Household and Individuals: Two Sides of the Same Coin

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Household and Individuals: Two sides of the same coin

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Abstract: The well-known Stiglitz report has recommended a shift of emphasis from the current production-oriented system of economic measurement to one focused on understanding socio-economic inequalities between various groups of households. Accordingly, this could be accomplished by looking merely at the joint distribution of household's income, consumption and wealth rather than at production indicators.

Undoubtedly, the inter-generational dimension of the economic transfers becomes relevant within the shifted paradigm. It has lately been considered and studied within the international research community by a dedicated consortium of specialists led by Lee and Mason. The remarkable output of their efforts is known today as the System of National Transfer Accounts which aims to provide at aggregate level a measure of the reallocations of economic resources across various age groups.

From the above two mentioned ideas, one can immediately notice the duality of the two fundamental analytic units - household(s) and individual(s). Two related questions are the corner-stone for analysis.

a) *which is the best way to understand the new challenges, by considering individuals or households*?
b) *how to produce consistent statistics relevant from both perspectives.*

The second question has captured our attention due to the methodological challenges risen. Let us mention a few problems specific to this issue.

In our paper we propose a solution that facilitates the two-way trip from the household realm to the one of individuals by enabling the analyst not only to make consistent statistics for both household and individual perspectives, but also facilitates the aggregation of many important economic variables across these two important dimensions of well-being. The key role is played by a virtual register resulting from linking together the register of individuals with a register of households.

The register is further populated with corresponding variables representing personal features such as age and gender, together with a set household characteristics such as housing status, household composition, main source of income, age/gender of the head of the household and living standard. Two applications of the proposed method are considered, the Social Transfers in Kind (to go from the individual level to the household level), and private consumption (to go from the household level to the individual level).

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1. Introduction and background

Over the last years, we have seen an increased demand for socio-economic statistical information in the National Accounts. Gross Domestic Product (GDP) and other macro-economic indicators are important economic measures of the economy, but not suitable when wellbeing is considered. To allow for better measurement it is necessary that additional micro data is brought into the System of National Accounts (SNA). The SNA provides accounts that are comprehensive, consistent and integrated, and are therefore useful for economic analysis. But, because it lacks information on the distributions, this economic analysis does not go beyond the macro aggregates or the average for a household. Two of the most influential publications in the last years addressed this issue; the G-20 Data Gaps Initiative (Financial Stability Board, 2009) and the report of the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz, Sen, & Fitoussi, 2009). Both reports recommended a greater prominence for the household sector and a focus on distributions of economic flows within this sector. These initiatives led to task forces, expert groups and many country efforts to provide measures of inequalities in the household sector (among many others: Accardo *et al*, 2009; Braakmann & Schwahn, 2012; Durier & Richet-Mastain, 2012; Australian Bureau of Statistics, 2013; Bruil & Koymans, 2014).

Recently, the publication of Pikkety's book, Capital in the 21st century (2014), again showed the analytical possibilities gained by adding distributional information to the National Accounts. The immense work done on income and wealth distributions for a large number of years gained much attention. The use of tax data over survey data allows for a more refined analysis of inequalities, as survey data tend to undercount or miss the incomes of the richest individuals, the 1%.

The focus on inequalities is not the only point of interest that triggers the demand for distributions in the System of National Accounts. In the field of population economics, demographic changes ask for a greater knowledge of the age dimension in the SNA. Demographic changes are a major challenge for governments all over the world. In most developed countries the population is ageing due to a risen life expectancy and lower birth rates. For policy makers this raises some concerns, of which the sustainability of government transfer systems, funding of healthcare expenditures, or the fairness of

pension systems are most often debated. These topics all relate to the economic lifecycle of individuals, which shows that only during the working years individuals produce more than they consume. During the other years (youth and old age) Individuals are dependent on intergenerational transfers. When people are young they rely on their parents for consumption needs like food and shelter and during retirement people receive pension benefits and/or depend on savings. These demographic changes demand a clear understanding of the age dimension, but in its current state, the National Accounts framework does not cover this. Consequently, this framework has clear limits in explaining the role of age in the process of income generation, consumption, saving and (intergenerational) transfers. To meet these challenges, the National Transfer Accounts (NTA) has been developed (Lee & Mason, 2011; United Nations, 2013). This NTA, still being in the development phase, focuses for now on the economic lifecycle and the intergenerational reallocations of means. The economic lifecycle account juxtaposes labour income and total consumption; the difference between these two is called lifecycle deficit. This deficit has to be covered by definition by transfers or asset based reallocations. Especially this lifecycle deficit has received most attention (Vaittinen & Vanne, 2008; Kluge, 2009; Sambt, 2009). The first steps undertaken by Statistics Netherlands in the field of the NTA are described by Barb and Bruil (2014) and Bruil (2014).

Ideally the SNA framework is enriched with the distributional information needed to make any analysis wanted. Micro data provides the measures of the distribution of income, consumption and wealth, but the combination of the SNA with these micro sources is often difficult. Differences in definitions or concepts may cause inconsistencies between the SNA and the micro sources. Moreover both causes described above demand for a different institutional unit; inequalities are considered on the household level, demographic changes on the individual level. In the SNA, the individual is not considered as an institutional unit, it is stated that "*the household as a whole rather than the individual persons in it must be treated as the institutional unit*" (SNA 2008, §4.5). The reasoning behind this is that income and wealth is pooled together and consumption decisions are taken jointly within the household. However, the generational perspective can only be served meaningfully on the level of the individual, because age is an individual characteristic and a household often covers multiple generations. A focus on the household as an institutional unit would therefore be insufficient. This does raise many issues however because micro sources often provide distributional information only on the household level.

Linking micro information to the SNA raises many methodological questions, concerning for example the differences in concepts, scope or population. For the inequalities on the household level these are covered by Bruil & Koymans (2014), and in detail by Fesseau & Mattonetti (2013) who cover the approaches of members of the Expert Group on Disparities in a National Accounts framework. But enriching the SNA with distributions on an inidividual level aggravate these methodological questions as data limitations become more apparent. Moreover the publication of both household and individual distributions in the SNA ask for approaches that are consistent with each other.

Purpose and outline of the paper

In our paper we propose a solution that facilitates the two-way trip from the household realm to the one of individuals by enabling the analyst not only to make consistent statistics for both household and individual perspectives, but also facilitating the aggregation of many important economic variables across these two important dimensions of well-being. The key role is played by a virtual

register resulting from linking together the register of individuals with a register of households. The register that we propose brings a massive number of distributional information in the national accounts, both for the household and the individual sphere.

In the next section we describe the sources we have on distributional information and specifically address the data limitations we face. Difficulties arise when micro information is known on the household level but needed for individuals or vice versa. In section 4 we describe an ideal situation that allows us for the compilation of consistent statistics for both the household and the individual strata. We elaborated upon the cases in which we face data limitations, using examples for social transfers in kind and private consumption. In the last section we summarize and conclude.

2. Data sources and limitations

Adding distributional information for individuals and households to the national accounts brings forward the need for micro data that contain these distributions. There are a number of data sources available, all focusing on a specific subject, and with different populations. Some data sources focus only on households, which makes it difficult to consider the individual level. Sometimes only an estimate is available for individual age groups. For our purpose, to go back and forth between individuals to households, we need to link both spheres. For this we built a virtual register.

For income components, in the Netherlands, the Income Panel Survey (IPS) is available. This is an annual survey, taken from administrative records of multiple registers (including tax data). The IPS gives results for individuals and households, already allowing for the switch between both points of analysis. The results for individuals have to be considered with care. Some variables are imputed instead of measured and are allocated to one person in the household, this is the case for income from owner occupied dwellings for example. For tax data it could be that because of fiscal rules (income) components are relocated within households. Allocating the imputed items to the head of the household, and shifting income components to the person with the highest income causes a gender bias, because the head of the household is often male.

The individual consumption expenditures by households are covered by the Household Budget Survey (HBS), which is an annual cross-sectional survey. It excludes people living in non-private dwellings such as prisons and hospitals, which differs from the scope of the SNA. The results are published only on the household level. Using this data source only, it is not possible to analyse the individual consumption.

Wealth data are available as part of the IPS for now, but in the very near future as a full register. This register will contain almost all assets and liabilities households have. This information is not available on the individual level and pension claims are not part of this source. This data is derived mainly through tax data. The pension claims are not part of the taxable wealth and also falls outside the scope of the micro statistics. The Pension Claims Statistics (PCS) does measure these claims, on an individual basis. However, only for the working population. The wealth statistics for now have difficulties measuring small loans (that stay outside the focus of the tax authorities), savings related to mortgages, and the wealth of self-employed. For all these three issues currently a project runs to improve the estimates.

Part of actual consumption and adjusted disposable income are the social transfers in kind. These are hardly measured by data sources, even though the total amount is considerable. In the Dutch National Accounts the total social transfers in kind amount to more than 100 billion euros in 2010. For a large part this is due to the expenses on education or healthcare, and much less to social protection in kind. For each of these social transfers information on distributions can be found, but it is difficult to find a full coverage of population. Until 2009 we used data from the National Institute for Public Health and the Environment (Slobbe, Smit, Groen, Poos, & Kommer, 2011) on healthcare costs per age group for men and women. This is available only for the years 2003, 2005, 2007 and 2011. This data source covers the Exceptional Medical Expenses Act (AWBZ) and the Healthcare Act (ZVW), which are together about 30% of the total social transfers in kind. Education is the other important consumption group, but here also there is limited information. For this we use no direct sources, but make estimates by imputing average values per age class per education type. This is not further explained upon in this paper.

Table 1 shows the data limitations per NA dimension and data source. It shows that data is often available either for individuals or for households, but seldom both. Only the IPS covers both perspectives.

Individuals	Source per dimension	Households
Income		
No coverage of imputed National Accounts transactions (except owner-occupied dwellings). Not all income components are easily identifiable as individual, due to tax regulation or imputation.	IPS	No coverage of imputed National Accounts transactions (except owner-occupied dwellings).
Consumption		
Not available	HBS	Institutional households are outside the scope of the HBS.
Wealth		
Not available	WS	Small loans are not identified. Assets and liabilities of self-employed are only available as a balance. Savings related to mortgages are not identified. Pension wealth is not part of the scope of the WS.
Only available for the working population (21-65 years).	PCS	Not available
Social transfers in kind		
Only information available for combinations of 21 age groups * gender.	Exceptional medical expenses act (AWBZ)	Not available
Until 2009 only information available for combinations of 21 age groups * gender, from 2009 onwards a full register is available on the individual level with healthcare costs relating to the Healthcare Act (ZVW).	Healthcare Act (ZVW)	Not available
Total spending per education type available and number of children enrolled per age class per education type	Education	Not available

Table 1: Data limitations

3. Virtual National Accounts Register

Our approach to combine all data sources available in a virtual national accounts register needs two main building blocks. These are a complete register of all individuals living in the Netherlands, and a register of all household living in the Netherlands. Each of these registers contains characteristics of either population, e.g. age and gender in case of individuals and housing status, main source of income and household income in case of households. The characteristics are of course not limited to these examples.

In this paper we will present the general idea of the virtual national accounts register and illustrate the use of it with two examples. The first example will show how social transfers in kind are estimated on the household level, the second example will cover the trip from the household to the individual realm focusing on private consumption.

Building a national accounts register

Let $\Pi = \{\pi_1, \pi_2, \cdots, \pi_N\}$ and $H = \{h_1, h_2, \cdots, h_M\}$ denote the population of individuals and households, respectively, where $M < N$ since the number of households cannot exceed the one of individuals. A person $\pi_i, i \in \{1, \cdots, N\}$ is assumed to be characterized by various features such as age $\ell_i \in \{0,1,\cdots,100\}$, gender $\gamma_i \in \{M, W\}$ - M – man, W – woman, marital status $\mu_i \in \{0,1\}$, 0 – single, 1 – has a family relationship, etc.

Person	Age	Gender	Marital status	Household code	…
π_1	ℓ_1	γ_1	μ_1	j_1	⋮
⋮	⋮	⋮	⋮	⋮	⋮
π_i	⋮	γ_1	μ_i	j_i	⋮
⋮	⋮	⋮	⋮	⋮	⋮
π_N	ℓ_N	γ_1	μ_N	j_N	⋮

Similarly, a household $h_i \in H$ is uniquely characterized by its code $j_i, i \in \{1, \cdots, M\}$. For any such a household we assume that the age of the household head λ_i is known and so are a number of other relevant features such as n_i - the number of household members, etc.

Household code	Age of household head	Number of members	…
j_1	λ_1	n_1	⋮
j_2	λ_2	n_1	⋮
⋮	⋮	⋮	⋮
j_M	λ_M	n_M	⋮

When integral information is available over both populations, that is the above variables are tabulated in registers for all persons and household, one can navigate from one register to another one by simply coupling them together, using the natural family bond relationship

$$\forall \pi_i \in \Pi \Rightarrow exists \quad unique\, h_j \in H\, such \quad that\, \pi_i \in h_j \tag{1}$$

However, such an integral recorded information is not always available. Since many statistical offices around the world have developed estimation methods based on surveys, what is available are measurements on a subpopulation level, say $\hat{H} \subset H$. Clearly the challenge consist is estimating as accurate as possible the non-observed sub-population $\tilde{H} = H - \hat{H}$. By doing so, one generates "surrogate" information that can be added to the available measurements. Such a pair of registers is called virtual. Obviously, the better one can estimate the non-observed part, the more accurate are the statistical claims one can make. Two relevant remarks are worth to be made:

1) The quality of the estimation made on the unobserved part can be improved when new sources of information are available at a later moment in time. This updating operation is performed mostly when a revision of the national accounts is done, but also can take place in a model maintenance cycle. In the limit case it converges to the true but non-observed part.
2) In that matter, we have had a positive experience with the synthesis of a virtual pension register where pension entitlements have been estimated (Barb, Dzambo I, Eenkhoorn, & Zijlmans, 2012).

Example 1: Social transfers in kind: from individuals to households

The first example shows the path from individuals to households. Let us consider the situation of health-care costs. Although the total costs of the national health system are recorded in national accounting as being a significant component of the government expenditure, the issue of estimating the average cost per diagnosis for a population that have been double stratified with respect to say, age and gender, has not been addressed to the best of our knowledge within classical national accounting framework.

In the Dutch case, the National Institute for Public Health and the Environment (RIVM) has performed during the last decade extensive research on the topic. Their findings are bundled together in the form of a broad study aimed at determining the demands on health care resources

caused by disease, age and gender and attempting to demonstrate the importance of the perspective on health expenditure (Slobbe, Smit, Groen, Poos, & Kommer, 2011). Their results are reported in six dimensions: health care provider, health care function, source of finance, age, gender and disease. In our example we shall restrict ourselves to two of them, age and gender. The raw data consists in average costs of health financed by the government, where the stratification is done with respect to 21 age-classes and gender. For the year 2007 these values are depicted in the following figure:

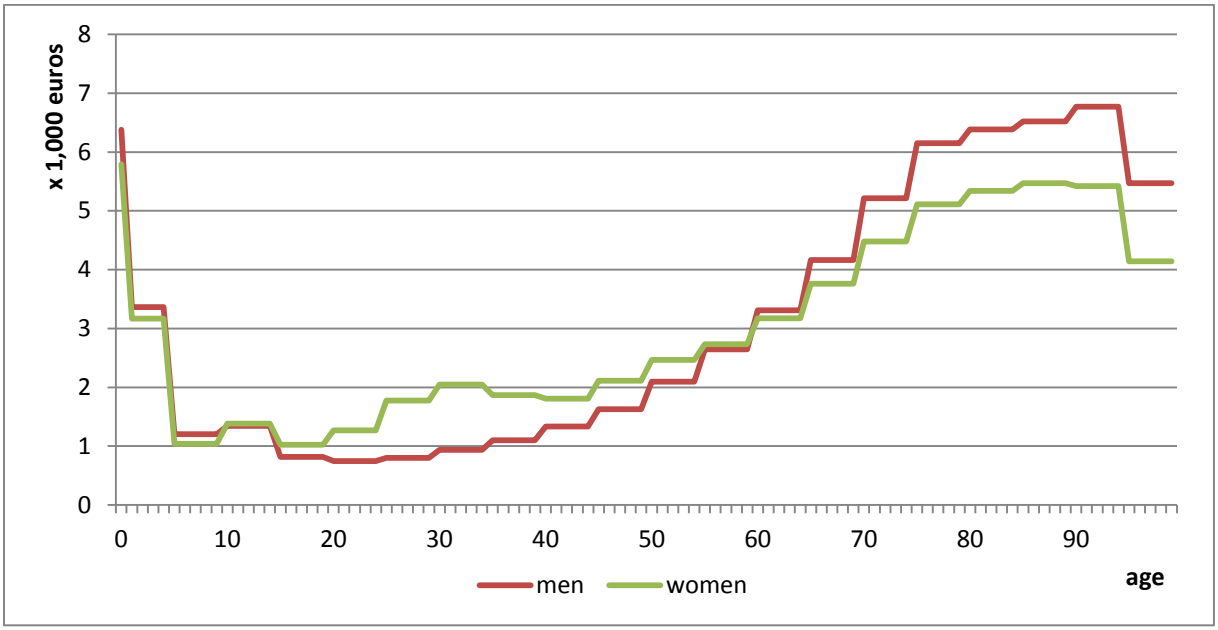

Figure 1: average healthcare costs in 2007 financed by the Dutch government w.r.t. to 21 age-classes and gender

Notice that if the virtual national accounts register would be integrally available, then individuals and households can be linked, the only thing remaining to be done is imputing eventually missing information on the individual level and aggregating over household. In our case we are interested in a much finer age-stratification, $0 \leq \ell \leq 100$, than provided by the RIVM. In order to obtained it, we apply a polynomial interpolation to the available strata-average data.

The RIVM data is only available for a couple of years (not for 2009), and only available for 21 age groups. Using this information we estimated an age pattern for 2009 for all ages (0-99+). The resulting 200 age patterns (200, because this was done separately for men and women) were imputed in the register. Because we know from each person their household, we can estimate the healthcare costs per household and per household type.

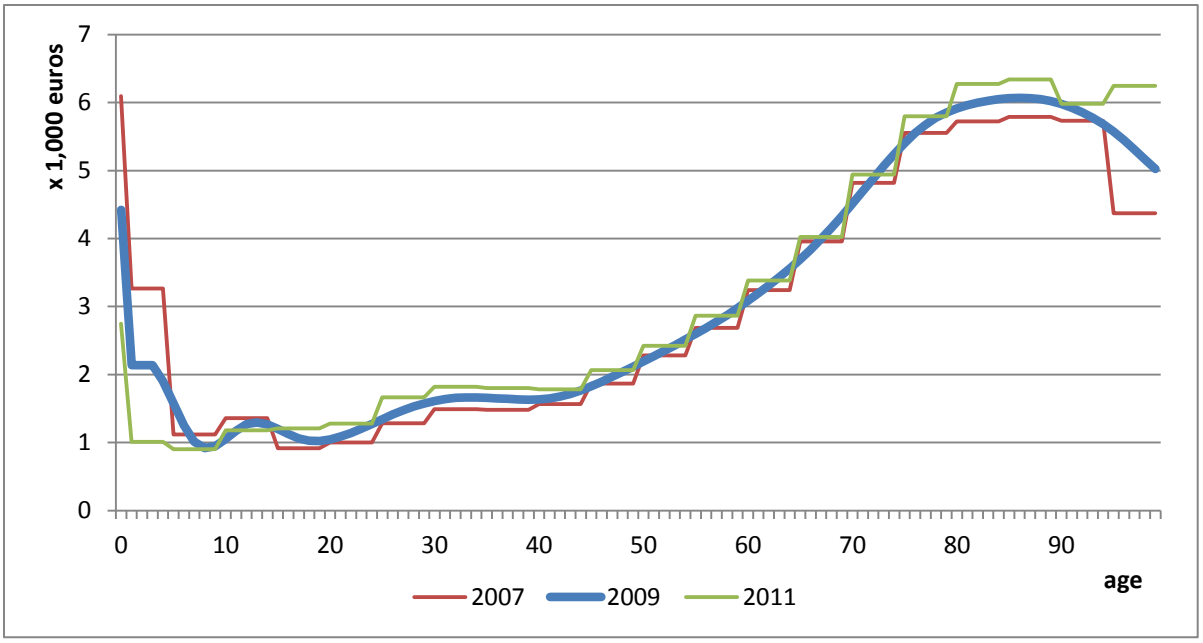

Figure 2: age profiles for 2009 for the total population

The problem we are facing is formulated as follows:

Let $\Pi = \{\pi_1, \pi_2, \cdots, \pi_N\}$ *denote the population of individuals assumed to be doubly stratified with respect to* K *age-classes and gender* $\gamma_i \in \{M, W\}$, $\Pi = \bigcup_{k \in K} \bigcup_{\gamma \in \Gamma} \Pi_{k\gamma}$, $N = \sum_{k \in K} \sum_{\gamma \in \Gamma} N_{k\gamma}$, *and let* $\bar{z}_{k\gamma}$ *denote the stratum-average of the health costs financed by the government* $\bar{z}_{k\gamma} = \frac{1}{N_{k\gamma}} \sum_{\pi \in \Pi_{k\gamma}} z_\pi(k, \gamma), \forall k \in K, \gamma \in \Gamma$ *.Let* $H = \{h_1, h_2, \cdots, h_M\}$ *denote the population of households assumed to be multi-stratified w.r.t. to an index of features* $H = \bigcup_{i \in I} H_i$ *and let* $\bar{z}_i = \frac{1}{N_i} \sum_{h \in H_i} z_h(i), \forall i \in I$ *.Compute then an estimation of the stratum average costs* $\bar{z}_i = f(\bar{z}_{k\gamma})$.

Our approach can be summarized as follows: let us consider for the sake of the argument a stratum H^* in the population of households of size M^* consisting in all families without children characterized by the fact that the age of the household head is between 35 and 40. For every such a family $\mathrm{h_i} \in \mathrm{H}^*, \mathrm{i} = 1, \ldots, \mathrm{M}^*$ is assumed that the identity of its members is known. In this case, one can immediately find in the population register the unique identification number of the man $\mathrm{m_r}$ and respectively the one of the woman w_p that are bond together within that family. Accordingly, their ages ℓ_{m_r} and ℓ_{w_p} are also known, let $\mathrm{k_m}$ and $\mathrm{k_v}$ denote the indexes of these age-strata and let then $\bar{\mathrm{z}}_{\mathrm{k_m}}$ and $\bar{\mathrm{z}}_{\mathrm{k_v}}$ de stratum-average values of the corresponding health-cost. By taking into account that there exists no register information about the health costs of these two particular

persons, we shall impute them in the virtual register by using exactly the values $\bar{z}_{k_m}$ and $\bar{z}_{k_v}$. Clear enough, $\hat{z}_{h_i} = \bar{z}_{k_m} + \bar{z}_{k_m}$ represents an estimator for the health-costs of the family h_i.

Results for 2009

For 2009 we can compare the results from this virtual register with results from an actual register that is available from this year onwards. The actual register contains information on healthcare costs on an individual level. These are simply balanced to the national accounts total and linked to the household register. The results in figure 3 show that our estimate of the virtual register quite reasonably compares with the results from the actual register. The modelling in the virtual register was done quite straightforward using the strata of only age and gender. The results shown indicate that income might play an important role as well. Refining the model using smaller strata (age * gender * household income) could take away the remaining differences between the results of these two approaches.

Note that the same exercise can be done in a survey as well (instead of a virtual register), when both households and individuals are available. However these surveys contain weights to go from the survey sample to the entire population, for example the IPS choses the weights for the households using 29 strata of household size, province, and age of the head of the household. These weights might not be representative for the added information, in case information is imputed or modelled in the survey. The example above only uses age and gender, which were both part of the weighting strata. However when household income would have been taken into account as well, this would fall outside of these strata. Using a virtual register the dependence of this weighting scheme is eliminated.

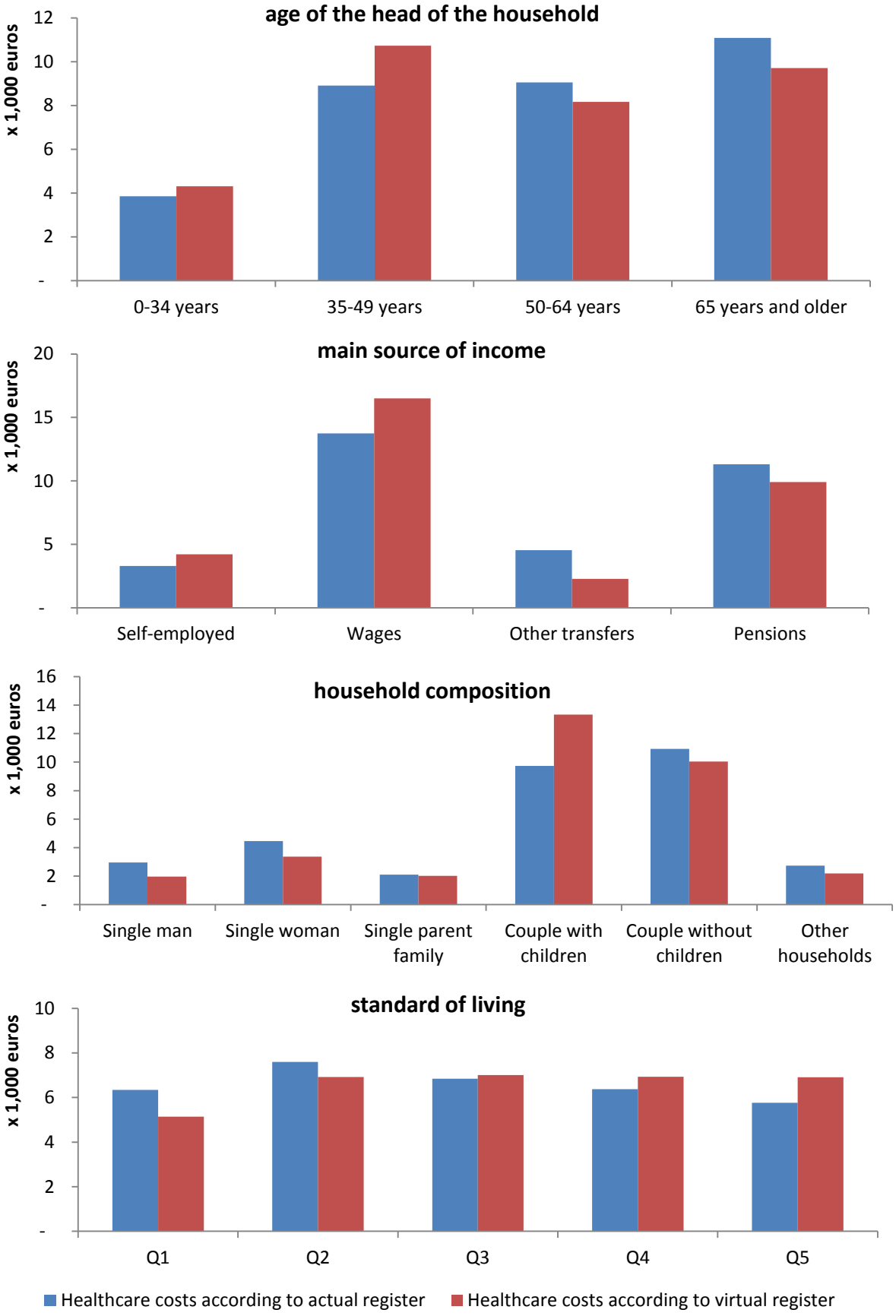

Figure 3: Comparison of healthcare costs estimated through the virtual register and an actual register (2009) for 4 household categories

Example 2: Consumption: From households to individuals

The second example shows how to go from households to individuals. This is less straightforward and only knowing which individual belongs to which household is not enough. A kind of distribution key is necessary, in order to allocated the data that is available on the household level over the individuals in the household. This distribution key differs per transaction considered. The distribution can be modelled using information available in the register, for example in case of the distribution of wealth over household members. Information on wealth is only available for households as a whole, but we do have information on income from wealth on an individual level. For example the distribution of dividend income per individual is known and can be used to allocated the wealth of households in stocks and bonds over the individuals.

The example shown in this section considers private consumption. Consumption has historically been measured at the level of households. The logic behind this is that many vital resources are jointly consumed. It is therefore often difficult to estimate the average value of many consumption related variables in a stratified population of individuals. Several option are available to derive these values. Among them, the most promising and commonly used is the equivalence scale representing a simple model of how resources are allocated to and consumed by various members of a given household.

Studies on distributions often consider equivalence scales. A multi-person household has more needs than a single person household, but these needs do not grow proportionally. A household of four persons does not have double the expenses on housing than a household of two persons, so it is said that larger households have economies of scale. To be able to account for these economies of scale, each household is assigned a value in proportion to its needs. This value is based upon equivalence scales. With these equivalence scales each household is recalculated to a single person household.

Three allocating strategies are considered: the Oxford Modified Equivalence Scale, the equivalence scale designed by the National Transfer Accounts project, and the equivalence scale designed by Statistics Netherlands.

- The Oxford Modified Equivalence Scale (OMS) assigns a value of 1 to the head of the household. Each other adult (14 years or older) is assigned a value 0.5 and each child (younger than 14) 0.3.
- The equivalence scale designed by the NTA project scale, that gives the value 0.4 for children age 4 or younger, and is equal to 1 for adults age 20 and older. For the ages between 4 and 20 there is a linear increase (United Nations, 2013, p. 100).
- The equivalence scale of Statistics Netherlands depends on the household composition, i.e. the combination of number of adults and number of children (see figure 4 below). For the households outside this table the formula $E = \{A + (0{,}8 * C)\}^{0{,}5}$ is used, where E is the value of the equivalence scale, A the number of adults, and C the number of children. We use the parameters in this formula for adults (1) and children (0.8) (Statistics Netherlands, 2011).

Number of adults	Number of children				
	0	1	2	3	4
1	1	1.33	1.51	1.76	1.95
2	1.37	1.67	1.88	2.06	2.38
3	1.73	1,95	2.14	2.32	2.49
4	2	2,19	2.37	2.53	2.68

Figure 4: Equivalence scales Statistics Netherlands (grey cells are estimated using extrapolation).

Private household consumption is measured by the Household Budget Survey (HBS). It measures average consumption on the aggregate level of identified household characteristics, like household composition (see figure 5 below), household main source of income or of the head of the household. These households characteristics are known in our virtual register, and the average consumption expenditures are imputed in the virtual register. The total household consumption expenditures are allocated over the household members using the equivalence scales.

			Total consumption	Food and non-alcoholic beverages	Alcoholic beverages, tobacco and	Clothing and shoes	Housing, water, electricity, gas	Healthcare	Education	Other
Total households			32,6	3,3	0,6	1,7	9,3	0,4	0,4	17,0
Singles	men	younger than 65 years	21,9	1,8	0,5	0,6	7,5	0,2	0,2	11,1
		65 years or older	20,5	1,6	0,4	0,5	8,6	0,2	0,0	9,2
	women	younger than 65 years	21,5	1,7	0,4	1,1	7,1	0,3	0,3	10,8
		65 years or older	20,2	2,0	0,2	1,0	8,6	0,5	0,0	7,8
Couples	Without children	age of the head younger than 65 years	38,0	3,6	0,9	1,9	10,1	0,6	0,2	20,8
		age of the head 65 years or older	32,8	3,4	0,6	1,3	10,1	0,6	0,0	16,8
	With children	only underage children	43,8	4,9	0,6	3,0	10,4	0,5	0,5	23,9
		at least one child of age	46,1	5,0	0,8	2,5	11,3	0,5	1,4	24,6
Single parent family		only underage children	27,3	3,0	0,3	1,8	8,3	0,3	0,4	13,2
		at least one child of age	33,2	3,1	0,8	1,7	9,3	0,5	0,8	16,9
Other multi-person households			46,6	4,5	0,9	2,2	10,5	0,8	0,9	26,9

Figure 5: Average private consumption per household type (2010)

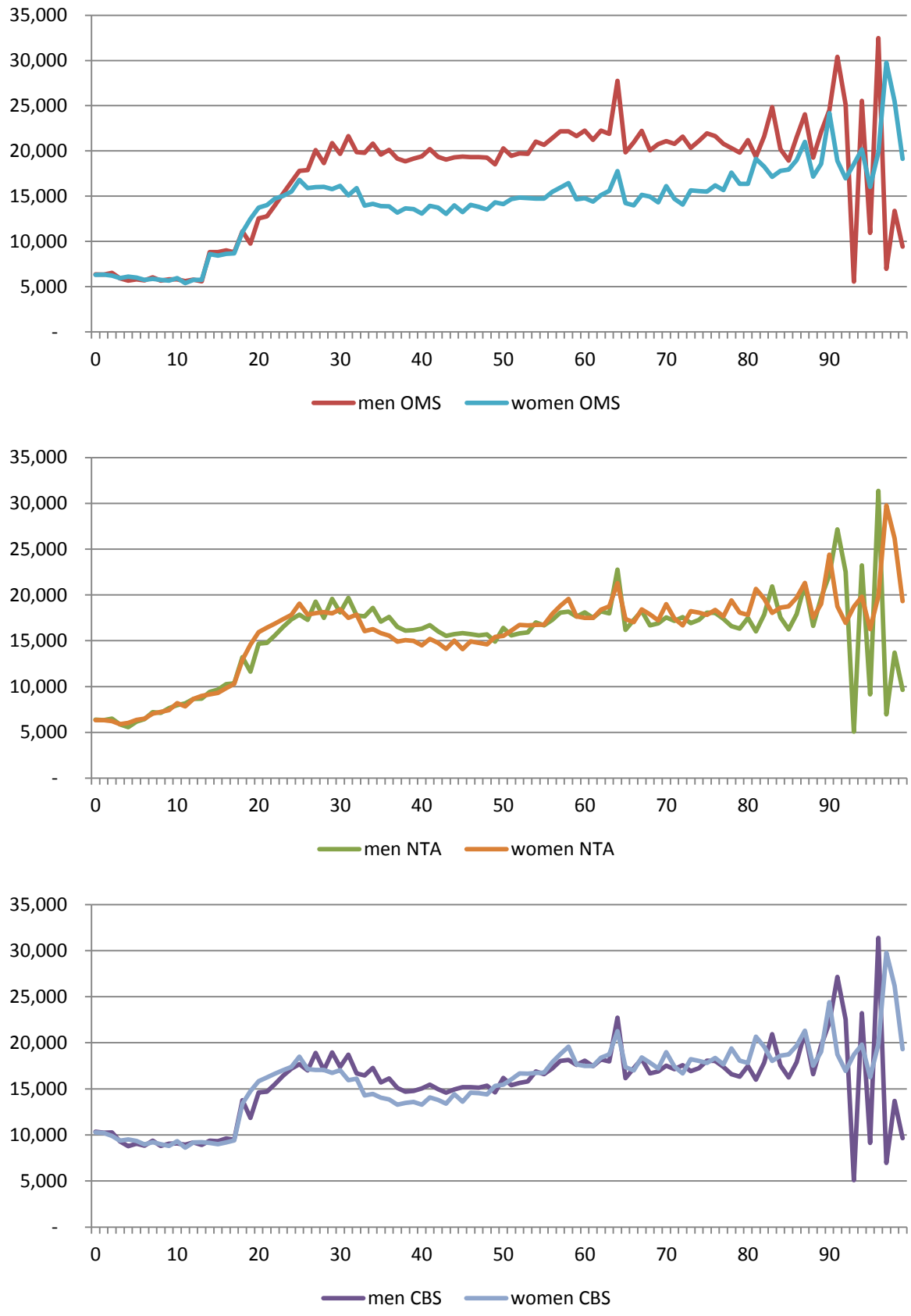

Figure 6: Consumption patterns for men and women using three equivalence scales (2010)

The results for the Oxford Modified Equivalence Scale show different consumption patterns for men and women. Obviously it is perfectly reasonable that men and women do not buy the same goods, or the same amounts of goods and therefor have different consumption patterns. However the resulting age patterns from this equivalence scale arise because the household head is used as a deciding characteristic in the allocation. In most cases the household head is male and they will therefor get assigned a higher value than the partner, who is often female. The choice for this equivalence scale is not feasible for the Netherlands. The differences between the NTA scale and the scale of Statistics Netherlands (CBS) are much smaller and only apparent for the younger ages. We prefer to use the latter scale, because this is designed using the country specific consumption patterns for the Netherlands.

These resulting consumption patterns are volatile between subsequent age groups, especially for the ages above 90 years. For men, these age groups are not well populated, for women this coverage is better. For these ages perhaps it is better to present them as one age group of 90+. But also the patterns for the other ages are volatile. We used a smoothing procedure (Friedman, 1984) to eliminate the noise in these age patterns. Figure 6 shows that private consumption is somewhat higher for men than women for the ages 26-49, from the ages 65 and above women consume more than men. Whereas the consumption of men declines for the ages above 90 years, this still increases a little for women. However for the highest ages the volatility is largest and the resulting age profiles are less reliable.

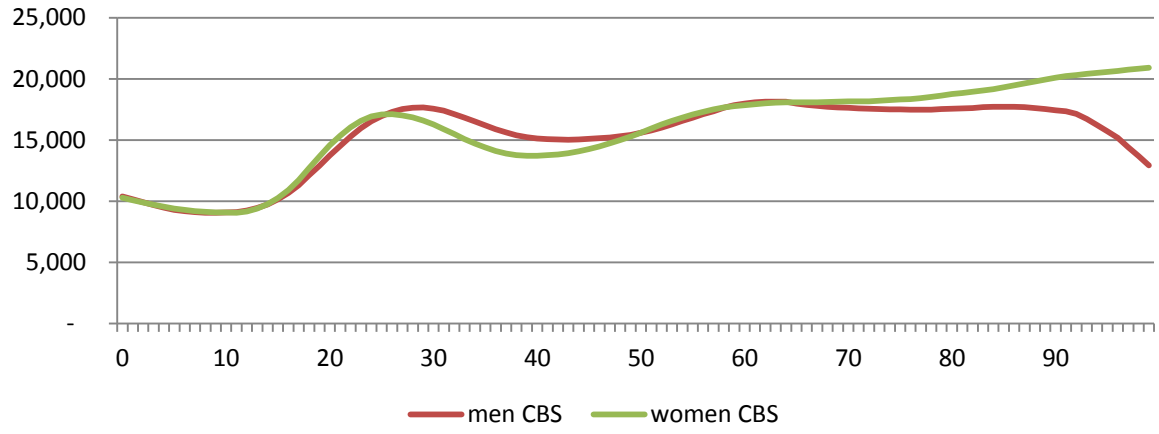

Figure 7: Smoothed consumption patterns for men and women (2010)

4. Summary, conclusions and further work

In our paper we have proposed a solution that facilitates the two-way trip from the household realm to the one of individuals by enabling the analyst not only to make consistent statistics for both household and individual perspectives, but also facilitating the aggregation of many important economic variables across these two important dimensions of well-being.

The key role is played by the synthesis of a “virtual register” resulting from compiling together the register of individuals with a register on households. Both are filled with available information on distributions of SNA transactions. The register that we propose brings a massive number of

distributional information in the national accounts, both for the household and the individual sphere. The model based imputation approach makes possible the two-way trip between the statistical populations, the one of households and the one of individuals, which otherwise would be difficult. Moreover, such a register can further be coupled to any other statistical register, say a company register, provided that such a coupling key is available. The variety and the richness of statistical claims is tremendous.

Let us finally notice that the quality of the data stored in such a register can gradually be improved when new information on a particular topic in question is available or, in the case of model based imputation of missing data, a finer and more accurate model is developed. The Healthcare Act example is a good example of this. Taking into account that SNA transactions are often imputed since their coverage on micro-data level is limited, one can expect also an improvement in the quality of inferred statistical claims on individuals and households.

This project will run further in the years to come. It is expected that at the end of this year register information on wealth will be available for the years 2012 and 2013. In 2015 the income components from the IPS will become available as a full register as well. Also information on other transactions, like child day-care (a component of the social transfers in kind) recently became available for a number of years. The latter register can possibly replace the modelled approach that is used currently.

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