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The Gendered Impact of COVID-19 in Rural Kenya

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Statement of Originality

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Abstract

This paper explores the difference in effects of COVID-19 between men and women in low-income households in rural Kenya. It investigates whether the gender gap has widened, as it has done in urban areas in western countries or has narrowed like in previous recessions. By using financial data obtained from weekly household interviews conducted throughout 2020, this research examines how wages, consumption and net savings have changed due to the pandemic. The main findings entail that income fell significantly for both men and women in the first four months post-lockdown, but relatively less for women than for men. The number of men and women with an income below the poverty line has increased. Expenditures have dropped for men by 34.46% and for women by 28%. As food expenditures dropped and saving behavior has not changed, this report concludes that the respondents did not have enough savings to smooth over their consumption. In the long term, the income of women in a household is more responsible for household expenditures on business and transport, but in the short term, it does not matter. There is statistical evidence that women work more if the men in their household earn less. However, this effect is minuscule and not economically meaningful.

Contents

CHAPTER 1

Introduction

Between February and April of 2020 (the first months of the COVID-19 pandemic), the unemployment rate of women in the US increased by 12.8 percentage points, whilst for men, the unemployment rate increased by 9.9 percentage points (Alon et al., 2020). During the Great Recession, employment for men had declined by 8.2%, whilst for women it was a decline of 3.9% (Sahin et al., 2010). The reason why this pandemic recession differs from previous recessions is due to social distancing. In regular recessions, men's employment is affected more acutely (Alon et al., 2020; Albanesi and Kim, 2021). Thus, it was necessary for women to join the labour force to compensate for the loss of her husband's income. In turn, this reduces the gender wage gap by two percentage points (Alon et al., 2020). However, the industries most affected by the pandemic were the catering industry, hospitality and travel. These are services where women have a high employment share. Moreover, these are all services with high contact and inexecutable with social distancing, thereby increasing the gender wage gap by 5 percentage points (Alon et al., 2020).

Not only has the gender wage gap increased, but the number of people living below the poverty line has also increased (Bundervoet et al., 2021). During the Great Recession, developing economies continued reporting growth, whereas the number of people living in extreme poverty grows during the current pandemic.

Although the pandemic only started last year (2020), there has already been a large amount of research done on its impact. Most of these papers have been about the wage gap, as women started working less (Collins et al., 2021) and losing their jobs more often than men (Alon et al., 2020; Albanesi and Kim, 2021). Not only have the wages been affected by COVID-19, but people's consumption behaviour has also changed. The consequence of the industries closing due to COVID-19 is that consumption in these sectors declines as well (Hodbod et al., 2020). As primarily women work in the affected sectors, the drop might cause the gender wage gap to grow.

Past research indicates that COVID-19 has a significant impact on wages and consumption in western countries. However, the COVID-19 pandemic may even have a larger impact on

developing countries (Buheji et al., 2020). The measures taken to protect citizens from the virus could deprive people who are already living with an income below the poverty line of minimal survival necessities. Countries where the majority live off a day-to-day income question how workers will make a living (Buheji et al., 2020). Bundervoet et al. (2021) report that income losses in developing countries have been significant due to the lockdowns and stay-at-home orders. Nonetheless, low-income countries report lower job losses (Bundervoet et al., 2021). The reason being that employment in low-income countries is dominated by self-employed work such as small businesses and agriculture. However, Bundervoet et al. (2021) also find that women in developing countries were significantly more likely to become unemployed post-COVID.

As the pandemic will have an impact on income, it is natural to assume that expenditures will also change. In developing countries household expenditures are linked to the gender composition of the household (Case and Deaton, 2003). Certain categories of expenditures will depend on either the men or the women in a household. If the income of either the men or the women in a household drops, it is important to see how this gender composition changes.

To broaden the knowledge of gender gaps and COVID-19 in the developing world, I will investigate gender differences in rural Kenya. This research will use data on households surveyed in the counties Kakamega and Kisumu in Kenya. The respondents were interviewed weekly and were asked, among other things for their financial transactions and health information. The baseline interview contains their socio-economic information. As data collection started pre-outbreak and the interviews were with the same people every week, an extensive report can be made to investigate these gender differences. The financial transactions will show whether income has dropped since the pandemic and as a result if people reduced their consumption. I will investigate how COVID-19 has impacted wages, consumption and net savings by comparing income, expenditures and net savings in the months following the COVID-19 outbreak to prior to the outbreak.

Previous literature finds that the pandemic had a harsher impact on women than men. Literature based on how the pandemic affected developing countries indicates that the number of people in extreme poverty has increased. The same findings might hold for rural Kenya. To investigate this, this research regresses the months following the lockdown in Kenya on income. The same will be done for expenditures and net savings. As other variables impact income, expenditures and net savings, the original model will be estimated in two additional ways. One where the variables I predict affect income, expenditures and net savings will be added, and one where the original model is estimated with individual fixed effects so that all time-invariant variables are held constant. Furthermore, this research will investigate whether women will work if men in their household earn less. Lastly, I will investigate whether household expenditures depend more on women or men in a household.

The main findings are that income has dropped significantly for men and women but relatively less for women than for men. For the different categories of expenditures, this research finds that transport and education have a larger expenditure drop for women than for men. Total expenditures decreased by 34.5% on average for men after the lockdown and 28% for women. Most of the respondents did not have any savings pre-lockdown. Thus they were not able to use their savings when their income dropped to keep up with their food consumption. These findings differ from the literature in the sense that the drop in income was relatively smaller for women than for men The difference between men and women's changes in expenditures is not significant, whilst previous literature found that especially reduced their consumption.

Moreover, this analysis finds that if the income of men is less, then women work more. This finding is statistically significant, but the coefficient is very small, thus barely economically significant. Lastly, it does not matter which income has a larger effect on household expenditures in the short run. In the long run, the categories business and transport depend more on women's income in a household.

This paper is organized as follows. The next chapter presents previous literature on this topic. Chapter 3 describes the data this research uses and chapter 4 the methodology based on this data. Chapter 5 presents the results. Lastly, chapter 6 discusses the findings and draws conclusions.

CHAPTER 2

Gender Differences and the Impact of COVID-19

This section will give an overview of past literature regarding the responses of economic shocks (including the COVID-19 pandemic) on people. Firstly, this section will be about how wages were affected and the difference between the current pandemic recession and previous recessions. Next, we will move on to how consumption and saving behaviour has changed due to the pandemic. Finally, this section will provide insight into how COVID-19 has impacted developing countries.

Bryan and Longhi (2018) study the effects of labour supply responses of couples in the UK. The authors use quarterly data of the years 1992–2011 containing household characteristics. They find that in households with working men and non-working women, women are more likely to start looking for a job if their partners unexpectedly become unemployed. The authors do this by looking at the number of women that is inactive at time $t-1$ and estimating the probability that a woman will join the workforce at time t (during the recession). They estimate this by using the first difference of the woman's activity status and two dummy variables indicating whether the partner lost their job or not and whether there was a recession at the time or not. For dual-earner households, Bryan and Longhi (2018) state that women increase the number of working hours during a recession if their partner loses their job. They investigate this by estimating the difference in the number of paid hours using the dummies indicating whether the partner lost their job or not and whether there was a recession at the time or not. Both these estimations were done with OLS. Addabbo et al. (2013) also investigate the decision of women to join the labour market during a recession, focusing on Spain. They test whether there was an added-worker effect (AWE), meaning that there is actually an increase in labour supply during an economic shock, or a discouraged-worker effect (DWE), which is the opposite. Unlike the research of Bryan and Longhi (2018), they use a Probit model to estimate the probability that an individual will join the labour force. Similar to the previously mentioned research, they use their partner's employment status as a regressor, but also incorporated the imputed wages, age, education, whether the individual has children, is chronically ill and whether their partner is

self-employed or is working part-time. Instead of using a dummy for the presence of a recession, Addabbo et al. (2013) estimate this probit model during the Great Recession and compare it with labour supply behaviour before the recession. They find an increase in labour supply of 21% by women if their partner was unemployed and a labour supply increase of 0.7% of men married to unemployed women.

The previous paragraph shows signs of reduction of the gender wage gap. Comparing this to the current pandemic recession, Collins et al. (2021) investigate the employment changes for dual-earner households in the US where both parties were able to work from home. They estimate the number of working hours in the past week by using February, March and April 2020 as independent variables to capture the changes in work hours in those months. The authors find that for parents with younger children, the mother's working hours were reduced by 4.5 times more than the father's. Alternatively, Albanesi and Kim (2021) classify the occupations by whether they are flexible or not and whether they are high-contact jobs or not. High-contact (flexible and inflexible) jobs have a significantly larger share of women than men, explaining the unemployment rate increase of women during the pandemic recession. For flexible (inflexible) and low-contact occupations, the share of women is 49% (17%). Furthermore, for flexible/low-contact occupations, they find that the rise in unemployment is similar for men and women, with about 1 percentage point lower for women than for men. For inflexible/low-contact occupations, employment status was compared to a year prior. Albanesi and Kim (2021) state that women's employment declined by 42%, whilst it was 25% for men. Thus, signs of the gender wage gap increasing are showing during the current pandemic recession.

Moving on to consumption behaviour changes, Hodbod et al. (2020) use survey data of five European countries to study whether consumption changed when some of the restrictions were relieved compared to before the pandemic. The data covered the tourism, hospitality, services, retail and public transport sectors. They performed a probit regression to estimate whether people would consume less in a specific sector controlling for age, gender, household size, income, employment status, education level and some behaviour factors. This analysis leads to finding that consumption dropped between 38% to 66% depending on the sector. Confirmed by Bounie et al. (2020), who use transaction and bank data from France. They observe a decrease in expenditures of 50% since the first lockdown from mid-March to mid-May. If consumer preferences change after the pandemic, saving firms in the sectors people would consume less in will cause an imbalance in unemployment (Hodbod et al., 2020). The results of Hodbod et al. (2020) show that the sector hospitality (including the catering industry) had a decline in consumption of 55%. Moreover, 66% of the people stated they would travel less, 46% indicated they would consume less in the retail sector. Finally 38% of the households would visit services such as hairdressers and beauty salons less. These are all female-dominated sectors, making COVID-19 have long-term effects on the gender gap in the labour market (Alon et al., 2020).

Not only is there a gender gap in the in the labour force, but Hodbod et al. (2020) also find that the drop in women's consumption, compared to pre-pandemic, is consistently larger than that of men in all sectors. Dang and Nguyen (2021) analyse the impact of COVID-19 on gender inequality in income, employment, savings and expenditure consequences. The authors used survey data conducted in April 2020 from six countries (China, Italy, Japan, South Korea, the UK and the US) with different income levels. After regressing economic outcomes, including increased expenses and increased savings on the female variable, they find that women tend to reduce their consumption and increase their savings. This may be explained as the survey also indicated that women expected their income to fall 50% more than men in the next six months and therefore want to be prepared (Dang and Nguyen, 2021). In addition, the fact that women are more risk averse than men (Croson and Gneezy, 2009) could also explain this outcome (Dang and Nguyen, 2021).

Measures such as lockdowns that have been taken due to COVID-19 have a different impact on developing countries and developed countries (Buheji et al., 2020). Since 1990 the number of people in extreme poverty has been declining, yet Sumner et al. (2020) predict that the COVID-19 pandemic will cause the trend to go upwards again. Many countries in sub-Saharan Africa had to block all social and economic activities. Buheji et al. (2020) state that taking such measures in countries where the majority of the people survive on a daily income could have a harmful impact. A large part of the people in developing countries work in agriculture (Deaton, 1997). This means that their living depends on external effects such as the weather, natural calamities, sickness and price fluctuations of their crop. Therefore, it is important for people in low-income countries to separate consumption from income so that these external effects do not have such a large impact (Deaton, 1997). High-income countries have been able to provide their citizens of relief and stimulus. However, governments of developing countries do not have the fiscal space to provide such relief (Bundervoet et al., 2021). The impact of this for low-income households is more severe, as they might not be able to smooth their consumption due to the lack of savings.

Paxton and Zhuo (2011) use saving and development data from Mexico to analyse how savings are impacted by economic shocks. From their regression analysis, they find that savings and economic shocks have a positive relation. When an interaction term between wealth and shock is added the relation becomes negative. This implies that poorer households start saving after a shock to take precautionary measures, and wealthier households start using their savings to smooth their consumption (Paxton and Zhuo, 2011).

Bundervoet et al. (2021) research the short term effects of COVID-19 on households in developing countries. The data consists of indicators such as job loss, income loss and food insecurity of households from 34 countries conducted by phone surveys during the pandemic. After regressing respondent characteristics, including gender on the indicator of choice, they find

that the pandemic has a larger impact on those who already have a disadvantage in the labour market. Women were significantly more likely to lose their job. They find that 42% of women lost their jobs on average, whilst for men it was 32%.

Mahmud and Riley (2021) examine household responses to economic shocks. Their study focuses on how COVID-19 has impacted rural Uganda. Using phone surveys, the authors have data on 1075 households from 114 villages in Kagadi and Kyenjojo in Uganda. Two surveys were conducted, one pre-lockdown (baseline survey) and one post-lockdown (follow-up survey). The authors analyse this by regressing the variable indicating whether it was the post-lockdown survey or not on the variable of interest. When the variable of interest is income, the results show that there was a large drop post-lockdown. Labour wage income and business profits decline with over half their pre-lockdown value. 21% of the people in the survey owned a business at the baseline survey. 70% of the businesses were closed during the follow-up survey due to the pandemic. Mahmud and Riley (2021) state that the fall in income has led to a decline in expenditures as well. Food expenditures declined by about 40%, and 50% more of the people reported hunger post-lockdown comparing to pre-lockdown.

Janssens et al. (2021) investigate income and expenditure loss due to COVID-19 in rural Kenya. The data is from a weekly household survey that started in December 2019 and continued during the COVID-19 pandemic over the phone. The households are situated in Kakamega and Kisumu counties, and the data contains baseline socioeconomic and health information The weekly data includes income from work and the expenditures were categorised into food, education and transportation subgroups. By testing for significant differences between the mean pre-COVID and the weeks post-COVID using household fixed effect regressions, the authors find that income from work declined up to 666 Kenyan shillings towards the end of April. The overall expenditures declined up to Ksh 569. The food expenditures remained the same. However, household expenditures on education and transportation did decrease. This was anticipated as schools closed and travel restrictions were implemented. Janssens et al. (2021) also find that during the COVID-19 pandemic, households deposited fewer savings as their income declined. The data also showed that households withdrew less savings, trying to protect the savings they still had left. The level of savings withdrawn seemed to be independent of the level of savings. The potential explanation is that households that already had saving habits could hold on to their savings better at the beginning of the pandemic (Janssens et al., 2021).

CHAPTER 3

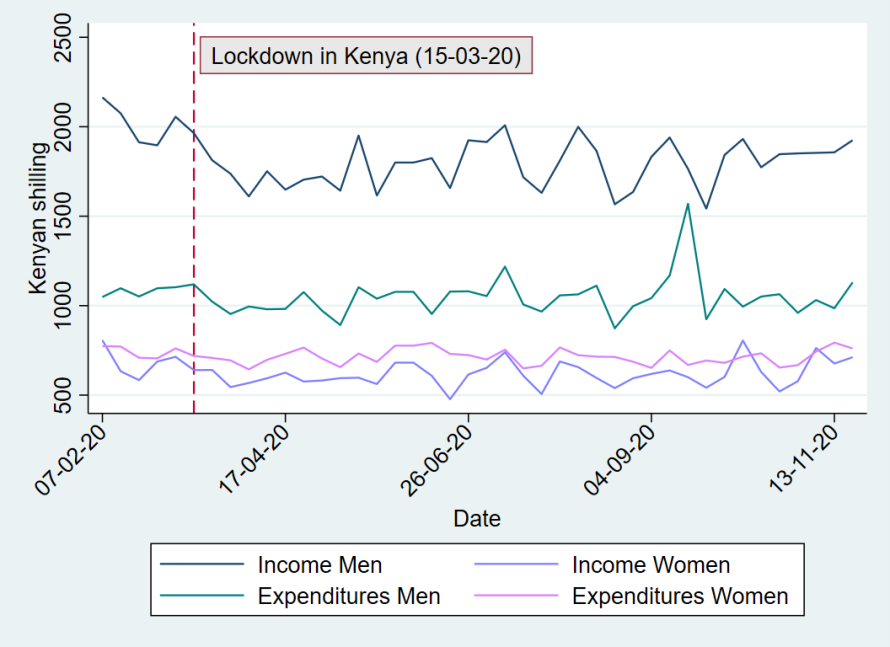
Data

3.1 Description of the data set

This research will use the same data as Janssens et al. (2021). This is data from the Financial and Health Diaries study. This study has tracked low-income households weekly in the counties Kakamega and Kisumu in Kenya. Originally, this data was meant to study the impact of providing health insurance using mobile technology (i-PUSH) and how it improves health outcomes, access to healthcare and financial protection for low-income women and their family members. Data collection started in December 2019 and continued until the week of the 20th of November 2020. After the COVID-19 pandemic started, the weekly interviews of the members in the household were privately conducted over the phone. These interviews were with the same people every week. As the COVID-19 outbreak happened soon after the data collection started, Janssens et al. (2021) have also been able to provide insight on how COVID-19 has impacted low-income households in rural Kenya. Each household in the study population includes either a pregnant woman or a mother with children below the age of four. The data contains 437 men and 627 women and their demographic, socioeconomic and health information. Financial transactions such as income, expenditures and savings were recorded as well. Income from labour is not the only source of income. Individuals also receive gifts and remittances from household members and non-household members. Expenditures were categorized into business expenditures, expenditures on food, health, transportation and education. The data set contains people starting at age 12. As these will not give a good representation for an analysis on income, expenditures and savings, I will only look at the individuals starting at age 18. After removing this, the data set contains 494 women and 328 men.

Figure 3.1 shows the trend of the mean income and expenditures for men and women for each week. Week 1 starts in the first week of December 2019. Around week 8 there is a peak in both categories. Janssens et al. (2021) state that this is due to Christmas and New Year break. This would increase the average of the pre-COVID period and thus the authors left it out of their analysis. I will do the same and start the analysis from the first week of February 2020.

Figure 3.1: The overall trend of income and expenditures per week for men and women



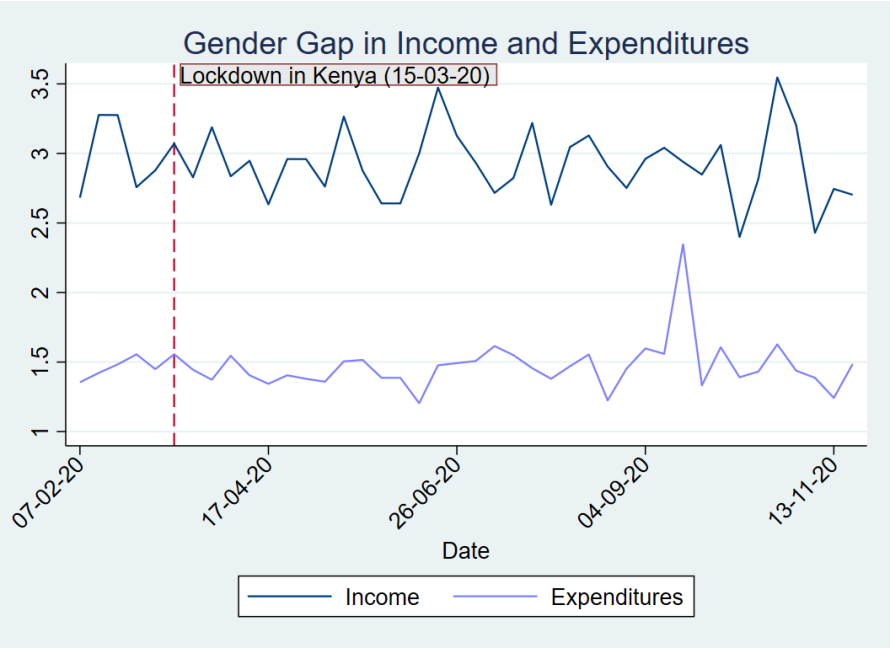
Note: The red vertical line indicates the week of the lockdown. The data continues up until week 51 which is the week of the 20-11-20. These are weekly finances and the poverty line is in months.

Figure 3.2 shows the gender gap of income and expenditures expressed in the following way

$$\frac{\text{Income Men}}{\text{Income Women}} \text{ and } \frac{\text{Expenditures Men}}{\text{Expenditures Women}}$$

Thus, if men earn more or spend more this coefficient will be larger than 1 and vice versa. The figure shows that men's income throughout the year is at least twice as large as women's on average. Men also spend more on average, but this gender gap is smaller than that of income.

Figure 3.2: The gender gap in income and expenditures



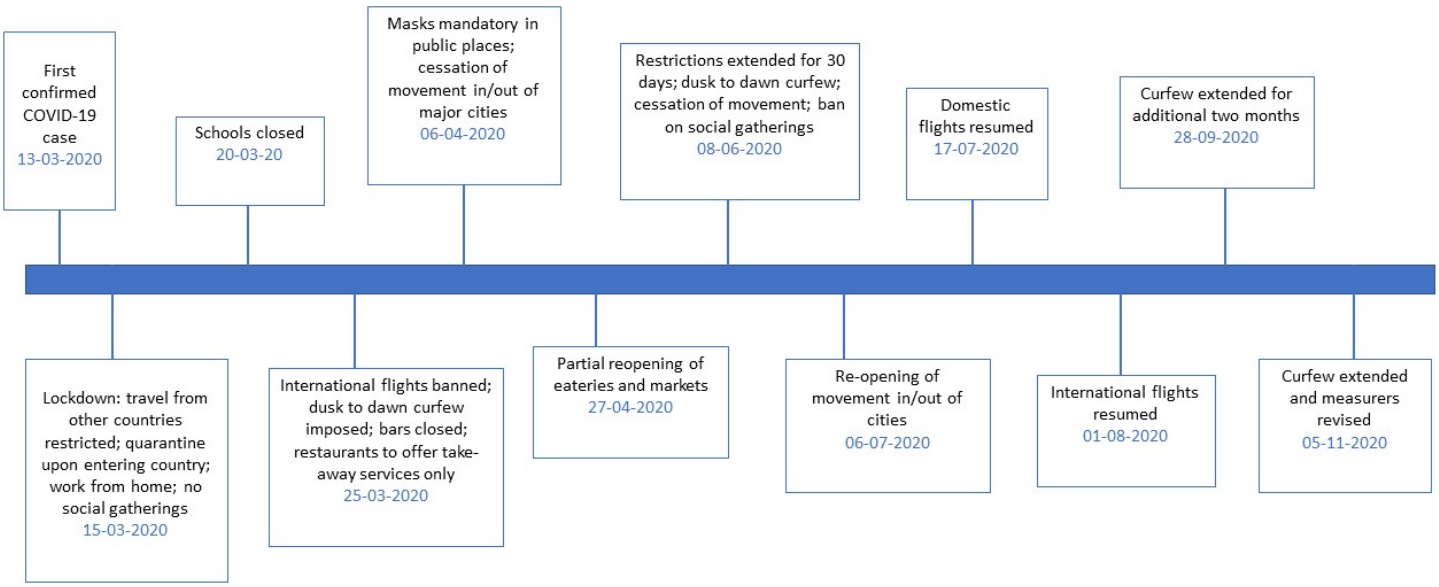
Note: The red vertical line indicates the week of the lockdown. The gender gap is calculated as follows: $\frac{income\_men}{income\_women}$, and the same way for expenditures.

Figure 3.3 shows a timeline of the events related to COVID-19 in 2020. The first COVID-19 case in Kenya was detected on March 13, 2020. All workers were ordered to work from home on March 15. On March 20 all schools closed and remained so for the entire time period of the data set. March 15 is indicated by a dashed red line in Figure 3.1. We can see that around that week, the mean income declines for men, and it is unclear for women.

Furthermore, the currency used in Kenya is the Kenyan shilling. At the time of this research, 100 Kenyan shillings is equivalent to 0.76 Euros. It is important to note that the poverty line in 2020 is Ksh 3252 per month (Elezaj et al., 2020). With this information I find that 46.04% of the men in the data set and 78.54% of the women have a monthly income below the poverty line pre-lockdown [1].

[1]Note that the poverty line is constructed on the basis of households' adult equivalent consumption (Elezaj et al., 2020). In this report I compare the respondents monthly income to this poverty line.

Figure 3.3: COVID-19 timeline Kenya



Note: Information up until August 2020 was obtained from Jakubowski et al. (2021), the remaining information is from various news articles from GardaWorld (2020). For this thesis it is also important to note that schools remained closed throughout 2020.

3.2 Representativeness of Survey Data

The data set contains individuals from rural areas in the counties Kisumu and Kakamega in Kenya. Janssens et al. (2021) have provided a table comparing descriptive statistics of their data set and descriptive statistics of Kisumu, Kakamega, and Kenya from the Kenya Integrated Household Budget Survey 2015/16 (this is Table 1 of Janssens et al. (2021)). As the study had some requirements to be in the sample, the study sample contains more people with young children and fewer elders than the sample from KIHBS. This is likely also the reason more heads of the households in this sample are married. Moreover, the study sample has fewer farmers, is slightly better educated, and contains more people that do casual labour than the sample from KIHBS. As I will remove people younger than 18 from the data set, the mean age in my sample size will be slightly higher.

CHAPTER 4

Methodology

4.1 Descriptive Statistics

Figure A.1 and Figure A.2 also show the trend of income of men and women throughout the weeks and what share is from income from work and what share is from non-labour income. A notable observation is that the income of women has a much larger share from non-labour income. This entails gifts and remittances from non-household members. In contrast, the income of men does not depend as much on these remittances.

Figure A.3 gives insight on how expenditures have changed over the weeks. Business expenditures entail whether the individual has spent money on their own business. It is clear to see that men spend more on their business than women. For the other categories, it is more ambiguous whether there is a gender gap in expenditures. Furthermore, there are no apparent decreases in expenditures due to COVID-19 to be seen in the graphs. Slight declines after week 15 were then picked up again a few weeks later.

Figure A.4 shows the gender gap in the different categories of expenditures. The gender gap is calculated as follows:

$$\text{Expenditure Gender Gap} = \frac{\text{Expenditures Men}}{\text{Expenditures Women}}$$

for all categories of expenditures. The graph shows that indeed men spend more on their business than women. This could be because men are more responsible for larger expenditures for their businesses than women. Food expenditures seem to lie slightly under the value 1, implying women spend more on food than men. The other categories fluctuate a bit more, with men mostly spending more than women in most weeks.

Table 4.1 shows the share of men and women for a particular occupation. The data set contains many women with no occupation, but most of them do have an income, implying that they do receive gifts and remittances. The table shows the education level of the respondents. The respondents were asked to either answer their highest grade completed or the highest

grade attended. The percentages in the table represent the combination of those two answers. Moreover, the table shows the mean number of women and men in a household, the average age of the men and women in the data set and their average income, savings and expenditures pre-lockdown.

	Occupation share					
	Employment	Business	Farmer	Casual	Other	
Men	31.7%	44.5%	25%	39.6%	18.9%	
Women	11.33%	27.32%	13.2%	14.78%	3.8%	
	Education Level share					
	Pre-primary/Nursery	Primary	Secondary	Diploma	University Undergraduate	University Graduate
Men	0%	50.61%	21.64%	3.96%	0.91%	0.61%
Women	0.2%	50.4%	24.69%	2.83%	0.4%	0.2%
	Household survey participation			Age at week 10		
	Mean	Min	Max	Mean		
Men	0.82	0	3	35.14		
Women	1.235	1	4	30.84		
	Income (pre-lockdown)	People with income	People with savings			
	Mean	Percentage (pre-lockdown)	Percentage (pre-lockdown)			
Men	2011.44	92.68%	18.6%			
Women	677.61	67%	20.04%			
	Mean Expenditures pre-lockdown					
	Business	Food	Health	Transport	Education	
Men	499.88	421.64	26.38	42.50	95.62	
Women	135.93	455.14	15.84	44.28	88.77	

Note: Household survey participation indicates the number of people in a household that is participating in the survey. The mean income is the average of the six weeks pre-lockdown available in the data set. The same calculation is done for the mean expenditure categories. These are in Kenyan shillings. The percentage of people with an income is the people with an income higher than zero divided by the total amount of people. This income is income from work, thus not with gifts and remittances. A similar calculation is done for people with savings.

Table 4.1: Descriptive Statistics

4.2 Statistical Analysis

This section will illustrate the analyses that this research will perform. Firstly, this section will show an analysis on how income, expenditures and savings have changed since the lockdown. Secondly, this section will present a model to study whether women work more, if the men in the household earn less. Lastly, the section will show an analysis on household expenditures and whether women's or men's income is more responsible for a certain category of household expenditures.

4.2.1 Analysis on Income, Expenditures and Savings

To investigate how COVID-19 has impacted wages, consumption and savings, the months after everyone was instructed to work from home will be compared to before said instruction. As the analysis will start in the first week of February (week 10) and the date of the instruction to work from home was the 15th of March (after week 15), weeks 10 through 15 will be grouped together to form the excluded category. As the income of the respondents varies considerably per week, I have grouped the rest of the weeks into months by weeks of four by creating dummies. Thereafter, I took the mean of the weeks within the month, so that I can compare the months of four weeks with the pre-lockdown 'month' of six weeks. This results in nine months to use as regressors. Each month will be compared to the excluded category. Moreover, for this analysis, income will be the sum of the respondents' income and gifts/remittances from non-household members. This is because gifts/remittances play a prominent role in the respondents' income, especially for women. The following regression will be performed, which will be estimated separately for each gender

$$y_{t,i} = \alpha + \sum_{t=1}^{9} \beta_t m_t + \varepsilon_{t,i} \tag{4.1}$$

where y is income plus gifts/remittances at time t for individual i. The variable m_t represents the month t. Month $t = 1$ indicates the first month after the lockdown.

For a robustness analysis, I will perform two additional regressions for this analysis. Besides gender and the COVID-19 restrictions, there could be other possible reasons that income has changed. For example, socio-economic characteristics such as age and education probably have an impact. Furthermore, the severity of the health problems of the respondents might be relevant in a COVID-19 impact analysis. Lastly, another variable to look at is the number of people in the household. Unfortunately, such a variable does not exist in the data set. However, the number of people in a household that are participating in the survey is included in the data set. Adding all these variables into Equation 4.1 gives

$$y_{t,i} = \alpha + \sum_{t=1}^{9} \beta_t m_t + \gamma_1 age_i + \gamma_2 hhpart_i + \gamma_3 educ_i + \gamma_4 mild_{t,i} + \gamma_5 moderate_{t,i} + \gamma_6 severe_{t,i} + \varepsilon_{t,i} \tag{4.2}$$

where *hhpart* is the number of people in a household participating in the survey, *educ* is the highest grade completed by a respondent or the grade the respondent is currently attending. The remaining variables, *mild*, *moderate*, *severe* are dummies indicating the severity of a respondents' health problem.

Janssens et al. (2021) used household fixed effects regressions to analyse the impact on their variables of interest. Instead of household fixed effects, another analysis will be performed using individual fixed effects to capture the other time-invariant variables that were not added

to Equation 4.2.

The categories in Figure A.3 seem to be very noisy, and it is unclear whether expenditures indeed declined after the lockdown. To have a better understanding whether expenditures have dropped, the three analyses for income will also be done for the logarithm of the total of all categories of expenditures. Furthermore, the logarithm of each category of expenditures will also be taken and analysed separately with the fixed effects model.

As I predict income to fall, but for expenditures, it is unclear, it may be interesting to investigate how people have been able to keep up their expenditures with a fall in income. As mentioned in chapter 2, Deaton (1997) states that people in developing countries should be prepared for falls in income, as their income depends on external effects. This might imply that they have some money saved up to smooth their consumption. As the data set contains weekly information on how much money the respondents saved and how much they withdrew, I can create a variable *net savings* which is *money withdrawn* subtracted from *money saved*. Using the three methods again to analyse this, we should be able to see whether the respondents started using their savings after the lockdown.

Furthermore, to see if there is significant difference between the changes in income, expenditures and net savings between men and women the following specification will also be estimated:

$$y_{t,i} = \alpha + \sum_{t=1}^{9} \beta_t m_t + \lambda woman_i + \sum_{t=1}^{9} \gamma_t m_t \times woman_i + \varepsilon_{t,i} \tag{4.3}$$

where $y_{t,i}$ is either income, the logarithm of total expenditures or net savings. This time the months estimate how those variables change for both men and women. I created a dummy *woman* which is 1 if the respondent is a woman and 0 if they are a man. The cross term will indicate whether the difference between men and women is significant. This estimation will also be done with individual fixed effects. The analysis with individual fixed effects will also be done for the logarithm of the different categories of expenditures.

4.2.2 Labour Participation Analysis

The reasons why the gender wage gap generally increased during the COVID-19 recession (chapter 2) possibly do not apply to rural Kenya. Therefore, the COVID-19 impact on female wages might not be as harsh for this research as in urban areas. It might even be the opposite and resemble a regular recession, as Figure A.1 shows a slight decline in male wages and is not so clear for female wages (Figure A.2). The women in the household will possibly start working more as the income of their husband declined due to COVID-19. This will be analysed by the

following linear probability model

$$w_{i,t} = \alpha_i + \beta MI_{t-1,h} + \varepsilon_{i,t} \tag{4.4}$$

where w is a dummy indicating whether female i earns any income in month t. MI is the total income of all the men in a household h in the month prior. This specification is similar to the analysis Bryan and Longhi (2018) performed, however this one does not use labour participation, because labour participation was not available in the data set. Thus, a dummy (w) was created to indicate whether a woman works or not to use as labour participation.

4.2.3 Household Expenditure Dependency Analysis

It may be interesting to investigate whether the expenditures on a certain category in a household depends more on the wife's income or the husband's income. As from Figure A.3, it is unclear whether there is a difference in expenditures of men and women, the gender difference may be investigated differently. Hereby looking at the effect of the women's or men's income in a household on the overall expenditures of the household.

$$expend_{C,t,h} = \alpha_t + \beta_1 HI_{t,h} + \beta_2 SMI_{t,h} + \varepsilon_{C,t,h} \tag{4.5}$$

where $expend$ is the total expenditures in a household h of category C at time t. Here HI represents the household income and SMI represents the share of the income generated by the men in the household.

The two additional regressions for income as robust analysis will also be done for the analysis on labour participation and household expenditure dependency. Thus, the control variables in Equation 4.2 will also be added to Equation 4.4 and Equation 4.5. Moreover, those two equations will also be estimated with individual fixed effects.

CHAPTER 5

Results

This section provides an overview of the results of the analyses discussed in the previous section. Firstly, this section will show the results of the regressions on the income, expenditures and net savings of men and women and what kind of impact COVID-19 has had on these variables. Secondly, this section presents the outcome of the analysis on the women's labour participation and whether women will work more if the men in the household start earning less. Lastly, this section shows how the distribution of the women's income and men's income in a household affects certain categories of household expenditures.

5.1 Income, Expenditures and Savings

Table 5.1 presents the results of Equation 4.1, Equation 4.2 and the results of Equation 4.1 with individual fixed effects. With the pre-outbreak month as the excluded category, columns 1 and 2 of Table 5.1 show no significant changes in income post-lockdown. Even after adding socio-economic characteristics and health information (column 3 and 4) the table indicates that income has not dropped significantly. However, this result changes when individual fixed effects are added to the model (in column 5 and 6). Income has dropped in the first few months post-lockdown. These coefficients are larger and statistically more significant for men than for women. It was already known that the men in the data set earn a lot more. The relative drop in income of the first month after the lockdown for women is 13.4% [1] and for men it is 14.1% [2]. The average relative income drop for women is 8.93% and for men 11.19%. The last column of the table also shows that the changes in income for women is inconsistent in its level of significance. Men have a more consistently significant income drop.

Before the lockdown 46.04% of the men and 78.54% of the women had a monthly income below the poverty line. In the two months post-lockdown this increased to 51.83% for men and 82.49% for women [3].

[1] $13.4\% = -90.62/677.61$

[2] $14.1\% = -283.4/2011.44$

[3] This is done by calculating the number of men or women with an income below the poverty line in the first and second month post-lockdown, then dividing by the number of men or women in the data set and taking the

	(1)	(2)	(3)	(4)	(fixed effects)	(fixed effects)
	Income Men	Income Women	Income Men	Income Women	Income Men	Income Women
7 February - 13 March	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
20 March - 10 April	-283.4	-90.62	-340.1	-114.7	-283.4***	-90.62**
	(241.0)	(94.02)	(238.6)	(105.5)	(76.52)	(32.58)
17 April - 8 May	-332.1	-83.05	-433.7	-31.91	-332.1***	-83.05*
	(241.0)	(94.02)	(248.3)	(111.2)	(76.52)	(32.58)
15 May - 5 June	-219.8	-47.01	-298.6	-37.78	-219.8**	-47.01
	(241.0)	(94.02)	(240.1)	(105.8)	(76.52)	(32.58)
12 June - 3 July	-181.3	-89.23	-184.9	-84.53	-181.3*	-89.23**
	(241.0)	(94.02)	(240.7)	(106.0)	(76.52)	(32.58)
10 July - 31 July	-219.7	-42.01	-266.7	-55.99	-219.7**	-42.01
	(241.0)	(94.02)	(238.8)	(105.4)	(76.52)	(32.58)
7 August - 28 August	-244.7	-81.09	-273.5	-82.19	-244.7**	-81.09*
	(241.0)	(94.02)	(238.6)	(105.4)	(76.52)	(32.58)
4 September - 25 September	-241.9	-78.08	-217.6	-87.80	-241.9**	-78.08*
	(241.0)	(94.02)	(238.6)	(105.4)	(76.52)	(32.58)
2 October - 23 October	-163.1	-38.45	-155.5	-44.26	-163.1*	-38.45
	(241.0)	(94.02)	(238.7)	(105.4)	(76.52)	(32.58)
30 October - 20 November	-139.9	4.669	-73.50	8.570	-139.9	4.669
	(241.0)	(94.02)	(238.7)	(105.5)	(76.52)	(32.58)
Age			37.44	103.8***		
			(24.29)	(10.40)		
Age^2			-0.558	-1.106***		
			(0.285)	(0.125)		
Household Participation			-298.4***	-39.16*		
			(40.78)	(16.90)		
Education			-0.144	33.98***		
			(4.261)	(2.110)		
Mild Health Problems			364.3	-383.9		
			(455.2)	(209.6)		
Moderate Health Problems			-1116.4*	-448.6*		
			(543.9)	(210.3)		
Severe Health Problems			-950.5	-162.7		
			(654.6)	(236.5)		
Constant	2011.4***	677.6***	2414.2***	-1288.5***	2011.4***	677.6***
	(170.4)	(66.48)	(537.5)	(212.3)	(54.11)	(23.04)
N	3280	4940	2720	4110	3280	4940
R^2	0.001	0.001	0.035	0.094	0.009	0.005

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: The first two columns are the results of estimating Equation 4.1 with OLS. The third and fourth column are the outcomes of Equation 4.2, also performed with OLS. The last two columns are the results of estimating Equation 4.1 with individual fixed effects. The dates are all in the year 2020. Household Participation indicates the number of people in a household participating in the survey. The health problems are dummies indicating the severity of the respondents' health problem.

Table 5.1: Income Analysis

average. There are 165 and 175 men with an income below the poverty line in month 1 and 2 resp. For women this is 409 and 406.

Table B.1 and Table B.2 show the results of estimating Equation 4.1 with individual fixed effects on the different categories of log expenditures. For both men and women we can see that in the first month post-lockdown the coefficients for food are not significant meaning they tried to keep up with their food expenditures. However, soon after that their food expenditures did decline. Health expenditures did drop for men, but for women there is no statistical evidence that their health expenditures have changed. Both transport and education expenditures have decreased for both men and women in all months following the lockdown. Table 5.2 shows that for the categories transport and education, the expenditure drop was relatively larger for women than for men.

	Business	Food	Health	Transport	Education
Men	-30.45%	-29.35%	-27.84%	-35.04%	-51.88%
Women	-20.10%	-25.73%	-8.88%	-40.02%	-61.45%

Table 5.2: Expenditure drops for each category

Note: These are the average expenditure drops over all months post-lockdown.

Table B.8 displays the outcome of estimating Equation 4.1, but now with logarithm of total expenditures as dependent variable. From the first four columns we can see that in the first months post-lockdown there are barely any significant changes in expenditures. In the later months total expenditures do start to drop with the drops being statistically more significant for women than for men in some months. Once individual fixed effects have been accounted for we can see that total expenditures have dropped since the second month post-lockdown (significant at the 1% level). The average expenditure drop for men is 34.46% and for women 28% [4].

Table B.9 shows the outcome of the analysis on net savings. The table shows no significant coefficients, implying that both men and women have not changed their saving behavior since the pandemic.

This section described relative changes in income and expenditures. However, Table B.3 shows that these changes do not differ significantly between men and women. This table displays the outcome of estimating Equation 4.3, which estimates whether the change of the dependent variables differ between men and women significantly. The cross terms of the gender dummy and the month variable reveals that none of these cross terms are statistically significant. Like the regression on income and net savings with Equation 4.1, the cross terms regression also shows no significance in the drop of income and the changes in net savings for men and women combined.

[4]This was calculated by talking the average of all coefficients, which is -0.42244 for men and -0.32844 for women, then applying $100 \cdot (\exp(coeff) - 1)$.

Table B.4 shows the outcome of the same regression, but now with individual fixed effects. Now the month dummies confirm that income and expenditures dropped for men and women in the months post-lockdown [5]. As an estimation with individual fixed effects means taking first differences, naturally the *woman* dummy is zero. The cross terms in the regression on income show that in the first few months the drop in income is significantly larger for men than for women. For the changes in expenditures and net savings the difference between men and women is not significant.

To see if the differences in Table 5.2 are significant Table B.5 shows the outcome of estimating Equation 4.3 for the different categories of expenditures with individual fixed effects. The business, food, health and transport columns show no statistical evidence that the gender difference in the table above (Table 5.2) is significant throughout the months. Moreover, Table B.5 illustrates that the category education had a significant gender difference in the drop post-lockdown. The coefficients are negative implying that women reduced their education expenditures considerably more than men.

5.2 Labour Participation

Equation 4.4, which estimates whether women work if the income of the men in their household drops results in the outcomes shown in column 1 of Table 5.3. Interestingly, the coefficient (Household Income Men at $t-1$) of column 1 and 2 is negative, but in the individual fixed effects estimation, the coefficient is positive. Thus, column 1 and 2 indicate that in households where men earn less, women work more. However, column 3, which is based on changes in income and labour supply, shows that if the income of the men in the household increases, the probability that a woman in the household will start working will increase. To interpret these coefficients, we can do a back of the envelope calculation. The average household income of the men throughout the months is Ksh 1561.27. Based on column 1, if the household income of the men is 10% lower, then the probability a woman in the household works for an income increases by 0.15 percentage points [6]. On the other hand, based on column 3, if the household income of the men is 10% lower, then the probability a woman in the household works for an income decreases by 0.1 percentage points [7]

[5] This is also similar to the outcome of estimating Equation 4.1 on income and expenditures with individual fixed effects for men and women separately.

[6] $0.0015 = -156.13 \cdot -0.0000101$

[7] $0.001 = -156.13 \cdot 0.00000629$

	(1)	(2)	(fixed effects)
	Women Income Dummy	Woman Income Dummy	Woman Income Dummy
Household Income Men at $t-1$	-0.0000101***	-0.0000105***	0.00000629*
	(0.00000188)	(0.00000228)	(0.00000316)
Age		0.0148***	
		(0.00265)	
Age^2		-0.000173***	
		(0.0000316)	
Household Participation		0.00275	
		(0.00444)	
Education		0.000420	
		(0.000518)	
Mild Health Problems		0.0253	
		(0.0468)	
Moderate Health Problems		0.0307	
		(0.0554)	
Severe Health Problems		0.234***	
		(0.0641)	
Constant	0.356***	0.0711	0.330***
	(0.00623)	(0.0530)	(0.00562)
N	7398	6147	7398
R^2	0.004	0.011	0.001

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Women Income Dummy indicates whether a woman in a household earns any income. *Household Income Men at* $t-1$ represents the total income of all the men in a household in the month prior. The first column is the outcome of estimating the linear probability model Equation 4.4. The second column is the same estimation, but with more control variables. Household Participation indicates the number of people in a household participating in the survey. The health problems are dummies indicating the severity of the respondents' health problem. The third column estimates Equation 4.4 with individual fixed effects.

Table 5.3: Women's Labour Participation

5.3 Household Expenditure Dependency

From Table 5.4 the results of Equation 4.5 can be seen. When the household has a higher income, expenditures on all levels are higher as well. The share of the household income from the men has a negative coefficient (and significant at the 1% level) on the categories business and transport. This indicates that the household expenditures on these categories rely more on the income of the women in the household. The categories food and education are not significant, implying that it does not matter from which party the income comes from for household expenditures on food and education. When the same analysis is done with individual fixed effects (Table B.6) none of the coefficients are significant. Thus, in the short term, for household expenditures it does not matter whether the income comes from the men or the women in a household.

Table 5.4: Household Expenditures

	(1)	(2)	(3)	(4)	(5)
	Business	Food	Health	Transport	Education
Household Income	0.488***	0.129***	0.0145***	0.0194***	0.0351***
	(0.00550)	(0.00249)	(0.000500)	(0.00118)	(0.00291)
Share of Men Income	-187.2***	34.90	-10.14*	-75.23***	-43.57
	(51.47)	(23.34)	(4.676)	(11.07)	(27.26)
Constant	-343.9***	642.4***	43.67***	125.7***	79.18***
	(39.96)	(18.12)	(3.631)	(8.594)	(21.17)
N	7599	7599	7599	7599	7599
R^2	0.510	0.266	0.100	0.037	0.019

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: These are the outcomes of estimating Equation 4.5 on the different categories of expenditures. These expenditures are at the household level. *Household Income* indicates the total income of all the people in a household. *Share of Men Income* is the total income generated by the men in a household divided by the total household income. This estimation is done with OLS. The estimation is done over all months. Thus, *Share of Men Income* shows whether women or men's income is more responsible for household expenditures on a certain category throughout the year.

CHAPTER 6

Discussion & Conclusion

This section will discuss the implications of the results in the previous section and the main findings. First, these findings will be compared to previous research mentioned in chapter 2. Secondly, this section will discuss preferred methods performed for this research. Moreover, this section will discuss the limitations of this research and suggestions for further research. Lastly, this section will present the conclusion.

6.1 Main Findings

Previous literature on how COVID-19 has impacted men and women has emphasised how the gender gap may have grown. As a large portion of women work in hospitality and services in urban areas in western countries, the restrictions and lockdowns have caused many women to become unemployed (Albanesi and Kim, 2021; Alon et al., 2020). On top of that, in a household where women were able to work from home, their working hours were reduced 4.5 times more than the men's hours in the household (Collins et al., 2021). In rural Kenya, the income drop for men comparing to pre-lockdown is relatively larger than that for women. Especially in the first few months post-lockdown the drop is significantly larger for men than for women. However, such an income drop in low-income households already has a large impact on both men and women. Pre-lockdown 46.04% had an income below the poverty line. This increased to 51.8% in the first two months post-lockdown. Thus, the number of men with an income below the poverty line increased due to the lockdown with 5.76 percentage points. For women this went from 78.54% of the women having an income below the poverty line to 82.49%, hence an increase of 3.95 percentage points. These results suggest that the difference in income since the lockdown has relatively hit men harder than women. This is confirmed by Table B.4, which shows that the cross terms of the woman dummy and the month dummy is significantly positive. Thus, the drop in income for men is significantly larger for men than for women. This is contradictory to the research of Bundervoet et al. (2021), which investigated 34 developing countries and found that the pandemic had a more negative impact on women than men. A possible reason for this is that this data is a bit more selective as each household in this data set contains a woman.

The COVID-19 pandemic has had quite a different impact than in regular recessions, where the gender gap has narrowed a bit. In previous recessions, in households where the men lost their job, women started working more (Bryan and Longhi, 2018; Addabbo et al., 2013). As for this research, it was suspected that the COVID-19 pandemic would have a larger impact on the income of men than women, the findings of Bryan and Longhi (2018); Addabbo et al. (2013) could possibly hold for rural Kenya. Table 5.3 show the results of this analysis. Columns 1 and 2 show that the prediction is correct as the coefficient of the income generated by the men in a household is negative and significant (at the 1% level). However, the coefficient is minimal, implying that if the men in a household earn less, the probability that a woman in that household works more is minuscule.

Column 3 (the analysis with fixed effects), however, has a positive coefficient. Thus, in the short-run, if the income of men increases, the income of women also increases. Nevertheless, again, the effect is minimal.

Moreover, Hodbod et al. (2020) state that comparing to pre-lockdown, consumption has declined over all of their investigated sectors in some European countries. Dang and Nguyen (2021) find that especially women reduce their consumption. However, previous literature has also found that income declined more for women than for men, so this result will likely not hold for this research. As it was found that income declined more for men than for women in this research, it will follow that expenditures will also decline more for men. From Table B.1 and Table B.2 we can see that the categories business, transport and education expenditures declined for both men and women. This is logical as the lockdown somewhat prevented them from spending on these categories. Furthermore, health expenditures dropped for men, but there were no significant changes for women. A potential reason is that all women in the data set have children or are pregnant and are responsible for these health expenditures, whilst men probably only go to the doctor if they are sick. This research also found that for most categories there is no statistically significant difference in the drop in expenditures. Education expenditures however, do have a clear gender difference. Women reduced their education expenditures more than men did. Moreover, during the pandemic the household expenditures on business and transport in the long run have been more reliant on women's income (Table 5.4).

We also see that in the first month post-lockdown both men and women tried to keep up with their food expenditures, but in the months thereafter this was no longer possible. This result is similar to the findings of Mahmud and Riley (2021) where the food expenditures in Uganda declined post-lockdown and more people reported hunger. Deaton (1997) state that people in developing countries whose incomes fluctuate a lot should be prepared for times where they do not earn any income by using their savings. I found that savings did not change significantly since the lockdown (Table B.9). If saving behavior had not changed, but income did drop, I predicted people would use their savings to smooth over their consumption. However only 18.6%

of the men and 20.04% of the women had any savings pre-lockdown, which is most likely why many people were not able to smooth over their consumption. Janssens et al. (2021) state that savings did not change because people tried to hold on to whatever savings they had left.

From the graphs on income and expenditures (Figure 3.1, Figure A.3) it was suspected that income would fall, but for expenditures, it was unclear. Table B.8 shows clearly that the total expenditures did decline post-lockdown. In the first month however, both men and women tried to keep up with their regular expenditures. As their income dropped their total expenditures soon thereafter also declined. The difference in the drop of total expenditures does not differ significantly between men and women.

6.2 Methods Implemented

Three different methods have been implemented for the robustness analysis. For the analysis on expenditures, the model with fixed effects is preferred. This analysis shows that once all time-invariant variables have been accounted for, there is a significant expenditure drop for men and women due to COVID-19. Thus, this method gives a clearer understanding of the impact of the pandemic on total expenditures. The same holds for the analysis on income and the analysis on income with woman and month cross terms.

For the analysis on women's labour participation, it was helpful to have these different methods. Columns 1 and 2 of Table 5.3 show the long-run implication of changes in income of men in a household. Column 3 (analysis with fixed effects) shows the short-run implications and has a different sign in the coefficient, showing that the long-run and short-run implications differ. The same holds for the analysis on which share of household income affects household expenditures more. Some coefficients switched sign when an individual fixed effects analysis was performed.

For all analyses, adding socio-economic variables to the primary method has not added much helpful information. This way, we can see how other variables affect income, labour participation and expenditures, but for a COVID-19 impact analysis, this might not be necessary as the individual fixed effects account for the time-invariant variables.

6.3 Limitations and Suggestions

This research uses a data set which only contains 6 weeks of financial information pre-lockdown. Income post-lockdown has declined comparing to these 5 weeks. However, it is unknown whether income remained higher for a longer time pre-lockdown than post-lockdown. For example, the data in December and January was removed from this analysis because it did not give a representative image of the income the respondents receive throughout the year. Thus, it is uncertain whether February does give a representative image of the income throughout the

year.

Moreover, the analyses performed in this research has been based on previous research on how economic shocks have impacted men and women in western countries. COVID-19 impact analyses have been performed for developing countries, yet not separately for men and women. Thus, methods intended for analyses for western countries have been implemented for rural Kenya. The analysis on women's labour participation (Equation 4.4) has a much smaller effect than it did in western countries. It was not in the scope of this research to analyse why this coefficient was so small and how to improve this analysis. For future research it is important to note that the income of the respondents fluctuate considerably per week. This could intervene with trying to estimate labour participation for a certain time based on men's income at the time prior. As income dropped for men more than for women, it also may be interesting for future research what external effects caused the difference in income drop. Why was the income drop relatively smaller for women than for men in rural Kenya?

6.4 Conclusion

This research analyses the impact of COVID-19 on income and expenditures for people in rural Kenya. It finds a significant drop in income for both men and women comparing to pre-lockdown in the first four months post-lockdown. Interestingly the drop is smaller for women than for men, which is contradictory to the literature (chapter 2). As a result of this the number of men and women with an income below the poverty line has increased. Labour participation of women in a household does depend on the income of the men in that household, as the relation is statistically significant, but it is barely economically significant. Moreover, this coefficient differs in short-run and long-run. As income dropped, expenditures did the same. Like in previous research, expenditures have dropped due to the pandemic. These declines are relatively larger for women in the categories transport and education. There were not many people with savings pre-lockdown. They could not smooth over their consumption with these savings and saving behavior has not changed since the lockdown. In conclusion, the measures taken in rural Kenya to protect citizens from the virus has caused more men and women to have an income below the poverty line.

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Appendices

APPENDIX A

Summary statistics

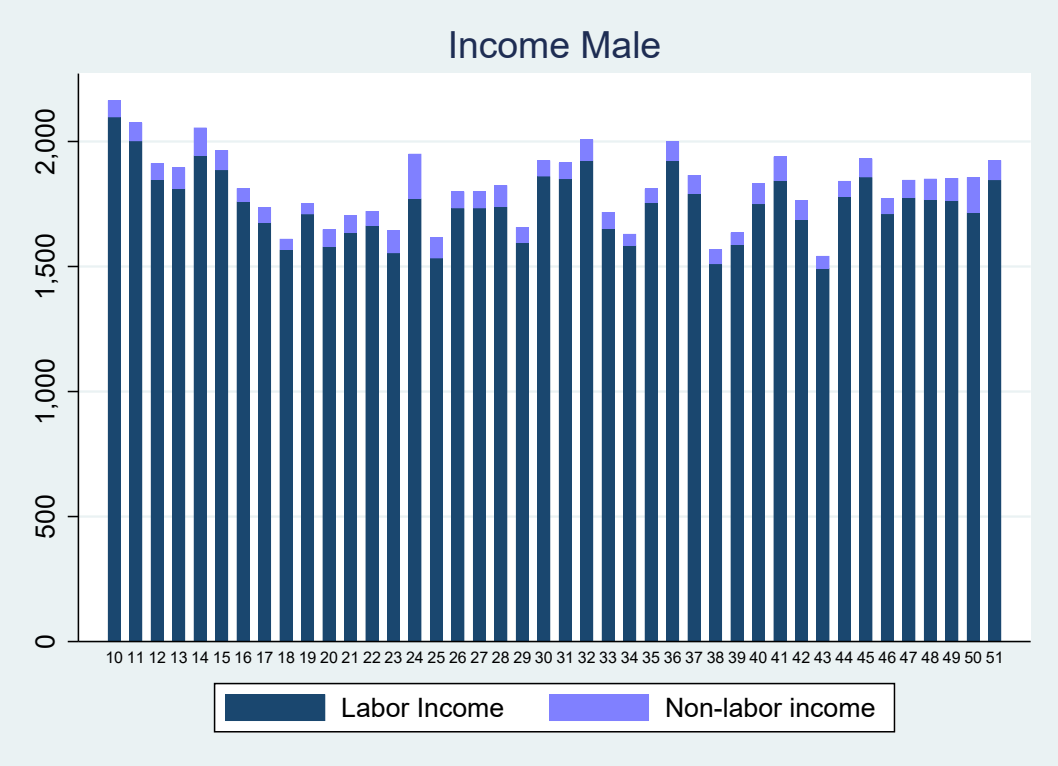


Figure A.1: Income of men throughout the weeks

Note: The graph shows the income of men throughout the weeks in Kenyan shillings. Non-labour income is income from gifts and remittances.

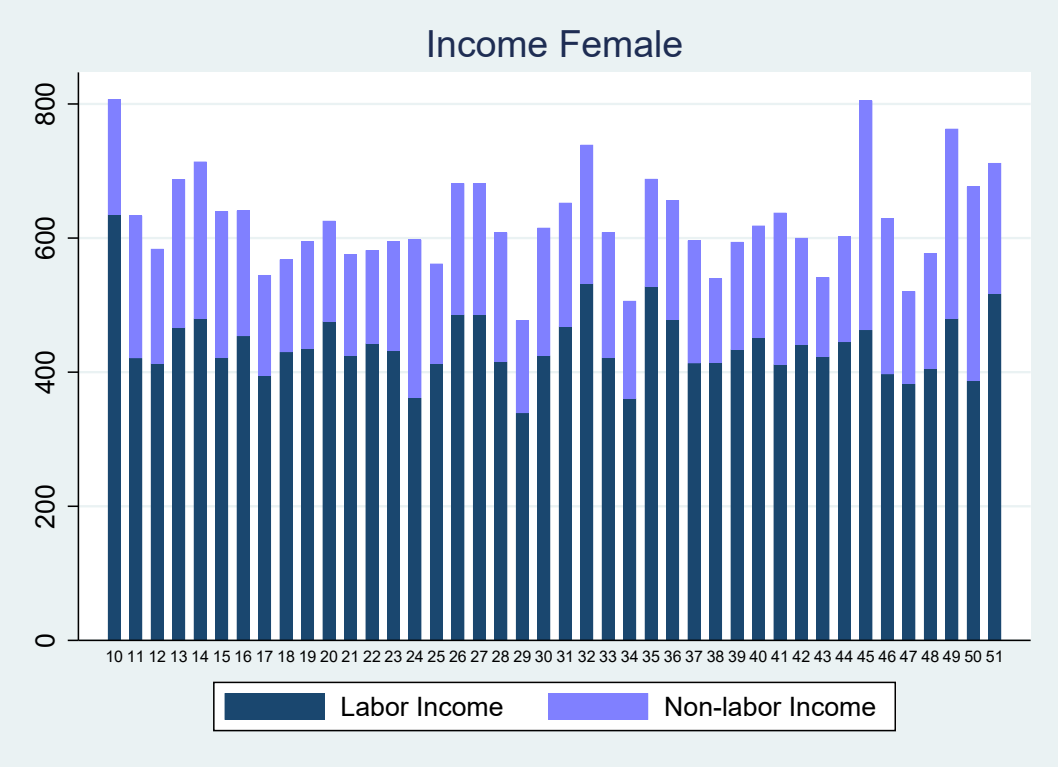


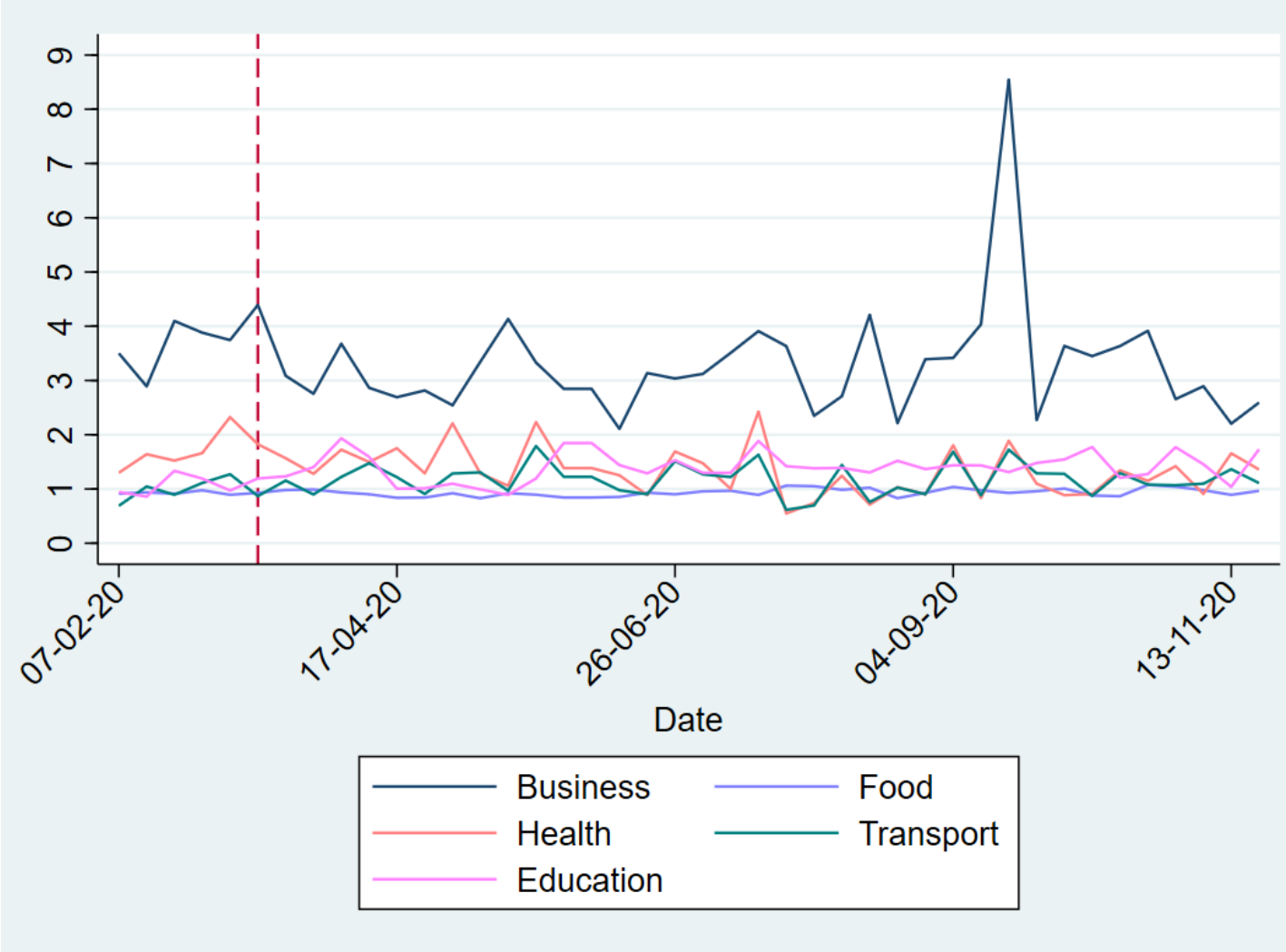
Figure A.2: Income of female throughout the weeks

Note: The graph shows the income of women throughout the weeks in Kenyan shillings. Non-labour income is income from gifts and remittances.

Figure A.3: Trend of expenditures in the different categories through out the weeks for men and women

Note: On the y-axis we have the Kenyan shilling. March 15th is when the lockdown started. This is indicated by a dashed red line.

Figure A.4: The gender gap in the different categories of expenditures



Note: The gender gap is calculated by dividing the male expenditures by the female expenditures. If the value is larger than 1 then men spend more on that category than women. The red dashed line indicates the week of the lockdown.

APPENDIX B

Results

	(1)	(2)	(3)	(4)	(5)
	Business	Food	Health	Transport	Education
Household Income	0.306***	0.0743***	0.0162***	0.0158***	0.0146***
	(0.00849)	(0.00302)	(0.00126)	(0.00128)	(0.00257)
Share of Men Income	-80.78	17.07	15.89	7.489	-26.05
	(65.36)	(23.21)	(9.701)	(9.886)	(19.79)
Constant	8.139	782.1***	22.58**	79.47***	115.1***
	(47.80)	(16.97)	(7.094)	(7.230)	(14.47)
N	7599	7599	7599	7599	7599
R^2	0.160	0.082	0.024	0.022	0.005

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B.6: Household Expenditures with Individual Fixed Effects

Note: Household Income indicates the total income of all the people in a household. Share of Men Income is the total income in a household generated by the men divided by the total household income. This estimation was performed with OLS.

	(1)	(2)	(3)	(4)	(5)
	log(Business)	log(Food)	log(Health)	log(Transport)	log(Education)
7 February - 13 March	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)
20 March - 10 April	-0.390***	-0.0985	-0.300***	-0.284***	-0.466***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
17 April - 8 May	-0.321***	-0.285***	-0.467***	-0.453***	-0.553***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
15 May - 5 June	-0.422***	-0.218**	-0.279**	-0.439***	-0.584***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
12 June - 3 July	-0.302***	-0.370***	-0.378***	-0.542***	-0.791***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
10 July - 31 July	-0.313***	-0.337***	-0.254**	-0.470***	-0.789***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
7 August - 28 August	-0.268**	-0.430***	-0.408***	-0.518***	-0.937***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
4 September - 25 September	-0.427***	-0.543***	-0.322***	-0.429***	-0.917***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
2 October - 23 October	-0.471***	-0.518***	-0.400***	-0.489***	-0.857***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
30 October - 20 November	-0.354***	-0.328***	-0.128	-0.258**	-0.689***
	(0.0906)	(0.0831)	(0.0884)	(0.0839)	(0.0834)
Constant	2.023***	4.958***	1.358***	1.582***	1.562***
	(0.0640)	(0.0588)	(0.0625)	(0.0593)	(0.0590)
N	3280	3280	3280	3280	3280
R^2	0.013	0.026	0.015	0.023	0.065

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B.1: How expenditures differ from pre-lockdown for men

Note: This is the result of estimating Equation 4.1 with individual fixed effects and the log expenditure categories as y-variable. This estimation was only done for men. The dates are all in the year 2020.

	(1)	(2)	(3)	(4)	(5)
	log(Business)	log(Food)	log(Health)	log(Transport)	log(Education)
7 February - 13 March	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)
20 March - 10 April	-0.124	-0.0842	-0.120	-0.247**	-0.706***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
17 April - 8 May	-0.113	-0.173**	-0.265**	-0.468***	-0.765***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
15 May - 5 June	-0.212**	-0.182**	-0.0501	-0.551***	-0.889***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
12 June - 3 July	-0.227***	-0.278***	-0.177*	-0.734***	-0.999***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
10 July - 31 July	-0.305***	-0.456***	0.0315	-0.503***	-1.080***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
7 August - 28 August	-0.249***	-0.388***	0.0324	-0.494***	-1.112***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
4 September - 25 September	-0.282***	-0.494***	-0.167	-0.655***	-1.138***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
2 October - 23 October	-0.263***	-0.335***	-0.0122	-0.487***	-0.986***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
30 October - 20 November	-0.244***	-0.287***	0.0185	-0.461***	-1.004***
	(0.0667)	(0.0560)	(0.0857)	(0.0850)	(0.0671)
Constant	1.092***	5.286***	1.258***	1.802***	1.558***
	(0.0472)	(0.0396)	(0.0606)	(0.0601)	(0.0475)
N	4940	4940	4940	4940	4940
R^2	0.008	0.032	0.006	0.023	0.092

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B.2: How expenditures differ from pre-lockdown for women

Note: This is the result of estimating Equation 4.1 with individual fixed effects and the log expenditure categories as y-variable. This estimation was only done for women. The dates are all in the year 2020.

Table B.3: Cross term regression

	(1)	(2)	(3)
	Income	log(Expenditures)	Net Savings
20 March - 10 April	-283.4	-0.196	-23.83
	(176.6)	(0.173)	(84.95)
17 April - 8 May	-332.1	-0.406*	-47.23
	(176.6)	(0.173)	(84.95)
15 May - 5 June	-219.8	-0.264	-4.582
	(176.6)	(0.173)	(84.95)
12 June - 3 July	-181.3	-0.431*	22.61
	(176.6)	(0.173)	(84.95)
10 July - 31 July	-219.7	-0.426*	10.76
	(176.6)	(0.173)	(84.95)
7 August - 28 August	-244.7	-0.522**	2.004
	(176.6)	(0.173)	(84.95)
4 September - 25 September	-241.9	-0.586***	-70.33
	(176.6)	(0.173)	(84.95)
2 October - 23 October	-163.1	-0.560**	11.98
	(176.6)	(0.173)	(84.95)
30 October - 20 November	-139.9	-0.411*	97.17
	(176.6)	(0.173)	(84.95)
Woman	-1333.8***	0.0505	-42.93
	(161.0)	(0.157)	(77.48)
(20 March - 10 April)×Woman	192.8	0.0719	-0.779
	(227.7)	(0.223)	(109.6)
(17 April - 8 May)×Woman	249.1	0.184	35.32
	(227.7)	(0.223)	(109.6)
(15 May - 5 June)×Woman	172.8	-0.000648	-4.768
	(227.7)	(0.223)	(109.6)
(12 June - 3 July)×Woman	92.11	0.0774	-46.34
	(227.7)	(0.223)	(109.6)
(10 July - 31 July)×Woman	177.7	-0.0480	-45.17
	(227.7)	(0.223)	(109.6)
(7 August - 28 August)×Woman	163.6	0.125	-39.51
	(227.7)	(0.223)	(109.6)
(4 September - 25 September)×Woman	163.8	0.0711	24.66
	(227.7)	(0.223)	(109.6)
(2 October - 23 October)×Woman	124.6	0.216	-33.32
	(227.7)	(0.223)	(109.6)
(30 October - 20 November)×Woman	144.5	0.150	-92.24
	(227.7)	(0.223)	(109.6)
Constant	2011.4***	5.649***	139.3*
	(124.8)	(0.122)	(60.07)
N	8220	8220	8220
R^2	0.063	0.006	0.002

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This is the outcome of Equation 4.3. Expenditures was estimated in logarithms. This time the first 9 month variables indicate how the variables change for both men and women. The cross terms indicate if the variables differ significantly between men and women.

Table B.4: Cross term regression with individual fixed effects

	(1)	(2)	(3)
	Income	log(Expenditures)	Net Savings
20 March - 10 April	-283.4***	-0.196*	-23.83
	(57.41)	(0.0763)	(35.19)
17 April - 8 May	-332.1***	-0.406***	-47.23
	(57.41)	(0.0763)	(35.19)
15 May - 5 June	-219.8***	-0.264***	-4.582
	(57.41)	(0.0763)	(35.19)
12 June - 3 July	-181.3**	-0.431***	22.61
	(57.41)	(0.0763)	(35.19)
10 July - 31 July	-219.7***	-0.426***	10.76
	(57.41)	(0.0763)	(35.19)
7 August - 28 August	-244.7***	-0.522***	2.004
	(57.41)	(0.0763)	(35.19)
4 September - 25 September	-241.9***	-0.586***	-70.33*
	(57.41)	(0.0763)	(35.19)
2 October - 23 October	-163.1**	-0.560***	11.98
	(57.41)	(0.0763)	(35.19)
30 October - 20 November	-139.9*	-0.411***	97.17**
	(57.41)	(0.0763)	(35.19)
Woman	0	0	0
	(.)	(.)	(.)
(20 March - 10 April)×Woman	192.8**	0.0719	-0.779
	(74.06)	(0.0985)	(45.39)
(17 April - 8 May)×Woman	249.1***	0.184	35.32
	(74.06)	(0.0985)	(45.39)
(15 May - 5 June)×Woman	172.8*	-0.000648	-4.768
	(74.06)	(0.0985)	(45.39)
(12 June - 3 July)×Woman	92.11	0.0774	-46.34
	(74.06)	(0.0985)	(45.39)
(10 July - 31 July)×Woman	177.7*	-0.0480	-45.17
	(74.06)	(0.0985)	(45.39)
(7 August - 28 August)×Woman	163.6*	0.125	-39.51
	(74.06)	(0.0985)	(45.39)
(4 September - 25 September)×Woman	163.8*	0.0711	24.66
	(74.06)	(0.0985)	(45.39)
(2 October - 23 October)×Woman	124.6	0.216*	-33.32
	(74.06)	(0.0985)	(45.39)
(30 October - 20 November)×Woman	144.5	0.150	-92.24*
	(74.06)	(0.0985)	(45.39)
Constant	1209.8***	5.679***	113.5***
	(25.64)	(0.0341)	(15.72)
N	8220	8220	8220
R^2	0.007	0.028	0.005

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This is the outcome of Equation 4.3 with individual fixed effects. Expenditures was estimated in logarithms. This time the first 9 month variables indicate how the variables change for both men and women. The cross terms indicate if the variables differ significantly between men and women.

Table B.5: Cross term regression for the different categories of expenditures

	(1)	(2)	(3)	(4)	(5)
	log(Business)	log(Food)	log(Health)	log(Transport)	log(Education)
20 March - 10 April	-0.390***	-0.0985	-0.300**	-0.284**	-0.466***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
17 April - 8 May	-0.321***	-0.285***	-0.467***	-0.453***	-0.553***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
15 May - 5 June	-0.422***	-0.218**	-0.279**	-0.439***	-0.584***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
12 June - 3 July	-0.302***	-0.370***	-0.378***	-0.542***	-0.791***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
10 July - 31 July	-0.313***	-0.337***	-0.254*	-0.470***	-0.789***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
7 August - 28 August	-0.268**	-0.430***	-0.408***	-0.518***	-0.937***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
4 September - 25 September	-0.427***	-0.543***	-0.322**	-0.429***	-0.917***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
2 October - 23 October	-0.471***	-0.518***	-0.400***	-0.489***	-0.857***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
30 October - 20 November	-0.354***	-0.328***	-0.128	-0.258**	-0.689***
	(0.0854)	(0.0748)	(0.0989)	(0.0967)	(0.0828)
Woman	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)
(20 March - 10 April)×Woman	0.266*	0.0143	0.180	0.0366	-0.240*
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
(17 April - 8 May)×Woman	0.208	0.112	0.202	-0.0154	-0.213*
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
(15 May - 5 June)×Woman	0.210	0.0355	0.229	-0.112	-0.305**
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
(12 June - 3 July)×Woman	0.0754	0.0923	0.201	-0.192	-0.208
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
(10 July - 31 July)×Woman	0.00786	-0.120	0.286*	-0.0329	-0.291**
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
(7 August - 28 August)×Woman	0.0194	0.0419	0.441***	0.0248	-0.175
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
(4 September - 25 September)×Woman	0.144	0.0488	0.155	-0.226	-0.221*
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
(2 October - 23 October)×Woman	0.208	0.183	0.387**	0.00202	-0.129
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
(30 October - 20 November)×Woman	0.110	0.0411	0.146	-0.202	-0.315**
	(0.110)	(0.0965)	(0.128)	(0.125)	(0.107)
Constant	1.463***	5.155***	1.298***	1.714***	1.560***
	(0.0382)	(0.0334)	(0.0442)	(0.0432)	(0.0370)
N	8220	8220	8220	8220	8220
R^2	0.010	0.029	0.009	0.023	0.081

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This is the outcome of Equation 4.3 for the different categories of log expenditures with individual fixed effects.

	(1)	(2)	(3)	(4)	(5)
	Business	Food	Health	Transport	Education
Household Income	0.505***	0.148***	0.0176***	0.0245***	0.0442***
	(0.00665)	(0.00282)	(0.000565)	(0.00121)	(0.00357)
Share of Men Income	-176.8**	84.68**	0.879	-53.75***	-33.90
	(62.05)	(26.31)	(5.275)	(11.29)	(33.34)
Age	1.018	14.00**	2.898**	-3.271	13.78*
	(10.86)	(4.607)	(0.924)	(1.977)	(5.838)
Age^2	-0.0344	-0.187***	-0.0355**	0.0280	-0.114
	(0.133)	(0.0565)	(0.0113)	(0.0243)	(0.0716)
Household Participation	-27.52	101.2***	13.00***	64.19***	-38.24***
	(16.92)	(7.175)	(1.439)	(3.079)	(9.092)
Education	-2.801	-1.772*	0.337	0.307	-2.065
	(2.022)	(0.857)	(0.172)	(0.368)	(1.087)
Mild Health Problems	140.9	78.57	-43.93**	-50.60	-88.22
	(181.8)	(77.07)	(15.45)	(33.08)	(97.67)
Moderate Health Problems	-159.9	-62.48	27.40	29.21	-134.6
	(214.4)	(90.90)	(18.23)	(39.01)	(115.2)
Severe Health Problems	-308.1	-216.6*	-14.56	-105.7*	126.4
	(245.3)	(104.0)	(20.85)	(44.64)	(131.8)
Constant	-263.2	61.86	-65.11***	-18.47	-119.5
	(219.9)	(93.23)	(18.69)	(40.01)	(118.2)
N	6311	6311	6311	6311	6311
R^2	0.482	0.325	0.148	0.123	0.028

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B.7: Effects on Household Expenditures

Note: This is the result of estimating Equation 4.5 (with OLS) where we look at who's share has a larger impact on household expenditures on a certain category. This model also includes the control variables used for a robustness analysis. Household Participation indicates how many people in a household are participating in the survey. The health problems are dummies indicating what severity the health problem is.

	(1) Men	(2) Women	(3) Men	(4) Women	(fixed effects) Men	(fixed effects) Women
	log(Expenditures)	log(Expenditures)	log(Expenditures)	log(Expenditures)	log(Expenditures)	log(Expenditures)
7 February - 13 March	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
20 March - 10 April	-0.196	-0.124	-0.225	-0.157	-0.196*	-0.124*
	(0.191)	(0.130)	(0.196)	(0.126)	(0.0841)	(0.0577)
17 April - 8 May	-0.406*	-0.222	-0.417*	-0.421**	-0.406***	-0.222***
	(0.191)	(0.130)	(0.204)	(0.133)	(0.0841)	(0.0577)
15 May - 5 June	-0.264	-0.265*	-0.258	-0.348**	-0.264**	-0.265***
	(0.191)	(0.130)	(0.198)	(0.126)	(0.0841)	(0.0577)
12 June - 3 July	-0.431*	-0.354**	-0.442*	-0.465***	-0.431***	-0.354***
	(0.191)	(0.130)	(0.198)	(0.126)	(0.0841)	(0.0577)
10 July - 31 July	-0.426*	-0.474***	-0.426*	-0.555***	-0.426***	-0.474***
	(0.191)	(0.130)	(0.197)	(0.126)	(0.0841)	(0.0577)
7 August - 28 August	-0.522**	-0.397**	-0.616**	-0.466***	-0.522***	-0.397***
	(0.191)	(0.130)	(0.196)	(0.126)	(0.0841)	(0.0577)
4 September - 25 September	-0.586**	-0.515***	-0.681***	-0.538***	-0.586***	-0.515***
	(0.191)	(0.130)	(0.196)	(0.126)	(0.0841)	(0.0577)
2 October - 23 October	-0.560**	-0.344**	-0.628**	-0.358**	-0.560***	-0.344***
	(0.191)	(0.130)	(0.196)	(0.126)	(0.0841)	(0.0577)
30 October - 20 November	-0.411*	-0.261*	-0.404*	-0.274*	-0.411***	-0.261***
	(0.191)	(0.130)	(0.196)	(0.126)	(0.0841)	(0.0577)
Age			0.211***	0.290***		
			(0.0200)	(0.0124)		
Age^2			-0.00219***	-0.00322***		
			(0.000235)	(0.000149)		
Household Participation			-0.341***	-0.184***		
			(0.0336)	(0.0202)		
Education			0.00648	0.00979***		
			(0.00351)	(0.00252)		
Mild Health Problems			-0.180	0.931***		
			(0.375)	(0.250)		
Moderate Health Problems			-0.684	0.830***		
			(0.448)	(0.251)		
Severe Health Problems			-2.170***	-0.528		
			(0.539)	(0.282)		
Constant	5.649***	5.699***	2.370***	0.774**	5.649***	5.699***
	(0.135)	(0.0916)	(0.442)	(0.253)	(0.0594)	(0.0408)
N	3280	4940	2720	4110	3280	4940
R^2	0.005	0.005	0.097	0.154	0.027	0.029

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This is the result of estimating Equation 4.1 (with OLS) Equation 4.2 (with OLS) and Equation 4.1 (with individual fixed effects) on log total expenditures. The dates are all in the year 2020. Household Participation indicates how many people in a household are participating in the survey.
The health problems are dummies indicating what severity the health problem is.

Table B.8: Total Expenditures

	(1)	(2)	(3)	(4)	(fixed effects)	(fixed effects)
	Net Savings Men	Net Savings Women	Net Savings Men	Net Savings Women	Net Savings Men	Net Savings Women
7 February - 13 March	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
20 March - 10 April	-23.83	-24.61	-20.44	-30.23	-23.83	-24.61
	(122.7)	(36.52)	(132.9)	(40.96)	(46.64)	(20.24)
17 April - 8 May	-47.23	-11.91	-114.4	-2.242	-47.23	-11.91
	(122.7)	(36.52)	(138.3)	(43.18)	(46.64)	(20.24)
15 May - 5 June	-4.582	-9.351	-26.73	-5.364	-4.582	-9.351
	(122.7)	(36.52)	(133.7)	(41.10)	(46.64)	(20.24)
12 June - 3 July	22.61	-23.74	16.04	-19.50	22.61	-23.74
	(122.7)	(36.52)	(134.1)	(41.16)	(46.64)	(20.24)
10 July - 31 July	10.76	-34.41	22.25	-28.18	10.76	-34.41
	(122.7)	(36.52)	(133.0)	(40.95)	(46.64)	(20.24)
7 August - 28 August	2.004	-37.50	13.14	-39.15	2.004	-37.50
	(122.7)	(36.52)	(132.9)	(40.95)	(46.64)	(20.24)
4 September - 25 September	-70.33	-45.66	-41.67	-51.99	-70.33	-45.66*
	(122.7)	(36.52)	(132.9)	(40.95)	(46.64)	(20.24)
2 October - 23 October	11.98	-21.34	51.52	-20.61	11.98	-21.34
	(122.7)	(36.52)	(133.0)	(40.95)	(46.64)	(20.24)
30 October - 20 November	97.17	4.930	142.6	2.173	97.17*	4.930
	(122.7)	(36.52)	(133.0)	(40.97)	(46.64)	(20.24)
Age			-55.43***	11.17**		
			(13.53)	(4.039)		
Age^2			0.600***	-0.136**		
			(0.159)	(0.0485)		
Household Participation			-59.86**	-11.36		
			(22.72)	(6.565)		
Education			-1.731	8.687***		
			(2.374)	(0.819)		
Mild Health Problems			496.6	-85.08		
			(253.6)	(81.41)		
Moderate Health Problems			-240.3	-151.5		
			(303.0)	(81.70)		
Severe Health Problems			153.6	-28.69		
			(364.7)	(91.87)		
Constant	139.3	96.36***	1435.3***	-72.84	139.3***	96.36***
	(86.79)	(25.82)	(299.4)	(82.48)	(32.98)	(14.31)
N	3280	4940	2720	4110	3280	4940
R^2	0.001	0.001	0.012	0.033	0.006	0.003

Standard errors in parentheses. Levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This is the result of estimating Equation 4.1 (with OLS) Equation 4.2 (with OLS) and Equation 4.1 (with individual fixed effects) on net savings. The dates are all in the year 2020. Household Participation indicates how many people in a household are participating in the survey. The health problems are dummies indicating what severity the health problem is.

Table B.9: Net Savings