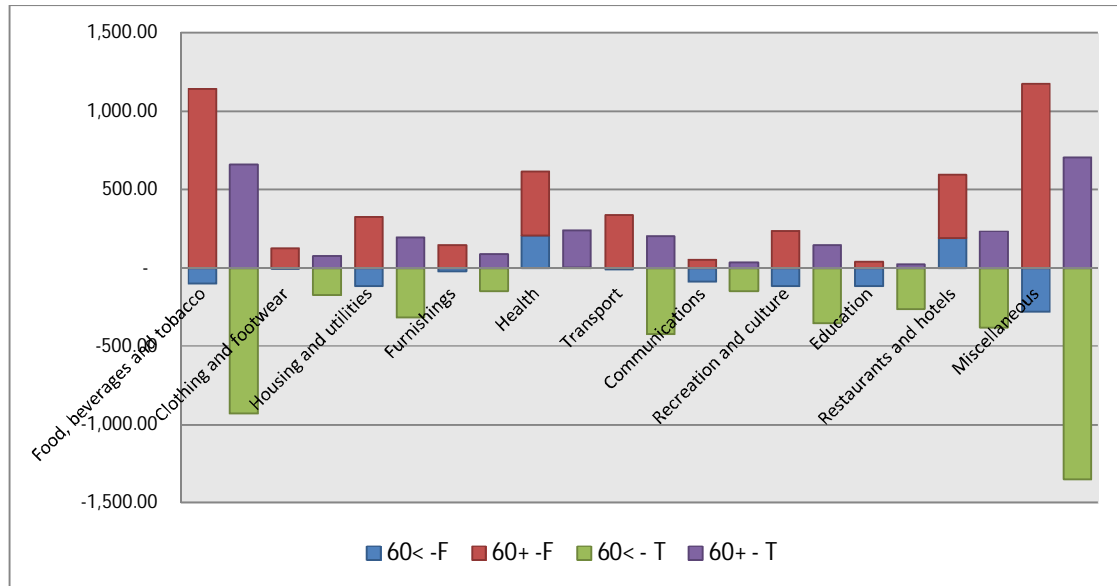
Source: NEUJOBS population forecast and Household budget survey, Input-Output analysis and authors' own calculations

In both the friendly and tough scenarios, the highest expected increase in consumption of younger customers is related to restaurant and hotel services. We can explain this fact by an expected higher standard of living in EU which could result in increased demand for these types of services. In both scenarios, the highest increase in total private demand is expected to target health care services for couple of reasons. First is the fact that there will be more elderly citizens demanding care. On the other hand, there will be a large group of aware younger age cohorts demanding preventive healthcare. In most of the selected product and services, the groups' additional demand of both type of households by age is quite similar, and it needs to be borne in mind that the base of the elderly is smaller thus its dynamics is higher. There are, of course, some exceptions such as education, clothing and footwear, and transport in which a higher proportion is related to younger age cohorts. With respect to demographic and economic changes in total demand for selected product groups, an increase of between 19 – 38% will be seen in the case of the friendly scenario and 11 - 27% according to the tough scenario.

Impact of Ageing on the Structure of Employment

Structural shifts in demand will result in a changed structure of labour demand and we will focus on this issue in the following text. In the methodology applied, we expect that productivity will increase during the reference period by 21.7% based on the tough scenario and 22.2% based on the friendly one.

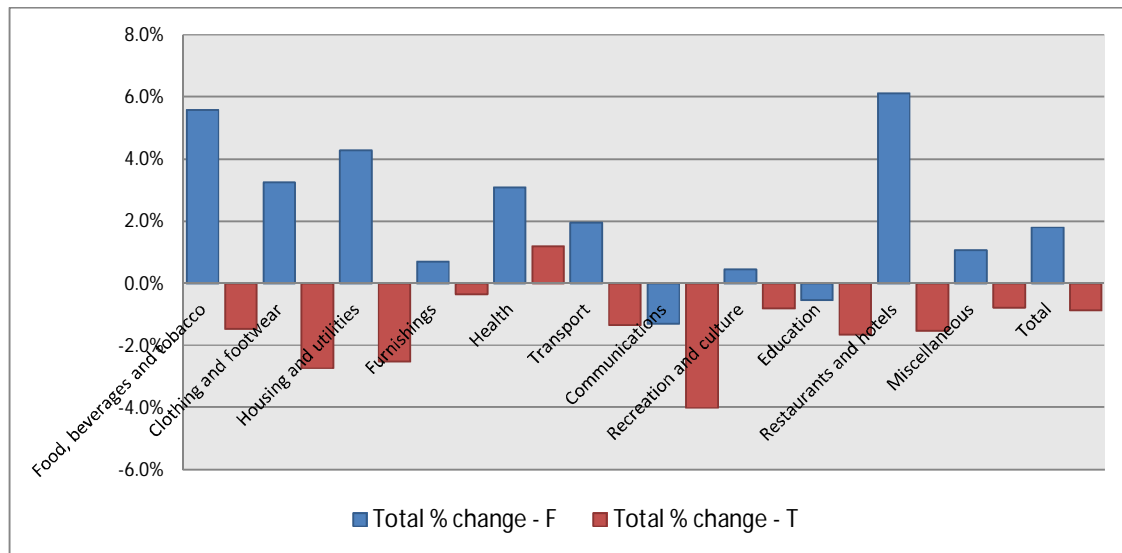
Figure 27 Expansion labour demand generated by demographic transition, thousands of jobs created (thousands) by additional demand (2010-2025) of households by age of reference person, friendly (F) and tough (T) scenario, EU27



Source: NEUJOBS population forecast and Household budget survey, Input-Output analysis and authors' own calculations

The changes discussed above concerning demand could affect labour demand in different ways. As an example, we can look at the expected changes in employment in sectors producing food, beverages and tobacco in the friendly scenario. In this scenario, the additional demand of both age groups of households in 2025 is around 15% of total demand in 2010. Due to higher productivity, and an assumption that employees producing products for younger customers at the beginning of the reference period will be producing this type of products over the whole period, a result can be expected of a loss of approximately 100,000 jobs. Conversely, the increased demand of the elderly will generate an expansion in labour demand of around 1.1 million new jobs. In such a case, employees superfluous for the production of goods for younger households will effectively be employed in production for the elderly. The additional demand of elderly households will create approximately 4.4 million new job opportunities according to friendly scenario.

Figure 28 Expansion labour demand generated by demographic transition, total percentage change 2010-2025, friendly (F) and tough (T) scenario , EU27



Source: NEUJOBS friendly population forecast and Household budget survey, Input-Output analysis and authors' own calculations

The demand of elderly customers has a positive impact on employment in both scenarios. In the friendly scenario, this positive impact is partially offset by the negative impact of a decrease in labour demand of 400,000 of jobs. In the case of the tough scenario, the negative impact of younger customers on employment (4.4 million job loss) results in a decrease in total employment. The most positive impact of the demographic transition on employment in the friendly scenario is expected in the sectors of food, beverages and tobacco, health care, restaurants and hotels, transportation, housing and utilities. In the tough scenario, the positive addition of the elderly is outweighed by decreased labour demand in the majority of sectors due to the development of the additional demand of younger customers. The only sector in which a positive development in employment can also be expected in the case of the tough scenario is that providing health care. The overall impact of this demographic transition could be slightly positive in the case of more positive developments according to the friendly scenario and slightly negative in the case when future, actual global developments are more akin to the tough scenario. From the perspective of customers by age cohorts, higher dynamics and growth potential could be related to products and services targeted at the elderly. If we try to identify sectors with the highest growth potential, we should count the following: sectors producing/providing food, beverages and tobacco, housing and utilities, restaurants and hotel services and, above all, health care. In most cases, younger customers also contribute significantly to product and service groups' growth potential. The silver economy, as a concept for the future, has high growth potential and also could help to increase the long-term competitiveness of EU in global markets if proper innovative actions and initiatives in this field are implemented.

Conclusions and Discussion

Changes in the age structure of populations have unavoidable effects on the economy. Experience with the “first” demographic dividend has shown that changes in the age structure of the population can affect production substantially. Effects of a similar extent can be expected also on consumption caused by the retirement of the baby boomer generation. Based on this, a “second” demographic dividend can be expected. Such a development has inspired the emergence of the concept of the “silver economy”. The segments of goods and services targeting the elderly are going to grow purely because of the increase in the proportion of the elderly in the overall population. Astute reaction to this change, followed by changes in the production and provision of goods and services, could bring a competitive advantage, not only within Europe, but also by expanding into non-European markets.

Nevertheless, this paper focuses mostly on the situation in EU member states. Analysis of the available statistical data has revealed differences in the extent and intensity of ageing among European countries. Most of these differences are in the patterns of ageing. Some countries are ageing faster than others, some are further ahead than others, but there is no European country where ageing is not clearly observable. Few social phenomena come with such indisputable evidence.

The increase in the proportion of the elderly in the population will drive consumption on items which are relatively more often consumed by this sector, namely, consumption related to housing, health care and food. The consumption of more luxurious items such as recreation, traveling, or restaurants by the elderly, differs significantly across countries. In countries with higher incomes- represented mainly by the EU15 - the elderly spend relatively more on these items. In European countries with lower incomes, represented mainly by the EU new member states, the elderly spend relatively less on these items. The effect of ageing on the share of the consumption of these luxury items of the total consumption of households will, therefore, be twofold. In countries with higher incomes, the elderly will spend relatively (but also absolutely) more on recreation, restaurants and transport. The demand for silver economy goods and services also has a strong geographical aspect. The core of demand driving silver economy is in high income countries.

Our analysis rests on the strong assumption that the structure of consumption of the elderly does not change in time with the changing of generations. This assumption was made because of a lack of data. In order to be able to capture any cohort or generation effect on the structure of consumption, comparable data for a longer time period would be a necessary precondition. The Household Budget Survey sets out some evidence on the structure of consumption even from the Eighties, but is available for the period only for *some* of the EU 15 countries and the comparability of the data is rather limited.

Several authors point out that the baby boomer generation will change the existing structure of consumption. This will happen mainly because this is the first generation which has grown up in post Second World War Europe, reshaping existing consumption patterns throughout their whole lives.

Another change in the structure of consumption could be caused by a change in wealth and the incomes of the elderly in the new EU member states. This could be caused either by an increase in the living standards of the whole population, or by the ageing of strong, higher-income age groups, leaving the labour market after a few years of working experience in a transition economy labour market. Both would distort the structure of consumption towards luxury goods as they would have a positive effect on the incomes of the elderly.

There are also reasons why we can expect some opposite effects. The most current is the increase in insecurity because of the unstable economic environment caused by the consequences of the global economic crisis. In an environment of higher insecurity, individuals may consume less, preferring saving to consumption. Expenditure on luxury items of consumption will be cut most because expenditure on food, housing as well as health care are, to some extent, inevitable.

Regardless of the changes in the structure of consumption, further increases in the proportion of the elderly, which are expected based on the available demographic projections, will increase the importance of elderly consumption within identified areas. . On a narrower level, the differences between the consumption of the elderly and the rest of the population can be revealed within each of the identified areas of consumption. In other words, there are reasons to expect that, for example, food products bought by elderly differ on average from the food products bought by the rest of the population. HBS and the COICOP classification do not allow us to follow these differences at this lower level. Some qualitative data gathering would be more appropriate in exploring these differences in consumption.

Changes in consumption will be reflected in changes in production and, thus, will result in changes in employment. The aim of this study has been to analyze the impact of ageing on future consumption structure and its impact on the labour demand in selected EU member states. Finland, Italy, Germany and Slovakia were selected for the analysis. Figures for the selected countries are complemented by the EU 27 figures. To gain information on the sectorial structure of the analyzed economies we used IOTs based on the ESA95¹⁸ methodology published by Eurostat to approximate the impact of changes in consumption structure on the labour demand in sectors generated by ageing. We have also taken into consideration population projections developed under the umbrella of the NEUJOBS project by using the friendly and tough scenarios.

The results were rather divergent for the countries analyzed. In general, we assumed that silver consumers would target their consumption at recreation, healthcare, restaurants and culture. The assumptions were confirmed by Germany. In contrast, in Slovakia, the silver consumption was focused on food, beverages, housing and utilities, which are all products and services needed for daily living.

The impact of silver consumption seemed to be the most straightforward in Germany. The German elderly and silver consumers tend to spend a significant part of their income on health care, recreation and culture. This is possible thanks to a well-developed pension system and high average salaries. Overall, silver consumption will show an increasing trend in Germany and will likely need additional employees to meet the growing demand of the elderly in almost every sector of the national economy. This will constitute a main driver for changes in the structure of products and services provided.

Taking a closer look at development in Slovakia, we notice that the population tends to age over time by 2025. We can expect that silver consumers in Slovakia will likely avoid private consumption in the healthcare sector. Their needs are largely met by the state, and their household budgets are often limited, impeding large expenditure on health care. The new jobs generated by the additional demand of elderly Slovaks are likely to be concentrated in the food industry, and housing and utilities.

¹⁸ European System of Accounts; updated in 1995

The development of silver demand in Italy is fairly similar to the one in Germany. Among food, beverages and tobacco, housing and utilities and health care, the elderly will spend relatively large amounts on luxurious types of products. The positive development of silver labour demand will be offset by a decreased labour demand in younger age cohorts. In Italy, the silver economy represents an important opportunity that should be translated into a generation of new job opportunities.

The expected future development generated by demographic transitions in Finland show that the demand of silver customers will target daily life necessities as well as other types of products (furnishing, recreation and culture, transport, communication and restaurants and hotels). This confirms the expected fact that the standard of living in Finland is relatively high. The only source of positive labour demand expansion in Finland in future will be demand from elderly consumers. Specialization of companies meeting their needs should enhance GDP growth.

Applying the proposed national methodology to the aggregate data of the EU 27, the impact of demographic ageing was approximated with respect to divisions into two groups of households by age of reference persons (younger than 60 and older than 60). The effect of the increased demand of the elderly will generate approximately 2.6 – 4.4 million new jobs over the period 2010-2025. Even this increase at an EU level can be considered as a significant labour demand increase which deserves the attention of policy makers. Contrary to this, the demand of households with a reference person younger than 60, together with productivity gains, will result in job losses of approximately 0.5 - 4.5 million, depending on the two tough and friendly scenarios considered. This decrease can also be considered as an important change and, in the light of EU employment targets, appropriate reform measures should be addressed to the labour market in order to solve it. These results partially confirmed the growth potential if the silver economy as the demand of the elderly will increase over the coming decade and, thus, new job opportunities should be created to meet the specific needs of the elderly. It need to be stressed that changes in public expenditure and the export potential of silver economy were not taken into consideration and these effects should be deemed to be positive thus the growth potential of the silver economy in the long-term competitiveness of the EU was not fully disclosed in this working paper.

One of the shortcomings of the analysis conducted is that productivity growth is assumed to be equal in relative terms across the sectors analyzed. Obviously, the expected productivity gains in manufacturing sectors should be higher than those in services. This can partially underestimate future labour demand in non-tradable sectors and vice versa in tradable sectors. But we expect that the range of tough and friendly scenarios is able to cover most likely future development trajectories.

Demographic transition will not only generate changes on the demand side, where the special needs of silver customers have to be met. The increase in the number of elderly will be accompanied by growing numbers of retired people and an increased pressure to replace workers leaving active, working life. Thus, demographic change is a multifaceted issue and needs to be addressed in a holistic way.

We have to keep in mind that ageing not only has an impact on the consumption structure. There are other economic, social and cultural factors that could significantly influence consumption patterns. Our analysis has shown that aging will be one of the key drivers and determinants in the future consumption structure and, thus, its impact will be significant on labour demand as well. Nevertheless, not all EU member states will face this issue to the same extent. In general, "silver" households seem to be a group with special needs and high

growth potential. Thus, it is reasonable to produce products and provide services tailored to meet the needs of elderly consumers. Countries like Slovakia should focus on the production of goods and services for wealthier countries with large and affluent groups of silver consumers. Countries like Germany should, on the other hand, consider focusing on domestic markets, meeting the needs of the growing group of wealthy “silver” consumers.

References

- Bloom, D. E. – Canning, D. (2004). *Global Demographic Change: Dimensions and Economic Significance*. Working Paper 10817. Cambridge: National Bureau of Economic Research, September 2004, <http://www.nber.org/papers/w10817>.
- Bloom D. E. – Canning D. – Sevilla, J. (2002). *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*. Santa Monica: RAND. ISBN 0-8330-2926-6.
- Bloom, D. E. – Williamson, J. G. (1998). *Demographic Transitions and Economic Miracles in Emerging Asia*. World Bank Economic Review 12, no. 3, September 1998, 419 – 456.
- Commission of the European Communities (2005). *Green Paper: Confronting demographic change: a new solidarity between the generations* (COM(2005) 94 final). Brussels: EU COM.
- Commission of the European Communities (2006). *The demographic future of Europe – from challenge to opportunity* (COM(2006) 571 final). Brussels: EU COM.
- Commission of the European Communities (2009). *Dealing with the impact of an ageing population in the EU (2009 Ageing Report)* (COM(2009) 180 final). Brussels: EU COM.
- Council of the European Union (2007). *Opportunities and challenges of demographic change in Europe: the contribution of older people to economic and social development* (6216/1/07 SOC 59). Brussels: Council of the EU.
- Dovářová, G. (2012). *Strieborná ekonomika v domácej a svetovej literatúre*. In Páleník V. et al. *Strieborná ekonomika v slovenskom, európskom a svetovom kontexte* (Silver Economy in the Slovak, European and Global Context). Bratislava: Ekonomický ústav SAV (Institute of Economic Research SAS), 23 – 82, ISBN 978-807144-205-9.
- European Commission. 2003. *Household Budget Surveys in the EU. Methodology and recommendations for harmonisation - 2003*. Luxembourg: Office for Official Publications of the European Communities, 2003. http://ec.europa.eu/eurostat/ramon/statmanuals/files/KS-BF-03-003-_-N-EN.pdf. ISBN 92-894-5435-0.
- Fisher-Kowalski, M., Haas, W., Wiedenhofer, D., Weisz, U., Pallua, I., Possanner, N., et al. (2012). *SOCIO-ECOLOGICAL TRANSITIONS: Definition, dynamics and related global scenarios*. NEUJOBS Working Papers.
- Huisman, Corina, et al. 2013. *Demographic scenarios 2010-2030*. s.l. : NEUJOBS, 2013. Working Paper D 10.1.
- Jackson, R. – Howe, N. – Nakashima, K. (2011). *Global Aging and the Future of Emerging Markets*. Washington: Center for Strategic and International Studies. Everest Capital, 2011.
- Lee, R. – Mason, A. (2007a). *Population Aging, Wealth, and Economic Growth: Demographic Dividends and Public Policy*. WESS Background Paper (background paper prepared for UN World Economic and Social Survey 2007), January 2007. http://www.un.org/esa/policy/wess/wess2007files/backgroundpapers/popaging_lee_mason.pdf.
- Lee, R. – Mason, A. (2007b). *Transfers, Capital, and Consumption over the Demographic Transition*. In *Population Aging, Intergenerational Transfers and the Macroeconomy*. Robert Clark, Naohiro Ogawa, and Andrew Mason (eds.), Cheltenham, UK: Edward Elgar 128-162. http://www.rand.org/content/dam/rand/www/external/labor/aging/rsi/rsi_papers/2009/LeePaper03.pdf.

Lührmann, M. (2005). *Population Aging and the Demand for Goods & Service*. Mannheim Research Institute for the Economics of Ageing. Discussion Paper, No. 95-05. Mannheim: Department of Economics, Universität Mannheim. http://mea.mpisoc.mpg.de/uploads/user_mea_discussionpapers/gtyzs5eximf4u8v9_95-2005.pdf.

Mason, A. – Lee, R. (2004). *Reform and support systems for the elderly in developing countries: capturing the second demographic dividend*. International Seminar on the Demographic Window and Health Aging: Socioeconomic Challenges and Opportunities. Center for Health Aging and Family Studies and the China Centre for Economic Research, Peking University, Beijing, May 10 – 11, 2004. Accessible also at: <http://www.ceda.berkeley.edu/Publications/pdfs/rlee/Mason%20Lee%20Genus.pdf>.

Meijer, F., Visscher, H., Nieboer, N., & Kroese, R. (2012). *Job creation through energy renovation of the housing stock*. NEUJOBS Working papers.

Shackleton, R. – Foertsch, T. (2005). *Global population aging in the 21st century and its economic implications*. Washington, DC: Congress of the United States, CBO, December 2005, <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/69xx/doc6952/12-12-global.pdf>.

UN (2007). *World Economic and Social Survey 2007: Development in an Ageing World*. New York: United Nations, Department of Economic and Social Affairs. E/2007/50/Rev.1, ISBN 978-92-1-109154-0. <https://www.un.org/esa/analysis/wess/wess2007files/wess2007.pdf>.

ANNEX

ANNEX 1: Results of the cluster analysis

Cluster 1 (Chapter 2.2)

Cluster 1	Food and non-alcoholic beverages	Alcoholic beverages, tobacco and narcotics	Clothing and footwear	Housing, water, electricity, gas and other fuels	Furnishings, household equipment and routine maintenance of the house	Health	Transport	Communications	Recreation and culture	Education	Restaurants and hotels	Miscellaneous goods and services
Belgium	141	23	34	298	57	67	97	24	83	1	59	117
Czech	253	31	38	256	66	30	82	44	87	0	29	83
Denmark	119	33	35	378	58	41	96	20	109	2	24	84
Germany	111	14	43	322	56	56	107	22	118	2	44	104
Ireland	141	48	39	328	70	29	88	26	88	7	46	89
France	157	21	43	317	62	56	94	27	65	0	25	133
Italy	210	20	50	350	50	50	90	20	50	0	30	70
Luxembourg	108	21	53	359	62	30	119	17	69	2	75	85
Netherlands	111	22	44	323	67	19	84	28	104	2	47	148
Austria	146	25	51	244	61	45	124	23	121	1	46	112
Slovenia	200	24	48	302	56	22	102	34	86	1	36	90
Finland	144	21	23	356	46	61	108	25	102	1	19	93
Sweden	105	19	31	338	64	37	129	21	117	0	23	46
UK	110	22	36	365	69	13	111	21	121	3	60	70
Norway	121	33	41	301	63	46	172	20	113	0	28	61
Croatia	295	29	41	358	40	26	57	36	42	2	18	56

Cluster 2

Cluster 2	Food and non-alcoholic beverages	Alcoholic beverages, tobacco and narcotics	Clothing and footwear	Housing, water, electricity, gas and other fuels	Furnishings, household equipment and routine maintenance of the house	Health	Transport	Communications	Recreation and culture	Education	Restaurants and hotels	Miscellaneous goods and services
Bulgaria	350	22	14	404	23	70	25	38	17	1	13	21
Estonia	244	18	36	383	49	47	89	36	50	3	9	37
Latvia	369	23	42	239	37	78	64	45	47	3	18	34
Lithuania	396	28	44	253	35	100	45	35	27	1	12	26
Hungary	265	29	33	237	53	81	76	60	75	2	24	65
Poland	267	19	28	368	40	84	50	42	48	3	9	46
Romania	514	36	26	191	27	103	18	31	27	1	5	20
Slovakia	277	24	36	398	40	45	38	30	42	1	13	56
Macedonia	453	33	63	145	58	40	60	47	32	6	30	33

Cluster 3

Cluster 3	Food and non-alcoholic beverages	Alcoholic beverages, tobacco and narcotics	Clothing and footwear	Housing, water, electricity, gas and other fuels	Furnishings, household equipment and routine maintenance of the house	Health	Transport	Communications	Recreation and culture	Education	Restaurants and hotels	Miscellaneous goods and services
Greece	186	25	56	300	70	75	71	32	29	4	69	84
Spain	203	19	62	362	49	23	73	24	50	4	73	57
Cyprus	208	18	57	245	74	67	123	27	44	12	63	63
Malta	274	30	68	105	105	46	123	27	96	2	63	61
Portugal	179	18	32	305	51	102	84	30	45	6	89	57
Turkey	316	31	50	326	64	31	66	36	16	6	24	35

ANNEX 2: Aggregation of CP12 and corresponding CPA sections

COICOP	CPA
Miscellaneous goods and services (CP12)	Coal and lignite; peat (10)
	Crude petroleum and natural gas; services incidental to oil and gas extraction excluding surveying (11)
	Uranium and thorium ores (12)
	Metal ores (13)
	Other mining and quarrying products (14)
	Wood and products of wood and cork (except furniture); articles of straw and plaiting materials (20)
	Pulp, paper and paper products (21)
	Printed matter and recorded media (22)
	Coke, refined petroleum products and nuclear fuels (23)
	Chemicals, chemical products and man-made fibres (24)
	Rubber and plastic products (25)
	Other non-metallic mineral products (26)
	Basic metals (27)
	Fabricated metal products, except machinery and equipment (28)
	Machinery and equipment n.e.c. (29)
	Office machinery and computers (30)
	Electrical machinery and apparatus n.e.c. (31)
	Radio, television and communication equipment and apparatus (32)
	Medical, precision and optical instruments, watches and clocks (33)
	Other transport equipment (35)
	Secondary raw materials (37)
	Wholesale trade and commission trade services, except of motor vehicles and motorcycles (51)
	Retail trade services, except of motor vehicles and motorcycles; repair services of personal and household goods (52)
	Financial intermediat. services, except insurance and pension funding services (65)
	Insurance and pension funding services, except compulsory social security services (66)
	Activities auxiliary to financial intermediat. (67)
	Renting services of machinery and equipment without operator and of personal and household goods (71)
	Computer and related services (72)
	Research and development services (73)
	Public administrat. and defence services; compulsory social security services (75)
Membership organisation services n.e.c. (91)	
Private households with employed persons (95)	