Potential of the Silver Economy

in an Ageing Europe dealing with an Ongoing Debt Crisis and Problems in the Labour Market

Viliam Páleník et al.

INSTITUTE OF ECONOMIC RESEARCH
Slovak Academy of Sciences

Team of authors
Gabriela Dováľová
Boris Hošoff
Veronika Hvozdíková
Ivan Lichner
Viliam Páleník
Iveta Pauhofová
Kristína Petríková
Marek Radvanský

Reviewed by
Piotr Błędowski, Warsaw School of Economics
Radim Boháček, CERGE-EI
Vladimír Novák, CERGE-EI

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INTRODUCTION

The European Union is experiencing intense population ageing caused by increasing life expectancy and low birth rates. This trend is considered to be one of the major challenges affecting EU competitiveness in world markets, as well as the potential for economic growth and employment. Gradual transformation of social systems is increasingly necessary, because their current form is not structured to withstand a higher financial burden induced by the prolongation of retirement, an increased demand for health-care and long-term care for the elderly.

A majority of the existing scientific analyses is focused on the negative consequences of ageing with regard to public finances. Less attention is paid to the impact of ageing on the national economy parameters in terms of the changes in the volume and structure of demand and supply of products, services, labour and capital. The objective of this publication is to provide the reader with broader perspectives of the Silver Economy. New market opportunities initiated by an ageing population are mentioned in the current literature more frequently than before, but such a complex analysis of the Silver Economy as provided here is still an exception.

The first chapter represents a basic macroeconomic framework for the introduction of the Silver Economy, with the focus on the debt crisis and on causes of deflationary tendencies. It highlights the fact that, at times of demand and consumption crisis, it is important to find new pro-growth factors that could transform impulses from macroeconomic policy and structural reforms to higher economic growth and job creation. In this context we have to pay attention to both negative and positive consequences of population ageing.

The second chapter contains a definition of the Silver Economy and provides an overview of literature dealing with economic dimensions of population ageing. This chapter provides an overview in areas such as purchasing power, savings and consumption as well as new market opportunities for innovative companies responding to the needs of older people. Attention is paid also to the promotion of the Silver Economy

at the European level. A case study at the end of this chapter presents the potential, opportunities and barriers in segments of spas and spa tourism – which we find to be a typical sector of silver industry in Slovakia.

The third chapter provides an overview of the latest tendencies and demographic trends in Europe. It compares the ageing process in various geographical regions of Europe, briefly presents the ageing trend on a worldwide level and identifies emerging economies as those facing the highest dynamics of population ageing. Analysis of actual stages of demographic transition among major EU trading partners is used to point at potential export markets for silver goods produced in Slovakia or elsewhere in Europe.

The fourth chapter deals with the context of an ageing population in relation to the formation of demand, because the trend of population ageing presents an opportunity for a saturation of needs, particularly in regions with high potential demand of older people. This chapter also provides insight into the differences and similarities in consumer behaviour of older people among individual EU countries. Particular attention is given to the consumer behaviour of older people in Slovakia. Model scenarios illustrate how changes in consumption patterns could affect employment in the EU.

An important part of this publication is the results of modelling the medium-term effects of an ageing population on the Slovak Economy. These results are presented in the concluding chapter. Since the expected changes in the context of population ageing are complex in nature and involve a number of factors (such as changes in population size, changes in consumer behaviour, etc.) we have prepared a number of scenarios while the obtained results provide important information relevant for the formulation of economic policy in Slovakia.

1. THE DEBT CRISIS AND THE SEARCH FOR NEW PRO-GROWTH FACTORS IN AN AGEING EUROPE

The ongoing debt crisis in developed economies is part of a broader process of negative phenomena like recession, deflation, unemployment and wage stagnation, or increases in public and private debt. The intensification of these processes in a relatively short time (2008–2010) indicates the importance of accompanying factors and causal links which, in developed economies, led to the biggest financial and economic crisis since World War II. The debt crisis has the largest impact on the economies of Europe and Japan. Relevant factors of this crisis are broadly discussed, and many studies deal with these problems, e.g., Bernanke (2014), Valiante (2011), Cline (2014). Analyses of this topic show common characteristics, as they all underline the simultaneous development of more than one crisis factor.

The evolution of the GDP growth indicator captures the differences in periods both before and after the year 2009. The following Figure 1.1, compares seven regional groups[1] within Europe, plus the USA and Japan. It clearly depicts the global character of the ongoing crisis, as none of these regions had higher growth in the latter period than in the former one.

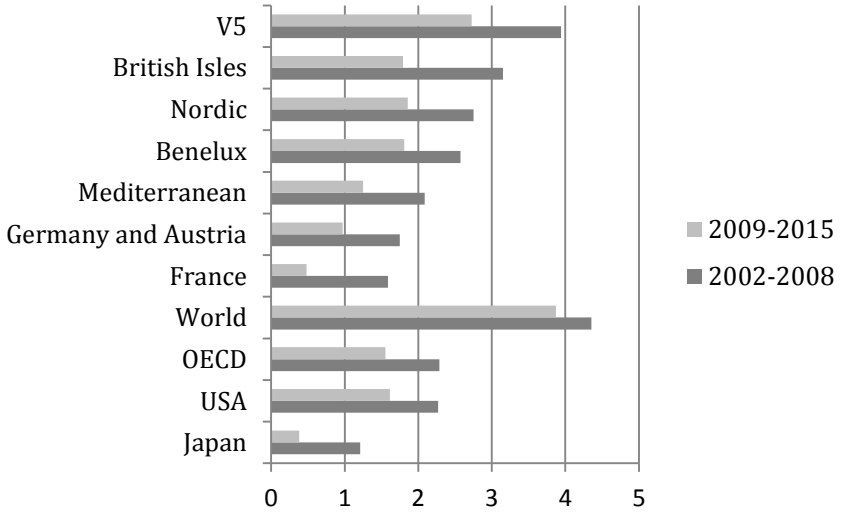
The slower growth in the second period corresponds with the rapid growth of public debt in all EU member states except Hungary. Public debt exceeded 100 % GDP in several countries (Greece, Portugal, Italy, Cyprus, the Republic of Ireland and Belgium). Paradoxically, in connection with GDP, this debt grew despite several austerity measures, possibly due to simultaneously weakened growth factors.

One of the main factors of the debt crisis in Europe was growing imbalances on current accounts between core countries (Germany, France) and peripherals (Greece, Italy, Spain, Portugal). The imbalances on the side of peripheral countries were created after the year 2000 by a significant increase in domestic demand supported by broader financial integration. Deficits in current accounts of those countries led to an

[1] The countries are grouped into those regions on the basis of multifactorial analysis (Pauhofová – Páleník, 2012).

increase in foreign debt, which combined with growing domestic debt. A decisive factor was the revenue shortfall and the increase in budget expenses during the recession that affected EU as a whole in 2011; however, individual countries were affected at different times and with different intensities. Large bailouts granted from member states to private companies (banks) and countries (Greece) on the verge of bankruptcy also contributed to the increase of indebtedness.

F i g u r e 1.1
Average GDP growth (%)



Source: OECD Economic Outlook, 2015.

Economic developments in the EU during the period 2008–2013 correspond with conclusions of a study (Elmendorf – Mankiw, 1999), according to which a decrease in public savings[2] does not have to be fully compensated by an increase in private savings. As a consequence, total gross savings[3] have to decline. In the given period, gross savings in the EU decreased by 1.3 % of GDP. A similar tendency was noticed also globally, on the level of the OECD countries. This kind of decrease in savings

[2] Accompanied by the increase of budget deficits.

[3] Gross savings as a difference between gross national pension and total expenditures, plus gross transfers.

results in smaller investments,[4] so it has a negative effect on potential GDP and labour productivity. Smaller investments combined with high long-term unemployment and a decrease in the workforce can lower potential output. The fact that countries with a large debt have slower economic growth is supported by many empiric studies, e.g., Reinhart – Rogoff (2010).

The increase in budget deficits and public debt puts pressure on fiscal consolidation, which has manifested itself both by harsh savings and by the sudden absence of funds for various social programs. Countries and governments lack reserves to finance unexpected outlays and acute problems, e.g., the wave of immigrants in the south of Europe.

The debt crisis affected the population of seniors (aged above 65 years) to a considerable extent. Many of them now depend on social help and are threatened by poverty and social exclusion. On the other hand we have to emphasize an interesting fact. According to Eurostat data, approximately 19.8 % of seniors in EU-27 in 2010 were threatened by the risk of poverty and social exclusion, which was a considerably smaller figure than the data for the total population (23.4 %). The reason is that, while seniors' incomes are relatively stable and guaranteed by the state, the incomes of people of productive age can be affected by unemployment or problems with finding a proper job (especially among young graduates). Given this fact, seniors became an interesting segment of potential consumption. However, there are huge differences among member states in this regard. While in Luxemburg the ratio of seniors endangered by poverty or social exclusion is only 6 %, in Bulgaria this ratio is higher than 50 %.

The vulnerability of seniors is affected by their financial situation. This is closely intertwined not only with the sustainability of pension systems but also with the fact that during a debt crisis, governments are forced to cut down or abolish some public expenditures and social programs. Seniors could have their disposable income cut down, because they have to pay more for various services and goods which were previously state-subsidized. The problem for seniors is that this could negatively affect their access to medical and social services. And because

[4] Smaller investment is also result of political instability.

of the debt crisis and enacted fiscal consolidation programs in many European countries, quality of life is negatively affected by a combination of relatively small pensions, growing rents (especially in cities) and tightening or reduction of housing support from the state (AGE, 2012). The crisis further threatens seniors and their future purchasing power with high unemployment. This applies not only to the unemployed seniors who are just approaching their pension age, but also to the high unemployment of people at a productive age[5] who will not be able to save enough money for their pension – a situation that will reduce their future potential demand and consumption.

Not only the economic situation but also demographic changes themselves will have obvious implications for the development of employment, unemployment and for labour market performance as a whole. A decrease in the number of households with members at a productive age will affect aggregate consumption, the capacity and structure of production and, therefore, the demand for labour in sectors which produce predominantly for this specific generation. On the contrary, an expansion of industries producing products for seniors can generate an increased demand for workforce (more in Chapter 4, part 2). Also, labour supply itself can be affected by changes in the population age structure, when a decline of population in productive age could cause shifts in terms of higher labour force participation in the older population. A decrease of workforce in young and middle aged groups could lead to a reduction of unemployment among younger people (the highest unemployment rate is reported in the youngest age cohorts) or older segments of active population.

In this context, we could witness a revision of EU policies – where main objectives in the areas of unemployment and social inclusion, defined in European strategic documents, include increasing the total employment rate, increasing the participation rate among women (advocacy of this objective was initiated by the Lisbon Strategy in 2000) and increasing the participation rate of older women and men (added to the objectives one year later by The Stockholm Council).

[5] In some countries (e.g., Slovakia), it applies also to high long-term unemployment.

Reacting to the economic crisis, the European Commission identified in its Communication (European Commission, 2009) European labour markets as a key area threatened by the consequences of a global economic crisis. The Commission urged member states to reinforce cooperation when achieving commitments in the area of employment and recommended not only the support of total employment, but also an improvement in skills among workers and in the availability of jobs, mobilizing the financial instruments EU member states have at their disposal. In the Europe 2020 Strategy, an ambitious increase in total employment (aiming for 75 % employment among the active population by 2020) is one of five main objectives – along with a higher rate of labour force participation among youth, among older workers and among low-qualified workers, along with better integration of migrant labour – that should all contribute to higher rates of employment.

The European Union came closest to fulfilling this objective in 2008, when the average employment rate in the EU was over 70 % (the original objective of the Lisbon Strategy). However, the economic crisis brought up short this positive development, whether in countries which used to be rather successful in accomplishing labour market and employment objectives (Cyprus, Portugal, and Ireland) or in countries which were already achieving below average results in this regard (Greece, Spain).

Also a partial Lisbon Strategy objective to raise the employment rate of women to 60 % was almost fulfilled in 2008, when the average rate for the EU reached 59 %. This case was also later influenced by the consequences of the crisis of 2009, but by 2013 the employment rate of women had already returned to the pre-crisis level. In 2013, the original specific objective to raise the employment rate of young-old (55 to 64 years) to 50 % was also fulfilled, when the EU-28 member states exceeded this level. Particular attention was paid to the employment of older people, mainly because of the endeavor to prolong the working life of the European population and thereby to mitigate the impact of the population ageing process on public funds, the social system, the labour market and economic growth as such.

While in the past the emphasis was on increasing employment among women and seniors, the economic crisis showed that the particularly vulnerable groups in times of unfavorable economic development are young people. After the crisis, the unemployment rate of elderly workers approximately copied the tendency of total unemployment growth, while unemployment among the youngest people (under 25 years of age) developed in a rather different manner – it grew faster than the unemployment of the other age groups and remained high even later, when labour markets in several European countries were becoming stabilized. As early as 2009, unemployment among young people (the European average) rose to one fifth of the active young population and continued to grow. Unemployment among young people in some European countries continued to grow in an unprecedented way. In Greece and Spain, the unemployment rate of persons younger than 25 years rose up to 60 %. Also, countries that previously exhibited only low levels of youth unemployment (Portugal, Cyprus, Ireland) are now struggling with high levels. It is not surprising that this problem became a priority in European policy and that new instruments aiming to support the employment of young people are introduced and implemented in many member states.

Another serious and persisting consequence of the crisis is the growth of long-term unemployment – its share in total unemployment has been rising continuously since 2009. In 2014, long-term unemployment (lasting more than 12 months) already represented half of the total unemployment in the EU, of which approximately 7.3 million were unemployed for more than 2 years (almost 30 % of total unemployment).

With the emergence of a new wave of population ageing, as less populous generations enter the productive age category, the situation in the labour market is about to change. While at the beginning of the millennium, the main priority of the EU was to maintain solidarity between generations (based on the assumption that older people need to be protected due to social context of demographic change; see also Green Paper on ageing; European Commission, 2005), the main priority today is the implementation of programs like ´Youth Guarantee,´ tackling recent unemployment challenges. In coming years, stronger support of labour

mobility and restructuring of education programs may become the policy priority as a result of young worker losses and changes in consumer behavior. The Russian economy, struggling with a lack of human capital, despite the recession of 2009 and an expected recession in 2015, can serve as an example of the noticeable impact ageing has on labour markets in recession times, too.

The connections between demographic change, the debt crisis and structural deflation are presented in the following section.

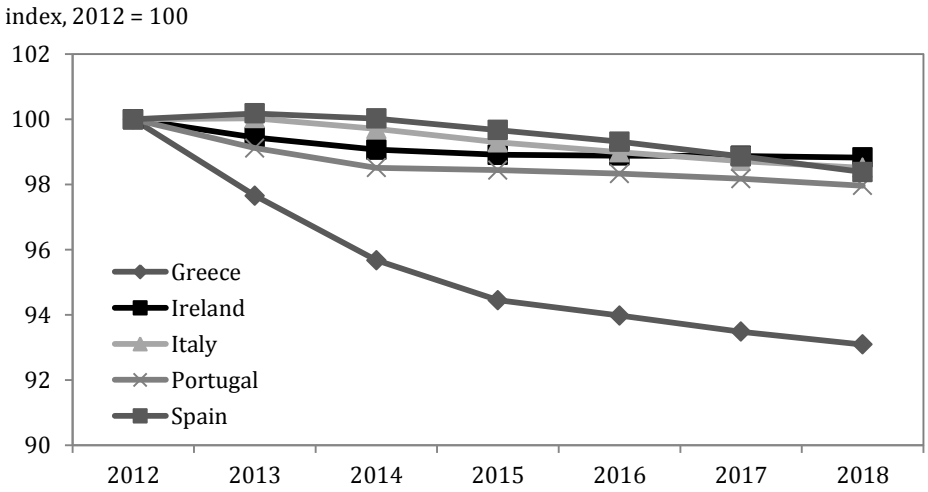
Demographic Changes and Structural Deflation

Despite efforts of the European Central Bank (ECB) to revive economic activity by means of an easy money policy, it appears that the monetary policy itself is not enough for sustainably reviving growth and expanding the economic cycle. Weak credit activity indicates growing concern in the market in relation to future developments in the EU.

The planning and targeting of interest rates by ECB proved inefficient with regard to the support of aggregate demand. Even after the reduction of official interest rates, private companies and households did not start to consume and to invest more. Weakened demand is caused by a variety of factors, but uncertainty and risk avoidance are key. When unemployment is as high as it is currently, people naturally worry about their jobs and disposable income. At the same time, they have a tendency to reduce (or to refinance) their old debt. Instead of stimulating consumption, low interest rates could prompt people to think that, without taking greater risk, they will not be able to save enough for retirement. The fear is that their savings and pensions will be valorized only minimally because of low interest rates.

The smaller supply of credit for non-financial corporations, even its negative growth in 2010–2013, weakened aggregate demand and supported deflationary pressures that are noticeable especially in the indebted countries of the European periphery. The comparison and projections of relative indexes of consumer prices is shown in Figure 1.2.

F i g u r e 1.2
Relative consumer prices, periphery versus northern Euro area economies, 2012–2018



Note: The northern Euro area economies are Austria, Belgium, Finland, France, Germany, and the Netherlands.
Source: Cline (2014).

Economist Fisher (1933) was the first to deal with the problem of debt deflation in the form of a coherent economic theory. His findings about developments during the period of the Great Depression in the 1930s are apparently still relevant. Fisher's theory about the dynamics of debt deflation influenced the policy of the Federal Reserve System (FED) and its reaction to The Great Recession. Empiric experience was probably one of the reasons that The Board of Governors of The Federal Reserve System decided to save the investment bank Bear Sterns in 2009. This move prevented the spread of panic across the entire financial system and protected against a precipitous fall in the price of financial assets. Fisher's influence could be seen even before The Great Recession, particularly in 2001–2004, when the FED tried to weaken the deflationary pressure growing throughout the economy (caused by the collapse of share prices among technology companies) by easing monetary policy. Basically, it was a success, but the accompanying effect of this expansionary policy was the inflating of a new bubble, this time in the housing market. It burst in 2008, beginning one of the biggest crises since World War II.

According to conventional monetary theory, solving the problem with deflation should be straightforward, and economic growth should be boosted by the effective use of tools traditionally available to the central bank. These assumptions are confirmed mainly by experience within the USA, but less so by experience within Japan. There are many reasons for differing economic outcomes after responsible authorities embrace the same policies – from structural reasons to cyclical ones.

The Monetarist doctrine (Friedman, 1963) assumes that inflation is always a monetary phenomenon, and it does not matter whether a decrease in price levels was induced by other factors. The central bank has sufficiently effective instruments to achieve its inflationary objective anytime, as it is mentioned, for example, in the work of Mishkin (1984). The fact is that, since the introduction of the Economic and Monetary Union (EMU), deflationary pressures in Europe have been strengthened. For example, in comparison with Japan, member states of the EMU do not have their own monetary policy or their own currency that they could devalue during a debt crisis (thereby increasing the potential growth of their economies).[6] Moreover, the member states of EMU lack the kind of federal budget and fiscal union that the USA has, so their potential for economic policy interventions is significantly weakened. After the expiration of the expansive monetary policy instituted by the ECB, we can realistically expect some growth of risk premiums in several indebted European countries. This would strengthen deflationary pressures that are, for now, subdued by the ECB monetary policy of quantitative easing, realized through the purchase of government bonds.

The central banks in Japan and in the Eurozone undertake unprecedented monetary expansion through a policy of quantitative easing. As a consequence of this policy, it can be expected in the mid-term that there will be a similar unprecedented growth of asset prices like shares, properties and bonds[7] but also the potential appreciation of foreign

[6] The fiscal devaluation should have similar effect i.e. the increase in indirect taxes simultaneously with the decrease in direct taxes by the same amount.

[7] This could increase the wealth of seniors, especially in countries where pension funds hold a high proportion of shares in their portfolios. More than 20 % of such holdings are found in portfolios in Finland, Belgium, Netherlands, Estonia, Poland, Norway, Switzerland, Austria, Portugal and Great Britain.

currencies at the expense of the Euro or Yen. That would certainly attract the attention of speculators, and the increased volatility and movement of cross-border capital could cause unexpected financial instability.

The policy of quantitative easing is based on the purchase of government bonds. This artificial increase in the demand for government bonds affects its yields and disrupts the mechanism for the allocation of risk. Also, purchasing and production decisions could be eroded compared to how the economy would react in an environment without central bank interventions. Because of the policy of quantitative easing, seniors, insurance companies and pension funds, as well as ordinary investors, lose opportunities to invest without any risky valorization of their savings, because the interest rates are virtually zero. Undoubtedly, it has some influence on consumer behavior and, at the same time, it encourages affected economic subjects to seek other, riskier investment opportunities to valorize their savings. This could discourage many people. The experience of the USA shows that the policy of quantitative easing could potentially improve unemployment, inflation or the GDP growth – but it is not a rule that works everywhere, unless structural reforms are introduced in the Eurozone and in Japan.

The monetary policy and central banks of developed economies have their own experiences fighting inflation, but, except for the Bank of Japan, responsible authorities lack recent experience with deflation. Due to this, conventional instruments of monetary policy to fight deflation could be less effective. First of all, central banks currently do not fight with inflation but rather with deflation. In order to solve this problem, other policies need to be applied. Monetary policy could be paralyzed by the liquidity trap, when banks are unable to support growth of price levels and higher economic efficiency by means of conventional instruments. Secondly, traditional tools of the central bank – interest rates – are virtually ineffective because of their current low levels. This supports the above mentioned hypothesis that the solution to creeping deflation will require the application of other, less conventional approaches by both monetary and fiscal policy[8] authorities. We emphasize mainly the structural reforms

[8] The effects of fiscal policy in the environment of the EMU are dealt with, e.g., by Pálenik et al. (2011), who talks about the so-called fiscal trap and the disinclination to worry much about the acceptance of restrictive fiscal actions.

that support both the efficiency of public finances and the productivity of companies and regions. In the light of high public debt and the inefficiency of conventional monetary policy, it is clear that responsible authorities cannot leave out structural reforms when dealing with deflation. When speaking about population ageing, proper structural reforms should be aimed at customizing public finance parameters (especially in the areas of health-care and social services), but attention should also be paid to reforms aimed at exploiting the potential demand of seniors (Silver Economy). However, this potential differs in every country.

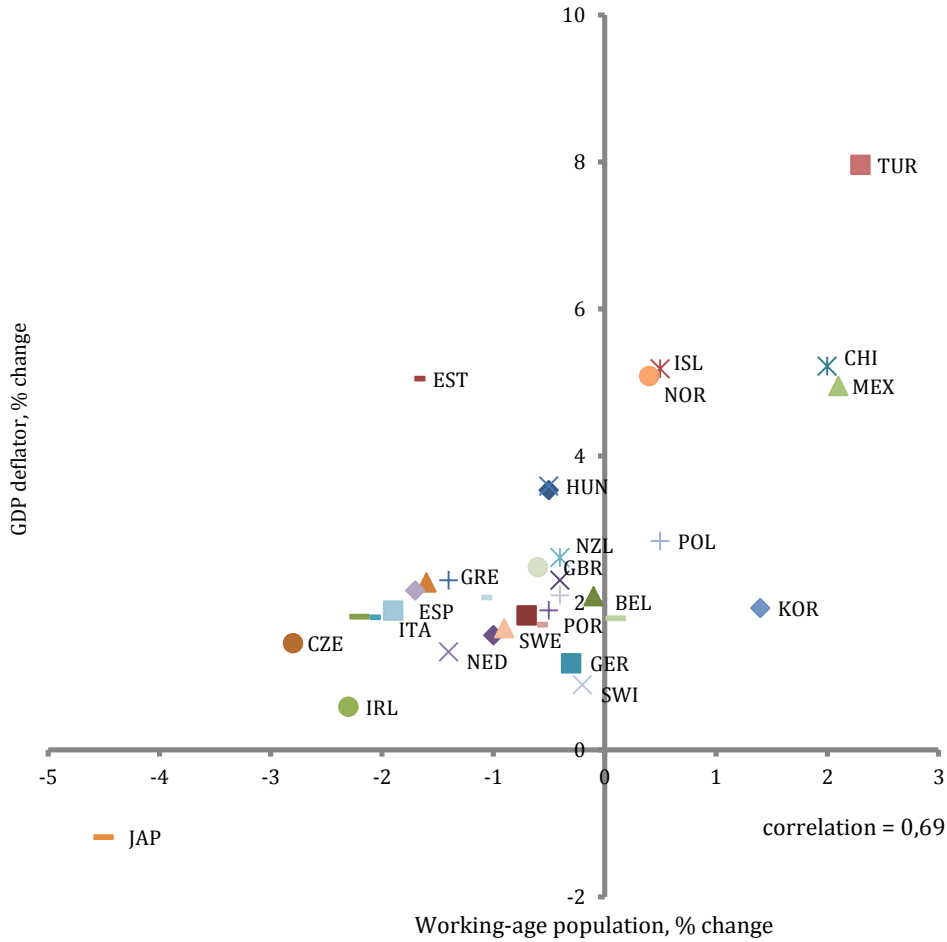
Deflationary factors in connection with population ageing

When seeking the causes of deflation and the debt crisis, we discover that, except for the increase in unemployment and for external imbalances, these could result from the vast phenomenon of population ageing in developed countries. This connection is mentioned in the studies of various authors and institutions, for example Konishi – Ueda (2013), Anderson – Botman – Hunt (2014). Population ageing, caused by a lower fertility rate and the prolongation of life expectancy, leads to a reduction in the labour force. Thus, developed economies are gradually going to have more seniors than people in productive age groups. To retain the standard of living for seniors, governments should pay attention not only to labour productivity and introduction of technological innovations, but also to the areas of institutional quality and education. It is possible that, despite various fiscal reforms, governments will not avoid tax increases in the future, to retain the standards of living of seniors. In any case, such proceedings and structural changes require a wide consensus, and it is possible that, in the future, the issues of health care and social care will be even more important than today, and that these issues will become the subject of political struggle.

The impact of population ageing on economic activity and efficiency can be mitigated, e.g., by increasing the proportion of seniors in the labour force. In this case, demographics could influence the economy in three main ways: by changes in the capacity of labour force, by changes in productivity growth and by changes in savings. That’s why one of the

first policy options in several developed economies has been the acceptance of a gradual increase in retirement age. A higher retirement age should mitigate the effect of population ageing on a decline in labour force participation when, without a complementary growth in productivity, GDP growth is jeopardized. Education is of great importance in this respect, because an educated and skillful labour force is productive at any age. The growth of the older population would not lead to any significant decline in productivity if this population is well educated.

Figure 1.3
The correlation between the growth of the productive population and inflation (2004–2013)



Source: World Development Indicators, author´s calculation, 2015.

From Figure 1.3, it is obvious that the decline of the productive population corresponds with higher deflationary pressures. This is confirmed on the wider sample of countries than just on the member states of EU and by the coefficient of correlation, whose intensity in the monitored period of 2004–2013 was just below the 0.70 level. This is a rather strong connection between the growth of the productive population and inflation in the OECD countries.

In connection with deflation and an ageing population Japan, is very often mentioned as an example. The timing of the first Japanese experience with a deflationary trend in 1998 corresponds with the beginning of a long-term decline in labour force participation because of population ageing. A similar historical development in the decline of labour force participation can be seen in the USA, although initially it was not accompanied by deflationary pressures. Europe is another possible example. Unlike in other developed economies, the Japanese experience was accompanied by a long-term deflationary trend. For other developed economies, this was an uncommon tendency.

After the recent amplification of deflationary pressures in Europe, the know-how of Japan has become very beneficial. The Japanese example encompasses about two decades of stagnation and deflation. The essential lesson taken from those years may be that the solution to long-term deflation requires policy makers to make the best of both monetary and fiscal policy instruments, which should be focused on the specific needs of particular segments of the national economy. In this regard, we assume particular sources of deflation and seek solutions to weaken persistently low prices. These deflationary factors could be enumerated as follows: 1) greater aversion to a risk; 2) tendency to lower consumption; 3) development of a deflationary psychology, including the conviction that prices will continue to fall. In the text below we will analyse these factors in more detail.

1) Future pressure on social and health care systems in developed economies is complicated because these economies enter rather long periods already burdened with high deficits and record-breaking public debt. For this reason, expectations of higher risk premiums or radical

fiscal consolidation are justified. Obviously, materialization of the above mentioned expectations will decrease economic growth and reinforce deflationary pressures. Alternatively, a different extreme might occur. The countries may decide to monetize those unsustainable public debts without any fiscal reforms, which could lead to higher inflationary pressures. In the light of recent experience, this alternative is worth mentioning as a warning in cases where authorities would give monetary policy up to the uncontrollable financial requirements of government.

A decline in labour force participation corresponding with a growing number of people of retirement age will result in changes in aggregate supply and demand. Compensating for relatively lower income in the retirement age population by drawing on savings leads to a decrease in total domestic savings and a growing demand for savings inflow from abroad. Foreign sources should replace missing domestic savings, and we could realistically predict that this will lead to higher interest rates (risk premium) for government bonds.

Analysing the tendency to avoid higher risk, we can conclude that seniors incur additional charges when applying for bank loans. This makes it almost impossible for them to achieve higher consumption rates. At the same time, they show a tendency to avoid risk and so they no longer valorize their savings as they did when they were younger. On the contrary, they usually reduce their savings. Moreover, as has already been mentioned, population ageing coincides with higher medical and social expenses. Committing private and public expenses to a particular population group leads to a higher concentration on consumption of certain goods and services. This increased consumption creates deflationary tendencies in other sectors and sub-sectors of the economy. On the other hand, it expands the potential within certain markets and creates opportunities for companies addressing the specific needs of seniors.

2) Regarding the lower propensity to consume in connection with an ageing population, it is obvious that socio-demographic development within a country significantly influences consumer behavior and the amounts expended on consumption. Consumer expenses of the productive population are significantly higher than those of the population over

60 years age. Aside from objective reasons, such as a variation in basic needs, seniors´ tendency to consume less could also be affected by external factors not related directly to seniors and their personal preferences.

The propensity of both productive and unproductive populations to consume is influenced by income polarization. In the environment of increasing intergenerational poverty in developed countries, this polarization could be, considered a subjective factor in lowering the propensity to consume. It is likely that, without necessary structural reforms in the areas of taxes and transfers, we will witness deeper income polarization among seniors. The deflationary pressure resulting from recent stagnation and uneven distribution of wages among workers of productive age leads, via lower fund contributions to future pensions, into a likely increase in future polarization. On the other hand, this tendency, generated by the concentration of disposable income in the hands of particular seniors, could promote innovation in products and services to improve life in old age.

In some countries, the propensity to consume will be influenced by the composition of the portfolio of pension funds. On average in OECD countries, approximately 60 % of assets are allocated to corporate shares and government bonds. With regard to the trend of population ageing, these investments of pension funds could in the future influence the performance of capital markets more strongly than they have up to now. Countries that have already adopted pension reforms are characterized both by a greater proportion of corporate shares in portfolios of pension funds and also by the fact that assets allocated in pension funds represent a relatively large share of the GDP. For example, more than 100 % of GDP is allocated in the assets of pension funds from Switzerland, the Netherlands, and Iceland. We see high volumes of assets in pension funds in countries like the USA (72.2 % of GDP), Great Britain (95.8 % of GDP), Australia (93.2 % of GDP), and Finland (75 % of GDP), but also in Chile (58.5 % of GDP). Thanks to earlier pension reform, Chile is listed among the developed countries such as the USA, Great Britain and the Nordic countries, which account for a relatively high proportion of capital income among seniors (OECD, 2013).

These countries enjoy an advantage from the purchasing power of seniors, since their pension funds started valorizing personal savings into the two-pillar pension systems much earlier, when the indicators of bond yields and of the return of equity (ROE) were much higher than today. Recently, these investment funds are valorized lower, thereby endangering future consumption by older people. This is proven by record-breaking low bond yields and also by the declining value of the ROE. This applies to the USA as well as to Europe, while Japan reports consistently lower values of average yields than the USA and Europe.

In connection with savings for retirement, it is necessary to mention an additional factor that could influence seniors´ propensity to consume. At first glance, it may seem that the indexation of pensions according to the consumer price index (CPI) is a useful tool to protect pensioners against increases in the cost of living.[9] In comparison with the productive population, however, pensioners are, by virtue of their relatively static income, more exposed to the negative consequences of inflation. The official CPI represents the spending of an average household on several groups of the most frequently purchased goods. But when the expenses of pensioners differ greatly from those of the average household, the indexation of pensions will not be able to protect them in certain segments of expenses from the spiral of growing costs.

In Europe during 1996–2011, housing prices grew by 40 %, and the cost of medical care grew more than twice as fast as the total CPI index. Hence, the recent loss of the purchasing power of seniors with respect to their specific needs may be significantly greater than is predicted by the CPI. This factor should not be underestimated, because the complete or partial indexation of pensions according to prices is used in pension systems by the vast majority of the OECD countries.

3) The third factor preserving deflationary tendencies is the build-up of deflationary psychology and the conviction of private individuals that the fall of prices in the economy will continue. Deflation helps mainly those people, whose income is wholly (or to a large extent) based

[9] It can be compensated with the indexation of pensions by nominal wage level (or combination of both).

on savings, or on consistently paid rent. Thus, in terms of population age structure, deflation is convenient mainly for seniors who managed to gather savings during their productive lives. However, those savings will not grow but rather shrink in the future, creating expectations of falling purchasing power within this group of people. This supports the deflationary psychology that is, on top of that, supported by the development of incomes of the productive population. These incomes experience stagnation in an environment of deflation. Combined with relatively high levels of unemployment, this can represent an important obstacle to the willingness to take risks, whether in form of higher debt, or of investment.

* * *

The below average economic growth of European countries is not only a consequence of financial crisis, but also a firmly established symptom. Deflation combined with weak demand reflects both, the financial and debt crises, but also the trend of population ageing, a low growth of productivity[10] and the growth of income polarization. European economies have already shown their exhausted capacity to react to fiscal and monetary stimuli. This means that continuation of current policies without performing significant structural reforms will probably lead to growth of debt and increased income polarization, which have risen substantially in recent years.

Fiscal consolidation may contribute to the return of trust to the markets and will gradually support private demand. But the range of fiscally restrictive precautions cannot be sustained for the long-term at the expense of economic growth. It is reported (e.g., by Blanchard – Leigh, 2013, De Grauwe – Ji, 2013) that the goals of austerity measures have not been achieved. Due to continued structural problems and high unemployment, each country will need to find and analyse new pro-growth areas, including commercial opportunities brought by an ageing population.

[10] Lower productivity growth can be partially explained by ageing and increased proportion of labour-intensive services in the structure of production.

2. DIFFERENT RESEARCH APPROACHES TO THE RELATIONSHIP BETWEEN POPULATION AGEING AND ECONOMIC DEVELOPMENT

In Europe, population ageing is a long-term trend that started several decades ago. According to Eurostat data, the average median age increased by 0.3 years per year during the last 12 years (rising from 38.3 years in 2001 to 41.9 years in 2013), which means that the population of EU-28 is ageing very quickly. Primarily a low birth rate together with increasing life expectancy contributed to this current demographic trend. Eurostat data show observable improvements in this area, as the birth rate in EU-28 increased from 1.46 in 2002 to 1.58 in 2012. However, it is still below the replacement level needed to stabilize population levels (without the influence of migration). Between 2002 and 2012 life expectancy at birth rose from 77.1 to 79.6 years. Progress in economic, social and medical areas has also contributed noticeably to the increase in the size of the older population.

A review of literature about population ageing showed two opposite views: the first sees ageing population as a burden to society or as a threat to public finances due to the increasing number of pensioners and the economic dependency ratio, with a corresponding growth in public debt (e.g., Sharpe, 2011; Bloom – Canning, 2008; Walder – Döring, 2012). The second sees ageing potentially as a new area of economic growth, the inclusive character of which could create new employment opportunities for excluded groups as well as better access to essential goods and services relevant for older people (e.g., Accenture, 2011).

In relation to the second view, the term "Silver Economy" is coming more and more to the fore. A Silver Economy is understood as an adaptation of the economy for the future needs of a growing number of elderly people. This potential is also connected with the creation of new market opportunities for the business sector. These are created not only by private, but also by public expenditures associated with population ageing and specific needs of elderly people (European Commission, 2015).

Theoretical concepts associated with the Silver Economy

To date, comprehensive studies dealing systematically with the Silver Economy are rather scarce (e.g., Páleník et al., 2014 deals with this issue in Slovakia). Earlier studies are capturing only partial economic dimensions of the ageing population, such as purchasing power, savings, household consumption, new opportunities for innovative companies responding to the needs of the elderly or the potential export of goods and services for seniors. It is important to note that this literature review does not claim to be exhaustive. The overall purpose is rather to provide a broad overview of the existing evidence base.

Purchasing power

Europe´s shrinking population also means fewer potential consumers, which in turn can affect the size of aggregate demand as well as the profit in particular sectors of the economy. However, a simultaneously ageing population leads to a rising proportion of older people who have lower but relatively stable incomes. The number of potential consumers is obviously not the only indicator of business opportunities. The size of their purchasing power (such as the size of accumulated wealth and net household incomes derived from work productivity, etc.), as well as the propensity to consume[11] have an important role in possibly compensating for lower numbers of consumers.[12]

According to a UN study (2013), earnings, private transfers from other family members[13] and income from investments together with

[11] If the population decline is not compensated by migration.

[12] According to European Commission (2014), total population of EU-28 is projected to increase (from 507 million in 2013) up to 2050 by almost 5 %, when it will peak (at 526 million) and will thereafter decline slowly (to 523 million in 2060). Decreases of the total population are projected for about half of the EU member states. The proportion of seniors aged 65 or over is expected to increase between years 2013–2080 from 18.2 % to 28.7 %.

[13] In developed countries such as the USA, Austria and Germany, elderly people are net private donors supporting their children until relatively late age. In countries such as Japan, elderly people, approximately over the age of 70, become net receiver of private transfers (UN, 2013).

other assets consist important sources of support for elderly people, mainly in developing countries in which systems of public social security are not developed enough or are not developed at all yet. In the European context, Italian economists Christelis – Jappelli – Paccagnella – Weber (2009) focused on elderly people with regard to income, wealth and other financial indicators. In their paper they used The Survey of Health, Ageing and Retirement in Europe (SHARE) database, which provides micro data on health, socio-status and social and family networks of approximately 110,000 individuals aged 50 or older from 20 European countries. They concluded that income from the imputed rent is relatively low in Scandinavian countries, Germany, Greece and the Netherlands; however, they are significant in France, Italy and Spain. This result is consistent with the fact that, in many countries, the prices of houses are high and a considerable number of seniors who already paid off the mortgage are wealthy from the point of view of owning property, while from the point of view of disposable income they are rather poor. The research confirmed that pensions constitute the main source of income for older Europeans in all of the observed countries. They were followed (except the Netherlands and Switzerland) by imputed incomes and, in almost half of the observed countries, the other components (e.g., incomes from assets) represented a relatively small portion of retirement income.

Christelis – Jappelli – Padula (2005) deal in their paper with the wealth composition and financial asset ownership of elderly people in selected European countries. The authors prove that significant differences exist between countries in composition of net worth and they show that total financial wealth is generally higher in the North than in the South of Europe. They also concluded that the elderly tend to invest more in stocks and to have a more diversified portfolio in Northern and Central Europe than in the South.

Christelis – Jappelli – Padula (2008) are among those scholars who focused on the problem of income inequality, which can consequently influence inequality of wealth within EU countries. The authors proved that income inequality is relatively low in northern countries (Sweden,

Denmark). It is relatively high in Spain and Greece, while countries of the central continental Europe are situated somewhere in between.[14]

Consumption inequality in all of the observed countries is less widespread than income inequality. A different trend exists within these particular countries, with the lowest inequalities in northern countries but also in Greece and Spain. On the contrary, significant inequalities in consumption can be observed in Belgium and France. There are many more discrepancies in household wealth inequality than those in income or consumption. Countries with significant differences in wealth include Poland, Austria, Germany, the Netherlands and Sweden. Contrarily, countries with low differences in wealth are the Czech Republic, Switzerland, Belgium and Denmark.

Consumption and household savings

According to the neo-Keynesian lifecycle theory of consumption, in order to avoid large fluctuations people adapt their consumption behaviour to their anticipated life incomes. This means that young people consume more than they earn and therefore they fall into debt, because they expect that they will pay these debts with future higher incomes. Middle-aged people consume less than they earn, because they need to pay off debts accumulated earlier in life and, simultaneously, they need to create savings for retirement. Elderly people therefore can consume more than they earn, because they can use their accumulated wealth (Brumberg – Modigliani, 1963). But are individuals able to maintain their consumption levels in old age?

Much empirical evidence suggests that the increasing number of elderly people in the total population can lead to a decrease in aggregate consumption and, therefore, to lower economic growth (e. g., Hock – Weil, 2012). While many authors (e.g., Lűhrmann, 2005; Lűhrmann, 2008; Lefebvre, 2006; Desvaux et al., 2010) assume that an ageing population could exhibit changing consumer preferences or purchasing power within

[14] However, there are some exceptions to these north-south differences. Regarding income inequality, for example, Italy belongs to the central Europe group, while Austria belongs to the northern countries group.

particular age groups. Furthermore, the population shift can also affect aggregate demand and the structure of consumption expenditures, thereby leading to changes in the sectors of production and employment.

On the other hand, some studies prove consistency of life-cycle consumption (e.g., Slesnick – Ulker, 2005). There are also studies which prove that savings rates of elderly households are not significantly lower than those of households among the population of working age. Seniors do not deaccumulate assets or, if they do, they do it very slowly; neither do elderly households transfer a significant part of wealth to their offspring (e.g., Carroll – Summers, 1991). Weil (1994) points out that it is important to observe an interaction between generations, because receiving an inheritance or the expectation of receiving an inheritance is an important factor in determining youth savings (these expectations are differentiated between western and eastern part of Europe). Prettner (2012) came to the conclusion that population ageing itself will not have a negative impact on technological progress (through the lower propensity to save or lower level of aggregate savings), and therefore it will not influence economic prosperity of the country.

New opportunities for business sector

Several publications have appeared in recent years (e.g., Coughlin – Lau, 2006b), documenting that the ageing of the baby boom generation in Europe, Australia, and North America signals the arrival of a new generation of healthier, more educated and financially more independent people who want to enjoy life in retirement. People of this generation have more varied interests than previous generations, and they spend more money on communication technology, electronics and leisure activities and goods. The results obtained by Coughlin – Lau (2006a) suggest that opportunities for innovation associated with population ageing, which could help improve older people´s overall quality of life, may be found in all the areas of Maslow´s hierarchy of needs.

In literature different promising areas are highlighted for companies which will face challenges due to the ageing population. According to

Eitner (2011), these areas mainly include health care information technology, smart and independent living based on ICT, gerontologically relevant areas of the health economy (including medical technology and e-health, etc.), education and culture, media, senior mobility, recreational activities and wellness, fashion and, ultimately, insurance and financial services responding to demographic changes. In the field of ICT for health, the most promising area of research is telemedicine and telecare, which should result in providing more efficient health-care (Gassman, 2009). As reported by the European Commission, on a global scale the telecare and telehealth market is set to grow up to 17.6 billion Euros by 2017.[15]

For several years, great effort has been devoted to the study of ageing in Japan. Kohlbacher – Gudorf – Herstatt (2010) have demonstrated that the Japanese silver market can be divided into three prospective areas: easy to use and operate products (e.g., electronics), luxury products for wealthy seniors, and "gerontotechnology" – support and care devices for elderly peoply with disabilities or limited mobility.

Japan and many other countries have already started to incorporate initiatives related to technology and ageing into national R&D politics and innovation strategies.[16] Successful strategies have a potential to be transferred from a national to an international level rather quickly. The recent experience of various member states suggests that national initiatives play an important role in supporting and fostering development of a Silver Economy. These initiatives might take different forms and can target either the promotion of new dimensions of emerging markets linked to ageing population, providing consultation or stimulation of actions which motivate the society to react to new challenges connected to aspects of ageing. Another potential form of support is regulatory measures to guide society towards certain standards, e.g., introducing universal design, etc.

For example, in 2013 a national French strategy focused on creation and consequent support of a "silver sector" was put into place. The first

[15] <https://ec.europa.eu/digital-agenda/en/ehealth-and-ageing>.

[16] According to the European Economic and Social Committee, small businesses and medium enterprises should be the core of any future European innovational plan.

initiative within this strategy has been already implemented – creation of a "Silver Valley".

There are currently over 150 participants grouped in the valley, consisting of 80 companies generating approximately 1,000 jobs. The number of involved subjects is expected to grow, generating up to 5,000 jobs for people with higher qualifications.[17] The aim of this project is mainly to support the creation of innovation within the framework of the the Silver Economy.[18]

Export

Very few publications in the literature discuss the opportunities opening up in the export of goods and services to countries with strong potential demand of older people. A bright exception is the partial results of Vistesen research (2009), which claims that countries facing the problems associated with population ageing and aiming to achieve higher economic growth, will have to rely more on foreign demand. Chinese researchers from Peking University Yao – Yu (2009) also found that, due demographic evolution[19] and a lower degree of urbanisation, the export-oriented growth model in China is an inevitable choice. However, most of the previous studies do not take into account the total capacity of global export markets (Banister – Bloom – Rosenberg, 2010).

Bloom – Canning – Rosenberg (2010) emphasize the importance of appropriate trade policy for countries interested in exploiting their demographic dividend.[20] These countries could increase employment by supporting export. Simultaneously, it is maintained that not all the countries can achieve net export at the same time.

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[17] <http://www.b2match.eu/salons-sante2014/participants/10>.

[18] <http://www.social-sante.gouv.fr/IMG/pdf/_doc19_DP_Silver_Valley-3.pdf>.

[19] Prognoses claim that more than 30% of China´s population will be over 60 in 2050.

[20] The basis of the demographic dividend concept is that, during the phase of a growing proportion of adults as part of the population, these countries experience a descending dependency index´s value, whereas the proportion of population at a productive age is growing; this means that the growth potential of these countries is rising.

Torsekar (2010) highlighted a large exports potential for the USA into India, mainly in case of medical devices (between the years 2005–2009 this export increased by 73 %).[21] India is one of the leading world destinations for medical tourism, in which complex services in areas such as cardiology, orthopaedics and anaplasty are provided, while costs represent only approximately one tenth of the costs in the USA.

The ageing process is not restricted only to areas within Europe – great potential for silver markets can be observed well outside the European territory. Many regions where the scenario of dynamic ageing is well-known and can be predicted relatively precisely, belong to countries with some of the fastest increases in level of economic development and with an extensive domestic market. At the same time, these countries have good trade relations with the EU member states. It is important to mention that more than half of the world's population over 80 lives in these six countries: China, the USA, India, Japan, Germany and Russia. The USA, China and Russia are among the EU's main export partners. Americans over 50, for example, are significant contributors to US economic activity, spending $4.6 trillion a year on consumer goods and services. Including these direct-spending effects, their total economic contribution amounts to $7.1 trillion, a figure that is expected to reach $13.5 trillion by 2032 (Oxford Economics, 2013).

Results presented in the Asia Pacific Silver Economy Business Opportunities Report 2013 (Ageing Asia Pte Ltd, 2013), showed that the Asian Pacific's Silver Economy is expected to hit US $3 trillion by the year 2017. The differences between particular countries in Pacific Asia are based not only on the magnitude of the ageing population, but also on its purchasing power. Based on the ageing Asia Silver Economy index[22] (considering these key factors: per capita household savings, growth rate of household savings, percentage of ageing population and life expectancy), which was developed for better indication on the economic potential of the market, countries like Hong Kong SAR, Australia, Singapore and Japan, followed by Korea and China, seem to be the most attractive countries for silver market investors.

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[21] Approximately three quarters of Indian demand for medical devices is satisfied by imports; approximately 30 % of this import originates in the USA.

[22] Index developed by Ageing Asia Pte Ltd, 2013.

Focusing on China, Zeng Qi, secretary of the China Elderly People´s Industry Association, stated that the market size of the ageing industry will reach 3.3 trillion Yuan ($ 543.5 billion).[23] This means huge opportunities for the ageing industry, because its development is still far behind senior citizens' needs.[24] In coming decades, increased demand is expected in several sectors. For example, China is one of the largest markets for medical equipment. It shows significant potential for foreign companies that want to expand into the Chinese market to meet the increasing demand for better healthcare services. Very often the Chinese see foreign western medical device companies as more credible than their Chinese counterparts, and they appreciate high, western standards (quality, advanced technology, highly skilled workforce, etc.).

From the perspective of Asian Pacific region, Japan is widely perceived as a frontrunner in the silver market. According to expert evaluations, the silver market in this country will grow to almost 112–155 billion yen by 2025, while the annual growth of this market is estimated at between 4 – 5 % between the years 2000–2025 (Storz – Pascha, 2011).

For Slovakia, the idea of exporting goods and services for the elderly is a relatively new topic. According to economic simulations, specialising 50 % of Slovak exports so as to target ageing populations in developed EU countries would lead to an additional 1.5 percentage points in annual economic growth during the first decade (Páleník, 2009). Focusing on servicing the Silver Economy would not only have a positive impact on the Slovak economic growth, but could also mitigate the sensivity of the Slovak economy to the business cycle by lowering sensitivity of demand related to the Silver Economy.

Support of the Silver Economy in European context

The main aim of the EU 2020 strategy is to achieve growth characterized as intelligent, sustainable and inclusive. A part of that is the support of a knowledge economy and of innovation (intelligent growth), ensuring

[23] In 2009, China had 169 million people aged 60+. This number will increase to 250 million by 2025. Chinese seniors account for 300 billion to 400 billion yuan in annual disposable income. Over the next three decades tis expected that it will increase to 5 trillion yuans.

[24] <http://www.chinadaily.com.cn/business/2013–12/24/content_17193508.htm>.

sustainable growth and high employment.[25] In order to fulfill these criteria, it is crucial to take into consideration both demographic development and subsequent changes in the labor force structure. Intelligent growth should help to create conditions for people such that they could stay in the labor market longer and support the development of goods and services adapted to them. As for sustainable economic growth, it is necessary to strengthen healthier and more active ageing in order to avoid overloading public services. Inclusive growth within the labor market serves to guarantee quality of life for an ever increasing number of elderly people. The year 2012 was proclaimed as the year of active ageing and of solidarity between generations – a designation which was supposed to focus attention on the idea of active ageing at all levels. The main areas of this initiative are:

- employment,
- participation in society,
- healthy and independent living,
- intergenerational solidarity (Committee of the Regions, 2011).

The Committee of the Regions is aware of these issues, and its members (European Commission, 2009) discussed the possibilities by which the European Union could cope with the consequences of population ageing. All countries will have to cope with accelerated ageing; in some regions, however, this problem will be balanced somewhat by a higher rate of immigration. This will not be the case everywhere, since some of the less favoured regions for immigration will face a steeper decline in population. Therefore, the Committee of the Regions considers it important to analyse the problem from a broader demographic perspective and to take into consideration intergenerational solidarity, with enhanced understanding between different cohorts and between the rural and urban populations. Discussion should be focused on three main aspects:

- healthy ageing,
- participation in labour market,
- access to services and resources.

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[25] <http://ec.europa.eu/europe2020/priorities/inclusive-growth/index_sk.htm>.

The effect of ageing on health and social systems in Europe also underwent observation by the European Economic and Social Committee (Official Journal of the European Union, 2011). In the area of health systems, member states should focus on enhancing the quality of preventive and social care, supporting retirement houses and creating decentralized infrastructure in cities and villages where elderly people would have direct contact with medical staff or caregivers. At the European level it is important to adopt a resolution of the European Charter of rights and responsibilities of elder people who need long-term care and assistance. In particular, the Committee commented about these areas:

- Prevention: It is necessary to provide an environment for elderly people, such that their active life would be supported. This is important especially after they leave the workforce.
- Health services: These must be both integrated and personalized. The patient should remain the centre of attention and be actively involved in treatment. Development of age-appropriate aids should be promoted.
- Nursing services: Ensuring rehabilitation helps the patient return to an active life. Creating an appropriate environment for elderly people is of key importance.
- Ongoing research in the above-stated areas.
- Development of new technologies: Ageing represents inter alia economic potential, which can be used for improvements and innovations.
- Financial sustainability: Care expenses are paid from the funds of social systems. There is a tendency to transfer a part of expenditures to private companies. This requires ingenious system and checks.

The European Economic and Social Committee also believes that the formation of local networks for older people comprises a useful component for the elderly to become a vital part of the society. This is how multigenerational centres, voluntary actions, and providing 24-hour care can emerge. The Committee emphasized that many baby boomers have appreciable purchasing power in the context of Silver Economy, despite their increasing age. In their role as consumers, they have the potential to generate demand for adequate products and services that could result in boosting both growth and employment. Pharmaceutical products,

home care and traveling are cited as examples (European Economic and Social Committee, 2012).

Additionally, the consumer power of pensioners can support the growth of regional economies, if they are adapted to provide adequate services for elderly people. Regions adapted in this manner may specialize in services, health care provision (pharmacy, biotechnology and medical care), leisure activities, culture and education, tourism, financial services and care of households. The coastal areas of Southern and Western Europe, the Alps, the Pyrenees and the Massif Central are currently the main frontrunners in such specialisation, resulting in a high number of elderly persons residing there.[26]

The European Commission tried to stimulate the silver market and to help SMEs wanting to enter this market with a number of measures, e.g., adopting action plans [e.g., new eHealth Action Plans (2012–2020)], but also by co-financing programs emphasizing the improvement of the quality of life for older adults (e.g., the Ambient Assisted Living Joint Programme). Andalusia provides an example of supporting development of the Silver Economy via direct financing from European Union funds. In this region, projects of companies developing a variety of goods to meet the demand of elderly people – when they are primarily focused on the medical sector – are financed by the European fund of regional development through a scheme of public procurement (Martinez-Arca, 2014). The European Commission also organizes events to discuss ways to transform the challenges of population ageing into new market opportunities for the benefit of the whole society. For example, the European Commission organised an event in September 2014 „Growing the Silver Economy in Europe“ with the aim of bringing stakeholders together to better understand the potential of a Silver Economy as well as to collect input regarding future action. March 2015 saw the first European Summit organized with the goal to mobilise and engage stakeholders in the co-creation of the future EU agenda for innovation for active and healthy ageing. Creating a Silver Economy Strategy presents a significant challenge for the future.[27]

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[26] Dealing with demographic change regional policy responses.

[27] <https://ec.europa.eu/digital-agenda/en/news/growing-silver-economy-europe>.

Utilizing the potential of the Silver Economy: spas and spa tourism – model approach (a case study of the silver industry in the Slovak Republic)

So far the methodology of case studies has not been used with respect to Silver Economy research. In Slovakia, it has been applied by authors in the area of silver (spa) industry and it has been elaborated in more details in Páleník et al. (2014). The following section presents the most important results.

At the beginning it is important to note, that both by nature and by character, Slovak spas lie in a cross-over area between health care and the tourism industry. Spas number among typical silver industries, as indicated by the high average age of consumers currently between 45–55 years. The average age of visitors has decreased substantially over the past ten years (in 2004 it was approximately 70 years), mainly because younger people have become more conscientious about living a healthy lifestyle. Therefore, their spa visits have a more preventive character. Due to their specificity and attractiveness in the eye of domestic and foreign clients, they are still a kind of "flagship" for the tourism industry, which, however, in 2013 contributed to the GDP by only 2.7 %. According to the Statistical Office of the Slovak Republic, the number of spa visitors amounted to approximately 278.5 thousand in 2013, while the proportion of foreign clientele was slightly below 25 % of the total (most foreign visitors come from the Czech Republic, Germany, Russia, Israel, Poland, Austria and Ukraine). Medical spas were occupied at about 60 % of capacity (SACR, 2014), a significantly higher number[28] in comparison with other accommodation capacities. Thus idle capacities both in spas and in tourism represent considerable potential in themselves as well as from the emerging demographic trends perspective. An important challenge for the Slovak spa industry will therefore be the ability to identify and respond to worldwide trends.

[28] The proportion of spa tourism to overall tourist accommodation, according to SACR data, is in the long term approximately 7 %.

For example, in the Asian Pacific region, spas try to attract foreign clients by offering treatments popular in their home countries (traditional Asian therapies). In the Maldives, currently the top destination for Chinese tourists, spas try to encourage visitors by offering traditional Chinese treatments.

Around the globe, the so-called "farm-to-spa movement" can be obseved, which can be characterized as a partnership between spas and local farmers. Many spa facilities provide their services on a wellness principle, trying to focus on the so-called "whole beauty ecosystem". This means that they concentrate not solely on beauty care (skin, hair etc.), but also on the acquisition or consolidation of emotional beauty (self-confidence, charisma, etc.).[29] This trend is based on the idea that feeling more beautiful, happy and self-confident can have a positive impact on the health and physical qualities of the individual. Spas also try to respond to the increased demand within the silver population for so-called anti-ageing treatments. Some spas offer various meditation exercises especially developed for the silver population in an effort to respond to seniors´ increased demand for improving their connection with nature. Programs focusing on so-called "digital detox" are also becoming popular among seniors. Taking a break from digital technology could help them to regain or strengthen their overall balance in life.

Another trend is the rising numbers of so-called "hybrid spas", which offer the combined services of hotel-resort-spa-fitness-wellness-beauty centres. In connection with an emphasis on the preventive function of these facilities, many spas have introduced aromatherapy as an additional service. For the silver population, spas are important not only for treating chronic diseases or injuries, but also for relieving the symptoms of depression and other emotional illnesses.

Because of the ageing population, there is a trend to adjust spa facilities for the convenience of the elderly. According to a SpaFinder Wellness survey of global spas,[30] approximately 80 % of responding facilities provide barrier-free access, 50 % indicated the presence of special

[29] <http://hotelexecutive.com/business_review/3533/spa-industry-trends-that-touch-the-guest>.

[30] <http://www.spafinder.com/newsletter/trends/2014/2013-trends-report.pdf>.

equipment in their facilities and 43 % had a therapist who had completed a special training course focused on working with disabled persons. Only 8 % of respondents indicated that their marketing activities were not focused on the elderly market segment.

In the future, spas can be expected to improve access to their services for individuals with limited mobility by adjusting their entry width to accommodate wheelchairs and by buying hydraulic beds, chairs, etc. In some countries, there is also a trend toward "green" spas, which comply with certain global environmental standards (e.g., using natural preparations for treatment).

As illustrated above, individual spas try to differ from their competition as much as possible by trying to bring something new to the market, but also by responding to actual problems such as population ageing.

The Silver Economy from the Slovak medical spas perspective

In this part we present the main findings of in-depth interviews with representatives of six chosen medical spas in Slovakia (Brusno Medical Spa, The Spa Sklené Teplice, Spa Dudince, Spa Nimnica, Medical Spa Rajecké Teplice, Medical Spa Piešťany).[31] The survey was conducted from August to September 2014. The aim was to collect and summarize opinions and attitudes of the management of chosen medical spas towards the potential of the Slovak spa industry in the Silver Economy and to identify major trends, opportunities and barriers in regard to forthcoming demographic changes. Recommendations mutually agreed to by interviewees are included.

Opportunities and trends

The in-depth interviews indicated that representatives of medical spas are aware of demographic transitions in Europe and also of the potential of the Silver Economy. In their opinion, there is a clear need to encourage and facilitate scientific research into the health benefits/effects

[31] E.g., Eisenhardt (1989), (2007) deals with the use of case studies in research.

of spa-related treatments. This research could help to strengthen the competitiveness of Slovak spas in the international market.

Spas in Slovakia differ not only in proportion of domestic and foreign clientele but also in the proportion of self-financed people. In general, larger medical spas with a long history have a greater share of foreign clientele and of self-financed patients. For the most part, smaller spas have considerably fewer financial resources to allocate to marketing activites abroad. Their representatives find the negotiation process regarding conditions and the signing of contracts with foreign health insurance companies (covering spa procedures, alimentation and accommodations for their clients) very expensive while offering uncertain results. From this point of view, representatives of our spas see potential in providing services to foreign seniors whose accommodations and procedures would be covered by foreign health insurance companies, but greater government involvement in this field would be beneficial.

Respondents claim that an increased utilisation of health spa therapies of a preventive character has great potential, not only among younger clients, but also among elderly individuals who are more likely than their younger counterparts to experience a health deterioration. Early detection of disease often leads to greater treatment efficiency and shorter treatment duration, with less complex and less expensive care later. This can be an important factor, as it is predicted that an ageing population will cause higher health care costs.

The research findings also showed that both from the point of view of domestic and foreign clientele Silver Economy holds much potential, mainly in the health care and long-term care related areas. Latent potential lies also in the areas of health tourism (stomatological, beauty stays for elderly people, provision of medical and spa services in one package, etc.) and in the exploitation of synergy effects, which could lead to the export of complex packages of services, e.g., services of assisted living facilities combined with health care and spa services.

There is an ongoing trend in the Slovak spa industry: while small-size resort spas focus more on medical spa treatments, trying to ensure the highest standard of care and professionalism, many larger spas continue

to increase their role in wellness activities. By concentrating maximum services under one roof, they enable their clients to focus on their core activities and to enjoy higher comfort. This trend towards improving the variety and quality of complementary services could help to attract more solvent and demanding clients.

Many, mostly smaller, medical spas try to increase licensed activities within the indication groups that belong to their legally authorized scope of practice and, in this manner, to increase the number of potential clients.

Conducted research has confirmed that, due to demographic changes, a higher demand for healthier food (e.g., bio products) as well as for nutrition therapy and services of nutrition consultants, is expected. The resulting demand for domestic organic food from local producers may well increase, potentially reducing regional disparities.

Barriers and recommendations for economic policy

Based on case study findings we concluded that the implementation of the Silver Economy concept in Slovakia faces barriers. Barriers range from sales problems (wage inequality and low income, especially very low pensions) to the business environment, to lack of financial resources (e.g., for innovations, etc.). Barriers like low awareness of business opportunities created by an ageing population and prevailing stereotypes concerning the economic consumption of elderly people and their low mobility have been identified as less significant. The following obstacles to exporting spa services are seen as the most important: legislative limitations, insufficient government export assistance programs and language barriers. The in-depth interviews also show that the low quality of transportation infrastructure in Slovakia counts among the important barriers to tourism and spa business development.

The adoption of the euro is also considered to be barrier to a certain degree, inasmuch as the Slovak Republic lost the possibility to set the exchange rate of national currency in accordance with price developments in the world markets and with its economic policy objectives.

Adopting the euro in the Slovak Republic strengthened the competitiveness of neighbouring countries that retain their national currencies, primarily Hungary and the Czech Republic.

Future spa industry development is highly dependent on the quality of social infrastructure, and in this regard it is important to emphasize shortages and barriers in two significant areas. First, there is a lack of quality and choice of services provided by downstream industries like restaurants and shops near spa facilities. These services are often absent or offer poor quality service and do not correspond to spa clientele demands. The second significant barrier reflects one of the major concerns of the global spa industry today the shortage of a high-quality, trained labor force. In this regard, spa representatives find cooperation with regional school authorities (e.g., with secondary vocational schools like hotel academies) to be unsatisfactory. They confirmed that most of the graduates lack even the basic skills needed for this particular industry (e.g., inadequate or non-existent language skills).

Cooperation with local authorities is also problematic, as their activities and initiatives related to eliminating barriers and creating better business environments are very often rated as insufficient. The respondents claimed that the improvement of Slovak spa and tourism industry competitiveness in the global market needs stronger attention from policymakers (e.g., stronger anti-corruption policies could be supportive, since favouritism and corruption in spending of EU funds can hamper business competition).

More attention and financial support is also needed for research activities related to the healing effects of spa water. Research activities can help to build stronger cooperation with universities and research institutions and can also help to achieve a competitive advantage against foreign competitors. More assistance from the National Tourism Authority (including financial support), with marketing and promotional activities focused on increased and improved of promotion of Slovakia, is essential because this can help to increase foreign demand for tourism and spa-related products and services.

Based on our findings, health insurance companies should put greater emphasis on preventive care, because dealing with the acute care needs of individuals is usually much more expensive. An orientation towards foreign markets can be very important, since potential domestic demand is negatively influenced by the increased number of households in financial difficulty because of the financial crisis. Since the deficit in the health care system has been widening, a trend to restrict public funding for spa treatments can be seen. There is a also long-term increase in the number of self-payers, since the Ministry of Health has revisited a list of diagnoses that call for spa treatment. Some diagnoses have been removed from the list entirely. Others have been moved from the list calling for comprehensive treatment (category A) to the list calling for co-payment treatment (category B). However, low-income persons whose diagnoses fall within category B usually cannot afford this kind of treatment.

An effort on the part of public authorities to facilitate co-operation between the Slovak spa industry and foreign partners (mainly with foreign health insurance companies) could contribute to an increase in the number of foreign consumers.

* * *

A literature review regarding the ageing population shows that, despite a growing number of studies dealing with new business opportunities like health care and tourism within the Silver Economy, more research should be conducted in this field. Comprehensive studies such as those that provide a vision for the Silver Economy from multiple perspectives remain rare. Many authors offer only a partial view of the economic dimension of demographic changes, capturing aspects such as purchasing power, savings, household consumption, new opportunities for innovative companies that react to seniors' needs, and the potential for exporting Silver Economy goods and services. In the light of this literature review, we can expect population ageing to affect both the level and the structure of consumption expenditures as consumer preferences and purchasing power vary by age. This could have an impact not only on aggregate demand but also the production and employment sectors.

Our research suggests that Slovakia has great potential for economic opportunities within the spa industry – an industry which can be seen as a very promising component of a Silver Economy. To exploit this potential, it is necessary to eliminate barriers currently hindering its development.

3. THE DEMOGRAPHIC DIMENSION OF THE SILVER ECONOMY CONCEPT

The first part of this Chapter has the ambition to add the latest trends in demographic processes which still shape the new demographic profile of Europe to the well-known view on demographic phenomena that led to the population ageing process (reduced birth-rate and increasing life expectancy). We identify the current stage of the demographic shift occurring in the EU and look for similarities in development by larger units. In the context of the philosophy behind the Silver economy, which changes the comprehension of the ageing process from a threat to an opportunity, we point out that Europe is not the only continent where the ageing process is under way. In other economically growing regions, there is and will be change in the age structure of the population, but also in the size of the population of elderly people. At the same time, existing rush business relations between Europe and these regions and deepening involvement of these developing regions in world trade are setting the ground for emergence of the new silver makets where silver production generated (not only) in Europe can be placed.

Ageing of the European population

The character of former demographic processes along with recent trends determine the development of the demographic structure of the European population and also the contours of dynamics of population change – as a result, since the 1990's, not a natural increase, but migration is the main participant in the population growth in Europe. As many as eleven European countries face a decrease in population.[32] Dramatic shifts are also present on the side of the population age structure. Changes in the demographic profile of Europe result from a modified family model and transforming reproductive behaviour as well as from positive movements in the modernization of society, improvements in

[32] In the Baltic States, in the Southern European countries but also in, for example, Poland and Hungary.

health-care and hygiene standards, etc. That is why, in a certain stage of societal development, a situation occurs when the increase in life expectancy (caused by the mentioned positive movements) meets with a distinctive fall in the birth-rate (which is usually motivated by a lower child mortality but also by changes in the value system, higher life-standard demands, growing economic competition, etc.). In this context, 2002 was a critical period for the EU: the birth-rate fell to the lowest point in the history of the EU – 1.5 children per woman (data for the current EU-28); in as many as 17 countries of the EU-28, the birth-rate was below average value, in 11 countries with a rate under 1.3 per woman.

Current trends in demographic processes

Recently, we have observed a moderate improvement in fertility, which occurs after decades of continuous falling. For a short period of time (2008–2009), the total fertility rate had even risen back above 1.3 children per woman in all EU countries. The current trend of a "postponed childbirth" holds the key position in the revitalization of the birth-rate and can be documented by an increase in the mean age at which women give birth. While today in fifteen EU countries the average age of a woman at childbirth is above or equals 30, just ten years ago this was the case in only six EU countries. On average, during the last 30 years, the age of a European mother at child birth has increased by approximately 3 years, however in some European countries this age has increased by 5 years in comparison to the 1980´s (that means that women born in the 1980´s give birth to children on average 5 years later than their mothers). The postponement of parenthood could have been hence partially responsible for the drop in fertility rates in the past years. It is presumed that, when the mean age of mothers at childbirth stabilizes, the fertility rate will stabilize too – and – at a slightly higher level. This "catching up" of the birth-rate caused by the realization of postponed births is known as the "tempo effect". Along with postponement of parenthood also a drop in fertility comes for a certain period of time – in the first phase the fertility rate falls, but later it recovers.

The positive news is that the "catching up" of the fertility rate occurs despite changes in the traditional perception of the role of a family – even the growing divorce rate, the decreasing number of marriages and the increase of cohabitations or increase of the single-parent phenomenon (factors which shape the mentioned new model of family behaviour) have not stopped the (mild) revitalization of the birth-rate. In fact, a recovery of fertility occurs in countries where the new family model has been formed for a longer time. Currently, in six EU countries more than a half of children are born outside of marriage; more precisely, in eight countries inside the European territory more than 50 % of children are born as illegitimate: in northern countries – Iceland, Estonia, Norway, Sweden and Denmark as well as in Belgium, Slovenia and Bulgaria. Apart from Estonia and Bulgaria, these countries are at the same time highly above the European average in fertility rate; Slovenia is close to the average rate.

The increase in fertility, in connection with higher mean age at which mothers give, birth reveals another curiosity – countries, where the trend of birth postponement advanced the most, often register the highest birth-rate in Europe (this is the case of, for example, Sweden, Denmark, Finland, the Netherlands and France), but at the same time are among the most developed countries with the highest standard of living. The increase of standard of living and the development of the economy were in the past, generally, associated with a decrease in the fertility rate (contrary to this, currently the lowest birth-rate and at the same time the lowest mean age of women at childbirth are typical for countries such as Bulgaria, Romania, the Slovak Republic, Poland, and Latvia). Some studies connect this phenomenon with a new stage of development of society – the stage in which the higher standard of living is accompanied by an increase in the "desired amount of children" and, at the same time, allows the realization of this desire. This hypothesis is consistent with the expectation that also those countries which currently have a lower standard of living will display higher fertility rates at a later stage, as fertility will increase with wealth. On the other hand, higher fertility in most developed societies partially results from the fact that, in the most developed countries, birth postponement occurred the soonest and consequently they

have the earliest results of the tempo effect. This fact, however, does not disprove the expectations of an increase of the birth-rate in less developed EU countries.

In result, the rise of the birth-rate in recent years led to only a modest increase in the total fertility rate. The European average of 1.6 children per woman is still well below the "replacement level" (2.1 for developed countries). Although this positive change will strengthen the contribution of a natural increase to the overall growth of the European population, it cannot reverse the ongoing trend of population ageing. The background to this trend is created not only by a decrease in the birth-rate in the past but also by a positive demographic phenomenon – an improvement in life expectancy at birth. Over the last 50 years, it has increased by approximately 10 years for men as well as for women. According to the Eurostat statistics, in Europe, the highest life expectancy of women is in Spain, France, and Liechtenstein. For men, the highest life expectancy is in Iceland (the only country with a life expectancy slightly above 80) as well as in Switzerland, Liechtenstein, Italy and Sweden. When comparing healthy life years, we get less consistent results – this number has even been reduced in some European countries over the last decade. However, it can be stated that Europeans live longer and with more healthy life years than before.

The change of the European demographic profile

One of the commonly used indicators to illustrate the fact that the European population has been going through the ageing process for a while now is the median age – primarily its development since 1980. The median age has increased by 3.9 years since 2000, which is the same increase as in period of the last 15 years of the 20th century – between 1985 and 2000 (in 2000, the median age reached 38 years). To compare, between 1960 and 1980 (a period of 20 years), the median age increased only by nearly one year. A brief look at the above mentioned values indicates that, when comparing the development of the median age between the decades of the previous half-century, the speed of median age growth

was accelerating. A more detailed look at the individual years after 2000 will, however, reveal that the pace of the median age increase has been slowing down since 2002. The biggest jump (the fastest increase of median age) in the process of ageing of the European population is apparently over for this wave of ageing.[33]

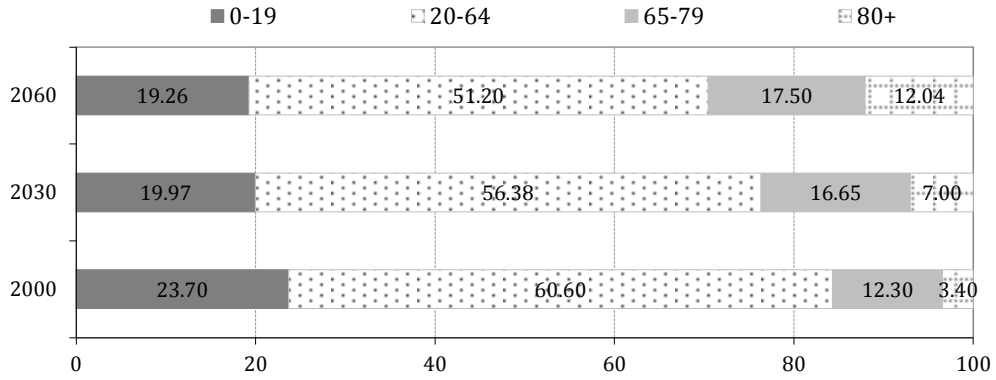
A more pithy view of the ageing process of Europe is given with structural indicators such as the proportion of the main age groups in the population and the change of their percentage over time, as well as the development of dependency indexes. They, at the same time, describe to what extent this demographic change will affect other areas of society. When we look at the age structure of the population according to the main age groups, which roughly correspond with economic activity and inactivity, we discover that, according to the Eurostat database about population, there has been a decrease in productive population in the age of 20-64 years since 2012 (in total, it has decreased by more than half a million people; Eurostat, online database demo_pjan) and an even bigger decrease (nearly one and a half million) when considering the productive population to be in the 15-64 years range. On the other hand, the number of seniors in the population has been increasing constantly for the last 20 years, at a more or less constant pace, by 1.5 % per year (in 2013 the tempo increased to 2 %). This means that, while 10 years ago there were 80 million seniors in the population of EU-28, today there are 92 million people at the age of 65 and older. The majority of these 92 million seniors live in Germany, Italy, France and Great Britain. More than a half (57 %) of all European seniors (65+) live in these countries.

The ageing process, reflected in a change of proportion of the main age groups, can now be observed for decades: the change was already obvious between 1990 and 2010: while the proportion of the productive population increased by 1.8 p.p., the percentage of the senior segment (65+) increased by 3.7 p.p. and the proportion of the child segment decreased by 5.4 p.p. The share of seniors (65+) in the population of EU-28 currently represents 18.2 % (in the mentioned year 1990 it was 13.7 %)

[33] The current value of 42 years means that one-half of the EU-28 population is younger and the other half is older than 42 years.

and the share of the productive population (20-64 years) is 60.7 % of the population. Children and youth under 20 form about one-fifth (15.6 % in the case of the age category under 15). The following graph illustrates how the structure of the population should change in the future according to the main age groups. The portion of seniors (65+) should exceed the children segment between 2020 and 2030.

F i g u r e 3.1
Structure of the European population according to the main age groups in 2000, 2030 and 2060 (in %)



Source: The year 2000 has real figures according to the Eurostat database (demo_pjanid). Years 2030 and 2060 have figures calculated according to EUROPOP (proj_10c).

According to the most recent prognosis of Eurostat – EUROPOP 2013 (main scenario) – the share of the European senior population is presumed to increase from the current 18.2 % to 28.1 % by 2050 (of which 10.9 % will be people over 80, which means their number will double by 2050) and to 28.7 % by 2080 (12.3 % of this number is the presumed amount of people over 80). Apparently, this prognosis incorporates a certain stabilization in the structure of the population after 2050 – the biggest decade-on-decade increase in senior population share is presumed to happen between 2020 and 2030; the dynamics of a senior population increase should culminate during this period (increasing by 3.5 p.p.). In contradistinction to the dynamics of the European median age increase (whose slowing down may have already started), the years of the biggest increase in the proportion of the European senior population are

still coming. The reason for this is the numerous generation of the post-war natal wave entering retirement age and causing an intensification of the senior population increase (which does not have any effect on the median age ranging around 40 years, as this generation is already beyond this point).

The aforementioned changes in the number and the percentage of the main age groups will also affect the increase of the old age dependency ratio, which represents the relation between the number of people in the post-productive age and in the productive age (economically active population). This can be considered as a simplified mathematical expression of the potential economic burden posed on the productive population emerging from the size of the post-productive population. The old age dependency ratio currently reaches 27.5, which means that for 1 senior (65+) there are 3.6 economically active people (version 1 of the index defined by interval 15-64). In 2000, this index was only 23.2 and, according to the prognosis EUROPOP 2013, it will increase to 49.4 by 2050 and to 51 by 2080, which means that, after 2050, there will be just 2 people of productive age for one senior (65+).

Regional similarities in the development of population ageing

Not only the present age structure of a population, but also the dynamics of the ageing process, naturally, differ from country to country. Currently, the highest proportion of senior population in the EU is in Italy, Germany and Greece (in all three mentioned countries the percentage of people over 65 is above 20 %). On the opposite end of the spectrum lie Ireland, the Slovak Republic and Cyprus (in all three mentioned countries the share of the senior population represents around 13 % of the population). The median age ranges from 45.3 years in Germany to 35.5 years in Italy – a ten-year difference only highlights the big disproportion within EU countries. While in Ireland (the country with the youngest population), the old age dependency ratio reaches the value of 18.6; in Germany (the country with the highest median age) it represents 31.3.

That means, while in Ireland there are 5 economically active people for one senior, in Germany there are only three.

A different timing of a start and of a culmination of the ageing process as well as a different speed of this process within EU countries will cause some European countries with the youngest population to join the group of countries with the oldest population within the horizon of the prognosis. For instance, it is presumed that Sweden, which in the 20th century was one of the countries with the oldest populations in the world, will have the second lowest proportion of senior population and the second lowest value of the old age dependency ratio, as well as the third lowest median age in the EU by 2050 (EUROPOP 2013). By that time, countries such as Portugal and Slovakia (which currently have the third lowest median age) will be among the group of countries with the oldest populations (ranked by median age); the highest percentage of senior population (more than one-third) will be in Portugal, Greece and Spain and, by 2080, Slovakia, Portugal, Germany, Poland, Italy and Greece are presumed to become leaders of this ranking (but the proportion of senior population in Greece and Spain will be on a decline at that time).

According to this prognosis, we can sort the EU countries into several groups according to similar development. Apart from a few countries, generally, the countries of Northern and Western Europe currently reach above-average values of ageing process indicators,[34] but the growth rate of these values will gradually slow down in the horizon of the prognosis, while countries of Central and Eastern Europe, which currently display the lowest values of ageing process indicators, will experience an acceleration in population ageing later in time, but with higher dynamics, which will, by the end of the period, cause the oldest age structure in these countries in comparison to the European average. This development can be partially ascribed to the previous change of demographic behaviour in these countries, when in the period of their socio-economic transformation, these countries adopted Western patterns of family behaviour, but these changes happened in a shortened time horizon in

[34] By the term "indicators of ageing" we understand median age, proportion of senior population (people over 65+), index of old age dependency and share of people above the age of 80.

comparison to Western countries. The pattern of Sweden will be applied also in Belgium, Denmark, Great Britain and France; in Germany and Italy the ageing process will last a little bit longer and these two countries will retain high values of ageing indicators; Romania and Hungary are presumed to be in the group of countries moving from the youngest populations to the oldest, alongside with the aforementioned Slovakia and Poland.

The most significant world regions with regard to ongoing demographic processes and the realization of the European Silver Economy

Even though it is true that the European population is among the oldest in the world (in the list of the oldest countries in the world according to median age there are as many as 18 European countries alongside only Japan and Hong Kong in the first twenty), the ageing process is not just a European issue. The increasing proportion of an older population (at the expense of younger generations) is nowadays a very common phenomenon which accompanies wider socio-economical changes related mostly to economic development (it occurs most often during the transition period from a transformation economy to the higher development stage). The recovery in fertility, which can partially attenuate the ageing process, can be usually observed when a country reaches the highest stage of development. It is not surprising that, according to the demographic prognoses of the United Nations (published by the Population division of Department of Economic and Social Affairs), developed countries are actually demographically the oldest ones (led by Japan, Western, Northern and Southern Europe and Canada), the fastest tempo of population ageing is, on the other hand, presumed to be in developing regions, with South-East Asia in first place.

Regarding the potential expansion of the Silver Economy, the mentioned development will lead to a spread of potential markets for the use of silver production, as many regions, where the scenario of dynamic ageing is well-known and can be predicted relatively exactly, belong to

successful emerging economies with extensive domestic markets and, at the same time, these countries have already well established trade relations with EU member states. Its own experience with the development of silver sectors of the economy in Europe can be helpful for European producers when producing and placing silver production in the export territories at the time when the first wave of population ageing hits the export partners' countries. It is important to mention that developing regions will have a much shorter time to adapt, in comparison to European countries – while in the highly developed regions of the world the proportion of seniors (65+) increased between 1950 and 2000 from around 8 % to 14 %, in developing regions (according to the classification of the United Nations) this percentage will reach the 8 % point in this decade (between 2015 and 2020) but it will approach the 14 % point by 2050 – the change which had been formed over half a century earlier in developed countries will happen in less than 30 years in developing regions. For example China, where the policy of parenthood planning and the policy of birth-rate control dramatically affected population development, achieved a demographic structure which France and Great Britain attained over 60 years in only 20 years. The economies, societies and authorities of countries with demographic transformation of this speed will be less prepared for adaptation to changes than European countries. In the current globalized environment, an option is to “export” knowledge but also real solutions through existing and new trade channels.

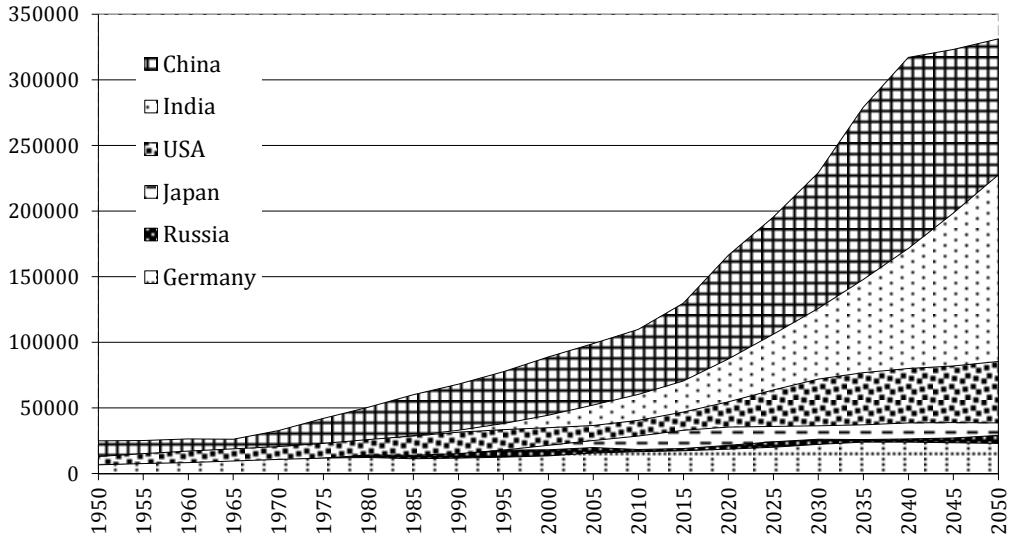
The ageing process will continue also in the developed world, but with the index of ageing (number of people over 60 per 100 people under 15) increasing to 1.6 times of today's value. In developing regions it will be 3.5-times higher than today's value. Europe, which is currently the region with the highest proportion of senior population, at more than 17 %, will remain in the first place till 2050; at that time it will be surpassed by East Asia. After 2050, the fastest ageing region should be Latin America.

When talking about the creation of possible silver markets, a useful figure is not only the percentage of senior population, which documents the progress of changes in the demographic structure of a certain region/country, but also potential future demand – the size of an actual

senior population. The answer to the question "Where will the majority of seniors – potential consumers of silver production – be living in the nearest future?" is clear: more than a half of the world's senior population (which was in 2010 more than 530 million people) lives in Asia (284 million seniors). In comparison, the European senior population is in second place with 121 million people over 65. Just in Eastern Asia, the senior population is bigger than the whole of Europe. The share of Asia in the world senior population will continue to increase: by 2050 it will represent almost two thirds of all seniors (65+) in the world – 900 million, five-times more than the number of European seniors, which will be in second place at that time with 190 million seniors (65+).

In the middle of the last century, only in three countries of the world did the number of people over 65 years surpass the threshold of 10 million: China (24.8 million), the USA (13 million) and India (11.7 million). Today, 11 countries have a senior population larger than that, beside the mentioned three: for example, Japan, the Russian Federation and Germany. The dynamics of the further expected growth of the senior population in some of these countries is unprecedented (Graph 3.2).

F i g u r e 3.2
Number of people over 65 in selected countries, 1950–2050
(in thousands of people)



Source: According to the database World Population Prospects; 65+; middle variant (UN, 2014).

Developing countries are the ones which will undergo a senior population expansion at the fastest pace. While indicators used to observe the ageing process (such as index of ageing, old age dependency ratio) will still display the highest values mostly in the developed regions of the world, the largest populations of seniors will live in developing ones – by 2050 more than 77 % of the world senior population will live there. Five countries of the world will have more than 50 million seniors each by that time: China, India, the USA, Indonesia and Brazil. Considering the aforementioned expected dynamics of senior population increase in the world's regions, it is not a surprise that just one of these countries belongs to the developed countries.

The senior population itself is ageing as well. No matter in what development stage it find itself, in most countries people over 80 are the fastest growing age segment of the population – even today it is growing at a 4 % rate. Currently, the percentage of people over 80 in the population surpasses 5 % in five countries: France, Germany, Italy, Japan and Sweden. More than a half of the world population over 80 lives in six countries: China, the USA, India, Japan, Germany and Russia. By 2050, Germany and Russia will be replaced by Brazil and Indonesia.

Considering possible opportunities for silver production export from European countries, information about the number of seniors living in a country, together with information about the economic power of the country (with the obvious implication for purchasing power and standard of living of the population), and information about the openness of an economy (can be added with the information about its share in the world trade), are creating the basic scope for estimating the potential demand of the silver market. In this context, it is worth mentioning that after the European union, the USA, China, India, Japan, Russia and Brazil are the six biggest economies of the world and, at the same time, they are six out of the seven most important trade partners of the EU outside the European territory (the most important if ranked by volume of exports and imports according to the territorial structural of the foreign trade, the seventh is Turkey).

Attention should be given to the mentioned BRIC countries for several reasons. Regarding the dynamics of economic growth, countries such as China and India have better results than the USA, Japan or the Eurozone countries (when comparing GDP growth rates), as they have been displaying higher output growth rates already for a longer period, moreover, they were the least affected by the economic crisis and also in the post-crisis period, the recovery, or growth of their economies has been more solid even when comparing with other developing regions. Developing countries also have higher growth rates in import and export volumes than was the average increase of world trade over the last two decades (with 2009 being an exception, when the world trade volume decreased). The increase of imports exceeded the increase of exports in these countries, both values being higher than in developed countries. This trend, ongoing now for more than two decades, creates the assumption of the next economic progress of these countries and their continuing involvement in international exchange and trade relations. The countries of BRIC are gradually increasing their share in the EU total trade (in import and export) at the expense of the USA and Japan. The USA, with a share of 17 %, is still the main export partner of the EU, but, since 2000, its proportion has decreased by approximately 11 p.p., which is the same value as the value of increase of the share of the second and third biggest export partners of the EU – China and Russia. In the case of imports, the change was even more significant – the decrease of the share of the USA and Japan, together by approximately 15 p.p., and the increase of the share of China and Russia means that China and Russia surpassed them and moved USA and Japan off to the third and the fourth place in ranking of the EU´s biggest import partners.

A more detailed look at imports (in this case into the mentioned countries) will tell us how solid "the absorption capacity" of a certain economy is and, at the same time, to what extent the domestic demand cannot be satisfied by domestic resources. While the amount of world imports has almost trebled since 2000 (in USD, according to COMTRADE), the imports of Russia and India have multiplied 9-times and the imports of China grew nearly 8-times. In comparison, the imports of Europe and

Japan have more than doubled – a little bit more than the imports of the USA. BRIC countries (especially 1. China, 2. Russia and 3. India) are attractive territories for European producers and exporters, not only for the development of their economic growth dynamics and their existing, advanced trade relations – which were even intensified over the last few decades, for the size of their domestic (unsatisfied) demand, but also – and this is important for the focus of this study – for the dynamic of ageing of their populations and extraordinary increase in the senior population in these countries.

The above mentioned countries are currently in various stages of demographic transition. The proportion of senior population (65+) in the total population of BRIC countries ranges from 5 % in India to 13 % in Russia (for comparison, Japan, which has the oldest population in the world, has 26 %); by 2050, just one of these countries will have a share lower than 20 % – India. Brazil and China will even have a proportion of the senior population larger than the USA – in China it will approach one quarter of the total population. Approximately 331 million Chinese seniors will represent the largest senior population in the world; this number will be higher than the number of seniors in Europe, the USA and Japan combined. India, with its 206 million seniors, will be in second place. Although the UN prognosis is dealing with a long time horizon and real values can slightly differ due to unexpected changes in the mortality or fertility rates, the results of the UN prognosis show an irreversible trend. The region of Eastern Asia will be home to the biggest senior populations and, at the same time, these countries give a good example of demographic dividend utilization (the so-called demographic bonus – a period favourable for economic development, when numerous generations enter productive age and a significant fertility fall decreases the children population, but the senior population is not big enough to radically influence dependency ratios).

* * *

Even the recovery in fertility, caused by postponed parenthood (realizing postponed childbirths), which we have witnessed in the past few years or the mentioned improvement of economic standards, cannot reverse the

ageing process of the European population. Even during the birth-rate recovery, the total fertility rate in the EU increased from its historically lowest value of 1.45 children per woman to 1.58 children per woman, which is still well below the replacement rate. The fact that the European population has been ageing now for decades can be best illustrated by the median age development: between 2000 and 2013 the median age increased by 3.9 years – which is the same increase as in 15 years of the last century. Between 1960 and 1980 (a period of 20 years) the median age had rose by less than one year. Beginning in 2012, the number of people of productive age (20–64) has been declining; on the other hand, the number of seniors in the population has been increasing constantly for the last 20 years, at a more or less constant pace, by 1.5 % per year on average. This means that while 10 years ago there were 80 million seniors in the population of EU-28, today there are more than 92 million. The majority of them live in Germany, Italy, France and Great Britain. According to the most recent prognosis of Eurostat – EUROPOP 2013 – the proportion of the European senior population is presumed to increase from its current 18.2 % to 28.1 % by 2050. The old age dependency ratio currently reaches the value of 27.5; which means that for 1 senior (65+) there are 3.6 economically active people (15–64); according to the prognosis EUROPOP 2013 it will rise to 49.4 by 2050, which means that after 2050 there will be just 2 people of productive age for one senior (65+).

A different timing of the start and culmination of the ageing process, as well as different speeds of this process within EU countries, will cause, in the horizon of the prognosis, some European countries with the youngest populations to join the group of countries with the oldest populations, and vice-versa. Countries which currently have the oldest populations, but will in the prognosis horizon have average or younger populations, are Sweden, Belgium, Denmark, and Great Britain; on the contrary, Romania and Hungary are presumed to be in the group of countries moving from the youngest populations to the oldest ones, alongside Slovakia and Poland.

The European population today is among the oldest populations in the world. The ageing process, however, is not limited only to the area of

Europe – potential silver markets for silver production produced or serviced by European companies will emerge and be developed also outside the European territory. The demographic change is ongoing also in the best performing developing economies, many of which already have intensive trade relations with EU countries. While in developed countries the ageing index will increase to 1.6-times of today´s value, in developing regions it will be 3.5-times higher than that of today. Europe, which is currently the region with the biggest proportion of senior population, with more than 17 %, will be surpassed by the region of Eastern Asia by 2050. Today, more than a half of the world's senior population lives in Asia. Only the countries in Eastern Asia are home to more seniors than the whole Europe. The most numerous senior populations will live in China, India, the USA, Indonesia and Brazil. Information about the size of the senior population living in a country and information about the economic power of the country (with the implication for the purchasing power and standard of living of the population), together with information about the extent of openness of the economy, are creating the basic scope for an estimation of the potential demand of the silver market. Six out of the seven most important trade partners of the EU outside the European territory (taken from the volume of exports and imports) belong, at the same time, to the countries with the biggest economies of the world: the USA, China, India, Japan, Russia and Brazil. From these, mainly BRIC countries show signs of the most dynamic potential of silver markets expansion: they have had high rates of economic growth over a long period (especially China and India, which are recording growth rates above the average values for developing economies); in the last two decades they have had faster tempos of import and export volumes than the average value of world trade, they continue to increase their share in the EU trade (import and export) at the expense of the USA and Japan and, at the same time, they are expected to go through the ageing process with the dynamics faster than developed countries (and also the most numerous senior populations will live there).

4. POTENTIAL OF THE SILVER ECONOMY IN TERMS OF INCOME, CONSUMER BEHAVIOUR AND EMPLOYMENT IN THE EU

Current economic development in particular EU member states does not establish optimistic predictions and prognosis in consumption. However, it is expected that an increase in total private consumption should initiate economic growth. Cumulating factors which can influence consumption are not only associated with the economic crisis but also with the population ageing in the European region, which needs to deal with problems in the field of pension systems reforms. Under these difficult conditions, characterized also by wage stagnation in most of the Eurozone countries and also by a high rate of unemployment, there is an ambition of the Silver Economy to bring new impulses for the business sector. This chapter consists of two parts. In the first section the authors deal with income and consumption behaviour in terms of the ageing European population, and in the second the authors pay attention to structural changes in demand and their consequences for the labour market.

The Silver Economy from the viewpoint of income and consumption structure

The potential of population ageing results from relatively stable incomes as well as from the total amount of savings and the specific structure of consumption of elderly people. A large number of elderly people and demographic trends create a positive precondition for implementation of the concept of a Silver Economy. However, it is necessary to fulfil the second condition, which is the stability of income and an adequate amount of savings accumulated during active life. Current wage stagnation in the EU countries and the development of the unemployment rate in the European Union are the major threats for the implementation process of this concept as it is expected that pensions will be lower than they are at this point. When assessing the possibilities of implementation of the Silver Economy concept, it is vital to take into consideration the

different stages of the ageing process in individual EU member states and the difference in size of their potential demand, which are subsequently reflected in consumer behaviour.

The analysis of consumption behaviour with regard to the Silver Economy arose from the need to map the opportunities for the Slovak business sector, which could be able to respond to the changes in consumption preferences and habits of an older population in those EU countries where the potential demand is the highest. This issue in Slovakia is dealt with by several authors, e.g., Pauhofová – Páleník, 2013; Páleník et al., 2014; Pauhofová – Dováľová, 2014.

Methodology

The objective of this part of the publication was to identify regions with the highest potential demand of people aged 50 and over and, within them, through the analysis of their consumption (by considering the structure of household expenditure) to identify the most promising sectors with the highest growth potential from the ageing point of view. Particular attention was paid to the possibility of implementation of the Silver Economy concept in Slovakia.

Analysis of income inequality across EU countries is based on the EU-SILC survey, which is the main source for the compilation of statistics on income, social inclusion and living conditions based on data from EU member states. Administrative data on individual income from the Social Insurance Agency was used to examine the dimension of income stratification in Slovakia. A cross-country analysis of households´ consumption expenditures is based on the Eurostat database. A detailed classification of consumption expenditure of households divided by the age group of head of household [50–64 years (young-old), 65–79 years (old-old), aged 80 or over (the oldest-old)] was available on request for 22 EU member countries[35] and for the year 2005. The structure of consumption expenditures for the year 2005 represents approximate proportions which could be considered as being a typical for elderly people in respective countries for

[35] Except the Czech Republic, Croatia, Italy, Malta, Poland and Portugal.

the pre-crisis period. Eight-year longitudinal data (2004–2011) was available only for Slovakia whereas, in the analysis of consumption structure, only those households which met the age limits[36] were included. Household expenditures are presented according to the Classification of individual consumption by purpose (COICOP), whereas overall expenditures were normalized to 1000 Euros. Unless stated otherwise, we use these categories: CP01 (food and non-alcoholic beverages), CP02 (alcoholic beverages and tobacco), CP03 (clothing and footwear), CP04 (housing, water, electricity, gas and other fuels), CP05 (furnishings, household equipment and routine household maintenance), CP06 (health), CP07 (transport), CP08 (communication), CP09 (recreation and culture), CP10 (education), CP11 (hotels and restaurants), CP12 (miscellaneous goods and services). Detailed analysis of consumption structure of people aged 50 or over is based on the multi-dimensional statistic method – cluster analysis, which is used for dividing units into groups (clusters) so that the units, which are in different groups, were as similar as possible.[37]

Potential demand in the old and new EU member states

The crisis exposed serious structural problems in new EU member states where unemployment rate has increased sharply. The high rate of long-term unemployment, as well as problems with increasing youth unemployment, became a huge challenge across the whole of Europe. The necessity to increase labour force participation stresses the need for structural reforms in all major economies. Easier dismissals of permanent workers and lower rates of compensation should increase labour market flexibility but there is more to be done to tackle unemployment. The number of young adults living with their parents has increased, therefore job loss of both parents can become a serious issue. The incidence of over-indebtedness has increased significantly overall across Europe since the financial crisis of 2007–2008. Households with higher total debt service than the net income radically limit their expenditures. Particularly high indebtedness of households in the Netherlands,

[36] The change of the structure of expenditures for young and old people adjusted for the effect of changes in the price level was analysed.

[37] For the analysis we used NeuroXL Clusterizer software.

Italy and Spain weaken the economic prospects of these countries. In most European countries, not only household but also private and public sector indebtedness has become a serious problem. They also have to deal with the wage stagnation of the working and middle classes, as well as with increasing income inequality among EU countries, but the problem is also distribution of income between households within particular countries. The financial crisis has further worsened the situation in income and wealth inequalities between the northern and southern EU countries.

Income polarization has become one of the main obstacles for an increase of households´ consumption, which is expected to bring a significant contribution to economic growth in particular EU countries. Structural problems in the labour market, deepening income polarization in EU countries and income difference between new and old EU member countries, create a narrower manoeuvring space for overall consumption. Barriers resulting from differences in potential demand between EU countries, size and consumption pattern create various possibilities for the implementation of the concept of a Silver Economy in new and old EU member countries. The potential demand of people aged 50 and over in new and old EU countries is presented in Table 4.1. Analysis of potential demand formed by incomes and number of potential silver consumers showed that, in the medium-term period, old EU member states have more perspective for the realization of a Silver Economy.

T a b l e 4.1

Proportion of people aged 50 and over and their potential demand in old and new EU member countries, as a % of total European potential demand in particular age groups, 2009

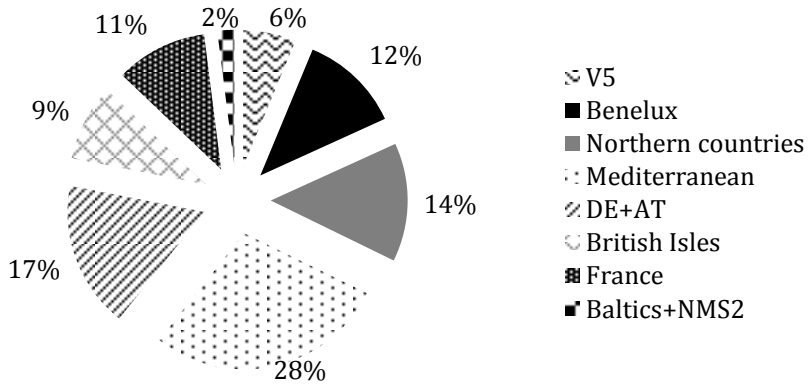
	50+	50 – 64	65 – 79	80+
Potential demand (% of total potential demand of European countries)				
Old (EU-15)	88,2 %	87,5 %	89,2 %	89,1 %
New (EU-8+EU-2)	8,1 %	8,5 %	7,5 %	7,4 %
Proportion of people aged 50+ (% of total number of people aged 50+ within European countries)				
Old (EU-15)	71,7 %	26,6 %	73,5 %	74,9 %
New (EU-8+EU-2)	26,6 %	28,5 %	24,9 %	23,3 %

Source: Processed from the data EU-SILC 2009.
Note: EU-15 Countries – AT, BE, DE, DK, ES, FI, FR, GR, IE, LU, NL, PT, SE, UK, IT.
EU-8+EU-2 Countries – BG, CZ, EE, HU, LT, LV, PL, RO, SL, SK.
Norway, Malta, Cyprus and Iceland were also considered in the analysis of total potential European demand.

From the territorial point of view, regions (created by using multifactor analysis, Pauhofová – Páleník, 2013) with the highest potential demand of people aged 50 years and over are: those of the Mediterranean Sea (mainly Italy), Germany and Austria but also the region of France. Northern countries and the countries of Benelux have also a relatively good potential for realization of the Silver Economy concept. These regions together contribute to the total potential demand of a silver population in Europe by the amount of 83 %.

F i g u r e 4.1

Regions with the highest potential demand of population aged 50 years and over (%, 2009)



Source: EU SILC 2009, based on the average income.

According to the results of the potential demand analysis, Slovakia belongs to the Visegrad region. The proportion of the population aged 50 and over in this region represents approximately 17 % from the overall number of the over 50 population of all EU countries which were included into the analysis (the proportion of Slovakia was approximately 1.6 %). The Visegrad region contributed to the overall potential demand within the European territory by only 6 % (Slovakia only by 0.5 %).

The extremely weak potential demand of elderly people is the major obstacle for the implementation of the concept of a Silver Economy in Slovakia. The average (monthly) current income of the active population is higher only by 17 Euros in comparison with the income of those in the

age group of 50–64 years old. This fact indicates that older people who are expected to have the required skills and experience have a lower income in comparison with the average for the active population. Therefore, it is less anticipated that future retirement pensioners will reach the level of retirement pensions of the current old-old people. Moreover, the negative trend in labour incomes does not create an opportunity for the accumulation of social security funds, which could ensure more solidarity for future generations of older people.

Low potential demand, shaped by the incomes of the population in particular age groups, is currently affected by the negative impact of the crisis (e.g., impoverishment of the population, high unemployment, stagnation of wage levels etc.) and, hence, is reflected in households´ consumption expenditures.

T a b l e 4.2
Development of average (monthly) net income of the population according to the age groups in Slovakia (Euros, constant prices 2013, in 2005–2013)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
All	418	430	458	473	486	501	504	510	514
Active	491	502	539	551	552	566	569	573	577
Young-old	439	454	476	494	524	543	552	559	560
Old-old	316	329	347	358	396	416	421	436	447
Oldest-old	302	315	335	342	372	384	379	384	394

Source: Data proceeded from Social Insurance Agency of the Slovak Republic.

Similarities and differences in the consumption structure of older households between EU countries

Until recently, a consumer´s previous consumption experience was, for elderly people, very important. Prior research showed that particular stereotypes persist in their consumer behaviour and they are very price sensitive. According to several foreign studies, nowadays consumers are more informed and more aware of their needs and desires and they compare and consider various factors. Some more recent findings (e.g., Ying - Yao, 2006) suggest that older people do not take into consideration only economic aspects but, on the contrary, the price is just one of the decisive

factors in consumption. It is assumed that in the field of consumption, economic factors (income level, the total volume of savings, general price level etc.) will be taken into consideration more than non-economic factors (health, individual preferences and value preferences, consumer habits, education etc.). In particular EU countries, the combinations of these determinants have been shown to play a key role in the consumer decision making process.

The diversity of consumption patterns in particular countries is affected by various factors (economic, cultural, geographical, historical, etc.). Traditions can play an important role in terms of the national strategy "let´s-support-local-business" (for example in France, Italy and Austria). Climatic conditions affected by the geographical location of the country fundamentally influence the differentiation of consumer behaviour of older people in the northern and southern parts of Europe. This is reflected, for example, in the lower proportion of spending on energy in southern European countries compared with the Nordic countries (on average by 4 percentage points for young-old and old-old people and by 6 percentage points for the eldest-old). The Nordic countries[38] have higher price levels for food and non-alcoholic beverages compared with southern countries. A lower income in the southern countries as well as a different lifestyle compared to Nordic countries cause the higher proportion of expenditure on food in the southern European countries for young-old, old-old and the oldest-old households, on average by 4 p.p., 8 p.p. and 10 p.p, respectively by age group. Households of older age people in southern countries have also a higher share of restaurant and hotel expenses compared with those in the Nordic countries. On the contrary, due to milder maritime climate, they spend a lower proportion of their household budget on recreation and culture (by about 6 percentage points). The high degree of solidarity in the Nordic countries leads to a lower share of household expenditures on health compared to southern European countries. All these factors influenced the existence of similarities or differences of older people's household consumption patterns across EU countries.

[38] The highest price level of food and non-alcoholic beverages among EU countries was observed in northern countries.

The household consumption structure of eastern EU countries in comparison to western EU countries is also influenced by the number of people living in rural areas, because the living cost in the country side is much less than that of a city. One very important factor is also the household size. Traditions and the worse economic situation of elderly people living in the eastern part of EU, the high cost of maintenance of a household in combination with relatively low incomes, contributed to the effort to use the effects of economies of scale by living more generations in extended households. By this they can decrease expenditures for electricity, water, heating etc. and use the saved money for meeting other needs. In western countries with a better standard of living it is expected that demographic factors will continue to increase the number of single-person dwellings.

Within the economic factors, the difference of price levels as well as income level of households is important. Northern and western European countries tend consistently to have higher household incomes but also higher prices than south-eastern European countries.

Mainly due to the impact of economic factors, households of the eastern EU countries devote a much higher proportion of their total expenditures to food and non-alcoholic beverages than those of the western EU countries (on average by 17 p.p. for the age group of young-old and old-old people and by 20 p.p. for the group of the oldest-old) while energy expenditures are not fundamentally different. This is subsequently reflected in the lower proportion of recreation and culture, restaurants and hotels as well as of miscellaneous goods and services expenditures.

By using cluster analysis for households whose head was aged 50 to 64 years we found three clusters of countries that share reasonable similarities in terms of their consumption structure:

Cluster 1: old EU member states (AT, BE, DE, DK, FL, FR, IE, LU, NL, SE, UK) and Slovenia;

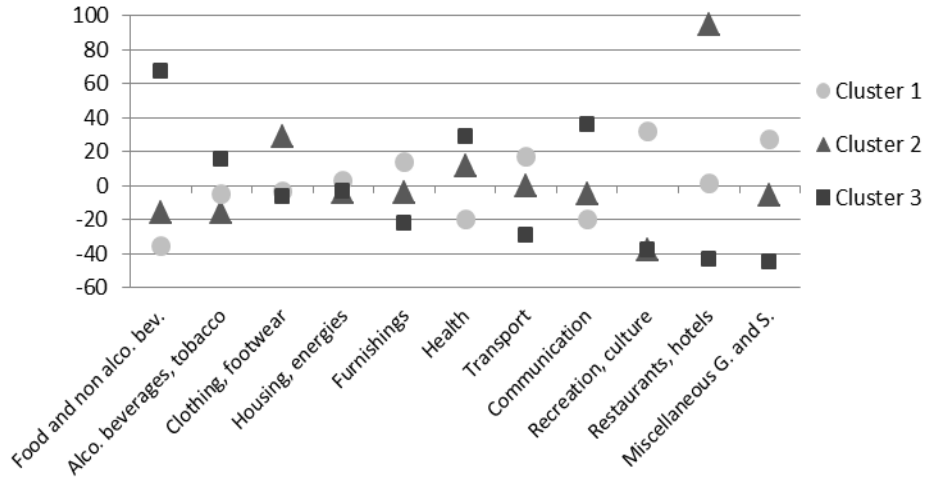
Cluster 2: southern countries (CY, ES, GR);

Cluster 3: new member states (BG, EE, HU, LT, LV, RO, SK).

Figure 4.2 shows how particular clusters differ compared to the EU22 average within the selected 11 product and services categories. From the Silver Economy point of view, Cluster 1 represents the most promising

group of countries in this age group. One characteristic of this cluster is that households in these countries have a significantly lower proportion of expenditure on food and non-alcoholic beverages and a significantly higher proportion of spending on household furnishings, transportation, recreation, culture and miscellaneous goods and services than average.[39]

F i g u r e 4.2
Differences in consumption of young-old households (50–64 years) within three clusters (COICOP, %)



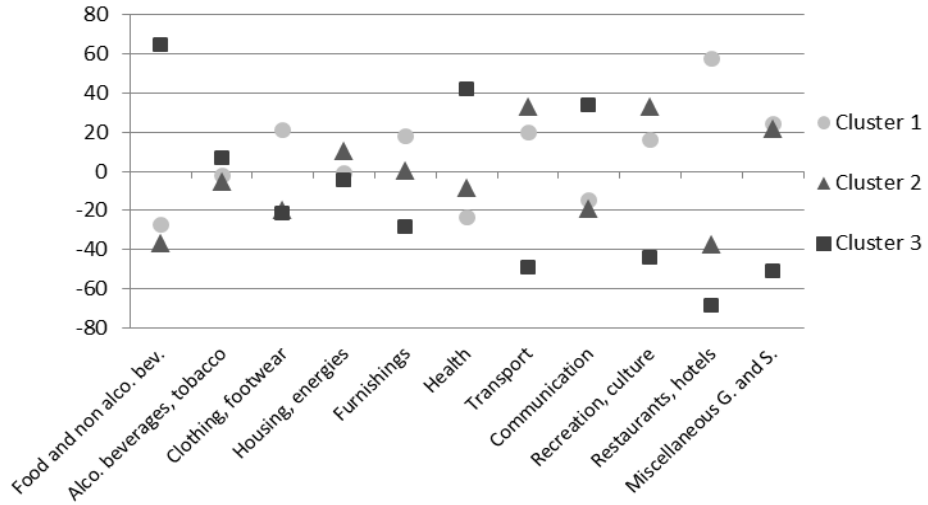
Source: Own processing based on Eurostat data.

Figure 4.3 illustrates the main differences in the consumption structure of households whose head was aged 65 to 79 years. Cluster analysis showed that households within this age group have the most similar structure of consumption within these countries: southern countries (CY, ES, EL), Benelux countries (BE, LU, NL), Austria, Germany, Ireland, Slovenia and the United Kingdom. This age group within these countries is characterized by a lower proportion of expenditures for food and non-alcoholic beverages, health, communication and a higher proportion of clothing and footwear, furnishings, household equipment and routine

[39] Due to the very low proportions of education expenditures (CP10) but relatively high differences, these expenditures are not included in the following graphs which show the differences of individual clusters.

household maintenance, transport, recreation and culture, hotels and restaurants and miscellaneous goods and services.

Figure 4.3
Differences in consumption of old-old households (65–79 years) within three clusters (COICOP, %)



Source: Own processing based on Eurostat data.

The second group consists of the Nordic countries (DK, FI, and SE) and France. Old-old households in this group of countries have a lower proportion of expenditures for food and non-alcoholic beverages, health, and communication expenditures, however, this group has a lower proportion of expenditures for clothing and footwear, restaurants and culture than the average. The higher proportion of expenditures compared to the first group of countries is demonstrated mainly in the category of housing (including energies costs). In the third group there are the new EU member states which, compared to the average, have a high proportion of expenditures for food and non-alcoholic beverages, health, communication and a lower proportion of expenditures mostly for clothing and footwear, furnishings, household equipment and routine household maintenance, transport, recreation and culture, hotels and restaurants as well as for miscellaneous goods and services.

By similar cluster analysis for the oldest-old households we found Cluster 1 consisting of old EU member countries and Slovenia, Cluster 2 comprising southern countries including Slovakia and Cluster 3 consisting of new EU member countries.

Ageing and consumer behaviour in Slovakia – the model example of a country from the V5 region

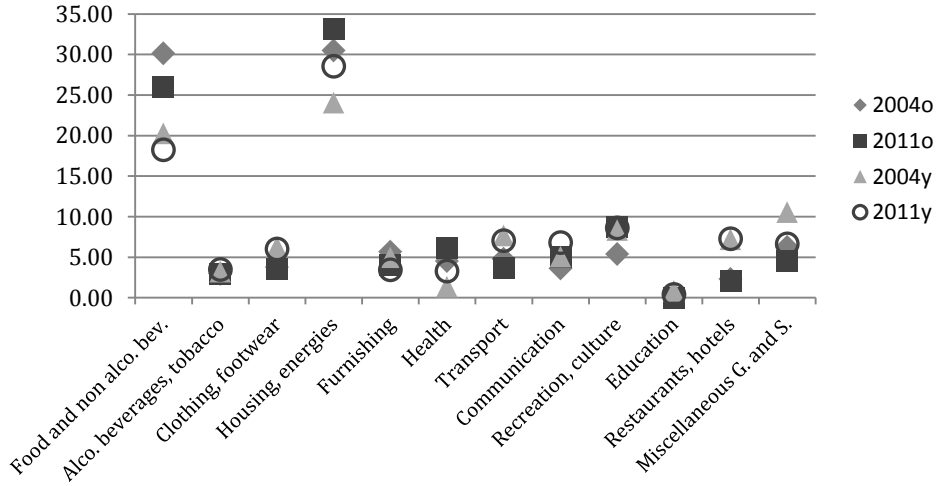
In many developed economies as well as in Slovakia, the share of food and non-alcoholic beverages (CP01) in total household consumption expenditure dropped, as indicated in Figure 4.4. Between the years 2004–2011, the share of food and non-alcoholic beverage expenditures of younger (25–49 years old) and older (50 and over) households declined in both age groups on average by 2 p.p. and by 4 p.p., respectively. This decline was partially compensated by a share increase of housing and energies, expenditures (CP04) from 24 % in 2004 to 28.6 % in 2011 (younger group of households) and from 30.5 % in 2004 to 33.1 % in 2011 (older group of households). Thus, the biggest amount of the household budget for both groups of households is spent on food and living, however with opposite trends. The share of food and non-alcoholic beverage expenditures together with the share of housing and energies was reduced in the households of older people by 1.5 p.p. while, on the other hand, it was increased by 2.5 p.p. in the households of younger people. Despite a mild decrease, the share of these two expenditure categories in older households remains at the very high level of 59% from the total as a result of permanently low retirement pensions averting higher consumption of other goods and services. The shares for clothing and footwear (CP03), (furnishings, household equipment and routine household maintenance (CP05), transport (CP07) and for miscellaneous goods and services (CP12), seem to have decreased between 2004 and 2011 in both types of households. On the other hand, in these two groups of households there can be also seen a trend of rising shares for expenditures on alcoholic beverages and tobacco (CP02), health

(CP06), communication (CP08) and on recreation and culture (CP09). Compared to younger households, households whose head was aged 50 and over slightly decreased the share of their total consumption expenditures on hotels and restaurants (CP11).[40]

As we can see in Figure 4.4, the structure of consumption expenditures differs by the type of household. Despite the changes that occurred during the period of 2004–2011, two major components (CP01 and CP04) of household spending remain on a high level and this pattern does not correspond with the ambitions for the convergence of household consumption structure in Slovakia and the old EU member states which have higher living standards. In comparison with these countries, Slovak households have a considerably tighter manoeuvring space for consumption changes. This is caused mainly by the significantly differentiated level of disposable incomes, general price level as well as by differences in the amount of savings and in the average propensity to save. Huge income disparities could be observed mainly among the population aged 50 and over. This fraction of the Slovak population is extremely limited in consumption by low but relatively stable incomes. Previous research activities in the field of income inequalities (e.g., Pauhofová, 2010, 2012) showed evidence that almost 96 % of pensioners in four regions of Slovakia have pensions below 300 Euros per month. Furthermore, after the financial and economic crisis, the income situation of the young generation has been not improving. Persistent problems with the long-term unemployment rate and income uncertainty have also had negative effects on consumer behaviour. Therefore, due to the global financial crisis, slow recovery, persistence of structural problem, etc. the European convergence process might slow down or even stop in certain countries with the consequence of postponing the implementation of the Silver Economy concept.

[40] While the share of expenditures on education (CP10) decreased in the younger households, in older households it remained unchanged. However, in both groups of households the level of private expenditure on education is notably low.

Figure 4.4
Changes in the structure of consumption expenditures in two types of households (younger households and older households),[41] 2004–2011
(in %)



Note: Axis X represents categories of households´ final consumption expenditures (COICOP); axis Y represents the share of household total expenditure.
Source: Own processing according to data from Household Budget Surveys (HBSs).

New opportunities for the private sector in terms of consumption

The analysis of elderly household consumption, dividing expenditures into two groups: functional expenditures (CP01, CP04, CP06, CP07, CP12) and expenditures related to lifestyle (CP02, CP03, CP05, CP08, CP09, CP11)[42] showed big economic opportunities for the private sector brought by the ageing population. The structure of private consumption in old EU countries and a comparison with new EU countries indicates that the share of functional expenditures in total consumption expenditures is much higher in new EU countries than in the rest of the EU. The highest shares of household final expenditures were devoted to housing and energies and to food and non-alcoholic beverages. These largest

[41] Younger households whose head is between 25–49 years old and older households whose head is aged 50 or over.

[42] Division of expenditures into two groups according to authors Dujin – Lehuédé – Mathé – Siounandan (2010): Étude de l´impact du vieillissement de la population sur l´offreet la demande de biens et de services de consommation was slightly modified for the needs of the authors' analysis.

components accounted for about 39 %, 48 %, 54 % in old EU member states and for about 52 %, 63 % and 67 % in new EU countries respectively by age groups of young-old, old-old and the oldest-old people. The elderly households´ consumption of goods and services related to lifestyle in new EU countries is constrained by the lower budget, which can slow down growth within the sectors oriented towards the production of lifestyle goods and services.

From the functional expenditure group point of view, new opportunities for the business sector arise in health-care (e.g., telemedicine, e-health, m-health innovations, elderly friendly medicines, etc.)[43] because, in general, the elderly require more health-care services and their treatment is usually more costly in comparison with the younger generation. Reduced mobility in older age opens new opportunities in the transport industry (e.g., adjusted vehicles for the changing needs of elderly people, e-mobility, innovations in the field of fall prevention etc.).

With an ageing population, a higher demand for bioproducts (e.g., bio-foods and food products)[44] is expected, which can strengthen growth prospects in the bioproducts industry. Preferences towards fresh local products in some countries, e.g., in France, can represent a barrier for foreign export companies, but can be supportive for local economies. The anti-ageing market, which is globally projected to be worth USD 191.7 billion by 2019,[45] is also very promising for the private sector.

Diffusion of technology into all aspects of everyday life opens new possibilities for innovations across many spheres of elderly needs. New business opportunities could be seen also in ICT solutions supporting the independent living of elderly people. According to previous research (Studla, 2012), the willingness to leave familiar surroundings declines significantly with old age. There are many factors which can influence their decision whether to relocate in old age, e.g., a family financial situation, property ownership, health or marital status. For example, in the

[43] About the ageing population and benefits of the deployment of ICT technologies in medicine was written by several authors, e.g., Grossmann, 2009.

[44] Increasing popularity of natural products („bio“) among the generation of middle-aged individuals was stated for exapmle by Véghová, 2011.

[45] <http://www.transparencymarketresearch.com/pressrelease/anti-aging-market.htm>.

Netherlands approximately 50 % of seniors consider moving to a new place, but 70 % of them generally do not want to move far away as they prefer the area where they originally lived. In some countries like France, there is a tradition to provide care for older relatives within their families. The promising EU market of elderly living provides different solutions, which vary across the EU-28 countries.[46] Some countries like Sweden support people to live at home for as long as possible, therefore there is a huge potential in the home care service business. But, as the proportion of the oldest-old people (with a lower ability to live independently) increases, also the higher demand for other solutions like nursing homes, centres with specialized care, long-term hospitals, residential care, etc. can be expected. As older people require more and more specialised services, the trend of higher demand on quality and new services could be expected in hotels, restaurants and in the tourism sector. This sector is highly labour intensive as, according to Eurostat data, more than 9 million people were employed in the EU hotel and restaurant sector (4.2 % of all employed people) and more than 2.3 million people worked in the tourist accommodation sector (1.1 % of all employed people).[47] New challenges arise for enterprises operating in this sector as an economic recession influenced the incomes and demand of older people, who are now more price sensitive. They will have to deal also with the problem of how to attract new customers from outside Europe but also how to succeed in international competition.

Impact of the Silver Economy on employment in the EU[48]

Ageing is, currently, considered as an important social and economic problem of the EU. The effects of ageing on the composition of consumption will lead to structural economic changes. The increasing demand for several specific commodities and services could be considered as an opportunity for some economic sectors also in small countries. On the

[46] Several studies focusing on independent living technologies have been done, e.g., Carretero – Kucsera, 2015.

[47] <http://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Tourism_employment>.

[48] In this section, the authors used the results of analysis provided within the *NEUJOBS research project: Employment 2025*: How multiple transitions will affect the European labour market. This project was funded under the EU's 7th Framework Program.

other hand, as a result of inevitable changes in consumer behaviour, several sectors will face a decline in demand for their production. Therefore, due to the ageing process, a reflection of changes in the aggregate demand for goods and services on the labour market could be expected, but to a different extent for particular EU countries.

Methodology

In this part of the publication, the authors intend to provide a detailed overview about how structural shifts in demand due to population ageing will result in structural changes in the labour market.

The results, which are presented in this part of the publication, are based on the data of consumption structure taken from the European household budget survey (HBS)[49] and the results obtained from the study of Štefánik et al. (2013). Only the future impact of private consumption was analysed, despite the fact that a significant increase in demand can be expected also in the case of publicly funded health-care and social services.

The estimated number of households structured according to the age of head of the household in the EU (younger than 30, 30–44, 45–59, above 60 yeras) was based on the demographical prognosis NIDI (Huisman et al., 2012), whereas there were 2 scenarios created, optimistic (friendly) and pessimistic (tough). Preconditions for the future development of total household consumption are, in the applied analysis, based on the enhanced projection of the NEMESIS model (Boitier et al., 2013). The presented analysis was extended with information about consumption structure, based on 12 COICOP categories for all 4 types of households. Overall consumption (and also consumption according to 12 COICOP categories) in individual countries was based on the basis of information about the estimated number of households and average household consumption specified according to the head of household´s age (under 60 years and over 60 years). The estimate of proportions was dynamically interconnected to the expected development of convergence of household consumption predicted by the NEMESIS model. Results of this estimation were subsequently used as input data for the input-output model, by

[49] At the time of forming the analysis the authors had data only from 2005.

means of which possible influences on employment in several industries were estimated.

For the needs of this analysis it was necessary to interconnect several sources of data. 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). The transformation table from COICOP to CPA was created on the basis of expert estimation. Thus, only CPA sectors producing corresponding products from selected COICOP groups were coupled together.

After such transformation, an input-output analysis for EU-27 countries was used to estimate the impact of demographic changes on the EU labour market.

In an effort to transform the results of the NEMESIS model for the purpose of estimating the effects of demographic changes on the structure of workforce demand, we took into consideration estimates for the growth of productivity and income. For the fulfilment of this objective we used the following preconditions:

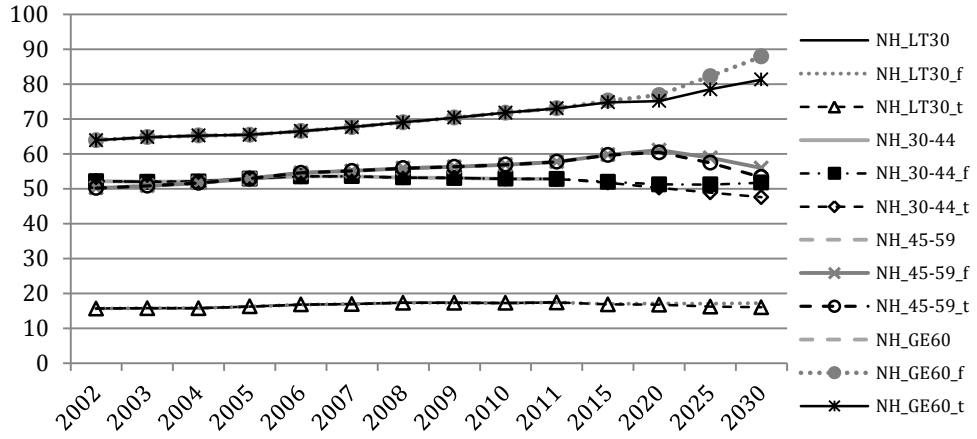
- in each country GDP per employee was used for an approximation of the labour productivity growth rate, while we expected that productivity growth will be the same in all sectors of the economy;
- the growth rate of average household expenditure was used as an approximation for the growth of wages; in other words, we assumed that changes in household expenditure will be directly proportional to the increase in wages.

Simultaneously, the assumption was applied that employees producing goods and services for younger or older people will stay within the same type of production. On the basis of this assumption, we could compare the volume of potential production (when taking into account productivity growth) with the expected changes in the final household consumption. It is important to have this assumption in mind when making conclusions. It is necessary to emphasize that the ageing of the workforce has not been taken into consideration and thus replacement demand has been omitted from the analysis.

Changes in private consumption

The results of the prognosis indicate that population ageing will have a significant impact on the structure of households by the age of reference persons (see Figure 4.5). According to both of the considered scenarios, the number of households whose head is older than 60 years will be significantly higher in 2030. The number of households with a reference person aged from 45 to 59 years will reach its peak in 2020 and, subsequently, will experience a sequential decrease to the level achieved in the year 2006. In contrast, according to the analysis of the two youngest age groups, the number of their households is expected to stagnate or it can slightly decrease. The situation can differ across particular EU member states.

F i g u r e 4.5
Household structure by age of reference person in the EU,[50] in millions



Source: Eurostat; Štefánik et al., 2013.

In 2010, the demand of young-old households represented approximately 28 % of total household consumption.[51] As the share of young-old households reached in 2010 almost 36 % of all households, it can be

[50] Excluding Denmark, Finland, Sweden and Slovenia, for which HBS data availability was limited.

[51] In this section, Silver demand represents the consumption of a household whose head is over 60 years old.

concluded that the decline in the level of income during retirement leads to a decreasing ability to generate demand. The consumption structure differs among countries depending on the age structure of the population and the income and wealth level. The share of silver demand on consumption represents, in Slovakia, a relatively low percentage. In 2010 it was slightly below 25 %. On the other hand, a much greater share of more than 32 % was registered in Germany, which already faces the effects of population ageing. The results of the estimations show that, in the future, there will be an increase of silver demand in each country of the European Union.

The results of the estimations showed that in EU-27 the share of households with the head aged 60 years and over will increase from almost 36 % in 2010 to 43 % in 2030 (which represents an increase of more than 20 percent). Similar development is expected also in the case of households whose reference person is aged between 45 and 59 years; their share on the total consumption will increase approximately from 32 % in 2025 to 35 % in 2030. The highest share of total consumption of this type of households will be expected in Germany, where it could reach roughly 38 % in 2025 and grow up to 42 % in 2030. The growing demand of these households will have a significant influence on demand in several sectors.

The reflection of the overall changes in the consumption structure resulting from population ageing is presented in Table 4.3. Sectors with the highest potential growth include those which provide food and beverages, housing and energies, restaurants and hotels, and especially health-care, social and long-term care services funded from private sources. We can also expect similar effects in the case of demand generated by public authorities, because a significant part of the demand for goods and services from the health-care and long-term care sectors is funded from the health and social insurance system. Luxurious goods and services, including restaurant services, recreation and culture or alcohol and tobacco, are more frequently demanded and consumed in countries with higher average incomes (mostly in EU-15).

T a b l e 4.3

Structure of household consumption in Eurozone countries, % of total household consumption expenditure
(friendly scenario)

	2005		2010		2015		2020		2025		2030	
	60-	**60+**	**60-**	**60+**	**60-**	**60+**	**60-**	**60+**	**60-**	**60+**	**60-**	**60+**
Food and non alco. bev.	9.74	4.35	9.53	4.72	9.50	4.83	9.45	4.95	9.11	5.39	8.74	5.82
Alco. beverages, 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, footwear	4.47	1.21	4.42	1.17	4.38	1.20	4.37	1.23	4.23	1.34	4.8	1.45
Housing, energies	18.99	9.28	19.00	9.80	18.85	10.1	18.56	10.22	17.61	11.14	16.62	12.3
Furnishings	4.16	1.60	4.5	1.59	4.2	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	3.6	9.5	3.31
Communication	2.27	0.67	2.35	0.70	2.30	0.71	2.23	0.72	2.6	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[1]	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
Miscallaneous G. and S.	6.88	2.48	6.68	2.46	6.58	2.53	6.50	2.60	6.30	2.82	6.13	3.4
In 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**

[1] Data in the HBS database about education was not reliable, therefore it was omitted from the analysis.

Source: Authors; Štefánik et al., 2013.

The structure of consumption will probably be influenced by the change of lifestyle within the whole EU, as well as by the ageing of cohorts leaving the labour market with relatively higher incomes in comparison with their predecessors. These factors have the potential to shift consumption structure in the direction towards consuming more luxurious goods and services. Due to this fact, current silver demand is more concentrated in countries with high incomes and future development will depend on the speed of convergence of new EU member countries.

The demand for particular goods and services will be influenced by various factors, including income elasticity, the well-being of households, situation on the labour market, inequalities, etc. Estimates indicate that the share of younger cohorts on total consumption has the tendency to decline. However, certainly there exist goods and services where the decline of demand will be more significant, e.g., transport, clothing and footwear, thus sectors, which means goods and services typically demanded by the younger age cohorts.

The impact of population ageing on the labour market

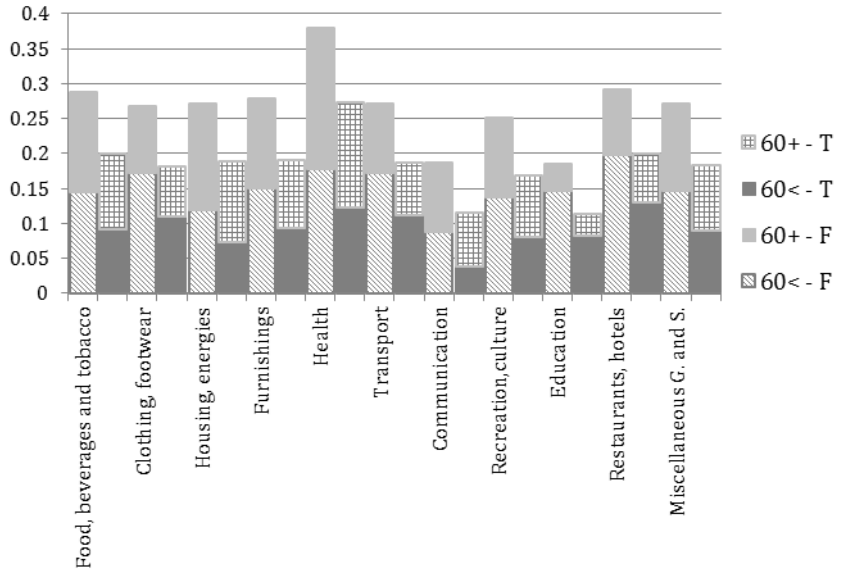
An ageing population has various impacts on particular markets in EU countries. According to the NEMESIS model results it is possible to expect that household consumption in the EU-27 will increase in the period 2010–2025 by 18.8 % (tough scenario) or by 27.4 % (friendly scenario). Negative impacts from a decreasing share of consumption of younger households (with the reference person aged under 60 years) will lead to the reduction of employment mostly in industries with relatively high productivity. Otherwise, the increase of demand of silver households will lead to an increase of demand for a workforce, mostly in labour intensive industries.

According to the results of both scenarios, the higher demand for restaurant and hotel services can be expected in the case of younger age groups (in the case of improving living conditions of younger people in the EU). The highest growth in private expenditures can be expected in the services of the health-care sector for several reasons. The first one is the fact that the number of elderly people who will need health and nursing care will rise (even if the majority of them will be

financed through public funds or, more precisely, from the system of health insurance) (Schultz et al., 2014). On the other hand, a larger group of aware younger age cohorts demanding preventive health-care services will arise. In the majority of selected sectors, the additional demand of both types of household[52] is very similar. In most of the selected products and services, the groups' additional demand of both type of households by age is quite similar, and it needs to keep in mind that the base level for the elderly is smaller, thus its dynamics are higher.[53] Demographic and economic changes will be reflected in the development of demand for individual product groups whereas, in the case of the friendly scenario, the growth of demand will be in the range of 19 % – 38 %, and of 11 % – 27 % in the case of the tough scenario.

F i g u r e 4.6

Additional demand according to type of household and COICOP major expenditure groups, the change between 2010–2025, friendly (F) **and tough** (T) **scenarios**



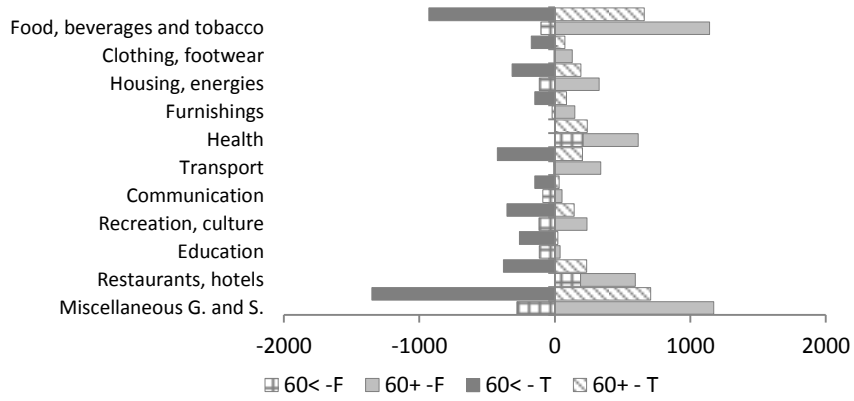
Source: Authors; Štefánik et al., 2013.

[52] Households with the head of the household aged under 60, and households with the head of the household aged above 60.

[53] Clearly, there are exceptions like education, clothing and footwear, or transport, where additional consumption is predominantly linked to the younger age cohorts.

Structural changes in demand will affect also labour demand. On the basis of the NEMESIS model results, it is reasonable to expect the growth of labour productivity during the referential period by 21.7 % in the tough scenario and 22.2 % in the friendly scenario. The above mentioned changes in consumption behaviour should manifest themselves differently in the demand for labour. As an example, we can mention the expected employment changes in food, beverage and tobacco production industries. The additional demand of both age groups of households in 2025 is around 15 % of the total demand in 2010. However, due to higher productivity, and an assumption that employees producing goods and services for younger customers at the beginning of the reference period will be producing these types of products over the whole period, a result can be expected of a loss of approximately 100,000 jobs. On the other hand, the higher demand of the elderly corresponds with a higher demand for a workforce and could create about 1.1 million new working positions. In this case, it is questionable to what extent it will be possible to relocate redundant employees producing goods for the younger cohorts into sectors that are more interesting from the perspective of an ageing population.[54] The additional demand of elderly households will create (in the case of the friendly scenario) approximately 4.4 million new working positions.

F i g u r e 4.7
Additional labour demand generated by demographic transition in EU-27, thousands of people, the change between 2010–2025, friendly (F) **and tough** (T) **scenarios**



Source: Authors; Štefánik, M. et al., 2013.

[54] More expenditures for trainings and education could be expected.

In individual countries, two opposing effects of population ageing on total employment could be found: the impact of the decreasing real demand of households with the head aged under 60 years and the positive effect arising from the growing number of silver households. In a more detailed view on the negative impacts of younger households, the total number of employees range from -3.5 % (friendly scenario) and -5.3 % (tough scenario) in the case of Germany and, in the case of Slovakia, from -0.1 % to 0.6 %. Additional employment as a result of the rising demand of young-old consumers ranges from the level of 0.0 % to 0.6 % in Germany, 1.1 % – 2.2 % in Slovakia, 0.5 % – 1.6 % in Italy, 0.8 % – 1.3 % in Finland and 1.2 % – 2.0 % in the case of the EU-27. The total impact of changes in consumption on employment ranges from 0.5 % to 2.0 % of additional working places in the case of Slovakia to a decrease of employment from 9.2 % to 9.5 % in the case of Germany.

From the perspective of the European Union, the overall effect stemming from the growth in demand of older households will generate a significant amount of new working opportunities, ranging from 2.6 to 4.4 million working positions during the period 2010–2025. On the other hand, the changes in demand of younger households in combination with labour productivity growth can lead to job losses in the amount of about 0.5 to 4.5 million. The overall net effect of changes in consumption on employment while meeting the defined assumptions may lead to the reduction of 1.9 million jobs in the tough scenario, or to the creation of 3.9 million new jobs in the friendly scenario. These changes can be considered as significant, and as the EU has clear goals in the field of employment, in connection with population ageing there will have to be implemented particular reform measures aimed at the labour market.

* * *

The results of the analysis of potential demand in EU countries showed that possibilities for the implementation of the Silver Economy concept are relevant particularly in the Mediterranean region but also in countries such as Germany, France, followed by Benelux, as well as the Nordic countries. On the other hand, the Silver Economy concept in terms of satisfying the needs of the elderly in Slovakia is more difficult to implement,

especially because of the income situation of the elderly and limited possibilities to accumulate pensions during the long-term perspective. Simultaneously, it is noteworthy that the initiation of the Silver Economy concept as a pro-growth factor on the side of Slovakia is determined not only by internal, but also by external factors and conditions. It means that the success of Slovak enterprises will depend on the exploitation of export structures in competition with foreign companies, since it can be assumed that enterprises from countries with a high potential for implementation of the Silver Economy will want to use these opportunities as well. Improvement of domestic conditions in Slovakia is also important, especially in terms of support for national businesses, so that they will be more able to succeed in this competition.

In general, the difficult economic situation and lag of information and proper analyses in some ageing countries can discourage the corporate sector from greater involvement in the field of the Silver Economy. It can be expected that countries where governments need to deal with resource constraints will place a lower priority on the implementation of the Silver Economy concept than wealthier nations. Therefore, initiatives at the EU level could facilitate this situation, especially in the new EU member states which still lag behind old EU countries also in terms of technology, knowledge-intensity and investment into research and development.

5. MACROECONOMIC IMPACTS OF POPULATION AGEING IN SLOVAKIA

In the preceding chapters, we collectively named the Silver Economy as an adaptation of the economy for the future needs of a growing number of elderly people. In relation to the different structure of demand of the elderly and their increasing proportion on overall domestic demand, we can assume significant effects on the overall demand structure to which goods and services offered will have to be adapted. It is obvious that some of the sectors could profit from these changes and others will face a slowdown or even a decline in domestic demand.

For a model expression of individual economic agents' behaviour and an analysis of possible impacts of population ageing on economy and employment, we used Computable General Equilibrium (CGE) Model. In this introductory part of the chapter we deal with the description of the applied methodology. The next part of the chapter deals with the analysis of population ageing and its impact on the Slovak economy and employment. In the conclusion of this chapter we summarize the most important findings and we define recommendations for the economic policy.

Methodology

Computable General Equilibrium Models represent the formalization of macroeconomic structures of the economy. This type of model takes into consideration microeconomic aspects of individual agents' behaviour. The underlying database is built on national accounts and supply and use tables; however, these models do not include classification according to age groups in their basic conception. Because of this, it was necessary to find an adequate modification of the methodology to make it possible to use the CGE model for the intended analysis of the impact of population ageing on the economy and employment. As an essential step towards the possibility of applying the model for the fulfilment of analysis aims, it was necessary to disaggregate part of the source data concerned to households according to age[55] and to put a specific estimate of their consumption elasticities into

[55] This problem is described in detail in Lichner – Petríková (2014): The construction of a data base for CGE models.

effect.[56] Since underlying surveys are conducted on the households level,[57] the splitting of households according to the head of the household (head person) was used for this disaggregation, which can partly influence the accuracy of the gained results obtained in relation to the ageing population. However, the methodology of disaggregation does not have a radical influence on the comparability of the results of individual scenarios and their direct and undistorted comparison is possible to be made.

For the needs of the analysis, CGE_EU_SAV_SILVER_2014 model was created. This model is based on the principles of the standard CGE model described in Löfgren et al. (2002). The suggested model framework has block structure that consists of the following eight interconnected blocks of equations: block of international relations, block of prices, production block, block of households, block of enterprises, government block, capital block and closures. The applied model is closely interconnected with the underlying data captured in the social accounting matrix from year 2010. In general, the applied version of the model represents the static Computable General Equilibrium Model of several industries, from which most of them produce miscellaneous goods and services, and following production inputs were used to produce them: capital, land, labour and intermediate consumption goods produced by other industries.

The model applied to determine the potential impacts of demographic changes and associated phenomena is designed as a traditional Walras'[58] general equilibrium model, which distinguishes four main institutional sectors of the economy. These are the sectors of enterprises, households, government and foreign sectors. As the households' sector is of crucial interest to the project, we divided it into two representative households with the head under 65 and above 65 years. Simultaneously, for the needs of the implemented analysis, the production side of the economy in the model was disaggregated into 12 aggregated branches

[56] See Lichner – Petríková (2014): Estimation of expenditure elasticities using the Quaids model – the case of Slovakia.

[57] Statistically, incomes and household consumption are included in two findings. The first one is Detection of family accounts (Household Budget Survey) and the second one is EU-SILC – Survey about incomes and living conditions (European Statistics on Income and Living Conditions).

[58] Walras (2003), the original text 1889.

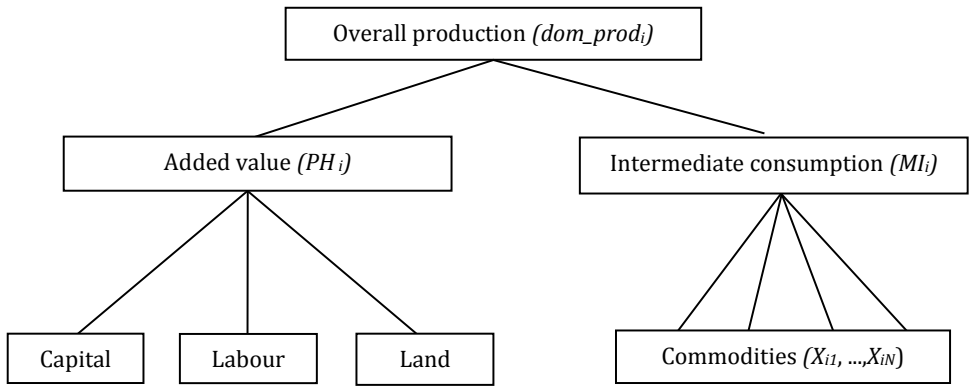
(NACE Rev. 2 classification)[59] and consumption products (classification of the CPA production).[60] The next section of this chapter will be devoted to a description of the basic relationship of the blocks selected and equilibrium conditions of the used model.

Production block

In this block equations of the production side of the Slovak Economy are defined. With regards to the SAM matrix structure, production is modelled on the basis of a two-level production function, as can be seen in Figure 5.1.

On the upper level of the production function, the amount of value added and intermediate consumption are combined to generate output. The amount of created value added is the result of a combination of the three production factors: capital, land and labour. These are intercombined through the functional form of the CES production function. The applied shape of the production function takes into consideration the prices of production factors and their substitution is possible on the basis of elasticity of substitution.[61]

F i g u r e 5.1
Structure of the applied production function



Source: Authors.

[59] From the French Nomenclature statistique des activités économiques dans la Communauté eurospéenne – Classification of Economic Activities.

[60] From the Statistical classification of product by activity.

[61] Substitutional elasticities were gained from Badri – Narayanan – Walmsley – Terrie, 2008.

Land as a production input was attributed only into the sector of agricultural production due to data restrictions and specific nature of its production process. The amount of intermediate goods demanded was defined through the Leontief specification (Leontief, 1936). As it is in the SAM matrix, every industry produces one aggregate commodity which, in fact, consists of several commodities into which it is divided subsequently.

Together with the relations describing the production process, equations expressing the overall development in this part of the economy were defined in this block. Firstly, the price of overall production of the particular industry was defined as the weighted average of prices of individual commodities produced by this particular industry. For the stated transformation, the following equation was applied:

$$c\_domprod_i = \sum_i \omega_{ij}.c\_kom_{ij}$$

in which $c\_domprod_i$ represents the price of aggregated production of sector i, ω_{ij} is the coefficient of the industry production transformation i on commodities j and c_kom_{ij} are commodity prices j produced by an industry i.

Subsequently, it was necessary to define individual relations on the first and second level of production. On the upper level, overall aggregated production of the industry was described by the CES production function:

$$dom\_prod_i = \alpha P_i.(\gamma P_i.PH_i^{-\rho P_i} + (1-\gamma P_i).MS_i^{-\rho P_i})^{-1/\rho P_i}$$

in which dom_prod_i represents the amount of the aggregated production in sector *i*, αP_i is the coefficient expressing the overall efficiency of the production technology in sector *i*, γP_i is the unit parameter of a particular production input in sector *i*, PH_i express the amount of used value added in sector *i*, ρP_i is the parameter expressing the elasticity of the substitution between value added and intermediate consumption

and MS_i represents the amount of used intermediate consumption in sector *i*.

This part of the production side of the model is supplemented by the zero-profit equation of the upper level of the production function, the equation defines the relationship of the input price of the industrys' intermediate consumption as a weighted average of used commodity prices, and the equation of the condition of the first order equilibrium between value added and intermediate consumption depending on their price development.

The next block of the model contains equations that define the creation of value added on the second level of production. The value added results from a combination of production factors (capital, land and labour) through the production function with the CES functional shape. The model is defined to differentiate between sectors in which all the production factors enter into a process of value added creation and those in which it is just capital and labour. The production function on the second level of the production in the value added part is of the following form:

$$PH_i = \alpha PH_i.(\sum\nolimits_f \delta_{fi}.(\alpha F_{fi}.F_i)^{-\rho PH_i})^{-1/\rho PH_i}$$

in which αPH_i is the coefficient expressing the overall effectiveness of the production technology in sector *i* on its second level, δ_{fi} is the unit parameter of the production factor *f* in sector *i*, αF_{fi} is the parameter of the effectiveness of the production factor *f* in sector *i*, ρPH_i is the parameter expressing the elasticity of the substitution among production factors in sector *i*. In this part of the model, the average price of factors used is specified through the transformation of the second level of production function. This equation represents the condition of the first order for equilibrium in terms of Walras' law. Subsequently, demand for individual commodities of the intermediate consumption is defined as well as their prices.

Aggregated production of individual sectors is transformed into a particular commodity structure in this block. This transformation is defined by their summation in the case of homogeneous commodities production.

However, in the case of the majority of branches the transformation of aggregate production into heterogeneous commodities was defined by the following function of aggregation with CES shape used for this purpose:

$$prodkom_i = \alpha PK_i .(\sum_i \delta PK_{ij} .kom_{ij}^{-\rho PK_i})^{-1/\rho PK_i}$$

in which $prodkom_i$ represents domestic production of the commodity *i*, αPK_i is the parameter of the effectiveness of the commodity transformation *i*, δPK_{ij} represents the proportional parameter of the commodity *j* in sector *i*, kom_{ij} is the amount of commodity production *j* produced by sector *i*, ρPK_i is the parameter expressing the elasticity of the aggregation.

At the end of this block, equations for overall gross incomes of the production factors were defined. These are expressed as a sum of incomes of the factors in individual sectors and incomes of the foreign factor. In the final equation, adjustment of the gross income of factors into the disposable form through their reduction of depreciation and the tax burden is defined.

Households block

In the applied model, households are divided according to the age of the head of the household into two representative households. Households with the head under 65 represent the source of the labour force on the labour market. Capital and land used in the production process are possessed by both types of households. This model block can be divided into two parts. In the first part, income of households is defined and in the second part their expenditures are described. Household incomes represent payments for services of the production factors owned by

particular households, transfer payments from domestic institutional sectors and foreign transfers.

In the expenditure part, equations defining household transfers paid to households and enterprises are derived as a constant share of gross incomes reduced by income tax and savings. Another equation defines households´ final consumption budget as the difference between household gross income and household expenditures on taxes, savings and transfer payments. The final equation in this block represents an equation describing the consumption behaviour of households. In the applied model, the utility function in the Stone-Geary functional form was used to describe households´ consumption behaviour. This formulation represents a linear expenditure system in which the value of individual household utility is maximized in terms of their rational expectations. This type of utility function represents a generalization of the Cobb-Douglas production function first suggested by Tinbergen (1942), who assumed minimal positive amounts of labour and capital needed for production. Following this spirit, Geary (1950) and Stone (1954) continued with this generalization and applied the suggested assumption also for the theory of consumption. This utility function shall take the following functional form:

$$U(C_{ij}) = \prod_i (C_{ij} - \mu H_{ij})^{\alpha HLES_i} \rightarrow \max$$

in which U is the value of a utility, C_{ij} is the level of commodity consumption *i* by household *j*, μH_{ij} represent the minimum quantity of subsistence consumption of the *i* commodity and $\alpha HLES_i$ represent the marginal expenditure share parameter of the Stone-Geary function.

Application of the Stone-Geary functional form of utility function has in comparison with the Cobb-Douglas function several pros. Firstly, household utility grows only in the event that consumption of individual goods is higher than subsistence consumption level. Another advantage arises from empirical definition of the consumption elasticity of individual commodities; in the case of the Cobb-Douglas function this elasticity is always 1. After considering budgetary constraint through the solution

of a mathematical problem, it was possible to derive the applied shape of the demand function of households for individual goods and services:

$$C_i.c\_xd_i = \mu H_i.c\_xd_i + \alpha HLES_i.\left[rozp\_dom - \sum_i \mu H_i.c\_xd_i \right]$$

in which C_{ij} represents the level of household consumption of the commodity *i* by the household *j*, $^{c-xd_i}$ represents the demand price, $^{\mu H_{ij}}$ is the level of the subsistence consumption of the commodity *i* by the household *j*, $^{\alpha HLES_{ij}}$ represents the marginal expenditure share parameter of the Stone-Geary function of the household *j* for the commodity *i* and $^{rozp\_dom_j}$ stands for the household final consumption budget *j*.

By application of the Stone-Geary functional form of the utility function, we assumed that households allocate a fixed proportion of additional income into the consumption of individual goods.

Government block

Similarly as in case of the other institutional sectors, this block is also divided into 2 logical parts that complement each other: income and expenditure parts.

In the first part, relationships of the government related to its incomes are expressed. To model the impacts of changes in the social contributions rates, a separate equation for those was defined. The level of social contribution rates can be endogenized by means of this equation or, according to particular needs, it can be edited in terms of expected changes. Subsequently, equations expressing the level of tax and social contributions incomes are defined. Tax and social contributions incomes are the result of the multiplication of given rates and the tax base. As closure of the income block, equation of overall government incomes is defined. This equation derives tax and social contributions government incomes from the ownership of production factors and net transfers with foreign countries. Incomes from the government ownership of production factors are defined as a fixed proportion on overall incomes of the given factor of production.

The expenditure part of the government block is described by equations that define the amount of final government demand for goods and services, overall consumption expenditures, level of transfer payments to households and an equation for the overall government expenditures. Demand for goods and services was defined through the transformation of the Cobb-Douglas utility function, with government aiming at its maximisation:

$$U = \prod_i G_i^{\alpha G_i} \rightarrow \max$$

in which G_i represents final government consumption of a commodity *i* and αG_i is the preferential parameter of the Cobb-Douglas utility function. Budget constraint for final government consumption is defined by multiplying the amount and price of demanded goods and services. Transfer government payments are, for every type of household, defined separately. In the case of transfers for households under 65 years, the number of unemployed are taken into account as factor determining their amount. In the case of households with the head of the household above 65 years, the definition of the applied functional form of transfers' equation differed depending on the scenario. In the case of scenarios, where we primarily did not focus on the influence of population ageing on government expenditures on pensions, this expenditures equation was defined as being the fixed proportion on overall government income. In the case of the scenario focusing on the impacts of ageing on the pension system, these expenditures were defined as a multiplication of the number of old-age pensioners and the average pension, which represented the fixed proportion of the average wage so that living standards of pensioners remained stable compared to the working population.

Total government expenditures are defined as the sum of expenditures on final consumption, transfers to households and net transfers to enterprises.

Capital block

An important part of the economy is represented by capital formation, which is implemented by means of the transformation of savings into capital. This part of the economy is described in the capital block, which describes the creation of savings as well as the generation of investments. In the first part of the block, the equation of overall savings in the economy is defined. Total savings represent the sum of savings generated by households and enterprises, increased by government savings and capital account from balance of payments.

In the second part of this block the equation defining the amount of investments created in individual sectors of the economy and equation of overall expenditures on investments are defined. The equation of investment goods creation is defined by the Cobb-Douglas functional form. Expenditures on investments are defined as the sum of created investments and changes in inventories. Combination of these two equations represents a solution to the following problem:

$$I_i.c\_xd_i = \alpha I_i.(U\_hosp - \sum_i zsz_i.c\_xd_i)$$

in which I_i represents the amount of demand for a certain type of investment goods, αI_i is the parameter of the Cobb-Douglas utility function of investments, U_hosp represents the overall savings in the economy and zsz_i stands for changes in inventories in the sector *i*. On the basis of the solution of this problem we gain the values of created investments in the commodity structure.

Changes in inventories are defined as an exogenous variable. This approach was selected due to the limited possibilities of model specification.

Block of model closures

In the last block of the model, closures that balance demand and supply of individual markets are defined. In this block equations describing selected macroeconomic aggregates were also defined. Gross domestic

product is described by equations based on expenditure and the production method of its calculation:

$$HDP = \sum_i (C_i + I_i + G_i + zsz_i).\mathrm{c\_xd}_i + (\mathrm{c\_ex}_i .EX_i - \mathrm{c\_im}_i .IM_i)$$

$$HDP = \sum_{fi} WF_f .WFDIST_{fi} .FD_{fi} + dan\_prijm$$

in which $^{c-ex_i}$ represents the price of exported commodity *i*, ^{EX_i} expresses the amount of exports of the commodity *i*, $^{c-im_i}$ stands for price of imported production including import duties and transport and trade margins, ^{IM_i} expresses the amount of imports of commodity *i*, ^{WF_f} represents the average price of production factor *f*, $^{WFDIST_{fi}}$ reflects the distortion from the average price of production factor *f* paid for services of production factor in the sector *i*, $^{FD_{fi}}$ expresses the value of demand for production factor *f* in the sector *i* and $^{dan\_prijm}$ are the overall tax incomes of the government.

In this part of the model, balances for all three markets of production factors are defined. In the case of capital and land, the demand of these factors is equal to their supply. In the case of balance on the labour market, labour supply equals to the sum of labour demand and the number of unemployed. Subsequently, balance on the commodity market is described; it defines the amount of overall supply of the commodity as the sum of the intermediate consumption, final government and household consumption, investment demand and changes in inventories. The equation of average wage is defined in this block as well. Average wage depends on the unemployment rate and has a functional form of the wage curve (Blanchflower – Oswald, 1995, p. 155).

Furthermore, also government savings as a difference between government incomes and expenditures together with the capital account of balance of payments are defined as a part of this block. The capital account of balance of payments was defined as the amount of imported production combined with production factors´ incomes from foreign countries, which was reduced by the amount of exported production and net transfers to households, businesses and governments of foreign countries. In the last part of the block, the balance on the capital market

was defined as balance between total savings in the economy and total expenditures on investments.

Applied model closure

In application of CGE model, it is inevitable to define the so called model closures that determine the behaviour of individual components of the model. In accordance with Walras' law, it is necessary to reach a balance on all the markets, thus it is necessary to define the appropriate type of closure not only for markets of production factors but also for all the markets described in the model. From mathematical perspective, closures are used for securing equality between number of equations and number of variables in the model. In general, it is inevitable to define the functional form of balance of investments and savings and the trade balance.

As we applied the static model for definition of possible impacts of population ageing, capital markets and land fixed supply and demand of these commodities in individual sectors were assumed. On the labour market we postulate that labour is mobile across individual sectors and, simultaneously, we assumed the existence of unemployment. The number of economically active inhabitants was defined on the basis of a study by Bujňáková – Štefánik (2013).

As for external balance closure of the Slovak economy, fixed level of the payments balance was introduced. The choice of this closure was determined by two main facts. First, for the sake of interpretation of the results for the actual level of foreign loans. Secondly, measuring welfare by means of household consumption would not be appropriate if foreign financial sources were allowed for. This is based on the fact that the static model does not take into consideration the necessity of repaying of these loans in the future.

When choosing a closure describing investment and savings balance, we decided to use a savings-driven form in which investment activity adapts to the level of savings. We chose this closure because the aim of our analysis was not to model changing behaviour of individual agents in connection with savings.

Government behaviour in the applied model depends on the following closure: tax and social contribution rates representing fixed variables, the

levels of which change only in certain scenarios. Government deficit was fixed at the level of the benchmark year, to express only the impact of demographic changes on the behaviour of other economic subjects without an influence on the public debt level. Because of this, only the level of expenditures on final consumption and transfers to households are determined by the model.

As the numeraire of the model we chose a CPI which makes all the price changes (including income of production factors) interpretable in the constant prices of the benchmark year.

Model scenarios

In this part of the chapter, the model scenarios applied for analytic projection of the possible effects of individual phenomena connected with the demographic development are described in detail. Because we tried to model complex changes in the economy, three scenarios describing particular impacts of population ageing were defined. Among the phenomena analysed is the change in household consumption influenced by population ageing in the Slovak Republic. Subsequently, we focused on the effects of population ageing on public finances. Close attention was given to rising pressure on the pension system and the growth of public spending on health-care. We did not focus on long-term care because of the lack of available data.

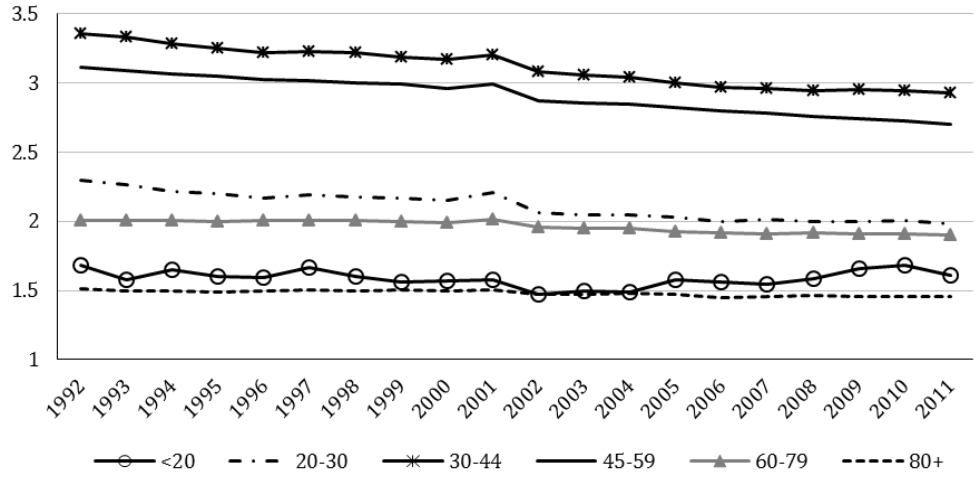
Demographic scenario

This basic model scenario focused on the expressing of potential impacts of population ageing on overall and partial demands of individual household types, with the assumption of constant behaviour of 5-year households´ groups, *ceteris paribus* from the benchmark year 2010.[62] Based on the combination of the data from demographic projections and micro-data from the Household Budget Survey (HBS) 2010, the number of households in individual 5-year age groups was estimated. Underlying

[62] The consumer basket of 5-year age groups of households remains fixed at the level from the 2010.

demographic data was taken from the Eurostat projection EUROPOP 2013 – Main scenario. The applied method assumed fixed shares of each population age group on the given types of households according to age. In both studied types of households, a decrease in the average number of household members was estimated. As for under 65 households, the average number of members would decrease from 3.21 in 2010 to the level of 2.96 in 2025. In the case of older households, a relatively smaller drop in the average number of household members from the initial 1.67 to 1.56 in 2025 was projected. These results follow trends that have occurred in the last decade in the majority of EU countries, as can be seen in Figure 5.2.

F i g u r e 5.2
Average number of household members according to the head of the household, in selected EU countries[63]



Source: Štefánik, M. et al. 2013.

On the basis of this method, the expected number of households according to the age of the head of household was calculated. In line with the expected trend of an increasing number of inhabitants above 65 years, the increase in number of households with the head of the household aged

[63] Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, France, Greece, Netherlands, Ireland, Lithuania, Luxembourg, Latvia, Hungary, Malta, Germany, Poland, Portugal, Austria, Romania, Slovak Republic, Spain, Italy and Great Britain.

above 65 was also estimated. Their number would grow from the approximately 431 thousand in 2010 to more than 616 thousand in 2025. In the case of households with the head under 65 years, only a small decrease would appear, despite the noticeable decrease in total number of inhabitants in this age group, from the level of 1,500 thousand households in 2010 to 1,494 thousand households expected in 2025. During the period analysed, the number of households from this group would slightly increase with the maximum of 1,526 thousand households in 2017.

Combined information on the projected number of households and average number of household members was utilized to estimate the impact of demographic changes on consumption of individual household types. To calculate the potential demand in 2025, data about the average demand per one household member for the given 5-year group needed to be derived from HBS 2010. That data was subsequently utilized for quantification of demographic changes impact on household consumption with the head of the household under 65 and above 65 years. It is necessary to stress that there is relatively large uncertainty in the development of behaviour of individual household types. In the case of this scenario, only the impact of demographic structure changes of the Slovak population was taken into account and the obtained results must be interpreted with caution. In the following chart, a projection of final household consumption in constant prices estimated by model is presented.

T a b l e 5.1
Households' consumption impacts, in million Euros – demographic scenario

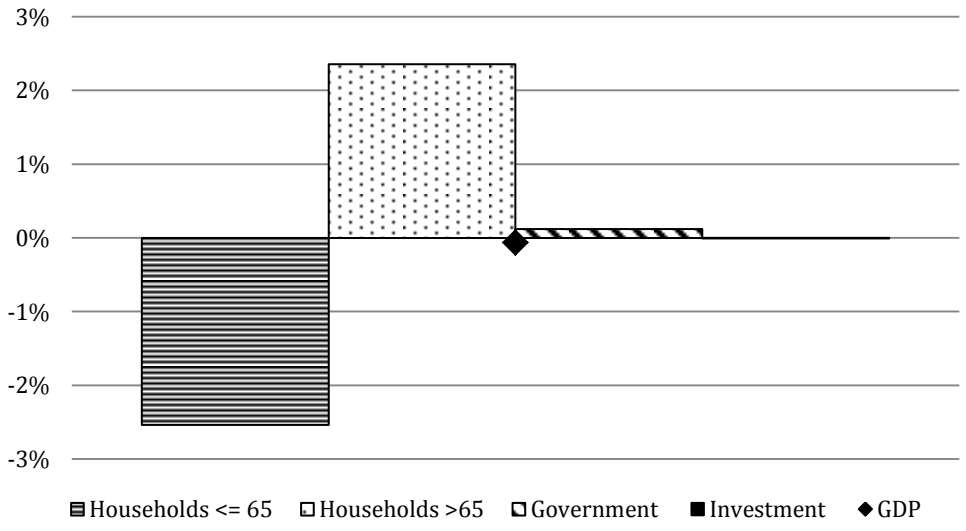
	Households under 65 years		Households over 65 years	
Food, beverages and tobacco	-6.0 %	-441.5	44.4 %	532.7
Clothing, footwear	-6.4 %	-111.9	44.0 %	73.2
Housing, energies	-6.1 %	-413.1	44.6 %	550.7
Furnishings	-6.3 %	-102.6	44.4 %	121.2
Health	-5.7 %	-53.6	45.1 %	117.6
Social services	-5.7 %	-10.0	55.8 %	10.1
Transport	-6.2 %	-115.0	44.4 %	61.0
Communication	-6.6 %	-81.9	44.5 %	59.3
Recreation, culture	-5.9 %	-121.8	44.6 %	98.5
Education	-6.9%	-43.9	42.8 %	8.3
Restaurants, hotels	-6.9 %	-98.4	45.3 %	26.9
Other goods and services	-6.7 %	-546.7	44.8 %	322.4
In total	-6.3 %	-2 140.4	44.6 %	1 981.9

Source: Authors.

In the case of the demographic scenario, it has to be taken into consideration that we assumed the so-called *no policy change* from the government point of view. Thus, no change in tax and social contribution rates occurred in the scenario. The impacts of ageing on the growth of public spending on health and pensions were not fully taken into account. In other words, in this scenario we expected that no adjustment of pensions due to an increased number of old age pensioners would take place. Also, conducted analysis focused only on the potential impact of demographic changes on household consumption.

The results of this scenario unveiled the possibility of only a slight decrease in total households´ final consumption when comparing the years 2010 and 2025. Its magnitude would be on the level of 0.4 % or, in absolute terms, about 160 million Euros. The stated change would have a slightly negative impact on GDP at the level of an approximately 0.1 % GDP decrease in result.

F i g u r e 5.3
Contributions to GDP growth – Demographic scenario



Source: Authors.

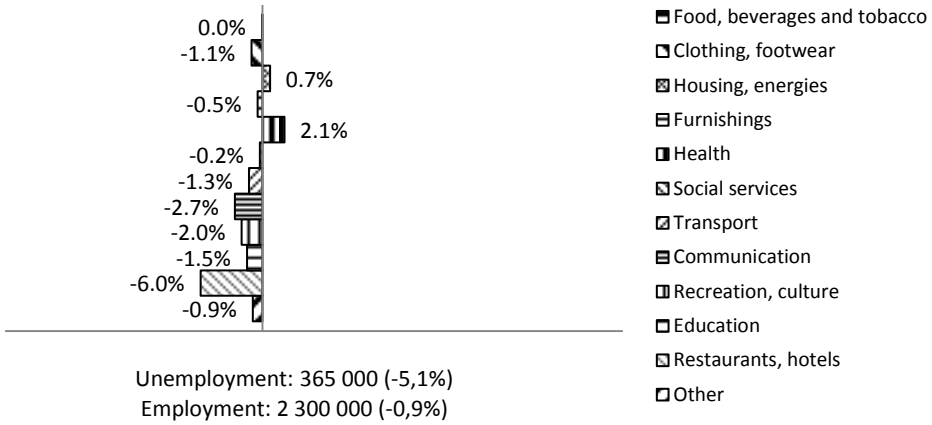
The results have shown that a decrease in consumption of under 65 households is almost completely substituted by the growth of older

household consumption and government sector expenditures. In Figure 5.3, the impacts on changes in inventories and net exports are not depicted, as from the definition of model closure it would be only of marginal magnitude.

The changed structure of household consumption will have an essential influence on labour demand in all sectors. On the other hand, demographics will influence also the supply side of the labour market, whereas we assumed a slight decrease in number of economically active inhabitants. As an input of the supply side of the labour market, modified results of the Bujňáková and Štefánik (2013) study were used. The modification of the results of the stated study had to be made with respect to its systematic overestimation of real data in the post-crisis period. On the basis of the results of the economically active projection in 2025 (a gradual increase of retirement age to the level of 65 years in 2025 was assumed), reduced by the average error term of 2009–2013, we estimated that in 2025 the number of economically active inhabitants will be on the level of 2,665 thousand. This assumption was subsequently used in all scenarios.

As illustrated in Figure 5.4, a change in household consumption resulting from demographic development has a negative impact on employment in the majority of economic sectors. The only exception is the health-care sector in which growth of private consumption is expected. A slight increase in employment can be expected also in the energy sector, which results mainly from an increase in the overall number of households. The third sector with the least negative influence on employment represents the food and beverages production sector, in the case of which no change in employment is expected. The most significant decrease in employment should be expected in restaurant and hotel services of a magnitude up to 6 %. Overall decrease in employment of approximately 20 thousand jobs, tantamount to 0.9 % can be expected.

F i g u r e 5.4
Employment impacts in the sectors – Demographic scenario



Source: Authors.

Along changes in employment the development in the total unemployment was depicted – number of unemployed persons was projected to decrease by 20,000, or 5.1 % within total. This represents a decrease in the unemployment rate by 0.7 p.p. compared to the benchmark year. A paradox of the simultaneous decrease in employment and unemployment is determined by a lower number of economically active inhabitants that is expected with regards to projected demographic development.

With assumptions about the fixed consumption behaviour of households, only a slightly negative total impact of demographic changes on the national economy with a drop in GDP of 0.1 % and an employment drop of 0.9 % are to be expected. Due to the assumption of the fixed share of pensions on government expenditures, it was estimated that additional transfer from working households to pensioner households in the amount of approximately 1.5 billion Euros would be needed to maintain the level of expected consumption. Without this intergenerational financial aid, fully covering the additional demand of older households, the estimated level of elderly consumption would not be feasible without a change in their savings behaviour.

Health-care scenario

With the growing number of people in retirement age, the pressure on government expenditure connected to this group of inhabitants will

increase. We did not take this into account in the previous scenario. Alongside the growing expenditures on pensions from the first pillar of the pension system, government expenditures on health-care services will also increase. According to General Health Insurance Company data in 2010, the average expenditures for a person above 65 years were three times higher than that of one under 65 years. When we use the data from the demographic prognosis (Vaňo, 2013) and assumption of preserving a stable level of expenditures in real prices according to age groups, Radvanský and Dováľová in their study estimated that the possible increase of total expenditures on health-care between 2010 and 2025 would reach 16 %. We used this result as a qualified estimation of a possible future increase of government expenditures on health-care. Since the aim of this scenario was to analyse the net influence of increased public expenditures on health-care, we assumed that the level of other expenditures remains fixed on the level of the benchmark year. Since we increased the total public health-care expenditures, it was necessary to find the source of their financing. As health-care expenditures are founded from health insurance contributions, we focused on necessary changes in health insurance contribution rates.

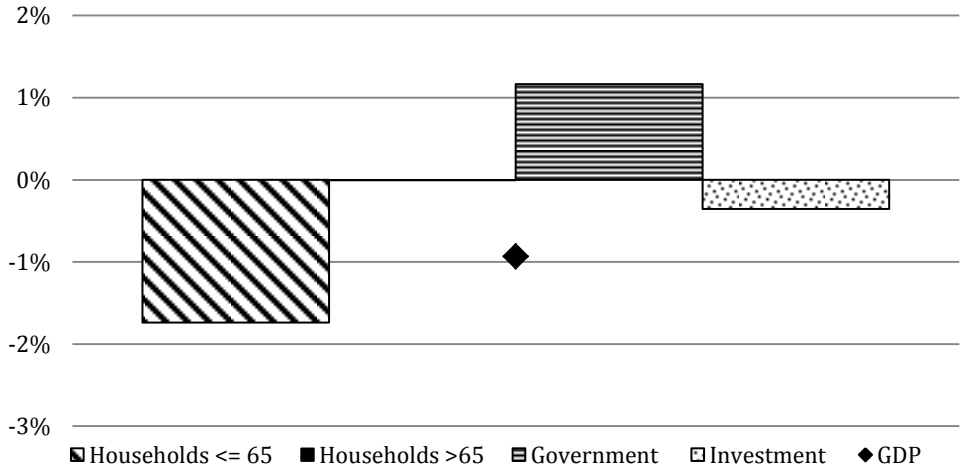
Based on the value of expected public health-care expenditures increasing by approximately 508 million Euros, the needed change in social contribution rates (paid by employee + employer) was analytically estimated at the level of 2.3 p.p. under *ceteris paribus* conditions.[64] Due to the fact that increases in payroll taxes negatively affect the demand for labour and, indirectly, the overall performance of the Slovak economy, the expected theoretical yield of 508 million Euros was not achievable for several reasons. The most significant was the slowdown of the economy as a reaction to the social contribution rates increase. Secondly, prices in the health sector increased, as it is the only sector in which there is an expected increase in domestic demand. Due to this fact, it was necessary to adopt additional measures also on the expenditure side of the public budget in order to achieve the fiscal neutrality of the analysed demographic impacts. In the applied scenario, we decided to decrease household welfare in the active age, since in the case of transfers to households of the

[64] According to relatively conservative estimates of the AHEAD project, it will not be necessary to realize changes at the level of health levies due to the ageing of the Slovak population up to 2025, although it will be necessary to increase those rates by 3 p.p. by 2050 (Páleník et al., 2007).

older we applied the *no policy change* approach described above. This approach implicitly expected a decrease in the standard of living of the growing number of elderly. This parametric set-up lead to the growth of government revenues from social contributions by approximately 260 million Euros and a decline of governments´ transfers to young households by approximately 740 million Euros. Overall, there were shifts in the public budget to the level of 1 billion Euros, which were generated by a decrease in economic activity that translated to the lower collection of other types of taxes and a price increase in the health-care sector generated by the growth of government demand.

The GDP structure in Figure 5.5 shows that the government sector is the only one which positively contributed to the GDP growth. As a result of the *no policy change* approach, the position of households of the elderly after the introduction of the above mentioned changes has not altered. On the other hand, in the case of the households of the young, decrease in disposable income can be observed that was in turn projected into negative contribution to GDP growth. Increased domestic production costs induced by the growth of social contribution rates slightly reduced the price competitiveness of domestic production. In combination with the negative impacts on investment activity, these effects eliminated the positive contribution of the government sector, and a total decrease in GDP to the level of 0.9 % was estimated.

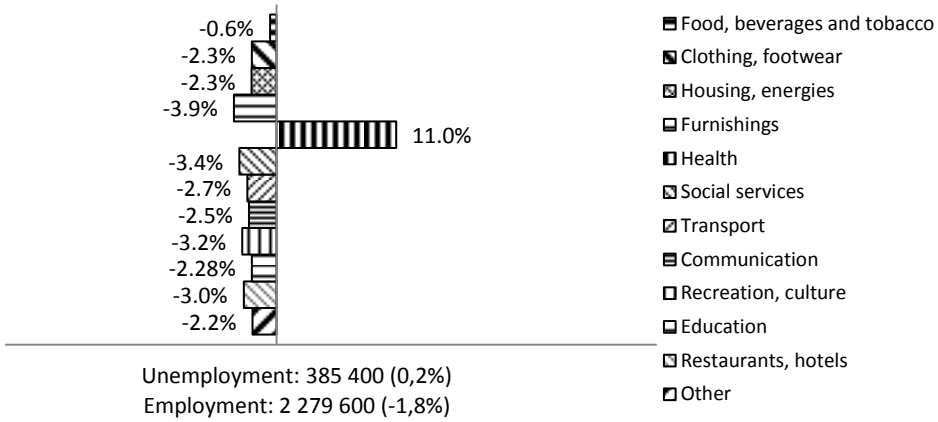
F i g u r e 5.5
Contributions to GDP growth – Health-care scenario



Source: Authors.

Changes in employment illustrated in Figure 5.6 resulted directly from the shock introduced in the model. The only sector with an expected increase in employment is the health-care sector. Despite the decrease in employment in other sectors, only a slight decrease in total employment was estimated (664 persons). In the household consumption of the elderly, there were only marginal changes, while the household expenditures of the young dropped in the range of 2.3 to 11.1 % as a result of the total income decrease.

F i g u r e 5.6
Employment impacts in the sectors – Health-care scenario



Source: Authors.

T a b l e 5.2
Households' consumption impact, in million Euros – Health-care scenario

	Households under 65 years		Households over 65 years	
Food, beverages and tobacco	-2.3 %	-167.5	-0.1 %	-0.8
Clothing, footwear	-2.6 %	-45.3	0.0 %	0.1
Housing, energies	-2.2 %	-145.7	-0.2 %	-2.9
Furnishings	-11.1 %	-177.8	-0.5 %	-1.4
Health	-8.8 %	-80.3	1.8 %	5.3
Social services	-5.5 %	-8.8	-0.1 %	-0.0
Transport	-2.9 %	-54.7	-0.4 %	-0.5
Communication	-2.0 %	-25.0	-0.2 %	-0.3
Recreation, culture	-3.0 %	-61.1	-0.6 %	-1.4
Education	-4.9 %	-31.5	-0.1 %	-0.0
Restaurants, hotels	-1.9 %	-27.0	-0.3 %	-0.2
Other goods and services	-4.0 %	-322.9	0.0 %	0.2
In total	-3.4%	-1147.5	0.0 %	-1.89

Source: Authors.

Changes in household consumption illustrate how they will be potentially influenced by the need for searching for additional financial resources necessary to finance growing demand for health-care services from public funds. As we can see from the scenario results, additional negative impacts are expected in the case of the under 65 households that will be responsible for creation of additional income for the public budget through the payments of higher social contributions. The final consumption of elderly households would be influenced by increasing health expenditures and changes in the structure of government income and expenditure only marginally.

The increase in health-care expenditures seems inevitable during the next decade and will be accompanied by an economic slowdown in most industries.

From the labour market point of view, these effects would result in an increase in employment in the health-care sector and a decrease in total employment by 1.3 %. Increasing pressures on public health-care expenditures will need to be reflected in the adoption of measures on the expenditure and income side of the public budget. These measures will be most probably negatively translated in the welfare of the economically active population. Among the main focus of the policies related to health services in the future remains the adoption of measures lowering costs, preventive care and healthy living that are associated with lower negative effects on the national economy. Among other alternatives, generation of health-care contributions from other incomes and pensions would be considered. But, without detailed analysis of its individual effects on the households´ welfare and other economic indicators, this option is only hypothetical.

Pension system scenario

In the case of the previous scenarios, we did not take into account the link between government expenditures on pensions and the increasing number of pensioners. We assumed that the share of these expenditures on the public budget income will remain fixed. In the case of the demographic

scenario, the increase of the consumption of households above 65 had to be financed by direct transfer from younger households. In this scenario, we assume that the number of pensioners in 2025 will reach the level of 1.2 million. Simultaneously, we assume that the average pension to average wage ratio in the national economy will remain fixed. We assumed a relatively optimistic (from the point of view of households) future development in the area of retirement pensions. Rising pressures on public finances arising from the higher number of pensioners would have a significantly negative impact on economic growth. Similarly to the previous scenario, we assumed that increasing payments from the first pillar of the pension system[65] will be financed from increased rates of social contributions on pensions.

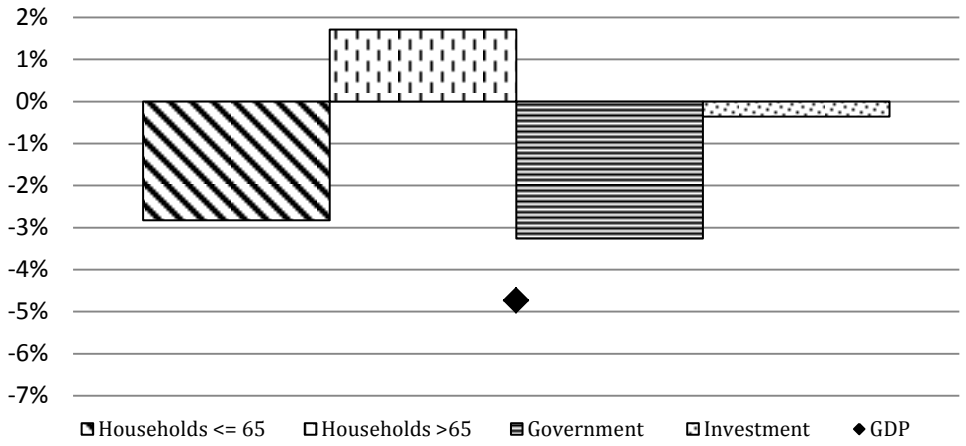
Increasing payments on old age pensions from the first pillar of the pension system already generates deficits. The expected growth in the number of pensioners will result in the necessity of increased social contribution rates or a lower replacement rate. In the case of our analysis, we assumed a fixed replacement rate and we estimated the *ceteris paribus* increase of rates to the level of 23.6 %, i.e. 8.2 p.p. Since the increase of labour taxation influences economic activity negatively (primarily labour demand), changes to the income side of public finances were not sufficient to finance the expected growth. The growing number of unemployed in the case of higher social contribution rates increases pressures on the government budget. Increasing government transfers to households would negatively influence government expenditures on final consumption, which can put the supply of public services at risk.

Figure 5.7 shows the contributions of individual components to the total development of the GDP. In this scenario, young households and the government had a negative contribution to GDP growth. This negative contribution was partially compensated by older households´ consumption. Due to the applied assumption that only members of young households participate on the labour market, the decreased consumption of these households was mostly caused by the decrease in their disposable

[65] According to the medium-term character of the CGE model, we did not take into consideration the influence of the second (capitalization) pillar of the pension system.

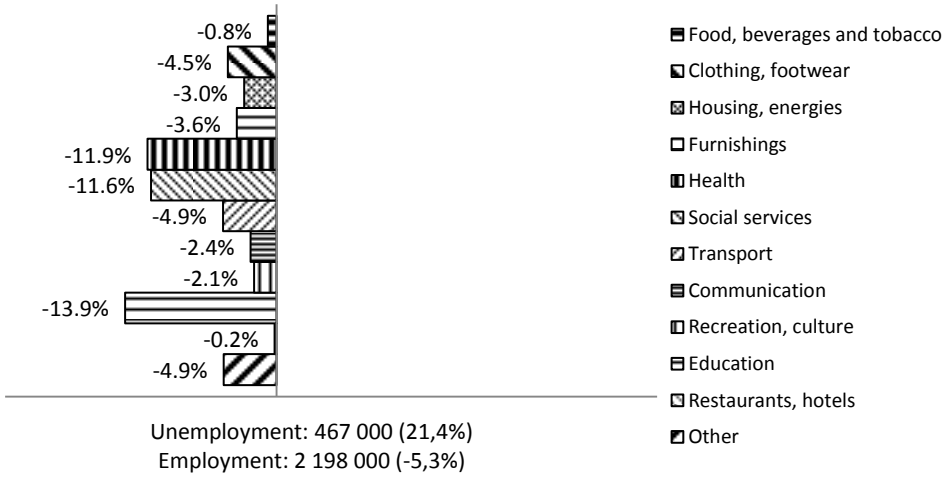
incomes. The negative contribution of the government can be explained as being the combination of two factors. Firstly, increased transfers to young households as a result of the growing number of unemployed (an increase of 15 %). Simultaneously, an increase of transfers to older households resulting from demographic development, to which 36 % more funds were allocated. This would result in a total GDP decrease of 4.8 %.

F i g u r e 5.7
Contributions to GDP growth – Pension system scenario



Source: Authors**.**

F i g u r e 5.8
Employment impacts in the sectors – Pension system scenario



Source: Authors.

From a detailed look at employment changes, we can see that all sectors were negatively influenced by the growing social contribution rates. The most significant changes were in the education, social services and health-care sectors (sectors that are mostly financed by public funds). Increased social contribution rates increased the number of unemployed by more than 82 thousand compared to the benchmark year. The drop in overall employment is connected with increased wages that have a negative impact on the competitiveness of domestic production. The total decrease of young households´ consumption would significantly exceed the growing consumption of older households. This factor and the decrease of government consumption negatively influenced total domestic demand.

An increase in government transfers to older households would positively influence their consumption and the most positive effects can be expected in the case of sectors that are most expenditure elastic. In the case of younger households, a decrease of their consumption can be expected due to lower disposable incomes. Total household consumption will decrease by 2.0 %.

T a b l e 5.3
Households' consumption impacts, in million Euros – Pension system scenario

	Households under 65 years		Households over 65 years	
Food, beverages and tobacco	-3.8 %	-274.4	6.9 %	93.3
Clothing, footwear	-4.2 %	-72.8	29.9 %	51.8
Housing, energies	-3.6 %	-239.1	6.7 %	93.6
Furnishings	-22.6 %	-361.8	78.4 %	231.6
Health	-7.6 %	-69.1	21.5 %	63.9
Social services	-9.9 %	-15.9	22.7 %	7.5
Transport	-4.8 %	-89.1	127.3 %	172.1
Communication	-3.3 %	-40.2	13.8 %	19.9
Recreation, culture	-5.9 %	-121.6	50.4 %	117.6
Education	-7.4 %	-47.9	97.0 %	12.2
Restaurants, hotels	-2.9 %	-40.9	65.1 %	41.6
Other goods and services	-6.0 %	-491.9	29.6 %	223.9
In total	-5.6 %	-1 864.8	23.1 %	1 129.0

Source: Authors.

An increase in the tension on the public budget from the side of the growing group of old-age pensioners will require changes to the income and expenditure side of the public budget. As stated, without the significant changes in the social contribution system, there will be a significant decrease in potential product of the economy and a decrease in working population welfare. Policy makers will have to effectively link the revenues of the public budget with the capital side of the economy to mitigate the expected negative impacts of a demographic change on the employed.

Conclusions and recommendations

As it is often emphasized, Slovakia will be facing the most intense process of ageing from all EU countries in the near future, which cannot be ignored from the macroeconomic point of view. In this chapter, we introduced the expected macroeconomic impacts of population ageing on the structure of the economy and employment in the Slovak Republic. The results of the analysed scenarios illustrate the effects population ageing might have on key macroeconomic indicators, e.g., changing structure of demand, production and employment. We pointed out that, within the next decade, population ageing will represent a challenge not only from a social, but also from an economic perspective. The demographic scenario unveiled the fact that population ageing itself requires a transfer of part of disposable resources towards the elderly by intergenerational transfer system.

In the pension system scenario we derived that institutionalization of this transfer without additional fiscal measures will slow economic performance by 4.8 %. This will be accompanied by significant negative pressure on employment (a decrease of 5.3 %). Additionally, we analysed the indirect effects of an expected increase in demand for health-care in the health-care scenario. Simultaneously, it is necessary to point out, that in the case of this scenario, we did not take into account the increasing need for long-term care services that would potentially have

further negative impacts on the performance of the Slovak economy. Without support for healthy ageing, prevention and an increase in the efficiency and quality of health-care, increased health costs will be reflected in a GDP decrease of approximately 1 %, and employment lowered by almost 2 %.

T a b l e 5.4
Comparison of chosen indicators, base year 2010

		Demographic scenario	Health-care scenario	Pension system scenario
GDP	million Euros	65,854.2	65,276.2	62,761.1
	percentage change	-0.1 %	-0.9 %	-4.8 %
Employment	in thousands of people	2,300.0	2, 279.6	2, 198.0
	percentage change	-0.9 %	-1.8 %	-5.3 %
Unemployment	in hundreds of people	365	385.4	467
	percentage change	-5.1 %	0.2 %	21.4 %
Households under 65 consumption	million Euros	31,898.8	32,420.0	31,702.7
	percentage change	-5.0 %	-3.4 %	-5.6 %
Households over 65 consumption	million Euros	6,448.2	4,894.0	6,024.9
	percentage change	31.7 %	0.0 %	23.1 %
Households total consumption	million Euros	38,347.1	37,314.0	37,727.6
	percentage change	-0.3 %	-3.0 %	-1.90 %

Source: Authors.

It is obvious that the applied model is not able to simulate reality and is only an estimate of the future development of productivity, consumption behaviour of older households, real demand for public services, etc. However, it is vital to illustrate the character and the direction of expected changes in the structure of the economy. Simultaneously, it was proven that standard measures such as the higher effectivity of tax collection, suppression of the grey economy and corruption, etc., will not be sufficient and also additional measures of the economic policy supporting the Silver Economy should be adopted in order to mitigate consequences of demoghraphic development. Primary findings support the intuitive assumption that ageing will have a rather negative effect on the economy, accompanied by increased pressure on public finances.

Several measures that can partly eliminate the negative impacts of population ageing exist. Some of them are already being broadly implemented in EU countries, including Slovakia, such as an increase in the retirement age. Additional measures such as promotion of active ageing, prevention and support of long-term care are still relatively low-key in Slovakia. It is necessary to look for further measures and, subsequently, to analyse their possible impacts. These include the Silver sector demanding subsidies, cohesion policy expenditures aimed at the Silver Economy in the next programming period, etc. Taking into consideration expected labour demand, it will be inevitable to implement measures also in the education system to minimize the lack of qualified workforce in certain sectors, e.g., health-care and long-term care services.

Slovakia should simultaneously support the export of goods and services for the elderly, in those sectors in which it has a comparative advantage, e.g., natural spring spas and the provision of complementary services including accommodation and tourism. Regarding this measure, Slovakia should become a leading country promoting the wide implementation of the EU single market in the provision of health and long-term care services. Ageing represents a problem in almost every country on the European continent. Therefore, it is necessary to monitor and select further effective measures applicable to the specific conditions of individual countries to secure long-term sustainability.

MAIN CONCLUSIONS

Process of demographic ageing will significantly influence the development of Slovak and many other European countries for years to come. Increasing share of older people in the total population and the size of their incomes have become particularly valid in the context of current consumption crisis. Population ageing is thus no longer seen only as a threat in terms of public finances and higher social expenditures, but also as a great commercial opportunity based on the volume of stable incomes, level of savings as well as specific consumption patterns typical for older people. The Silver Economy is still underestimated in many countries, hence generating ample room for Slovak entrepreneurs who are able to respond on changing behaviour of silver consumers, especially in countries with high potential demand. Implementation of the Silver Economy could help to improve the quality of life of older people, as well as to initiate the creation of new jobs and support for economic growth.

This study provides results of both qualitative and quantitative economic analysis of the Silver Economy potential in Slovakia within the international economic and demographic context. Based on its findings several conclusions can be drawn.

As a subsequence of population ageing there is a need for structural changes and policy adaptation in the context of European economies – if these are not met, member states (Slovakia in particular, being the country of principal interest of the study) are going to face weakening position of potential output which in turn will result in lower savings and investment activity. Without appropriate structural reforms that would establish the infrastructure and business conditions for Silver Economy the economic benefits resulting from drawdown of retirement savings will be shared only by the best prepared economies and entrepreneurs.

Despite the lack of comprehensive studies dealing with the phenomenon of Silver Economy as such, there is plenty of partial research works capturing economic dimension of population ageing, where the authors take up particular aspects of this phenomenon such as: purchasing power, savings, household consumption and new opportunities for innovative

companies or export potential for products and services for the elderly. From the macroeconomic perspective, many point to the fact that population ageing could impose changes not only in consumer preferences but also in purchasing power of the particular age groups. This could affect the amount of aggregate demand or the structure of consumption expenditures and lead to changes in production and employment within the various sectors of economy.

We can refer to Slovak spas as typical example of the silver industry, as demonstrated by relatively high average age of spa clients. Given the peculiarity and attractiveness of domestic as well as foreign clients' point of view, spa industry has the potential to become the leader of silver tourism in Slovakia. Qualitative survey conducted in selected Slovak spas indicated main opportunities of Silver Economy in the following areas: provision of medical and spa treatment in one product package, provision of comprehensive services suitable for export (social services in facilities for seniors, health care services and thermal treatment) and spa treatments with preventive character. Among the main barriers for the export of these services following may be included: legislative constraints, lack of appropriate support for the business sector by the government and public authorities, language barriers, poor quality of transport infrastructure, adoption of euro (in relation to foreign clients from the countries which are not members of EMU), poor quality of social infrastructure and sometimes complicated cooperation with municipalities. Biggest obstacle for increasing domestic demand for spa services lies in relatively low income levels.

A slight improvement in the birth rates, which we have witnessed in Europe in recent years, will be unable to reverse the process of population ageing. Current old age dependency ratio has values around 27.5 (that means 3.6 people in productive age account for one person aged over 65 years) and it will rise to 49.4 by the year 2050 (i.e., that only 2 persons in productive age will account for one senior aged over 65 years). It is acknowledged within demographic statistics that while there were approximately 80 million seniors aged over 65 years in the EU ten years ago, today there are more than 92 million. More than half of all European

senior population now lives in Germany, Italy, France and the UK. With the exemption of a few countries, North and Western European countries are recording above-average number of population ageing indicators, but the pace of their increase will gradually slow down and in relation to high dynamics of population ageing these countries will be replaced by countries from Central and Eastern Europe.

The European population belongs to the oldest one in the world, but the process of ageing is not limited just to the territory of Europe and we can find potential markets for silver production also beyond the territory of Europe. Emerging economies with large domestic markets are also struggling with demographic transition including those countries which have already intensive trade relations with the EU.

By 2050 share of senior population in East Asia will converge to the European level – currently region with the highest share of senior population. Moreover, already half of the world´s senior population resides in Asia (over 65 years old). In the future, countries with the most numerous senior populations will be China, India, USA, Indonesia and Brazil. Information on the multitude of senior population, along with the information on the economic strength of the country (with implications for the purchasing power and living standards) and information on the openness of the economy (share on the world trade) are establishing basic framework for estimating the existence of potential demand for silver production. Six out of seven most important EU trading partners outside the European territory are belonging to largest economies in the world: USA, China, India, Japan, Russia and Brazil. Mainly BRIC countries are recognized as economies with the most dynamic potential for the silver markets: they are persistently performing high GDP growth rates (especially China and India), they have achieved high growth rates of imports and exports and are gradually increasing their shares on external EU trade at the expense of the USA and Japan. Finally they are expected to accelerate the dynamics of population ageing with the pace not experienced before in the developed countries.

Based on the study findings, European regions with the greatest potential demand of silver goods and services are: Mediterranean (especially

Italy), Germany and Austria, and France. Nordic countries and the Benelux also have good potential in this regard. On the other hand, in new EU member countries despite consisting a relatively fair share of the silver population (especially Poland), potential for development of silver demand seems not to be particularly perspective. Hence the implementation of Silver Economy in the Slovak Republic is somewhat limited by the income situation and future retirement pensions of older generation. However, the opportunity in the context of Slovak economy seems to lie in export possibilities. These should be embraced by the institutional support of businesses and by the setting of specific goals when addressing the needs of older people in particular EU countries, including the better utilization of EU funds.

In general different consumption patterns can be observed in the Northern, Southern as well as East European countries. The differences in consumption patterns are influenced by various factors, such as economic, cultural, geographical or historical background. When comparing Northern and Southern countries, climatic factors and geographical location are essential for different consumer preferences. Lower share of expenditures on energy, recreation and culture and higher share of expenditures on food, non-alcoholic beverages as well as restaurants and hotels is typical for Southern European countries when comparing with the Northern counterparts. Lower personal health care costs in Nordic countries in comparison to Southern are mainly the result of higher living standards and more generous social systems. In the light of economic aspects, important differences can be found in the price and income levels, while in general there are lower average price levels as well as earned incomes in the East and South European countries when compared with Nordic and Western European countries. Consequently, households from Eastern Europe spend bigger share of their budget on food and non-alcoholic beverages alongside with housing expenses – including energy. Thus their potential demand in other areas, for example in leisure activities, is in comparison with Western European countries rather limited.

Analysis of silver households' expenditures in the countries with the biggest potential demand in terms of income indicated promising commercial opportunities in number of areas. In the agriculture and food

sector increased demand of elderly people can be expected – in particular different types of organic products, nutritional supplements and other dietary food products to maintain optimal levels of health and to prevent diseases. In construction industry there are likely new prospects associated with apartment complexes or even small towns adapted for seniors. However, according to previous surveys, in majority of OECD countries older people are naturally inclined toward ageing in place and therefore rather prefer to relocate within the city, or municipality where they live and usually do so only after deterioration of their health. In countries where governments support residence of older people in their own homes or apartments (e.g., Sweden) higher demand for construction activities and new household equipment can be anticipated in the variety of technological innovations such as interactive camera monitoring system or the like. In this respect, European smart homes and assisted living markets have major growth potential. There are new commercial possibilities for adapted vehicles and also public transport modalities. Furthermore, there is significant scope for improvements in the areas of lifelong education (e.g., universities of the third age), restaurant and hotel services, leisure activities, but also financial and insurance services (e.g., complementary health insurance, social care insurance, reverse mortgages, personal advisory services). In the field of ICT for health the most promising areas consist telemedicine and telecare. The new generation of seniors also shows greater inclination towards anti-ageing products and services, as well as towards products related to healthy life style. Thus a desirable market opportunity seems to be awaiting companies in the area of ICT innovations that can help individuals to improve the quality of life, stay healthier and live longer.

The process of ageing significantly affects labour demand, however it is highly country-specific across member states. In countries with relatively low income levels (including the Slovak Republic) satisfaction of basic needs on the domestic market and solid ability to attract foreign clients in the services sector will be the key element for successive implementation of the Silver Economy. In the light of the coming socio-economical changes and high costs they create it is important to exploit „hidden“ reserves in the EU labour market. Expected effects of ageing can

be mitigated through active ageing policies and by increasing the retirement age. The costs of these changes could be reduced by immediate action in all European countries.

According to results of macroeconomic model ageing of Slovak population will lead to higher expenditures on health care and old-age pensions, resulting in the increase of social and health insurance contributions by 2.3 p.p. and 8.2 p.p. respectively. From macroeconomic perspective, above mentioned scenarios forecast a fall of the GDP by 0.9 % and 4.8 % respectively. This would be accompanied by drop in the total employment. The lack of necessary resources would either lead to enormous increase in the indirect taxes up to one-third, or to extreme increase of public debt. Considering solely demographic development overall outcomes tend to be more conservative, leading to less negative economic development – slight drop in GDP (-0.1 %) was forecasted. This demonstrates that demand side of Silver Economy has the potential to reduce adverse effects of ageing on GDP. Key finding of the macroeconomic analysis was corroboration and further quantification of inevitable additional intergenerational transfer from young households to older households. This brings forward the question of intergenerational solidarity and its growing importance in the near future.

GLOSSARY AND ABBREVIATIONS

Abbreviations of the countries. We use following geographical or protocol names of the European countries and respective country name abbreviations:

Geographical name	Official name in English (protocol name)	Country Code
Belgium	Kingdom of Belgium	BE
Bulgaria	Republic of Bulgaria	BG
Czech Republic	Czech Republic	CZ
Denmark	Kingdom of Denmark	DK
Germany	Federal Republic of Germany	DE
Estonia	Republic of Estonia	EE
Ireland	Ireland	IE
Greece	Hellenic Republic	EL
Spain	Kingdom of Spain	ES
France	French Republic	FR
Italy	Italian Republic	IT
Cyprus	Republic of Cyprus	CY
Latvia	Republic of Latvia	LV
Lithuania	Republic of Lithuania	LT
Luxemburg	Grand Duchy of Luxembourg	LU
Hungary	Hungary	HU
Malta	Republic of Malta	MT
Netherlands	Kingdom of the Netherlands	NL
Austria	Republic of Austria	AT
Poland	Republic of Poland	PL
Portugal	Portuguese Republic	PT
Romania	Romania	RO
Slovenia	Republic of Slovenia	SI
Slovakia	Slovak Republic	SK
Finland	Republic of Finland	FI
Sweden	Kingdom of Sweden	SE
Iceland	Republic of Iceland	IS
Norway	Kingdom of Norway	NO
Switzerland	Swiss Confederation	CH

Active ageing. The World Health Organisation defines active ageing as the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age.

Ageing index. The number of persons (60 years old and above) in the post-productive age per 100 persons under the age of 15 years (index published by the UN).

Ageing populations. Population ageing is represented by an increase in the relative number of older persons in a population and is associated with an increase in the median age of the population.

Baby boomers. People who were born approximately between the years 1946 and 1964.

Demographic dividend. Refers to a certain phase of the demographic transition when fertility rates fall due to reduction in child mortality and size of child segment of population significantly decreases while productive (active) part of population expands and post-productive population remains app. the same size. This shift in population´s age structure reduces potential burden of non-active (not-working) population segments and may boost economic productivity and economic growth (economic benefit is not inevitable and depends on many other factors).

Demographic transition. The demographic transition is the process whereby fertility and mortality move from initially high levels to subsequent low levels, with accompanying changes in the size, growth rate and age distribution of the population. Before the start of the demographic transition, life was short, fertility was high, growth was slow, and the population was young. Declining mortality starts the typical transition followed after a considerable lag by fertility declining. This pattern of change causes growth rates first to accelerate and then to slow again, as population moves towards low fertility, long life and an old age structure. The demographic transition is a specific change in the reproductive behaviour of a population that is said to occur during the transformation of a society from a traditional to high modernized state.

EUn. New member states of the European Union, including: Bulgaria (BG), Cyprus (CY), Estonia (EE), Hungary (HU), Lithuania (LT), Latvia (LV), Romania (RO), Slovenia (Sl) and Slovakia (SK).

EUo. Old member states of the European Union, including: Austria (AT), Belgium (BE), Germany (GE), Denmark (DK), Spain (ES), Finland (FI),

France (FR), Greece (GR), Ireland (IE), Luxembourg (LU), Sweden (SE) and the United Kingdom (UK).

Gerontotechnology. It is an interdisciplinary field of scientific research in which technology is directed towards the aspirations and opportunities for the older persons. Gerontotechnology aims at good health, full social participation and independent living up to a high age, be it research, development or design of products and services to increase the quality of life.

Healthy life years. HLY indicator measures population´s health by combining mortality and morbidity data to a single indicator. It is based on an age-specific prevalence (proportions) of the population in healthy and unhealthy condition and age-specific mortality information. It defines the number of years that a person is expected to continue to live in a healthy condition. It is also called as health (or disability-free) life expectancy.

Imputed rent. It describes the benefit gained by the household compared with a corresponding household living in a rental dwelling with market rent.

Life expectancy. It refers to the average number of additional years a person could expect to live if current mortality trends were to continue for the rest of that person's life. Most commonly cited as life expectancy at birth.

Main age groups. Age groups of population specified by their relation to the economic activity, pre-productive age is usually defined by the interval of 0–19 years (alternatively 0–14), productive age by the interval 20–64 years (alternatively 15–64) and post-productive age by 65 years and above (depending on data availability). In particular parts of the book we use age 25 years as a bottom margin of the economic activity. The age groups classification of 0–24, 25–49, 50–64 and above 65 is mainly used in those parts of the book that are related to labour market topics.

Median age. Age that divides the population in two parts of equal size (there are as many persons with ages above the median as there are with ages below the median).

Mortality rate. The number of deaths per 1000 inhabitants in a given year.

Natural increase. The difference between the number of live births and the number of deaths during the year; negative difference is marked as natural decrease.

Old age dependency ratio. This ratio generally measures the number of elderly persons at or above a certain age (usually 65), divided by the number of persons of working age (usually 16-64 years). The ratio has been widely used in economic analysis to measure the number of retired dependent persons per active member of the labour force.

Regions with the highest potential demand of population aged 50 years. Baltics + NMS2 (Lithuania, Latvia, Estonia, Bulgaria and Romania), V5 (Slovakia, Czech Republic, Hungary, Poland, Slovenia), Benelux (Belgium, Netherlands, Luxemburg), Northern countries (Sweden, Denmark, Norway, Iceland, Finland), Mediterranean (Greece, Italy, Portugal, Malta, Spain, Cyprus), DE+AT (Germany and Austria), British Isles (The United Kingdom of Great Britain and Northern Ireland), France (France).

Silver Economy. An adaptation of the economy for the future needs of a growing number of elderly people. This potential is also connected with the creation of new market opportunities for the business sector. These are created not only by private, but also by public expenditures associated with population ageing and specific needs of elderly people (European Commission, 2015).

Silver economy is created by consumers aged above 50 years. According to the United Nations people aged over 60 or 65 years represent older population. The classification of age groups usually varies across countries, whereas it also many times reflects differences in social classes or working abilities. For the purposes of our analysis we will divide people aged 50 years and over into the following three groups:

- **Young-old** (people aged from 50 to 64 years),
- **Old-old** (people aged from 65 to 79 years),
- **The oldest-old** (people aged above 80 years).

Silver generation. It is represented by the population aged 50 years and over.

Silver market. Market with goods and services orientated towards people aged over 50 years.

Telecare. Telecare designs systems and services capable of social alert and social services. Telecare is used mainly to monitor the situation of people dependent on external help, e.g. elderly or disabled people in the home setting.

Telehealth. The term telehealth covers systems and services linking patients with care providers to assist in diagnosing and monitoring, as well as the management and empowerment of patients with long-term conditions (chronic patients). Telehealth solutions use devices (interactive audio, visual and data communication) to remotely collect and send data to a monitoring station for interpretation and to support therapy management programmes and improve patients' knowledge and behaviour.

Total fertility rate. It refers to the number of children that would be born per woman, assuming no female mortality at child bearing ages and the age-specific fertility rates of a specified country and reference period.

Universal design. It is the design of products and environments that can be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

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Institute for Gerontotechnology.
OECD. Glossary of statistical terms.
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Viliam Páleník et al.

Phone: 42-1-2-52 49 54 80, Fax: 42-1-2-52 49 51 06
E-mail: viliam.palenik@savba.sk
http://www.ekonom.sav.sk

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