



# How will senior Germans spend their money?

The interplay of demography, growth and changing preferences

March 27, 2007

In 2050, half the German population will be over 55, instead of one-third currently. In 2030 already, there will be as many retirees as working people if no corrective action is taken. Conventional wisdom would predict that this will bring about profound changes in the consumption structure with ripple effects in all sectors of the economy. However, our analysis shows that the impact of a changing age structure by itself will be more subtle.

**Ageing does not directly impact the total shares of expenditures at the country level.** Age clearly affects an individual's expenditure shares along his or her life-time: older households spend relatively more on housing and health, less on transport. But these differences alone are not enough to translate into a change of the consumption structure at the country level. With ageing alone, relative spending on each consumption segment remains unchanged. (However, the ageing of society will drastically affect the nature of demand *within* most consumption segments, especially health, entertainment and transport.)

**In fact, economic growth is the main driver of change in the consumption structure.** Rising levels of expenditures and shifts in relative prices have a major impact on how people spend their money. Ageing is indirectly at play here through its effect on income distribution, as wages and pensions are not expected to grow at the same rates.

**Another important driver – though hard to quantify – is societal transformation, which induces changes in consumer preferences.** The erosion of the classical family structure, as well as technological progress and globalisation, are altering our society, in part in combination with ageing. As a result, we expect a boost to entertainment, health-care, "other" (wellness, financial and insurance services) and education expenditure shares.

Our projections show that when all three drivers (demography, economy and society) are factored in, transport, housing, health-care and entertainment take larger expenditure shares at the expense of food. The main household expenses will remain housing, transport, entertainment, and – still – food.

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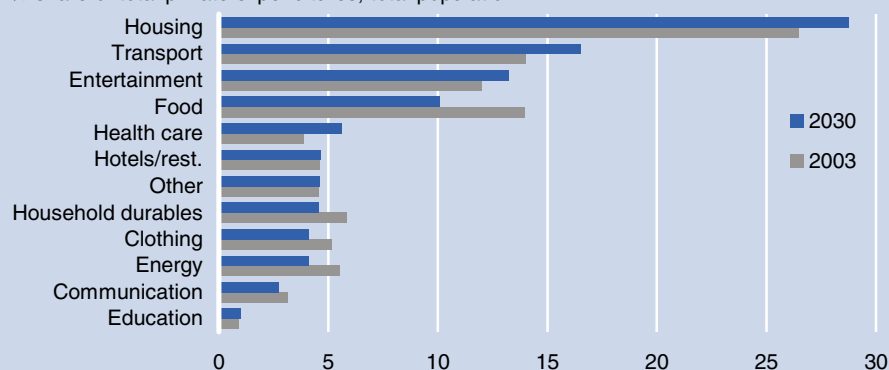
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### Germans in 2030: home-making, mobile, fun-loving

% share of total private expenditures, total population



Sources: EVS 2003, Deutsche Bank Research



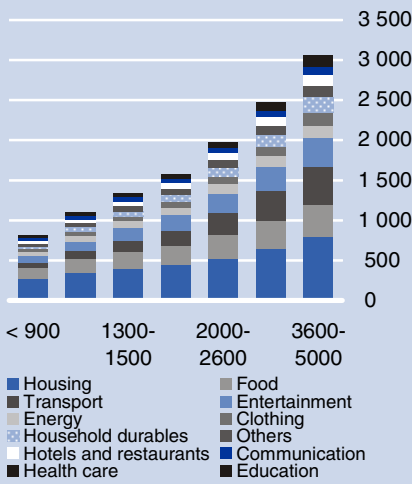
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**Bibliography**

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**The rich spend more, on different things**  
in EUR



Source: EVS Germany 2003

1

**Shifts in the relative shares of different consumption segments, as a result of demographic, economic and social changes?**

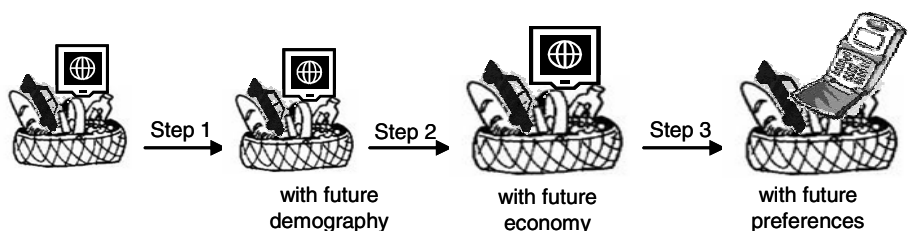
A German household currently spends on average over 2000 EUR per month on personal consumption, with wide variations according to income (see chart 1) as well as size and composition of the household. How this amount is spent is of considerable interest to many, ranging from producers of goods and services to policy makers.

A major component of economic activity, consumer spending accounted for 59% of GDP in 2005. A household's disposable income is split into two: consumption and saving. The level of consumption expenditures is positively correlated to both the household's net assets and its expected future income, and negatively correlated to the real interest rate: other things remaining the same, the lower the interest rate, the smaller is the amount of saving and the greater is the amount of consumption expenditure. For a given level of consumption, its structure (how the money is distributed over the various consumption segments) will be determined by the perceived needs and choices of the individuals, influenced by various factors such as household composition, age, personal preferences, etc. Private consumption in the overall economy is also obviously driven by demography through the number of households in specific categories of age and size.

The three main drivers of private consumption are therefore: economic factors (such as wages, pension income, return on assets and saving rates), social factors (affecting consumer preferences), and demography. A long-term forecast of the consumption structure requires us to understand the impact of these drivers and anticipate changes in those three dimensions. Then we can analyse whether the relative expenditure shares of the various consumption segments will undergo changes. The evolution of demand for the respective products and services within each consumption segment is also an important issue but is not the focus of this publication.

The first section introduces our approach and presents the main results. The second section describes the current consumption structure in historical and international contexts. The third section shows that pure ageing has no observable impact on the overall consumption structure (although it will have an impact through the other two drivers, and also will affect the nature of demand *within* some segments). The fourth section discusses how social changes affect consumer preferences, and thus consumption. The fifth section provides a forecast of the consumption structure, taking into account the impact of economic growth and shifts in relative prices, as well as the additional impact of social factors. The last section discusses the implications of these changes on the consumption structure.

**Modelling approach**





## 1. Our approach – main results

A household's consumption structure depends on its income, age structure and personal preferences. Will changes in these drivers translate into changes observable in the overall consumption structure at the country level? In this paper, we investigate the impact of demography, the economic situation and consumer preferences on the consumption structure.

For this analysis, we first need to forecast changes in these three drivers, and then examine the impact of these changes. For the latter, we are faced with a methodological decision: we can either incorporate all changes at once into the analysis, or introduce the changes in one driver at a time. We opted for the step-by-step approach. This leads to a lengthier analysis but provides us with additional information on the magnitude of the impact for each driver.

### The three drivers are connected

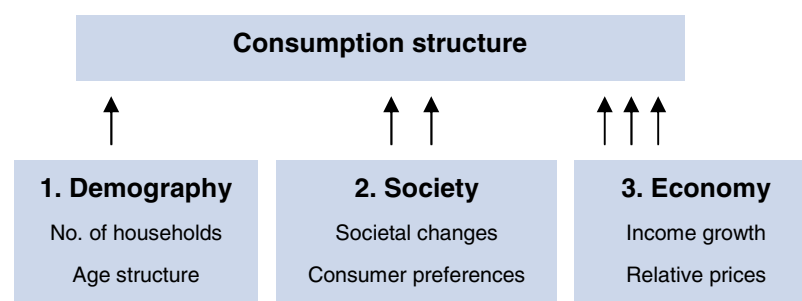
In order to fully understand our results, it is important to keep in mind that our three drivers are inter-dependent, and that the delineation of the individual steps is somewhat artificial. Although we show that the mere impact of demography on the consumption structure is negligible, ageing will indirectly affect the consumption structure through the other two drivers, economic and societal changes.

Indeed, economic growth will translate into different income rates for workers and pensioners. Thus, although labelled "economic", the impact of income growth is connected to the age distribution.

Similarly, given their high share of the population (one-third in 2006), the baby-boomers play an important role in shaping overall consumer choices. As this age group gets older, they will induce changes in consumer preferences which can arguably be attributed to ageing, although they are classified as social factors.

An additional impact of ageing is only visible when one looks at a more micro level than the consumption segments discussed in this paper. The ageing of society will drastically affect the nature of demand within most consumption segments, especially health, entertainment and transport.

### A step-by-step approach



#### ***Step 1: The pure impact of demography on the consumption structure is minimal but there are some hidden aspects to this***

Our starting point for this step is the forecast of the number of households in each age group. Then we derive future expenditure shares for each age group, assuming first "static ageing", and then taking into account "dynamic ageing".

#### Hidden impact of ageing through:

- the economy (different growth rates for wages and pensions)
- social preferences (dominating role of the baby-boomers)
- a finer cut within the consumption segments

**Static ageing...**

According to the static assumption, the future expenditure shares of each age group are identical to the current (2003) ones. We can thus derive the pure mechanistic impact of ageing, driven exclusively by changes in the number of households for each age group.

Our analysis shows that the impact is negligible. We demonstrate that this absence of an impact of ageing on the consumption structure, surprising at first sight, is due to the shape of the life-cycle curve as well as the dominating effect of the baby-boomers.

**... and even less dynamic ageing**

In order to reflect the lifestyle changes associated with “living longer, healthier”, as well as the increase in the retirement age and technology literacy, we design a dynamic ageing process. We assume here for the older age groups a consumption pattern found today in a younger age group. This is another example of the interdependence of the drivers, as this dynamic ageing process incorporates preference issues. As expected, the consumption forecast supporting dynamic ageing results in changes which are even more limited than in the previous, purely mechanistic step.

**... have a direct impact on the consumption basket*****Step 2: Consumer preferences are expected to have a significant impact on the consumption structure*****Societal changes drive changes in consumer preferences and affect consumption structure**

The erosion of the classical family structure, technological progress and globalisation are altering our society. From these changes, we infer a qualitative impact on the expenditure shares of some segments. People are expected to spend more on leisure, home entertainment and travel. A growing desire to lead a balanced and healthy life further boosts spending on entertainment, and wellness.

***Step 3: Economic factors have a major impact on the consumption structure*****Income growth and relative price changes have a major impact on how people spend their money**

In this final stage of our analysis, we incorporate changes anticipated in the economic environment, such as age-dependent income growth and relative price changes.

**Main results**

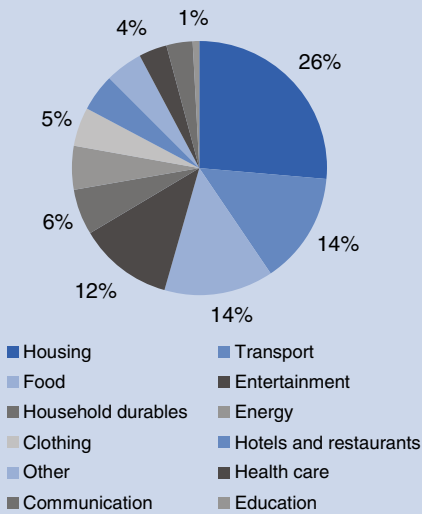
In summary, the results of this study are two-fold. On the one hand, we identify the magnitude of the impact for each driver, as much as it is possible to separate them. On the other hand, we forecast the consumption basket of the future.

We show that relative shifts in consumption between different segments are not significant when ageing alone is factored in. Economic growth and societal transformation do weigh in more significantly. Rising levels of expenditures, shifts in relative prices and changes in consumer preferences are the main drivers of change in the consumption basket.

We provide a forecast of future expenditure shares and identify the winning segments. Transport, housing, health-care and entertainment take larger expenditure shares at the expense of food.



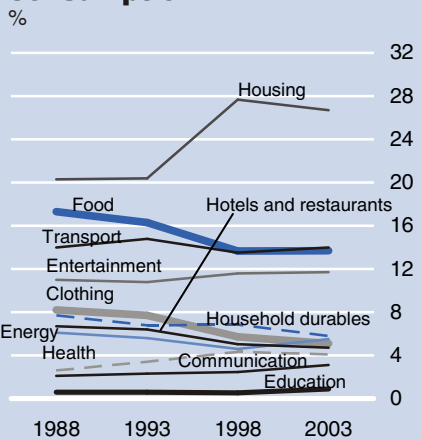
### Housing, transport, food and entertainment are the main expenses



Source: EVS 2003

2

### Share in overall consumption



Sources: EVS West Germany, DBR

3

**Drastic increase in housing expenditures, decrease in the shares of food, clothing and energy**

## 2. Learning from past and present

### 2.1 Housing accounts for a quarter of our expenses, followed by transport, food and entertainment

The current structure of German consumption (see chart 2) shows that housing (26%), transport (14%), food (14%) and entertainment (12%) account for the highest shares in total household expenditures, while the share of each other segment is less than 6%. Our source for household expenditure data is the survey results published by the German Federal Statistical Office every 5 years, based on a sample survey of German households about income and consumption (Einkommens- und Verbrauchsstichprobe, EVS)<sup>1</sup>. This survey uses diaries with several hundreds of expenditure categories filled by a representative sample of over 50,000 households<sup>2</sup>.

The EVS considers 11 major consumption segments but we chose to separate housing expenditures (rent or imputed rent<sup>3</sup> and maintenance) from housing-related energy expenditures, in order to get more specific information on these two sectors. The labelling of the various segments is mostly self-explanatory. "Food" is used here in a broad sense, including beverages as well as tobacco products. Transport expenditures are mostly connected to the purchase (27%) and operation of private vehicles, with fuel a major expenditure (25%), and public transport accounting for 14% of transport expenditures. The entertainment segment encompasses a broad list of sub-segments ranging in decreasing order from leisure and cultural services (26%), audio-video and computer devices (20%), down to package travels (18%) and newspapers-magazines/books (17%). The communication segment refers mostly to telephones (83%), also answering machines, fax and related services. Education expenditures refer mostly to primary schools (Kindergarten) and elementary schools (62%), to a lesser extent to the tertiary sector and continuous education. The energy segment considered here refers exclusively to energy expenditures related to housing. "Other" includes as major sub-segments insurance services (35% of its share) and personal care (28%).

### 2.2 Over the past 15 years: Increase in housing and entertainment expenditures, decrease in the share of food

For historical trends, we use the last four EVS data sets (1988, 1993, 1998 and 2003), only for West German households for the sake of consistency in the data<sup>4</sup>.

<sup>1</sup> More comprehensive and reliable consumption data are found in the National Income and Product Accounts (Volkswirtschaftliche Gesamtrechnung, VGR), but they are not given according to age range and type of household, and do not differ for major segments in a substantial way from the EVS data (the discrepancy tends to be a bit higher for occasional expenses like education). The consumption measures provided by the EVS survey are therefore generally taken to be reliable. For more details on this issue, see Deelen and Schettkat (2004), Lehmann (2004) and Winter (2004).

<sup>2</sup> Households with monthly income above EUR 18,000 are ignored because their small number makes it impossible to get meaningful data.

<sup>3</sup> The "imputed" rent for home-owners is the rent tenants would have to pay in order to live in their house.

<sup>4</sup> The raw data were adjusted as required for the purpose of reconciling the consumption segments of earlier surveys with the new definitions effective as of 1998.



**Price changes can be due to:**

- a change in manufacturing costs
- revised margins (e.g. due to a change in competition)
- arbitrary decisions (monopoly, e.g. oil)
- a change in quality levels (but CPIs are supposed to factor in an overall quality change)

Chart 3 shows, on average across all West German households, the development of the budget share of the various segments in nominal terms. In order to understand the development of nominal shares, which is the focus of this paper, we first discuss the two drivers: prices and real shares<sup>5</sup>. The real shares are derived from the table of real expenditures (see table 5). These were computed using 2000 as the base year, adjusted according to the CPI price indices shown in table 4 below.

**CPIs**

Basis 2000

	1988	1993	1998	2003	% change 1998-2003
Food	84.8	95.4	101.0	106.4	25.6
Clothing	85.4	96.0	99.6	100.7	17.9
<b>Housing</b>	67.2	83.3	97.7	103.8	<b>54.5</b>
<b>Energy</b>	72.4	84.5	84.3	110.2	<b>52.2</b>
Household durables	85.3	95.3	99.7	102.2	19.9
Health care	76.2	86.3	103.2	102.4	34.3
<b>Transport</b>	66.8	83.8	92.5	106.7	<b>59.8</b>
<b>Communication</b>	120.0	127.0	124.1	96.4	<b>-19.7</b>
Entertainment	84.1	94.3	99.3	100.7	19.8
<b>Education</b>	58.9	73.2	94.6	106.2	<b>80.3</b>
Hotels/rest.	73.9	90.7	97.7	106.5	44.1
Other	73.1	86.7	96.0	106.8	46.0
<b>Total</b>	<b>80.0</b>	<b>89.9</b>	<b>98.0</b>	<b>104.5</b>	<b>30.6</b>

Source: Federal Statistical Office

4

Prices overall have increased by over 30% over the period 1988-2003. The segments exhibiting higher price changes are education (+ 80%), transport (+ 60%), housing (+ 54%), energy (+ 52%), whereas communication is the only segment experiencing a price decrease (-20%). Technological advances typically set a trend towards a price decrease for a given quality level, often dampened by an overall quality increase, as observed currently in the electronics sector (sub-segment of entertainment). For the communication

**Expenditures**

Real, EUR 2,000

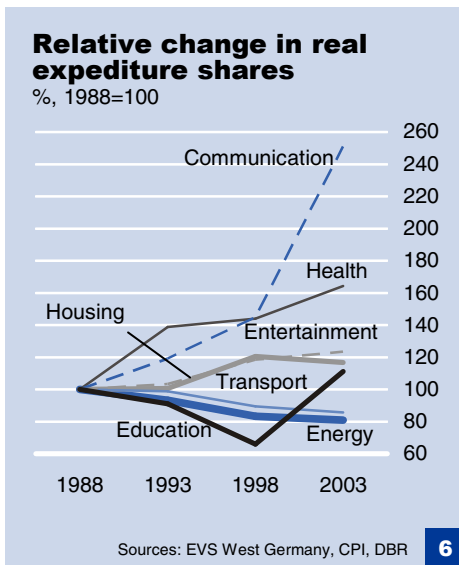
	1988	1993	1998	2003	% change 1998-2003
Food	298	318	290	290	-2.5
Clothing	140	150	123	115	-17.5
Housing	429	476	618	575	33.9
Energy	128	124	102	117	-8.7
Household durables	133	132	147	129	-2.6
Health care	49	73	80	90	84.8
Transport	307	329	313	296	-3.5
Communication	26	33	42	73	182.5
Entertainment	189	212	256	263	39.0
Education	16	16	12	20	25.0
Hotels/rest.	134	130	110	100	-25.7
Other	70	86	97	97	39.7
<b>Total</b>	<b>1918</b>	<b>2080</b>	<b>2191</b>	<b>2165</b>	<b>12.9</b>

Sources: EVS 2003, CPI, DBR

5

<sup>5</sup> The nominal values of any entity are its money values in different years. Real values adjust for differences in the price level in those years and represent volumes.





segment, the liberalisation of the telecommunications market in 1998 generated a sharp price decrease due to increased competition.

Most segments display similar trends for the shares in nominal terms and real terms. The share of housing shows a drastic increase between 1993 and 1998, in nominal terms from 20.4% to 26.7%, and has been approximately stable since. This rise reflects an increase in real expenditures, due to the upgrading of housing standards (size<sup>6</sup> and quality), as well as the price increase mentioned above. Accompanying this large expansion in housing expenditures, the real shares on most other segments decreased between 1993 and 2003: for transport, clothing (for these two items, expenditures also decreased in real absolute amounts), food and hotels and restaurants by about 2 percentage points of the total expenditures in real terms, and for energy by about 1.2 percentage points. By contrast, expenditure shares for entertainment, health-care and communication rose by 1 to 2 percentage points of total expenditures (they increased as well in real absolute terms). Spending on household durables and education has been stable over the time period.

In nominal terms, the share of transport expenditures stayed more or less constant. This is the result of the strong price increase which triggered a decrease in real demand. Education expenditures increased comparatively more in nominal terms, also due to relatively large price increases. For communication, a sharp price decrease, combined with a drastic share expansion in real terms resulted in a more moderate share increase in nominal terms.

Chart 6 displays the relative change in the consumption structure in real terms. Most notable are the increase in the expenditure shares of communication (151%) and health-care (64%), keeping in mind that the actual shares are relatively small.

### 2.3 International comparison

#### Consistency across countries

In order to place Germany in an international context, we investigated expenditure share data available across countries over the period 1988 – 1999 (Germany, France, Spain, UK and the US)<sup>7</sup>. For most segments, the past changes discussed in the previous section are not specific to Germany but are also registered in these countries. Housing, food and transport account for the highest expenditure shares. The share of housing expenditures exhibits a sharp increase in all five countries and the share of food a decrease.

More generally across Europe (EU-25)<sup>8</sup>, average German household budget allocation is in line with the EU-15 countries. The expenditure share for housing and home energy is the biggest part of household budgets in most EU-15 countries, whereas the ten new member states which joined in 2004 tend to spend most on food. The rate of home ownership is low in Germany, about 45% in western Germany and 35% in eastern Germany<sup>9</sup>. But this has no impact as there is no significant difference between the housing expenditure shares of homeowners and tenants. This is worth

<sup>6</sup> The living space per inhabitant has been steadily increasing (Federal Statistical Office).

<sup>7</sup> Eurostat for four European countries (Germany, France, Spain, UK), Bureau of Labor Statistics for the US. The segment definitions may differ from the EVS definitions used above.

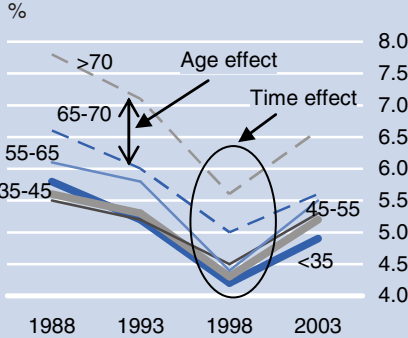
<sup>8</sup> See Eurostat 1999 data in Puente (2005).

<sup>9</sup> Federal Statistical Office. Home ownership is also very unevenly distributed across income groups.

**The effects of time:**

- time in its historical context (for instance growth period vs recession)
- the cohort effect, pertaining to differences between generations
- the age effect, in a life-cycle context

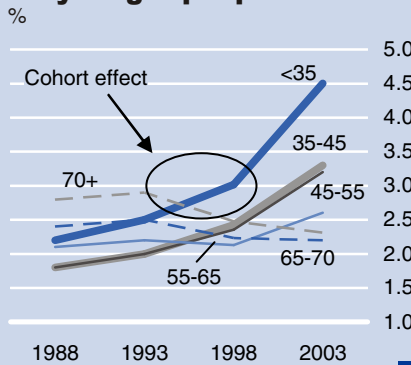
**Energy expenditure share by age group**



Source: EVS West Germany

7

**More communication for younger people**



Source: EVS West Germany

8

mentioning, as one could have argued that people think longer term when buying a house, and would consequently incur an imputed rent higher than what they would be prepared to pay as actual rent.

The “transport and communications” expenditure share depends on geographic factors such as insularity and population density but also development of infrastructure and holiday habits. Finland, Portugal and Luxembourg are the countries which devote the biggest share of their budget to this segment, whereas the Netherlands rank last among the EU-15 countries.

For “leisure and culture”, the expenditure share depends on cultural factors and household income. The countries with the highest share for this segment are the United Kingdom, Sweden and Luxembourg, whereas Italy is the EU-15 country which spends the least.

As regards health-care, Germany’s health expenditures as a share of GDP are among the highest in the world, 10.9% in 2003 (compared with 7.9% in Japan, 8% in the UK, 10.4% in France, with the US the highest at 15.2%<sup>10</sup>). At the same time, public coverage is fairly high, 79% in 2002 (compared with 81% in Japan, 80% in the UK, 78% in France, and 42% in the USA<sup>11</sup>). Actual household expenditures for medical goods and services are consequently moderate (at around 4%, they are on par with France and Japan, higher than the UK at around 1%, and lower than the US at 5.7% in 2005<sup>12</sup>).

Education in Germany is basically public as well: except for books and other learning materials, German education in schools is free, although universities are starting to charge tuition fees. For children up to 3 years of age, the mother is the main caretaker, even if childcare attendance is rising steadily. And unlike in most other countries, schools usually are half-day schools.

**2.4 Age-specific trends**

Looking at consumption trends by age range helps us to gain a deeper understanding of the evolution of the consumption basket, and will be used to justify future projections in Section 4. Time-series graphs (see charts 7 to 9), generated from 1998 to 2003, display expenditure shares for the major consumption segments in nominal terms, for the finest age groupings available through the EVS data over the period: below 35, 35-45, 45-55, 55-65, 65-70 and above 70 years of age<sup>13</sup>.

For most segments, the time-lines for the various age groups are fairly parallel to each other and consistent with the overall trend depicted in chart 3. Having the age group lines parallel to each other as in chart 7 represents an absence of cohort effect. The vertical gap between two lines is attributable to age (age effect) and a spike up or down occurring simultaneously on several lines reflects an event at that particular point in time (time effect). The spike on chart 7 in 1998 reflects a decrease in oil prices (heating costs account for most of the housing energy expenditures). We discuss now the segments which display different developments across age groups. The difference in the steepness of the lines (the fact that

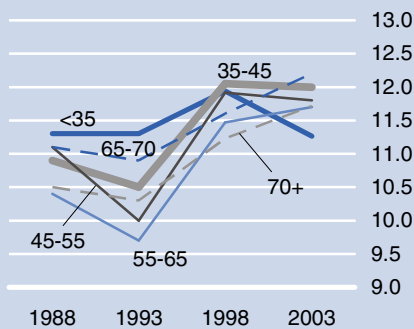
<sup>10</sup> OECD Health data 2006.

<sup>11</sup> WHO.

<sup>12</sup> Same as 7, and Statistics Bureau of Japan, Family Income and Expenditure Surveys.

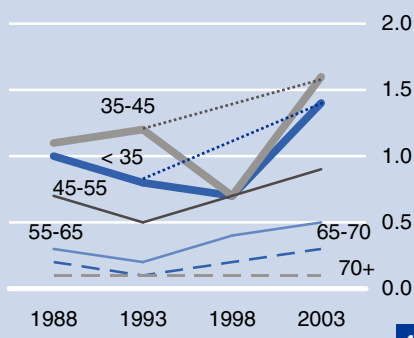
<sup>13</sup> Since 2003, both extreme groups have been split into two: below 25, 25-35, and 70-80, 80 and above. These groupings will be used for forecast calculations.

**Stronger increase in entertainment for older people**  
%



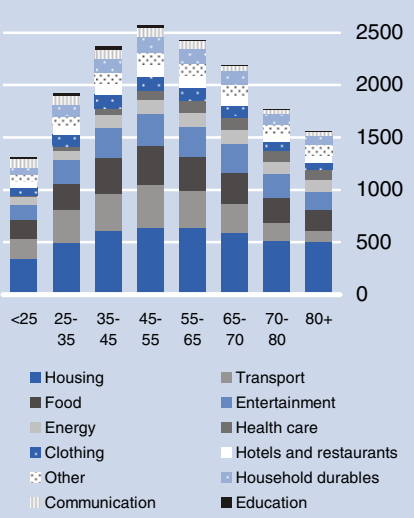
Source: EVS West Germany **9**

**Stronger increase in education for younger people**  
%



Source: EVS West Germany **10**

**More EUR in mid-life**  
EUR



Source: EVS 2003 **11**

they are not parallel, meaning that the age groups behave differently over time, best illustrated on chart 8) gives an indication of the cohort effect<sup>14</sup>.

The overall slightly upward trend over 1998-2003 in the communication expenditure share is the result of clear uptrends for the three younger groups (with the most drastic change for the below 35 group, from 2.2% to 4.5%), a mild uptrend for 55-65, and a flat or slightly decreasing line for the older age groups (chart 8). This is a cohort effect likely to be perpetuated in real terms to the older groups as these young cohorts get older: in the future these older people will be more technology-literate and prone to use mobile phones and the internet much more than the current members of this age group. However, this historical difference between age groups also likely reflects higher prices for mobile phone communication (mostly used by younger groups), as rates for fixed phones have tended to decrease sharply. Since the cost of mobile phones and internet usage is increasingly charged on a flat-rate basis as well, we do not expect this difference to be lasting.

The overall slight increase in the entertainment share shown on chart 3 is mainly the result of a steady increase since 1993 for those aged over 45 (from 10.9% to 12.2% for the 65-70, and from 10.3% to 11.7% for the over-70s) as displayed in chart 9. This could be considered a trend for this segment. As older people get fitter thanks to medical progress, they will be more likely to spend on leisure items such as cultural events or travelling. Their computer and software expenses will also increase as they become more technology-literate.

The education expenditure share displayed a fairly flat profile on chart 3 but chart 10 illustrates a larger increase for the younger groups from 1993 to 2003. The dip observed in 1998 for the two youngest age groups is artificial and simply reflects the fact that the Federal Statistical Office moved child-care expenditures for that year to the segment "other" (and categorised them again as education expenditure in 2003). Since the education expenditures of the EVS survey refer by and large to Kindergarten and elementary school expenses, it is expected that they are incurred more predominantly by the younger age groups who are most likely to have children in primary or elementary education settings. The share increase for the three younger age groups after 1993 likely reflects an increase in the number of children in child-care as well as the price increase mentioned above.

**3. Demography and consumption**

Demography is expected to have an effect on consumption patterns on several grounds. Relevant to individual consumption are household size and composition (age of the household head, typically the person with the highest income, and number of children). In addition, the population level affects the size of overall consumption. In Section 5, we will take into account the more indirect effects of ageing on income and hence consumption.

<sup>14</sup> One can also illustrate the cohort effect by following over time the various generations: the 35-45 group of 1993 becomes the 45-55 group of 2003 (the cohort born between 1948 and 1958), the 45-55 group becomes the 55-65 group (the cohort born between 1938 and 1948), etc.

We show in this section that the ageing of society has no significant impact on the overall expenditure shares by segments. Only a finer cut into sub-segments, as discussed in Section 4, reveals a significant impact of ageing.

### 3.1 How age affects individuals' expenditure shares

Charts 9 and 10 show how the household expenditure patterns change with age. These charts are based again on the EVS 2003 data now for the whole of Germany, according to the age of the household head<sup>15</sup>.

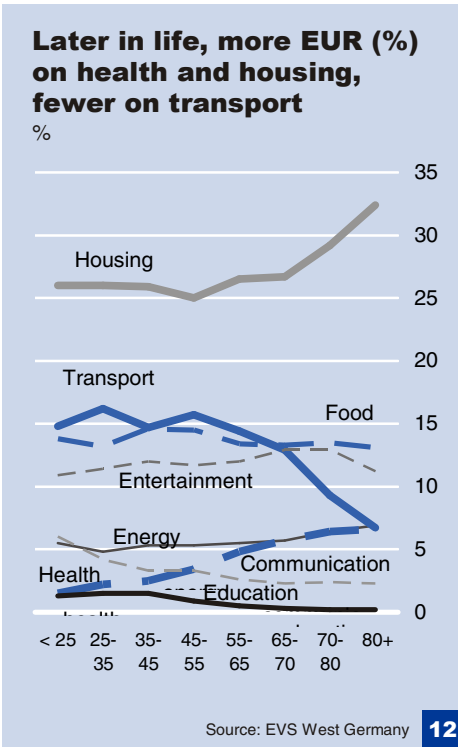
The overall consumption level varies over the life-time in line with the level of disposable income, peaking in mid-life. Chart 11 displays the typical trend of household expenditures over the lifecycle. It shows a sharp increase in earlier life, reaches a maximum for the 45-55 age group, followed by a decrease in later life.

In terms of expenditure, shares, depicted in chart 12, a drastic increase over the life cycle is observed for housing, after 50 years of age (from 25% to 32.4%). This reflects primarily unchanged rents when incomes fall since older people often do not move out of their homes, even if they do not need the space after their children have left or a partner has died ("remanence" effect). In connection with this, energy expenditure shares (related to housing) also increase, although to a lesser extent (from 5.5% to 6.9%). The only other segment exhibiting a clear increase is health-care expenditures: this is a very large increase from 1.5% for the youngest group up to 6.6% for the oldest.

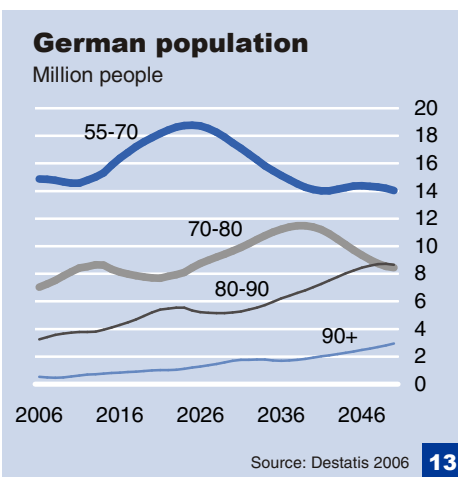
All other expenditure shares decline with age or stay approximately constant. The most dramatic decrease is in the transport category: from its highest at 16.2% for the 25-35 age group, it decreases down to 6.7% for the over-80 age group. These observations are consistent with our notion of age-and health-related effects on consumption and in line with the literature<sup>16</sup>.

### 3.2 Population and household forecast

Based on individuals' consumption patterns over their life-time, one can use demographic forecasts to analyse whether society's consumption structure will change due to the changing age structure. More specifically, we need population forecasts estimating the number of households in each age group (we refer here to the age of the household head).<sup>17</sup> In terms of the time horizon, 2020 to 2030 is a logical point for long-term forecasts. However, when it comes to contemporary demographic issues, it is advisable to go beyond the



### The basis for modelling the impact of demography on consumption



<sup>15</sup> A proper analysis of life cycle effects necessitates panel data (where the same people are tracked over time), which allow a separation of age effects from cohort effects. Since such data are not available, we use these EVS cross-sectional data.

<sup>16</sup> See Börsch-Supan and Stahl (1990), van Deelen and Schettkat (2004), Lehmann (2004), Martins *et al* (2005).

<sup>17</sup> Age is only one dimension of household distribution: EVS also categorises households according to type (number of occupants/children under 18, also gender for single households), income categories as well as professional categories. Our focus in this section is age, which is the dimension expected to change the most drastically in the future. The decrease in household size is discussed below and supported in the analysis through its impact on the number of households (which will increase in proportion to the total population). The size decrease is also theoretically expected to affect consumption patterns due to known scale effects (e.g. a couple's expenditures on food and housing are typically more than those of a single person but less than twice the amount) but household composition at large turns out not to be significant in practice. For more on this, see Lehman (2004) and Salverda and Schettkat (2004).



**Household forecast: methodology**

Forecasting the number of households is a topic in itself which generated a number of research papers\*. The Bundesamt für Bauwesen und Raumordnung (BBR) produces a forecast until 2020 (Raumordnungsprognose\*\*) using a refined version of the headship-rate method. In this classic approach, the age specific headship rates are computed by dividing the number of persons who are head of a household by the total number of persons of the same age. The future household numbers are then typically projected by keeping the headship rate constant. In the BBR forecast, the headship-rate method is the basis, but the headship rates follow a trend instead of being kept constant. We will use these data in our forecast\*\*\*, extrapolated until 2050. The headship-rate method will also be used to extrapolate the Raumordnungsprognose household forecast until 2050.

\* For a review, see Yi et al. (1999)  
 \*\* Raumordnungsprognose 2020/2050 in Berichte Band 23, Bundesamt für Bauwesen und Raumordnung  
 \*\*\* As the age groupings they consider are not as refined as the EVS data for older people (no distinctions above 65), we extrapolate current data by assuming the respective shares of the older age groups (65-70, 70-80, 80-90, and 90+) to the whole 65+ age group to be constant. As a starting point for the extrapolation, we use household data provided by the Federal Statistical Office for 2004.

time when the baby-boomers will retire, around 2030. Our time-horizon in this section is therefore 2050.

**Population forecast**

The Statistisches Bundesamt releases population forecasts every 3 years. The latest in November 2006 included twelve basic scenarios based on the levels of birth rate (decreasing down to 1.2, constant at 1.4, or increasing up to 1.6), life expectancy (for male/female respectively constant at 83.5/88, or increasing up to 85.4/89.8 by 2050) and net migration (two basic levels: 100,000 or 200,000 per year). Three additional scenarios were designed in order to incorporate more extreme values of migration levels (0 and 300,000) or birth rate (2.1). We use here the combination of constant birth rate, increased life expectancy, and moderate migration (100,000). This scenario has the advantage of being both fairly conservative and resulting in a relatively old population (immigrants tend to be young). Chart 13 shows how the number of older people increases in several age groups. All age groups below 55, not represented here, see their numbers decrease. Most striking is the steady increase for the 80-90 and 90+ age groups. The ratio to the total population of the 80+ age range, currently 4.6% is expected to rise to 16.4% in 2050, when 1 out of 6 people will be over 80.

**Trends in number of households**

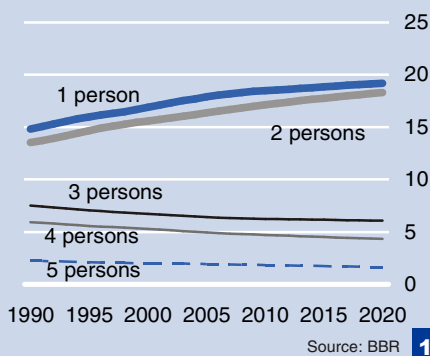
The number of households is driven by population level as well as household size. This is why the total number of households can increase even with a shrinking population: at about 39 million currently, it is expected to increase until 2020 (up to 40.7 millions households with the chosen scenario) and then decrease (down to about 37 millions in 2050). Indeed, the average household size is on the decrease: it was 2.2 in 1990, 2.1 in 2002 and is forecast at less than 2 in 2020. Chart 14 displays the headship rate forecast (fraction of households to the total population) for various household sizes. It shows an increase in the incidence of the number of 1- and 2-person households and a decrease for large households. An analysis by age group (not shown here) tells us that this is true for all ages except for the over 65 group: the rate of 2-person households is increasing but the rate of 1-person households is decreasing, resulting in an increase in the average household size for this age group. There are two reasons for this change<sup>18</sup>, specific to the over 65 age group: long-term effects of World War II and narrowing gender gap in life expectancies. Indeed, the world war widows are dying, thus pushing up the relative number of 2-people households for this age group. And the gap between male and female life expectancy is narrowing, so a larger number of older couples live together longer. In spite of this increase in the average household size, the number of households for the above 65 group will still increase, due to a drastic population increase for this age group.

For the other groups, the predominating factors for the decline in household size are the decrease in the number of children born, the increase in the divorce rate combined with fewer marriages in the first place.

Chart 15 shows the forecast of the number of households by age groups. After 2030, only the age groups above 65 experience an increase in the number of households.

**Headship rate increase for small households**

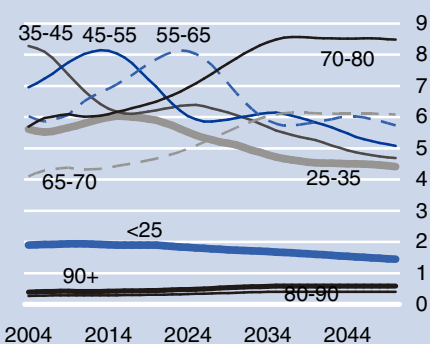
No. of households / total population, %



Source: BBR 14

**Number of households by age**

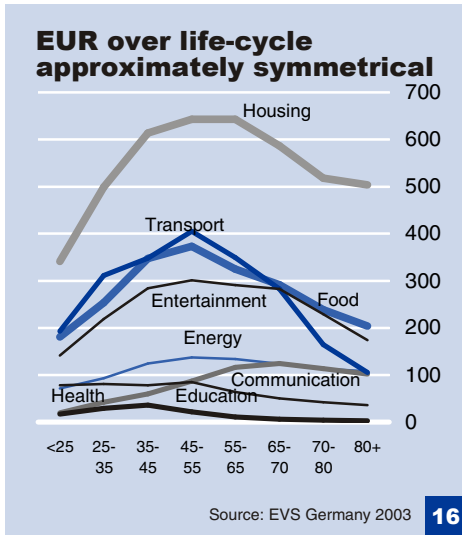
Millions



Sources: BBR, Destatis, DBR 15

<sup>18</sup> Private communication with BBR

**“Static ageing” has no significant impact on consumption structure**



### 3.3 Static ageing: Baseline forecast for consumption structure

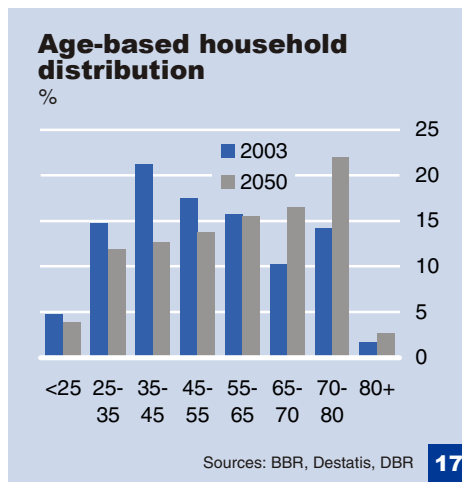
The first step of our forecast is to estimate the purely mechanistic impact of anticipated demographic changes on expenditure shares. This is done by assuming for the future the same expenditure structure as in 2003 (static ageing) for each age group. Each age group is assumed to spend, until 2050, the same amounts on consumption segments as their parents currently do. The overall expenditure shares for a future year  $t$  are calculated by aggregating for each consumption segment  $i$  the total nominal values from each age group  $j$  (basic amount of 2003,  $y_{ij2003}$ , multiplied by the number of households in this age group forecast for that year,  $n_{jt}$ ), and then dividing by the total expenditures over all 12 segments. Since we are here only interested in the *shares* of expenditures, we do not need to worry about a growth rate applied uniformly across all age groups.

$$\text{share for segment } i \text{ in year } t = \frac{\sum_{j=1}^8 y_{ij2003} * n_{jt}}{\sum_{i=1}^{12} \sum_{j=1}^8 y_{ij2003} * n_{jt}}$$

In line with the literature<sup>19</sup>, the results displayed in the table at the end of this section show no observable effect of pure ageing on consumption patterns. As expected, the segments with the largest (although minor) changes are the ones displaying the most drastic change over the life cycle (see chart 12): housing, health-care and transport, and in the expected direction (a minor increase in the expenditure share for housing and health-care, and a minor decrease for transport).

This absence of mechanistic impact of ageing on the consumption structure is at first sight surprising but easily explained by looking more deeply into the equation above. Chart 16 illustrates the nominal expenses for 2003 used in this equation. Most expenditure segments display a quasi-symmetrical shape around a “mid-life axis”, with a peak around 55 years. Health-care is the most notable exception as it is increasing overall. For housing, the end point is also higher than the starting point, and for transport lower, but there is still a peak in mid-life. (As expected, these are the three segments with less flat profiles in chart 12.)

Now, chart 17 illustrates the household distribution according to age in 2003 and 2050 and shows significant changes during this period, as also displayed in the following table.



	<25	25-35	35-45	45-55	55-65	65-70	70-80	80+
difference 2050-2003 (% share)	-1	-3	-8	-3	0	6	8	1

**Drastic changes in the age-based household distribution cancel each other out due to the symmetry of the life-cycle curve of expenditures**

It turns out that the respective changes of the total household shares for each age group reproduce somewhat the quasi-symmetry of chart 16, so that the decreasing number of younger households is matched by an increase in the number of older households (at approximately the same level of expenditures for the various

<sup>19</sup> Lehmann (2004), Martins *et al.* (2005) and Buslei *et al.* (2007) obtain similar results.

segments, due to the approximate symmetry discussed). As a result, the household changes cancel each other out, resulting in no observable impact on the overall expenditure shares. For the segments with less symmetric curves, the difference in expenditures between the youngest and oldest age groups is negligible due to the highest expenditures around mid-life (dilution effect). For health-care, there is an additional dilution effect as the expenditure share is fairly small.

### 3.4 But ageing is not static!

The ageing of society is a well-known and heavily discussed phenomenon<sup>20</sup>, with far-reaching consequences in terms of public finances, social aspects, political issues, etc. What is relevant here above all, in terms of its impact on personal consumption, is that a longer life is accompanied by better health later in life.

#### *Dynamic ageing and its modeling*

**80 year-olds in 2050 fitter than current 80 year-olds, with a “younger” lifestyle**

Life expectancy has been rising in Germany by 2.5 months every year<sup>21</sup>, or by 10 years over 50 years, and we expect 80 year-olds in 2050 to be fitter than current 80 year-olds, due to medical advances as well as general lifestyle issues<sup>22</sup>. Also, due to increased pressure on the pension system, people will work up to a more advanced age (the legislation is currently being changed and expected to change further). Currently at 61, the average retirement age in Germany may have increased up to 68 by 2050. This delay in retirement will postpone the related lifestyle changes currently experienced by the 55-65 age group. For instance, current 25 year-olds will be 68 in 2050 but their mindset might be more akin to a current 61 year-old who has recently retired. At the same time, cohort effects will be tangible in some areas like technology literacy, which will affect the level of computer usage and the embracing of technology at large for older age groups.

All these factors reflecting dynamic ageing will induce lifestyle changes likely to affect consumption patterns. In a large internet survey conducted in 41 markets globally, the ACNielsen market research company asked consumers about their attitudes towards age, and over half of the respondents agreed that “your 60s are the new middle age”<sup>23</sup>. In order to reflect these “healthy ageing” changes, we assume in this step of our model that for the older age groups (above 65), the share of any given consumption item in total consumption in 2050 will be the current share of a younger age group. The age groups are shifted towards “younger” consumption patterns.<sup>24</sup>

<sup>20</sup> See Bergheim (2006), Gräf and Schattenberg (2006) and the series Demography Special, Deutsche Bank Research.

<sup>21</sup> See Oeppen and Vaupel (2002).

<sup>22</sup> See Ziegler and Doblhammer (2005).

<sup>23</sup> Consumers’ attitudes towards aging, ACNielsen (2006).

<sup>24</sup> More specifically, age group sliding occurs as follows:

- up to 65: unchanged (no changes in consumption patterns for a given age group with respect to today’s patterns)
- future 65-70 also like current 55-65, so we combine both groups into 55-70 (which also reflects a later retirement age)
- future 70-80 like current 65-70
- future above 80 like current 70-80
- current 80 and above is translated into 90 and above.

This describes the state of age-related consumption patterns in 2050 used in this consumption forecast. The changes are made effective gradually by combining (for the age groups over 65) the current consumption basket and the future consumption basket (of the younger age group) with the respective weights (2/3 and 1/3 in 2015, 0.5 and 0.5 in 2030, 1/3 and 2/3 in 2040, to reach 0 and 1 in 2050).



**Dynamic ageing has even less impact on overall expenditure shares**

As expected, the consumption forecast supporting these assumptions results in changes which are even more limited than in the previous, purely mechanistic step. For instance, in 2050 the share of health-care has increased to 4.2% (as opposed to 4.4%). Indeed, the “society” considered here is younger, in terms of consumption patterns, than in the previous step, and the results reflect the “slower ageing” in behaviour implied by the age group sliding described above.

<b>Expenditure shares</b>					
Consumption forecast with static and dynamic projections					
	2003	2050 static	Diff. (static)	Diff. (dyn.)	2050 dynamic
Food	13.9	13.7	-0.2	-0.2	13.7
Clothing	5.1	5.0	-0.1	-0.1	5.1
<b>Housing</b>	26.5	26.8	<b>0.3</b>	-0.2	26.3
Energy	5.5	5.6	0.1	-0.1	5.4
Household durables	5.8	5.9	0.0	0.2	6.0
<b>Health-care</b>	3.9	4.4	<b>0.5</b>	0.3	4.2
<b>Transport</b>	14.0	13.5	<b>-0.5</b>	<b>0.4</b>	14.4
Communication	3.1	3.0	-0.2	-0.2	3.0
Entertainment	12.0	12.2	0.2	0.1	12.1
Education	0.9	0.7	-0.2	-0.2	0.7
Hotels and restaurant	4.6	4.6	0.0	0.0	4.6
Other	4.6	4.6	0.0	0.0	4.6

Sources: EVS 2003, DBR **18**

**3.5 The hidden impact of ageing**

We have just demonstrated that ageing by itself (static or dynamic) has no observable effect on the consumption structure. However, this does not imply that ageing has no effect on overall consumption!

First of all, the three drivers are not unrelated and separating their impact is somewhat artificial. Ageing will indirectly affect the impact of the other two drivers.

Indeed, age distribution will indirectly affect income distribution (since wages and pensions are not expected to grow at the same rate), hence the consumption structure, as will be discussed in Section 4.

Similarly, the baby-boomers play an important role in shaping overall consumer choices. Indeed, they made up one-third of the population in 2006. As this age group gets older, they will induce changes in consumer preferences which can arguably be attributed to ageing, although they are classified as social factors.

Secondly, at a more micro-level within consumption segments, the specific needs and preferences of the elderly will boost demand for various products and services, as will be discussed in Section 4.

**Ageing is hidden: in the impact of the economy through the age-based income distribution and in some changes in consumer preferences...**

**... and affects the nature of demand when one looks more deeply into consumer segments**

## 4. Social factors and consumer preferences

Our forecast so far has taken into account demographic changes (as well as some lifestyle changes considered in the “dynamic ageing process”). This section focuses on another driver of consumption: societal changes affecting consumer preferences<sup>25</sup>. As discussed above, some changes in overall consumer preferences will be driven by the ageing of the baby-boomers and have a demographic component to it. The discussion is kept qualitative here, we will examine the potential impact on the consumption structure in the last step of our forecast, in Section 5.

A broad range of social and cultural factors affect what people feel and want, and impact their consumption patterns. This discussion will focus on factors expected to have a direct impact on the consumption basket<sup>26</sup>.

### 4.1 Connectedness’ next step: virtual communities

Technological innovation and an increased ability to communicate, by portable phones, e-mail or through the internet, will continue to modify the consumption landscape. This will not only give rise to new technical products and services but also to new business channels. (For instance, in a shift from consumption to participation, customers increasingly collaborate with companies in developing products, and turn into “prosumers”, producers and consumers at the same time.) The market will be increasingly global (pushing up the import share of consumption) and consumers will have easier access to product information and comparisons.

As people can easily and frequently communicate with each other, often on a real-time basis, they tend to monitor the movements of others more closely than ever. They are concerned with the tastes and actions of others on a larger scale and this is expected to accelerate the speed and intensity of fashion phenomena.

The typical family of the past (mother, father, two children) is no longer as common as it used to be, due to various factors: a low birth rate, the birth of the first child occurring later in a woman’s life, a decrease in the number of marriages and an increase in the divorce rate. As a result, we witness an increase in the numbers of singles, single parents, transitory relationships and recomposed families. This will affect the lifestyle and potentially the consumption behaviour in various areas (housing, entertainment, eating out, etc.)

In connection with this individualisation and the spread of communications, new networks are formed, especially virtual communities. Surveys conducted in Japan in 1997 and 2000<sup>27</sup> showed that while communications within the extended family became less intensive, communications with friends and acquaintances developed through a variety of networking contacts: the neighbourhood, the internet, or various clubs. In Germany, the membership rates in various associations (sport or cultural) is on the rise, and virtual communities are growing quickly worldwide for personal as well as professional interests (communities of practice). For instance, Ecademy, a social network for business people was founded in 1998 and has over

**Technological progress and globalisation: customers are better informed...**

**... and fashions come and go, faster and stronger**

**The classical family structure is losing ground...**

**... and personal networks diversify, including virtual communities experiencing rapid growth**

<sup>25</sup> To explore future developments in Germany in a wider context, see the upcoming study by DB Research on the future of Germany.

<sup>26</sup> For a broader treatment of the impact of societal changes on overall consumption, see Rollwagen (2007).

<sup>27</sup> See Nitto and Shiozaki (2001).

**Ethical concerns increase demand for  
“wholesome quality”**

100,000 members worldwide. Second Life is a 3-D virtual world, built and owned by its residents, where you can enjoy yourself, buy, sell or trade.

“Related to this new breadth of networks, a growing number of people are concerned by global environmental and social issues. A new lifestyle, coming from the US, is gaining popularity in Europe. The Lohas (Lifestyle Of Health and Sustainability) describes an integrated, rapidly growing market for goods and services that appeal to consumers who have a meaningful sense of environmental and social responsibility and incorporate those values into their purchase decisions. Far from ascetic, they have adopted the “less is more” principle, and their priority is “wholesome quality”. These individuals favour bio food, energy-efficient electronics and appliances, renewable energy, green building products, wellness and alternative health-care, alternative transportation (hybrid vehicles), socially responsible investing, etc.

**4.2 No more rat race! Let’s take our time and be healthy****A growing desire to lead a balanced...**

There is a trend away from “workaholism”. People are increasingly interested in a better work-life balance and value free time in a new way. They are consequently more likely to invest in leisure activities of all kinds. (This is another driver for the growing interest in leisure activities on top of the individualisation of society discussed above). This trend is likely to intensify in a society in which working life is becoming more hectic due to the ups and downs in workload associated with more discontinuity in employment<sup>28</sup>.

**... and healthy life boosts spending on  
entertainment and wellness**

More people nowadays feel that their lives are “out of balance”<sup>29</sup> and demand a holistic approach to well-being. This growing demand for things that make consumers feel healthier is one force behind the rise of the wellness industry; the other is the desire to reduce health-care costs. So there is a huge opportunity to offer products and services that make people feel more balanced. This represents a big change in consumer psychology, and one that is likely to deepen over time: market research suggests that 35 year-old Americans have a much stronger desire to lead healthy lives than 65 year-olds<sup>30</sup>. Prevention is taken more seriously in general (witness for instance the overall steady decline in the number of smokers), and a growing number of employers promotes wellness at work, both to cut costs and to reduce stress and health-related absenteeism.

**4.3 Who will take care of me?****The loss of social safety nets nurtures  
a feeling of uncertainty for some**

It is important to keep in mind that the positive GDP growth forecast (associated with an overall increase in income) is expected to be associated with greater income disparity,<sup>31</sup> so that poverty will rise. Moreover, the fragmentation of society, discontinuity in employment, and the wearing-out of the social security system contribute to a feeling of insecurity. As a result of similar and broader changes in Japan, Nitto and Shiozaki<sup>32</sup> identified a move in the direction of more self-protective lifestyles as a type of risk hedging, including: a diversification of personal networks, a tendency to maintain loose

<sup>28</sup> For more on this, see Rollwagen (2007).

<sup>29</sup> Three out of four adult Americans now feel that their lives are “out of balance”. The wellness boom. The Economist January 6<sup>th</sup>-12<sup>th</sup> 2007.

<sup>30</sup> The wellness boom. The Economist January 6<sup>th</sup>-12<sup>th</sup> 2007.

<sup>31</sup> Jahresgutachten 2006/07 published by Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung.

<sup>32</sup> See Nitto and Shiozaki (2001).

**Belt-tightening strategies for  
Germans: clothes, vehicle usage and  
gas/electricity**

**“Fashion victims”, “party poopers”  
and “fast food canners”**

**The growing silver economy will  
affect the nature of demand within  
sectors**

but close ties within families and a return to family life from “work-aholism”, which is also happening in Germany. Because of decreasing involvement of the state, people are forced to take more responsibility. Another effect of this heightened feeling of uncertainty may be an increase in expenditures on insurance.

In uncertain or more difficult times, consumers sometimes need to alter their shopping basket, even if only temporarily (breaks in employment, etc.). Consumers worldwide seem to be fairly unanimous about what they would cut back on, with out-of-home entertainment, spending on new clothes and upgrading technology (in this order for Europe) the top three belt-tightening strategies worldwide, according to a survey by ACNielsen<sup>33</sup>. Priorities varied across regions and the Germans were the least likely to delay upgrading technology. Their top three “cut backs” appeared to be clothes, vehicle usage and gas/electricity. The UK is also categorised as a “fashion victim”, with clothes, take-aways, technology to be cut back first. France and Spain, “party-poopers”, choose entertainment as the first area to cut back, followed by clothes. In the US, a “fast food canner”, the top three cut-backs are take-aways, gas and electricity and entertainment. In fact, these strategies reflect to some extent the different lifestyles in each region, hence the segments where the biggest savings can be made.

#### 4.4 The growing silver economy

A broad consumer segment, growing in importance due to their number and purchasing power, is the so-called 50+. They are not a homogeneous group and need to be differentiated further for marketing purposes but as a group they represent more than half of the purchasing power and financial assets in Germany. They buy 45% of all new cars, 50% of all facial products and book 35% of all packaged travels<sup>34</sup>. Almost half of the “best agers” prefer to have a pleasant life rather than save, against 27% of the same age group ten years ago.<sup>35</sup>

Sectors which cater to this range of the population in specific ways will experience changes in the nature of demand. The “silver consumers” have specific needs due to various reasons:

- their relative high amount of free time will increasingly affect the entertainment sector: in the media-IT area (e.g. courses for old beginners), in tourism (for instance, increased demand for wellness-oriented services in packaged travels), offers off-season, fitness for older people, etc.
- the desire for increased security raises the demand for various electronic devices to make daily life safer (various kinds of alarms, etc.)
- the body-related changes obviously impact the health-care sector but also increase the demand for “intelligent homes” (where most controls are automatic but also support impaired vision, hearing or memory), and for vehicles supporting these changes.

These are just some examples giving a flavour of the impact that ageing can have within segments, at a micro level, as opposed to

<sup>33</sup> The ACNielsen Global Online Survey, November 2005.

<sup>34</sup> Frischer Wind, Wirtschaftswoche No. 28, 10.7.2006.

<sup>35</sup> According to a survey conducted by GfK (Gesellschaft für Konsumforschung), as reported in Spiegel special No. 8, 2006.

across segments which is what we examine in the rest of this paper<sup>36</sup>.

## 5. The impact of economic factors on future consumption patterns

In this section, we take into account overall spending growth as well as price changes. We also discuss the additional impact on expenditure shares of the social factors introduced in the previous section. We identify the winning consumer segments: transport, housing, health-care, entertainment, and the losers: food, energy, household durables, clothing, communication.

A full analysis of the economic factors impacting consumption would necessitate detailed forecasts of wage trends (based on age as well as qualification), growths in pension incomes and returns on assets, saving rates, changes to the tax system, to the inheritance legislation, etc. and these are beyond the scope of this paper.

### 5.1 Modelling spending growth

Our starting point uses the intermediate results of Section 2 (consumption forecast derived from taking into account dynamic ageing). Those calculations were based on nominal expenditures on the 12 segments for each age group in 2003 (as mentioned above, the effect of a uniform growth rate is cancelled out when looking at the shares), and modified up to 2050 according to the dynamic ageing process described above.

Here we “grow” these expenditures, on the basis of the following assumptions. Our baseline is long-term (real) GDP growth of 1 ½% per year<sup>37</sup> (GDP is a generally accepted proxy for consumer spending, which is its largest component). Now, we need to take into account the life-cycle effect on income (hence spending) growth. Indeed, wages and pension will have different growth rates. The worker-to-pensioner ratio is drastically decreasing (currently 2:1, it is expected to be 1:1 in 2030 in Germany if no corrective action is taken), and even with current and future reforms as well as the increasing use of personal savings in older age, pension income is expected to grow significantly slower than wages. Wages in turn are likely to grow proportionally more for younger workers who will be in higher demand than more mature workers. In order to reflect the various income growth rates for the different age groups, we assume the following.<sup>38</sup>

- under 35 years of age, spending growth is 2%
- between 35 and 65, it is 1.5%
- above 65 years, spending growth is 1%.

In order to capture the impact of income growth on spending on the 12 segments considered, we use income elasticities based on the literature<sup>39</sup> as well as our own computations derived from EVS 2003 data and VGR historical data<sup>40</sup>. Elasticity above 1 indicates a proportionally higher propensity to spend more on this particular

#### Our model for future consumption:

- population and household forecast
- dynamic ageing
- age-dependent income growth: 2%, 1.5%, or 1% per year
- income elasticities
- price changes for each consumption segment (overall 1.5% per year)
- price elasticities
- saving rate at its 2003 value (10%)
- additional impact of soft factors

<sup>36</sup> For more on this, see for instance the “Fifth report on the situation of the old generation in Germany” (2006) published by the Ministry for families, seniors, women and youth. Also Knigge, Gruber, Hofmann (2003).

<sup>37</sup> See Bergheim (2005).

<sup>38</sup> See also Lehmann (2004).

<sup>39</sup> See Breithaupt *et al* (1979), van Deelen and Schettkat (2004).

<sup>40</sup> Volkswirtschaftliche Gesamtrechnungen, Destatis, October 2006.

segment as income increases (the best example is luxury goods), an elasticity below one indicates a proportionally lower propensity to spend more (food expenses, for instance, are hardly affected by higher income), and elasticity of 1 reflects an increase in expenditure on par with income growth.

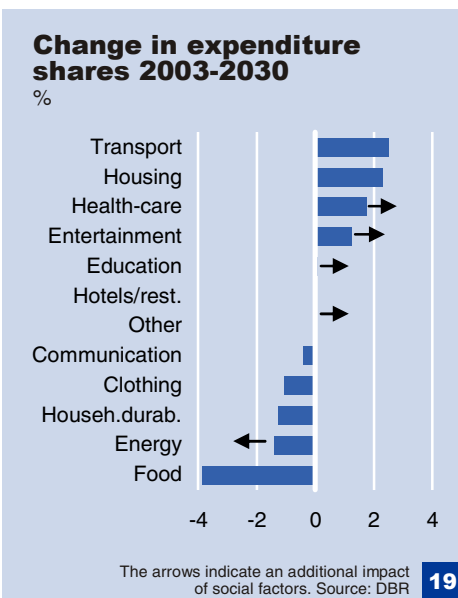
To account for price changes, we use an overall inflation rate of 1 ½%<sup>41</sup>. The rates pertaining to each segment have been inferred from historical data (the past CPIs used above) as well as judgment. To capture consumers' reaction to price changes, we use price elasticities based on the literature<sup>42</sup> as well as our own computations using VGR data. Price elasticities quantify the proportionate change in demand given a change in price and are typically negative. A good with a price elasticity less than -1 (e.g. goods with many substitutes, or that are not essential) is said to be "elastic" and a good with a price elasticity closer to zero (e.g. goods that are more essential to everyday living, and that have fewer substitutes, like staple foods) are said to be "inelastic". The time-horizon is also decisive when considering price elasticities. For example, the demand for automobiles would, in the short term, be somewhat elastic, as the purchase of a new vehicle can often be delayed. However, over the long run, the demand would probably be inelastic in rural areas, since there are few alternative modes of transportation. Here, we are obviously interested in long-term price elasticities.

The saving rate is an important issue when forecasting consumption. Saving rates are kept constant in our modelling (at the rate of 2003: further spending grows at the same rate as income) because it is not clear in which direction they will develop<sup>43</sup>.

### 5.2 Germany's consumption structure in 2030

Expanding our model by age-specific income growth and changes in relative prices has a clear impact on consumption structure<sup>44</sup>.

Consistent with the previous section, the computations were made until 2050 (see table 19), but the main results here will be analysed until 2030, since the latter is a more reasonable horizon when forecasting economic factors.



<sup>41</sup> DBR long-term forecast.

<sup>42</sup> Distelkamp et al. (2004).

<sup>43</sup> One could argue that an ageing society is expected to save overall less, since older people tend to have a low saving rate or even dissave. At the same time, this effect is not prevalent with dynamic ageing as people retire later in life. Also, given the decrease in public pension transfer, individuals are forced to save more for their retirement.

<sup>44</sup> Lehmann (2004) and Buslei *et al* (2007) obtain different results since their calculations do not take price changes into account.



**Expenditure shares**

%

	2003	2010	2020	2030	2040	2050
Food	13.9	12.8	11.3	10.1	8.9	7.8
Clothing	5.1	4.9	4.5	4.1	3.7	3.4
Housing	26.5	27.1	28.0	28.8	29.4	29.9
Energy	5.5	5.1	4.5	4.1	3.6	3.2
Household durables	5.8	5.5	5.0	4.6	4.1	3.7
Health-care	3.9	4.3	4.9	5.6	6.4	7.2
Transport	14.0	14.7	15.8	16.5	17.3	18.2
Communication	3.1	3.1	2.9	2.7	2.6	2.4
Entertainment	12.0	12.4	12.8	13.2	13.6	14.0
Education	0.9	0.9	0.9	1.0	1.0	1.1
Hotels/rest.	4.6	4.6	4.6	4.7	4.6	4.6
Other	4.6	4.6	4.6	4.6	4.6	4.5

Sources: EVS 2003, DBR

**20**

We will now comment on the above forecast, and include in the discussion some relevant social factors not incorporated in the computations, but discussed in the previous section. These will affect the propensity to consume, hence the elasticities which were kept constant in the above forecast at the estimated current level until 2050. Some of these factors will reinforce the trends identified in the above forecast, some will milder them<sup>45</sup>, as indicated by the arrows on Chart 20 for the relevant segments. We refrain from quantifying these impacts because of the huge uncertainty which would be associated with those numbers. The combined impact of the various arrows has to be zero, so that an increase in any share will lead to a decrease in others. Since most of the social trends we identified are expected to lead to an expenditure share increase in one or two segments, the other segments will see their shares decrease.

***The winners: Transport, housing, health-care, entertainment*****Upgrade in quality of housing**

The **housing** expenditure share is expected to continue its upward trend. Upgrading of housing standards is expected to continue, especially with more sensible energy and construction processes. The further decrease in the average household size will increase both demand for accommodation and average living space per person, with strong regional differences according to migration patterns (inward or outward)<sup>46</sup>.

Although a decreasing household size will tend to increase overall expenses on furniture and other household equipment, they are still increasing slower than average: neutral elasticities and moderate price increases yield a decreasing share for **household durables**.

The home **energy** expenditure shares are also expected to decrease further, mostly due to the emphasis on saving, both for heating and electrical appliances, made possible by technological advances and rising environmental awareness. A big uncertainty for this segment stems from price changes. The inflation rate considered here is relatively high (at 1.7% p.a., which translates into a doubling of energy prices by 2050) but may still be underestimated.

<sup>45</sup> An alternative way to account for changes in consumer preferences is obviously to incorporate them directly in a forecast of elasticities but this is very tricky and the impact is then less transparent to the reader.

<sup>46</sup> See Just (2003)





**Consumer preferences and technological innovations: more demand for entertainment**

An arrow is displayed on the graph to reflect the fact that potential savings are expected to further decrease this share.

The **entertainment** segment is tricky to comment on, since it gathers widely different subsegments. The overall share increase forecast here is driven by high income elasticity and above-average price increase. Its main component, *leisure and cultural services* (sport, theatre, concerts, attraction parks, movies, radio and TV fees, etc.) is a growth segment, mostly due to a growing desire for a better work/life balance as well as the erosion of traditional social structures. Increases in real demand as well as prices are expected to lead to a sharp increase in the share of this subsegment. The subsegment referring to *audio-video and computer devices* is strongly influenced by technological innovations (devices are becoming smaller, faster, more efficient, with an emphasis on multimedia) driving a low price increase, hence a stable nominal expenditure share in spite of increased real spending. As opposed to the already saturated TV market, only 67% of all households owned a computer in 2005 vs 57% in 2002<sup>47</sup>. The demand for *package travelling* is expected to continue to increase resulting from the traditional German fondness for travelling as well as from the increasing importance of leisure and free-time. The scope of the offer will broaden, as people request more originality and catering to their individual needs. For this segment as a whole, we also identified a trend (age effect) in 1.4: a higher propensity to consume for the older age groups. The various social factors just mentioned are expected to boost the entertainment expenditure share, on top of the results derived from our model.

**Mobility is on the rise: better equipped cars and more public transport**

The **transport** segment breaks with the past somewhat since its share shows a clear increase, as opposed to a fairly flat historical profile in nominal terms. This increase is driven by a relatively high overall price increase, comparatively high income elasticity and low price elasticity. The subsegments are different in nature but their growth reflects an overall increase in demand for mobility. Car sales are still expected to grow, although more moderately than in the past, with an emphasis on technology-driven quality (especially in the directions of environmentally friendly engines, communication and information systems, and safety). In terms of public transport, the commuter traffic is expected to increase slightly, in spite of the decreasing numbers of school children and students, because of road congestion, urban politics and potential road tolls. Expenses on rail and air transport are expected to increase, as part of a growing vacation budget.

**Growing importance of “health” and education and more responsibility for individuals**

**Health-care** shares should continue to increase for several reasons. The ageing of society is a contributing factor, although a small one, as the calculations discussed in Section 2 showed. The result obtained here is driven by above-average price changes, high income elasticity, and low price elasticity. People are becoming more health-conscious and attach greater importance to overall well-being. Technological progress will be an additional driver for increased expenditures. And the anticipated decrease in what the public health-care systems can afford will force households to cover more of their health-care costs. We consequently expect an additional increase in this share of expenditures.

The **education** expenditure share comes out as pretty much unchanged since the high price increase is dampened by neutral elasticities. Prices are indeed expected to increase well-above

<sup>47</sup> Informations-Technologie in Haushalten 2005, Statistisches Bundesamt.

average, as the state reduces its support, as already seen for higher education. For child care, more favourable family policy may lead to more moderate price increases and demand will be positively affected by the increase in female employment. In a broader sense, education expenses are anticipated to increase slightly due to growing demand driven by the ongoing switch from an industrial to an information and knowledge-based society as well as rapid technological change requiring life-long learning. People are increasingly aware that education is a good investment necessary to ensure long-term employability. We thus expect an additional increase in this expenditure share.

***The losers: Food, energy, household durables, clothing, communication***

**Basic needs food and clothing lose share as income grows**

The expenditure share of **food** has been steadily decreasing and is expected to continue this trend: as a basic need, food is not consumed in significantly higher quantities with growing income, so that its share decreases. It is however expected that food quality and nutritional value will gain in importance in the consumers' eyes, with increased consumption of organic food, which may slightly push food expenditures up<sup>48</sup>.

The expenditure share of **clothing** is also expected to continue its downward trend. It is however losing ground as a basic need and increasingly used to affirm one's personality and as a status symbol.

**Communication is becoming a basic need**

One can argue that **communication** is becoming a basic need on the ground that, along with food and housing, its expenditure share is decreasing with rising incomes<sup>49</sup>. Historically, its share has been increasing as a result of large increases in real demand dampened by price decreases. The result obtained here is combination of the forecast of low price increases as well as neutral elasticities, based on current data. The number of households with internet connection is expected to increase further (43% in 2002, it was 58% in 2005)<sup>50</sup>, as well as time spent surfing the internet, but it is doubtful whether this will increase expenses if flat rates are widespread. This "communication" segment will probably need to be redefined as the border with audio-video and computer devices (currently included in the entertainment segment) is increasingly blurred by the rapid development of "all-in-one" devices (MP3 players, video/TV, computer files via mobile phones). Telecommunications, information technology and the media are now growing together.<sup>51</sup>

The share of expenditures on **hotels and restaurants** (occurring only in Germany by definition of this segment) is expected to remain constant due to conflicting drivers. On the one hand, the increasing share of single households and double-income families will drive up the demand for out-of-home meals. This will, however, be dampened by an increasing interest in travelling abroad, even if Germany will likely stay the number 1 holiday destination.

<sup>48</sup> During the period from January to September 2006, German households increased their expenditure on organic food products by 17% compared with the same period of the year before. This reflects both a higher number of households buying these products (especially fresh goods and breakfast foods) and an increased number of health food purchases per household. (Organic food products surge ahead, Press Release January 11, 2007, GfK (Gesellschaft für Konsumforschung)).

<sup>49</sup> EVS 2003.

<sup>50</sup> Informations-Technologie in Haushalten 2005, Statistisches Bundesamt.

<sup>51</sup> See Stobbe and Just (2006).

The two major subsegments under “other” are **insurance services** and personal care. **Personal care** expenses are expected to increase in a society attaching growing importance to well-being and wellness. Expenditures are also expected to increase in the insurance area, for two reasons. Societal factors such as the fragmentation of society, discontinuity in employment, and the wearing out of the social security system contribute to a feeling of insecurity, hence the desire to have additional individual insurance. Also, given the ageing of society and decreasing pension transfers, people have an increasing need to secure pension income for a longer post-retirement life, through personal savings. This is expected to boost demand for such products in **financial services** as well. These factors are expected to lead to an additional increase in the expenditure share for “other” items.

## 6. Implications

These shifts in relative household expenditures, resulting in changes in overall demand will drive changes at several levels.

**Comfort and convenience in high demand, with implications...**

New markets (niches) will develop, especially to meet the specific needs of an ageing population. Focusing on the major segments masks substantial changes in demand for certain products and services. For example, companies have to re-think their range of products when ease-of-use and safety are a prime concern, whether in the home environment or pertaining to transport. Services, which are likely to gain in importance in a knowledge-oriented and ageing society, will need to adapt to a changing demand as well. The entertainment sector, for example, will be increasingly faced with growing demand for off-season, wellness-oriented vacations. In the health-care sector, budget constraints will result in more privatisation. Different models for the provision of these services will develop, combining purely market-based solutions with non-profit support networks.

**... for companies,...**

Companies which recognise at a sufficiently early stage the potential of the silver economy and opt for a meaningful strategy will reap the benefits. This requires adequate investment in development and innovation and a successful marketing strategy. A prerequisite is naturally a good understanding of the elderly, with their needs and preferences affecting the type of products or services offered, as well as all client interactions. To deepen this understanding, it is useful to bridge the typical age gap between developers/marketers and their consumers. One way to achieve this is to integrate older people into the company, as staff, or more feasibly for the oldest elderly, as “prosumers”.

In addition, shifts in demand will require a new employment structure, with implications for public policy-makers and private companies, as education and training schemes need to adapt accordingly. Individuals will then have the responsibility to commit to life-long learning.

**... policy-makers and individuals**

As a growing number of consumers will be retired and drawing their income from pension transfers and personal savings, pension policies and relevant offerings from financial service providers will have a key impact on consumption. Pushing up the retirement age is also likely to have major consequences for the 60-70 age group, on their income, lifestyle and consumption patterns. A judicious choice of immigration policies can also have a positive impact on overall consumption.

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