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Abstract / Résumé

The System of National Accounts, which provides information on important macroeconomic indicators such as Gross Domestic Product (GDP), household disposable income and final consumption, typically excludes the value of unpaid household activities. Exceptions are made for the production of goods for own final consumption (e.g. subsistence farming), the services from owner-occupied dwellings, and the production from employment of paid domestic staff, but the output from unpaid domestic and personal services, such as the preparation of meals, taking care of children, cleaning, repairs, volunteering, etc., is all excluded. This report deals with the impact of including unpaid household activities on macro-economic aggregates for G7-countries. It builds upon earlier work by Ahmad and Koh (2011) and van de Ven and Zwijnenburg (2016). The report starts off with discussing the pros and cons of including unpaid household activities, or more specifically, the reasons why these activities are currently excluded from the macro-economic aggregates that can be derived from the framework of national accounts. It then discusses how estimates can be compiled using statistics from time use surveys and other available information. Here, also some of the complexities related to the approximate valuation of unpaid household activities are being addressed. Subsequently, results are presented for the level estimates of GDP as well as for economic growth when including the value of unpaid household activities for the G7 economies. The report concludes with a number of recommendations on the way forward, also touching upon some of the (potential) policy implications of the work on valuing unpaid household activities.

Keywords: national accounts, households, time use, satellite accounts, unpaid work. JEL Classification: C82, D13, E01, J22.

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Le Système de Comptabilité Nationale, qui fournit des informations sur des indicateurs macroéconomiques importants tels que le Produit Intérieur Brut (PIB), le revenu disponible des ménages et la consommation finale, exclut la plupart des activités non rémunérées des ménages. Il existe des exceptions pour la production pour compte propre de certains biens (agriculture de subsistance par exemple), les services de logement des propriétaires-occupants et la production liée à l'emploi de personnel domestique rémunéré, mais la production correspondant aux services domestiques et à la personne non rémunérés, tels que la préparation des repas, le soin apporté aux enfants, le ménage, les réparations, le bénévolat, etc., est totalement exclue. Ce rapport examine l'impact de la prise en compte des activités non rémunérées des ménages sur les agrégats macroéconomiques des pays du G7. Il s'appuie sur les travaux antérieurs d'Ahmad et Koh (2011) et de van de Ven et Zwijnenburg (2016). Il commence par analyser les pour et les contre de la prise en compte des activités non rémunérées des ménages et, plus particulièrement, les raisons pour lesquelles ces activités sont actuellement exclues des agrégats macroéconomiques de la comptabilité nationale. Le rapport étudie ensuite comment des estimations peuvent être faites à partir des enquêtes emploi du temps et d'autres sources disponibles. Certaines des difficultés liées à l'évaluation approximative des activités non rémunérées des ménages sont abordées. Le rapport présente ensuite des résultats montrant comment le niveau du PIB et la croissance économique des pays du G7 sont affectés lorsque les activités non rémunérées des ménages sont prises en compte. Dans sa conclusion, le rapport propose quelques recommandations et évoque certaines

répercussions possibles pour les politiques publiques de la valorisation des activités non rémunérées des ménages.

Mots-clés: comptes nationaux, ménages, emploi du temps, comptes satellites, travail non rémunéré.
Classification JEL : C82, D13, E01, J22.

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1. Introduction

1. One of the more fundamental criticisms when it comes to the System of National Accounts (SNA (2009)) concerns the non-recognition of unpaid services provided within households as being part of the production boundary. This boundary defines which productive activities should (not) be accounted for in the system of national accounts, and the production of which goods and services does (not) add to output, value added and Gross Domestic Product (GDP). By excluding unpaid household activities, the level of GDP is supposedly underestimated, while GDP growth is underestimated in times of increasing labour market participation, which often coincides with a substitution of unpaid household activities, such as preparing meals and taking care of children, with 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. Such satellite accounts are linked to the central framework but provide more insight in specific phenomena by re-arranging some of the central classifications, introducing some complementary elements and/or applying some alternative concepts. Well-known examples are satellite accounts for tourism, health and education. A satellite account for unpaid household activities complements the central framework by expanding the concept of production, thus significantly affecting the main aggregates that can be derived from the system. The report at hand won't specifically deal with the ins and outs of setting up such a satellite account, although it will indirectly touch upon it. Here, more attention is paid to the impact of including unpaid household activities on well-known macro-economic aggregates, such as GDP and economic growth.

4. Before arriving at the results, this report first discusses, in Section 2, the main pros and cons of including the relevant unpaid household activities in the production

boundary of the SNA. Section 3 then discusses how estimates can be compiled using statistics from time use surveys and other available information. Here, also some of the complexities related to the approximate valuation of unpaid household activities are being addressed. Subsequently, in Section 4, the main results are presented, mainly looking at GDP and economic growth, although one has to realise that other important indicators such as household disposable income, household final consumption and household saving are also affected significantly. Finally, in Section 5, apart from providing a short summary and the main conclusions, recommendations are made on the way forward regarding the treatment of unpaid household activities. This also touches upon potential policy implications of this work.

2. Defining the production boundary in the System of National Accounts (SNA)

5. The inclusion or exclusion of unpaid 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."*

6. According to the general production boundary, it is clear that unpaid household activities, such as preparing meals, taking care of children and elderly, and cleaning, are part of production. However, the (2008) SNA prescribes a more restrictive boundary, specifically in relation to these unpaid services produced within and between households. The production of goods within households, the main example of which relates to subsistence farming[2], should always be included, while the production of unpaid 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 unpaid household 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."*

7. One could add that the inclusion of unpaid household activities may hamper the interpretability of some headline indicators that can be derived from the framework 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.

[2] For other examples of goods production for own final use, see § 6.32 of the 2008 SNA.

Some would argue against this point by stating that the SNA already includes various imputations, among which goods produced within households and services of owner-occupied dwellings, but one could argue that 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 part of taxable income. 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 unpaid household services would lead to a change of GDP in the range of 15 to 70%, 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 (see e.g. van de Ven and Zwijnenburg, 2017). 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.

8. Whatever the case, 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 unpaid services produced within households that are to be included. Stiglitz, Sen and Fitoussi (2009) list 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 13 below as well). A related issue concerns the proper allocation of simultaneous activities, such as taking care of children while cooking or cleaning. One could also add here that in many cases services from unpaid household activities 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.

9. Apart from the above more conceptual and theoretical considerations, important aspect that cannot be overlooked has to do with possible data concerns of the underlying statistics needed to compile estimates of unpaid household services, certainly when taking into account the sheer magnitude of the estimates in comparison to the traditional national accounts aggregates. This is discussed in further detail in the next section.

3. Estimating unpaid household activities in physical and monetary terms

10. When it comes to monitoring unpaid household activities, the single most important source of information for measuring the related services, both in physical terms (hours spent) and monetary values, consists of the time use surveys. The OECD database on time use surveys contains, at the first level, a breakdown into five main activities:

1. paid work or study (work-related activities);
2. unpaid work (household activities);
3. personal care;
4. leisure; and
5. 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.

11. The most relevant category for the purpose of estimating the production of unpaid household services, unpaid work (household activities), is subsequently disaggregated into the following subcategories:

- routine housework;
- shopping;
- care for household members;
- care for non-household members (informal volunteering);
- (formal) volunteering; and
- travel related to household activities.

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 www.timeuse.org/mtus.html. In the MTUS, 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.

12. Ideally, one would prefer to have an even more detailed breakdown, to monitor shifts between the production of unpaid household services 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.

13. 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 report, the potential problems with this distinction are simply ignored, thus following the perception and the allocation of time chosen by the households.

14. Secondly, some of the activities included under unpaid household services concern activities that are not services provided within or to other households. Formal volunteering, for example, relates to providing support to sports clubs or charity organisations, assisting teachers in schools, etc. The outputs 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 is 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 expenditure of households.[3] In this report, these complications are again ignored, by making the assumption that all household activities directly benefit the same or other households.

15. 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 when estimating the impact of including unpaid household activities in the system of national account. Although the latter may not be that important in G7-economies, it is certainly something to consider when analysing developing economies with a substantial level of subsistence farming. Please note, however, that this would again require a more detailed breakdown of the time spent on unpaid work. In this report, this potential double-counting is again ignored, mainly because it is considered negligible in the case of most economies considered in this paper.

[3] 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 won't be further elaborated in the context of this paper.

16. Having high quality data on time use is a sine qua non to arrive at good estimates of unpaid household services, both in physical and – as explained below – in monetary terms. One would prefer to have time use data with more granularity into types of activities and into various groups of respondents, for example to further analyse the impact of digitalisation, or to monitor the impact of policies related to an ageing society on the demand for people's time spent on informal care. 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 rather 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 unpaid household services, 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 in most countries is nearly impossible with the current state of affairs.

Box 3.1. Adding leisure time

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."*

Alternatively, one could "simply" show a memorandum item, representing the value of leisure time, next to, but not integrated into, the value of household disposable income (and production). 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). Furthermore, Figure 4.1 provides information on a possible way to value leisure time using information on experienced well-being available in a number of time-use surveys.

17. When including the production of unpaid household services in the production boundary of the system of national accounts, one of the most important methodological issues concerns the valuation of the relevant services. In practice, one would prefer to arrive at a market-equivalent price, for which one can distinguish two basic options: (i) taking the market price of equivalent services transacted on the market; and (ii) using a cost-based approach (see e.g. UNECE, 2017). As in quite a number of cases, it may be quite difficult to put unpaid household services on a par with similar marketed services (e.g. cooking of meals), and/or to have a proper appreciation of the exact services provided under the time use categories, almost all available studies try to arrive at a market-equivalent price by applying the second approach. 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 services.[4] However, different from applying this methodology

[4] In this study, for reason of simplicity, the possible impact of intermediate consumption in the valuation and recording of unpaid household activities is ignored. This is not that problematic, as in the usual

to government services where actual salaries and wages are paid, the use of the cost-based methodology in the case of unpaid household activities 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.

18. In imputing a value for the time spent, two basic methods can be distinguished, leading to substantially different results:

- The replacement cost approach, where an average post-tax, hourly wage, representative of the broad range of activities covered in the production of unpaid household services, is constructed. A full application of this approach, not being pursued in this study, would try to estimate the average wage costs for each of the activities separately. Such a more detailed breakdown of the various unpaid activities would definitely add to the quality of the estimates, but lack of appropriate data is a major concern.
- 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 unpaid household activities. Here, a full application would typically calculate the opportunity costs for each relevant group of individuals, requiring more detailed and representative background information on the (potential) earnings on the labour market (e.g. information on gender, age and level of education) of the time use survey respondents. Having such information would add considerably to the quality of the results.

Furthermore, an alternative approach consists in taking into account information on experienced well-being available in a number of time use surveys. See Box 3.1 for more information on this alternative approach.

19. From a conceptual perspective, one would typically favour the replacement cost approach, as this best represents the market-equivalent price. However, from a welfare perspective, the opportunity cost method may be preferable as well. As noted by Schreyer and Diewert (2014):

> *"We conclude that two elements condition the choice between an opportunity cost and a replacement- cost approach:*
>
> - *In the general case of an unconstrained household, a first element enters the considerations: Is the purpose of valuing time spent on household production to capture full consumption (a welfare- related concept) or is the purpose more narrowly defined at capturing only the value of own-account household production (not necessarily a welfare- related concept)? In the second case, the replacement cost method applies; whereas in the first case, household time should be valued using the opportunity- cost method.*

methodologies for valuing output of unpaid household services, the impact of including intermediate consumption on GDP and household final consumption will be zero. It would only lead to a higher value of output and intermediate consumption, thus leaving GDP unaffected. For household final consumption, it would only lead to a reallocation of the goods and services immediately used up in the production of household services (e.g. food products) to the consumption of household services.

- *The second element is whether the household under consideration is constrained in its allocation of time between selling its labor services and other usages of time. If the answer is to the affirmative, as it would be in the case of an unemployed or retired person in our present model, the replacement-cost method will constitute the correct valuation for own-account household services as well as for other components of full consumption, in particular leisure."*

20. A fully correct application of the above methodology to arrive at a market-equivalent price for unpaid household services also requires taking 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, the quality of the service of (grand)parents taking care of children is probably much higher. A second example of these problems to arrive at a truly market-equivalent pricing model 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 is likely to lead to a (significant) overvaluation of the unpaid household services produced within households.

21. The input of capital, or capital services, another component of the cost-based methodology, are related to the use of various consumer durables in the production of unpaid household services, such as household appliances, motor vehicles and some types of furniture.[5] 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 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

[5] In this report, the following consumer durables are considered as capital goods used in the production of unpaid household services: household appliances (COICOP-item 05.3); tools and equipment for house and garden (05.5); and purchases of vehicles (07.1). A problem in relation to the first two categories 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. With regard to purchases of vehicles one needs to take into account that part of the transport services produced with these capital goods may be related to paid employment and leisure.

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. In this report, a fixed interest rate of 4% has been applied, similar to previous exercises.

22. The inclusion of unpaid household activities affects the main macro-economic aggregates from national accounts to a significant degree. Leaving apart some of the complications of including goods and services that are immediately used up in the process of producing unpaid household services[6], the extra output of unpaid household services will directly change, one-to-one, the level of GDP. But it doesn't stop there. Also household disposable income and household final consumption will be affected to the same degree. In addition, the treatment of some consumer durables as capital goods in the process of producing unpaid household services will lead to a re-allocation of the relevant expenditure categories from household final consumption to investments by households, thus also affecting numbers on household saving. It is important to realise that including unpaid household activities in the system of national accounts is not limited to GDP, but has repercussions for many other indicators. The concept of household income will totally change with the imputation of income from the production of unpaid household services, as a consequence of which it will diverge significantly from general perceptions of income.

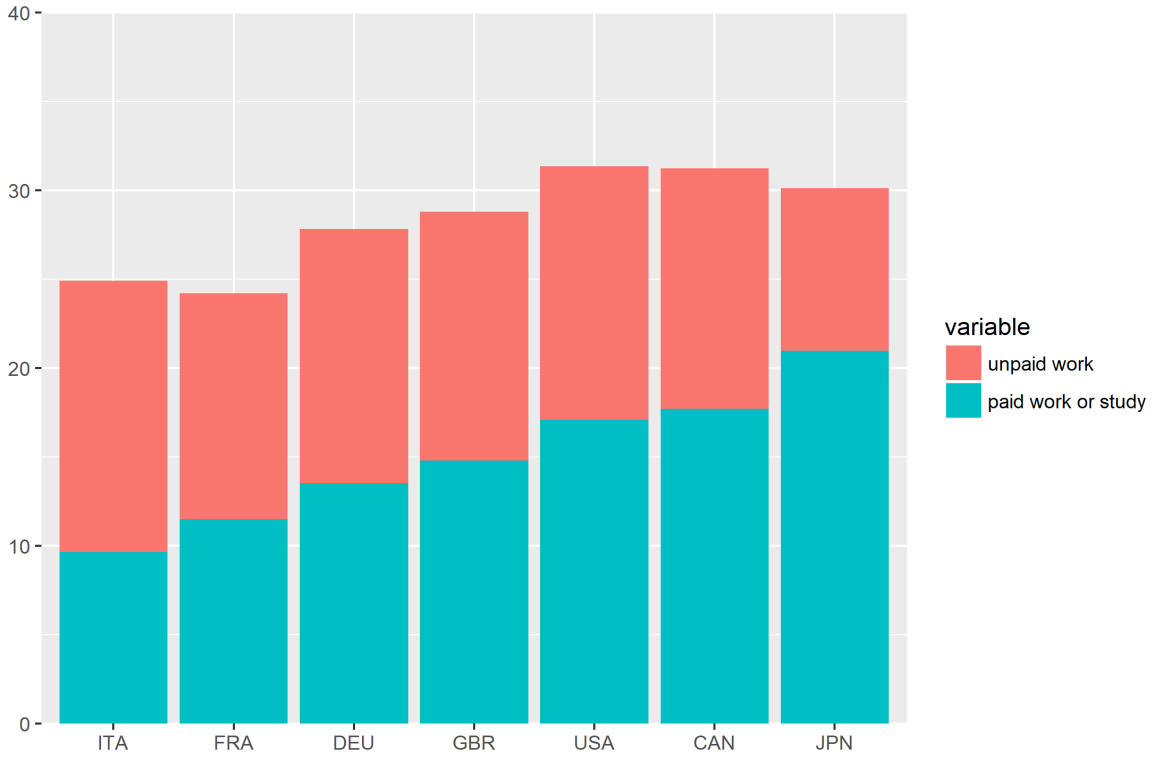
23. For all the above reasons, national accountants are not particularly inclined, to say the least, to extend the production boundary by including unpaid household services in the central framework of national accounts. That does not preclude, however, the compilation of additional satellite type of accounts on a regular, not necessarily annual, basis. The remainder of this report will not dwell upon the set-up of such satellite accounts. Instead, reference is made to van de Ven and Zwijnenburg (2016), in which two types of satellite accounts are presented, one in which the traditional supply and use framework of the national accounts is "simply" enlarged with observable data which track developments in the area of unpaid household services, and one in which the relevant activities are actually valued and fully integrated into the central framework of national accounts. In this report, only the results of including unpaid household activities in the production boundary are presented, with a focus on the impact on GDP and economic growth for the G7-economies.

[6] See footnote 3.

4. The impact of including unpaid household services on GDP and economic growth

24. In this section, some results are presented on the impact of including unpaid household activities in the framework of national accounts. Most results have been updated using the research presented in Ahmad and Koh (2011) and van de Ven and Zwijnenburg (2016). Figure 4.1 shows the average time spent on unpaid household activities and paid work or study across the G7-countries on the basis of the most recent data available. Paid work or study ranges from less than 10% of total time spent in Italy to almost 21% in Japan. On the other hand, unpaid household activities range from slightly more than 9% in Japan to more than 15% in Italy. Total time spent on paid and unpaid activities ranges from less than 24-25% in France and Italy to more than 31% in Canada and the USA. One wonders about the international comparability of these level estimates, whether these may be affected by cultural differences and/or by a slightly different phrasing and interpretation of the questions. Developments over time sometimes show quite strong, not always easy to explain, changes. On the other hand, however, such developments may reflect true changes caused by business-cycle effects, such as the impact of the 2007-09 economic and financial crisis.

Figure 4.1. Unpaid household activities and paid work or study (% of total time spent)



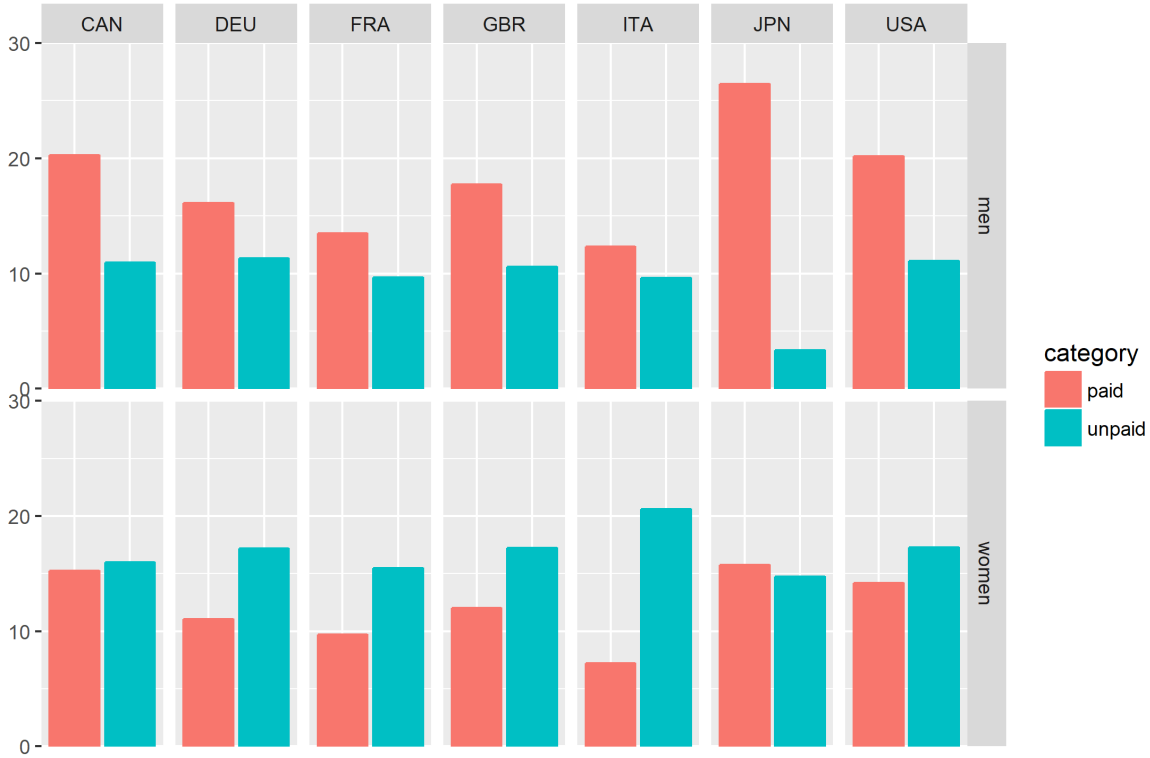
Note: Data are based on the latest available time use surveys: Canada (2015); France (2009-10); Germany (2012-13); Italy (2013-14); Japan (2016); United Kingdom (2014-15); and United States (2016). Data refer to the population aged 10 and over for Germany and Japan; to the population aged 11 and over for France, Italy, and the United Kingdom; and to the population aged 15 and over for Canada and the United States.
Source: OECD Time Use Database: http://stats.oecd.org/Index.aspx?DataSetCode=TIME_USE.

25. Figure 4.2 provides a further breakdown of the average time spent on unpaid household activities and paid work or study by gender. The results show noteworthy differences[7]. Whereas for all G7 economies the amount of time spent on paid work or study exceeds the time spent on unpaid household activities for men, it is the other way around for women, with Japan being the only exception. On average, Japanese women spent slightly more time on paid activities or study than on unpaid household activities, although the difference between the two categories is far less pronounced than for men. In that regard, Japanese men show the highest percentage for time spent on paid work or study across the G7 countries. Whereas Japanese men on average spent more than 26% of their time on paid work or study, this is only 13.5% in France and slightly more than 12% in Italy. On the other hand, Japanese men show the lowest percentage for time spent on unpaid household activities. Whereas this is more than 9.5% in all other G7 countries, it is only slightly more than 3% in Japan. In all countries, women on average spent more time on unpaid activities than men, with Italy and Japan showing the largest gaps. The

[7] Please note that some of the differences across countries may be caused by differences in the years and the population to which the time use data refer. For more details, see the foot-notes to the relevant tables and graphs.

percentages spent on unpaid household activities for women range from around 15% in France and Japan to more than 20.5% in Italy. For more details on gender differences, reference is made to Chapter 5 of OECD (2017a) and to OECD (2017b).

Figure 4.2. Unpaid household activities and paid work or study by gender (% of total time spent)



Note: Data are based on the latest available time use surveys: Canada (2015); France (2009-10); Germany (2012-13); Italy (2013-14); Japan (2016); United Kingdom (2014-15); and United States (2016). Data refer to the population aged 10 and over for Germany and Japan; to the population aged 11 and over for France, Italy, and the United Kingdom; and to the population aged 15 and over for Canada and the United States.
Source: OECD Time Use Database: http://stats.oecd.org/Index.aspx?DataSetCode=TIME_USE.

26. Looking at the details of unpaid household activities in Table 4.1 below, most of the time, as a % of total time, is spent on routine household work, ranging from 5.8% in Japan to 9.9% in Italy. As a share of total time spent on unpaid household activities, this routine work ranges from 54% in the United States to 74% in France. Albeit to a significantly lesser extent, shopping and care for household members including child care show to be the other main unpaid activities with a simple average of 17% and 22% of time spent on unpaid household activities across the G7 countries. Volunteering accounts for a relatively modest percentage in the G7 economies, ranging from 0.1% of total time for the United Kingdom to 0.5% in the United States. The other categories also show relatively low percentages, although travel related to unpaid household activities is relatively high for some countries. Whereas it is only 2.5% of time spent on unpaid household activities in France, it amounts to around 10% in Germany and the United Kingdom, and 13.5% in the United States. In analysing these results, one can hardly avoid the conclusion that some numbers may represent statistical artefacts, and suffer

from delineation problems, either as a result of differences in definition or being caused by differences in surveying. In the case of Japan, for example, there are no data for the categories care for household members and travel related to household activities.

Table 4.1. Unpaid household activities (% of total time spent)

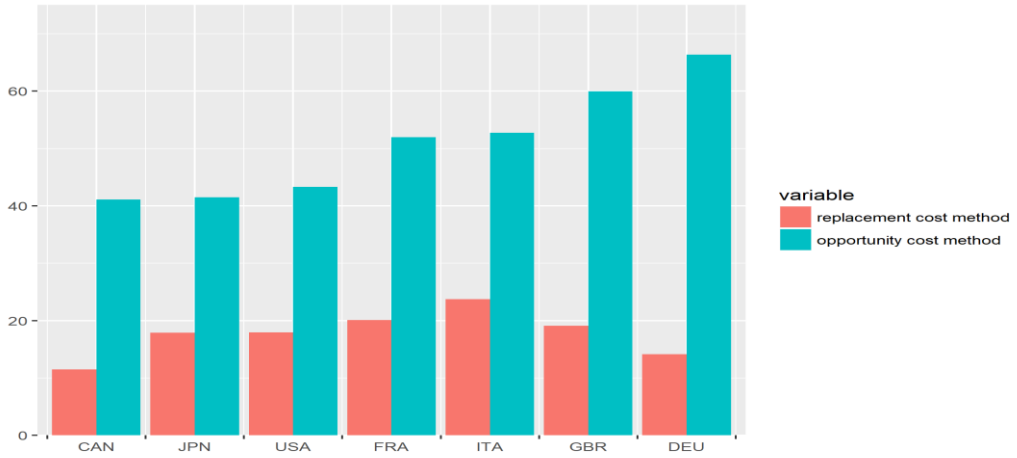
	Canada	France	Germany	Italy	Japan	United Kingdom	United States
Unpaid work	**13.5**	**12.7**	**14.3**	**15.3**	**9.2**	**14**	**14.3**
Routine housework	8.7	9.5	8.3	9.9	5.8	7.9	7.8
Shopping	1.8	1.5	2.4	1.9	1.8	2.1	1.7
Care for household members	1.7	1.3	1.0	1.4	-	1.9	1.8
Child care	1.6	1.2	0.9	1.2	1.0	1.4	1.7
Adult care	0.1	0.1	0.1	0.2	0.3	0.5	0.2
Care for non-household members	0.3	0.1	0.5	0.5		0.5	0.3
Volunteering	0.2	-	0.5	0.2	0.3	0.1	0.5
Travel related to household activities	0.8	0.3	1.4	1.4	-	1.4	1.9
Other unpaid	0.1	0.1	0.2	0.0	-	-0.1	0.3

Note: Data are based on the latest available time use surveys: Canada (2015); France (2009-10); Germany (2012-13); Italy (2013-14); Japan (2016); United Kingdom (2014-15); and United States (2016). Data refer to the population aged 10 and over for Germany and Japan; to the population aged 11 and over for France, Italy, and the United Kingdom; and to the population aged 15 and over for Canada and the United States. For Japan, information on "adult care" and "care for non-household members" is combined as no separate information is available on these two categories.
Source: OECD Time Use Database: http://stats.oecd.org/Index.aspx?DataSetCode=TIME_USE.

27. Figure 4.3 shows the value of imputed labour costs for the time spent on the production of unpaid household services, comparing the results using replacement costs and opportunity costs, respectively. Taking the replacement cost method as a point of reference, the imputed monetary value ranges from 11.5% of GDP for Canada to 23.7% for Italy. In evaluating these results, it has to be noted that the results are very sensitive to the use of the various wage rates, which for the replacement cost approach have been derived from data collected by the OECD, as part of the collection of data for calculating Purchasing Power Parities. Countries themselves are obviously much better equipped to select relevant wage rates. Furthermore, as average wages and salaries for the whole labour force are higher than the average wages and salaries typically paid to workers in "domestic work" type of activities (cleaners, childcare workers, etc.), it should not come as a surprise that the impact on GDP of using the opportunity costs method is significantly higher, ranging from 41.1% for Canada to 66.4% for Germany.

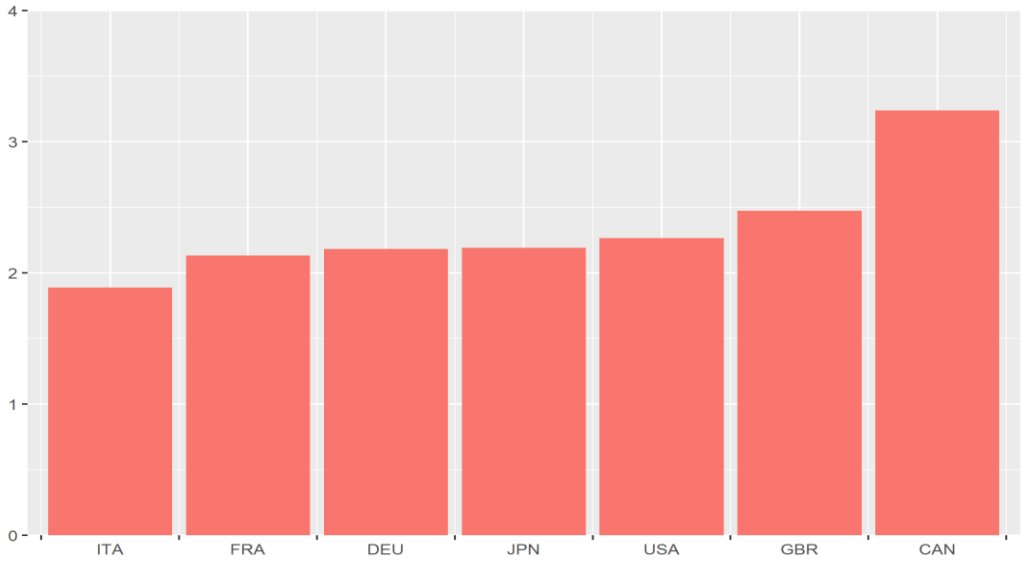
28. Figure 4.4 presents the value of imputed capital services in the production of unpaid household activities as percentage of GDP. As mentioned before, the results are based on estimates of the amount of consumer durables used in the production of unpaid household services and assumptions on the depreciation rate and the rate of return on invested capital. The total value of the imputed capital services ranges from 1.9% of GDP in Italy to 3.2% in Canada. The contribution of capital services in the production of unpaid household services is thus far lower than the contribution of the labour costs and, with the notable exception of Canada, shows less dispersion across countries.

Figure 4.3. Value of labour costs imputed for the time spent on production of unpaid household services (% of GDP), 2015



Note: Data on time use are based on the latest available time use surveys: Canada (2015); France (2009-10); Germany (2012-13); Italy (2013-14); Japan (2016); United Kingdom (2014-15); and United States (2016). Data refer to the population aged 10 and over for Germany and Japan; to the population aged 11 and over for France, Italy, and the United Kingdom; and to the population aged 15 and over for Canada and the United States.
Source: OECD Time Use Database: http://stats.oecd.org/Index.aspx?DataSetCode=TIME_USE;
Gross Domestic Product: http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1;
Taxing Wages: http://stats.oecd.org/Index.aspx?DataSetCode=AWCOU.

Figure 4.4. Value of capital services imputed for the production of unpaid household services (% of GDP), 2015



Source: Gross Domestic Product: http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1;
Final Consumption Expenditure of Households:
http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE5;
Taxing Wages: http://stats.oecd.org/Index.aspx?DataSetCode=AWCOU.

Box 4.1. Alternative method for estimating the labour costs

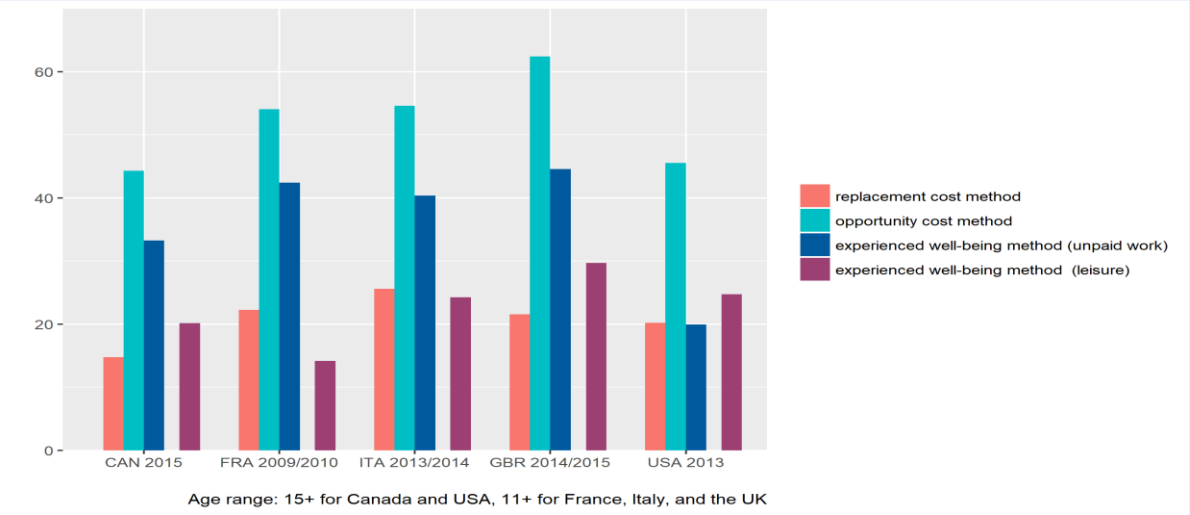
An alternative method to estimate the labour costs involved in unpaid household activities consists of using data on experienced well-being available in a number of national time use surveys, to derive a relative price of an hour spent on unpaid activities in relation to the price of an hour spent on paid activities, thus trying to correct for any differences in experienced well-being between these two types of activities. In this method, the line of reasoning is that, if a person regards paid work twice as unpleasant as unpaid work, the monetary value he/she attributes to paid work must be twice as high as the price of unpaid work, in order to get engaged in paid work activities.

Time use surveys increasingly contain information on experienced well-being during various activities following the recommendations formulated by Stiglitz, Sen and Fitoussi (2009). This information allows for the construction of the so-called U-index (see Kahneman et al., 2004), which measures the proportion of individuals who are in a negative state of mind during a given activity. For example, in the United States, the proportion of individuals who are in a negative state of mind during paid work is 25.6%, whereas this figure is 11.6% among those who engage in unpaid activities. This means that, on average, paid work is regarded as 2.2 times more unpleasant than unpaid work in the United States, implying that the value of an hour worked on unpaid activities should be equal to 45.5% (1/2.2) of the value of an hour spent on paid work (this latter being approximated by the wage rate).

As data on experienced well-being are currently available for Canada, France, Italy, the United Kingdom and the United States, preliminary results on the value of labour input into unpaid household activities on the basis of this alternative approach can be compared with results on the basis of the usual methods as described in this paper for the G7 countries. Figure 4.5 shows that the value of labour costs for the time spent on unpaid household activities on the basis of the alternative method are between 20% and 40% of GDP. These results fall in between the estimates on the basis of the replacement cost method (12%-24%) and the opportunity cost method (41%-66%).

Finally, since this alternative method also provides for the possibility to derive an hourly value for other activities, Figure 4.4 also shows the share of the value of leisure as a % of GDP per capita. Cross-country differences in Figure 4.4 mainly arise from differences in the unit value of leisure rather than the amount of time allocated to this activity.

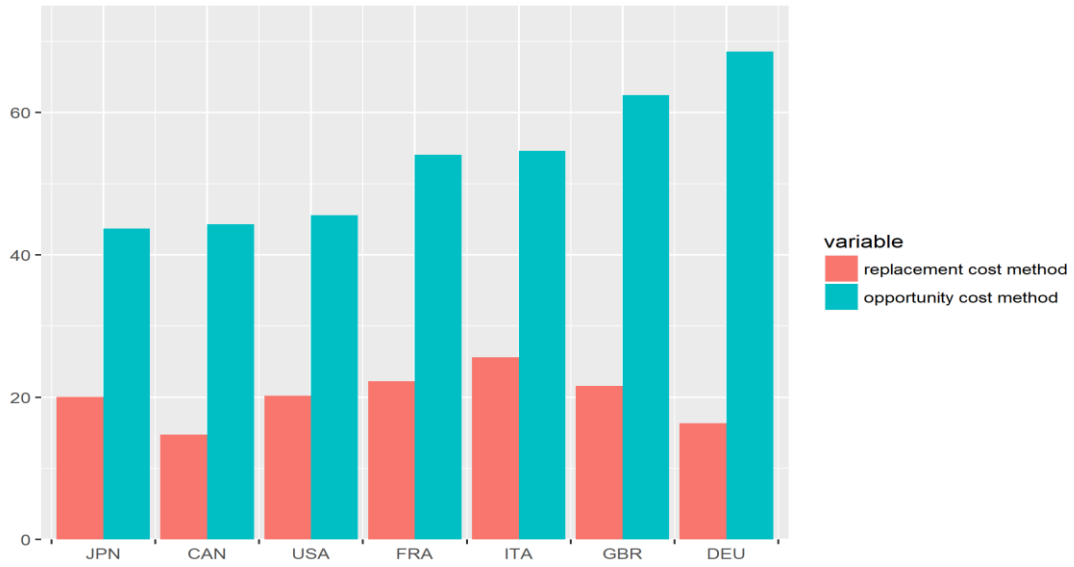
Figure 4.5. Value of labour costs imputed for the time spent on production of unpaid household services (% of GDP) on the basis of the usual methods and the alternative approach, 2015



Note: Data on time use refer to 2015 for Canada; to 2014-15 for the United Kingdom; to 2013-14 for Italy; to 2013 for the United States; and to 2009-10 for France. Data refer to the population aged 11 and over for France, Italy, and the United Kingdom; and to the population aged 15 and over for Canada and the United States.
Source: Alpman, A. and C. Balestra (2018), "Unveiling the monetary value of non-market activities using experienced well-being and time use surveys", *OECD Statistics and Data Directorate Working Papers* (forthcoming).

29. Figure 4.6 shows the overall impact of the inclusion of the value of unpaid household activities on GDP for the G7 economies. As the amounts related to capital services are relatively small, the results look similar to the ones presented in Figure 4.3. Focusing on the replacement cost approach, the imputed monetary value now ranges from 14.7% of GDP for Canada to 25.6% for Italy. The numbers for the opportunity costs method range from 43.7% for Japan to 68.6% for Germany.

Figure 4.6. Value of own-account production of unpaid household services (% of GDP), 2015



Note: Data on time use are based on the latest available time use surveys: Canada (2015); France (2009-10); Germany (2012-13); Italy (2013-14); Japan (2016); United Kingdom (2014-15); and United States (2016). Data refer to the population aged 10 and over for Germany and Japan; to the population aged 11 and over for France, Italy, and the United Kingdom; and to the population aged 15 and over for Canada and the United States.
Source: OECD Time Use Database: http://stats.oecd.org/Index.aspx?DataSetCode=TIME_USE;
Gross Domestic Product: http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1;
Final Consumption Expenditure of Households:
http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE5;
Taxing Wages: http://stats.oecd.org/Index.aspx?DataSetCode=AWCOU.

30. 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 reason, in addition to looking at the impact of the inclusion of unpaid household activities on the level of GDP, rough estimations have been made for the impact of adding unpaid household services to real growth rates of GDP. It is important to note that in the calculations it has been assumed that the productivity of one hour household work did not change over time. This is hardly plausible, given the increased use of more effective household appliances in, for example, preparing meals and cleaning. Furthermore, one has to acknowledge that some of the results may be (seriously) affected by breaks in the time series of data on time use. Finally, due to the absence of annual time use survey data, the data do not allow for a proper analysis of year-on-year changes for short time periods, which would have been interesting, for example to monitor the impact in a time of economic and financial crisis, such as the one experienced in 2007-09. Notwithstanding these caveats, the results are considered to provide a good proxy, or at least a good direction, of the overall structural impact over a longer period of time.

31. Looking at the real growth rates of GDP, it should not come as a surprise that the inclusion of unpaid household activities generally leads to a lowering of the official

growth numbers.[8,9] Since the 1970s, in many countries female labour participation has (significantly) increased, as a consequence of which time spent on unpaid household activities has decreased compared to the time spent on paid activities, and unpaid household services have been substituted by services provided by the market. Table 4.2 presents the impact for a number of countries for which longer time series are available: Canada, the United Kingdom, and the United States.

Table 4.2. Average annual real growth in GDP, excluding and including an imputed value for unpaid household services

Canada	Period	1981-86	1986-92	1992-98	1998-2005		2005-10	2010-15		1981-2015
	Official	2.39	1.6	4.93	3.31		1.14	2.24		2.39
	Replacement	2.26	1.54	4.57	3.04		1.35	2.02		2.25
	Opportunity	1.98	1.34	3.9	2.51		1.57	1.58		1.96
United Kingdom	Period				1995-2000	2000-05	2005-14			1995-2014
	Official				3.32	2.76	1.08			2.1
	Replacement				3.38	1.92	1.03			1.88
	Opportunity				3.6	0.97	0.99			1.66
United States	Period	1975-85	1985-98		1998-2003	2003-08	2008-10	2010-14	2014-16	1975-2016
	Official	3.5	3.26		2.86	2.25	-0.16	2.02	2.17	2.8
	Replacement	3.02	2.96		2.36	1.85	-0.05	1.66	2.32	2.46
	Opportunity	2.6	2.7		1.85	1.47	0.07	1.33	2.46	2.15

Source: OECD Time Use Database: http://stats.oecd.org/Index.aspx?DataSetCode=TIME_USE;
Gross Domestic Product: http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1;
Final Consumption Expenditure of Households: http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE5;
Taxing Wages: http://stats.oecd.org/Index.aspx?DataSetCode=AWCOU.

32. 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 unpaid household services is higher. For Canada, official growth rates between 1981 and 2015 are lowered, on average, by 0.14 percentage points when applying the replacement cost approach. The decrease is 0.43 percentage points for the opportunity cost method, ranging from 0.26 to 1.03 percentage points for the various sub-periods distinguished before 2005. Interestingly, adjusted growth rates are higher than official growth rates in the period 2005-10, the impact ranging from 0.21 to 0.43 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.

33. The picture for the USA between 1975 and 2016 is similar to that of Canada, the inclusion of unpaid household activities on the basis of the replacement cost method lowering GDP growth by 0.34 percentage points on average, while the impact using the opportunity cost method decreases official growth rates by 0.65 percentage points on

[8] Please note that no allowance has been made to changes in labour productivity in compiling results on the production of unpaid household services over time. One could, for example, assume a productivity change equivalent to the developments in relevant market activities. This would then lower the divergence between economic growth numbers including and excluding unpaid household activities, at least for the periods in which official economic growth is higher than the adjusted one.

[9] The intertemporal developments of time use data may be affected by changes in the reference population. This is especially true for the developments in Canada between 1971 and 1981, the developments in the UK between 1995 and 2000, and the developments in the US before 2003.

average. Here too, one can observe a positive impact of the adjustments on official growth rates during the economic and financial crisis; see the numbers for the period 2008-10. In the period 2010-14, the impact returns to its normal pattern of lowering official growth rates, although in the latest period, 2014-16, growth rates including unpaid household activities are higher again.

34. Finally, the results for the United Kingdom necessarily focus on a shorter time period, but also provide interesting results. Whereas the inclusion of unpaid household activities has a lowering impact on GDP growth rates in the periods 2000-05 and 2005-14, a positive impact can be observed for the period 1995-2000. However, the latter may be caused, at least partly, by a change in the reference population between 1995 (population 16 years and above) and 2000 (population: 8 years and above), and also by a change in the sources[10]. Furthermore, the negative impact on GDP growth for the time period 2000-05 shows to be far more substantial than in Canada and the United States for the same time period. The inclusion of unpaid household activities according to the replacement cost approach would lower GDP growth by more than 0.84 percentage points on average and even 1.79 percentage points according to the opportunity cost approach. This also raises the question whether this indeed reflects economic reality or that this is due to inconsistencies in the time use survey data over time.

[10] The 1995 time use data have been derived from the Office of Population, Censuses and Surveys (OPCS) Omnibus Survey, while the data for 2000/2001 come from the UK Time Use Survey.

5. Summary and conclusions

35. This report started with shortly addressing the main pros and cons of extending the traditional production boundary used in the System of National Accounts (SNA) with unpaid household services. After presenting the basic methodologies and the main sources for estimating these services, the report presented results on the impact of their inclusion on macro-economic aggregates.

36. As noted before, 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 unpaid household 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 3-5 years.

37. For the compilation of high quality estimates, 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 unpaid household 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 authors of this report are slightly pessimistic. A promising, yet not very much explored avenue, could be the use of "big data" to capture the time use of people, at least parts of them. The latter could perhaps also help to monitor ongoing displacements of economic activity through the digitalisation of the economy and the society at large. Examples of the latter relate to making own travel arrangements through the internet, instead involving travel agencies, or enlarging the public knowledge through Wikipedia or open-source software development.

38. The second condition relates to the availability of an internationally agreed set of standards and classifications for the compilation of satellite accounts for unpaid household services. In this respect, excellent work has been done by the UNECE Task Force on Valuing Unpaid Household Service Work. A first important step forward has been made with the compilation and dissemination of the "Guide on Valuing Unpaid

Household Service Work" (UNECE, 2017). As noted before, it is highly recommended that countries actually start compiling, at regular intervals, estimates themselves, based on the internationally agreed methodology. Countries do not only have better access to statistics underlying the estimates for unpaid household activities, they are also much better aware of local circumstances. Furthermore, only gaining practical experience and exchanging views on this experience will lead to a better notion of data gaps and how to improve in the most efficient way on the availability of data, potential improvements and refinements of methodologies, and more detailed international standards and guidance.

39. Looking at the results of some provisional calculations, it shows that extending the production boundary with unpaid household services has a significant impact on the traditional macro-economic aggregates. Here, it should be emphasised that the inclusion of these 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, household final consumption and investments. Depending on the country and the valuation method, the level of GDP is increased by 15% to almost 70%. Due to the increased labour force participation, the inclusion usually has a lowering impact on economic growth, and implies that traditional estimates may overstate growth numbers which include all activities, paid as well as unpaid.

40. More generally, better monitoring and valuing unpaid household activities provides a better insight on the importance of the provision of these unpaid services for the functioning of the economy at large. Without the support provided at home, the functioning of the formal labour market would dramatically decline in efficiency, thus potentially having severe impacts on economic growth, and on well-being more generally.

41. Valuing unpaid activities also helps in assessing the (possible) impact of specific policies, such as promoting equal partnerships in which mothers and fathers equally share the responsibility of raising children (which is generally understood to increase the well-being of families and children) or policies addressing unequal burdens for total time spent on work, be it at home or at the formal labour market, across gender and age categories. It may also provide important input in political debates such as how to deal with the impact of an ageing society in which care for elderly will become more crucial for the well-being of significant and growing shares of the population. If not provided in an informal way by people taking care of each other in the form of unpaid household activities, the government may need to step in to redress the negative impact on the elderly, with substantial resource implications as a consequence. Valuing unpaid activities may thus help in better understanding the possible impact of an ageing society as well as in better assessing the impact of different policies.

42. Finally, as noted before, the digitalisation of the economy may have significant impacts, not only on the economy as such, but more broadly on the way we live together and organise our lives. For example, formal economic activities are increasingly displaced by own activities (e.g. booking a hotel yourself via internet instead of via a travel agency, self-scanners in supermarkets) and people increasingly create public goods via the provision of unpaid services (e.g. the creation of Wikipedia and open software). To understand the changes that are going on as a consequence of this transformation, which may not only directly benefit the formal economy, but also help people in improving their well-being, it is of crucial importance to proper monitor all activities that contribute to the functioning of the society at large, be it formal or informal, including the exchanges between the two of them.

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