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Methodological issues on the assessment of domestic production.

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Households Satellite Account for France in 2010. Methodological issues on the assessment of domestic production

Abstract
We estimate the value of French domestic production in 2010, using the input method. We describe productive activities not currently covered by the system of national accounts (SNA) in a household satellite account (HHSA), following the recommendations of Eurostat. In line with previous studies in many developed countries, we find that remodelling the frontier of production to include domestic activities (house chores, cooking, care...) would have a sizeable effect on key macroeconomic indicators (the equivalent of 36% of the GDP, 55% of the disposable income, 63% of the consumption, and -5 percentage points for the savings ratio).
These estimates bring up several methodological issues. Most importantly, we quantify their sensitivity to technical choices which have not yet been settled by an international benchmark. The two most important issues are: first, the boundary of household production, and we advocate using a relatively narrow definition; second, the use of a gross or a net wage in the valuation of domestic work time.
Valuating home production in order to build a HHSA is a very different exercise from valuating it in a welfare economics perspective. Openly choosing one or the other can help settling some of the pending issues. This work should allow further harmonisation and development of Household Satellite Accounts.

JEL-code: D13, E01
Keywords: unpaid work, domestic production, household satellite account, time-use survey

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Le compte satellite des ménages en France en 2010 Problèmes méthodologiques dans la mesure de la production domestique

Résumé
Nous estimons la valeur des tâches domestiques en France en 2010 avec la méthode *input*. Nous décrivons ces activités productives actuellement non couvertes par le système européen des comptes (SEC) dans un compte satellite des ménages conforme aux recommandations d'Eurostat. Conformément aux précédentes études dans plusieurs pays développés, nous trouvons que la redéfinition de la frontière de production pour y inclure les tâches domestiques (ménages, cuisine, soins…) aurait un effet notable sur les principaux indicateurs macroéconomiques (l'équivalent de 36 % du PIB, de 55 % pour le revenu disponible brut, de 63 % pour la consommation et de -5 points pour le taux d'épargne).
Ce travail soulève plusieurs problèmes méthodologiques. En premier lieu, nous quantifions l'impact de décisions de méthode qui ne font actuellement pas l'objet d'un consensus international. Les deux choix les plus importants sont : tout d'abord la définition de la production domestique et nous défendons l'usage d'une définition relativement restreinte ; ensuite l'utilisation d'un salaire net ou super brut dans la valorisation du temps accordé aux tâches domestiques.
La valorisation de la production domestique dans le cadre d'un compte satellite se distingue de sa valorisation dans une perspective d'économie du bien-être. Choisir clairement entre ces deux exercices permet de résoudre certains points en suspens. Ce travail devrait permettre une plus grande harmonisation des comptes satellites des ménages.

Code JEL : D13, E01
Mots clés : travail bénévole, production domestique, compte satellite des ménages, enquête emploi du temps

Introduction

From their daily domestic work, households produce services they directly consume. No monetary transaction takes place to record this process. Whether a family has dinner at home or in a restaurant, they consume a meal which has been cooked. The same goes for the shirts they clean and iron themselves instead of taking them to the dry cleaner: in both cases, a service is produced and consumed, thus participating to the material well-being of the household. But in one case, there is a market transaction, and the consumption is recorded by System of National Accounts (SNA), whereas in the other case, it goes unrecorded for lack of market transaction.

As the Sen-Stiglitz-Fitoussi report on the measurement of economic progress recently pointed out (Stiglitz et al., 2009), this is not without consequence for international comparisons of household consumption across countries that differ in their reliance on the market for the provision of household services (the US vs European countries vs developing countries, for instance). This caveat is not new to economists: some of them have worked on the valuation of hours of unpaid work recorded by Time Use Surveys (TUS) in the last decades and pioneer works date back to the thirties. It is not new to national accountants either: the SNA in its 1993 edition (IMF et al., 1993) exposes the limitations of its production boundary, in particular with respect to household production, but for conceptual and technical reasons it consigned the measurement of domestic production to a satellite account.

An attempt to overcome such limitations of the SNA is the recent development of Household Satellite Accounts (HHSA). It consists in additional tables, compatible with the SNA framework, describing the economic transactions (monetary or not) related to domestic production. The HHSA affect households' production and consumption, but also their income. It also marginally impacts their investment. These modifications can have marked consequences on their savings ratio and the purchasing power of their disposable income. Also, care must be taken not to disrupt the fragile balance of the SNA; in particular not to create monetary counterparts to non-monetary transactions or not to record only one side of a transfer between two categories of agents.

The present paper is an attempt at implementing such principles in the design of a household satellite account that includes production, for France in 2010. Quantitatively, our estimates comfort previous work on the magnitude of domestic production with regard to GDP and consumption. In line with previous studies in many developed countries, we find that remodelling the frontier of production to include domestic activities (house chores, cooking, care...) has a sizeable effect on key macroeconomic indicators (GDP +36%, disposable income +55%, consumption +63%, savings ratio −5 percentage points). Moreover, for each function of domestic production, household production is much larger than their expenditure on market equivalents.

The estimation of HHSA aggregates is very sensitive to methodological choices. A vast strand of literature exists on these issues. In the wake of work done in the 1990s, a European task force made a first set of recommendations in 2003 (Eurostat, 2003). Still, a consensus has yet to emerge on several points. These points, and their relative importance for international compar-

isons of HHSA, are the object of this paper.

A crucial matter for harmonisation is the frontier between domestic work (a productive activity but excluded from the SNA) and leisure (non productive). In its broadest definition domestic work can be twice as large as it is in a more restrictive sense. Because its components are more consensual and less subject to an overestimation of productivity, we favour the narrowest definition of domestic production (hereafter *core perimeter*).

A greatly debated question is the choice of the wage to value time spent on various domestic activities. The *generalist substitute* method levels out any composition effect of domestic productions. In practice, such a composition effect seems marginal and hard to disentangle from the statistical noise between successive Time Use Surveys. We therefore believe that this does not constitute an obstacle to the use of the generalist substitute method. Also, using the *specialised* or *generalist* substitutes has a secondary effect on the estimates. In both cases, whether the wage is net of taxes and social contributions or gross is a key issue. Their inclusion raises other difficulties, in particular for the interpretation of the savings ratio and thus is a key issue for harmonisation.

The evaluation of services provided by households durables is aslo a difficult issue. A simplified permanent inventory method (PIM) can be used, but the PIM remains highly conventional and using it should discourage from reclassifying all the durables as productive capital.

Some other accounting questions can be solved by a simplicity argument: a parsimonious HHSA should not modify taxes and subsidies on production or changes in inventories, nor arbitrarily distribute ancillary functions of domestic production to principal functions. It can also easily avoid double counts of *production for own final use* already recorded by the SNA.

The remainder of this paper is organized as follows: section 2 reviews the literature on HHSA; section 3 deals with the definition and valuation of hours of unpaid work, and quantifies the effects of related methodological choices; section 4 deals with several issues specific to the national accounts and the HHSA, in particular intermediate consumption, capital, the permanent inventory method and finally section 5 exposes our estimation of the HHSA for France in 2010.

1 Domestic production amounts to 30 to 50% of GDP in most studies

An old debated question The measurement of domestic work and domestic production is an old debated question in national accounts as recalled by Vanoli (2002). In the related literature, one may find references dating back to the 19th century (Charlotte Perkins Gilman (Women and Economics 1898)), or to the 1930s and 1940s such as Margaret Reid (Economics of Household Production, 1934), Wassily Leontief (The Structure of the American Economy, 1941), cited in (Ironmonger, 2000) or S. Kuznets, L. Epstein and W. I. King, H. Kirk, W. C. Mitchell cited by Chadeau and Fouquet (1981), Alfred Marshall (Principles of economics: An introductory

volume, 1920), Arthur Pigou (The Economics of Welfare, 1932) in (Abraham and Mackie, 2006) or Lindahl *et alii* (1937), Wesley C Mitchell *et alii* (1921), Kuznets (1941) in (Vanoli, 2002). This question is also a matter of history (Folbre and Wagman, 1993) since the prevalence of market over informal economy is relatively recent in economic history.

Hawrylyshyn (1976) reviews some of the early quantitative studies on domestic work, from the second half of the 20th century. They mostly deal with the US but pioneer quantifications were performed in Nordic countries as well (Denmark, Norway, Sweden). Over the last 30 years, many authors have investigated this issue, mainly through Time Use Surveys and the valuation of hours worked for domestic production. We found references to 27 national or regional economies[1] where at least hours of domestic work have been converted to monetary equivalents. Chadeau (1992) reviews such work in 7 countries; Goldschmidt-Clermont and Pagnossin-Aligisakis (1995) and Goldschmidt-Clermont and Pagnossin-Aligiasakis (1999) do so in 14 countries.

Over the last 15 years or so, the focus has shifted from the valuation of productive time to the construction of Household Satellite Accounts (HHSA) as suggested by the SNA (IMF et al., 1993). In addition to the long debated questions already raised by hours worked and their valuation, the production of HHSA yields specific issues. The interested reader will find them expounded in (Eurostat, 2003), (Varjonen and Aalto, 2006) for the European Input approach, in (Abraham and Mackie, 2006), (Nordhaus, 2006) for the US Input approach and (Holloway et al., 2002) for the UK's Output approach.

Similarities of the estimates despite methodological differences The valuation of time in different countries and at different dates usually concurs to the same (blurry) picture of domestic work.

Hours of unpaid work are at least equal to hours of paid work (Chadeau, 1992), (Goldschmidt-Clermont and Pagnossin-Aligisakis, 1995), and (Roy, 2012). The value of this time can be estimated using various sets of assumptions and methodologies. These choices account for an important share of the estimates' dispersion in the literature (Chadeau, 1985). In his review, Hawrylyshyn (1976) corrects such methodological differences and finds that "housework is about a third of GNP". Chadeau (1985), Chadeau (1992) or Goldschmidt-Clermont and Pagnossin-Aligiasakis (1999) find ratios closer to 40%.

Beyond working time, domestic production has been estimated in several countries. Accounting for this production in household consumption (as households are both producers and consumers of domestic production) substantially modifies the national accounts figures. Prior to any adjustment, Chadeau (1992) finds for 6 countries in the seventies-eighties, using the specialist substitute method, that domestic work alone would increase household consumption by

[1] Australia, Austria, Basque Country, Bulgaria, Canada, Finland, France, Germany, Hungary, Italy, Israel, Japan, Luxembourg, Madrid, Mexico, Nepal, Netherlands, New-Zealand, Norway, Portugal, Russia, Slovenia, South-Africa, Sweden, Switzerland, United-Kingdom, United-States, but unfortunately we could find less than half of the referenced papers.

57% to 83%. Goldschmidt-Clermont and Pagnossin-Aligisakis (1995) find for Finland, Germany and Bulgaria in the late eighties-early nineties, that once domestic production is accounted for it is equal to 60% of total consumption.

Using the HHSA framework, Landefeld and McCulla (2000), Landefeld et al. (2009), Varjonen and Aalto (2006), Hamunen et al. (2012), Eustat (2004), Holloway et al. (2002) and Ruger and Varjonen (2008) have estimated domestic production for the US, Finland, the Basque Country, the UK and Germany, respectively. Table 1 gathers some of their results showing the impact of HHSA on key macroeconomic aggregates. Accounting for all the inputs of domestic production has a sizeable effect on major macroeconomic aggregates. For the US and the Basque Country, this effect diminishes with time. According to the authors, this can be explained by a greater access of women to the labour market. Also, accounting for domestic production can have a marked impact on savings ratios in both directions: the UK's households savings ratio would be negative while Finland's would be closer to zero.

			Revisions			Income and Savings ratio		
Country	Source	Year	GDP	Cons.	GFCF	Income	SNA$^{\intercal}$	non-SNA$^{\intercal}$
USA	a	1946	+50%	+63%	+50%	+59%	8.3%	10.8%
USA	b	1965	+39%	+49%	+50%	+49%	8.6%	11.5%
USA	a	1997	+36%	+34%	+54%	+38%	1.8%	8.5%
USA	b	2004	+27%	+26%	+48%	+32%	1.8%	4.2%
Finland	c	2001	+40%	+59%	+60%	+81%	-1.2%	0.2%
Finland	d	2006	+39%	+55%	+47%	+77%	-1.8%	-0.3%
Basque Country	e	1993	+49%	+74%*	-	-	-	-
Basque Country	e	1998	+39%	+64%*	-	-	-	-
Basque Country	e	2003	+33%	+56%*	-	-	-	-
UK	f	2000	+63%*	+95%*	+98%*	+93%*	4.2%	-6.9%*
Finland	g	2001	+36%	-	-	-	-	-
Germany	g	2001	+43%	-	-	-	-	-

*: our calculations, -: not available
$^{\intercal}$: SNA refers to production and other concepts as defined by the System of National Accounts, while non-SNA refers the extension of these concepts for the purpose of the Households Satellite Account.
a: (Landefeld and McCulla, 2000), b:(Landefeld et al., 2009), c:(Varjonen and Aalto, 2006), d:(Hamunen et al., 2012), e:(Eustat, 2004), f:(Holloway et al., 2002), g: (Ruger and Varjonen, 2008)
GFCF: household gross fixed capital formation, Cons.: household final consumption includes individual consumption except for Basque Country

Table 1: HHSA estimates in 5 countries: effects on key macroeconomic aggregates

Table 2 describes the inputs for domestic production as described by the HHSA, for 4 countries or regions. It is quite similar across countries. Net value added is equal to approximately three fourth of production while capital consumption is the smallest of the three components. However, the comparison between (Ruger and Varjonen, 2008) and (Varjonen and Aalto, 2006) for Finland in 2001 shows that international comparisons going beyond orders of magnitude are fragile: Ruger and Varjonen (2008) revise initial estimates of the German and Finish HHSA so as to make them comparable, which significantly modifies the estimates both in absolute and relative terms.

Table 3 shows the *Gross Value Added* in 3 countries by function of domestic production. As

	Basque Country			Finland				Germany	UK
Source	e	e	e	c	c	d	g	g	f
Reference Year	1993	1998	2003	1990	2001	2006	2001$^\diamond$	2001$^\diamond$	2000$^\diamond$
Production (10^6 €,£)	11.7	13.3	15.9	-	68.9 10^3	86.5 10^3	76.0 10^3	1.3 10^6	879.2 10^3
Net Value Added (%)	77.4	75.0	71.4	76.4	75.1	71.5	67.5	71.5	73.0
Intermediate Cons. (%)	21.6	23.9	27.3	21.4	20.8	24.0	24.7	23.0	21.1
Capital Cons. (%)	1.1	1.1	1.2	2.2	4.1	4.5	7.8	5.5	5.9

*: our calculations, -: not available $\diamond$: SNA + non SNA
c:(Varjonen and Aalto, 2006), d:(Hamunen et al., 2012), e:(Eustat, 2004), f:(Holloway et al., 2002), g: (Ruger and Varjonen, 2008)

Table 2: HHSA in 4 countries: inputs of non SNA domestic production

for the other tables, orders of magnitude are similar across countries, but it is impossible to say which part of the differences stems from national specificities or from the methodology. In particular, with their output method, Holloway et al. (2002) have an extensive approach of child care and accommodation for the UK. However, the accommodation function is similar across countries which hides the fact that for the UK, figures covers both SNA (imputed rents) and non-SNA[2] production for own use. Care covers twice as much gross value added than in the other two countries. Also, the small fraction of food production in UK households could reflect the stereotypical lack of interest in food of the British, but can also be explained by the way ancillary functions (transportation in particular) are reallocated to other principal functions.

Country	Basque	UK*$^\diamond$	Finland
Year	2003	2000	2006
Source	e	f	d
Food	46.6	9.6	31.6
Housing	30.3	32.1	34.6
Care	14.8	33.3	13.3
Clothing	8.4	5.4	11.1
Transportation	-	17.7	-
Shopping	-	-	-
HH management	-	-	-
Volunteer work	-	1.9	9.4

*: our calculations, -: not available $\diamond$: SNA + non SNA
d:(Hamunen et al., 2012), e:(Eustat, 2004), f:(Holloway et al., 2002)

Table 3: HHSA in 3 countries: ventilation of non SNA domestic Gross Value Added by functions (in %)

From these comparisons we can draw the following conclusions: our estimation should be

[2]non-SNA refers to the concepts of production and other operations for the purpose of Households Satellite Accounts as opposed to SNA referring to the definitions in the System of National Accounts

broadly in line with others but in details, comparisons can not be made without specific adjustments. The corollary conclusion is that there is a great need for a benchmarking method from which historical and international comparisons can be made.

2 The accounting and valuation of hours of domestic work

2.1 Time-use surveys: towards harmonisation

We use the latest French Time Use Survey, whose fieldwork took place between September 2009 and December 2010. It is representative of the non-institutional population of mainland France and 3 overseas *départements*. One individual was selected in each sampled household, among its members aged 11 and above. His/her spouse or partner, if there was one, was also interviewed. Respondents were given two diaries to fill in, one for a weekday and one for a weekend day. The sample eventually consists of 12 000 households, 18 500 interviewed individuals, 27 900 diaries. The activity list comprises roughly one hundred basic activities, in compliance with Eurostat's Guidelines on Harmonised Time Use Survey (Eurostat, 2008).

Household surveys and National Accounts have different scopes. The sum of the weights of the respondents with a diary is 54,4 millions, when the total population of France was 64,6 on Jan 1st, 2010. The difference consists of: the inhabitants of French Guyana; the children under 11; the residents of institutions such as care homes, boarding schools, prisons; and the students on campuses. The amount of unpaid domestic work made in France over the year 2010 estimated from Time Use data will therefore exclude Guyana, and using it as our estimate implies making 2 additional hypotheses:

- The amount of domestic work made by children under 11 is negligible, which seems to be a realistic assumption, in a developed country like France at least
- Residents of institutions do little domestic work. This assumption is standard in this literature and seems acceptable since by definition, most of these institutions provide cooking, cleaning, etc. for their residents.

Since their onset, time use surveys have been at the heart of an international community of researchers, and they are fairly comparable across countries, as regards their activities coding list in particular. At the European level, most countries follow Eurostat's Guidelines (Eurostat, 2008). This means that the data exist to compute comparable estimates of hours of unpaid work. The crux of the problem is to agree on which activities to include in domestic work.

2.2 Defining domestic work

2.2.1 The definition is debatable, we test three possibilities

The question is not so much to give a theoretical definition of domestic work, as it is to decide where to set the boundary between productive and unproductive activities. Our view is that

a consensus can not be reached solely from any set of criteria. Yet, section 4 (in particular Table 11) demonstrates that estimates are very sensitive to the definition of domestic work, so that the agreement on a boundary is one of the keys to make international comparisons possible.

We favour the most restrictive definition (*core* perimeter) of domestic work for three main reasons: all its elements are commonly accepted as productive, it is *a priori* the easiest to measure across countries, and it is less subject to an overestimation of productivity (see 2.3 and 3.2), a key issue for the input method.

Drawing the frontier of production across the *grey zone* The *third party criterion* is usually the cornerstone of the definition of domestic production: "If an activity is of such character that it might be delegated to a paid worker, then that activity shall be deemed productive" (Reid, 1934, p.11) cited by Ironmonger (2000). Being too inclusive, this criterion has been completed with the reference to social norms: "the third party criterion comes up against borderline cases which must be resolved by reference to normal social practice and standards" (Chadeau, 1992).

However, there may remain ambiguous cases and these criteria should be seen as general guidelines more than golden rules. If sexual intercourse is identified as an important activity for well being (Stiglitz et al., 2009), it is chastely eluded in the literature on HHSA. However, it meets both criteria suggested by Reid and Chadeau. It can be delegated to a third party outside the household (sometimes to the detriment of the institution of marriage). Prostitution also exists (legal or tolerated) in most countries. However, we find hard to argue that unpaid sexual intercourse within the household should be deemed productive.

Here, National Accounting encounters serious anthropological issues that we are bound to leave unresolved within the scope of this paper. But theoretically, we could have included sexual intercourse in our most extensive perimeter since it is part of the "grey zone" if we take the third party criterion seriously. In practice, we totally lack the data to do so, even solely as a thought experiment.

The point of this far-fetched counterexample is: the SNA frontier of production is necessarily conventional and imperfect, the frontier of domestic production will be just as much. Comparability comes at this cost: somehow arbitrary, but unified conventions.

Including the *grey zone* could double the duration of domestic work House chores, cooking, taking care of a dependent adult, driving children to their football lesson... are commonly accepted as *productive* activities. On the other hand, breathing, sleeping and eating are undebated examples of *non-productive* activities. But beyond these core physiological activities lies a wide *grey zone* of daily actions that can be considered productive or not. The literature on domestic work traditionally relies on two criteria to sort productive and non productive activities, without solving all the conflictual cases. In order to highlight the impact of methodological choices on estimates of household production, we define 3 possible perimeters of domestic work,

from the most restrictive (the *core* definition) to the most inclusive (the *extensive* definition) (see Table 4). The *extensive* perimeter is almost twice as large as the *core* perimeter, both in terms of duration and imputed value.

Perimeter	core (I)	intermediate (II)	extensive (III)
Included Activities	cooking, dish washing, household upkeep, cleaning, child and adult care, laundry, household management, driving children or others	(I) and shopping, home repair, gardening, playing with children	(II) and driving oneself, walking the dog
Daily	2 h 07	3 h 04	3 h 53
Weekly	14 h 50	21 h 30	27 h 14
Share of volunteer work	3.7%	3.8%	5%
Women's Share	72%	64%	60%

Coverage: individuals aged 11 and over, France (excl. French Guyana and Mayotte).
Source: Insee, 2010 Time Use Survey.

Table 4: Working time for three possible perimeters of domestic work

1. The *core* perimeter consists of only those activities that every study in the literature agrees to be productive: chores such as cleaning, doing the laundry, the dishes, etc.; cooking; material care to and driving children and disabled persons; household management. All these routine tasks can be delegated and many households use market substitutes for them.

2. The *median* perimeter adds to the first list a number of activities that belong to the *grey zone*, either because they border on leisure ('productive leisure' such as gardening, home repairs and decoration, fishing and hunting, picking berries...) and are probably performed less efficiently than in a professional context, or because their utility lies (at least partly) in the process itself and their delegability can be questioned (productive leisure, playing with children). Shopping is also classified here because in our data, we cannot distinguish everyday grocery shopping, a productive chore, from "window shopping" or shopping for pleasure.

3. The *extensive* perimeter furthermore contains, as discussed below, travelling by car for oneself and walking the dog.

2.2.2 Three perimeters in details

Table 13 exhaustively lists the activities classified as productive in each of the three perimeters. Four main types of activities that make up the differences between the three perimeters require further discussion: personal care, transportation, productive leisure and childcare.

Personal care Men used to go to the barber to get shaved, but no longer do. So, is shaving oneself productive? The textbook example is that of the nobleman of the 18th century who had servants dress him, comb his hair, read books to him, etc. This would seem anecdotal except that today, more and more dependent elderly people receive paid help to wash, dress, eat, etc. So, washing can be delegated in some cases, and there exists a market substitute for it. Washing one's handicapped spouse is then productive work, but washing him or her if he or she has no disability isn't (and neither is washing oneself), which might seem paradoxical since the exact same task is performed, the same service rendered.

In this line of thought, Alesina and Ichino (2009), using the MTUS (Multinational Time Use Survey) database, include the *AV13: dress/personal care* category in their definition of unpaid domestic work. Doing this with our French data would add almost an hour to the average daily estimate of unpaid work. This would mean a dramatic increase: +50% over the core definition of domestic work, +33% over the intermediate one which currently totals 3 hours a day, +25% with the most extensive definition (currently 4 daily hours, see table 4).

The issue is the same with medical care: if a person does their own injections, massages or bandages (as people with chronic diseases often do), should it be counted as production since these acts are usually delegated to nurses and physiotherapists? In theory, the answer should be positive, but we choose not to include medical care done to oneself within our production boundary, mainly for measurement reasons: in our data, it is impossible to distinguish *serious* medical care (injections, strapping...) from everyday benign care (putting a band-aid on your child's finger). The latter is not delegable (you don't call the doctor for that) but constitutes most of the time households spend on *medical care*.

Travel time There is no consensus in the literature on how travel time should be treated (see for example (Eustat, 2004)). Some studies include travel time into the time devoted to the activity to which the travel is leading, for example travel to the store is incorporated into shopping time, travel to work into paid working time, etc., but this is not entirely satisfactory, since at least part of the travel time could be delegated. Clearly, driving someone else, a child or a relative for example, can be delegated and is productive. But what does it mean to delegate self-transportation? If I drive to work, I could delegate the driving to a chauffeur or use public transportation, and use that time to do something else: write work-related emails, read a book, etc. But the time that becomes available cannot be used totally freely, since I would still need to be in a car or a bus. If I have to go somewhere, my travelling can only be partially delegated. And I can pay someone to drive me to work, but what if I'm walking 10 minutes to work? Here, the means of transportation enters into play: only driving can be delegated, and only partially so.

The 2010 TUS data for France includes information on the means of transportation / location for every 10-minute interval. We use this information to include only travelling by car (*travelling to work* or *other travelling*) into unpaid work, and only in the most extensive definition of domestic work. *Accompanying a child* and *travelling for another household* (mostly driving other people) are included in core productive activities, since they are entirely delegable to any trustworthy driver.

Gardening, home repairs, fishing and hunting: the frontier with leisure There is another *grey zone* where domestic work and leisure overlap. If the person mainly derives utility not from the output of the activity (the good or service produced), but from performing the activity, from the process itself, then it can no longer be delegated without losing all its value. Amateur pianists do not play the piano in order to be able to hear some (probably poorly performed) music, but for the sake of playing. So, it is generally agreed that unpaid artistic endeavours (music, painting, photography, making films) should not be counted as productive.

The case of what is, precisely, often called *productive leisure* is less clear cut. It includes gardening; home or vehicle repairs; sewing and knitting; fishing; hunting; picking plants, berries or mushrooms. Producing vegetables, fishing and repairing the car are most often delegated in our society, so one might think that people who engage in these activities do so because they enjoy it. But then, from a National Accounting perspective (as opposed to a welfare economics perspective), the question of whether one is enjoying the activity is not necessarily relevant. Indeed, to measure market production, we do not take enjoyment into consideration to measure the value of paid work: the same wage is counted, whether one enjoy the job or not. Most of the literature thus includes gardening, home repairs, knitting and sewing in domestic work, because these are productive, delegable activities. Actually, the current SNA definition of production, used to measure GDP, includes the goods produced by households for themselves, thus recognizing the productive potential of households. In industrialized countries however, it is admitted that only agricultural goods, alcohol, game and fish require counting, because the production of other goods (clothes, furniture, etc.) is too small to be worth the measurement effort.

This means that if counting hours of unpaid domestic work was to become the basis for an input-based valuation of household production to be recorded aside GDP as a complement, goods for own consumption would potentially cause double-counting. The way we correct for double counts is detailed in 3.2. Yet the amounts at stake are small relative to the overall value of unpaid domestic work. For France in 2010, the value of household own production of goods included in GDP was 3.18 billion € , a very small figure compared to the 1900 billion € of GDP.

Productive leisure is a case in point regarding the issue of productivity that one necessarily encounters when measuring production through inputs and not outputs. Since gardening, home repairs or fishing are often done for pleasure, we can suspect that people take their time to do it, and productivity is lower than if it was done for pay. On this basis, together with the fact that they are probably done for themselves (as hobbies) as much as for their output, we do not include gardening and DIY in the core definition of domestic work, but only in the intermediate and extensive ones. On the contrary, unpleasant activities such as vacuuming or doing the laundry are less suspect of such bias, and their productivity is probably closer to that of their market equivalent.

The same goes with walking the dog: it can be delegated and "dog-sitters" are beginning to appear in France but most often, when reading the diaries, one feels that walking the dog and taking a pleasure walk are one and the same activity, and it generally takes much longer than the necessary time for the dog to be walked. This is why we have included walking the dog only in the most extensive definition of domestic work, whereas material care of pets is included in the median definition and care of productive animals in the core definition.

Is all time spent with children productive? Childcare is the last major issue that needs to be tackled if one is to agree on a definition of unpaid domestic work. First, social norms as to what can be delegated are variable over time and place. Breastfeeding is no longer physiologically delegated to another woman in industrialized countries, but feeding a newborn can be delegated thanks to bottle feeding. Some people have therefore argued that breastfeeding is productive, while others who oppose bottle feeding argue that it is not, because it can not be delegated. At the other end of the spectrum, can *playing with one's child* or *having a conversation with one's child* be delegated without losing its (emotional) value?

Within the Eurostat Task Force (Eurostat, 2003), no consensus could be reached on the question of what constitutes productive childcare. In Time Use data, it is possible to consider as childcare (in descending intensity of care):

- only time spent with an explicit activity of material childcare as primary activity
- time spent engaging into various activities for or involving children, but less material and more leisure-like: games, conversations... as primary activity
- time spent on these two types of activities, either as primary or secondary activity
- all time spent in the presence of a child, even if it is not involved in the activities described in the diary. Even sleeping when a child is present could potentially be counted as childcare, since an adult needs to be there and the task of "being there" could be delegated to a babysitter.

As an illustration, one can compute this latest, extreme figure: the amount of time adult respondents spend alone with a child or several children (so we can assume that the respondent is in charge of supervising the children). It amounts to 46mn a day on average, 138mn for a mother living in a couple, 57mn for a father living in a couple, and 272mn for a single mother. This is twice the time spent with childcare as a primary activity (23mn on average), and the figure would be even larger if time spent with both children and other adults was included.

This shows that, with the French TUS data at least, deciding whether or not to count the time spent with children in passive childcare as productive would have a major impact on the measurement of domestic work. This impact is much stronger than that of secondary activities.

In what follows, we choose to include only active childcare done as a primary activity, and we distinguish between core childcare (material care and supervision), which we include in the *core* definition, and leisurely childcare (playing, discussion with the child) which we include in the *intermediate* and *extensive* definitions only.

2.3 The valuation of time

In the literature, three methods for valuing domestic work exist: the *generalist substitute*, the *specialised substitute*, and the *opportunity cost* methods.
In the *generalist substitute* method, hours worked are valued using the hourly wage of a worker performing all tasks indifferently (e.g. *housekeeper*). In the *specialised substitute* method, each hour worked is valued using the hourly wage of a worker performing that task specifically (resp.

	Perimeter					
	core		intermediate		extensive	
	Billion h	Billion €	Billion h	Billion €	Billion h	Billion €
Housing	13	211	18	293	18	293
Food	17	290	17	290	17	290
Clothing	4	61	4	75	4	75
Care	6	95	8	134	9	149
Transportation	1	29	2	37	16	317
Shopping	0	0	7	115	7	115
Total excl. volunteer	40	687	56	944	70	1239
Volunteer	2	28	2	42	3	60

Source: Insee Time Use Survey 2010, DADS 2010 - our calculations

Table 5: Three definitions of domestic work and their valuation using the least qualified specialised substitute in 2010 in France

cook, *housecleaner*, *handyman*...). In the *opportunity cost* method, hours worked are valued using the market hourly wage of the person performing the task (e.g. dentist wage when he is cooking). We favour the *specialised substitute* to avoid the overestimation of productivity.
We also test 2 *generalist substitute* methods for a sensitivity analysis: the minimum wage and the housekeeper wage.
We disregard the *opportunity cost* method. Disregarding it is standard in the literature on household satellite accounts, but we have an additional reason to do so: this method is a welfare economics method, while we perform a national accounting exercise.
Also, we assess the sensitivity of time valuation to the treatment of imputed taxes and social contributions.

We use the least qualified specialist wage We value the time spent on each activity at the wage of the *specialised substitute* one would have to hire to do the job (Table 13). This method is one of the methods suggested by Eurostat (2003). Of course, very few people have all the skills of a cook, a plumber, a childminder and a teacher at the same time, so this valuation might somewhat over-estimate the productivity of household work. But two elements allow us to mitigate this criticism. First, people tend to self-select out of the tasks they are very unproductive at. Very few economists do their own plumbing at home, for example. Second, the tasks that make up the greater part of unpaid work are not the most skilled ones: food preparation, housecleaning, child care. Nevertheless, there may remain some differences due to capital intensity and increasing returns to scale. In order to account for this, we choose the least qualified and least capital intensive job as our specialist substitute every time we have a choice: we value cooking time at the wage of a kitchen aide, not at that of a chef, and cleaning at the wage of a domestic cleaner, not an industrial one.

We favour the *core perimeter* which is less subject to an overestimation of productivity As mentioned in 2.2.1, we favour the core perimeter of domestic work for three main reasons: all its elements are commonly accepted as productive, it is *a priori* the most easily measurable across countries and it is less subject to an overestimation of productivity. Indeed, contrary to the core perimeter, the median perimeter includes many productive activities which can be performed for their own sake: gardening, sewing, knitting, handy-work... When considered as leisure by the households, using a market wage to value the hours worked will most surely overestimate the value of the output. An example of this overestimation is given by the *production for own final use* already accounted for in the national accounts, with an output method. In 3.2, we compare these figures with those derived from the input method using the TUS (see table 7). The output method might be somewhat imprecise and conventional since it is not accurately measured each year, but the input method clearly overestimates the productivity of households in their kitchen garden or when they fish, hunt, pick-up mushrooms... For this reason, we favour the most restrictive perimeter of domestic work which contains mostly off-putting tasks that a majority of people would consider chores (apart from cooking in some countries): dish washing, house cleaning, laundry...

We do not consider the valuation of time through the opportunity cost method The *opportunity cost* method is fraught with well known difficulties, it implies imputing a potential market wage to all individuals outside of the labour market, e.g. at-home parents, retired persons... The usual argument to disqualify this method is the following: if one values domestic productive time with the market wage of the person performing the house chore then a dentist would implicitly be a much better cook than a bus driver: there is *a priori* no reason for this outcome to be right. However, it does not suffice to disqualify the opportunity cost method. Essentially, the market wage represents the opportunity cost only in the simplest microeconomic allocation of time model, where workers can freely allocate marginal amounts of time between market work, domestic work and unproductive activities (leisure). One could then argue that a refined model could allow to more appropriately measure the opportunity cost than equalizing it to the market wage.
Beyond the difficulty of building such a model, our argument is more straightforward: the frontier between national accounts and welfare economics is drawn in such a way that the opportunity cost method is beyond the scope of the present exercise[3] (see also (Landefeld and McCulla, 2000) for more details).

2.3.1 Wage sensitivity analysis

Generalist or specialised substitute (−3%) The generalist wage method consists in valuing all the hours of domestic work at the same rate. It is one of the methods suggested by Eurostat (2003): using the wage of a *generalist housekeeper*. This method might be preferred for an international benchmark since the data for the *specialised substitute* method are not available in every country (see (Varjonen et al., 1999) appendix 2). It is also the method used

[3]This should not be seen as an endorsement of the current distinction from our part; we leave to more experienced national accountants/economists the task of remodelling it, if need be.

	core perimeter	median perimeter	extensive perimeter	generalist substitute	minimum wage
Super gross	17.2	17.0	17.6	16.5	10.4
Net	10.1	10.1	10.3	9.8	6.9

Source: Insee : Time Use Survey 2010, DADS 2010 - our calculations

Table 6: Substitute wage in € per hour in 2010

by Landefeld and McCulla (2000) and Landefeld et al. (2009) on US data.

However, the generalist wage method does not solve the issue of international comparability: even where the data do exist, the choice of the reference wage is not clear-cut and references are made, depending on the publication, to ISCO-88 categories 3221 (Medical assistants), 3231 (Nursing associate professionals), 512 (Housekeeping and restaurant services workers), 5121 (Housekeepers and related workers), 513 (Personal care and related workers), 9131 (Domestic cleaners and helpers), ISCO-08 category 5322 (Home-based personal care workers) or simply 51 (Personal services workers). With our data set, based on the French PCS classification, we would use *domestic services and cleaning workers* for the generalist substitute (PCS 563c *Employés de maison et personnels de ménage chez des particuliers*, which includes ISCO-08 5152 *Domestic housekeepers* and 9111 *Domestic cleaners and helpers*). Their hourly wage is equal to 16.5€ while the average wage of the specialised substitute lies between 17.0 and 17.6€ depending on the perimeter (see Table 6). The method of the generalist substitute scales down by less than 1€ the hourly wage, i.e. by 3%, the valuation of domestic work. The choice of a substitute wage is thus not a major source of discrepancies compared to the definition of domestic work and the treatment of social contribution and working time, at least in the French context.

Gross or net wages: a critical choice (–41%) Whether or not one should include all taxes and social contributions within the valuation of hours of unpaid work is a matter of perspective. If the main interest is household production, the imputed wage would include taxes and social contributions. If the main interest is household income, the imputed wage would be net of taxes and social contribution.

We choose to use *super gross* hourly wages (i.e., including all taxes and social contributions whether paid by the employer or the employee). The main reason for this choice is that it is coherent with the National Accounts concept of *Compensation of Employees* (the total remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the latter during the accounting period).

Using net wages (before income tax) would induce a 41% decrease in the valuation of domestic work. Thus, the decision to use one wage or the other is not marginal quantitatively, and it should be a priority in the agenda towards international harmonisation. It is also not benign for the interpretation of the savings ratio (see 3.9).

Moreover, the conversion from net to super gross wage raises its own conceptual issues. In France, paid domestic work is subject to tax rebates and subsidies. In particular, compensations paid by households to domestic personnel are partly subsidized by the general government for some specific domestic work (help for the elderly, handicapped persons but also care of young children). Under some conditions, up to 50% of the compensations paid can be deducted from the employers' income tax. This tax rebate is treated as imputed subsidies by the ESA 2010. Should we include specific subsidies and tax rebates in imputed wages ? For sake of simplicity, we chose not to.

The minimum wage (−40%) France has an hourly minimum wage (SMIC) below which workers can not legally be paid. By construction, this wage is lower than average wages recorded by our administrative wage data ("DADS"). Although the SMIC is almost a reflex for a French economist, using it to value hours of unpaid work will not allow for international comparisons as not all countries have a minimum wage, and existing ones are not even comparable. In some countries, the minimum wage is very low compared to the mean wage, and very few people are actually paid at the minimum wage. In other countries such as France, the minimum wage is set at a level closer to the median wage, it can be considered as a "living wage", and a significant proportion of the workforce actually earns it (around 15%).

In 2010, the minimum wage was 10.43€/h super gross and 6.95 €/h net. It is noteworthy that due to regressive social contribution rebates on small wages, the difference between the valuation with the minimum wage and the specialist substitute is markedly smaller in net (−32%) than in super gross (−40%, see Table 6).

In both cases, using this wage for the valuation of domestic work does not seem relevant, at least not for the purpose of international comparisons.

The generalist substitute method levels out any composition effect across time (±1%) In temporal comparisons, the generalist wage method has the major drawback of levelling out the various skills required for different domestic tasks. Indeed, in comparison across time, we would like to be able to measure the effect of a shift from less skilled unpaid domestic tasks to more skilled ones. Such shifts may have happened in the last decades, with better educated women working more often outside their home. If they now spend less time doing the laundry and more time helping their children with homework for instance, the value of their home production may have increased. Using the same wage for all domestic tasks would prevent us from registering any composition effect of this kind.

However, the composition effect is potentially small, as the imputed wages are very close: in the core perimeter 87% of hours are imputed with specialists wages which differ by less than 1.5€ from the generalist substitute. One fourth of unpaid working time is dedicated to cleaning the dwelling. If one half was reallocated to skilled child care (homework supervision), valued at the average wage of a teacher, the value of domestic work would increase by just 0.2%. If it was reallocated to food preparation, valued at the average wage of a kitchen aide, it would increase

by less than 1%.

Thus this is not a strong case against the generalist substitute method.

Working time vs. paid time (+22%) Our source for hourly wage (DADS) uses paid time as a reference but TUS record worked time. The difference between these durations are paid holidays, sick leaves, maternity leaves, national holidays... periods during which workers are paid but not productive. As a consequence, our hourly wage from DADS is equal to $w = \frac{Annualwage}{Annualpaidtime}$ which we multiply by TUS's worked time, a duration conceptually shorter. On aggregate for the market industries there is a 22% wedge between these two durations in 2010: 22% of paid time is actually not worked. As a first approximation, we could thus assume that our valuation of domestic work underestimates by approximately 22% the true value of domestic work because it ignores non worked paid time. However, we can not assess whether there are some specificities linked to the particular occupations we consider (the working time and paid time of domestic cleaners paid by the hour are probably closer to one another, for instance). Before engaging in complex correction, the choice of an international benchmark on this matter could be guided by the available data.

3 From TUS to HHSA

3.1 The output and input approaches are two polar ways of measuring an in-between reality

Alternatively to the input method used here, the output method has been used for domestic production. As the UK's experience shows (Holloway et al., 2002), it is quite complex, whereas the input approach, based on previous experience on Time-Use Surveys, seems more practical to implement (both in terms of method and available data). Previous experiences and TUS availability are the main reasons for our choice of the input method. This choice is thus open to criticism and orientates the scope of domestic production we consider, in particular when it comes to capital (see 3.7).

However, there seems to be a consensus on the fact that the output method would, theoretically, be the first-best estimation procedure. Yet one may argue otherwise: the output and input approaches are two polar ways of measuring an in-between reality.

When a market exists, prices theoretically measure the willingness to pay of the marginal buyer for a good or service. The price embeds information beyond the cost of producing the said good or service. Typically, when the right logo is printed on a t-shirt, the value of the product increases by much more than the printing cost. What is relevant from the National Accounts perspective is that prices are public and allow for a better description of the transactions.

On the one hand, using the output method and applying market prices to domestically pro-

duced goods and services implies that the willingness to acquire these products does not depend on their producers: market and domestic products are essentially identical. It is thus implicitly assumed that households are constrained to produce domestically in some way (financially, because of time, through social norms...) but otherwise they would purchase their domestic production from the market.

On the other hand, the input method implies that the decision to domestically produce is deliberate so that market and domestic products are essentially different. In the absence of any price to measure the specific value of these products, the best value we can (objectively) impute to domestic production is the valuation of its inputs.

Both methods are subject to a problem of quality evaluation. In addition, the output method raises the difficulty that market prices embed characteristics which do not apply to domestic production (allowing firms to price with a mark-up). The input method poses similar difficulties on wages as a measure of productivity.

In both cases, one may be tempted to go beyond these objective measures to capture the true willingness to pay for domestic production. Indeed, one can argue that nothing compares with dad's chocolate cake, while nothing is worse than wearing grandma's hand-knit pull-over at school, implying that their value is neither the price of their market equivalent nor their production cost. For the present exercise we did resist this temptation, which is quite consensual and justified by similar reasons as those invoked for not considering the *opportunity cost method*: we are working within the theoretical framework of national accounting, not welfare economics.

3.2 Avoiding double counts of *Output for own final use* (5% of production)

As mentioned in 2.2, there are some double counts between the standard household account and the TUS estimates. Specifically, food products, either grown, picked, hunted, fished, bred, milked, vinified, distilled or brewed are already counted, both in *Output for own final use* and *final consumption expenditure* (P12). Also, major construction work and maintenance of dwellings are counted both in *Output for own final use* and *GFCF*.

In these cases we favour the existing National Accounts' estimation of *P12* and we do not count the corresponding time from the TUS data. This choice has a limited impact for construction work (see table 7), but the input method appears to overestimate the productivity of households in their kitchen garden or when they fish, hunt, pick-up mushrooms... probably because these are both productive and leisure activities. We choose to trust the output-based estimation, in spite of its own limitations. Provided that the output method was perfectly accurate, then the overestimation avoided by not valuing the agricultural production of households with the input method would amount to 49 billion €, i.e. 5% of domestic production in the *core perimeter*.

HHSA	Activity	Gardening ($\frac{1}{2}$)	Breeding	Fishing, hunting	Gathering	Construction
	Hours*wage	26.6	7.0	13.9	0.8	2.7
SNA	B1=P12-P2			2.5		2.3
	P12			3.4		4.9
	P2			0.9		2.6

For construction (incl. major maintenance of dwellings), the SNA figures are close to the imputed value of time from the TUS. For domestic production of food products, valuing time with low qualified specialists' wages is 20 times larger than the output estimation from the SNA account.
Source: Insee : National accounts - Base 2005, Time Use Survey 2010, DADS 2010 - our calculations

Table 7: Labour input from TUS and Output for own final use in billion (€)

3.3 Reclassified consumption expenditure

In France, household consumption expenditure is built using the "Nace rev2" nomenclature for the balancing of the Supply and Use Table (SUT). It is also published using the COICOP classification. We use the Nace to isolate intermediate consumption and Gross Fixed Capital Formation (GFCF) because it is available in greater detail.

... into intermediate consumption Table 15 lists the goods and services we reallocate into intermediate consumption. Table 8 evaluates the value of this intermediate consumption depending on the chosen perimeter. The value of intermediate consumption ranges from 255 billion €to 315 billion €, depending on the chosen perimeter. The definition of domestic production therefore has a limited impact on the value of intermediate consumption : ±60 billion €. It amounts to one tenth of the effect of the choice of the perimeter on the valuation of time (Table 5). From the *core* to the *intermediate* perimeters, productive leisure activities such as gardening, sewing and knitting account for 12 billion € of additional intermediate consumption. From the *intermediate* to the *extensive* perimeters, the fraction of car use counted as domestic production jumps from 11% to 97%. Consequently, the proportion of car-related expenditures that falls into intermediate consumption dramatically increases (+47 billion €), making up most of the difference between perimeters as regards intermediate consumption.

in billion euros

Perimeter	Housing	Food	Clothing	Care	*Transportation*	**Total**
Core	64	175	5	5	6	255
Intermediate	75	175	7	5	6	268
Extensive	75	175	7	5	53	315

Note: There is no intermediate consumption for the ancillary functions *Shopping* and *Volunteer Work*
Source: National accounts - Base 2005, Insee - our calculations

Table 8: Three definitions of intermediate consumption for domestic production in 2010 in France

... into GFCF Table 16 lists the goods and services we reallocate into GFCF. It is shorter than the one used with the input method in Finland (Varjonen and Aalto, 2006) or the US (Landefeld et al., 2009). The reason for this is explained in 3.7: we assume that durables

can not be productive without the addition of labour. Table 9 evaluates both GFCF and CFC depending on the chosen perimeter. In the same way as for intermediate consumption, capital is also impacted by the perimeter of domestic production, mainly through the way car use is counted as productive. This effect is however small, compared to that of the valuation of time (Table 5).

Because CFC for each function is a moving average of the corresponding GFCF with specific weights defined by the permanent inventory method (see section 3.8) and as the trends in GFCFs are small, CFCs have the same order of magnitude as GFCFs.

in billion euros

Perimeter	Housing		Food		Clothing		*Transportation*		**Total**	
	GFCF	CFC	GFCF	CFC	GFCF	CFC	GFCF	CFC	GFCF	CFC
Core	1	1	6	6	2	2	8	8	18	17
Intermediate	3	3	6	6	2	2	8	8	19	19
Extensive	3	3	6	6	2	2	73	74	84	84

Note: There is no capital for the functions *Care*, *Shopping* and *Volunteer Work*
Source: National accounts - Base 2005, Insee - our calculations

Table 9: Three definitions of capital (GFCF and CFC) for domestic production in 2010 in France

3.4 No change in taxes and subsidies on production

We do not change the taxes and subsidies on production as they currently appear in the SNA household account. The reason for this is twofold: first, we are reluctant to reclassify transactions which have a counterpart outside the Households Account (here in the General Government Account); second, it would not be significant. Luckily for us, there is no longer a tax on car use in France, taxes on dwellings are already properly accounted for and there are only marginal if any subsidies that are conditional on engaging in domestic production of some kind (childcare for instance). We could have reallocated some individual consumption of general government to subsidies, when it was on products used as intermediate consumption for domestic production (e.g. food bank). In addition to representing only a small amount, this choice would raise similar issues as volunteer work: everything else being unchanged, this reclassification from *transfers in kind* to *subsidies* would modify the gross disposable income without changing household final consumption expenditure. Savings would be impacted but hardly in link with domestic production, consumption, or actual saving behaviour.

3.5 Household production as its own intermediate consumption (neutral on value added and final consumption but +5% on production)

We could call it the *driving to the shop to purchase food to cook dinner* problem. The question is: how much of a specific domestic production do you engage in, not for its own sake, but as a means to another one? Our convention on this matter is chosen for the sake of simplicity.

Eurostat (2003) suggests to estimate domestic production in five principal functions: housing, food, clothing, care and volunteer work. Ancillary functions (transportation, shopping, management) should be allocated to their true final purpose (driving to the shop to purchase food to cook diner = food preparation).

Unfortunately, allocating ancillary work to principal functions is not always possible with our data (*shopping* and *transportation*). Since any judgemental breakdown from our part would have a sizeable impact on the relative sizes of domestic production functions, we choose to treat these two ancillary functions as if they were an end to themselves.

This convention is neutral on the total value added and final consumption. It also enables better international comparisons than when allocations are made differently across countries, and allows others to use their own breakdown, when more data is available. Moreover, counting the ancillary functions *Transportation* and *Shopping* as intermediate consumption in the other functions would increase domestic production by 5% in the *core perimeter* and 34% in the *extensive perimeter*.

3.6 No changes in inventories

The standard framework already accounts for changes in inventories of households as users. We see no reason to modify this estimation even though some goods were reclassified from final to intermediate consumption.

Productive households may also generate *other inventories* and *work in progress*. Under this category, work in progress for construction and other major maintenance of dwellings are already accounted for. In the remaining possibilities, as most of domestic production falls into the services category, we could only think of such things as unfinished knitting by December 31st and jars of jam. Hopefully, our judgemental estimation of such changes in inventories (0) is not too far from reality.

3.7 New Frontier - on the capital side (+8% production)

Defining the frontier of domestic production from the sole point of view of Time Use Surveys could be misleading (Ironmonger, 2000). Indeed, dwellings produce rents (real or imputed) without any hours worked. Similarly, one could consider that owning (or more restrictively using) any durable is similar to producing a rental service for oneself. A possible valuation of this production stemming from durable goods could be the time of domestic use times market rental cost, but due to a lack of data we do not implement it: *we do not include production resulting from capital alone in our estimate of domestic production.*

We believe that the alternative to estimate capital input through the Permanent Inventory Method (PIM) would be unsatisfactory. In the present estimation, consumption of fixed capital

(CFC) is by far the smallest of the three inputs so that defined as it is, domestic production is satisfactorily estimated despite the flaws of the PIM. Considering all the durables as productive capital would scale-up GFCF and CFC to approximately 100 billion € resulting in an 8% increase (respectively 1.5%) of domestic production in its *core perimeter* (resp. *extensive perimeter*).

In the principal function *housing*, we mainly consider house chores, decorative gardening and small house repairs. The services provided by a *fully furnished* dwelling are not included. The output method does not raise this kind of issues because it does not require the identification of productive capital (Holloway et al., 2002).

3.8 The robustness of the Permanent Inventory Method (PIM) (±0.1% of production)

Our approach to capital depreciation is in-between that of Landefeld and McCulla (2000), who break down the total services provided by durables in proportion of hours of unpaid work, and Fraumeni (1997) or Jalava and Kavonius (2009), who specify depreciation rates for each durable. We do not develop a complete set of depreciation factors for each durable reclassified in GFCF, but borrow from the capital accounts 3 sets of such factors, which are compatible with the PIM:

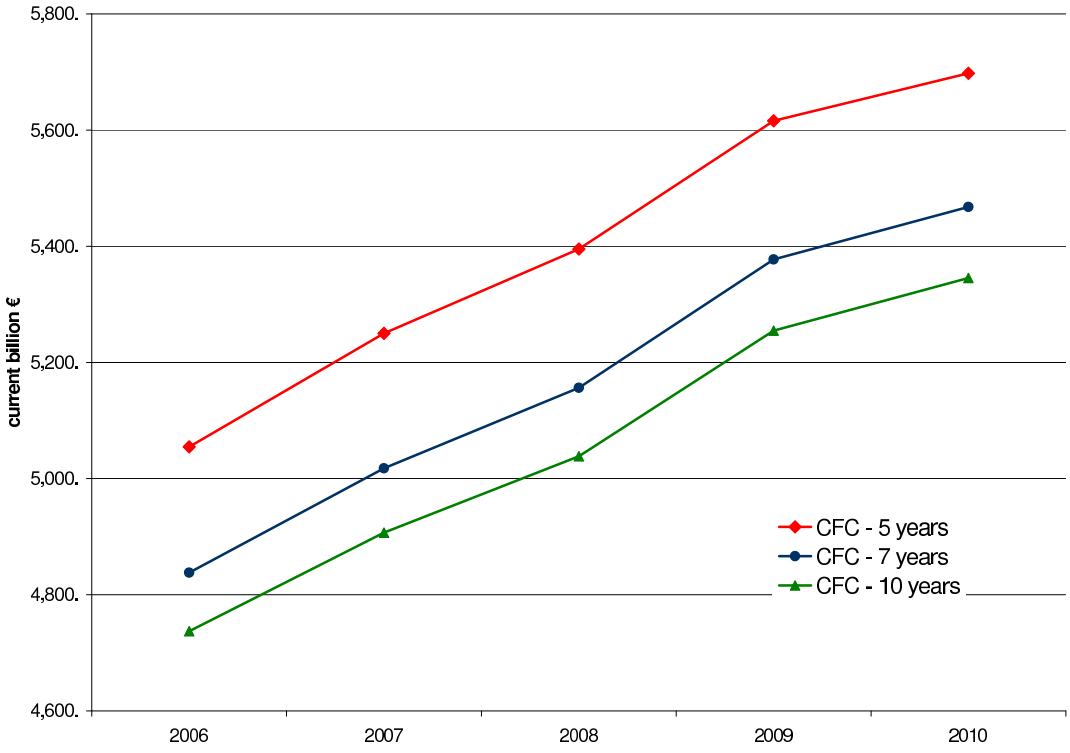
- (AN.11131) *transportation equipment*: average duration 7 years, maximum 21 years
- (AN.111321) *computers*: average duration 5 years, maximum 10 years
- (AN.111322) *communication equipment*: average duration 10 years, maximum 20 years

Investment is grouped for each of the domestic production functions and as a sensitivity test, the three sets of coefficients are applied.

Depreciation factors are not chosen for the similarity of the assets with reclassified durables, but because the average and maximum durations seem reasonable assumptions for domestic appliances nowadays. However, for cars and other transportation-related investment, coefficients for transportation equipment should be the favoured assumption. They should be chosen from an industry which uses mainly cars to avoid other transportation equipment.

Figure 1 shows the sensitivity of the estimated *CFC* for food services to the choice of a depreciation rate of durables. It is the function with the highest sensitivity to the depreciation factor: in 2010 when the average duration of capital goods is assumed to be 5 years, CFC is 6.2% below its value when the assumed duration is 10 years. Our estimation using the PIM is not very precise, however an uncertainty of 5% on CFC weights only 1 billion € whereas the total value of domestic production is larger than 959 billions. It is only a fraction of the suspected uncertainty on the valuation of time spent in productive leisure such as gardening (see 3.2).

If all durables were reclassified into investment, a 5% uncertainty on CFC would still weight only 5 billion € on total domestic production. Hence, our choice not to consider capital production more extensively may be thought drastic. However, we wish to make it clear that if



Source: National accounts - Base 2005, Insee - our calculations

Figure 1: *Consumption of Fixed Capital (CFC)* of durables used for domestic production of food services

a lot has been done empirically and conceptually in the treatment and harmonization of TUS, for a complete input approach of domestic production, more needs to be done on the treatment of capital. Valuing the service of capital through time of use multiplied by rental cost would *a priori* be a good start.

3.9 Implications for the interpretation of the savings ratio and purchasing power of disposable income

The key figures for economic analysis that are extracted from the household account are the savings ratio and the purchasing power of disposable income. The construction of a HHSA raises questions on both concepts and their values must be handled with great caution.

Purchasing power of disposable income This figure is directly impacted by all the choices made to value domestic work: perimeter, substitute wage, imputed taxes and contributions, worked time or paid time (see 2.3.1). These methodological choices can greatly affect the imputed disposable income derived from domestic production (equal to the value added derived from this activity). This additional income is not marginal (704 billion €) in the total disposable income (SNA plus domestic production, see Table 12). It is almost as high as households' *gross*

wages and salaries (768 billion €).

In addition, to estimate the purchasing power of this total income (SNA+HHSA), the deflator of consumption including domestic production would have to be computed. This practice is currently impossible as the HHSA is not produced on a regular basis. The alternative is to use the SNA consumption deflator which requires the strong assumption that SNA consumption prices and non-SNA consumption *prices* have similar evolutions.

Savings ratio (11% or 13%) The SNA's estimate of the savings ratio is 15.9% in 2010. Our estimate in the HHSA is 11.2%. The way the treatment of imputed taxes and social contributions affects the savings ratio is not straightforward. Let C^{HHSA}, GDI^{HHSA} denote total consumption and gross disposable income as we measure them, that is SNA plus non-SNA, including imputed taxes and social contributions. Let $\tau^{imputed}$ denote these taxes. If one is interested in the value of domestic production/consumption, taxes and contributions should be included as they are included in the value of market production. However, if one is interested in the potential income from domestic production, one may consider net wages $GDI^{HHSA} - \tau^{imputed}$, that is substract imputed taxes from the *mixed income* in the distribution of income accounts.

In this case, the savings ratio would be negative: –3.4% ($\frac{GDI^{HHSA}-\tau^{imputed}-C^{HHSA}}{GDI^{HHSA}-\tau^{imputed}}$). Although this savings ratio seems economically relevant, it yields severe accounting and communication issues. Subtracting the imputed taxes and contributions from the mixed income would modify the net lending/net borrowing of households while no monetary transaction is recorded. It is then necessary to apply a specific correction to make the HHSA neutral on the financial accounts. This correction is mandatory because the financial account describes the detention of money, stocks and financial assets in general, and they can not be affected by transactions in kind: one can not *save* domestic production. But, this correction leaves the door open to abusive policy recommendations as part of the production simply vanishes in the sequence of accounts.[4]

In line with National Accounting practice and for sake of simplicity, we choose not to make such a correction and leave imputed taxes and contributions in the mixed income. This convention is somehow related to the accounting of imputed rents: imputed income equals avoided expenditures. With our choice to use super gross wages the savings ratio is equal to 11.2% ($\frac{GDI^{HHSA}-C^{HHSA}}{GDI^{HHSA}}$). The alternative is to use net wages in the production account, in which case the savings ratio is equal to 13.0% ($\frac{(GDI^{HHSA}-\tau^{imputed})-(C^{HHSA}-\tau^{imputed})}{GDI^{HHSA}-\tau^{imputed}}$).

The invisibility of volunteer work (+3% of production) Introducing the value of volunteer work into the HHSA is not straightforward. The value of this work can logically be added to the production of NPISHs. It does not appear in household consumption expenditure but only

[4]We published a prior version of this work in French. Although we did not subtract imputed taxes from the mixed income, some reactions, both from journalists and the general public, were that we implied a recommendation to tax domestic production.

in household final consumption: household savings are neutral to NPISHs production. However, if imputed wages from NPISHs to households were counted, they would have no counterpart in consumption and be added to both *gross saving* and *net lending or net borrowing*. This would have to be corrected as there is no monetary transaction in domestic production which could justify a modification of the *net lending or net borrowing* of the original households account. To correct for this inconsistency, one would have to assume that part of NPISH production (the amount corresponding to household wages due to volunteer work) is in fact consumed directly as household consumption expenditure.

Given the small share of volunteer work in total domestic work, we found it less confusing not to include it in the HHSA but to value this time separately.

4 A household satellite account for France in 2010

4.1 The production account (+36% of GDP) and its distribution by functions

Following the input approach, we add up the three inputs of home production (labour, intermediate consumption and *consumption of fixed capital* (CFC)) to obtain an estimated value of this production (see Table 10). We do so using three definitions of household production (see 2.2.1).

This production can be evaluated between 959 billion € and 1,639 billion €. The corresponding gross value added amounts to between 704 and 1,324 billion € which corresponds to a revaluation of GDP (in current prices) of +36% and +68% respectively.

This result is in line with other estimates ranging from 27% in the USA in 2004 to 63% in the UK in 2000 (see Table 1).

The production function of households is quite similar to that of other countries (see Table 2): labour (or net value added) accounts for three fourth of total production while Consumption of Fixed Capital is the smallest of the three inputs (between 2 and 5%, similar to the estimates for Finland).

Household production can be broken down into 4 principal functions and 2 ancillary functions, plus volunteer work (see Table 11).[5] The ventilation of domestic production in functions can be compared with satellite accounts in other countries (see Table 3). As for the Basque Country (Eustat, 2004) and Finland (Hamunen et al., 2012), *food* and *housing* account for the bulk of domestic production while *clothing* accounts for less than 10% of the total. Compared to Holloway et al. (2002) for the UK, we define *care* and *transportation* more restrictively, which can explain the smaller share of these functions in domestic production. Indeed, with our *extensive* definition of domestic production, transportation accounts for a much larger share of production (27% instead of 5% initially, larger than the UK's estimate of 17.7%) as almost all

[5] We do not distribute ancillary functions to principal functions (see 3.5 for a discussion of this choice), and *volunteer work* is treated separately (see 3.9)

in billion euros

	Core Perimeter		Intermediate Perimeter		Extensive Perimeter	
Labour	687	72%	944	77%	1 239	76%
Intermediate Consumption	255	27%	268	22%	315	19%
Consumption of Fixed Capital	17	2%	19	2%	84	5%
Domestic Production	959	100%	1 231	100%	1 639	100%
Gross Value Added	704	73%	963	78%	1 324	81%

Note: the details of each input by function are displayed in Table 5 for labour, Table 8 for intermediate consumption and Table 9 for consumption of fixed capital.
Source: National accounts - Base 2005, Insee - our calculations

Table 10: Houshehold domestic production account for three definitions of production in France in 2010

car journeys are assumed to be productive in this perimeter (see 2.2.1). Besides, volunteer work is a minor function: 3%, in-between the figures for the UK and Finland.

in billion euros

Perimeter	Housing	Food	Clothing	Care	*Transportation*	*Shopping*	**Total**$^{\diamond}$	*Volunteer*
Core	276	472	68	100	43	0	959	28
	29%	49%	7%	10%	5%	0%	100%	3%
Intermediate	370	472	83	139	51	115	1231	42
	30%	38%	7%	11%	4%	9%	100%	3%
Extensive	370	472	83	154	445	115	1639	60
	23%	29%	5%	9%	27%	7%	100%	4%

$^{\diamond}$: This total is excluding volunteer work
Source: National accounts - Base 2005, Insee - our calculations

Table 11: Three definitions of domestic production in 2010 in France

4.2 The complete sequence of accounts for the most restrictive definition of domestic production (*core perimeter*)

Table 12 presents the modified sequence of accounts resulting from the incorporation of the HHSA into the household account. It adds 959 billion € to the production of households (estimated at 416 billion € with current SNA conventions), and 255 billion € to their intermediate consumption. Their consumption is in turn scaled-up by 686 billion € (+959 billion € of home production, -255 billion € reclassified as intermediate consumption and -18 billion € as gross fixed capital formation).

Financial accounts are not impacted by home production, and net lending or net borrowing is unchanged. This is a necessary property of HHSA as it only adds non-monetary transactions to the initial account. Stock of capital accounts should be modified to include the goods reclassified as *Gross Fixed Capital Formation* (GFCF) for home production, but because this capital increase

would be marginal compared to the value of household dwellings, this account is not displayed here.

in billion euros

ESA code	operation	SNA	non-SNA	Total
Production Account				
	Resources			
P1	Output at basic price	415.9	958.9	415.9
P11	of which : Market output	230.5		230.5
P12	Output for own final use	185.4	958.9	1 144.3
	Uses			
P2	Intermediate consumption	87.9	255.3	343.2
B1	Gross value added	328.0	703.6	1 031.6
Generation of income account				
	Resources			
B1	Gross value added	328.0	703.6	1 031.6
	Uses			
D11	Gross wages and salaries	34.2		34.2
D121	Employers' actual social contributions	9.4		9.4
D122	Employers' imputed social contributions	0.0		0.0
D29	Other taxes on production	16.3		16.3
D291	of which : Taxes on salaries and manpower	0.6		0.6
D292	Miscellaneous taxes on production	15.7		15.7
D39	Other subsidies on production	-3.1		-3.1
B2+B3	Gross operating surplus and gross mixed income	271.2	703.6	974.8
B2	Gross operating surplus	152.8		246.9
B3	Gross mixed income	118.4	703.6	727.9
Allocation of primary income account				
	Resources			
B2+B3	Gross operating surplus and gross mixed income	271.2	703.6	974.8
D11	Gross wages and salaries	767.6		767.6
D121	Employers' actual social contributions	224.8		224.8
D122	Employers' imputed social contributions	49.6		49.6
D41	Interest	28.7		28.7
D42	Distributed income of corporations	65.0		65.0
D421	of which : Dividends	40.0		40.0
D4222	Withdrawals from the income of quasi-corporations	25.0		25.0
D44	Property income attributed to insurance policy holders	48.3		48.3

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ESA code	operation	SNA	non-SNA	Total
D45	Rents	2.5		2.5
	Uses			
D41	Interest	19.8		19.8
D45	Rents	1.3		1.3
B5	Balance of primary incomes	1 436.6	703.6	2 140.2
Secondary distribution of income account				
	Resources			
B5	Balance of primary incomes	1 436.6	703.6	2 140.2
D62	Social benefits other than social transfers in kind	415.6		415.6
D621	Social security benefits in cash	298.0		298.0
D622	Private funded social benefits	30.7		30.7
D623	Unfunded employee social benefits	54.1		54.1
D624	Social assistance benefits in cash	32.8		32.8
D72	Non-life insurance claims received	28.2		28.2
D75	Miscellaneous current transfers received	30.7		30.7
D752	Current transfers between households	2.0		2.0
D759	Other miscellaneous current transfers	28.7		28.7
	Uses			
D51	Taxes on income	142.6		142.6
D59	Other current taxes	21.6		21.6
D6111	Employers' actual social contributions	224.8		224.8
D6112	Employees' social contributions	105.1		105.1
D6113	Social contributions by self- and non-employed persons	27.7		27.7
D612	Imputed social contributions	49.6		49.6
D71	Net non-life insurance premiums paid	24.6		24.6
D75	Miscellaneous current transfers paid	24.2		24.2
D751	Current transfers to non-profit institutions serving households	10.0		10.0
D752	Current transfers between households	3.1		3.1
D754	Fines and penalties	1.0		1.0
D759	Other miscellaneous current transfers	10.1		10.1
B6	Gross disposable income	1 290.9	703.6	1 994.5
Use of disposable income account				
	Resources			
B6	Gross disposable income	1 290.9	703.6	1 994.5

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ESA code	operation	SNA	non-SNA	Total
	Uses			
P31	Individual consumption expenditure	1 085.3	686.0	1 771.3
B8	Gross saving	205.6	17.5	223.2
Capital account				
	Resources			
B8	Gross saving	205.6	17.5	223.2
D9C	Capital transfers received	5.1		5.1
D92C	Investment grants	2.1		2.1
D99C	Other capital transfers	3.0		3.0
D9D	Capital transfers paid	-9.5		-9.5
D91D	Capital taxes	-7.7		-7.7
D92D	Investment grants			
D99D	Other capital transfers	-1.7		-1.7
	Uses			
P51	Gross fixed capital formation	112.3	17.5	129.8
P52	Changes in inventories	-0.2		-0.2
P53	Acquisitions less disposals of valuables	0.7		0.7
K2	Acquisitions less disposals of non-financial non-produced assets	-1.6		-1.6
B9A	Net lending (+) or net borrowing (-)	90.1	0	90.1
Redistribution of income in kind account				
	Resources			
B6	Gross disposable income	1 290.9	703.6	1 994.5
D63	Social transfers in kind	352.6	28.3	380.8
D631	Social benefits in kind	182.3		182.3
D6311	Social security benefits. reimbursements	76.8		76.8
D6312	Other social security benefits in kind	75.4		75.4
D6313	Social assistance benefits in kind	30.1		30.1
D632	Transfers of individual non-market goods and services	170.2	28.3	198.5
	Uses			
B7	Adjusted disposable income	1 643.5	731.8	2 375.3
Use of adjusted disposable income account				
	Resources			
B7	Adjusted disposable income	1 643.5	731.8	2 375.3
	Uses			
P4	Actual final consumption	1 437.8	714.3	2 152.1
B8	Gross saving	205.6	17.5	223.2

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ESA code	operation	SNA	non-SNA	Total

Source: National accounts - Base 2005, Insee - our calculations

Table 12: The complete sequence of households account and the households satellite account in France in 2010

4.3 Consumption is increased by 63%, income by 55% and the savings ratio is lower by 5 percentage points

The inclusion of home production, in its most restrictive definition (the *core perimeter*), substantially changes the picture of the economic activity of households. Indeed, it implies a 686 billion € net increase in consumption, which can be compared with the individual consumption expenditure as it is currently computed in National accounts (1,085 billion €): incorporating home production raises final consumption by 63%. Gross disposable income also increases by 55% (+704 billion € of Value Added). Correlatively, the savings ratio (savings on gross disposable income) goes down from 16% to 11%.

Taking the extensive definition of home production boosts the increases in income and consumption to 103% and 114%, respectively. The saving ratio still drops by 5 points, a result unchanged because GFCF also increases. However, the savings ratio should be analysed with caution (see 3.9).

4.4 Home made consumptions are much larger than their market equivalents

Even within the *core perimeter*, consumption of home-produced services dwarfs its market equivalents for every function considered. Generally speaking, the French domestic services sector is made of much more home-made services than externalized ones. Home food production represents 472 billion €, 8 times the consumption of meals in restaurants and eateries (59 billion €). The gap is even wider for household upkeep - 276 billion € vs. only 9 billion € for the employment of gardeners, cleaners and housekeepers -, and for clothing - 68 billion € of home production (laundry, ironing, mending...) vs. less than 2 billion € of corresponding market services (dry cleaning). Finally, one could think that France having a lot of public transportation, a relatively high level of female labour force participation and an active policy of childcare, market consumption of transportation and care could be large relative to the amount of household production of these services. Yet we find that the value of transportation provided by households (within the *core* perimeter, i.e. excluding self-transportation) is more than 50% higher than consumption of transportation services whether it is by plane, train, taxi, bus... (43 vs. 28 billion €). As regards care, home production (100 billion €) tops household final consumption of *Social work activities* (67 billion €) as recorded by the SNA, i.e. including general government and NPISHs contributions.

It would be interesting to compare these results across countries with various levels of public transportation, of women labour force participation and with different levels of socialization of care. However, since transportation and childcare are precisely two major *grey zones* in the definition of home production, such comparisons cannot be made until an agreement is found over a common delineation of their boundaries. Being able to compare the relative contribution of the private sector, the public one and households to the provision of transportation and care, across economies that are organized differently, would be a particularly valuable outcome of such an agreement.

Conclusion

One century ago, economists were estimating the value of a housewife using the cost of a housekeeper. Time Use Surveys then allowed for more precise and less sexist appraisals of domestic work. We are now linking these estimations with National Accounts. On the one hand, a lot has been said and done in this literature, on the other hand more harmonisation is needed before we can enlighten policy makers with estimates of domestic production following a shared methodology, reproduced every 5 or 10 years.

Our estimates on France in 2010 show that these methodological issues can be ranked: agreeing on a frontier of domestic production and on a net or gross wage rate are the two decisions that have the greater quantitative impact on the results. We chose the most restrictive perimeter of domestic production because we believe it to be the less disputable, and gross wages in accordance with the SNA definition of employee compensation, but these choices are obviously still open to debate.

As for the other methodological choices (specialist or generalist wage, capital depreciation rate...), they seem quantitatively less urgent, at least for comparisons between industrialised countries. We tried to advocate that they should be made under two main guiding principles. The first one is a practical argument of simplicity: whenever possible, the most parsimonious solutions and the ones that imply the least changes in the existing SNA figures should be favoured. The second one is that when working within the framework of National Accounting, one should rely on preexisting National Accounting concepts and principles. In this regard, we tried to show that valuating home production in order to build a Household Satellite Account is a different exercise from valuating it in a welfare economics perspective.

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A Activity, time and wage

perimeter	activity	corresponding occupation	wage/hour (gross)	hours/year
1	setting the table and serving food	Waiters, busboys, bartenders (bars, cafés and restaurants)	15,4	13
1	cleaning dwelling	In-home domestic services workers	16,5	186
1	driving a child for one's own household	Drivers of private vehicles (salaried)	21,6	25
1	driving a child or an adult for another household	Drivers of private vehicles (salaried)	21,6	8
1	food preparation	Cooks and assistant cooks	17,9	219
1	dish washing	Kitchen help, kitchen apprentices and general food service workers	15,6	68
1	arranging purchases, loading and unloading the car	In-home domestic services workers	16,5	11
1	cleaning garden	In-home domestic services workers	16,5	4
1	laundry	In-home domestic services workers	16,5	20
1	ironing	In-home domestic services workers	16,5	32
1	packing/unpacking, sorting clothes	In-home domestic services workers	16,5	17
1	heating and water	Skilled general building maintenance workers	18,0	8
1	household management	Secretaries	20,5	31
1	other household upkeep	Skilled general building maintenance workers	18,0	7
1	moving	Movers (excluding drivers-movers), unskilled	15,3	4
1	administrative services	Secretaries	20,5	5
1	house construction and renovation	Unskilled construction workers, light work	15,7	4
1	tending domestic animals	Animal production workers	16,3	8
1	childcare:physical care and supervision	Childminders and foster parents	16,8	78
1	childcare: accompanying child	Home care workers, home help, family workers	14,5	6
1	childcare: medical care	Paediatric nurses	24,5	0
1	childcare: teaching the child, help with homework	Childminders and foster parents	16,8	10

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perimeter	activity	corresponding occupation	wage/hour (gross)	hours/year
1	physical care of an adult	Home care workers, home help, family workers	14,5	7
1	installing or repairing computers	Radio and television, appliance and electronic equipment repairmen (salaried)	19,9	2
2	commercial services	In-home domestic services workers	16,5	3
2	reading and talking with child	Sociocultural and leisure centre workers	18,0	7
2	other help to an adult household member	Home care workers, home help, family workers	14,5	2
2	organisational volunteer work (meetings)	Secretaries	20,5	15
2	producing and repairing textiles	Tailors and seamstresses, skilled fabric workers (excluding garment manufacture), skilled leather workers	19,4	13
2	shopping for goods	In-home domestic services workers	16,5	128
2	repairs of dwelling	Unskilled construction workers, light work	15,7	61
2	making, repairing and maintaining equipment	Unskilled construction workers, light work	15,7	5
2	vehicle maintenance	Skilled maintenance and repair mechanics: automotive	18,5	9
2	gardening	Gardeners	15,6	65
2	Pet care	Home care workers, home help, family workers	14,5	12
2	other or unspecified domestic activities	Miscellaneous service employees	18,2	5
2	childcare: other interactions with children	Childminders and foster parents	16,8	2
2	childcare: playing with children	Sociocultural and leisure centre workers	18,0	21
2	accompanying, keeping company to an adult household member	Home care workers, home help, family workers	14,5	2
2	fishing, hunting	Fishermen and aquatic life cultivation workers	20,5	13

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perimeter	**activity**	**corresponding occupation**	**wage/hour (gross)**	**hours/year**
2	picking berries, mushrooms or herbs	Agricultural workers with no particular specialisation	13,3	1
3	Walking the dog	Home care workers, home help, family workers	14,5	19
3	driving to/from work	Drivers of private vehicles (salaried)	21,6	81
3	other travel by car	average of 642b, 643a (personal and delivery drivers)	19,5	175

Table 13: Correspondance between TUS activities and occupation, with corresponding time and wage

B Compatible classifications for National Accounts and HHSA

In the French National Accounts, using Nace rev 2 classification, households are already productive in:

(01) Crop and animal production, hunting and related service activities

(02) Forestry and logging

(03) Fishing and aquaculture

(10.1) Processing and preserving of meat and production of meat products

(10.5) Manufacture of dairy products

(11) Manufacture of beverages

(43) Specialised construction activities

(68.R) Real estate activities (real rents)

(68.I) Real estate activities (imputed rents)

(87.N) Residential care activities (non market)

(88.N) Social work activities without accommodation (non market)

(97) Activities of households as employers of domestic personnel

Using the TUS we found a way to estimate domestic production in:

(01) Crop and animal production, hunting and related service activities

incl. (01.49) *Raising of other animals* when pet care is considered

(43) Specialised construction activities, more precisely

(43.2) *Electrical, plumbing and other construction installation activities*

(43.3) *Building completion and finishing*

(47) Retail trade, except of motor vehicles and motorcycles (more simply shopping)

(49.3) Other passenger land transport

plus its ancillary function (45.2) *Maintenance and repair of motor vehicles*

(56) Food and beverage service activities

(78) Employment activities (volunteer work provided to NPISHs)

(81.2) Cleaning activities

(81.3) Landscape service activities

(88.N) Social work activities without accommodation (non market)

(96.01) Washing and (dry-)cleaning of textile and fur products

Other ancillary activities for domestic production such as

(69.20) or (77.22) Accounting, bookkeeping and auditing activities; tax consultancy or Business and other management consultancy activities

(49.42) Removal services

(62) Computer programming, consultancy and related activities

(95.2) Repair of personal and household goods

This sample from Nace rev 2 covers the functions identified by Eurostat (Eurostat, 2003), it is given to point out that the HHSA can be built with very limited modifications to the SNA's conceptual framework. Even with an extensive approach to capital, capital services could be recorded under *rental services* (77). In the exposition of the HHSA we aggregate these productions so as to isolate the broader functions of domestic production.
It is also noteworthy that the TUS estimates hours in domestic production for which the output is already accounted for (namely food and construction when big enough to be counted as investment). The way we avoid double counts is explained in 3.2.

B.1 Final consumption and production for own use common to SNA and HHSA

Code	Product	Million €	Own use	Final
HA01S1B	Potatoes (P12)	330	1,0	-
HA01S6B	Leguminous (P12)	6	1,0	-
HA01S7B	Fresh vegetables (P12)	1149	1,0	-
HA01T1B	Tropical and oleaginous fruits (P12)	15	1,0	-
HA01T1D	Temperate climate fruits (P12)	254	1,0	-
HA01U8B	Eggs (P12)	64	1,0	-
HA01U9C	Honey (P12)	9	1,0	-
HA02Z0B	Forestry products (P12)	506	1,0	-
HA03Z0B	Fishing products (P12)	11	1,0	-
A88.12	Manufacture of tobacco products	18137	-	1,0
HC19Z2C	Heavy fuel oil	35	-	1,0
HC19Z2D	Other fuel oil (white spirit)	37	-	1,0
HC19Z2E	Liquified Petroleum Gas	1661	-	0,3
GC26AB	Manufacture of computers and peripheral equipment, electronic components and loaded electronic boards	6097	-	1,0
GC26C	Manufacture of communication equipment	2055	-	1,0
GC26D	Manufacture of consumer electronics	9169	-	1,0
HC26E0BC	Manufacture of watches and clocks, scientific and technical instruments	1073	-	1,0
GC26G	Manufacture of optical instruments and photographic equipment, magnetic and optical media	2028	-	1,0
HC27A0E	Electric toiletries	435	-	1,0
HC27B3C	Other batteries	423	-	1,0
HC27B3D	Lamps	536	-	1,0
HC27B3EF	Manufacture of electric lighting equipment	940	-	1,0
HC27B3G	Manufacture of other electrical equipment n.e.c	92	-	1,0
HC27B4	Manufacture of electronic and electric wires and cables, wiring devices	331	-	1,0

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Code	Product	Million €	Own use	Final
HC28A8	Manufacture of office machinery and equipment (except computers and peripheral equipment)	36	-	1,0
HC28B0A	Farm tractors (excl repair)	78	-	0,5
HC28B0B	Agricultural machinery	606	-	0,5
HC28DIV	Manufacture of other special purpose machinery	109	-	0,2
HC29A1D	Camper vans	949	-	1,0
HC29A2	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	157	-	1,0
GC30AC	Building of pleasure and sporting boats, air and spacecraft	1491	-	1,0
HC30E0B	Manufacture of bicycles	1255	-	1,0
HC30E0C	Manufacture of invalid carriages	73	-	1,0
HC30E0D	Stroller, pushchair, baby carriage	271	-	1,0
HC13Z3B	Household linen	1639	-	1,0
HC13Z3C	Net, net curtains	372	-	1,0
HC13Z3D	Small beddings and bedclothes	375	-	1,0
A88.14	Manufacture of wearing apparel	34469	-	1,0
A88.15	Manufacture of leather and related products	11530	-	1,0
A88.16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1930	-	1,0
HC17B2A	Cotton wool products	183	-	1,0
HC17B2B	Manufacture of household and sanitary goods and of toilet requisites	3136	-	0,7
HC17B2CD	Manufacture of paper stationery	1077	-	0,9
HC20B2	Manufacture of perfumes and toilet preparations	15191	-	1,0
HC20C3DIV	Manufacture of other chemical products n.e.c.	90	-	1,0
A38.CF	Manufacture of basic pharmaceutical products and pharmaceutical preparations	11730	-	1,0
HC22A2A	Condoms	63	-	1,0
HC22B2	Manufacture of plastic packing goods	2074	-	0,8
HC22B3B5	Manufacture of other plastic products	3871	-	0,5
GC23A	Manufacture of glass and glass products	2050	-	0,9
HC23B1	Manufacture of refractory products, bricks, tiles and construction products, in baked clay	583	-	0,5
HC23B5A	Cutting, shaping and finishing of stone	597	-	1,0
GC25C	Manufacture of weapons and ammunition	356	-	1,0
HC25E2DIV	Manufacture of other fabricated metal products n.e.c.	1473	-	0,5
HC31Z1A	Manufacture of office and shop seats	232	-	1,0
HC31Z1B	Manufacture of office furniture	233	-	1,0
HC31Z2A	Manufacture of kitchen furniture	3402	-	1,0
HC31Z2B	Manufacture of mattresses	1990	-	1,0

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Code	Product	Million €	Own use	Final
HC31Z2C	Manufacture of home furnishing chairs and seats	2050	-	1,0
HC31Z2D	Other furniture n.e.c	5633	-	1,0
HC31Z2E	Garden and outdoor funiture	345	-	1,0
GC32A	Manufacture of jewellery, related articles and musical instruments	5450	-	1,0
HC32B1	Manufacture of medical, surgical and dental equipment	776	-	1,0
HC32B2	Manufacture of glasses	5129	-	1,0
GC32C	Manufacture of sports goods, games, toys and other goods	10397	-	1,0
A88.33	Repair and installation of machinery and equipment	341	-	1,0
GD35A	Electric power generation, transmission and distribution	21846	-	0,2
HD35B2	Distribution of gaseous fuels through mains	11035	-	0,3
GH49A	Rail transport	4819	-	1,0
GH49B	Other passenger land transport	10627	-	1,0
A88.50	Water transport	390	-	1,0
A88.51	Air transport	8611	-	1,0
A88.53	Postal and courier activities	1716	-	0,9
HI55Z1	Hotels, holiday and similar accommodation	14341	-	1,0
HI55Z2	Camping grounds, recreational vehicle parks and trailer parks	1671	-	1,0
HI55Z3	Other accommodation	743	-	1,0
A88.56	Food and beverage service activities	59188	-	1,0
A38.JA	Publishing, audiovisual and broadcasting activities	20162	-	1,0
HJ61Z0A	Telecommunications (excl. TV and radio packages)	26764	-	0,9
HJ61Z0B	TV and radio packages	2261	-	1,0
A88.62	Computer programming, consultancy and related activities	26	-	0,9
A88.63	Information service activities	58	-	1,0
A88.64	Financial service activities, except insurance and pension funding	15502	-	1,0
HK65Z1	Life insurance	17307	-	1,0
HK65Z2A	Health insurance	8907	-	1,0
HK65Z2D	Third-party insurance	386	-	1,0
HK65Z4	Pension funding	0	-	1,0
A17.LZ	Real estate activities	202055	-	1,0
A88.69	Legal and accounting activities	8409	-	1,0
A38.MC	Other professional, scientific and technical activities; veterinary activities	3602	-	1,0
HN77Z2Z3	Renting and leasing of other goods	3499	-	0,8
A88.78	Employment activities	283	-	1,0
A88.79	Travel agency, tour operator and other reservation service and related activities	1647	-	1,0
A88.80	Security and investigation activities	65	-	1,0

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Code	Product	Million €	Own use	Final
A88.81	Services to buildings and landscape activities	2775	-	1,0
A88.82	Office administrative, office support and other business support activities	278	-	1,0
A38.OZ	Public administration and defence, compulsory social security	649	-	1,0
A38.PZ	Education	11225	-	1,0
A38.QA	Human health services	23255	-	1,0
A38.QB	Residential care and social work activities	20247	-	1,0
A38.RZ	Arts, entertainment and recreation	19073	-	1,0
HS95Z0A	Repair of computers and peripheral equipment	357	-	1,0
HS95Z0B	Repair of communication equipment	81	-	1,0
HS95Z0C	Repair of consumer electronics	957	-	1,0
HS95Z0E	Repair of footwear and leather goods	259	-	1,0
HS95Z0F	Repair of furniture and home furnishings	1211	-	1,0
HS95Z0G	Repair of watches, clocks and jewellery	278	-	1,0
HS95Z0H	Repair of other personal and household goods	681	-	1,0
A88.96	Other personal service activities	12359	-	1,0
A38.TZ	Activities of households as employers	5786	-	1,0

Table 14: Goods and services kept in final consumption and production for own use

Source: Insee National Accounts, Million € in 2010

B.2 Final consumption reclassified into intermediate consumption

Code	Product	Million €	Housing	Food	Clothing	Care	Transp.*
HA01S1A	Potatoes	1509	-	1,0	-	-	-
HA01S6A	Leguminous	245	-	1,0	-	-	-
HA01S7A	Fresh vegetables	6967	-	1,0	-	-	-
HA01S8	Plants and Flowers	6053	1,0	-	-	-	-
HA01T1A	Tropical and oleaginous fruits	1442	-	1,0	-	-	-
HA01T1C	Temperate climate fruits	7368	-	1,0	-	-	-
HA01U8A	Eggs	1538	-	1,0	-	-	-
HA01U9A	Honey	290	-	1,0	-	-	-
HA01U9B	Pets	359	-	-	-	1,0	-
HA02Z0A	Forestry products	691	1,0	-	-	-	-
HA03Z0A	Fishing products	3557	-	1,0	-	-	-
GC10A	Processing and preserving of meat and production of meat products	34175	-	1,0	-	-	-
GC10B	Processing and preserving of fish, crustaceans and molluscs	4786	-	1,0	-	-	-
GC10C	Processing and preserving of fruit and vegetables	8760	-	1,0	-	-	-
GC10D	Manufacture of vegetable and animal oils and fats	1728	-	1,0	-	-	-
GC10E	Manufacture of dairy products	22471	-	1,0	-	-	-
GC10F	Manufacture of grain mill products, starches and starch products	1425	-	1,0	-	-	-
GC10G	Manufacture of bakery and farinaceous products	18472	-	1,0	-	-	-
GC10H	Manufacture of other food products	25518	-	1,0	-	-	-
GC10K	Manufacture of prepared animal feeds	2845	-	-	-	1,0	-
A88.11	Manufacture of beverages	22597	-	1,0	-	-	-
HC19Z1	Manufacture of coke oven products	0	1,0	-	-	-	-
HC19Z2A	Conglomerates and briquettes of coal	68	1,0	-	-	-	-
HC19Z2B	Heating oil	6871	1,0	-	-	-	-
HC19Z2E	Liquified Petroleum Gas	1661	0,6	0,1	-	-	-
HC19Z2F	Leaded petrol	0	-	-	-	-	1,0
HC19Z2G	Unleaded petrol	14047	-	-	-	-	1,0

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Code	Product	Million €	Housing	Food	Clothing	Care	Transp.*
HC19Z2H	Gas oil, diesel oil	21752	-	-	-	-	1,0
HC19Z2I	Lubricants	1297	-	-	-	-	1,0
HC27B3AB	Manufacture of car batteries and accumulators	408	-	-	-	-	1,0
HC13Z1	Preparation and spinning of textile fibres, weaving of textiles	380	-	-	1,0	-	-
HC13Z3DIV	Manufacture of other textiles n.e.c.	936	-	-	1,0	-	-
HC17B2B	Manufacture of household and sanitary goods and of toilet requisites	3136	-	0,1	-	0,3	-
HC17B2CD	Manufacture of paper stationery	1077	0,1	0,1	-	-	-
HC17B2E	Manufacture of wallpaper	252	1,0	-	-	-	-
HC17B2F	Manufacture of other articles of paper and paperboard	250	0,5	0,5	-	-	-
HC20A1	Manufacture of industrial gases, dyes and pigments, basic chemicals	47	-	1,0	-	-	-
HC20A3	Manufacture of fertilisers and nitrogen compounds	129	1,0	-	-	-	-
HC20B1A	Soap and detergents	2923	0,5	-	0,5	-	-
HC20B1B	Cleaning and polishing preparations	1921	1,0	-	-	-	-
HC20C1	Manufacture of pesticides and other agrochemical products	286	1,0	-	-	-	-
HC20C2	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	1503	1,0	-	-	-	-
HC20C3C	Manufacture of glues	224	1,0	-	-	-	-
HC22A1	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	1799	-	-	-	-	1,0
HC22A2B	Manufacture of other rubber products n.e.c	283	1,0	-	-	-	-
HC22B2	Manufacture of plastic packing goods	2074	-	0,3	-	-	-
HC22B3B5	Manufacture of other plastic products	3871	0,1	0,5	-	-	-
GC23A	Manufacture of glass and glass products	2050	0,1	-	-	-	-
HC23B1	Manufacture of refractory products, bricks, tiles and construction products, in baked clay	583	-	0,5	-	-	-
HC23B5B	Production of abrasive products	89	0,5	0,5	-	-	-
HC23B5C	Manufacture of other non-metallic mineral products n.e.c.	668	-	-	-	1,0	-

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Code	Product	Million €	Housing	Food	Clothing	Care	Transp.*
A88.24	Manufacture of basic metals	169	-	1,0	-	-	-
HC25E1	Manufacture of cutlery, locks, hinges, tools	1912	0,4	0,6	-	-	-
HC25E2C	Household metallic supplies	1311	-	1,0	-	-	-
HC25E2DIV	Manufacture of other fabricated metal products n.e.c.	1473	0,3	-	-	-	-
A38.BZ	Mining and quarrying	76	-	1,0	-	-	-
GD35A	Electric power generation, transmission and distribution	21846	0,5	0,2	0,2	-	-
HD35B2	Distribution of gaseous fuels through mains	11035	0,6	0,1	-	-	-
HD35B4	Steam and air conditioning supply	1713	1,0	-	-	-	-
A38.EZ	Water supply; sewerage, waste management and remediation activities	13045	1,0	-	-	-	-
A17.FZ	Construction	12615	1,0	-	-	-	-
GH49C	Freight transport by road and transport via pipelines	649	-	-	-	-	1,0
A88.52	Warehousing and support activities for transportation	7094	-	-	-	-	1,0
A88.53	Postal and courier activities	1716	0,1	0,1	-	-	-
HJ61Z0A	Telecommunications (excl. TV and radio packages)	26764	0,1	0,1	-	-	-
A88.62	Computer programming, consultancy and related activities	26	0,1	0,1	-	-	-
HK65Z2B	Dwellings insurance	5495	1,0	-	-	-	-
HK65Z2C	Car insurance	5627	-	-	-	-	1,0
A88.71	Architectural and engineering activities; technical testing and analysis	830	-	-	-	-	1,0
HN77Z1	Renting and leasing of motor vehicles	1322	-	-	-	-	1,0
HN77Z2Z3	Renting and leasing of other goods	3499	0,3	-	-	-	-

Table 15: Goods and services reclassified from final to intermediate consumption

Source: Insee National Accounts, Million € in 2010
*: reclassified goods are counted in proportion of car use.
There is no intermediate consumption for volunteer work.

B.3 Final consumption reclassified into GFCF

Code	Product	Million €	Housing	Food	Clothing	Transp.*
HC26E0A	Manufacture of aid to navigation equipment	349	-	-	-	1,0
HC27A0A	Domestic refrigirators and freezers	1735	-	1,0	-	-
HC27A0B	Washing machines	1572	-	-	1,0	-
HC27A0C	Dishwashers	703	-	1,0	-	-
HC27A0D	Electric cooker, electric heating and cleaning devices	2694	0,3	0,7	-	-
HC27A0F	Other small electric domestic appliances	1921	-	0,8	0,2	-
HC27A0G	Manufacture of non-electric domestic appliances	188	-	1,0	-	-
HC28A9	Manufacture of power-driven hand tools	980	1,0	-	-	-
HC28B0A	Farm tractors (excl repair)	78	0,5	-	-	-
HC28B0B	Agricultural machinery	606	0,5	-	-	-
HC28DIV	Manufacture of other special purpose machinery	109	0,2	0,2	0,3	-
HC29A1A	New motor vehicles	26594	-	-	-	1,0
HC29A1B	Second-hand motor vehicles	9125	-	-	-	1,0
HC29A1C	Engine swap	460	-	-	-	1,0
GC29B	Manufacture of parts and accessories for motor vehicles	22686	-	-	-	1,0
HC30E0A	Manufacture of motorcycles	1688	-	-	-	1,0
HC25E2DIV	Manufacture of other fabricated metal products n.e.c.	1473	0,2	-	-	-
A17.GZ	Wholesale and retail trade; repair of motor vehicles and motorcycles	14554	-	-	-	1,0
HS95Z0D	Repair of household appliances and home and garden equipment	595	0,5	0,3	0,3	-

Table 16: Goods and services reclassified from final consumption to gross fixed capital formation
Source: Insee National Accounts, Million € in 2010
*: reclassified goods are counted as GFCF in proportion of car use.
There is no GFCF for care and volunteer work.

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