Unpaid household work, volunteering and free services

Are those important for the GDP?

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Checklist
☒ I have checked that I am submitting the correct and final version of my assignment.
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Executive Summary

For years now, the question whether to include unpaid work in the GDP, such as cooking at home or volunteering has split economists' opinion. In 1953, the concept of GDP, short for Gross Domestic Product, was created to value economic growth by measuring market transactions while establishing a boundary of production. This implies that every market exchange, whether legal or illegal, has been accounted for. However, this means that the calculation of the GDP assumes that illegal exchange such as drug exchange or trafficking is important for economic growth, e.g., country A with a GDP per capita of 100.000€ and country B who recorded a GDP per capita of 50.000€. Even though the crime rate is higher for country A, the GDP leads us to believe that citizens of country A are living a life twice as good as those from country B. However, this is not the case as well-being depends on many other factors that don't include market transactions.

One factor which has a negative influence on well-being is income inequality. A country with many wage inequalities is prone to have a population that is less happy. Hereby, we are talking about either gender or race wage inequalities that can cause dissatisfaction to those who are affected as they are treated as being worth less than the others.

Similarly, we have negative externalities such as pollution or gun violence that might decrease the well-being of a country. Gun production leads to a boost of the economy as the production increases GDP. Yet, by expanding gun production, we observe an increase in gun violence. Thus, while we observe a high GDP, we neglect that the true well-being of citizens is decreasing.

There are various aspects that affect our well-being in a positive way which are overlooked in the GDP. Free services provided by the country, such as free transportation or free Wi-Fi, increases citizens' satisfaction but are not recorded in the GDP.

Another factor is leisure time and sport activities. A country with an increased leisure time also indicates increased well-being. Furthermore, it is publicly known that people that are given more vacation day are prone to be happier. (Kang et al., 2023)

Lastly, we have free work and household production which, according to the GDP, introduce little to no value for our economic growth. Free work such as volunteering has been ignored as it's difficult to measure its true value. The same holds for household production, it's not included in the GDP as it has no market transaction. Homemade goods, such as gardening or textile work, are not sold so their production is lost and not taken into the GDP.

The purpose of this report is to endorse the concept of including unpaid work such as volunteering or household work to the GDP.

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Description of Internship setting

The company

STATEC, founded in 1962, is the national institution for Statistics and Economics and focuses on providing a detailed and reliable image of the Luxembourgish society. It is under the authority of the Ministry of the Economy, yet professionally and scientifically independent. Since they are independent, they can define their own objectives if they obey to certain European statistical legislations. The name STATEC originates from the two words Statistics and Economics. It's a company that was established through the merge of the General Office of Statistics and the Economic Studies and Documentation Services. Their main goal relies on providing important statistical results to the public which represent aspects of the country such as the GDP, crime rate or national accounts. Results found by the team will then be published regularly on their official website. Additionally, STATEC releases their publications via a newsletter.

Their headquarters currently are in Kirchberg, Luxembourg but in the near future, they are planning to move to Esch-Belval, Luxembourg due to a lack of workplaces.

STATEC's mission and framework are based on the law of the 10th of July 2011, which states the necessity to provide high quality statistical information and conclusions. Through multiple surveys distributed to the public regularly, STATEC builds a statistical summary of Luxembourg as well as some national accounts that are important to represent Luxembourg to foreign countries. Of most importance are the monthly surveys on consumer prices which are necessary to measure inflation rate.

Furthermore, their goal lies in conducting short- and long-term forecasts by using macroeconomic models. Some economic trends such as GDP and unemployment rate are observed to make predictions and enhance knowledge on how the Luxemburgish economy works. General conclusion will be published quarterly or monthly to make it available to the public.

As for their organizational structure, STATEC is divided into three main groups, the director's board, production and analysis board and the research board.

The director's board, represented in blue on figure 1, is responsible for supervising and solving issues regarding budget and staff. This division consists of the Director Serge Allegreeza, the Deputy Director John Haas, the management advisor Marc Pauly, the project management officer Philippe Lepot, Claude Lamboray, who manages the methodology and Adriana Bandrabur who is responsible for large companies. Twice in a month, the director's board meets up to discuss and exchange important information. Serge Allegreeza has been appointed the director of STATEC in April 2003.
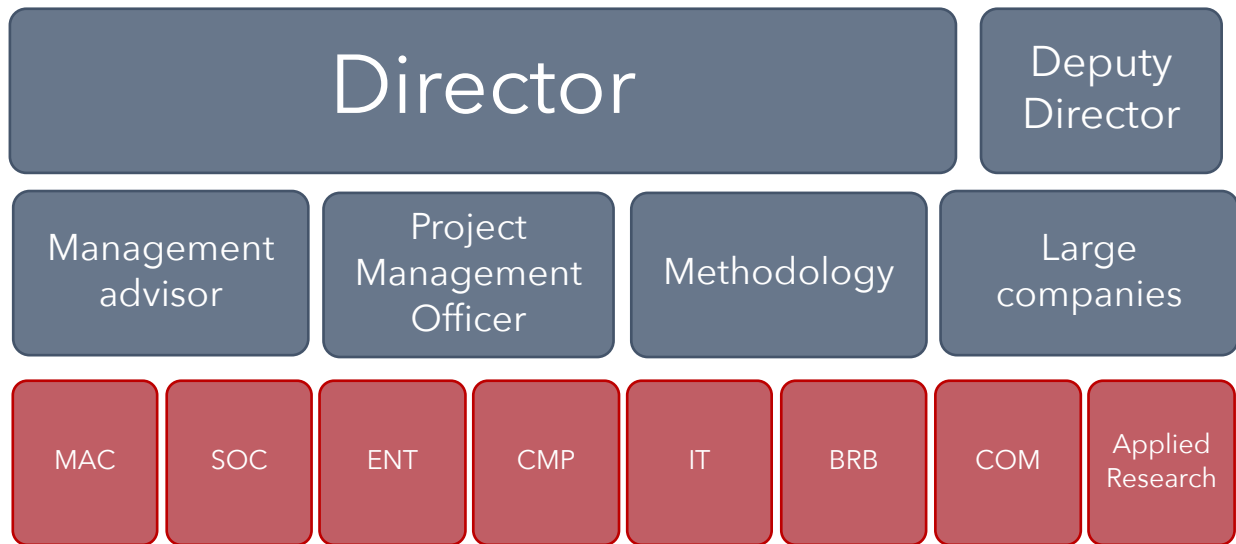
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Director				Deputy Director
Management advisor	Project Management Officer	Methodology	Large companies	
MAC	SOC	ENT	CMP	IT	BRB	COM	Applied Research

FIGURE 1 – ORGANIZATION CHART

Second, STATEC has eight different departments, visualized in red on figure 1, each supervised by a head of department. Twice a month, the head of department meets with the director and deputy director to report back on different topics.

The first department is called MAC and is supervised by René Krippes. MAC stands for macroeconomic statistic and tackles issues regarding accounting. There are five different units for five different accounts: national accounts, sector accounts, balance of payments, general government accounts and satellite accounts.

The second department (SOC) focuses on social statistics and is supervised by Jérôme Hury. Hereby, we have a unit for life condition, a unit for labor market and education, a unit for population and accommodation and a unit for prices.

ENT is analyzing statistics of companies. This department is supervised by Lucia Gargano and it has its main focus on trading, investments, structural business statistics, short-term indicators as well as business directories.

The CMP department, supervised by Tom Haas, focuses on conjuncture, modelisation and forecasts.

The IT team is managed by Luc Roettgers. This is a team for IT solutions, infrastructure and technical support.

Pierre-Jean-Oger is responsible for the department for budget, human resources and building (BRB).

The head of the communication department is Delia Controguerra.

Lastly, the applied research department, monitored by Chiara Peroni, which focuses on evaluating and advising studies. The team consists of a unit for wellness and entrepreneurship as well as a unit for industry trends and productivity.

Additionally, STATEC also has external employers who are responsible for distributing surveys to households.

Internship

My internship at STATEC was in the SOC department which is supervised by Jérôme Hury. This department focuses on social statistics and is further divided into four different specializations.

The first division, where my internship was held, is about life condition. The head of the division is Guillaume Osier who was my professional supervisor. The associated team of the department of life condition is, among others, responsible for multiple surveys about household budget, distribution of different tasks that people practice daily, road accidents and household violence.

The second division, supervised by Marco Schockmel, focuses on labour market and education. Their mission is centred around analysing the structure of salary, labour forces and education for all ages.

Third we have Francois Peltier who is responsible for research on population and housing.

And lastly, we have the division on prices with their head of division Marc Ferring. Hereby, the team does their research on consumer price indexes, producer prices and prices on housing and construction.

As part of the EMOS program, I had two internships. One during summer holiday as an introduction and one in April for my Master thesis. My overall task during both of my internship was to work with time use surveys and to find proof that data collected with time use surveys are important and necessary for different aspects of their analysis. Since time use surveys are very time consuming and costly, I needed to find convincing evidence to pursue a relaunch of time use surveys.

During my internship, my assignment was to analyse data collected during a survey performed in 2014. This survey was a time use survey in a form of a journal where randomly assigned individuals of Luxembourg had to record their daily life as accurate as possible. The goal with this survey was to get a detailed plan on how much time Luxembourg spends on the different tasks that households face each day. They wanted to create a representative summary of an individual living in Luxembourg.

My first task that I was given to was to find evidence that household work holds more importance to the GDP calculation than it currently is. I was given a deadline of two weeks to get familiar with the data set and to prepare a presentation.

The content of the presentation was to summarize the distribution of household work and paid work recorded in the survey. Additionally, I needed to find a way on how to measure household work such that we can see the importance to include household work in national accounts. My presentation on the results was held in front of employees of the MAC and SOC departments. The head of the satellite account, Olivier Thunus, seemed to be very interested and astonished by my presentation. They later contacted my professional supervisor to praise my work and to ask for further collaboration for my second internship.

For my second internship, I had to elaborate my work and to check if there is similar evidence in the time use survey of 2014 about volunteering. I was given a paper that they had been working on where they were missing the important numbers such as volunteering rate and total number of volunteer work based on different categories. My mission was to use the given time use survey and investigate if the collected data can be used for their current research. This task seemed to be similar to the one in my first internship. However, it was different in the way that I needed global assumptions and not only rely on my assumption on the average of the collected data. This meant that I needed to include individual weights. Since the time use survey collected two days worth of information for each individual, I also needed to include weights so that weekdays are given more importance than weekends. Both of those changes were very important to get the right representation of the Luxembourgish population in 2014. Yet again, the main goal remained to prepare a presentation in a span of three weeks for the satellite account division of the MAC department. I therefore collected the necessary data for organizational and direct volunteering work and prepared a presentation.

Afterwards, a co-worker of the MAC department, Rick Schmitz, who was at that time responsible for the sports and volunteering data assigned me my next task.

I was asked to collect data for each category of organizational volunteering work such as volunteering in sport associations or in politics to highlight the difference for each activity. Since I knew that they are also looking into sports data, I offered that I could additionally collect data for different sports category purely for their personal interest. Both Rick Schmitz and Olivier Thunus were very pleased with this proposition.

During both of my internships I only encountered a few problems. The main issues appeared when I faced the decision to work with either Stata or R. At the time of my first internship, I was familiar with working with the statistical software Stata and had to gain experience with R first. For this reason, I initially chose to work with Stata and continued to work with Stata for my second internship.

I felt confident enough to handle data with ease due to the experience in Stata I gained during my studies. However, things seen in class were less challenging compared to the problems that I encountered. I was faced with problems that took more time to solve than I initially anticipated.

At the beginning I had to learn how to use Stata specifically for time use survey. Therefore, my professional supervisor provided useful resources to learn about time use survey in Stata. Until then I had only seen how to use Stata in general and had a slight introduction of time use survey, but I have not seen how to combine both of them. It was after my first internship that I had a class on survey data in the fields of Economics and Finance which helped me to get a better understanding on how I could properly use Stata for time use survey.

With this newly gained knowledge I realized that a small portion of the work I had done during my first internship had some flaws that I had to correct first. First, I ignored the weights which resulted in the predictions being based on data from the survey instead of rescaling it so that I can make predictions for the whole country. Second, I didn't consider that there were two days per individual record, namely one weekday and one day on the weekend. This changed the results and the conclusions drawn during my first internship as we needed to put more weight on weekdays than on weekends.

Another struggle I faced were regressions. During my studies, I was told multiple times that in order to create a regression we add all our variables and then check the p-value for statistical significance. This, however, was not how I was told to do it in practice. I learned that there are better ways to find the right variables. I was surprised to learn by my professional supervisor that adding and removing variables to a regression, as taught at the university, wasn't the right way to find a good fit for our model. I was shown other methods such as stepwise regression and lasso regression which are easier and better approaches to get a regression. By learning about stepwise regressions, I was able to successfully implement them in Stata which gave me better results compared to the regressions before.

The interactions with my co-workers were, compared to my previous experiences and, especially to my first internship, almost meager. Since I shared an office with another employee, I was able to experience the working climate and noticed, that there were much less co-workers visiting the office compared to my previous internship at STATEC. Their conversations were less about inter-personal subjects and were reduced to work-related issues. There were fewer interactions between co-workers in total which did not help to create a good working atmosphere in my opinion.

As an intern, I wasn't integrated much and felt left out. It was especially noticeable, that during my first day, no one took their time to show me around and no one ever asked me if I wanted to join them for lunch. The following couple of days, no one tried to integrate me. Even after months of working there, some didn't even respond when greeting them in the hallway. Being the newly added temporary member to this department, I never felt like I was part of their team.

On the other hand, I was very pleased to hear that STATEC organizes a small gathering to celebrate diversity day. It became a yearly tradition in STATEC for co-workers to meet up near the library to celebrate the variety of cultures in our country. Some brought baked goods from their origin country which enhanced the experience of being around people with different cultural backgrounds. I saw this as an opportunity to meet some of my co-workers. The employee I was sharing my office with kindly asked me if I wanted to join her and some other co-workers to show up at the gathering. However, upon my arrival, I realized that there were multiple groups that had already formed which made it harder to enter a conversation and meet new colleagues. One of my colleagues, who has been working there for 20 years, commented that she barely knows anyone except for those who are working in the same department. That's when I realized that everyone stayed with their co-workers from their department but there seemed to be little to no interaction between the departments. The separation in different groups was similar to that I observed during my school years which always makes it difficult for newcomers to feel included.

Besides from the yearly meet-up for diversity day, I saw no major interactions with other departments. As explained by my professional supervisor, there only was a meeting once a month with all the heads of each department. Apart from organized presentations, such as my presentations about household and volunteering work, I witnessed no interactions between co-workers from my department and co-workers of other departments.

Achievement and contribution

When I worked as an intern at STATEC for the first time, I was put in a position to combine the social and the macroeconomic aspects. It was clear from the beginning that there was a straight line between social statistics and national accounts. My task was to take a social problem and prove that it may also be of an importance to national accounts. To do so, I needed to use data from a time use survey from 2014. I divided the population into different categories such as age groups or marital status and collected the total amount spend on household work and paid work. This was necessary to prove that household work, a social aspect, is necessary if we want to estimate the value of total production, a macroeconomic aspect.

Currently, women are undervalued in national income accountings because they spend more time on household work. This research shows that our current way of calculating the GDP portrays women's household work to be invisible.

Results were represented in a graph where we can observe the distribution of household work and paid work for each category. I test for significance using regressions.

My results were presented in front of employees of the MAC department including the head of satellite accounts. The presentation was a success. Olivier Thunus, head of satellite accounts, especially, was pleased to see that I included a regression of which he seemed to be particularly fond of. As someone who prefers working in accounting, Olivier Thunus appreciates regressions as they perfectly demonstrate which variables are significant and which are not. They addressed their interest by stating that they would be happy to work with me during my second internship as they needed someone who could help them with their missing information on volunteering work. They even talked about possibly using results found for their satellite accounts.

In my second internship, I further conducted research by collecting similar data for volunteering work. I held a presentation in front of co-workers from the MAC department including the head of the satellite accounts, Olivier Thunus, and colleagues of the SOC department as well as the head of the SOC department, Jérôme Hury. The presentation was successful and ended with in-depth discussions. Olivier Thunus asked me if I was able to collect data for individual volunteer categories such as political volunteering so that we can observe the difference of time spend for various kinds of volunteering.

I got praised for my initiative and determination for offering to collect additional data on sports activities as this was outside of my initial scope of the internship. After two working days, I finished collecting the necessary data and sent my results to all the co-workers that attended the presentation. Jérôme Hury was pleased with my work and expressed that the results looked promising and interesting.

Following that, I was asked to collect data from the time use survey of average time spend on public transport from 2014. The goal was to observe free services and to find evidence that it would help reduce poverty. The initial hypothesis was that free public services are beneficial to those with lower income.

I collected total hours spent on bus, train and other non- specified public transports. I divided the population into different groups such as income level, age or residency. Additionally, I distinguished between weekdays and weekends. I further collected similar data for private transportation such as car and motorbike.

After collecting the average amount spent on public transport, my task was to calculate the amount an individual would potentially save if public transportation were free. This was substantial to analyse the effect of free transportation on poverty rates.

As the end of my internship approached, my professional supervisor announced that there might be a possibility that STATEC would start a new survey to collect data on household work, volunteering and public transport more frequently. He was impressed with results found on my previous work and was in favour of implementing a survey. Hence, he asked me to create a one-page report and to build a prototype of the questionnaire that would be handed over to randomly selected individuals if the survey would be launched. I decided to create the survey in four different languages: Luxemburgish, German, French and English. The English version of the questionnaire as well as the report can be found in the Appendix.

As for contributions that were initially outside my internship, I tried to get in touch with some of my co-workers who either were working on a topic that I was interested in or needed additional help. During the end of my first internship, I had time off available and asked my professional supervisor to give me a quick summary of what each of the employees are responsible for and what topic they are currently working on.

One employee who was working on a survey about home violence at that time caught my attention. I tried to get in touch with her so that we could meet as I had a few questions about her topic. She proposed an online meeting where she started talking about how they collected the data, which questions are asked to randomly selected individuals and results found at the end. I further asked about the credibility of the results since home violence might be an off-limit topic for some individuals which would result in incorrect data. I explained my theory that victims of domestic violence are sometimes not aware of the severity of their situation and might downplay it when asked about it. It might even be possible that the perpetrator is sitting next to the victim while she/her fills out the questionnaire to make sure that she/he will answer so that it seems that there is no violence at all.

I asked those question having in mind that I was told that if someone is randomly picked for a survey, they would get a letter via post. Yet, assault is most likely to be correlated with control. Hence, if the culprit sees a letter with the victim's name, he might open it and then have control over the answers. I was later assured that individuals are given a code that must be introduced when entering the questionnaire to avoid this situation. She argued that this enables the victim to hide themselves in order to answer the questions. Yet, in my opinion, simply adding a code will not prevent the assaulter from controlling the answers. Until this day, it's still unclear on how they can assure that results they found are not underestimated due to certain uncontrollable factors. In my opinion, the mechanism of sending letters to randomly selected people is not appropriate for such topics. I suggested to openly promote the survey which will enable people around the country to take part in the survey anonymously. This would allow that victims can decide on their own to participate without their perpetrator knowing that they are selected and need to answer. It still rules out those who are under constant watch and would have no opportunity to respond. But the fact that letters are sent at home increases the probability that victims are not going to reply to the survey on their own without their perpetrator knowing it. Selecting everyone by making the invitation public will most likely not alarm the perpetrator since they believe that their victim wouldn't answer to this survey. Yet, handpicking those victims will leave a target on their back as their perpetrator knows that answering to those surveys are mandatory.

While waiting for instructions for my upcoming task, I decided to help my co-worker who was currently under pressure to meet a deadline. Her duty was to check multiple files for any mis recorded data. I needed to verify that necessary information such as household income was listed in each file. Additionally, I needed to control that every record was reported under the right section, i.e., nutrition for animals shouldn't be listed in the same section as food for humans.

Learning and link to UL master's curriculum

During both of my internships, I had the opportunity to expand and build upon my knowledge that I gained from different courses at the university.

Especially helpful were the three econometrics lessons that I had during my master's program. I did not only learn how to work with STATA but got exposed to the important theory that was needed for my conclusion. While the two first econometrics lessons helped me with understanding how to use testing and what time series are, Econometrics III helped me to understand how to treat and analyse my results in a deeper manner. I appreciate that, in Econometrics III, we were challenged to think outside the box and use theory learned in class to explain issues that at first sight seemed to have nothing to do with the theory. This skillset provided to be very handy for my internship as I was praised numerous times during it.

Additionally, I was pleased with the lesson about survey data in the fields of Economics and Finance as it was exactly what I needed for my topic. Since my internship was about time use surveys, I found it very helpful to get an introduction to STATA for surveys. Even though we only scratched the surface during this lesson, it helped me to familiarize myself and get more comfortable when handling survey data in STATA.

Certain lessons where we needed to apply advanced mathematics such as Mathematics in the first semester or Asset Pricing Theory in the second semester were equally helpful for my internship. The material that was covered during those lesson was not strictly necessary, but I profited from the logical thinking that was required in those classes. I'm strongly in favour of having more intellectual challenging lectures that help to improve our logical thinking.

Likewise, I gained a lot of knowledge during my internships. I expanded my knowledge in econometrics on regressions and learned new methods which I applied consequently. Additionally, I refined my soft skills through presentations in front of co-workers. My internship at STATEC helped me to reduce the anxiety of speaking in front of others as I held two presentations. Compared to holding a presentation in front of your class, I felt more at ease as they were very considerate and didn't point out every little flaw. Not being judged as harsh as during my university career was very uplifting and made me gain a bit more confidence in my own work.

I think that universities expect too much from students in certain situations for which students will be punished too harsh if they do not meet said expectations. Yet, in the labour market, small mistakes are forgiven. From my experience, they understand that one cannot be perfect and will not punish you for those. While universities robbed me of

my confidence to some extent through this, working at STATEC helped me in regaining my confidence.

Research section

Introduction

For our research we used a time use survey conducted by STATEC in 2014 in Luxembourg. The survey was in a form of a journal where individuals of a household were asked to record their daily activities as detailed as possible. Around 2088 individuals, aged from 10 to 74, were randomly selected to record their action for two days, one weekday and one weekend. Every new action had to be recorded with an estimate of actual time spent in hours and minutes for each activity. The results of the survey left us with a detailed classification of 200 different activities from hours spent on sleeping, working and free time. Even small details such as laying sick in bed had been recorded which demonstrates the amount of detail this survey was able to collect.

The goal is to use the collected data from the 2014 survey to get an estimate of time spent on free work. First, we estimate the distribution of household work and paid work to show the importance of household work in measuring well-being. Following that, we observe time spent on volunteering to introduce the idea of implementing voluntary work in the satellite accounts of non-profit institutions.

Yet, before any analysis could be pursued, it was important to take certain factors into consideration. To get a true representation of the Luxemburgish population, it's crucial to acknowledge individual weights as well as weighting of days. As our data set was limited to 2088 individuals, we needed to assign weights so that we can get an appropriate estimation of the whole population. Likewise, we couldn't ignore that the survey collected information for two days, one weekday and one day on weekends, for each individual.

What's more, since certain information on activities that was important for our research hasn't always been recorded for the younger generation, we decreased our population size to age 15 and above.

To test the reliability of the dataset, we used the aforementioned mechanism to get an estimation of time spent on sleeping. We were expecting an average of around eight hours per day which we found indeed. Hence, we can confidentially state that data from the time use survey are sufficient and reliable enough to get an accurate estimation for the whole population.

What's the distribution of household work and paid work?

To observe the importance of unpaid household work, it's necessary to look at the distribution of unpaid household work and paid work in Luxembourg. It's important to specify that certain side activities were not reported. For example, when a mom was cooking and watching over her kids, only cooking was reported as the main activity.

Furthermore, time spent on childcare might be underestimated as some didn't consider looking after their children as household work. This resulted in only a small portion of people that recorded the time spent on childcare.

Legend:
- Kitchen work
- Home maintenance
- Creation and maintenance of textiles and footwear
- Gardening and Animal care
- Repair work and DIYs
- Shopping
- Household management
- Childcare (Under 16 years old)
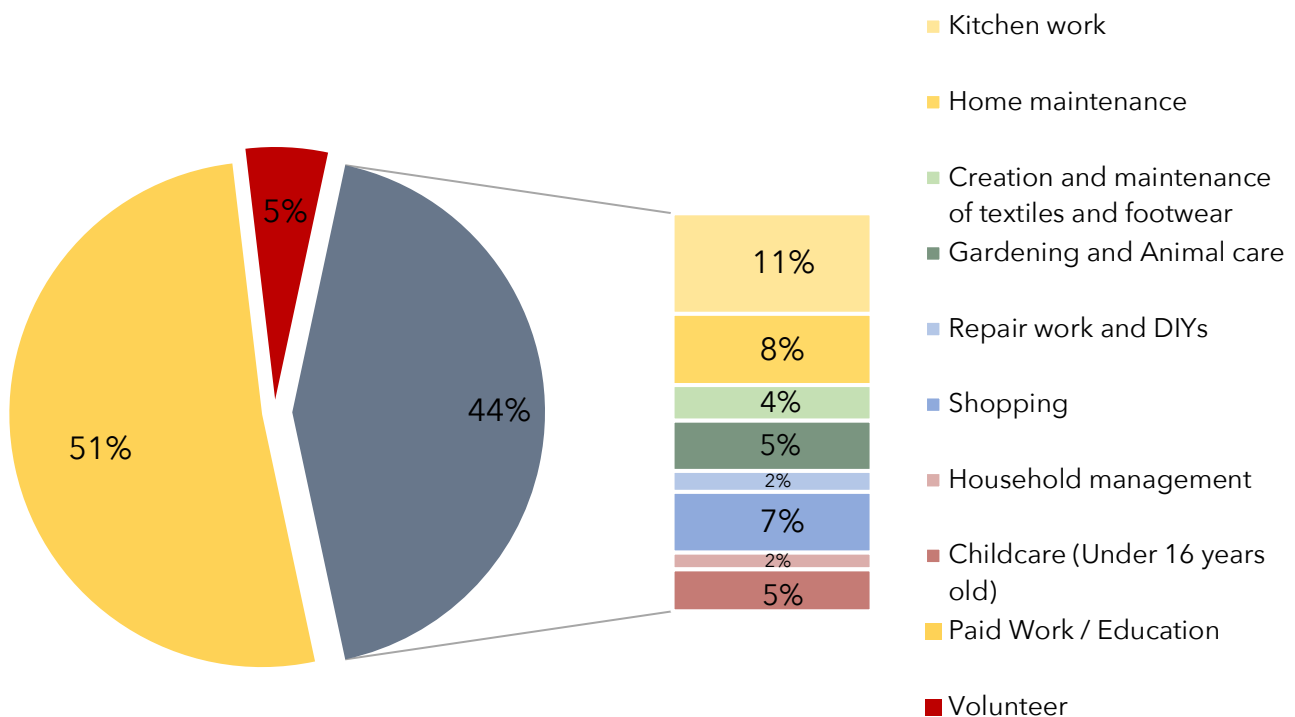- Paid Work / Education
- Volunteer

FIGURE 2 – AVERAGE TIME SPEND ON PAID AND UNPAID WORK

From figure 2, we conclude that Luxembourg is well-balanced regarding their time spent on paid and unpaid work. Hereby, we have 51% of the total time that is spend on paid work while 49% is spend on unpaid work. From the 49% of unpaid work, we have 44% for household work and 5% for volunteering. Paid work includes professional work, education as well as out-of-school education such as music or language lessons. Unpaid work includes volunteering and household work where household work includes all the work done at home which is not paid such as cooking or cleaning.

It's important to note that 44% doesn't mean we spend 44% of our day with household work. We only compare the ratio between unpaid and paid work meaning that time spent otherwise such as sport activities or self-care is not considered here.

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Therefore, it would be wrong to conclude that we spend around 10 hours per day with household work and 12 hours a day with paid work.

To elaborate our analysis, we divide our population into different groups to see if there is a change of distribution of paid and unpaid work.

From the start we predict that there will be a difference between genders. Therefore, we create a sub-group for male and female and let other variables vary to check if there are other factors that might change the distribution between paid work and unpaid work.

Firstly, we observe the change of distribution based on age. Thus, we create 5 different age groups. It's important to state that education is included in paid work which explains the high percentage of paid work for the younger generation.
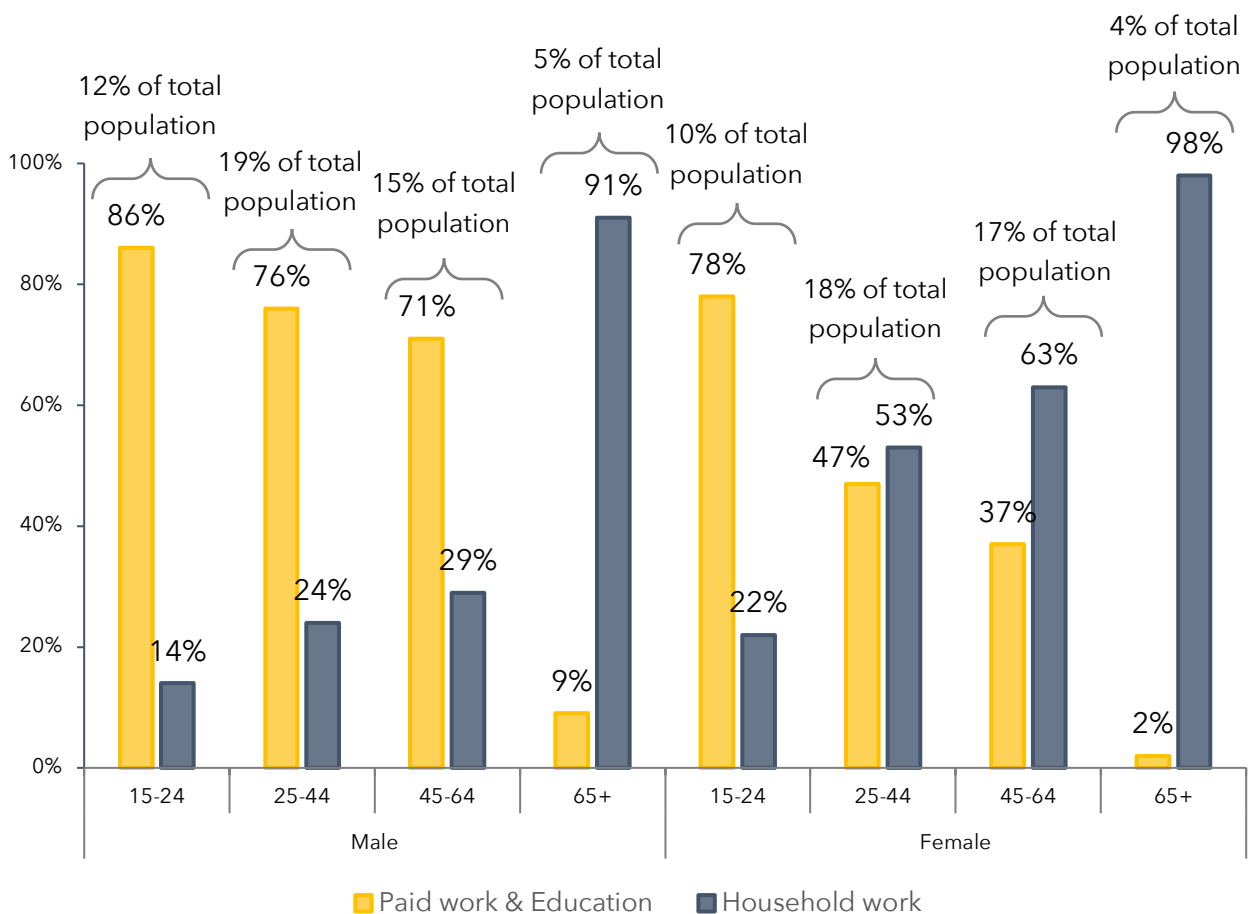

FIGURE 3 – DISTRIBUTION OF PAID AND UNPAID WORK BASED ON GENDER AND AGE GROUP

Looking at figure 3, we detect that at young age, there is just a slight difference of distribution of paid and household work between female and male. Women aged between 15 and 24 spend 57% more on household work compared to men in the same age category.

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Yet, looking at the generation aged between 25 and 44, we can see that women have a balanced distribution around 50% of each household and paid work while men still invest more time on paid work than on household work.

As we move upwards in the age categories, we notice that women spend more and more time on household work and reach a percentage of 98% household work as an elderly. As for men, we equally observe an increased shift of distribution in favour of household work with 91% at the end of our observation. The difference lies in the time where men start to invest more time on household work compared to paid work. While women start spending more time on household work at the age of 25, a man only dedicates more time to household work than to paid work as he reaches the end of his work career.

Following that, we needed to observe if marital status might influence the time spent on paid work and on household work. Therefore, we divided the population into three main groups:

- never married which are those who are either single or in a partnership,
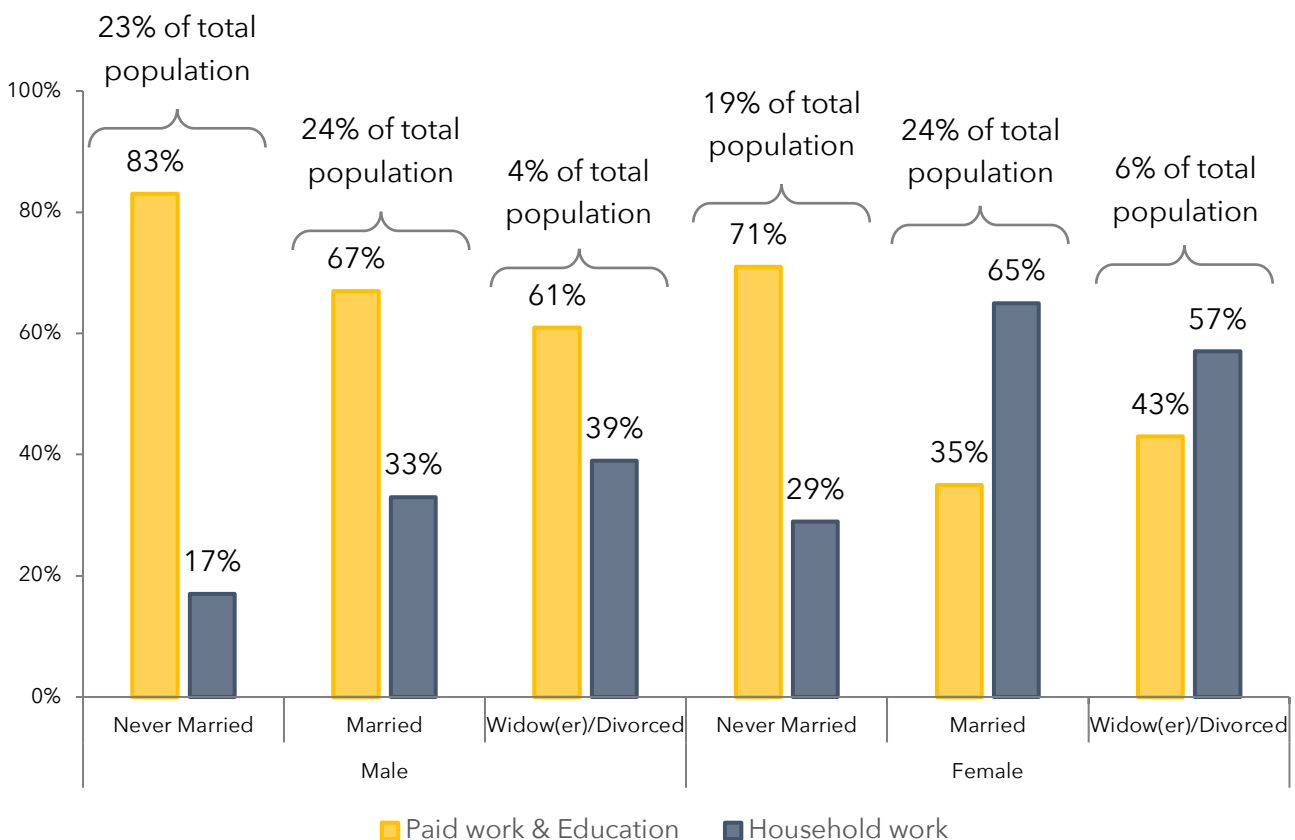- married,
- widowed or divorced.

FIGURE 4 – DISTRIBUTION OF PAID AND UNPAID WORK BASED ON GENDER AND MARITAL STATUS

Overall, we observe in figure 4, that males and females which were never married have spent more time on paid work than on household work. There is still a difference between females and males since we observe that women spend 70% more time on household work than men.

As for married couples, the gender difference is even more visible. A married man has a decrease of 20% of paid work and an increase of 94% of household work compared to a non-married man. However, the distribution between household work and paid work is still quite similar because they still spend more time on paid work than on household work. Compared to a non-married woman, a married woman spends 50% less on paid work and 125% more on household work. A reason for the shift of distribution for married couples might be correlated with having children present in the household. A married couple is more likely to have children in the household compared to a non-married couple.

Compared to widowed or divorced individuals, we see no big changes in the distribution of paid and household work. We only observe a slight drop for men in paid work and a slight increase in household work. This might be the case as divorced or widowed men now must do their own household work as there is no significant other that might help them with some household tasks. For women, we observe the inverse, namely an increase in paid work, which might be correlated with them having to work more as they no longer have as much financial aid from their divorced partner.

To test for the assumption that distribution of paid and unpaid work might shift due to the presence of children, we divided the population into 2 groups: no children or at least one child that is under 7 years old in the household.
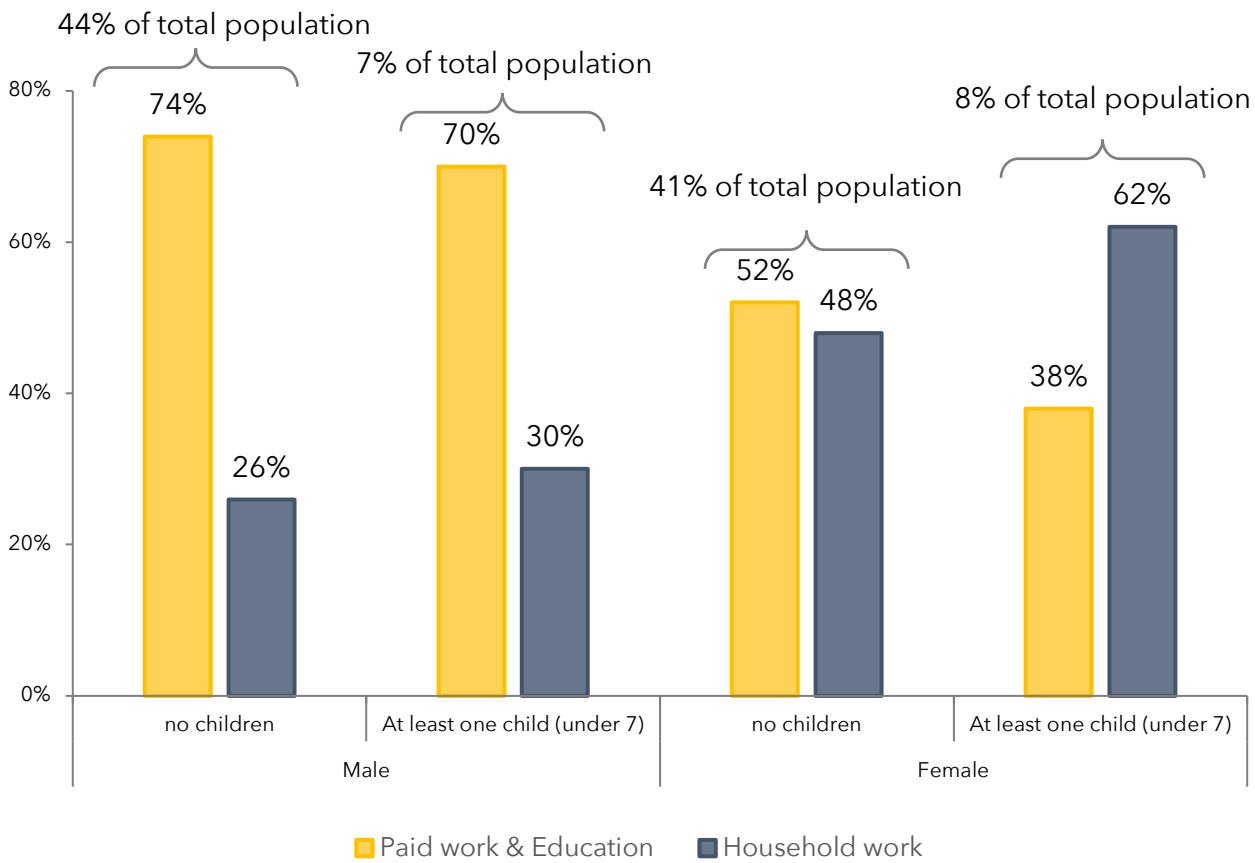
FIGURE 5 - DISTRIBUTION OF PAID AND UNPAID WORK BASED ON GENDER AND NUMBER OF CHILDREN

While men have a decrease of paid work of 5% and an increase of 15% of household work when children under 7 years are present in the household, woman have a decrease of 26% of their paid work and increase of 30% in household work. Hence, according to figure 5, woman's distribution of paid work and household work is affected by children in the household, but man's distribution has meager changes which are likely insignificant.

Following that, we are looking at the impact of labour force status on the distribution of paid work and household work. Hence, we divided our population into three groups: employed, unemployed and not in the labour force. Students are also part of the not-in-the-labour-force population which might explain a high percentage of paid work for not in the labour force group.
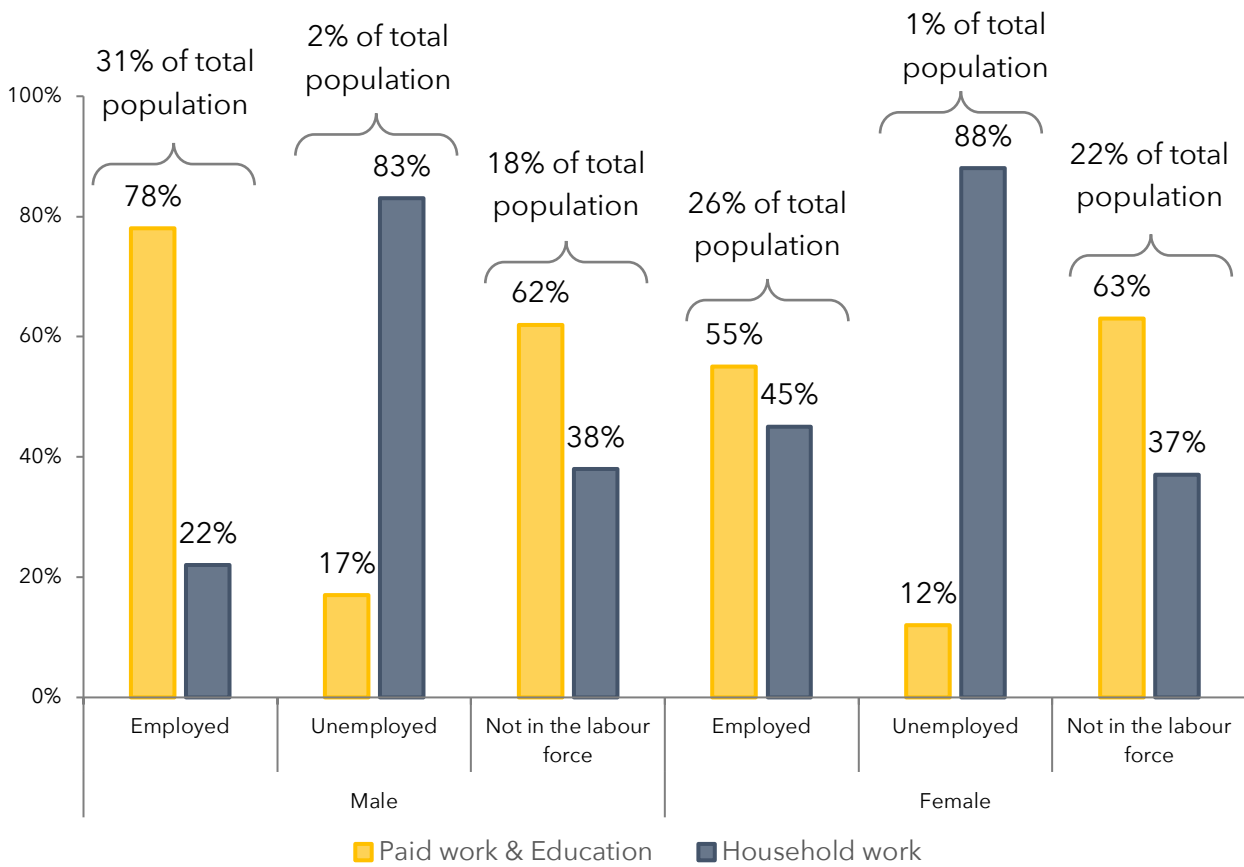
FIGURE 6 - DISTRIBUTION OF PAID AND UNPAID WORK BASED ON GENDER AND LABOR FORCE STATUS

Figure 6 shows us that the unemployed spend more time on household work as they do not have a paid job. The percentage for paid work is the time spent looking for a job.

If we compare the employed group with the not-in-the-labor-force group, we see that time spent on paid work gradually increases by 26% if a male is employed but decreases by 13% if a woman is employed. As for household work, a male not in the labor force spends 72% more time than an employed male but a woman spends 18% less than an employed female.

Lastly, we are going to see if there is evidence that nationality has an impact on the distribution of paid and household work. Figure 7 displays the distribution of paid and unpaid work for natives of Luxembourg and foreigners.
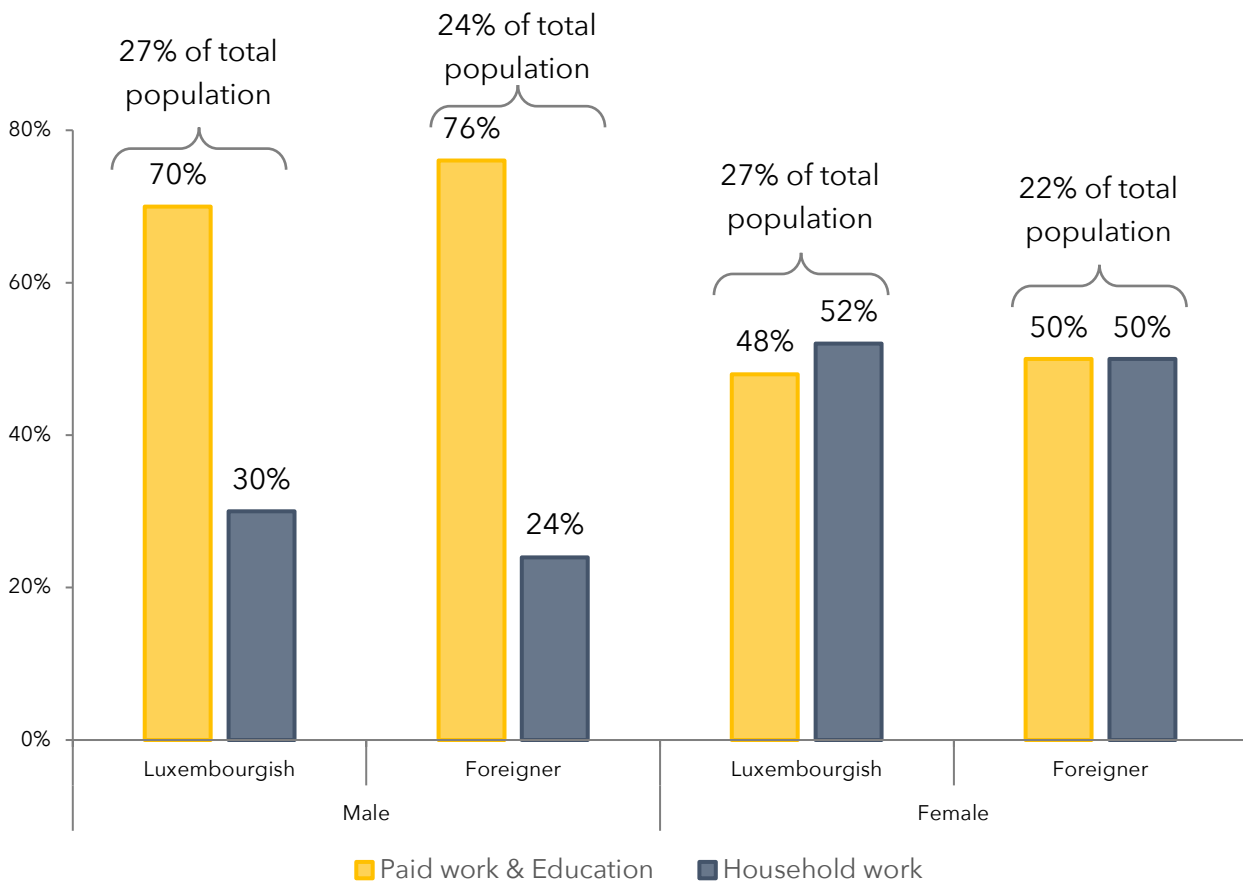
FIGURE 7 - DISTRIBUTION OF PAID AND UNPAID WORK BASED ON GENDER AND NATIONALITY

The only difference we may conclude is that foreigners tend to spend less time on household work and more time on paid work. There is a slight increase in paid work for a male foreigner of 9% and a significant decrease in household work of 25%. A foreign woman spends 4% more time on paid work and 4% less on household work.

To make a general conclusion, we need to check statistical significance of our variables on household work and paid work. We do a backwards stepwise regression in STATA and the significant level set at 5%. The backward stepwise regression allows us to get the best fit for our regression with all variables significant at the 5% level. We start with a set of all our independent variables and then delete them one by one while testing if the removed variables are statistically significant or not. See figure 8 for the stepwise regression of paid work and figure 9 for the stepwise regression of household work.

Prior to checking the regression, it is important to define our independent variables. Some variables where already in a good form, meaning that they were either binary variables or continuous variables such as:

- Gender which is set to 1 if female else 0.
- Age is a continuous variable from 15 to 74.

- Nationality is 0 if the individual is Luxemburgish else 0.
- Children takes 1 if there are children (under 7) present in the household else 0.

Yet, marital status and labour force status had multiple non cardinal alternatives which needed to be constructed into dummy variables for each alternative.

For marital status we created two different dummy variables called married and single. The variable married is equal to 1 if the individual is or was once married and 0 if the individual was never married, whereas the variable single is 1 if single, divorced or widowed else 0. To not saturate our model, we won't include a third variable for divorced.

For labour force status we created a variable called employed which gives us 1 if employed else 0 and a variable LF with 1 if the individual is in the labour force 0 else.

VARIABLES	(1) paid
gender	-0.774***
	(0.110)
age	-0.0344***
	(0.00517)
LF	-3.139***
	(0.492)
nation	0.265**
	(0.111)
employed	4.410***
	(0.483)
Constant	6.158***
	(0.163)
Observations	1,048
R-squared	0.157

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FIGURE 8 – STEPWISE REGRESSION OF PAID WORK

Using the stepwise regression, we conclude that gender, age, labour force status, nationality and employment status are all statistically significant at the 5% level for paid work, see figure 8.

As for household work, figure 9, we are left with variables gender, age, marital status, presence of children and employment status.

VARIABLES	(1) household
gender	1.735***
	(0.0955)
age	0.0413***
	(0.00428)
single	-0.779***
	(0.153)
married	0.358**
	(0.179)
children	1.544***
	(0.131)
employed	-1.249***
	(0.287)
LF	0.585**
	(0.291)
Constant	0.425*
	(0.222)
Observations	1,397
R-squared	0.419

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FIGURE 9 – STEPWISE REGRESSION OF HOUSEHOLD WORK

If we take a French male aged 30 which is employed, married and has children, we will have a daily average of 6 hours and 40 minutes spend on paid work and 2 hours and 55 minutes on household work. This gives us a percentage distribution of 70% paid work and 30% household work.

A woman with the same qualities would have 5 hours and 50 minutes on paid work and 4 hours and 40 minutes on household work. We observe that a woman with the same quality spends around 55% on paid work and 45% on household work.

Overall, we see that women have a different distribution than man such that they invest more time on household work compared to men but less on paid work.

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How much time do we spend on volunteering?

The same analysis can be done for voluntary work. As observed in figure 10, we only recorded that about 11% of Luxembourg participated in any kind of volunteering work in 2014. 7% was organization-based voluntary work while 4% was direct voluntary work.
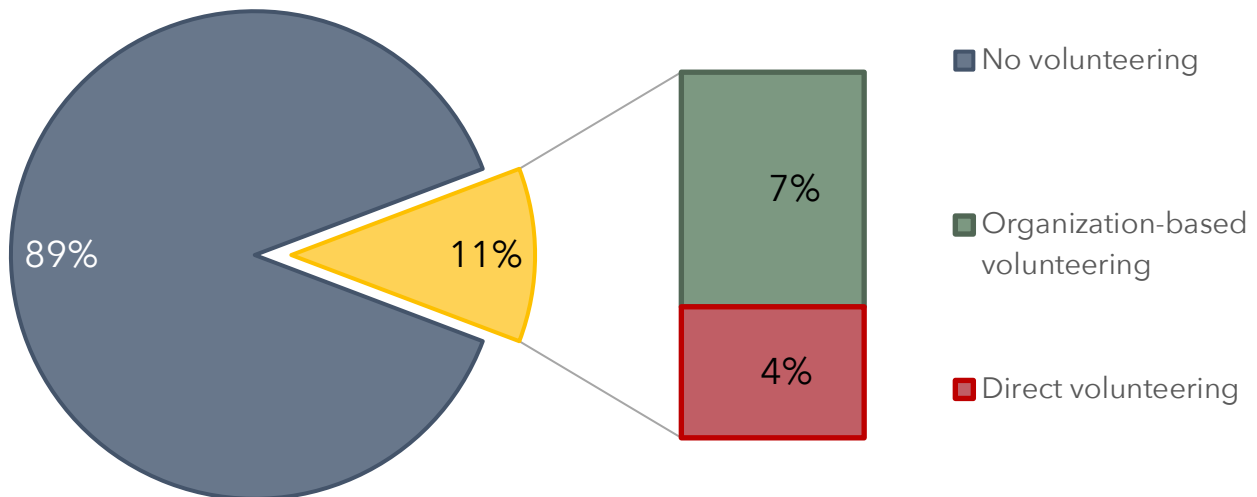

FIGURE 10– DISTRIBUTION OF VOLUNTEERING

We are only looking at the percentage of different population groups who participated in volunteering. This way, we can observe if the act of volunteering depends on different socio-demographic factors.

First, in figure 11, we observe the difference in gender. Women tend to spend slightly more time on volunteering work than men do. Women spend 30% more time on organization-based voluntary work and 27% more on direct volunteer work than a man does.
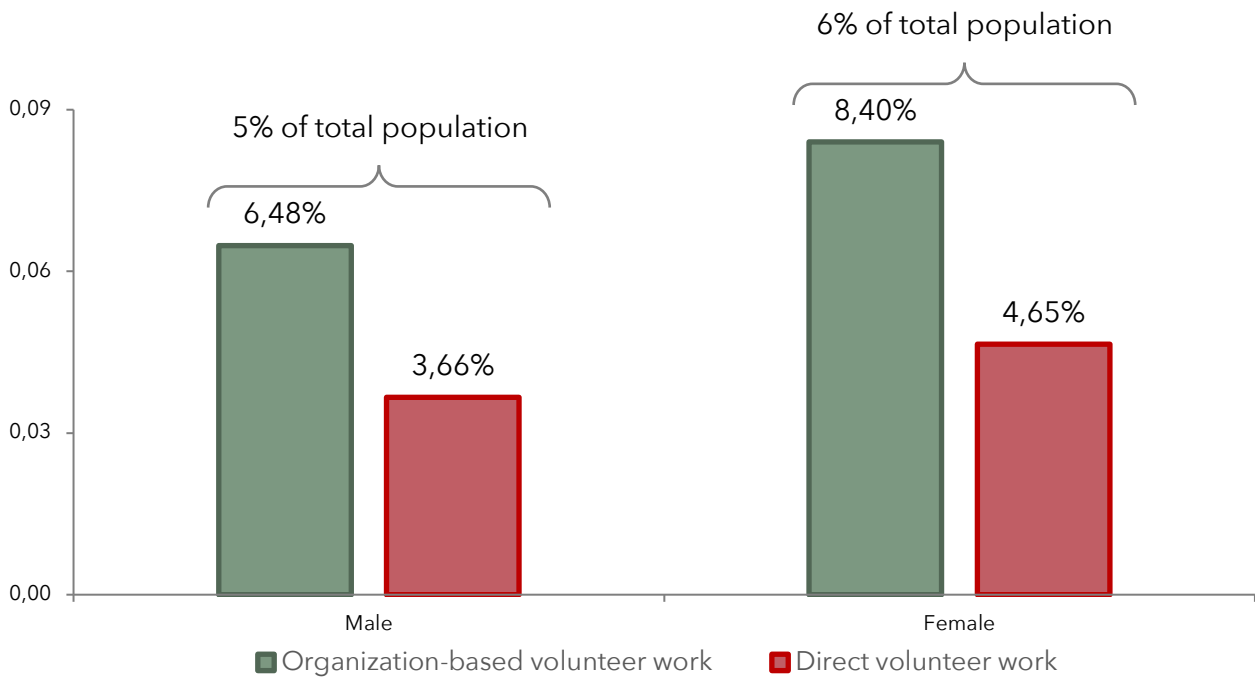
6% of total population

5% of total population

FIGURE 11–VOLUNTEERING BASED ON GENDER

As for different age groups, we can see in figure 12 that the older one gets, the more one invests his time on volunteering. Comparing the younger generation with the older generation, we observe an increase of 150% in organization-based and 1366% in direct voluntary work.
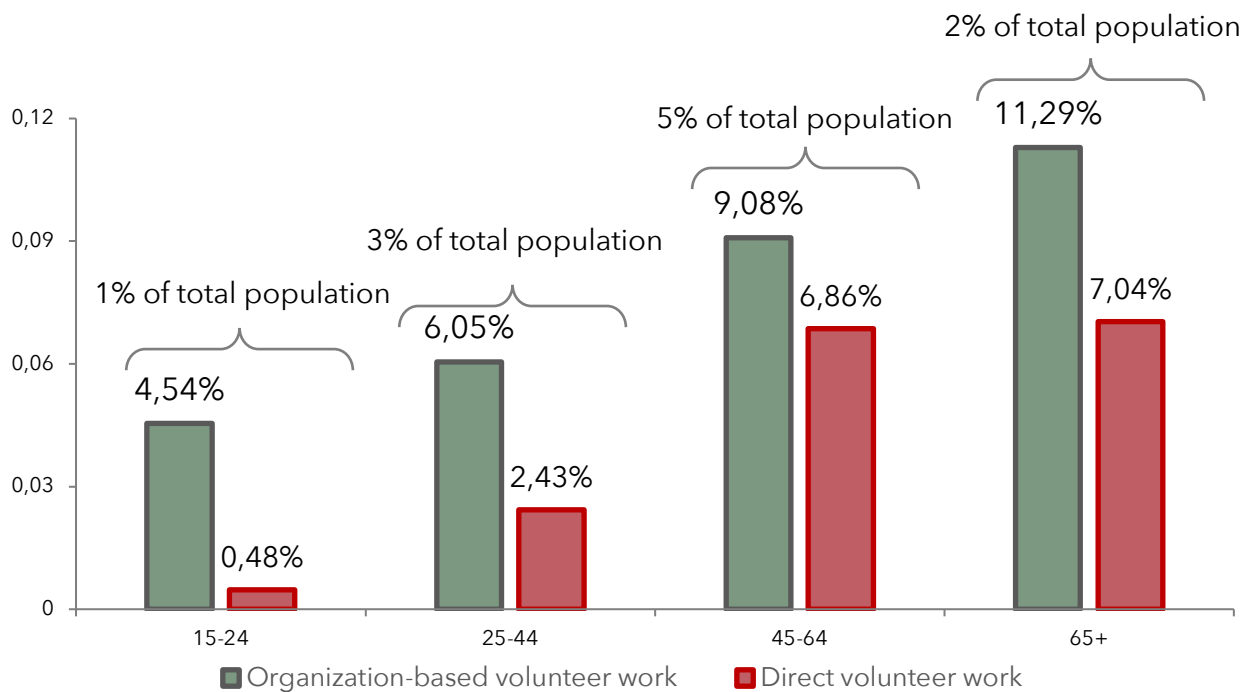

FIGURE 12 –VOLUNTEERING BASED ON DIFFERENT AGE CATEGORIES

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Next, it was important to check if time spent volunteering depended on marital status, see figure 13.

FIGURE 13 – VOLUNTEERING BASED ON DIFFERENT MARITAL STATUS

Most interesting, yet, is that widowed or divorced people spend more time on direct- than organization-based volunteering. Furthermore, comparing never married to widows or divorced, we observe an increase of 6731% for direct voluntary work. This might be explained through this category being most likely associated with the generation aged above 65 years.

Following that, we divide our population into groups based on their labor force status.
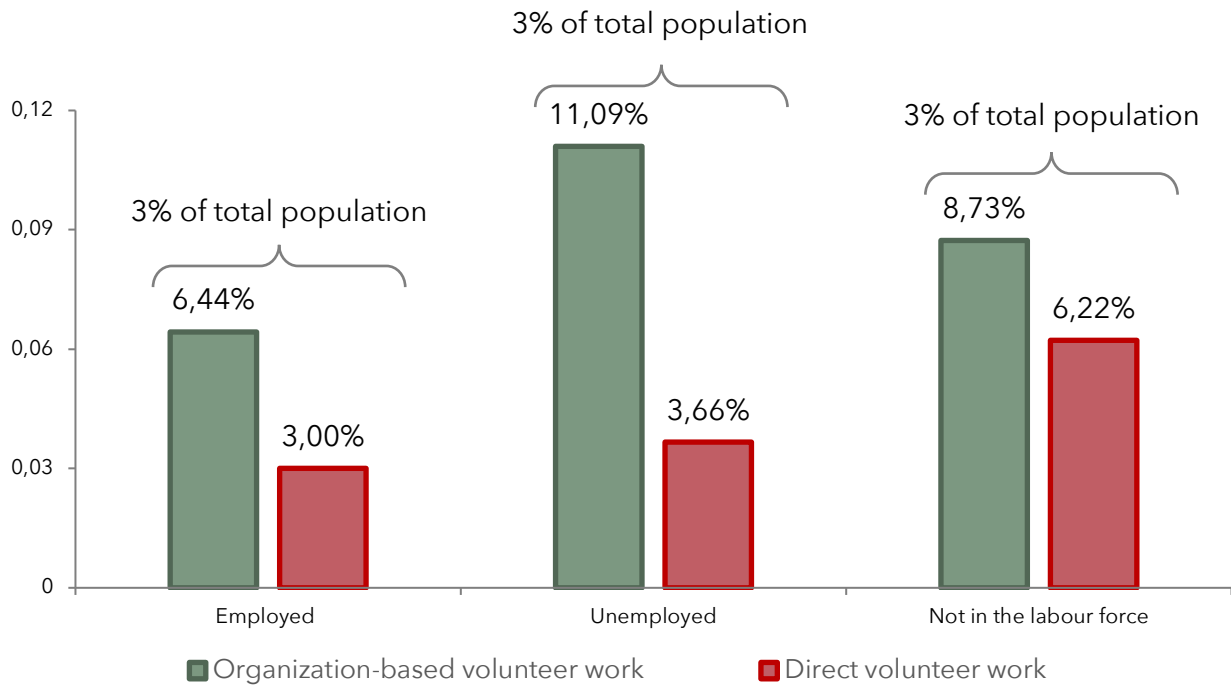
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3% of total population

3% of total population

3% of total population

0,12

11,09%

0,09

8,73%

6,44%

6,22%

0,06

3,66%

3,00%

0,03

0

| | Employed | Unemployed | Not in the labour force |

■ Organization-based volunteer work   ■ Direct volunteer work

FIGURE 15 – VOLUNTEERING BASED ON LABOR FORCE STATUS

Unemployed have the highest percentage spent on organization-based volunteering. Compared to employed, 72% of unemployed population spend more time on organization-based voluntary work. As for direct work, we have those who are out of the labor force who invest 107% more than employed. Knowing that pensioners are not in the labor force, we might understand the increase in direct volunteer work better.

To finish off, we analyzed the impact of residency on free work. We divided the population into those who live in a big city such as Luxembourg city or Esch and those who live further away from the city.

Looking at figure 16, we observe that there is a 65% increase in organization-based volunteering work for someone who lives in a city. As for direct volunteer work, there is only a slight increase of 3%.
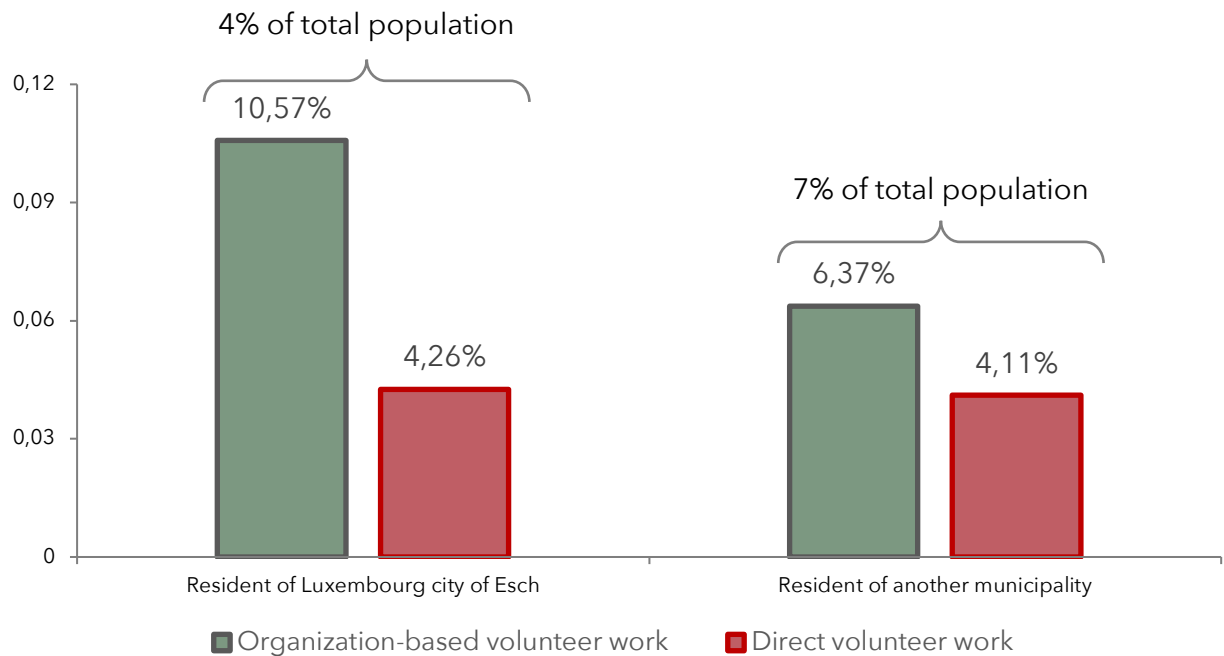
4% of total population

10,57%

7% of total population

6,37%

4,26%

4,11%

Organization-based volunteer work   Direct volunteer work

FIGURE 16 – VOLUNTEERING BASED ON RESIDENCY

To sum it all up, we are going to use a stepwise regression to check for the significance level. One more variable called *resi* was added for voluntary work. *Resi* equals 1 if the individual is living in Luxemburg city or in Esch and 0 otherwise.

VARIABLES	(1) organisation
married	-0.588**
	(0.257)
age	0.0189**
	(0.00774)
employed	-0.456**
	(0.188)
Constant	0.870***
	(0.326)
Observations	134
R-squared	0.112

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

FIGURE 17 – STEPWISE REGRESSION ON ORGANIZATION-BASED VOLUNTEERING

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For organization-based volunteer work, as described in figure 17, we found that marital status, age and employment status are statistically significant at the 5% level.

As for organization-based volunteer work, the stepwise regression indicates that only the variables married, age and employed are statistically significant at the 5% level, as shown in figure 18.

	(1)
VARIABLES	direct
resi	0.618**
	(0.308)
employed	-0.665***
	(0.249)
Constant	1.377***
	(0.177)
Observations	74
R-squared	0.134

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FIGURE 18 – REGRESSION ON DIRECT VOLUNTEERING

For example, let's assume that a 50-year-old individual is married, employed and lives in Luxemburg city. This individual spends around 46 minutes daily on organization-based and 1 hour and 20 minutes on direct voluntary work.

The same individual, was he not employed, would spend 1 hour and 13 minutes on organization-based and around 2 hours on direct volunteering.

We observe that employment status might influence the total amount spent on volunteering. It doesn't change the distribution of organization-based and direct voluntary work. For both cases, we observe a distribution of 35% for organization volunteering and 65% for direct volunteering.

If we would, however, change marital status to never married, only organization-based voluntary work would change to 1 hour and 21 minutes. Thereby, we have about 51% of volunteering on organization and 49% on direct work. If we take an individual that doesn't live in Luxemburg city or in Esch, we have a distribution of 53% for organization-based

work and 47% for direct volunteering as time spent on direct volunteering would decrease by 42min.

We also observe a shift downward in organization-based volunteering by decreasing the age while direct volunteering doesn't depend on age.

How to measure unpaid work?

There are two main approaches that are currently known to measure unpaid work, opportunity cost and replacement cost.

The opportunity cost represents the loss of the other alternative that has not been chosen. In other words, it's the cost of the next best alternative. To measure the value of domestic work, we us the person's actual employed wage rate at that moment. This means that if your hourly wage in your professional job is δ, then every hour spends on domestic work you will be earning δ as well.

This, however, comes with many flaws. According to the opportunity cost, a woman cleaning the house for an hour will earn less than a man doing the same task. Additionally, household work done by an unemployed would be worth nothing.

And lastly, we have the quality control issue. The wage is normally based on skills needed. However, some household activities need more or fewer skills than a day-to-day job. Let's take for example two different people spending two hours baking a cake at home. One is a professional baker who is used to baking more difficult cakes, the other is a doctor who has no idea of baking and just wants to please his wife with a good gesture.

Figure 17 represents both final cakes. Without pinpointing who baked which cake, it's straightforward to know which cake was done professionally and which wasn't.

FIGURE 17 – LAMB CAKE OF PROFESSIONAL BAKER VS. DOCTOR

In Luxembourg a pastry chef earns around 26€ per hour while a doctor earns 112€ per hour[1]. Using the opportunity cost, the right cake, done by the doctor would be worth more than the left cake made by the professional baker.

Worth of left cake, profession baker's cake: 2h * 26€/h = 52€

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[1] Based on data found on SalaryAfterTax

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Worth of right cake, doctor's cake: 2h ∗ 112€/h = 224€.

The doctor's cake is worth almost five times more than the baker's cake, which is ridiculous as the left cake is for sure of higher quality.

We can see that using the opportunity cost creates a lot of inequalities and is inefficient to value one's household work.

The second approach consist of using the value of the actual work done. This is called replacement cost approach. We can further distinguish between the specialist replacement cost approach and the general replacement cost approach. For the specialist approach, we use the wage rate of a specialist, hence it varies with the activity practiced. The general approach uses the wage of a general housekeeper. It's said that the general approach is more appropriate to measure the household work as a housekeeper can perform most of the household task at an average skill level.

One major issue with the replacement cost approach is that for some household tasks, there is no reference wage.

Furthermore, we still have the quality issue with this approach. Taking the same example as before, both of the cakes would be equally valued with the replacement cost. If we took the specialist approach, then we would take the wage rate of a specialist which, in this case, is the professional baker and both of the cakes would be worth 52€. As for the general approach, we need to consider that the general wage of a housekeeper in Luxembourg is around 14€ per hour. This means that both cakes would be worth 28€.

The quality control problem will always arise when measuring unpaid work as we cannot measure true quality of every individual for every skill set. Even if we would ask people to rate their skillset when recording their action, we would still have a lot of measurement errors as people tend to rate their skills sometimes higher or sometimes lower than it actually is.

To get a visual representation of the difference between opportunity cost and replacement cost, we divided the population into three income categories. We first calculated the median which was around 3500€ per month in Luxembourg in 2014. A low income is defined as below 50% of the median - 1750€ per month.

A monthly income between 50% and 150% is classified as middle-income. And lastly, a high income means an income higher than 150% (5250€) per month. For the replacement cost, we used 14€ for household work and 20€ for voluntary work. The graph represents the daily income of household work for each income class.
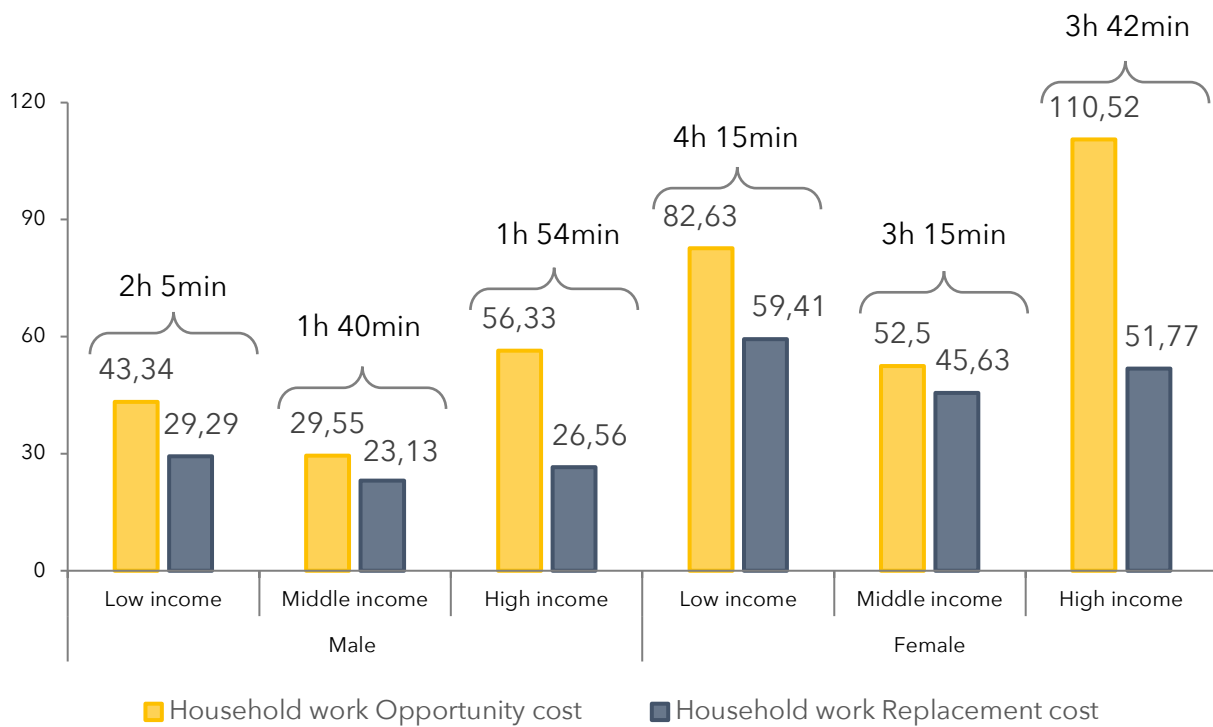
FIGURE 18 – OPPORTUNITY COST AND REPLACEMENT COST FOR HOUSEHOLD WORK
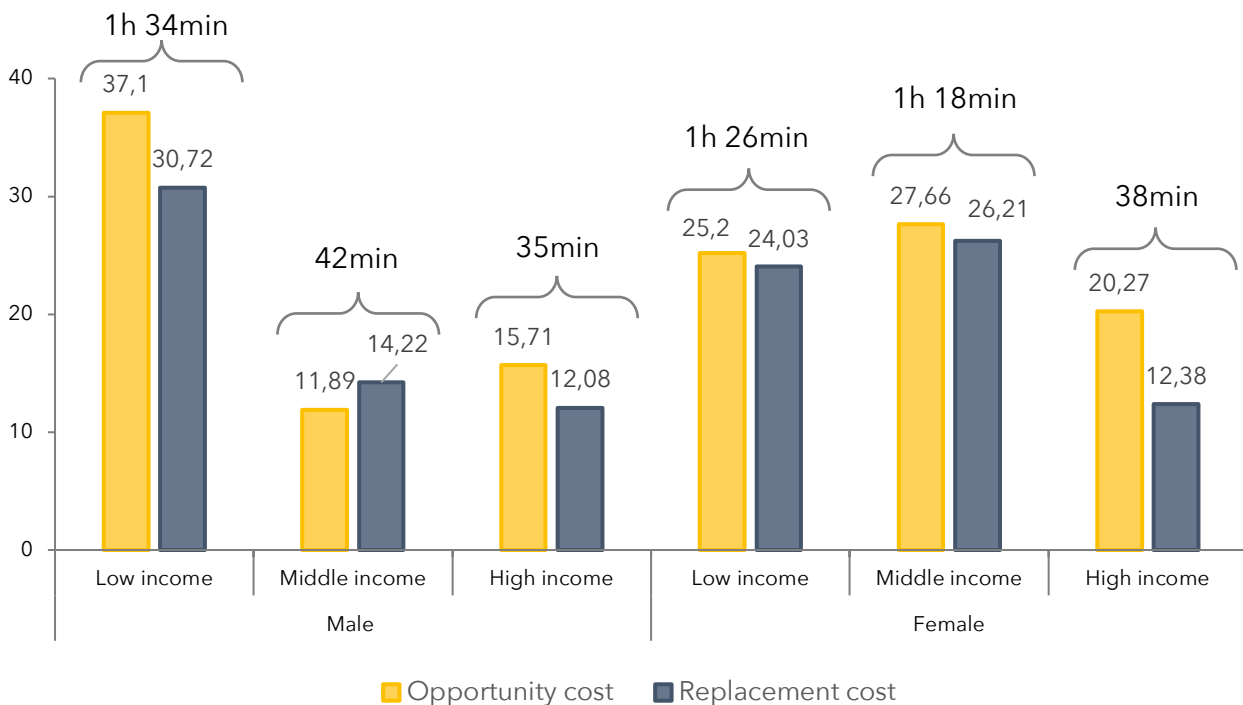

FIGURE 19 – OPPORTUNITY COST AND REPLACEMENT COST FOR VOLUNTEERING WORK

We can see that for both household work and voluntary work, the opportunity cost leads to a lot of inequalities where a person, who is spending less time on the same tasks, is being paid more. For the replacement cost, as the hourly wage is equal for every

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individual, we get a good representation on how much each group of income class spends on household work or on voluntary work. Hence, we conclude that replacement cost is the better approach for valuing household work and voluntary work.

Does free work have an economic importance?

To conclude we may state that free work is indeed more important for economic growth than it is publicly known. Those bajillions of hours parents spent on childcare or healthcare are lost when it comes to the GDP. In this research section, we found evidence that women do spend more time on household work than men. The outcome of this household work is beneficial to our economic growth as it ensures a healthy, well-educated and productive future generation which will lead to a potential economic growth. Those are tremendous benefits to the society that simply cannot be ignored when it comes to the GDP which is supposed to be a measure of our well-being. Assigning a value to household work will increase women's value to the society and may even close gender as well as wage inequalities.

Figure 22 illustrates gender wage inequality before and after introducing household work and volunteering work into the GDP. We observe that before including free work, women earn 18% less than men.
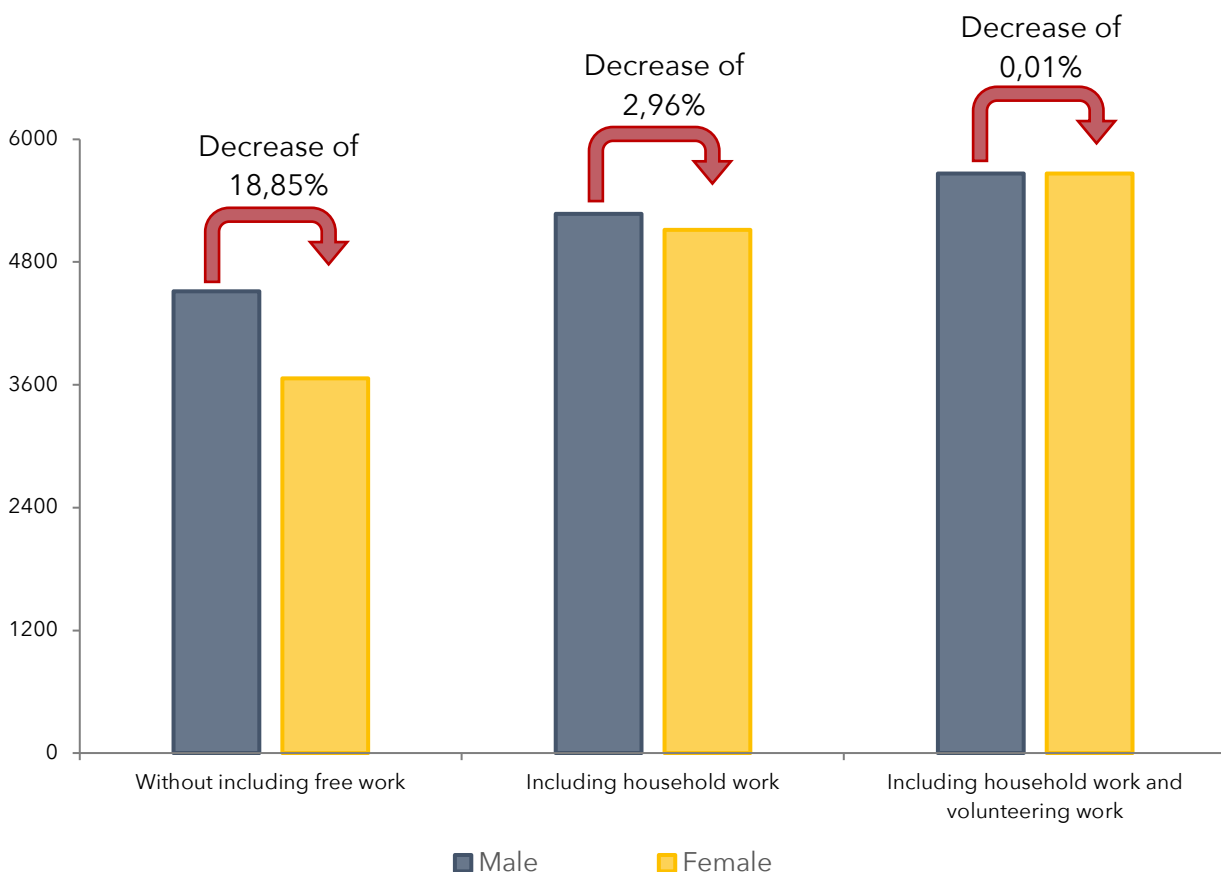

FIGURE 20 – GENDER INEQUALITY BEFORE AND AFTER FREE WORK

By taking the value of household work, previously calculated with the replacement cost, women are now earning around 3% less than man. Going a step further, we can

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additionally include the potential value earned for time spend on volunteering work. Hereby, gender inequalities are insignificant with women earning less than 1% less than men do.

We see that including free work when calculating the GDP will decrease gender wage inequalities and improve women's worth in the economists' eye. Therefore, we use the Gini index and get the visual representation on the Lorenz curve, figure 21. Here, we have a straight diagonal red line which indicates a perfect equality in income distribution. The further away the Lorenz curve will be from this red line, the higher the inequality we observe in the wage distribution. We observe that the blue line, where free work is included, is closer to perfect wage equality than the yellow line.
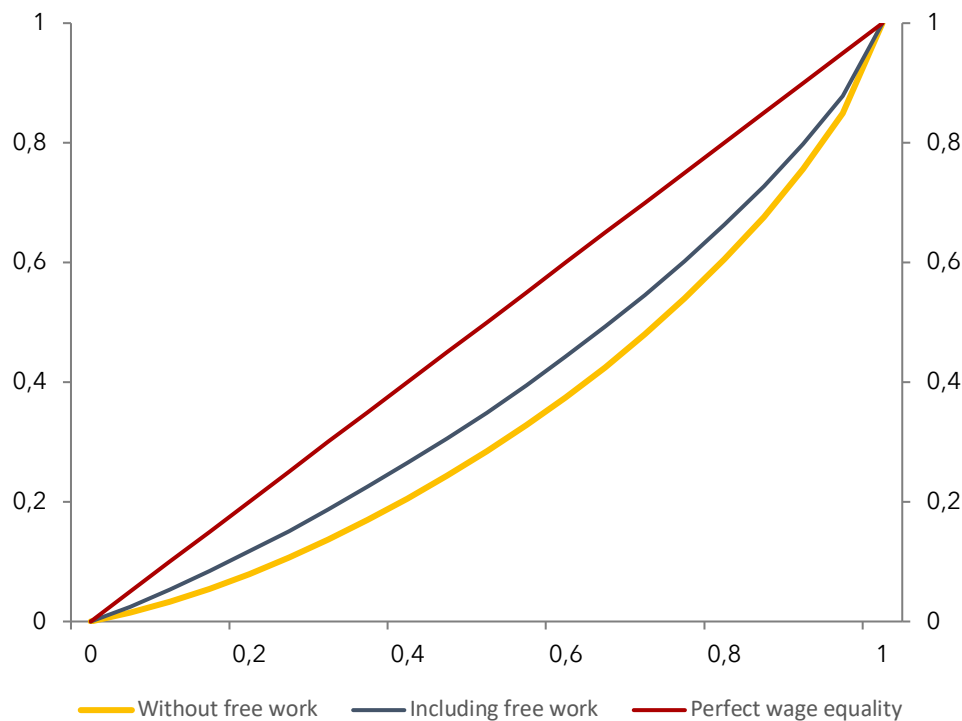

FIGURE 21 – LORENZ CURVE; WAGE INEQUALITY BEFORE AND AFTER ADDING FREE WORK

Is providing free services beneficial?

Lastly, it is also of a great importance to additionally observe free services provided by the country and to discuss if those free services are beneficial to the public. In our study, we will be focusing on free transportation due to the newly introduced free public transportation in 2020 in Luxembourg. With our collected data from 2014, we are trying to find evidence that introducing free transportation might decrease poverty rate. To do this, we collected average hour spend on public transportation for each income categories: low, middle and high. As time spent on public transportation might differ between weekdays and weekends, we add an average for weekdays and an average for weekends. Additionally, we added time spent driving by car or motorbike to see the distribution of public and private transportation.
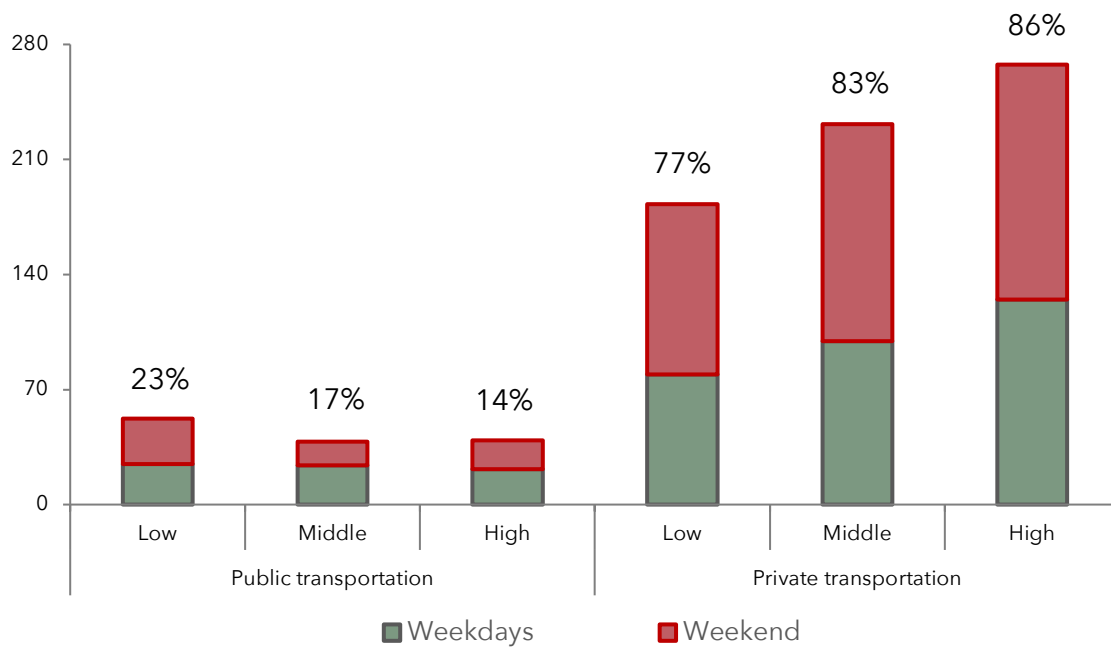

FIGURE 22 – DISTRIBUTION OF PUBLIC AND PRIVATE TRANSPORTATION

Figure 22 illustrates clearly that those with lower income tend to spend more time on public transport and drive less by car compared to middle- or high-class income group. Therefore, we can conclude that making public transportation free to all, will be most beneficial to those with lower income. Before free transportation was announced to the public, a bus or train ticket had an average cost of 2€. Knowing that, we calculated the potentially saved money per year for each income group. Since we observed changes of distribution of public and private transportation between gender, we divided our population into gender groups and found the results as seen in figure 21.

We observe that females with low income benefit the most out of free transportation and would potentially have saved up to 414€ in 2014.
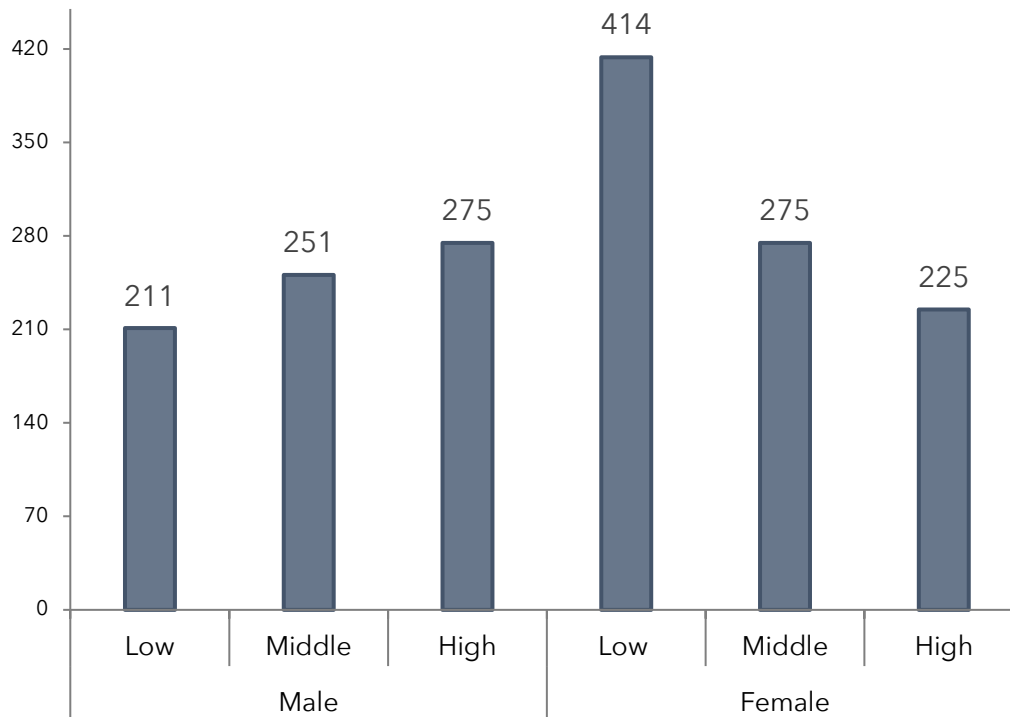

FIGURE 23 – POTENTIAL SAVED MONEY FROM FREE PUBLIC TRANSPORTATION

To figure out if this would lower poverty and income inequalities, we can use multiple methods.

First, we can simply look at the poverty rate before and after including renumeration for free transportation. We found that the poverty rate was 19,46% at the beginning. By adding the saved money to each income class, we got a slightly reduced poverty rate of 19,22%.

To observe income distribution, we analysed and compared the Gini indexes before and after remuneration. The Gini index measures wage inequality where 0 stands for perfect equality and 1 for perfect inequality. In 2014, Luxembourg recorded a Gini index of 0,31565 which is already relatively low. Using the data from our time use survey and adding the potentially saved money from free transportation, we are left with a Gini index of 0,31401. We observe a slight decrease indicating that free transportation would lead to less income inequalities.

Lastly, we can use the Lorenz curve (figure 24) to get a visual representation of the Gini index.
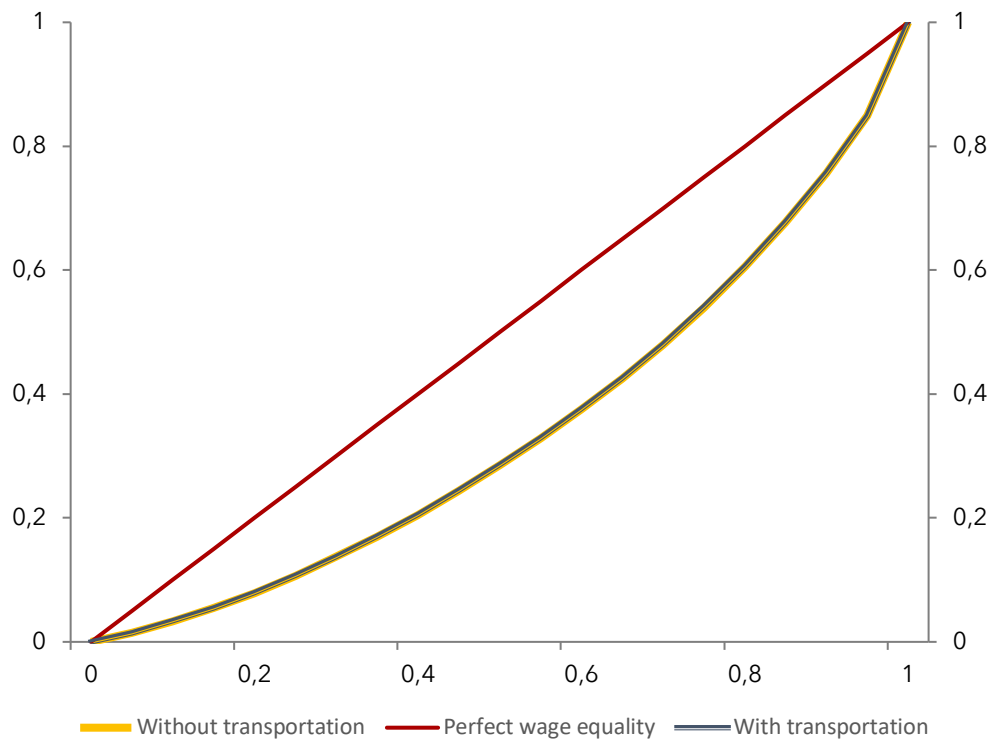
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FIGURE 24 – LORENZ CURVE

Visually, there is no big difference. Yet even a small decrease of wage inequality is an improvement. However, taking the same data as control group might not have been the best approach. We ignore the fact that some might increase their time spend on public transport once it became free. This effect cannot be seen when taking data from a group that wasn't exposed to free transportation. Taking this into account, we might predict much higher and more impactful results.

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Recommendations to the employer

First, I would like to address that it was sometimes challenging to reach my professional supervisor for advice. During my first internship, my professional supervisor managed to check in regularly to see how I progress with the tasks given. Yet, during my second internship I unfortunately didn't observe as many check-ins as I would have preferred. It appeared that my professional supervisor developed enough trust in me as he observed that, during my first internship, I was able to independently deliver good results. Thus, during my second internship, I found myself reaching out for help more often as the consistent approval of my work wasn't present anymore.

Yet, reaching out to my professional supervisor was sometimes challenging. This was partially rooted in the different time periods that we started working in.

Since I receive no financial support from my family, I needed to ensure that my monthly earnings were covered and thus needed to finance myself during the time beyond my internship. As the remuneration for my internship wasn't enough to cover my monthly expenses, I was obliged to work at a second position. Therefore, I started working at STATEC at the earliest possible, i.e., at 6:30, so that I was able to sustain my second job. This implied a decrease in the common time slots available to my professional supervisor and me due to me leaving work earlier than him. Since my professional supervisor started at nine and had most of his days already packed with multiples meetings, it was sometimes challenging to find a period where he was available. This unfortunately left me on my own when facing difficulties or simply feeling unsure with my results.

An example would be my first task given during my second internship. I was told that I needed to collect data similarly to what I've done during my first internship but now for volunteering work. Being confident that my work on household work was correct, I collected data for volunteering work the same way. This was a mistake. As I had to present my results, I was immediately shut off as someone realized that my calculation has not been made for the whole population but only for the population in the survey. This mistake could have been prevented if there were more frequent check-ins. I felt frustrated knowing that the work I've done so far was for nothing and that I had to start over.

Therefore, my recommendation would be to provide the intern with a time sheet where she/he knows when she/he can come by the office to check in on the work. I went by the office multiple times per day just to check if the door was open or shut. I knew that when the door was shut, my professional supervisor would be in a meeting or out of office. And most of the time when I passed by, the door was shut. Nonetheless, I must not forget to praise that whenever my professional supervisor was available, he was open to take time for my questions and answer to them in a good and detailed way.

Additionally, I'm grateful for the opportunity but I found it very intimidating that I, as an intern was responsible for an official presentation that was held in front of other departments. At the beginning of my first internship, I was told that I had two weeks to prepare a presentation on household work in order to convince the MAC department that it is necessary to consider household work for satellite accounts. As I just started my internship, I felt overwhelmed as I knew little to nothing about the topic. During those two weeks I worked overtime to ensure that the presentation is ready for the deadline. At the end it was a big success. Nonetheless, it was shocking news when I was first given the task.

A similar opportunity was given to me for my second internship. During my first week I was given the task previously mentioned for volunteering hours. After correcting my mistake and showing my results, I was told that I needed to prepare a presentation on this topic for the following week. I really appreciated the opportunity but would have liked it if someone gave me more precise directions on what was expected or at least gave me a bit more time so that I can familiarize myself with the topic. I felt that I needed to jump straight into the topic and had no time to expand my knowledge on this before I needed to hold the presentation in front of the people that had been working on this topic for months. Working under said pressure may be something what is asked from an employee. Yet, as an intern, I suppose that we are trying to impress to possibly get a job offer which further increases the pressure to deliver something flawless.

And lastly, there is an issue with car parking. During my first and my second internship I asked for a parking lot. I know that coming by car might be a privilege to some, but I had no choice as I needed to be flexible and quick due to my second job next to my internship. I couldn't afford to lose more time by taking the bus and needed to go from one place to another in the shortest time possible. As I later found out, I now understand that the parking situation isn't a light topic for employees at STATEC. Some employees are still waiting to get a parking lot as the space is limited. Yet even though someone explained the situation to me, I still feel like the system isn't the right one. Apparently the whole STATEC team is sharing one floor with the neighbouring building. However, there are two whole floors just for visitors. Keep in mind that visitors include external employees of STATEC that are just coming by for a short time, usually not over 90 minutes. Giving visitors more than twice the amount of space than employees is, in my opinion, not the correct choice, especially since employees will spend up to 12 hours per day in the office while visitors are leaving after 2 hours at the latest. I'm not complaining that I didn't get a parking lot, but rather that the parking situation for employees is not the best one.

As for company-wise criticism, I would suggest adding a mix of online and paper surveys as it would reduce travel costs for collecting the paper survey. I can envision an app

specifically created for STATA surveys where people can log in with their given identification number and then answer to the survey even when they are on the go. This would make it easier for selected individuals to record their daily actions as they can freely record every action on the run which further reduces the chance of them forgetting to record it at all. People are increasingly spending their time on their phone. Therefore, making surveys available through an app would also increase the participation rate. Paper surveys can persist for those who do not wish to record everything online. Still, it would reduce the cost of travelling since the number of individuals who do have a paper survey will be reduced.

As for the interview, it would be advised to offer both a personal and a telephone interview. Offering people multiple options will make them more prone to take part in the survey as they feel like they have a choice. This would also increase the participation rate for those who are super introverted and/or fear of being around people. People with high social anxiety might not answer when they know that someone is ringing on their door for a face-to-face survey. To reduce the rejection rate for those who suffer from social anxiety, it would hence be advised to offer a telephone interview instead of a face-to-face interview.

References, disclaimers, acknowledgements

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Disclaimer

I hereby declare that I am the sole author of the work entitled and here enclosed, and that I have compiled it in my own words, that I have not used any other than the cited sources and aids, and that all parts of this work, which I have adopted from other sources, are acknowledged and designated as such. I also confirm that this work has not been submitted elsewhere.

Acknowledgements

Things to do and to avoid

My internship as an EMOS candidate helped me to achieve my goal to experience working at a huge statistical institution. This internship gave me an inside view on how to make use of econometric models that I have seen at university which further elaborated my interest in those topics. I had the opportunity to use my mathematical skills to tackle socio-economic issues such as wage inequalities. For those who are interested in econometrics and statistics, I would without a doubt recommend enrolling to the EMOS program since it enables the opportunity to gain a lot of knowledge and experience.

One downside of the EMOS program would be related to the organization. I had to contact Marc Pauly, who is responsible for the EMOS program, my professional supervisor, Guillaume Osier as well as the student counsellor, Nadège Meyer-Hamy multiple times in order to finalize the contract for my second internship. I started contacting Guillaume Osier and Marc Pauly around October 2022 in order to get a confirmation for my research proposal. At the end of October, an online meeting was proposed by Guillaume Osier in order to discuss the possible options we might go for in my second internship. I was very pleased that I got a quick answer to my first approach.

Yet, the following approaches were not handled as fast as the previous one. Shortly after the online meeting, I contacted Nadège Meyer-Hamy and Marc Pauly to finalize the contract for my second internship. I filled out the form handed to me but then was left with no answer from Marc Pauly for three months. Only in February, all EMOS students were contacted and asked to provide Marc Pauly with time slots and research topic. As I already discussed this with my professional supervisor, I immediately sent the confirmed internship date as well as the research topic. Additionally, I kept asking for the final contract and verified that I had sent all the necessary information. The only answer I received was that it would arrive soon. The contract was handed to me mid-April, two weeks after my internship had started and seven months after my first approach to finalize the contract. The constant fear of being left with no internship grew as I was waited for months with no answer. I would have preferred to get a small note of approval from Marc Pauly so that I would have known that my position at my internship was secured.

Appendix

The household

Please enter the relationship between each member of the household in the matrix below using the following codes:

1 – Partner / Spouses

2 – Son / Daughter / Step-son / Step-daughter

3 – Son-in-law / Daughter-in-law

4 – Grandson / Granddaughter

5 – Father / Mother / Father's spouse / Mother's spouse

6 – Father-in-law / Mother-in-law

7 – Grandfather / Grandmother

8 – (Half) Brother / (Half) Sister

9 – Other family ties (Uncle, Niece)

10 – No family ties

	REFERENCE PERSON	2ND PERSON	3RD PERSON	4TH PERSON	5TH PERSON	6TH PERSON
REFERENCE PERSON						
2ND PERSON						
3RD PERSON						
4TH PERSON						
5TH PERSON						
6TH PERSON						

Personal information

	REFERENCE PERSON	2ND PERSON	3RD PERSON	4TH PERSON	5TH PERSON	6TH PERSON
GENDER						
- Male						
- Female						
AGE TO DATE						
MARITAL STATUS						
- Married						
- PACS						
- Single						
- Widower						
- Divorced						
NATIONALITY						
LABOUR FORCE STATUS						
- Employed						
- Unemployed						
- Retired						
- Student						
MONTHLY INCOME						
CURRENT EDUCATION LEVEL						
- Primary						
- Secondary						
- Professional training						
- Master's degree (short duration)						
- Bachelor						
- Master						
- PhD						
- Other						

Household work

All questions are to be answered by taking the average hours spent per day.

	REFERENCE PERSON	2ND PERSON	3RD PERSON	4TH PERSON	5TH PERSON	6TH PERSON
KITCHEN WORK						
- Cooking						
- Baking						
HOME MAINTENANCE						
- Cleaning						
- Tidying up (making the bed, putting away children's toys, …)						
- Storing the groceries						
- Taking out the trash						
- Other						
CREATION AND MAINTENANCE OF TEXTILES AND FOOTWEAR						
- Washing or ironing						
- Knitting or crochetting						
- Reparing clothes						
- Shoeshining						
- Other						
GARDENING						
- Planting vegetables, fruits, herbs or flowers						
- Law mowing						
- Maintenance of outdoor plants						
- Maintenance of indoor plants						
ANIMAL CARE						
- Taking your pet for a walk						
- Taking care of your pet						
- Other						

	REFERENCE PERSON	2ND PERSON	3RD PERSON	4TH PERSON	5TH PERSON	6TH PERSON
CONSTRUCTION, REPAIR AND DIY						
- Major construction and renovation works						
- Interior design						
- Reparing objects						
- Car related maintenance						
- Moving out						
- Other						
CHILDCARE						
- Physical care (bathing, feeding,…)						
- Watching children						
- Helping with school homework						
- Playing with or reading to children						
- Mental care						
- Accompanying children somewhere						
ADULT CARE						
- Watching and taking care of dependent adults						
- Accompanying an dependent adult somewhere						
- Other						

Volunteering

All questions are to be answered by taking the average hours spent per day.

	REFERENCE PERSON	2ND PERSON	3RD PERSON	4TH PERSON	5TH PERSON	6TH PERSON
VOLUNTEERING						
- Social sector						
- Arts, culture or entertainment sector						
- Sports associations						
- Political sector						
- Sector of youth organizations						
- Unspecified volunteer						
DIRECT VOLUNTEERING TO OTHER HOUSEHOLDS						
- Childcare						
- Home maintenance						
- Construction or repair work						
- Shopping						
- Caring for the elderly or dependent						
- Gardening						
- Pet care						
- Other						
PARTICIPATION IN MEETINGS OR ORGANIZATIONAL EVENTS						
- Political organization						
- Cultural organization						
- Social organization						
- Youth organization						
- Religious organization						
- Other						

Transport

All questions are to be answered by taking the average hour per day.

	REFERENCE PERSON	2ND PERSON	3RD PERSON	4TH PERSON	5TH PERSON	6TH PERSON
PUBLIC TRANSPORT						
- Bus						
- Train						
- Tram						
- Other						
PRIVAT TRANSPORT						
- Car						
- Motorcycle / Scooter						
- Bike						
- By foot						
- Other						

Company Evaluation

Part 1: Acknowledgement of the Applied Master Thesis

Student surname and first name: Coimbra Laetitia

Company: STATEC

Department: SOC – Social Statistic

Period of internship: from 03/04/2023 to 31/06/2023

Professional supervisor surname and first name[2]: Osier Guillaume

Appraiser (professional supervisor)

We have received and read through a draft or final version of the Applied Master Thesis prepared by the student and have released it for submission to the University

          x

YES   NO   -

Internship and applied master thesis performance evaluation

Please give a grade out of 20 (10 is the average) for the internship according to this appraisal. Your grade is equal to 45% of the final grade.
Grade: 15 / 20

Professional supervisor first name and surname

Guillaume OSIER

Date: 11/07/2023   Signature of the professional supervisor:

Guillaume Osier

Digitally signed by Guillaume Osier
Date: 2023.07.12 11:39:03 +02'00'

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[2] Information known at the stage of the signed internship agreement

Part 2: Assessment of competencies and performance

Strengths and weaknesses of the Intern
Principal strengths of the Intern (minimum 2):
Strong interest in social statistics
Serious and rigorous in her work
Good knowledge of statistical techniques, particularly survey sampling techniques
Areas for further development (minimum 2)
Stronger practice in statistical software tools such as Stata or R
Should be useful for the intern to acquire better knowledge of certain techniques which are increasingly used in Statistics Offices, particularly statistical learning methods (Lasso regression, decision trees, machine learning techniques etc.)

A=Exceeded expectations

B= Met expectations

C= Improvement needed

D= Did not meet expectations

NA = Not applicable

Commitment / work ethic					
	A	B	C	D	NA
Reliability: punctuality, availability, diligence		X			
Sense of responsibility: accepts the consequences of his/her actions		X			
Motivation: perseverance, drive		X			
Flexibility: adaptability, multi-tasking ability		X			
Pro-activity: innovation, improvements, problem-solving		X			
Comments:					

Professional skills					
	A	B	C	D	NA
Quality of work: self-management, discipline, critical mind		X			
Quantity of work: self-management, discipline, critical mind		X			
Technical skills - Technical knowledge - Global knowledge of files and client relationships			X		
Multi-tasking ability		X			
Organisation: respect of deadlines, time management		X			
Efficiency / productivity		X			
Commercial behaviour (with clients)					X
Comments: Practice of STATA needs to be improved					

Relationships and communication with others					
	A	B	C	D	NA
Relationship with colleagues: team spirit, cooperation, sharing of information		X			
Relationship with managers: trust, respect, acceptance of constructive criticism and advice, ability to report to the supervisor		X			
Relationship with Associates: trust, respect, acceptance of constructive criticism and advice, ability to report to the supervisor		X			
Relationship with clients: quality of relationship, presentation, listening, public relations					X
Communication: diplomacy, persuasion, listening and presentation		X			
Language skills in main language: fluency and quality of written and spoken expression	X				
Comments:					

Part 3: General Comments

We would be grateful if you could provide general comments based both on the internship experience and the Applied Master Thesis provided. Note that the Applied Master Thesis itself will also be read by the academic supervisor.

General comments on the internship and the Applied Master Thesis	I'm quite satisfied with the work of the intern, who has shown great interest in official statistics, particularly in the field of social surveys as carried out by STATEC's Social Statistics Department.