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¹ The opinions expressed and arguments employed in this paper are those of the author, and should not be considered as representing the official views of the OECD or of its member countries.

Summary

This paper deals with the set-up of a satellite account for unpaid household activities. It will first discuss a framework in which the traditional System of National Accounts (SNA) is enlarged with observed data according to time-use surveys, to arrive at an integrated approach in physical units (hours). In this framework time spent on paid labour activities, unpaid labour activities, education and training, leisure time, etc. is integrated in one comprehensive framework, providing ample opportunity to monitor and analyse changes and trade-offs between time spent on activities which are traditionally recorded in national accounts and time spent on unpaid household activities. In addition, it is proposed to break out certain national accounts transactions that are particularly relevant in the context of monitoring and analysing unpaid activities, such as, for example, consumption expenditure on food and other materials for preparing meals, various consumer durables used in the production of household market services, and market services which may be close substitutes to the relevant non-market services.

Subsequently, a conceptual framework is provided to actually value and fully integrate unpaid activities into the System of National Accounts (SNA). In this framework the standard production boundary of the 2008 SNA is extended by including domestic and personal services which are currently excluded from the system of national accounts (the preparation of meals, taking care of children, cleaning, repairs, volunteering, etc.). It also dwells upon the treatment of leisure time, and how this could add to the well-being of people. Also the possible extension to the creation of human capital is shortly considered. The envisaged framework deals with all the changes needed to arrive at a fully consistent recording of unpaid activities. As such, it will go well beyond the sheer impact on GDP of valuing unpaid activities, by also showing the potential impact on the other national accounts variables. Some quantitative examples on the impact of the various changes, for GDP and disposable income of households, are presented as well.

Key words: national accounts, households, non-market goods and services, time use, satellite accounts

1. Introduction

1. One of the more fundamental criticisms when it comes to the System of National Accounts (SNA) concerns the non-recognition of services provided within households as being part of the production boundary, thus not adding to output, value added and GDP. As a consequence, GDP growth is supposedly overestimated in times of an increasing participation in the labour market, which often coincides with a substitution of unpaid (or non-market) household activities, such as preparing meals and taking care of children, to purchasing the relevant services on the market.

2. The Report by the Commission on the Measurement of Economic Performance and Social Progress, more commonly referred to as the Stiglitz-Sen-Fitoussi Report (Stiglitz, Sen and Fitoussi, 2009), also acknowledges this point of critique, as part of recommendation 5: *“Broaden income measures to non-market activities”*, using the following rationale: *“... for many of the services people received from other family members in the past are now purchased on the market. This shift translates into a rise in income as measured in the national accounts and may give a false impression of a change in living standards, while it merely reflects a shift from non-market to market provision of services. Many services that households produce for themselves are not recognized in official income and production measures, yet they constitute an important aspect of economic activity”*. The Report goes on with also considering the inclusion of leisure, to improve inter-temporal and inter-spatial comparisons: *“Consuming the same bundle of goods and services but working for 1500 hours a year instead of 2000 hours a year implies an increase in one’s standard of living”*.

3. However, the Stiglitz-Sen-Fitoussi Report does not propose to change the central framework of the SNA. Instead, it suggests to compile *“comprehensive and periodic accounts of household activity as satellites to the core national accounts”*, to complement the more traditional picture. This paper deals with the set-up of such satellite accounts for household non-market services. Before getting into the details, the paper first discusses, in section 2, the main pros and cons of including the relevant non-market services in the production boundary of the SNA.

4. Section 3 then puts forward a framework in which the traditional supply and use framework is enlarged with observed data according to time use surveys, to arrive at a more integrated accounting of time use in physical units (hours). In this framework time spent on paid labour activities, unpaid labour activities, education and training, leisure time, etc. is integrated in one comprehensive framework, providing ample opportunity to monitor and analyse changes and trade-offs between time spent on activities which are traditionally recorded in national accounts and time spent on unpaid household activities. In addition, it is proposed to break out certain national accounts transactions that are particularly relevant in the context of unpaid activities, such as, for example, consumption expenditure on food and other materials for preparing meals, various consumer durables used in the production of household non-market services, and market services which may be close substitutes to the services produced within the households.

5. Subsequently, in section 4, a conceptual framework is proposed to actually value and fully integrate household non-market services into the System of National Accounts (SNA). In this framework the production boundary of the 2008 SNA is extended by including household non-market services which are currently out of the scope of official national accounts estimates. Furthermore, the impact of further extensions related to leisure time, and the inclusion of human capital, is shortly addressed. The envisaged framework deals with all the changes needed to arrive at a fully consistent recording of unpaid household activities. Usually studies on the impact of such changes are limited to how GDP is affected. However, in a consistent set of national accounts, changing the production boundary necessarily leads to changes in other income and expenditure items as well. The paper thus goes beyond the sheer impact on GDP of valuing unpaid activities, by also shortly describing the impact of including the production of household non-market services on indicators that are part of the so-called institutional sector accounts for the households' sector (household disposable income, savings, etc.).

6. Finally, in section 5, some quantitative examples are presented on the impact of the various changes, mainly for GDP and household disposable income. Section 6 summarises and concludes.

2. Defining the Production Boundary in the System of National Accounts (SNA)

7. The inclusion or exclusion of non-market services produced within households in the System of National Accounts (SNA) very much depends on the so-called production boundary, defining which productive activities should be accounted for in the compilation of national accounts. The 2008 SNA international standards define a general production boundary, and a more specific boundary to be applied in the actual compilation of national accounts. The general boundary is defined as follows (§ 6.24):

“Economic production may be defined as an activity carried out under the control and responsibility of an institutional unit that uses inputs of labour, capital, and goods and services to produce outputs of goods or services. ... A purely natural process without any human involvement or direction is not production in an economic sense. For example, the unmanaged growth of fish stocks in international waters is not production, whereas the activity of fish farming is production.”

8. According to the general production boundary, it is clear that non-market activities within households, such as preparing meals, taking care of children and cleaning, are part of production. However, the (2008) SNA actually prescribes a more restrictive boundary, specifically in relation to non-market activities within households. The production of goods within households is included, while the production of services is excluded with the exception of owner-occupied housing and the production of domestic and personal services by employing paid domestic staff. The main reasons for the exclusion of the main part of non-market services produced within households are summarised in § 6.30:

“..., the reluctance of national accountants to impute values for the outputs, incomes and expenditures associated with the production and consumption of services within households is explained by a combination of factors, namely the relative isolation

and independence of these activities from markets, the extreme difficulty of making economically meaningful estimates of their values, and the adverse effects it would have on the usefulness of the accounts for policy purposes and the analysis of markets and market disequilibria.”

9. One could add that the inclusion of household non-market services may hamper the interpretability of some headline indicators that can be derived from the system of national accounts, in the sense that, for example, household disposable income would deviate substantially from the common perception of income, including income definitions that are being used in micro-surveys and administrative data on households. Some would argue against this point by stating that the SNA already includes various imputations, among which non-market goods produced within households and services of owner-occupied dwellings, but – as I see it – there is a substantial difference in terms of consensus on the economic relevance of the items, the exact delineation and valuation, and the reliability of the estimates. In this respect, purchasing a house usually involves an outright comparison between paying rents and the costs related to taking out a mortgage loan and/or investing own funds. One can also observe that in some countries the imputed value of the income generated through occupying an own dwelling is taxed. Moreover, the sheer magnitude of the adjustments is much larger. Whereas services of owner-occupied dwellings typically stay (well) below 10% of GDP in OECD countries, the addition of other non-market services would lead to a change of GDP in the range of 15 to 60%, depending on the country and the methodology applied. Valuing leisure time may add another 20% or more to GDP, again depending on the country and the methodology applied. Furthermore, measuring output and value added is far easier in the case of owner-occupied dwellings, by the possibility to estimate market-equivalent rents based on actual rents of similar dwellings in the real estate sector.

10. The above arguments underlying the current production boundary in the central framework of national accounts seem to be more related to practical considerations than motivated by conceptual arguments. On the other hand, when addressing “... *the extreme difficulty of making economically meaningful estimates of their values ...*”, this also concerns problems of appropriately delineating non-market services that are to be included. Stiglitz, Sen and Fitoussi (2009) lists a number of these issues, for example the allocation of travelling time and the allocation of eating and drinking time, or the delineation with leisure time more generally (see paragraph 23 as well). A related issue concerns the proper allocation of combined activities, such as taking care of children while cooking or cleaning. One could also add here that in many cases the non-market services produced within households may not be that similar to market services. For example, taking care of children by (grand)parents cannot really be put on a par with paid childcare in a kindergarten. Also a meal produced at home may be quite different from having a meal in a restaurant.

11. When it comes to the valuation of non-market services within households, in practice, almost all available studies try to arrive at a market-equivalent price, by applying a type of costs-based approach to the valuation of the relevant services. In this approach, the value of output is assumed to be equal to the sum of costs related to the inputs of labour,

capital and intermediate goods and services². However, different from applying this methodology to government services where actual salaries and wages are paid, the use of the costs-based methodology in the case of household non-market services is much more debatable, the main reason being that for the main part of the costs involved, i.e. labour input, no actual payments are involved. As a consequence, one needs to impute a value for this input category.

12. In imputing a value for the time spent, two basic methods can be distinguished, the results of which lead to substantial differences in the results:

- The replacement cost approach, where an average post-tax, hourly wage, representative of the broad range of activities covered in the production of household production of non-market services, is constructed. A full application of this approach would try to estimate the average wage costs for each of the activities separately. In this respect, a more detailed breakdown of the various unpaid activities would add to the quality of the estimates.
- The opportunity cost approach, which takes the average post-tax hourly wage across the whole economy, thus trying to estimate the market income foregone as a result of spending time on non-market activities at home. Here, a full application would typically calculate the opportunity costs of each individual. Having more background information of the time use survey respondents would thus add to the quality of the results.

Another more prudent alternative, which is also applied in this paper, is to use the equivalent of a post-tax hourly minimum wage rate to value the labour input.

13. When applying the above methodology to arrive at a market-equivalent price for the non-market services produced within households, one would also need to take into account possible divergences in the productivity of the labour input and the quality of the product. For example, taking care of 10 children in a kindergarten is clearly more effective than taking care of one's own child, although on the other hand, as stated before, the quality of the service of (grand)parents taking care of children is probably much higher. A second example concerns the preparation of meals, where one may assume that a professional cook is more efficient and most probably provides a higher quality product than someone preparing a meal at home for the family. The output value of an hour's work by a professional cook will therefore usually be higher than that of an average individual spending an hour on preparing meals at home. As it is practically impossible to take into account all these differences in productivity and quality, one usually considers them to be non-existent. As a consequence, one may assume that the above methodology of using a costs-based approach, especially in the case of the replacement cost and the opportunity cost approach, is likely to lead to a (significant) overvaluation of the non-market services produced within households.

14. Capital services, another component of the cost-based methodology, are related to the use of various consumer durables in the production of household non-market services, such as household appliances, motor vehicles and some types of furniture. As these goods typically have a service life which goes beyond one year, it is preferable to estimate a value of the capital services that can be derived from using the capital goods over their entire

² Doing so, often intermediate consumption is ignored, as these goods and services are already included in final consumption expenditure of households and in GDP.

service life, instead of using numbers on the annual purchases. Capital services consist of the costs related to the depreciation of the relevant equipment and a return on the invested capital. They can both be estimated by applying the so-called Perpetual Inventory Method (PIM). According to this method, the gross capital stock is calculated as the sum of past purchases, adjusted for price changes and also adjusted for the retirement of the durables after the end of their service life. The net capital stock is set equal to the gross capital stock minus the accumulated depreciation. Important pieces of information to apply the PIM are a sufficiently long time series of investments in the relevant consumer durables and information about their service lives. From these measures, the two elements of capital services, depreciation costs and return to invested capital, can be derived relatively “easily”, although in the case of the latter component one also needs to make an assumption on the interest rate to be applied. Here, one could use, for example, the interest rate on debt securities issued by central government.

15. It goes without saying that a very important piece of information to arrive at estimates of non-market services within households, both in physical and in monetary terms, concerns having high quality and timely data on the use of time related to the relevant activities. And here we have a very serious problem. Time use surveys tend to be of relatively poor quality and do not include the necessary granularity into types of activities and into types of respondents. Furthermore, the surveys are conducted quite irregularly, with time spans between consecutive surveys up to five years and more, with no alignment across countries, as a consequence of which an international comparison for a given benchmark year is not truly possible. They often also lack consistency over time, as a consequence of which developments over time may be compromised to a significant degree. Furthermore, the timeliness of the data is extremely poor, with time lags of several years not being exceptional, whereas on the other hand the first national accounts estimates are typically produced within 30-45 days after the end of the quarter. All in all, one may be able to derive some long-term structural developments on the use of time for producing non-market services within households, although with some caveats given the discontinuities of the surveys over time, but most certainly, one is not able to get more insights on the short-term, cyclical changes over time. For example, one would be very interested in the impact of the economic and financial crisis in 2008, with quickly increasing levels of unemployment, which is nearly impossible with the current state of affairs.

16. From a more conceptual point of view, further discussion and agreement is needed on the preferable method to value household non-market services, especially when it comes to the imputation for the compensation of hours spent on various activities. Which of the methods, replacement cost, opportunity cost or minimum wage cost, provides the best answer? The replacement cost method seems to be the preferable way forward, given that one may want to arrive at a market-equivalent pricing of the relevant services, but in that case further discussion is still needed on which activities to consider as being representative of the various household activities, and on how to adjust for differences in productivity and quality of the services provided, as compared to similar market services. Also which compensation concept to apply, before or after taxes and social contributions, warrants further reflection. And then one needs to have available the relevant figures at a sufficient level of detail, which at the international level is not always the case.

17. For all the above reasons, national accountants are not particularly inclined, to say the least, to extend the production boundary by including household non-market services in the central framework of national accounts. That does not preclude, however, the compilation of satellite type of accounts on a regular, not necessarily annual, basis. In the remainder of this paper, two types of satellite accounts are presented, one in which the traditional supply and use framework is “simply” enlarged with observable data which track developments in the area of household non-market services, and one in which the relevant activities are actually valued and fully integrated into the central framework of national accounts.

3. A Simplified Satellite Account for Monitoring Household Non-market Services

18. One of the “less complicated” and certainly less disputable alternatives for monitoring the developments and the relative importance of household non-market activities is to add further extensions and breakdowns to the traditional supply and use framework of the national accounts, as a kind of satellite account. The satellite account proposed in this section does not require the extension of the production boundary and related imputations of output and value added. Its compilation is “limited” to the addition of information from time use surveys and the inclusion of more detailed breakdowns of activities and products. This section gives a more generic overview, the main thrust of the principles underlying the construction of such a satellite account. It does not go into rather specific details, when it comes to the various extensions and breakdowns. This also depends on what is considered policy relevant, practical and feasible at the national level. Furthermore, the discussion is limited to adding time use data and more granularity of already existing information in the use table, as the relevant breakdowns do not add that much to the information content of the supply table.

19. The most obvious extension relates to adding data on time spent on various household activities, thus supplementing data on (paid) employment. Such data can be derived from time use surveys, although not always in the preferred detail. The OECD database on time use surveys contains, at the first level, a breakdown into five main activities:

- i. paid work or study (work-related activities);
- ii. unpaid work (household activities);
- iii. personal care;
- iv. leisure; and
- v. other activities not included elsewhere.

In this categorisation, travelling time has been allocated to the associated activity. As a consequence, travel related to paid employment has been added to the first activity, while travel time related to shopping, taking care of children, etc. has been allocated to the second activity.

20. The most relevant category for the purpose of constructing a satellite account for non-market activities within households, unpaid work (household activities), is subsequently broken down into the following subcategories:

- i. routine housework;
- ii. shopping;
- iii. care for household members;
- iv. care for non-household members;
- v. volunteering; and
- vi. travel related to household activities.

21. A slightly different classification is being applied by the Centre for Time Use Research (Department of Sociology, University of Oxford) in their Multinational Time Use Survey (MTUS); see <http://www.timeuse.org/mtus.html>. The following activities have been distinguished as being part of unpaid work: cooking/washing up, housework, non-routine domestic work, shopping, childcare, domestic-related travel, and education/study activities.

22. Ideally, one would prefer to have an even more detailed breakdown, to monitor shifts between non-market production and market purchases for some important service categories, such as preparing meals, cleaning, and taking care of various groups of people (children, elderly and sick people). Especially for the latter category, one can observe a continuous, and in an ageing society almost certainly further growing, political debate on the role of government versus personal responsibility, either by purchasing the relevant services on the market or by taking care of it yourself, including the financial implications for government and personal income.

23. Three further remarks may be relevant for the interpretation of the time use data, also when actually putting a value to the relevant services. First, it should be noted that the distinction between time spent on unpaid household activities and time spent on leisure may not be that clear cut. Some will consider gardening as a drag, while others will view upon this activity as a way to spend leisure time. Similarly, *“many view cooking - and then eating – as a most enjoyable leisure activity, not a chore that is easily substitutable with a meal in a fast food restaurant”* (Stiglitz, Sen and Fitoussi, 2009). A similar line of reasoning could be applied to taking care of children. In this paper, it is proposed to simply ignore the potential problems with the distinction between unpaid household activities and leisure time, thus following the perception and the allocation of time chosen by the households.

24. Secondly, some of the activities included under unpaid work for household activities concern activities that are not services provided within or to other households. Volunteering, for example, often relates to providing support to sports clubs or charity organisations, assisting teachers in schools, etc. The results of these activities are produced by households, but “consumed” by non-profit institutions. Subsequently, these non-profit institutions may deliver these services to other households, usually other households than the ones doing the volunteer work, which in the (2008) SNA are recorded as transfers (in kind) from the institutions to the households benefiting from the services. For these reasons, it is considered important to clearly distinguish the time spent on volunteering, as - when valuing the relevant time - it should also add to GDP (more specifically to the value added of non-profit institutions), but it should not (directly) affect final consumption of households. Only when it comes to “actual consumption”, which equals final consumption expenditure *plus* goods and services provided for free or at economically insignificant prices

by government and non-profit institutions serving households, it will add to the consumption of goods and services by households. The intricacies of this recording will be elaborated in the next section.

25. The final point concerns a possible double-counting with paid work. The production of goods by households for own final use, including such production as a result of volunteering work (for example when building a house or another piece of real estate for a family member or the community as a whole), is already included in the production boundary of the system of national accounts, and the hours spent on such activities should already be recorded as part of “paid work”, as defined by the (2008) SNA. Therefore, they should be excluded from the unpaid activities in the satellite account. Although the latter may not be that important in developed economies, it is certainly something to consider when analysing developing economies with a substantial level of subsistence farming. In this paper, the potential double-counting with paid work is ignored as well, mainly because it is considered negligible in the case of most economies considered in this paper.

26. Table 1 provides an illustrative example of how the proposed (extended) use table may look like, although it has to be noted that the table still needs further elaboration. It also includes some numbers, for illustrative purposes only. The data on the time spent on various activities have been included as additional rows at the bottom of the table. The introduction of these rows would also require a further alignment of data from time use surveys with the ones already included in the use table. This first and foremost relates to the alignment of data on hours worked, including possible consequences for hours spent on household non-market activities. Although included in the table, one could consider scoping down the rows containing the more detailed breakdown of unpaid household activities presented in paragraph 20, as this information could also be included more implicitly, by having additional breakdowns of economic activities, i.e. the columns of the use table. In respect of the latter, one has two options. The first one is to introduce additional breakdowns in the column “activities of households as employers; undifferentiated goods and services”, the other one is to include the relevant non-market activities in the columns of related market activities, such as transport and storage, accommodation and food service activities, and social work activities. In this paper, it is proposed to apply the second alternative, together with the introduction of more detailed breakdowns of market activities that can be considered as approximate alternatives for the provision of the most significant household non-market services. Such breakdowns may also allow for an improved estimation of the inputs into the production of the relevant non-market services, if only because of the availability of average earnings for similar market activities.

[Table 1]

27. A further step in developing the simplified satellite accounts relates to having more detailed breakdowns for some of the products, the rows in the use table, which are relevant for the production of household non-market services. This does not only relate to the intermediate inputs, such as those for the preparation of meals, but also to consumer durables such as transport vehicles, equipment for preparing meals, etc. Such information would also constitute important building blocks for the compilation of a full-fledged satellite account for household non-market services with an extended production boundary.

28. Looking at the products which are used as intermediate consumption in the production of household non-market services, three (potentially) important categories can be distinguished: food products that are being used for the preparation of meals, products related to travel activities, and products related to repairs and maintenance of consumer durables and dwellings. There actually may be other (intermediate) products that are used for the production of household non-market services, such as cleaning products for routine housework, but these are considered negligible as compared to the products already mentioned.

29. In distinguishing the intermediate products, one would prefer to have a relatively neat distinction between food products that are actually being used for the preparation of meals versus other food products. Here, it is proposed to simply include all food products included in items 01.1.1 to 01.1.7 of the Classification of Individual Consumption according to Purpose (COICOP), thus leaving out items that generally do not need any preparation, such as 01.1.8 - Sugar, jam, honey, chocolate and confectionery, and 01.1.9 - Food products n.e.c.. This grouping would also exclude beverages, alcoholic as well as non-alcoholic; food products sold for immediate consumption away from the home; cooked dishes prepared by restaurants and catering contractors for consumption off their premises; and food products sold specifically as pet foods.

30. In respect of travel services, the most significant candidates to break out are petrol, regular maintenance and (purchased) repair services. In this case however, one cannot allocate the full amount of the relevant products to the production of non-market services produced within households, as a significant part of the transport services is related to paid employment and leisure. One could possibly compile more detailed estimates of the various categories based on transport statistics covering data on kilometres travelled for various purposes.

31. In the case of repair and maintenance of consumer durables and dwellings, especially the intermediate consumption for the purpose of “do-it-yourself” activities related to dwellings may be quite significant. Here, one needs to make a distinction between major renovations, which are typically recorded as part of investments, and regular maintenance and small repairs. In the latter case, national accounts make a distinction between “... *more substantial repairs, such as replastering walls or repairing roofs, carried out by owners, (which) are essentially intermediate input into the production of housing services ...*” (2008 SNA, § 6.36), and minor repairs which are typically done by tenants. In the current system of national accounts, intermediate goods used for the former type of maintenance would end up as intermediate consumption of housing services, whereas goods used in the latter type are recorded as final consumption expenditure. Therefore, if one wants to do it conceptually right, one would need to make two adjustments: moving part from intermediate consumption of housing services, and moving part of final consumption expenditures. Another complication is that not all relevant goods may actually be used in the production of household non-market services, as part may be purchased for the use by a hired professional. For the time being, no allowance has been made in table 1 for these goods, not only because it is quite difficult to disentangle the relevant transactions in the system of national accounts, but also because time use surveys

do not allow for a separate recording of household non-market services related to repair and maintenance.

32. When it comes to the distinction of consumer durables which are relevant for the production of non-market services within households, one would typically want to include COICOP-items 05.3 - Household appliances; 05.4 - Glassware, tableware and household utensils; 05.5 - Tools and equipment for house and garden. A problem in relation to this categorisation is that significant one-off purchases, for example fully equipped kitchens, may be recorded as a non-distinguishable part of purchases of dwellings. Furthermore, when renting a dwelling, the use of these appliances may be included, as part of the rentals paid, as well. The other important category of consumer durables concerns transport equipment (item 07.1), for which the same point on the partial allocation, as discussed in paragraph 30 above, is relevant. Finally, one may also want to estimate capital services related to items 05.1 - Furniture and furnishings, carpets and other floor coverings, and 05.2 - Household textiles, but these would then feed into dwelling services.

33. It may also show to be useful to break out certain services which are recorded in the traditional national accounts and can be considered as close substitutes for household non-market services. Doing so, one could monitor and analyse shifts between these services, and the non-market services produced within households that do not comply with the production boundary of the SNA. In this respect, one could think of activities and services related to restaurants, taking care of children, elderly, and other people within or outside the same household, personal transport, and cleaning and general maintenance of dwellings.

34. All in all, one would thus arrive at an extended use table, as depicted in Table 1. If compiled over a longer period of time, say every five years, such a table could provide valuable insights into shifts between the production of non-market services within households and the purchase of similar services on the market. The analysis of shifts in hours spent on paid employment and hours spent on unpaid work could be supplemented by a more detailed analysis of changes in consumption behaviour, for example shifts in the purchase of products for preparing meals at home to purchasing meals at restaurants, etc. Whatever the case, the data in this type of satellite table would constitute an indispensable element in producing a satellite account, in which the production boundary is extended by including monetary estimates of non-market activities within households. This is the topic of the next section.

4. A Satellite Account for Household Non-market Services with an Extended Production Boundary

35. In this section, the use table of the previous section is further elaborated by making changes to the traditional production boundary according to the (2008) SNA, by including the production of non-market services for own final use within households (and volunteering), over and beyond the services that are already included in the system of national accounts, such as services from owner-occupied housing and the production of domestic and personal services by employing paid domestic staff. The various sets of changes in the recording and the valuation of household non-market services are discussed.

Subsequently, the impact on traditional GDP and other macro-economic indicators is shortly elaborated upon. The final results are illustrated in Table 2, in which the same numerical example as the one in Table 1 is used to better illustrate the impact.

[Table 2]

36. The first step in the process is to change the recording of the items in final consumption expenditure of households that are used as intermediate consumption in the production of household non-market services. As noted in the previous section, disregarding goods used in repair and maintenance of dwellings and consumer durables, this mainly relates to food products used in the preparation of meals, and petrol and maintenance and repair services used for the production of own-account travel services. The relevant items are shifted away from the column representing final consumption of households to intermediate consumption in the columns of the respective activities. The first-order impact is a lowering of GDP. However, later on, this will be compensated by the additional output of household non-market services calculated using the sum of costs: intermediate consumption, consumption of fixed capital or depreciation, imputed “mixed income” for the time spent on unpaid activities, and imputed return to capital.

37. The second step is a more complicated one, i.e. the change in recording of consumer durables used in the production of household non-market services. First, the recording of the relevant consumption items needs to be changed to investments, or gross fixed capital formation in the official terminology of national accounts, by shifting them away from the column for household final consumption to the column of gross fixed capital formation. Furthermore, the estimated depreciation and return to capital need to be added to the rows for consumption of fixed capital and “mixed income”, in the columns of the activities in which the consumer durables are being used for the production on household non-market services. The shift from consumption to investment does not affect GDP. However, the introduction of capital services will increase GDP, by adding to the value of non-market output produced by households.

38. The final step consists of attributing a value to the hours spent on unpaid activities. The resulting value could best be added to the row of “mixed income” of the relevant non-market activities. This balancing item, “mixed income”, is normally used for the production of goods and services of small unincorporated enterprises, where the resulting operating income from the enterprise typically consists of a mixture of (implicit) compensation for labour input of the owner and family members, and an operating surplus. In the case of household non-market production, the similarity is quite significant, as it would include the imputed compensation for time spent on unpaid activities and the return to capital for the wealth invested in the capital stock of consumer durables. It is preferable, however, to keep both items separate, as is done in Table 2, in order not to lose information.

39. For services produced by volunteering, the changes for imputing a value for the time spent are slightly more complicated, as it involves the free delivery of labour to another unit/sector. There are two possible ways of recording the free labour input provided to, for example, a school or a charity. One could impute, as is being proposed in this paper, compensation of employees payable to households in the accounts of non-profit institution,

the alternative being an imputation of output in the households sector, equal to the imputed value of “mixed income” for the time spent on volunteering, which is subsequently delivered or “sold” to the non-profit institution. In both cases, the imputed receipt of income by households needs to be counterbalanced by an equivalent current transfer from households to non-profit institutions, to balance the accounts of both sectors involved. In both cases as well, the output of non-profit institutions, calculated as the sum of costs, will increase, either as a result of increased compensation of employees or as a result of increased intermediate consumption (the “purchase” of the services delivered for free).

40. All in all, the impact on GDP of extending the production boundary with household non-market services equals the total of imputed mixed income (or, in the case of volunteering, the imputed compensation of employees) and the total capital services from consumer durables. Final consumption expenditure of households will increase because of the additional consumption of non-market services produced within households. On the other hand, it decreases because of the alternative recording of goods and services used in the production of the relevant non-market services, which add to intermediate consumption, and the shifting of consumer durables to gross fixed capital formation. Output and final consumption of non-profit institutions increases with the value of imputed income from volunteering.

41. Going further down the system of national accounts, primary income of households increases in par with the increase of GDP. Gross disposable income, however, increases slightly less, because of the imputed current transfer to non-profit institutions, balancing out the imputed income received from volunteering. Households’ gross saving increases in line with the balance of the changes in disposable income and final consumption expenditure, and equals the increase in investments, thus leaving net lending/net borrowing unaffected. The system of national accounts also includes an alternative disposable income and final consumption aggregate for households, the so-called “adjusted disposable income” and “actual final consumption”, in which income and consumption are adjusted for the goods and services provided for free or at economically insignificant prices by government and non-profit institutions serving households. These adjustments will increase with the additional output produced via volunteering.

42. It is clear from the above that not only GDP is affected by the extension of the production boundary with household non-market services, but also disposable income, final consumption and investments. Unless clearly distinguished, this may hamper a comparison with micro-data from income surveys of households, in which a much more traditional concept of income is applied. In this respect, it is also important to acknowledge the (additional) problems in interpreting income developments of households. Looking at a micro-level, extending the production boundary, may actually lead to a quite counterintuitive increase of income, when someone, for example, gets unemployed, receives say 70% of his previous income as a social benefit, and starts doing additional work at home. Also at a macro-level, something similar could happen, for example in the aftermath of an economic crisis with quickly increasing rates of unemployment, although clear evidence of such an event was not found in the numbers after the 2008 crisis, as the available numbers on hours worked on unpaid household activities were inconclusive.

Adding leisure time

43. There has also been discussion about potentially further extending the concept of household income by adding a value to leisure time. To do this consistently within the system of national accounts, one would need to further extend the production boundary as well, which is more problematic than in the case unpaid household activities, as time spent on leisure does not satisfy a basic principle for defining services. In this respect, § 6.16 of the 2008 SNA states the following:

“The production of services must be confined to activities that are capable of being carried out by one unit for the benefit of another. Otherwise, service industries could not develop and there could be no markets for services. It is also possible for a unit to produce a service for its own consumption provided that the type of activity is such that it could have been carried out by another unit.”

44. Alternatively, one could “simply” add a memorandum item, representing the value of leisure time, to disposable income of households. But also in this case, one needs to resolve various problems in relation to the exact delineation and the valuation of leisure time. In respect of the latter, the conceptual problems are significantly larger than in the case of unpaid household activities, mainly because there is no such thing as an equivalent service, and therefore also a more or less equivalent market price, for leisure time. Most probably, one would end up with applying a valuation according to the opportunity costs of not doing paid or unpaid work, thus implicitly valuing leisure time of high income earners more than leisure time of low income earners. When one realises that leisure time is about 20% of total time spent, as compared to 20% on paid employment and 15% on unpaid work, one can also imagine the sheer magnitude of broadening the income concept with leisure time. For a more detailed discussion, reference is made to section 4.9 of Stiglitz, Sen and Fitoussi (2009) and to Boarini et al. (2006).

Adding the production of human capital

45. Yet another extension of the production boundary of household production that is being considered concerns the building up of human capital. Recently, a UNECE Task Force has released a draft Guide on Measuring Human Capital (UNECE, 2016). In this Guide, it is proposed to develop two types of satellite accounts: (i) a satellite account for education and training, and (ii) a human capital satellite account. The first type of satellite account mainly consists of traditional national accounts tables, among which a supply and use framework, with more detailed breakdowns of education and training related activities and products. In addition, the production boundary is slightly extended to include in-house training activities by enterprises. As the latter equally affects output and intermediate consumption, GDP is not altered.

46. In the second type of satellite account, the human capital satellite account, human capital is looked upon as a produced asset, thereby extending both the production boundary and the asset boundary of the SNA. The building up of human capital is treated as a kind of investment, whereby the human capital is gradually being produced by households themselves, using various inputs such education and training provided by schools and

enterprises; expenditures on, for example, schoolbooks and other training materials; and time spent on learning and studying at home.

47. To arrive at an estimate of the value of human capital, the guide proposes to apply either a “costs-based approach” or a “lifetime income approach”, thereby implicitly also defining the value of the related output and value added. In the costs-based approach, the output and the annual investment in human capital are based on estimates of the input elements mentioned in the above paragraph, thus including an imputed value for time spent on learning and studying. Using a Perpetual Inventory Method (PIM), estimates of total stock of human capital can then be derived. In the lifetime income approach, the total stock of human capital is estimated by calculating the net present value of future earnings, the output and annual investments being equal to the changes in the estimated capital stock as a result of the annual gross additions to the stock. The lifetime income approach typically leads to substantially higher estimates for output, investments and capital stocks. In the Guide, a full-fledged example has been elaborated for Canada, showing that, in 2010, using the costs-based approach, GDP would increase by 10% and capital formation by 76%, while total final consumption would decline by 7%. Applying the lifetime income approach to 2005, GDP would increase by 30% and capital formation by 150%, while final consumption would decrease by 7%.

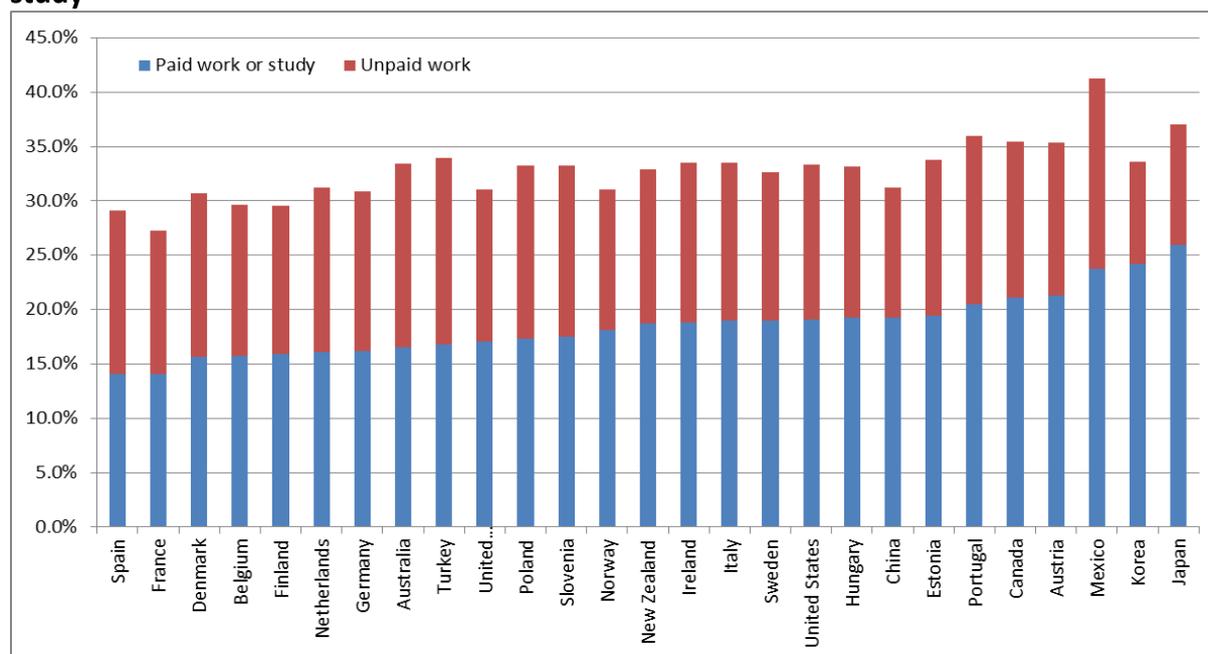
48. Taking non-market services, leisure time and production of human capital together, and using the lower bound estimates for the first and third category, one faces adjustments to traditional GDP which easily surpass 50% of GDP as a minimum. Disposable income of households would be even more affected. As a consequence, a completely different, but not necessarily an improved and more comprehensible story, certainly from an purely economic point of view, would be created. One can also wonder about its usefulness for policy purposes. Whatever the case, in the absence of high quality and timely source data and improved methodologies, it goes without saying that the reliability of national accounts aggregates would be seriously compromised.

49. For the above reasons, as stated before, national accountants feel very hesitant, not to say utterly reluctant, about extending the asset and production boundary of the central framework of national accounts in respect of the above activities. On the other hand, it should be feasible to compile relevant estimates in a standardised satellite account type of framework, for example every five years. A more regular compilation seems not to be advisable, given the unavailability and the relatively poor quality of the underlying data and methodologies, not allowing for truly capturing short-term developments. However, if compiled according to internationally agreed methodologies, multi-annual exercises to compile such satellite accounts would provide valuable information for monitoring important elements potentially affecting the well-being of people. Regular compilation would also be important to gain experience and to further improve methodologies. It may also provide an incentive for improving relevant source statistics, especially on the use of time by people, which is a sine qua non for deriving meaningful estimates.

5. The Impact of Including Household Non-Market Services

50. In this section, some results are presented on the impact of including household non-market services in the system of national accounts. Most results have been updated using the research presented in Ahmad and Koh (2011). Figure 1 shows the average time spent on unpaid household activities and paid work or study across a number of OECD member countries and China. Paid work or study ranges from around 14% of total time spent in France and Spain to a maximum of 23-26% for Mexico, Korea and Japan. On the other hand, unpaid household activities range from 9-12% in Korea, Japan and China to 17-18% in Turkey and Mexico. Total time spent on paid and unpaid activities is relatively similar across countries, with most countries being in the range of 30-35%, with the notable exception of Mexico where total time spent on working related activities equals 41.3%. In France, total time spent on these activities is lowest (27.2%), with Spain, Finland and Belgium having shares slightly below 30%. On the other end, Austria, Canada, Portugal and Japan have shares of work-related activities going (slightly) beyond 35%.

Figure 1: Percentage of total time spent on unpaid household activities and paid work or study *



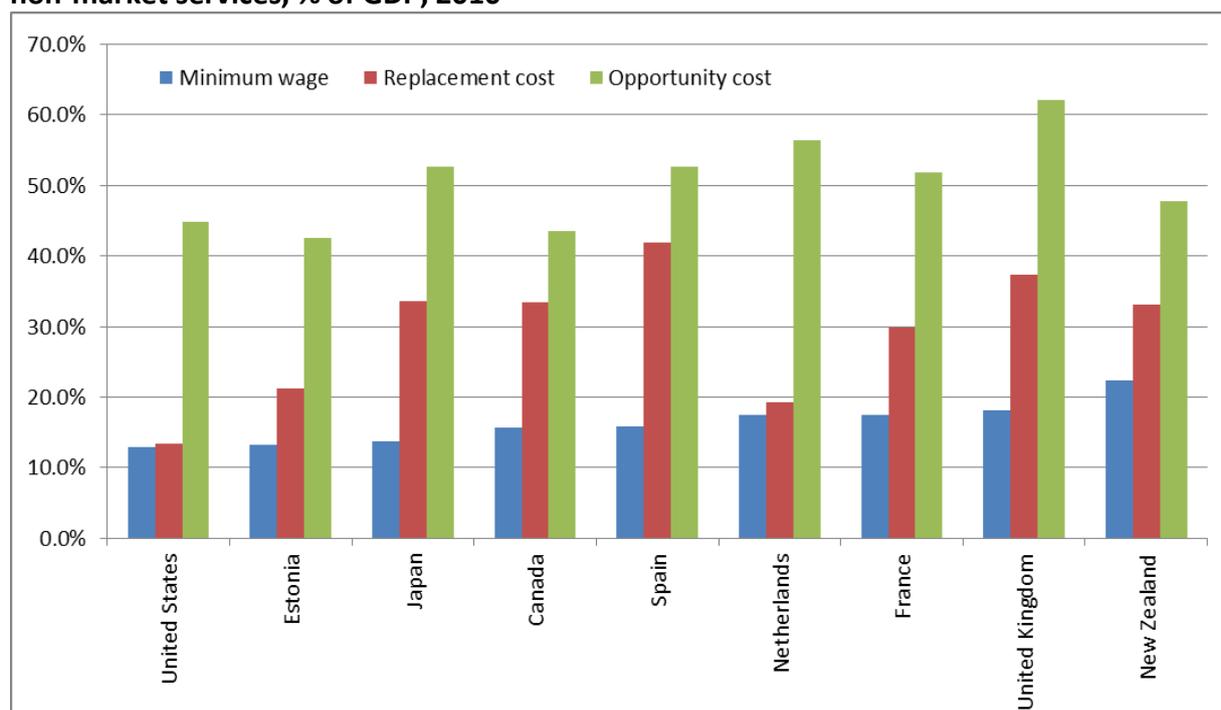
* Data are based on the latest time use survey available: Australia (2006), Austria (2008-09); Belgium (2005); Canada (2010); China (2005); Denmark (2001); Estonia (2009-10); Finland (2009-10); France (2009); Germany (2001-02); Hungary (1999-00); Italy (2008-09); Ireland (2005); Japan (2011); Korea (2009); Mexico (2009); Netherlands (2011); New Zealand (2009-10); Norway (2010); Poland (2003-04); Portugal (1999); Slovenia (2000-01); Spain (2009-10); Sweden (2010); Turkey (2006); United Kingdom (2005); and United States (2010).

51. Looking at the details of unpaid household activities, the picture across countries is more diverse. Most of the time is spent on routine household work, ranging from a remarkably low 43% of total time spent on unpaid household activities in Ireland to 72-73% in Portugal, Slovenia and Mexico, with a simple average of 59% for all countries for which data are available. On the other hand, care for household and non-household members ranges from a very low percentage of 8% in Belgium to an again rather remarkable high number of 29% in Ireland, with a simple average of 16%. Volunteering accounts in most countries for a relatively modest percentage, most countries staying (well) below 3%,

exceptions being Ireland (4%), United States (4%), and Turkey (8%). One can hardly avoid the conclusion that some numbers are statistical artefacts, and suffer from delineation problems, either as a result of differences in definition or being caused by differences in surveying.

52. Figure 2 shows the value of imputed labour costs for the time spent on the production of household non-market services, comparing the results using the minimum wage costs, the replacement costs, and the opportunity costs. Taking the replacement cost method as a point of reference, the imputed monetary value ranges from 13.3% of GDP for the USA to 41.9% for Spain. It doesn't come as a surprise that the numbers for the opportunity cost method are significantly higher, ranging from 42.5% for Estonia to 62.0% for the United Kingdom. On the other hand, the results using the minimum wage cost method are the lowest, ranging from 12.9% for the USA to 22.4% in New Zealand. It has to be noted that the results are very sensitive to the use of the various wage rates, which in this paper have been derived from data collected by the OECD. Countries themselves are obviously much better equipped to select relevant wage rates.

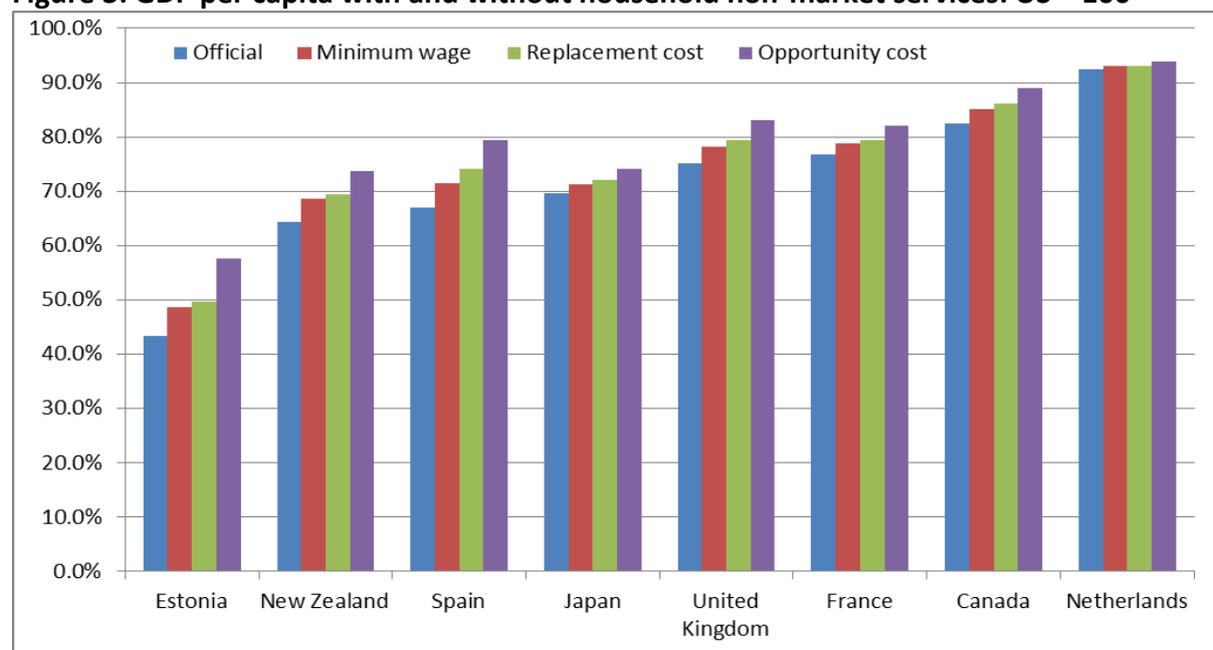
Figure 2: Value of labour costs imputed for the time spent on production of household non-market services, % of GDP, 2010



53. Figure 3, on the next page, shows the impact on the ranking of countries, when comparing GDP per capita, according to the official numbers, and according to GDP adjusted for household non-market activities using the three methods mentioned above. In these numbers, the adjustment is limited to the monetary value of unpaid household activities. Unfortunately, due to time constraints, it was not yet possible to recalculate consistent time series of capital stocks and thus capital services for consumer durables, as a consequence of which the impact of changing the recording of capital services could not be taken into account.

54. Looking at the results, it is rather surprising that the maximum impact on the ranking is 14.3 percentage points, for Estonia when comparing official numbers with adjusted GDP using the opportunity cost method. For the other countries, the impact is between 1.4 percentage points for the Netherlands, and 9.2 percentage points for New Zealand. However, if one compares the official numbers with the more commonly accepted adjusted GDP using the replacement cost method, the differences range from 0.8 percentage points for the Netherlands to 8.0 percentage points for Estonia. In this respect, the conclusion in Ahmad and Koh (2011) still holds: *“Perhaps the single most striking finding is that the relative rankings of countries is little changed whether the opportunity cost or replacement cost approach is used, and that the positions relative to the United States are generally similar for both approaches – with the opportunity cost approach typically coming in no more than 5 points higher than the replacement cost approach on average. The most important message from a policy, as opposed to statistical, perspective however, is the fact that the positions of countries at the lower end of the consumption scale, relative to the US, (e.g. Mexico and Turkey), improve significantly when estimates of household production of non-market production are accounted for.”*

Figure 3: GDP per capita with and without household non-market services: US = 100 *



* The numbers have been calculated using 2010 PPPs.

55. Although it's quite important to analyse the relative position of an economy as compared to other countries, the monitoring and analysis of macro-economic aggregates usually focuses on the developments over time, in nominal terms and especially in real terms, adjusted for price changes. For this paper, estimations have been made for the impact of adding household non-market services to nominal and real growth rates of GDP and the nominal growth rates of (adjusted) household disposable income. Here too, the analysis of the impact is limited to the imputation of a monetary value for the time spent on unpaid household activities. It is also important to note that in the calculations it has been assumed that the productivity of one hour household work did not change over the entire period. This is hardly plausible, given the increased use of more effective household appliances in, for example, preparing meals and cleaning. Furthermore, one has to

57. It is clear that the impact depends on the valuation method applied, with the impact on growth rates being larger when the applied wage rate and therefore the weight of the imputed household non-market services is higher. For Canada, official growth rates between 1971 and 2010 are lowered, on average, by 0.2 percentage points when applying the minimum wage method. The decrease averages 0.4 percentage points for the other two valuation methods, ranging from 0.2 to 0.8 percentage points for the various sub-periods distinguished before 2005. Interestingly, adjusted growth rates are higher than official growth rates in the period 2005-2010, the impact ranging from 0.2 to 0.4 percentage points, depending on the valuation methodology. One may assume that this is, at least partly, related to the effects of the economic and financial crisis.

58. The picture for the USA between 1975 and 2014 is more or less similar for the minimum wage method and the replacement cost method (lowering impact of 0.3 percentage points), while the impact using the opportunity cost method decreases official growth rates by 0.7 percentage points on average. Here too, one can observe a positive impact of the adjustments on official growth rates during the economic and financial crisis; see the number for the period 2008-2010. In the period 2010-2014, the impact returns to its normal pattern of lowering official growth rates.

59. Finally, the results for the Netherlands are much more diverse, probably as a consequence of discontinuities in the data that can be derived from the time use surveys; see for example the impact on the growth rates for the period 1975-1980 as compared to the impact for the period 1980-1985. Over the longer term, 1975 to 2011, the impact on growth rates is higher than what can be observed in Canada and the USA: 0.5 percentage points on average when applying the minimum wage method and the replacement cost method, and 1.1 percentage points when using the opportunity cost method. Furthermore, there is no turn of the sign in the years around the economic and financial crisis. The lowering impact on official growth rates during the period 2006-2011 is close to the average for the whole period observed.

60. Given the non-availability, at the time of writing this paper, of appropriate time series for the replacement rates over time, GDP growth rates in current prices are only presented using the minimum wage method and the opportunity cost method. The results are by and large in line with the impact for real GDP growth rates, sometimes slightly higher, sometimes slightly lower. On one occasion, the impact on GDP nominal growth has a different sign. Whereas in Canada the official real growth rate for the period 1986-1992 is higher than the relevant growth rate adjusted for household non-market activities, the reverse is true when comparing nominal growth rates. Interestingly, data for the USA in the years 2008-2010 show quite significant differences as well. While adjusted real growth rates are marginally higher than the official numbers, adjusted nominal growth rates (1.7% on average) are significantly higher than the official ones (0.8% on average).

61. As household disposable income is (substantially) smaller than GDP, and the adjustment related to the inclusion of household non-market services on disposable income is similar to that of GDP, it's obvious that the level of this income variable will be affected (much) more in relative terms. Looking at the level impact using the minimum wage method, it ranges from 17.2% in the USA to 38.6% in New Zealand for the countries in the

sample. Using the opportunity costs method adds 88% (simple average of country results) to household disposable income as currently defined in the system of national accounts. In the Netherlands, Sweden, Norway and Finland, household disposable income is more than doubled.

62. In terms of nominal growth rates, table 4 provides an overview of the results for some countries. As time series data for household disposable income are generally shorter than those for GDP, certainly after the recent transition of the international standards for compiling national accounts to the 2008 SNA, consistent backward data are momentarily available to a lesser extent. The results are quite diverse. In the USA, for example, the nominal growth rates adjusted for household non-market activities are generally lower than income developments according to current definitions, with the exception of the period 2008-2010. For the United Kingdom, the introduction of non-market services has hardly any impact on the official growth numbers, except for the period 2001-2005 using the opportunity cost method, as a consequence of which official numbers are lowered by 0.4 percentage points on average. In Canada, the adjusted growth rates are higher than the official growth rates in the period 2005-2010, while they are lower in the period 1998-2005. In the Netherlands, it's the other way around: a positive impact of the adjustment in the period 2000-2006, and a lowering impact in the years preceding and following this period.

Table 4: Average annual nominal growth in Household Disposable Income, excluding and including an imputed value for household non-market services

Canada	Period		98-05		05-10
	Official		4.9%		4.8%
	Minimum wage		4.4%		5.4%
	Opportunity		n.a.		5.1%
Netherlands	Period	95-00	00-06		06-10
	Official	5.4%	3.1%		1.7%
	Minimum wage	4.8%	3.8%		1.2%
	Opportunity	n.a.	4.8%		0.9%
United Kingdom	Period		01-05		05-10
	Official		3.9%		4.6%
	Minimum wage		4.1%		4.6%
	Opportunity		3.5%		4.4%
USA	Period		03-08	08-10	10-14
	Official		5.4%	1.2%	3.6%
	Minimum wage		5.1%	2.2%	3.6%
	Opportunity		4.7%	2.1%	3.0%

6. Summary and Conclusions

63. This paper started with shortly addressing the main pros and cons of extending the traditional production boundary used in the System of National Accounts (SNA) with household non-market services. As for various reasons, the inclusion of these services into the central framework of national accounts is considered to be a (far) too ambitious goal, it is proposed to compile satellite accounts on a multi-annual basis. Two types of satellite

accounts are put forward in section 3 and 4, respectively. In the first one, data that are considered important for the monitoring and analysis of developments in the provision of household non-market services are added and broken out. The second type of satellite account includes a full-fledged integration and monetary valuation of household non-market services. Section 5 provided some numerical results of extending the production boundary using various methodologies for valuing time spent on unpaid household activities. The main conclusions that can be derived from the paper are summarised below.

64. In view of the lack of high quality and timely source data, and the lack of well-established and internationally agreed definitions and methodologies, it is not considered opportune to extend the production boundary of the current SNA with the production of household non-market services. But even if the above conditions would be met, one still has to evaluate the usefulness of national accounts with and without the extension of the production boundary. In some respects, it may indeed provide a better, albeit still very partial, reflection of (economic) well-being of households. On the other hand, it clearly moves the system away from a monetary notion of the economy, as a consequence of which certain types of more traditional economic analysis may be burdened. Here, the more fundamental question is about the ultimate goal of national accounts. Is it the description of (monetary) economic activities or is it about measuring well-being more generally? Whatever the case, it is considered of the utmost importance to first gain more experience and practice in compiling relevant estimates. This should preferably be done in a satellite account type of framework, to be produced on a multi-annual basis, say every five years.

65. For the compilation of high quality satellite accounts, meeting two important conditions should have the highest priority. The first one concerns the need for improved time use surveys: more granularity, better periodicity, better consistency over time, and improved timeliness. In present times of severe pressures on statistical budgets and the need to decrease the respondent burden of surveying, this is easier said than done. Perhaps the regular compilation of satellite accounts for household non-market activities, and more generally the emphasis on trying to capture developments in the broader objective of well-being instead of economic growth only, can provide a momentum, although the author of this paper is slightly pessimistic. The second condition relates to the availability of an internationally agreed set of standards and classifications for the compilation of satellite accounts for household non-market services. In this respect, the establishment of the UNECE Task Force on Valuing Unpaid Household Service Work, with the objective to agree on a Guide for producing such satellite accounts, is an important step forward.

66. Looking at the results of some provisional calculations, it shows that extending the production boundary with household non-market services has a significant impact on the traditional macro-economic aggregates. Here, it should be emphasised that the inclusion of household non-market services, in a consistent set of national accounts, does not only have an impact on GDP, but also on other macro-economic aggregates such as household disposable income, final consumption and investments. Disregarding the impact of including capital services from consumer durables, depending on the country and the valuation method, the level of GDP is increased by 13% to 62%, while household disposable income increases in the range of 20 to 120%. The inclusion usually has a lowering impact on economic growth and changes in disposable income over the last four decades.

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