ESSAYS ON MATERNAL EMPLOYMENT AND CHILD HEALTH OUTCOMES

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Abstract

This thesis is composed of five chapters including three essays of original work relating to maternal employment and child health outcomes. The first chapter provides a motivation, a brief description of the data used and a summary of the findings. Chapter two, forms one of the three essays and provides findings on the impact of maternal employment and household socio-economic status on child health. The chapter uses data from Uganda Demographic and Health Surveys (UDHS) for 2006 and 2011. Chapter three is the second essay in this thesis and again uses Uganda Demographic and Health Surveys for the same years 2006 and 2011 but with a different unit of analysis from the second chapter, as it focuses on mothers instead of children. It investigates factors that influence mothers' decision choices for employment and subsequently the employment sector. The last essay forms chapter four which uses a UK rich data set of 'Understanding Society' to investigate the impact of maternal employment on a child's happiness. We make our general conclusion in chapter five and the appropriate recommendations.

KEY WORDS: Stunting, Comparative Wealth Index, maternal employment, Polygamous and Monogamous Marriages, routine, intermediate and professional jobs.

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CHAPTER 1

1.1 Introduction

There is generally an accepted view of the existence of health inequalities across the globe. Different countries have adopted different strategies to protect the health of their citizens, but health inequalities are widening within and between countries (see, Wagstaff et al., 2004). Among the most vulnerable are children. Many children especially in Africa and other developing countries are vulnerable to epidemics such as diarrhoea, cholera arising from natural calamities such as floods which have increased mortality rates (Douglas et al., 2008; del Ninno and Lundberg, 2005). Many of them come from poverty-stricken households and this puts them at a greater risk of poor health (Engle and Black, 2008). In addition, limited childcare provisions and failure of governments to support childcare, especially in the developing world has left many in despair and for mothers, an equally vulnerable group, have been left helpless.

The need of mothers to join the labour market makes childcare more challenging but is also seen as a solution for mothers to meet the needs of their children. There is literature that shows that children of mothers who participate in the labour market benefit from their mother's income (rather than father's) as women tend to spend their income on children directly and therefore improve children's health outcomes (see, Duflo, 2000). At the same time, other literature identifies risks to child health arising from mother's participation in the labour market (Berger et al.,2005; Rashad and Sharaf, 2019).

It is however clear that female participation in the labour market is increasing, given global efforts to empower women. While this is good in and of itself, mechanisms to support women and their offspring have not been put in place. Governments have not provided support to mothers to cope with both childcare and employment. Although literature on the effects of maternal employment is mixed with both positive and negative effects, our hypothesis is that maternal employment impacts on children of different socio-economic status differently and these effects may also depend on the employment choices made by the mother in terms of what motivates them to enter the labour market and when they decide, which sector they enter.

As a result, we investigate the impact of maternal employment and socio-economic status of a household on child health in our first essay. In the second essay we investigate determinants of mothers' decisions to enter the labour market, as well as their choice for a given employment sector. In the third essay we investigate how maternal employment and the related job characteristics influence a child's happiness.

In the first essay, we use the Uganda Demographic and Health Surveys for 2006 and 2011 to investigate the impact of maternal employment as well as household wealth on child health outcomes. A multivariate logistic regression model is estimated for the analysis using stunted growth as a proxy for the children's nutritional status and controlling for other relevant covariates. We focus on the rise in the new middle classes and the increase in maternal employment. Results indicate that children of employed mothers residing in middle-wealth households are more vulnerable to child stunting compared to their counterparts in poor and rich households. We also find the impact is greater for male children. We recommend that appropriate policies be implemented by the government to support mothers to cope with both conflicting realities of employment and childcare.

The second essay examines factors that influence employment decisions, and choice of employment sector by mothers with children below the age of five. Using a sample of mothers from the Ugandan Demographic and Health Surveys for 2006 and 2011, a multivariate logistic model was estimated to analyse the employment decision, while a multinomial logit model was used in the analysis of the employment-sector choice. We find, in common with the literature, that those employed are more likely to be educated to secondary school level, and more likely to be from poorer households. We find no shift in determinants of employment decisions by women between the two waves. On choice of employment sector, we find that in line with the existing literature, mothers with secondary education or more, are more likely to be in wage employment than in family or self-employment. Drawing on the literature we bring together other key variables not normally included in such estimations. We find mothers who have children when they are young (below 20) are less likely to be employed and if they do, they are more likely to choose family employment than wage or

self-employment. Secondly, while marital status has no impact on employment, mothers in polygamous marriages are more likely to be self-employed and less likely to choose family employment compared to their counterparts in monogamous marriages.

In our third essay we examine the impact of maternal employment on children's happiness. Due to data requirements, in this essay, we focus on the UK. Using 'Understanding Society' data for the period 2009 to 2015 we measure children's happiness by not only focusing on the general or global measure of life satisfaction that dominates the literature but based on different dimensions of child satisfaction including family and friend satisfaction which are key domains in understanding children's happiness but have had limited attention in literature. The general measure, we argue, may disguise important responses by adolescents under specific domains in their lives. We use the fixed effects estimator with Driscoll and Kraay (1998) Standard Errors in the analysis given existence of cross-sectional and temporal dependence (see, Hoechle, 2007). In all these estimates we find a negative impact of maternal employment on children's happiness in terms of general life, family and school satisfaction (also negative for child appearance satisfaction though not statistically significant) but a positive impact on friend satisfaction and schoolwork satisfaction. We argue that this could have attenuating effects on children's happiness if only a general measure of satisfaction was used. The study also reveals that children whose mothers are engaged in routine jobs or full-time jobs are more prone to lower levels of happiness compared to those whose mothers are employed in professional jobs or part-time jobs respectively.

In summary the key findings include, children of employed mothers residing in middle income households are more vulnerable to stunting compared to their counterparts in poor and rich households. Early births especially at ages below 20 negatively affects mother's choice to work and makes them more likely to work for family ending up in unpaid work. Meanwhile, mothers in polygamous marriages are more likely to be in self-employment but less likely to be in family work compared to their counterparts in monogamous marriages. Although Children's happiness in form of life, family and schoolwork satisfaction is

negatively affected by maternal employment this impact is small given that children's scores in self-rated questionnaires across all dimensions are skewed towards completely happy as opposed to completely unhappy. In addition, the negative effect on happiness in general, is reduced by the positive impact on friend and schoolwork satisfaction.

For the rest of this thesis, chapter 2 investigates the impact of maternal employment and social economic status on child health measured by the rate of stunted growth. Chapter 3 uses the same data set as chapter 2, to investigate determinants of maternal employment decisions regarding whether to work and if so in which sector drawing links between the two chapters. Chapter 4 investigates the impact of maternal employment and its forms on children's happiness measured by different dimensions of child satisfaction. In chapter five, we conclude and bring together the general findings of the thesis, identify possible caveats and make policy recommendations based on the results. The last chapter (6) is the bibliography.

CHAPTER 2

Is Higher Household Wealth a Reflection of Better Child Health Outcomes? Analysing the Impact of Maternal Employment on Child Health in Uganda

2.1 Introduction

Across the globe it has been found (Ruhm, 2000; Britto et al., 2017) that increased levels of parental childcare contribute to the improvement of children's health. The developed world has incorporated legislation in their childcare systems that ensures reliable care by either parent, childminders, nannies, au pairs, nurseries or schools. In many developed countries, child carers must be formally registered; usually have some training; and are paid at least a minimum wage. In addition, parents in Europe and the Commonwealth, for instance, may receive child benefits alongside free health care; and are often given longer and more flexible paid leave schemes compared to parents in developing countries[1]. In countries such as Sweden these rights are extended to both parents. Furthermore, child abuse attracts prosecution reflecting the strength of institutions in protecting children. All this contributes to better health outcomes for children in the developed world. As a result of these provisions, maternal employment in the developed world may be less of a concern to parents compared to their counterparts in the developing world where the story is markedly different.

Childcare provision is often unregulated and depends largely on extended families and informal caring arrangements. Institutions for child protection are relatively weak and rarely provide registration that would enable child protection. Carers are often paid below a minimum acceptable wage. Maternity

[1] The World Policy Analysis Centre (https://www.worldpolicycenter.org/policies/is-paid-leave-available-for-mothers-of-infants) provides details on the variation in maternity leave policies across the world. Countries that provide paid leave for 52 weeks or more include Canada, Germany, Sweden, Poland, Austria and Russian federation. 26-51.9 weeks; include the UK, India, Iran, Italy, France, Norway, Finland, Ireland, Chile and Venezuela. Countries giving 14-25 weeks or below 14 weeks include those in Africa, Australia, China, Mexico and some Middle East countries. Uganda gives less than 14 weeks and the US in the worst position with no paid leave to mothers. A recent study by Jou et al., (2018) shows that the US is one of the three countries world-wide with no national policy guaranteeing paid leave to employed women who give birth.

leaves are shorter. Payments to parents whilst on leave are relatively low compared to what is paid to parents on leave in developed countries.

With these limited provisions in mind, this study explores the impact of maternal employment on child health outcomes in a developing country. As employment patterns[2] shift and more women are encouraged to work in the formal and informal sector we investigate the effects of maternal employment and the socio-economic status of a household on child health in Uganda. This deviates from the standard literature which focuses on the effect of maternal education on child health (see Abuya et al., 2011; Bbaale, 2011; Ikeda et al., 2013; Shin, 2007; Shroff et al., 2009; Wakou and Bell, 2005); and the effect of maternal employment on child nutrition (Cooklin et al., 2008; Lamontagne et al., 1998; Rivera-Pasquel et al., 2015; Tucker and Sanjur, 1988). Instead we combine the effect of the household's socio-economic status and maternal employment on child health to explore the more nuanced pathway through which maternal employment affects child health outcomes.

The existing literature on the potential effects of maternal employment on child health is mixed. In a study on poor Indians and refugees from Bangladesh, Ulijaszek and Leighton (1998) show that maternal employment improves children's nutritional status. Children of employed mothers had significantly higher height for age compared to those whose mothers do not work. Similarly, studies on household resource allocation in developing countries indicate that income earnt by women increases their bargaining power, which leads to improved child health outcomes (Hoddinott and Haddad, 1995; Luke and Munshi, 2011; Thomas, 1990).

However, there is also literature identifying the negative outcomes of maternal employment on child health. Kimbro (2006) shows that the employment status of low-income working mothers in the US can threaten childcare in terms of the limited time allocated to activities like breastfeeding, attending vaccination

[2] Some literature (Verick 2014) argues that improving employment outcomes for women takes more than raising labour market participation. That the quality of employment matters because engaging in vulnerable employment is unlikely to improve the economic empowerment of women but instead a reflection of the subordinate position of women in a household.

clinics for the child and providing a well-balanced diet. Child health can also be affected by caregiver's attitudes (Beginet al., 1999).

The net effect of maternal employment on child health may be positive if income benefits can adequately compensate for the childcare lost. If the income is not high enough to outweigh the negative effects of maternal employment, it will negatively affect child health (See Begin et al., 1999; Lamontagne et al., 1998).

In this study we disentangle the effect of maternal employment on the health of children with different socio-economic backgrounds. Our study uses the Uganda Demographic and Health Surveys for 2006 and 2011 with respective samples of 2465 and 2130 children. We use stunted growth as the measure of child nutritional status since it represents long term malnutrition. Data[3] reveals that on average 81 percent of mothers in both surveys were employed and on average 35 percent of their children were stunted. Comparing this to women that are not in employment we find only 30 percent to be stunted. In terms of socio-economic status, statistics show that middle income households have a larger proportion of stunted children (40 percent average for both surveys) compared to the rich (26 percent) and poor households (35 percent). Our hypothesis is that higher rates of stunted growth for middle income children are partly explained by employment of middle-income mothers. We investigate this relationship using a multivariate logistic model for each of the surveys, with an interaction term combining maternal employment and household wealth. We further run the same model on sub-samples of female and male children from each survey to identify the gender differences associated with stunted growth.

We seek to answer the question as to whether there is higher risk of child malnutrition for children whose mothers are in employment compared to those whose mothers are not in employment. By considering the socio-economic status of the household we find a more nuanced story than discussed in the standard literature. Focussing on poor households we find that children of working mothers do fare better. Children in poor households, whose mothers are in employment are exposed to a relatively lower risk of stunted growth compared

[3] In our reduced sample, the employment rate for 2006 was 87 percent and in 2011, it was 75 percent. These rates are therefore different from those in the respective DHS reports.

to those whose mothers are not employed. This could imply that maternal employment is important to child nutrition in a very poor environment (Ulijaszek and Leighton, 1998).

However, we find that children of employed mothers in middle-income households are exposed to a higher risk of stunted growth than children whose mothers are not in employment. This implies that maternal employment imposes a greater risk to child health for mothers in middle income households. We attribute this to the pro-poor programs that leave out middle-income earners (see ICF International inc., 2014). According to Ravallion (2009) this group is equally vulnerable given that the majority live near to the lower bound of the income category. Middle income earners are also more likely to use domestic helpers (Annor, 2014), the majority of whom are poorly educated especially in the developing world (see Dinkelman and Ranchhod 2012). This exposes children to poor care behaviour and as a result poor child nutrition.

In the models we control for other covariates that relate to the characteristics of the children, their mothers and other household backgrounds. In further analysis, we find that children from middle income households are in general more likely to be stunted compared to their counterparts in poor and rich households. Male children of employed mothers in middle income households are also found more prone to stunted growth relative to their female counterparts when both are compared to children of employed mothers in rich households with an average risk of 14 percent and 12 percent respectively.

The rest of this chapter is organised as follows: Section 2 discusses the background to the study (section 2.1) and the literature for both developed and developing countries (section 2.2). Section 3 describes the data and methods. Section 4 presents and discusses the key findings. We conduct a sensitivity analysis in section 5 and conclude in section 6.

2.2 Background and Literature Review

2.2.1 Background to the Study

In the background section we discuss the two key variables in the study, namely; maternal employment/female employment and household wealth with respect to Uganda. We relate changes in female employment to changes in labour care activities[4] given the implementation of the Employment Act 2006 and the 2007 Ugandan Gender Policy and analyse their possible impact on labour force growth rates, medium monthly incomes (Table 2.1-below) and other labour market outcomes. We also relate the country's growth rate to household wealth during the survey period since this has implications for childcare arrangements and the possibility of maternal employment.

The rate of female employment in Uganda declined between 2005/6 and 2009/10. According to the 2011 DHS report (Uganda Bureau of Statistics (UBOS) and ICF International Inc, 2012), the employment of women aged 15-49 decreased from 81 percent in 2006 to 69 percent in 2011, while that of men decreased from 94 percent in 2006 to 91 percent in 2011. In terms of occupation, the agricultural sector employed more women in 2006 (75 percent) than in 2011 (57 percent). There was a shift to other occupations, for example women working in sales and services increased from 13 percent in 2006 to 17 percent in 2011.

The Uganda National Household Survey (UNHS) 2009/10 report (Uganda Bureau of Statistics 2010) also shows negative changes in female employment (see table 2.1 below); in 2005/6 the unemployment rate for the female population was 2.1 percent and more than doubled by 2009/10 to 5.2 percent. However, there was an increase in the annual labour force growth rate for the female population from 2.9 percent between 2002/3-2005/6 to 5.3 percent during 2005/6-2009/10 (see table 2.1). We attribute this to the implementation of the Employment Act 2006 and the 2007 Uganda Gender Policy which could have improved the labour market conditions for the female population. The

[4] Labour care activities include; looking after children, caring for the sick, fetching water, firewood and cooking, own construction or repairs, and food processing for own consumption.

Employment Act 2006[5] reduced gender discrimination in the labour market and called for men and women to be paid equally.[6] The 2007 Uganda Gender Policy[7] focused on ensuring improved livelihoods, promotion and protection of women's rights, ensuring their effective participation in decision making and governance, as well as acknowledging and considering gender issues in macro-economic management. The policy also included an institutional framework that holds all sectors accountable for their specific gender mainstreaming roles including development partners, urban authorities, local governments, Civil Service Organisations (CSOs) Faith Based Organisations (FBOs) and the Private sector. All these could have opened more employment opportunities for the female population thereby increasing growth in female labour force that surpassed the available job opportunities. Table 2.1 below gives statistics on changes in employment, labour supply, labour earnings, before and after the Employment Act 2006 and 2007 Uganda Gender Policy were implemented.

Table 2. 1: Changes in labour supply, employment and wage earnings after policy change.

Variable	Female		Male	
	2005/6	2009/10	2005/6	2009/10
Unemployment[8] rate (%)	2.1	5.2	1.7	3.0
Annual labour force growth rate (%)-Averages for 2002/3-2005/6 and 2005/6-2009/10	2.9	5.3	4.4	4.0
Real Median monthly earnings (000's of shs) of persons in paid employment (2005/6=base)	40	41	80	52

Source: UNHS 2005/6, UNHS 2009/10 and the Labour Force Report 2013.

[5] http://www.ilo.org/dyn/natlex/docs/SERIAL/74416/76582/F1768664138/UGA74416.pdf

[6] Part II section 6, sub-section 3, stipulates that "Discrimination in employment shall be unlawful and …, discrimination includes any distinction, exclusion, or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin, the HIV status or disability which has effect of nullifying or impairing the treatment of a person in employment or of preventing an employee from obtaining any benefit". In addition, Part II section 6, sub-section 7, stipulates that "Every employer shall pay male and female equal remuneration for work of equal value".

[7] http://www.mglsd.go.ug/policies/Uganda-Gender-Policy.pdf

[8] Unemployment rate and labour force growth rate are from UNHS 2005/6 and 2009/10. While monthly earnings are from the Labour Force Report of 2013.

The table above shows that there was a reduction in income disparity between the female and male population. In 2005/6 the real median monthly income for males was 80,000 shillings (Shs) while that for females was only 40,000 Shs (UBOS and UN, 2013). However, after the establishment of the Employment Act 2006, this gap reduced greatly as the real median monthly income for males fell to 52,000 Shs while that for females increased to 41,000 Shs.

There were also changes in average time spent on economic[9] and care labour activities[10]. According to the UNHS report there was a decline in time spent on economic activities by both males and females between 2005/06 and 2009/10 (see graph 1 below). In both surveys the female population spent less time on economic activities than males with 42 and 30 hours compared to 51 and 36 hours. Instead the female population spent more time on care activities. However, overall, care time by both females and males fell from 70 hours in 2005/6 to 48 hours in 2009/10 which could have had implications for child health.

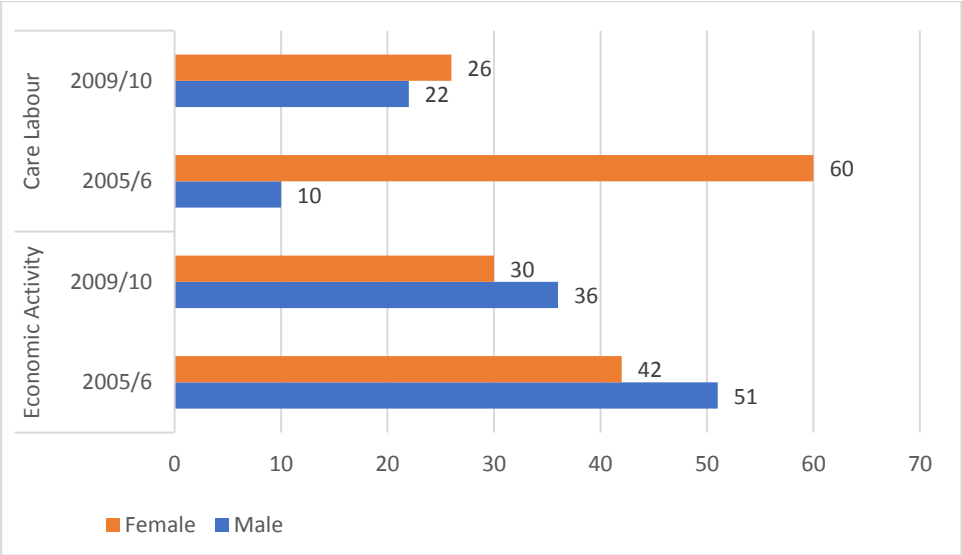
However, an interesting finding is the change in the relative amount of time spent on care activities by gender. For men the amount of time spent on these activities doubled in 2009/10 from 10 to 22 hours per week while for women it decreased by more than 50 percent from 60 to 26 hours per week. This could be explained by the emancipation policies at the time that may have promoted care activities to be fairly shared by the sexes, or employment laws that made it more favourable for the female population to increase their participation in economic activities and as a result reduce care time. What is also evident is that the ratio of time spent by females on economic activities to that spent by the males

[9] Economic activities are defined in UNHS 2010 Report (page 32) as those that contribute the country's National Income according to the System of National Accounts (SNA). While the care labour activities (non-economic activities) are those that do not contribute to the measured National Income.

[10] UNHS 2006 Report (page 35) outlines causes for the decline in both economic and care labour activities. One of them is age; it shows that average hours worked per day on economic activities increase initially with age up to 30-34 years and there after decrease with age. On the other hand, hours worked per day on care labour activities increase with age and reach a peak at 20-24 years then start declining. It also mentions that as age increases the gap between hours spent on economic and labour care activities widens. Increase in the level of Education also leads to a decline in care labour activities but an increase in economic activities and vice-versa. More education for women could reduce their care labour activities but would increase economic activities if jobs are available.

increased from 0.81 in 2005/6 to 0.83 in 2009/10 (See Figure 2.1 below) implying an increase in the economic activities by females relative to males.

Figure 2. 1 : Average Time Spent on Economic and Care Labour Activities Per week by Gender (Hours)



***Source**: Own construction, using data from UNHS 2005/6 and 2009/10*

We now discuss the country's growth rate relating it to household wealth and considering the issue of inequality. The country's average annual growth rate during 2000-2014 was at 6.6 percent which is higher than the Sub-Saharan average of 4.9 percent (United Nations (UN) and Ministry of Finance, 2015). In 2010 the country met the Millennium Development Goal of halving the proportion of people whose income is less than one dollar a day. This suggests an improvement in average wealth of a household. However, statistics from the UNHS Report 2010 (Uganda Bureau of Statistics, 2010) indicate that although the incidence of poverty was declining during 2005/06-2009/10, inequality was worsening. The national Gini coefficient increased from 0.41 to 0.43 between 2005/6 and 2009/10. The worst inequality was seen in sub-regions of Kampala (0.43), Central 1 (0.46), North East (0.51) and South Western (40) in 2009/10. Urban areas had a Gini coefficient increasing from 0.43 to 0.46, while for rural areas it increased from 0.36 to 0.38 during the same period.

2.2.2 Literature Review

We discuss literature relating to female employment and household wealth as key variables in this study. We reflect on literature from both the developed and developing countries and show how they differ in their findings. We also explore studies that have used the Demographic and Health Surveys and others focusing on child nutrition, to examine the determinants of child health, then show how our study builds on these existing studies.

2.2.2.1 Literature on Female Employment

A study from the US by Berger et al., (2005) uses data from a National Longitudinal Survey of Youth to determine the relationship between mothers' returns to work within three months of giving birth and the health and developmental outcomes of their children. Results indicate that children whose mothers return to work early are less likely to receive regular medical check-ups and breastfeeding in their first year of life. They may also not receive all their immunisations. These results are stronger for mothers who return to work in the first three months and on full-time basis. This is possibly because the US has no policy that guarantees paid maternity leave for mothers (Jou et al., 2018). In other developed countries where there is some support to mothers the case is different. A recent study in Italy (Brilli et al., 2016) shows that public childcare increases the probability that a mother will work by 1.3 percentage points.

The impact of maternal employment on child health in developing countries is twofold. Some studies show that maternal employment is positively associated with child health, while others indicate a negative relationship.

A study Ulijaszek and Leighton (1998) on a sample of poor Indians and refugees from Bangladesh in Calcutta shows that maternal employment increases the nutritional status of children in form of Height for Age (HA). The study finds the Z-scores of HA for children of jobless mothers extremely low-indicating the importance of maternal employment on young children's nutritional status in a very poor environment. However, the study also notes that the employed mothers were mainly taking part in the informal economy, working part-time and usually carrying their children with them and that the youngest children would be able to be breastfed on demand. It concludes that maternal employment

need not negatively influence child nutritional status especially if mothers work part-time and have their children with them.

Similarly, Ukwuani and Suchindran (2003) conduct a study in Sub-Saharan Africa using Nigeria as the case study to investigate the impact of women's work on child nutritional status. It considers whether women earned cash from their work and carried their children to work, in order to assess the importance of childcare and income in understanding the impact of maternal employment on child nutrition. Their findings reveal that maternal employment has a negative effect on child health during infancy but a positive effect during childhood. The study finds a negative and significant impact of women's economic activities on stunting of their children during childhood, whether they earn cash or not. However, after controlling for confounding social economic variables, children of mothers who do not earn cash but went to work with their children had similar levels of stunting with those of non-working mothers. This would imply a positive effect of earned cash on child nutrition, although authors find this less visible in the results.

A cross-country study (Oddo and Ickes, 2018) using 50 Demographic and Health Surveys samples from low and middle-income countries (LMICs) investigates the association between maternal employment and infant and young child feeding (IYCF) practices using three indicators, namely; exclusive breast feeding (EBF), minimum deity diversity (MDD) and minimum meal frequency (MMF) among children aged below 6 months (foe EBF) and those aged 6-23 months (for MDD and MMF). Their findings indicate that neither formal employment nor informal employment were associated with EBF. However, both children of formally and informally employed women had higher chances of meeting the MDD and MMF compared to those of the non-employed women. That also, compared to informally employed women, formally employed women were less likely to continue breastfeeding after one year. The study recommends that given the expected increase in labour force participation by women in LMICs, intervention strategies and policy-level approaches that support breast feeding among formally employed mothers should be considered and identified.

Another study by Harvey et al., (2018) also uses Demographic and Health Surveys from Cambodia, Myanmar and Indonesia, to investigate the socio-economic differentials in minimum dietary diversity (MDD). The study shows that most of the children (over 70 percent) from the low-income countries of Cambodia and Myanmar are in rural areas while those in Indonesia which is a middle-income country are halfway in rural and urban areas. It indicates that female labour force participation in Indonesia has remained relatively high compared to the other two countries and that children born of mothers actively engaged in the labour force in Indonesia with high status, in professional or skilled jobs with job security and year-round employment and wages in Indonesia, were more likely to receive MDD than their counterparts

Garti et al., (2018) investigate the effects of maternal daily work hours on the nutritional status of children in the Northern region of Ghana. They find that, longer maternal daily work hours are associated with reduced prevalence of stunting in children. The study compared children of mothers in public service who mainly worked for more than 6 hour a day to mothers who are farmers who mainly worked for fewer hours. It reveals that children of farmers had a 22.1 percent prevalence to stunting compared those of mothers in public service who had a prevalence to stunting of only 12.8 percent. The study attributes this to possible higher income and increased food expenditure and household food availability among mothers in public service as well as the social-cultural factors such as childcare and food preparation by grandparents, older siblings or other extended family members that reduce chances of stunting in their children. The study highlights that due to the cross-section nature of the data however, the causal relationships could not be implied.

Along similar lines, Lamontagne et al. (1998) found children of employed mothers fared better in weight and height than those whose mothers were not employed. Examining the relationship between women's employment, childcare strategies and nutritional status of children aged 12 to 18 months in 80 Nicaraguan households in ten low income urban communities, they noted that children with inadequate alternative childcare had a lower height for age compared to their counterparts.

Meanwhile, although Tucker and Sanjur (1988) underscore the finding that maternal employment has two conflicting effects on child nutrition, via increased income and decreased time available in the household, their results indicate that maternal employment in Panama, has a positive effect on child nutrition. They find that although maternal time in household production decreases with employment, total household time does not reduce due to the input of other household members.

On the other hand, other studies indicate a negative impact of maternal employment on child health. For example, Rashad and Sharaf (2019) investigate the impact of maternal employment on child nutritional status in Egypt. Their study uses PSM, OLS methods and IV 2SLS methods. Their results indicate that maternal employment increases the probability of having a stunted child by 18 percent and the probability of being wasted by 13 percent for children whose mothers are employed.

Leslie (1988) reviewed 50 papers investigating the relationship between women's work and child nutritional status and women's work and infant feeding practices. The review found several studies that compared nutritional status of children of employed and not employed mothers and found a negative relationship between maternal employment and child nutritional status. Similarly, there were also several studies that found a positive association between women's work and child nutritional status. Many studies found better nutrient in-take among children whose mothers worked, especially among children of higher income working mothers. The study however found no consistent pattern of negative or positive relationship either between women's work and child nutrition or women's work and infant feeding practices. It concludes that there is little evidence of the negative relationship between women's work and child nutrition.

2.2.2.2 Literature on Household Wealth

Child health outcomes in developed countries appear to be tied closely to the national provision of health care. A study from the US (Case et al., 2001) finds a positive relationship between child health and household income, with the

relationship becoming more pronounced as children grow older. Using the National Health Interview Surveys, and the National Health and Nutrition Examination Survey, they find that a large proportion of chronic health conditions arise during childhood. Children from poor households will have worse health conditions than children from well off households. They find that child health is closely associated with long-run average household income and that negative effects of lower permanent income accumulate over a child's life.

In contrast, for the UK which has a National Health Service, although Currie et al., (2007) also find a positive family income effect on child health using the subjective measure of general health status from the England Health Survey, they find it is very small. They also find that it does not increase with the child's age. They find no evidence of the gradient with more objective measures of health status such as blood test results or medical examinations. They conclude that family income is not a major determinant of child health in England, but instead nutrition and family lifestyles have an important role in determining child health. They recommend that given the size of these effects the promotion of healthy eating and active lifestyles may be a more effective policy instrument for improving child health than a strategy of re-distribution of income.

Most studies focus on individual countries. Boyle et. al. (2006) estimate the relative importance of development level, household wealth and maternal education on child health for 42 developing countries. They find that all the three variables have strong independent associations with child health. Regressions of child health on household wealth and maternal education however, showed substantial cross-country variations in both strength and form of association. Unlike maternal education, the pattern of household wealth was found to be erratic as in many countries there were diminishing returns to child health at higher levels of household wealth. The study reveals for example that in Egypt, the association between weight for age and household wealth becomes stronger at higher levels of wealth. However, in Mali the same association becomes weaker as household wealth increases.

Duflo (2000) investigates the relationship between child health and household resources in South Africa, using evidence from the old age pension programme. Findings show that the programme improved the health and nutrition of children especially for girls staying with women pensioners. Girls who were born after the programme implementation (so had no years of malnutrition) were taller if living with an eligible woman (but not a man). The finding did not extend to boys. The conclusion is that an exogeneous increase in income can improve child health especially when this income is in hands of women other than men.

In a longitudinal study aimed at investigating the relationship between household income and child mental health over time, Strohschein (2005) uses growth curve models to evaluate the effects of initial income and changes in income on trajectories of child mental health. The study finds a statistically significant relationship between initial household income and initial child mental health with lower levels of depression and anti-social behaviour. A decrease in income is associated with higher levels of depression and anti-social behaviour and the reverse is true of an increase in household income. The study also finds that the impact of initial household income on the rate of change in child depression declines as the child grows older while that on anti-social behaviour instead becomes stronger.

The above studies highlight the expectation of seeing a positive relationship between child health and household wealth or income but identify cases where the relationship may take a different direction. For instance, this may depend on whether it is the mother or husband that has a say on household income.

2.2.2.3 Literature on Demographic and Health Surveys (DHS)

There are a number of studies on child health outcomes using DHS data. Many of these focus on the impact of maternal educational attainment on child nutritional status. Shin (2007) using the 2000 DHS for Peru finds that the effect of maternal education on child health varies by region. Maternal education is less important for child health in urban areas, but that a higher level of education has a greater impact in rural areas. A substantial part of this effect is attributed to differences in living conditions and economic environments among communities.

Examining the influence of maternal education on child immunization and stunting Abuya et al. (2011), using the Kenyan DHS of 2003 find that in general, children born to mothers with at least primary education were more likely to be fully immunized compared to their counterparts whose mothers have no education at all. Similarly, children born of mothers with primary education were 94 percent less likely to have stunted growth compared to those whose mothers had no primary education.

Investigating the combined effects of maternal characteristics, environment and treatment options on prevalence of diarrhoea among children in Uganda, Wakou and Bell (2005) find for 2000/01 that while mothers' education is a mediating factor between the environment and the child, it has less effect when environmental factors change. The study gives an example of water supply where the main problem is that of infrastructure and access. Authors argue that in this case individual characteristics, such as education and awareness of mothers, cannot offset the effects of increased pollutants that may affect the quality of this water.

Bbaale (2011) finds that while mother's education matters, environment is also key. Children born of mothers with secondary and post-secondary education are less likely to suffer from diarrhoea by 5 to 7 percent, and 11 percent, respectively, compared to their counterparts whose mothers have no education qualifications at all. The study also revealed that living in rural areas increases the probability of Acute Respiratory Infection (ARI) occurrence in children by 8 to 9 percent compared to their counterparts in urban areas; while being in a higher wealth quintile reduces the probability of ARI occurrence in children by 5 to 18 percent compared to being in a lower wealth quintile.

The implication of these studies is that the area of residence, environmental factors and mothers' education can have important ramifications for child health.

Other studies have looked at more general determinants. For instance, Rahman et al., (2009) use the 1999/2000 DHS to examine the levels and determinants of acute malnutrition in Bangladeshi children aged 0-59 months. They found that the mother's Body Mass Index (BMI) and media exposure, birth size, child's age

and respiratory sickness in childhood were significantly associated with both severe and moderate wasting.

Kabubo-Mariara et al., (2009) using a pooled sample from the 1998 and 2003 Demographic and Health Surveys for Kenya, analyse the determinants of children's nutritional status captured by children's height and probability of stunting. They find that boys suffer more malnutrition than girls, and that older children, children of higher birth order and multiple birth children are more likely to be malnourished than their counterparts. They further reveal that mothers' education is more important than fathers' education on the nutritional status of their children and this nutritional status increases at a decreasing rate with household assets.

In Cambodia, Ikeda et al. (2013) assessed how changes in socioeconomic and public health determinants may have reduced stunting prevalence among children. Using a DHS for 2000, 2005 and 2010 and a hierarchical logistic model, they find that the reduction in stunting prevalence during the past decade was attributable to improvements in parental education, sanitation and household wealth, birth spacing and reduction in maternal tobacco use. Socio-economic development and public health improvements were found to have reduced child stunting in Cambodia.

Finally, Shroff et al. (2009) in Andhra Pradesh find women with higher autonomy measured by access to money and freedom to choose to go to the market were found less likely to have stunted children after controlling for household socio-economic status and maternal education. The study found that in the south Indian state, these two dimensions of female autonomy have an independent effect on child growth, emphasizing the importance of promoting women's financial and physical autonomy.

Most of the DHS studies look at the impact of maternal education and other maternal characteristics on child health. Others look at environmental factors such as pollution of water sources. Such studies have emphasised the impact of covariates such as (but not limited to) parental education, mother's body mass index and height, mother's autonomy and mother's media exposure on child health, controlling for children's characteristics.

2.2.2.4 Other Literature Relating to Care Behaviour and Gender of Child

There is also vast literature relating to the health and care behaviour of parents or caregivers on child health. Variyam et al. (1999) using household production theory specify their empirical model of children's diets. They argue that if the allocative efficiency hypothesis is valid, then mother's health and nutrition knowledge should be related to her education level and to the extent that a mother controls it, her children's diets should be positively related to their mother's health and nutrition. They find significant evidence that maternal health and nutritional knowledge influences children's diets, although the impact diminishes with the age of a child.

Gibson et al., (1998) contribute to this debate and argue that children's consumption of fruit and vegetables are related to different psychosocial and environmental factors and promotion of this behavior requires attention to nutrition education and child feeding strategies of parents. The study finds mother's nutrition knowledge strongly correlated to their children's fruit intake. Children's vegetable consumption was independently explained by the child's liking for commonly eaten vegetables and mother's belief in the importance of disease protection when choosing her child's food. On the other hand children's consumption of confectionary was predicted by the mother's liking for confectionary and the childrren's concern for health in choosing what to eat.

We also acknowledge the extensive literature on child health which has reported significant gender differences in male and female child health outcomes. A number of studies find that the health of male children is more vulnerable than that of female children. Wamani et al. (2004), find that more boys than girls were significantly stunted in poorer than in wealthier socio-economic strata in Hoima district of Uganda. The study reveals that the magnitude of the difference in stunting between boys and girls did not only diminish with improvements in socio-economic status but also varied with mother's education level. Mothers with no formal education were significantly more likely to have more boys stunted than their counterparts with education above primary.

In another study, after analysing 16 Demographic and Health Surveys in 10 sub-Saharan countries, Wamani et al. (2007) conclude that male children are more

likely to be stunted than female children and they attribute this to possible health inequalities in these countries. The study finds that the mean z-scores of stunting were consistently lower amongst female than male children in all the 10 studies. The difference in the pooled estimates for the mean z-scores between male and female children was statistically significant. The study also finds that compared to female children, male children in the poorest households were more likely to be stunted although the pattern was not consistent in all the ten studies. Similarly, Ukwuani and Suchindran (2003) use DHS for Nigeria and find that male infants are more stunted than female infants.

On the other hand, in trying to compare incidence of stunting among Cebu children in Philippines, Adair and Guilkey (1997) find that the number of new cases of stunting in males consistently exceeding that of females only in the first year, with the peak for both occurring at around 8 months of age. During the second year, there were more new cases of stunting in females with a peak at 16 months of age. So, their finding is that male children are more likely to be stunted in their first year, while females in their second year of life.

Other studies, however, show that countries that report high levels of sex discrimination against women and hence female children, for instance South Asia countries, see higher rates of female child mortality (Chen et al., 1981; Gupta, 1987).

This literature on the relationship between care behaviour and child health provides a good guide on generating recommendations to address child malnutrition. In our analysis, we utilise literature on gender differences in child health to investigate whether child stunting follows any pattern that may suggest presence of gender discrimination amongst children in Uganda with the hypothesis that female children are more favoured than the male given they are less vulnerable to poor health based on previous studies from developing countries.

Now reflecting on the general assessment of the entire literature, there is evidence that maternal employment has a positive effect on child health outcomes. It is also noted that increased levels of wealth see positive child health outcomes. And yet for Uganda with growing GDP, and falling poverty, we see

little impact on child stunting. With these findings in mind we examine the impact of maternal employment on child nutritional status in Uganda, taking into account the socio-economic status of individual households.

2.3 Data and Methods

We use data on children under-five years of age from the Uganda Demographic Health Surveys (UDHS) conducted in 2006 and 2011. In each of these surveys a representative sample of households were selected in two stages; in the first stage, clusters were selected from among the list of clusters sampled for the Uganda National Household Survey (UNHS) 2005 and 2010. The clusters in the two UNHS 2005/06 and UNHS 2009/10 were selected from the 2002 population Census sample frames. The matching of the samples was meant to link health indicators in UDHS 2006, UDHS 2011 to poverty data from UNHS 2005 and UNHS 2010 respectively (Uganda Bureau of Statistics (UBOS) and ICF International Inc, 2012; Uganda Bureau of Statistics (UBOS) and Macro International Inc, 2007). For the UDHS 2006, an additional 17 clusters were selected from the 2002 population census frame in Karamoja in order to increase the sample size for reporting Karamoja specific estimates in UDHS.

In the second stage, all households in each of the sampled clusters were completely listed and a sample of households was purposively selected. All households in these clusters that participated in the UNHS were included in the UDHS sample. All women of reproductive age 15-49 years that were either permanent residents of these households or visitors who slept in the household the night before the survey were eligible for the interview. All men aged 15-54 in one third of the selected households that were either permanent residents of these households or visitors who slept in the household the night before the survey were eligible for the interview. Anthropometric measures for height and weight were carried out on all eligible women aged 15-49, children under-five years of age in all the selected households and all eligible men aged 15-54 in one third of the selected households. Children younger than 24 months were measured for height lying down, older children were measured standing (Uganda Bureau of Statistics (UBOS) and ICF International Inc, 2012; Uganda Bureau of

Statistics (UBOS) and Macro International Inc, 2007). The data includes the three key variables needed for this study, namely: child health; maternal employment; and household wealth.

2.3.1 Measurement of Variables

Nutritional status, measured as the child's height for age, is the key dependent variable. We consider children living in the household aged 0-59 months. Children whose height for age z-score is below minus two standard deviations (-2SD) from the median of the WHO reference population are considered short for their age or stunted (Begin et al., 1999; Uganda Bureau of Statistics (UBOS) and ICF International Inc, 2012). We focus on stunting because it shows long term cumulative effects of inadequacies of nutrition unlike wasting or weight for height (Ikeda et al., 2013). Child nutrition is coded '1' for children who are stunted or whose height for age z-score is less than negative two standard deviations and '0' otherwise. Reported in table 2.2, in the 2006 survey, out of a sample of 2465 children 35 percent were stunted; for the 2011 survey, out of a sample of 2130 children, 31 percent were stunted.

Maternal employment is our first independent variable of interest. The variable is a dummy, taking a value "1" if the mother is employed and "0" otherwise. Mothers not in employment then act as the reference group. Descriptive statistics in table 2.2 below indicate that employed mothers have a larger proportion of stunted children with 36 percent in 2006 and 33 percent in 2011 compared to 33 and 27 percent for the non-employed mothers. From the previous literature review these summary statistics could be attributed to childcare arrangements in terms of feeding, giving medication, immunization and hygiene which may greatly worsen in the absence of the mother. This is expected to be more pronounced when using untrained nannies for childcare rather than close relatives.

The wealth index is the second independent variable of interest. It is a composite measure of a household's cumulative living standard. We use the Comparative Wealth Index as calculated by the DHS/ICF International Inc. using easy-to-collect data on a household's ownership of selected assets such as televisions

and bicycles, materials used for housing construction and types of water access and sanitation facilities (Measure DHS/ICF International Inc, 2013).

Following the DHS methodology, we computed the Comparative Wealth Index by adjusting the survey-specific DHS Wealth Indexes through regression on anchor cut off points of the baseline wealth index (Rutstein and Staveteig, 2014). Using Comparative Wealth Index, the quintiles are then re-grouped from 5 to 3 categories: poor for poorer and poorest, middle for middle, rich for richer and richest for easy interpretation and comparisons across groups. A dummy is generated for each of these three groups.

2.3.2 DHS Wealth Indexes vs Comparative Wealth Index

Although using household income and expenditures could be the more direct way of establishing a household economic status and health equity, Rutstein and Staveteig (2014) show that in DHS surveys, direct estimates of income and expenditures are not practical. In addition, other literature (Montgomery et al. 2000) indicate that collection of accurate income or expenditure data in health related household surveys is hindered by many factors including misreporting. However, Rutstein and Staveteig (2014) indicate that information on differences in health equity can be derived from existing DHS surveys without using income or expenditure data. This study indicates that using a Comparative Wealth Index is effective in producing aggregate results that match the per capita income measures for countries and regions.

The DHS Wealth Index is a survey specific measure of relative economic status of households based on the analysis of household assets and service amenities at a point in time. It is calculated separately for each survey as a relative index within each country and as a result, specific scores and quintile values represent different levels of economic status within specific surveys and cannot be directly compared across countries or over time. For example, in a rich country, a household may be included in the lowest quintile but when it is not necessarily worse off in absolute terms (see Rutstein and Staveteig, 2014, pg ix). Therefore, we do not find the DHS Wealth Index to be a suitable measure of economic status in this study. We need a measure that is comparable across surveys and countries. In this regard we can determine whether economic or health status

improved over time and across surveys. It also allows for results that are comparable across countries given that in many developing countries including Uganda, fighting poverty and improving health are partly dependent on international funding and development programmes.

The solution to this is using information external to DHS Wealth Index where economic poverty is measured by indicators of economic status common to all countries with DHS surveys. Such information is then carried into the DHS data sets by determining the cut points where the percentage of households ranked by the DHS index matches that in the external data. Then categories[11] of poorest, poorer, middle, richer and richest are assinged to households based on the cut-off points for the wealth index. It should be noted that at this point households which were in lower quintiles in the original DHS Wealth Index may cross over to higher income categories in the new Wealth Index (CWI) and vice versa. This is because the latter is an absolute rather than relative measure of economic status.

According to Rutstein and Staveteig (2014) the construction of the Comparative Wealth Index involved 4 steps, three of which are fully accomplished in their paper. It is in the fourth step where we contribute to provide the required CWI for Uganda, by using the already computed coefficients (α and β -see step 4 below). The steps were; i) comparison with a baseline (like with price indexes) and this involved a decision on which survey's Wealth Index can serve as a baseline. Their selection was arbitrarly and because the available DHS Wealth Indexes for all countries were from 1990 to 2011, the survey closest to 2000 was preferred (this was Vietnam's 2002 DHS Wealth Index). ii) Use of Unsatisfied Basic Needs and other items that are common to most DHS Wealth Indexes since 1990 as achoring points. For camparability, anchoring points were spread across the economic distribution by including points that are relevant to both poorer and wealthier levels. The Unsatisfied Basic Needs (UBN) Index was developed as a basis for the anchoring points at the lowest level of the economic

[11] In this study we collapse categories poorest and poorer into poor, and richest and richer into rich for easier analysis. Given that the index now takes on an absolute measure of economic status (other than relative), there are no overlaps. All the poor will be categorized by the same standard, as well as all the middle and rich households across surveys and countries.

distribution. The UBN framework assigns points on four items[12] namely; inadequate dwelling construct, overcrowded housing, inadequate sanitaion and high economic dependency. On the other hand, four more items were chosen as anchoring points for households at middle and upper end of the economic distribution. These included; possession of a television, a car or truck, a refrigerator and a fixed (landline) telephone. iii) calculating wealth score values for the anchoring points at lower, middle and upper end of the economic distribution. For items under the UBN framework, wealth scores were calculated for the percentage of households that had all four unsatisfied basic needs (4 points), three or more UBN (3 points), two or more UBN (2 points) and one or more UBN (1 point) and scores are used for the relative wealth index. For the other four items for the middle and upper end economic distribution, logistic regression analysis was used to determine the wealth score at which half of the households had each possession.

The final step in the computation of the Comparative Wealth Index is iii) to transform the country specific wealth index into a Comparative Wealth Index. The first three steps above were done for the baseline survey (2002 Vietnam DHS survey) and for each specific survey (of all countries), and for all the eight wealth score cutpoints in the baseline and specific surveys. A linear regression was run with the baseline anchor cutpoint values as the dependent variable and the specified survey's anchor cutpoints as the independent variable.

$$Baseline\ cutpoint_i = \alpha + \beta(Survey - specific\ cutpoint)_i$$

where; α is the amount of adjustment of the level of the survey specific wealth index relative to the baseline wealth index. β is the dispersion of the survey-specific index relative to the baseline index. The Comparative Wealth Index (CWI) score can then be computed for each survey by multiplying each household's wealth index score by coefficient β and then add the constant α to the product. Cut off points for the quintiles in the baseline wealth index are used

[12] The implementation of the framework varies by country but a version comparable to that of Peru was calculated for the DHS surveys and seemed to compare well with other indicators of poverty (Rutstein and Staveteig, 2014). Authors adjust the number of items from 5 to 4 deleting the item for "Households with children 6 to 12 years who do not attend school".

on the computed CWI and are the same for all surveys. α and β are already computed for all surveys for 1990-2011 (see Rutstein and Staveteig, 2014)[13].

2.3.3 Descriptive Statistics

In table 2.2 we provide descriptive statistics. We find that children in middle income households have higher rates of child stunting compared to children in both poor and rich households. We find that in both surveys of 2006 and 2011, 40 percent of the children in middle income households were stunted. For the children in poor households the stunting rate was instead slightly lower at 37 and 32 percent for 2006 and 2011 surveys respectively. Similarly, for those in rich households the rate was still lower at 30 and 22 percent in the 2006 and 2011 surveys and this leaves children in middle income households in a relatively worse situation. The middle-income class has been identified to be vulnerable to aggregate economic contractions by Ravallion (2009). According to Ravallion (2009), in 2005 there was an expansion of the developing world's middle-class due to economic growth and distributional shifts that saw an extra 1.2 billion people as new entrants. However, most of these new entrants remain fairly close to poverty with incomes bunched up just about $ 2 a day - the lower bound of developing world's middle-class.

Following the literature that finds that maternal education is a major determinant of child health outcomes (Frost et al, 2005; Martin et al., 1983; Young et al., 1983) we include maternal education in our analysis. The variable has three categories "No education", "Primary" and "Secondary or higher" coded as "0", "1", and "2" respectively. A dummy variable is generated for each of these categories. Statistics from table 2.2 below indicate that there are fewer cases of child stunting among children of mothers with secondary school education or higher. In the 2006 survey just 22 percent of children for mothers with secondary education or more, were stunted compared to 38 percent stunted children for mothers with either primary education or no education at all. For the 2011 survey 23 percent of children born to mothers with secondary education or more were stunted, while for mothers with primary education and no education at all, 33

[13] What we do in this study is to transform Uganda's wealth indexes for 2006 and 2011 into Coparative Wealth Indexes using the already computed values of α and β

percent and 37 percent of their children were stunted respectively. This is in line with the existing literature. Mothers with secondary education and above may have more nutritional knowledge than those with only primary education or no education at all. Existing literature (Gibson et al., 1998; Variyam et al., 1999) suggests that mother's nutritional knowledge improves children's diet which could reduce chances of stunted growth.

Again, following the literature we include the standard reproductive variables, namely: birth intervals, maternal age and birth type. Birth intervals were categorised into under 24 months; 24-47 months and 48 months plus. A dummy was generated for each category. Descriptive statistics from table 2.2 indicate that mothers who had a birth interval of less than 24 months had a higher proportion of stunted children than those with longer birth intervals in both surveys: 37 percent for 2006 and 34 percent for 2011. This is supported by literature (Abuya et al., 2011) which finds that long birth intervals (24-47 months) are strongly and significantly related positively to children's complete immunisation. This implies that children born in short birth intervals are more prone to stunted growth as they are likely not to complete immunisation and hence are vulnerable to diseases such as polio.

Table 2. 2: Descriptive statistics for the stunted by survey					
	2006 Survey		2011 Survey		Ttest For the stunted by Survey
Variable	**%Sample**	**%Stunted**	**%Sample**	**%Stunted**	
Nutritional Status	2,465	35	2,130	31	0.02
Mother's Education					
Secondary+	14	22	23	23	0.82
Primary	63	38	60	33	0.05
No Education	23	38	17	37	0.87
Wealth Index					
Poor	34	37	40	32	0.06
Middle	34	40	29	40	0.81
Rich	32	30	31	22	0.01
Birth order					
1st	15	35	17	33	0.62
2nd-3rd	29	36	33	31	0.11
4th-5th	25	35	23	28	0.02
6+	32	36	27	34	0.56
Mother's age at Birth					
<20 years	15	41	15	38	0.54
20-34 years	72	35	72	31	0.04
35-49 years	13	32	13	28	0.35
BMI of mother					
Small	11	35	11	28	0.11
Normal	76	37	71	34	0.13
Obese	13	27	18	22	0.30
Mother's Height					
Below Average	52	43	49	39	0.14
Above Average	46	27	51	24	0.13

Table continues to the next page

Table 2.2 Continued

	2006 Survey		2011 Survey		
Variable	**%Sample**	**%Stunted**	**%Sample**	**%Stunted**	**Ttest**
Maternal Employment					
Yes	87	36	75	33	0.17
No	13	33	25	27	0.14
Birth size					
Large	79	33	77	29	0.04
Small/very small	21	46	23	41	0.16
Birth type					
Single	98	35	98	31	0.04
Multiple	2	59	2	43	0.17
Diarrhoea					
Yes	27	40	24	33	0.03
No	73	34	76	31	0.17
Child's sex					
Female	50	32	50	28	0.04
Male	50	39	50	35	0.20
Residence					
Urban	11	24	21	17	0.11
Rural	89	37	79	34	0.11
Breastfed 1hr after birth					
Yes	52	33	62	32	0.89
No	48	38	38	30	0.00
Region					
Central	36	32	36	29	0.21
Western	23	39	21	41	0.37
East	12	35	13	25	0.02
North	29	36	30	29	0.04
Child's age (in months)					
8 or less	17	14	18	14	0.90
Sep-17	17	34	16	27	0.06
18-35	30	44	30	43	0.59
36-59	36	39	36	33	0.04
Birth Interval (in months)					
<24	34	37	37	34	0.33
24-47	54	35	49	31	0.16
48+	12	33	14	24	0.04

Maternal age is the mother's age at birth of the child, grouped into three categories 15-19 years of age, 20-34 years of age and 35-49 years of age. From table 2.2 above, mothers below 20 years of age had a higher proportion of stunted children than the rest of the age groups with 41 percent of children in 2006 and 38 percent in 2011 stunted. Literature shows that children whose mothers are less than 24 years of age when they have a child are at a higher risk of malnutrition due to the inability of younger mothers to take care of their children adequately (Hien and Kam, 2008).

The UDHS classifies regions in Uganda into ten areas namely: Kampala, Central1, Central2, East Central, Eastern, Karamoja, North, West-Nile, Western and Southwest. For feasibility, these regions are regrouped into: Central which includes Kampala, Central1, Central2 and East Central; East; North which includes Karamoja, North and the West-Nile; Western which includes Western and Southwest. In case of regions, descriptive statistics indicate that the western region has the largest number of stunted children compared to the rest of Uganda (Central, East and North). In the western region there were 39 percent children stunted in the 2006 survey compared to an average rate of 34 percent in other regions. In the 2011 survey, 41 percent children were stunted in the western region, a higher rate than in the rest of the regions whose average rate of stunting was approximately 28 percent. This corroborates existing literature which indicates that there are poor feeding habits for children in Western Uganda (Spring, 2014).

For residence, a dummy variable "urban" is generated and takes the value of "1" for urban and "0" otherwise. As expected, in 2006, 37 percent of rural children were stunted compared to 24 percent in urban areas; while in 2011 34 percent of rural children were stunted compared to just 17 percent in urban areas. There was a marked increase in the population living in urban areas from 11 to 21 percent. At the same time there was a decrease in the number of stunted children living in urban areas.

While there was a slight decline in stunting of four percentage points, overall the rate remains high at 31 percent. However, this decrease was experienced by predominantly the richer households and the decrease among poorer households

is barely significant. There was no change in the stunting rate for the middle-income households. In terms of regions, the East and North regions are the only regions that realised a significant decrease in child stunting[14].

To further examine the nutritional status of children we next examine food consumption patterns of children aged 6-23 months by socio-economic characteristics of the household. The suitable Infant and Young Child Feeding (IYCF) practices according to WTO (Uganda Bureau of Statistics (UBOS) and ICF International Inc, 2012) include timely initiation of feeding of solid and semi-solid foods from the age of 6 months and improving the quality of foods consumed as the child gets older while maintaining breastfeeding. With our reduced sample we identify how many food types (out of seven) each child had taken in the last 24 hrs before the survey. Food groups include: i) infant formula, milk other than breast milk, cheese, yogurt or other milk products; ii) foods made from grains, roots and tubers, including porridge and fortified baby food from grains; iii) Vitamin A-rich fruits and vegetables; iv) other fruits and vegetables; v) eggs; vi) meat, poultry, fish and shellfish (and organ meats); and vii) legumes and nuts. In table 2.3 below, we consider children with poor feeding practices which we define as consuming less than 4 food groups in a day. These were 635 in 2006 survey and 587 in 2011 survey.

[14] This could be explained by the mushrooming Non-Government Organisations (NGOs) in these areas with an initiative of helping children. A study on governance of NGOs in Uganda (Barr, Fafchamps and Owens, 2005) provides a distribution of active NGOs in Uganda in 15 districts outside Kampala city. In total, 15 districts had 1382 active NGOs but 35 percent of these were in the East (East central and Eastern made up of Busia, Iganga, Jinja and Mbale districts) of the country, 23 percent from the North and West-Nile (Kotido, Gulu, Arua and Lira districts) regions, 20 percent from the West (Mbarara, Kibaale, Kasese and Kabale districts) and 22 percent from other central districts (Luweero, Rakai and Mukono districts). From this analysis, it is clear that the East and Northern regions take up to 58 percent of active NGOs outside of Kampala city. NGOs operate primarily to attract local funds and to channel these funds say to development and human assistance (Barr et al., 2005) which involves health care interventions.

Table 2. 3: Descriptive statistics for children that consumed less than 4 food groups in the last 24 hrs before the survey				
	Survey 2006		**Survey 2011**	
Variable	% sample (**635**)	%stunted	%sample (**587**)	%stunted
<4 food groups	**100**	**33**	**100**	**28**
Comparative Wealth Index				
Poor	34	36	42	23
Middle	40	31	34	38
Rich	26	31	24	21
Region				
Central	32	32	33	25
North	23	34	21	27
East	16	33	20	18
Western	29	33	26	38
Mother's education				
No education	24	37	13	48
Primary	64	33	67	23
Secondary	12	23	20	29
Mother employed				
Yes	88	33	76	29
No	12	34	24	24
CWI if employed (sample)	**(560)**		**(444)**	
Poor	36	36	43	22
Middle	40	31	35	41
Rich	24	29	22	25

Note: Figures in parenthesis are total samples

We find that a large proportion of the sample consuming less than 4 food items in the previous 24 hours for 2006 were children from middle income households (about 40 percent) although those from poor households had a higher stunting rate of 36 percent. In 2011, the middle-income children who had less than 4 food types the day before the survey, had the highest stunting rate of 38 percent with a share of 34 percent in the entire sample. Statistics indicate that there were fewer children with poor feeding practices in the rich households relative to those in middle and poor households. In 2011, 35 percent of poor fed children were for middle-income mothers who were employed and of these, 41 percent were stunted. In terms of regions, statistics show that the largest proportion of poorly fed children are from the central (including Kampala, central 1 central 2, and east central) 33 percent on average in both surveys. However, the most stunted were those from the north in 2006 by 34 percent and western in 2011 by 38

percent. The western region has the second largest proportion of poorly fed children. We now turn to children fed on 4 or more food types (see table 2.4 below).

Table 2. 4: Descriptive statistics for children that consumed 4 or more food groups in the last 24 hrs before the survey

	Survey 2006		**Survey 2011**	
Variable	% sample (168**)**	%stunted	%sample (94**)**	%stunted
4 food groups or more	**100**	**30**	**100**	**28**
Wealth Index				
Poor	16	21	21	60
Middle	33	34	39	22
Rich	51	32	40	18
Region				
Central	48	31	55	20
North	12	28	12	25
East	10	21	14	40
Western	30	34	19	46
Mother's education				
No education	12	35	4	0
Primary	69	33	60	35
Secondary	19	21	36	21
Mother employed				
Yes	87	28	67	28
No	13	47	33	30
CWI if employed (sample)	**(147)**		**(62)**	
Poor	18	18	16	75
Middle	35	32	44	23
Rich	47	29	40	14

Considering children fed on 4 or more food groups in the last 24 hours prior to the survey (Table 2.4 above), we find that in general the rate of stunting is lower for this group (by 3 percentage points) than that for children fed on <4 food groups in 2006. However, the stunting rate for the two groups remains the same for 2011 survey. This suggests that other causes of stunted growth were very much in play in 2011. Although children in middle-income households had a higher stunting rate in 2006 survey (of 34 percent), this vanished to only 22 percent in 2011 and the higher stunting rate was among the poor households of about 60 percent. In terms of regions surprisingly, the western region still registers the largest proportion of children with stunted growth in both 2006 and

2011 surveys. Children of mothers with lower levels of education (Primary education or lower) are seen to have high rates of stunting. Among children having 4 or more food groups, those whose mothers are employed, have relatively lower stunting rates and much lower for 2006. For children of employed mothers in 2006 those in middle-income households were worse of but in 2011 it was children of the employed mothers from poor households that had the highest stunting rate of 75 percent. This manifests that there are other causes of stunting apart from having less than 4 food groups.

2.3.3 Methods

From the descriptive statistics, we find that children of employed mothers and those from middle income households are relatively more stunted than their counterparts of non-employed mothers and of employed mothers from other income groups. We now embark on an investigation in a multivariate setting to examine this relationship. We use a multivariate logistic model. The dependent variable is nutritional status (N) indicating whether the child is stunted or not with values "1" indicating stunted (a z-score of height for age less than negative two standard deviation), and "0" otherwise.

2.3.3.1 Model Specification

We use a logistic model in the analysis. Let the probability that a child is stunted be $P(y=1)$ otherwise $P(y=0)$ if not stunted. Using β as a vector of coefficients and given that y_i is dichotomous, then we estimate a multiple logistic model of the form;

$$P(y_i = 1/x_i) = \Lambda(\beta_0 + \beta_1 x_1 + ... + \beta_k x_k) = \Lambda(x_i \beta)$$

Since all covariates $(x_1, x_2 ..... x_k)$ are dummy variables we compute the partial effects associated with each. To do this we calculate the differences in the predicted response probabilities resulting from a discrete change in each of the variables. So, the partial effect of changing a variable x_j from zero to one (other variables kept constant) is given by;

$$\Lambda(\beta_0 + \beta_1 x_1 + \beta_j .1 + ... + \beta_k x_k) - \Lambda(\beta_0 + \beta_1 x_1 + \beta_j .0 + ... + \beta_k x_k)$$

2.4 Presentation and Discussion of Results

Table 2.5 below shows the multivariate logistic regression models with Average Marginal Effects (AMEs). The first two columns represent the 2006 and 2011 survey models respectively, then we split each survey by gender to produce the next four estimations.

Table 2. 5: Determinants of Child Stunting by Survey and Gender (Average Marginal Effects)

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Mother's Characteristics						
Secondary Education+	-0.107**	-0.080^{+}	-0.082^{+}	-0.124*	-0.139*	-0.029
	(0.037)	(0.046)	(0.049)	(0.054)	(0.056)	(0.062)
Primary education	-0.025	-0.035	-0.011	-0.028	-0.037	-0.034
	(0.025)	(0.029)	(0.038)	(0.031)	(0.033)	(0.043)
Mother employed	-0.009	0.006	0.044	-0.058	-0.030	0.037
	(0.033)	(0.021)	(0.046)	(0.043)	(0.024)	(0.033)
Age at birth <20 Years	0.105*	0.104*	0.151*	0.059	0.063	0.138**
	(0.047)	(0.046)	(0.063)	(0.067)	(0.064)	(0.050)
Age at birth 20-34 Years	0.045	0.064	0.082^{+}	0.005	0.085^{+}	0.050
	(0.031)	(0.039)	(0.043)	(0.045)	(0.050)	(0.049)
BMI: Small	0.017	0.012	0.029	0.009	0.029	0.003
	(0.031)	(0.031)	(0.044)	(0.043)	(0.036)	(0.049)
BMI: Overweight/obese	-0.091**	-0.076**	-0.101*	-0.088**	-0.081*	-0.067^{+}
	(0.028)	(0.029)	(0.041)	(0.034)	(0.038)	(0.039)
Height (=1 if below Average of 159 cm**)**	0.145**	0.139**	0.132**	0.158**	0.141**	0.121**
	(0.020)	(0.017)	(0.030)	(0.028)	(0.025)	(0.023)
Birth Interval						
<24 Months	0.037	0.047	0.088^{+}	-0.001	0.089	0.003
	(0.035)	(0.035)	(0.049)	(0.051)	(0.058)	(0.044)
24-47 Months	0.016	0.029	0.092*	-0.053	0.060	-0.010
	(0.029)	(0.032)	(0.043)	(0.044)	(0.053)	(0.047)
Child's Characteristics						
Age 9-17 Months	0.220**	0.165**	0.206**	0.247**	0.181**	0.148**
	(0.035)	(0.027)	(0.045)	(0.053)	(0.043)	(0.049)
Age 18-35 Months	0.345**	0.300**	0.348**	0.360**	0.342**	0.260**
	(0.028)	(0.023)	(0.038)	(0.043)	(0.040)	(0.045)
Age 36-59 Months	0.295**	0.206**	0.280**	0.326**	0.212**	0.201**
	(0.029)	(0.022)	(0.039)	(0.046)	(0.038)	(0.044)
Birth size (Larger)	-0.101**	-0.113**	-0.129**	-0.077**	-0.122**	-0.092**
	(0.022)	(0.018)	(0.033)	(0.031)	(0.037)	(0.024)
Diarrhoea	0.060**	0.039*	0.067*	0.056*	0.081**	-0.006
	(0.020)	(0.019)	(0.031)	(0.027)	(0.029)	(0.030)
Birth type (Multiple)	0.178*	0.181**	0.058	0.279**	0.180^{+}	0.175*
	(0.082)	(0.061)	(0.102)	(0.110)	(0.101)	(0.079)

Table continues to the next page

Table 2.5 Continued

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Birth order						
2nd -3rd born	0.032	-0.002	-0.004	0.076	-0.058	0.032
	(0.040)	(0.035)	(0.058)	(0.050)	(0.052)	(0.055)
4th – 5th born	0.042	-0.006	-0.005	0.095	-0.117*	0.091
	(0.045)	(0.034)	(0.065)	(0.057)	(0.051)	(0.057)
6th and above	0.055	0.033	0.020	0.094	-0.038	0.091+
	(0.044)	(0.037)	(0.064)	(0.058)	(0.053)	(0.053)
Breastfed within 1 hr of birth	-0.046+	0.003	-0.040	-0.052+	-0.006	0.017
	(0.019)	(0.021)	(0.027)	(0.026)	(0.028)	(0.031)
Female (child)	-0.063**	-0.090**				
	(0.019)	(0.022)				
Comparative Wealth Index						
Poor	0.036	0.087**	0.003	0.066*	0.110*	0.077+
	(0.030)	(0.029)	(0.044)	(0.038)	(0.049)	(0.042)
Middle	0.047+	0.106**	0.057	0.043	0.102**	0.112**
	(0.026)	(0.031)	(0.037)	(0.034)	(0.038)	(0.039)
CWI x Employment						
Poor x Employed	0.037	0.083**	0.023	0.050	0.098+	0.082+
	(0.031)	(0.031)	(0.046)	(0.039)	(0.052)	(0.048)
Poor x Non-employed	0.013	0.098*	-0.132	0.168+	0.146*	0.062
	(0.081)	(0.049)	(0.097)	(0.107)	(0.071)	(0.057)
Middle x Employed	0.060*	0.126**	0.077*	0.049	0.139**	0.116**
	(0.027)	(0.032)	(0.039)	(0.036)	(0.041)	(0.042)
Middle x Non-employed	-0.035	0.046	-0.078+	0.007	0.005	0.102
	(0.067)	(0.051)	(0.088)	(0.084)	(0.065)	(0.068)
Region						
Western	0.040	0.081**	0.009	0.082**	0.101**	0.054+
	(0.027)	(0.023)	(0.037)	(0.036)	(0.029)	(0.030)
East	0.009	-0.083*	-0.032	0.049	-0.092*	-0.094*
	(0.035)	(0.038)	(0.047)	(0.047)	(0.046)	(0.042)
North	0.013	-0.036	-0.042	0.071+	-0.055	-0.037
	(0.029)	(0.023)	(0.041)	(0.038)	(0.038)	(0.035)
Residence (Urban)	-0.057	-0.076*	-0.068	-0.043	-0.067	-0.080*
	(0.037)	(0.035)	(0.050)	(0.053)	(0.051)	(0.036)
Observations	**2,465**	**2,130**	**1,236**	**1,229**	**1,067**	**1,063**

Note:

- Standard errors in parentheses
- ** p<0.01, * p<0.05, + p<0.1
- **Reference groups include:**
- Mothers characteristics: No education, non-employed mother, 35+ years of age, normal BMI, 48+ months of birth interval
- Children's characteristics: 8 months old or below, birth size- small/very small, no diarrhoea, single birth, first born, not breastfed in one hour after birth, male child
- Comparative Wealth Index: Rich
- Interactions: rich mothers
- Region: Central
- Residence: Rural

In line with other studies using the DHS data we report similar findings on the core variables. We find those with secondary education are less likely to have stunted children. Similarly, mothers who are tall[15] or have a high BMI are less likely to have stunted children. Children that are larger at birth are less likely to be stunted. However, again following the literature, mothers who have children at a young age are more likely to have them stunted.

Turning to our key interest we find that maternal employment alone is not significant. We also find that compared to richer households the poor and middle-income households are more likely to have stunted children. The coefficient on middle income households is larger than that for poor households an indicator that children in middle income households are more vulnerable to stunted growth.

Focusing on the interaction variables we see the story becomes more nuanced. We estimate this relationship in two ways. First, we use mothers in rich households as the base; and in the appendix (Table 2.10) we use non-employed mothers as the base[16]. To directly test the difference between mothers in poor and middle-income households, we also use mothers in poor households[17] as the base (see Table 2.11 in appendix). All estimations tell a similar story. The results indicate that mothers in poor households whether they are employed or not are more likely to have children that are stunted. However, the coefficient is slightly smaller for employed mothers. This finding is supported by a study in India (Ulijaszek and Leighton 1998) which underscores the importance of maternal employment on young children's nutrition in a very poor environment.

On the other hand, mothers in middle income households are only likely to have stunted children compared to their richer counterparts if they are in employment.

[15] We include height to account for any genetic predisposition to be tall. The variable controls for ethnic differences and its resultant impact on child stunting. Given it is always significant we ran the regressions with it excluded in case it was proxying for something else. The results do not differ if we exclude height of the mother.

[16] With non-employed mothers as the base we can compare within income group. There is no statistical difference for poor and rich mothers; but again, we see employed mothers in the middle-income category are more likely to have stunted children.

[17] Although coefficients on employed mothers in middle-income households are not statistically significant, they are positive.

Mothers in middle income households without employment do not differ significantly from richer mothers. What is striking is the coefficient for mothers in middle income households who are employed is larger than that for either employed or non-employed poor mothers.

This result holds, using both the standard measure of household wealth provided in the DHS data as well as the calculated Comparative Wealth Index which is reported in the table. Using the Comparative Wealth Index, children in both poor and middle-income households are more likely to suffer from stunted growth as compared to children in rich households. It is also the case that this situation has worsened between 2006 and 2011. In 2006 children from poor households were 4 percent more likely to be affected by stunted growth, and those from middle income households were 5 percent more likely compared to children from rich households. By 2011 this had increased for both cohorts but significantly more for the middle-income households. In the 2011 survey, children from poor households were 9 percent more likely to be affected by stunted growth, and those from middle income households were 11 percent more likely compared to children from rich households. The interesting finding is that children of employed mothers from middle income households appear to fare worse than those from poor households when compared to the richer households. And their counterparts of mothers in middle-income households that are not in employment are in a better situation.

To summarise, we find that maternal employment alone has no impact on stunting but when we interact with wealth, we find that children of employed mothers in middle income households are more likely to suffer from stunted growth - by 7 percent in 2006 and 13 percent in 2011 compared to those of mothers in rich households. It seems, however, children with employed mothers in poor households are not worse off, with a risk of stunted growth only significant in 2011.

We argue these results suggest that maternal employment could be a likely contributor to rates of child stunting in middle income households.

Using the simple Wealth Index from the DHS we repeat the analysis and find similar results reported in Appendix Table 2.7[18]. Our findings are at odds with the standard literature on the correlation between income and health outcomes. Improvement in incomes of mothers, or of households, is widely accepted to improve the nutritional status of children in terms of improved access to food, childcare and health services (see Engelhard et al., 2004; Ikeda et al., 2013; Thomas, 1990; Thomas, Strauss and Henriques, 1990; Tucker and Sanjur, 1988). However, there is evidence that increases in incomes alone may not always imply a reduction in child undernutrition. Instead a balanced strategy of improved incomes and increased direct investments in appropriate health interventions is needed (Demirchyan et al., 2016; Haddad, 2003; Smith and Haddad, 2002; Subramanyam et al., 2011).

There could be several reasons for our finding that children in middle income households whose mothers are employed are more likely to have stunted children. One possible reason is the existence of pro-poor food relief programs in Uganda that leave out middle income earners. According to ICF International inc. (2014) in 2012, the United States Agency for International Development (USAID), Office of Food for Peace (FFP) awarded funding to private voluntary organisations to design and implement a multi-year Title II Development Assistance Program in most food-insecure regions of Uganda. The program was meant to target the most hunger-vulnerable households which leaves out middle income households. There is also evidence (Ravallion, 2009) that the developing world's middle-class is vulnerable given its expansion in 2005. This study argues that the expansion was not a horizontal shift that would lead to proportional changes in income levels but rather involved global distributional shifts that

[18] In 2006 children from middle income households whose mothers were employed, were 6 percent more likely to have stunted growth compared to those of employed mothers in rich households. In 2011, however, the risk of stunting to children of employed mothers in middle-income households was more pronounced at 12 percent on average, relative to children of employed mothers in rich households. For children from poor households in 2011 it was instead insignificant - implying that children from middle income households are worse off compared to those from the poor and rich households.

entailed greater poverty reductions at low poverty lines than one would have expected under a distribution-neutral growth process. That the modal income level has increased by a small margin with the rise in the mean and instead fewer people live near the mode and densities pile up just above two dollars a day which is the lower bound.

In addition, malnutrition among children in middle-income households could be attributed to the use of domestic workers typical of working families in developing countries who could have poor care behaviour. According to Muasya (2014) in many sub-Saharan African towns and cities, domestic workers (in form of house helps, house girls/boys or maids) have become an important resource in enabling women to cope with the challenges of combining work and family responsibilities. Their duties go beyond housework and childcare to include helping children with schoolwork and seeking medical attention for the sick. Other literature also shows that paid domestic helpers may pose financial burdens on workers and only a small proportion of workers (middle-class) may afford their services (Annor 2014). Unfortunately, most of these domestic workers are poorly educated in developing countries (see Dinkelman and Ranchhod 2012) yet care giving behavior such as feeding, health and health seeking behavior, as well as quality of caregiver's measured by their education, nutritional status and psychosocial characteristics (mental health, autonmy, social support), affect child health (Begin et al.,1999).

We also present the results by gender of the child and find that male children with employed mothers in middle income households were more vulnerable to stunted growth than their female counterparts. In the 2011 survey, the male children were 14 percent more likely to be stunted relative to male children of employed mothers in rich households, while the female children were 12 percent more likely to be stunted compared to the same group. In case of male and female children of employed mothers in poor households their respective risk was 10 percent and 8 percent (though only significant at 10 percent level).

Male children seem to be more exposed in poor households and female children more exposed to stunting in middle-income households. The 2011 survey shows that male children from poor households were 11 percent more vulnerable than

male children from rich households, while those from middle-income households were 10 percent more exposed to stunted growth, compared to their male counterparts from rich households. As for female children the reverse is true, in 2011 survey female children from middle income households were 11 percent more likely to have stunted growth, while those from poor households were 8 percent more likely compared to female children from rich households.

A hypothesis which we cannot test but can use to identify possible support for our finding on gender differences in child nutrition, is the existing literature on cognitive child development. According to Hoffman (1998) a few studies reported for developed countries found that sons of employed middle class mothers showed lower school performance and lower I.Q. scores than full-time homemakers. In related studies (Anon., 1988, as cited by Hoffman, 1998), there were three separate studies that looked into this relationship; two of them found no difference, but the third also found lower scores for sons of employed mothers in the middle-class. Meanwhile, in a study (Chase-Lansdale and Owen, 1987) on maternal employment and a joint examination of the infants' attachments to both parents, results show a trend suggesting that in employed-mother families, boys were more likely to be insecurely attached to both parents than girls in employed-mother families or infants of either sex in non-employed-mother families. Perhaps male children of middle-income households in Uganda may be facing similar constraints of insecurity when left to caregivers which is also likely to affect their feeding and eventually their growth potential.

Finally, considering regions, our results show that children in the western region are more susceptible to stunted growth than children in the central region in 2011, by 8 percent on average. Supporting evidence of our finding was seen in a survey by Spring (2014), which revealed that there are poorer feeding habits in the western region than in the central region. The survey indicates that fewer children in four western districts of Kisoro, Ntungamu, Buhweju and Rubirizi were fed with four or more food-groups a day than children in central region (like Mayuge and Namutumba districts). The summary statistics from table 2.3 above confirm that children in western Uganda are poorly fed. The table shows that in 2011 of all children that were fed on less than 4 food types (the day before

the survey) 26 percent were from the western region with the highest stunting rate of about 38 percent.

In contrast, children from eastern Uganda are less likely to have stunted growth than their counterparts from central region, on average by 8 percent in the 2011 survey. This is possibly because of the establishment of health-related projects in the region supported by the international community (mainly from the U.S and the UK) with a major focus of improving child health and that of their mothers. Such projects include but are not limited to the Uganda Village Project (UVP)[19] in Iganga district and Village Partners International (VPI)[20] in Tororo district. Many of such NGOs mainly target children from up-country rather than in the central region which puts children in central region at a disadvantage.

2.5 Sensitivity Analysis

In all our earlier models, we have not included a variable that reflects the child's feeding practice which is directly related to the likelihood that a child is stunted or not. The limitation however was that information on feeding practices was only collected for a small sample of children: 803 for 2006 survey and 681 for 2011 survey for children aged between 6-23 months that were breastfeeding at the time of the survey. We re-run the earlier models using these reduced samples, restricting them first to children that had poor feeding practices defined as consuming less than 4 food types in the previous 24 hours before the survey. The samples then become 635 in 2006 and 587 in 2011 for those poorly fed children. Table 2.6 reports the results which confirm our previous finding, namely children of employed mothers in middle income households are more likely to be stunted than their counterparts in poor and rich households. On average children of employed mothers in middle income households are 13 percent more likely to be stunted than those in rich households. There is a negative relationship between child stunting and maternal employment for children whose mothers are in poor households which would mean that maternal employment in poor

[19] Annual reports accessible at http://www.ugandavillageproject.org/who-we-are/executive-summary/

[20] Annual reports accessible at http://www.villagepartnersinternational.org/news/newsletters/

households reduces stunted growth (Ulijaszek and Leighton, 1998), however, the coefficient is not significant. Children of employed mothers in middle-income households then remain the group most affected by maternal employment.

Table 2. 6: Determinants of Child Stunting by Survey and Gender (Average Marginal Effects)

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Mother Characteristics						
Secondary education+	-0.128^{+}	-0.085	-0.182^{+}	-0.046	-0.094	-0.062
	(0.071)	(0.072)	(0.097)	(0.100)	(0.142)	(0.085)
Primary education	-0.075^{+}	-0.161**	-0.115^{+}	-0.028	-0.124	-0.177**
	(0.044)	(0.046)	(0.064)	(0.059)	(0.076)	(0.062)
Mother employed	-0.010	0.006	0.056	-0.030	-0.052	0.067
	(0.065)	(0.042)	(0.089)	(0.091)	(0.063)	(0.048)
Age at birth <20 Years	0.072	0.083	0.155	-0.007	0.204	0.034
	(0.085)	(0.092)	(0.126)	(0.121)	(0.133)	(0.085)
Age at birth 20-34 Years	0.056	0.036	0.081	0.052	0.079	0.014
	(0.056)	(0.067)	(0.076)	(0.080)	(0.083)	(0.072)
BMI: Small	-0.019	0.011	0.099	-0.068	0.005	-0.010
	(0.051)	(0.053)	(0.073)	(0.070)	(0.072)	(0.056)
BMI: Overweight/obese	-0.128*	0.057	-0.097	-0.173**	0.143	-0.029
	(0.050)	(0.057)	(0.078)	(0.065)	(0.099)	(0.048)
Height (=1 if <average of 159 cm)	0.121**	0.128**	0.108*	0.169**	0.132*	0.102*
	(0.035)	(0.037)	(0.053)	(0.043)	(0.055)	(0.050)
Birth Interval						
<24 Months	-0.023	0.099	0.056	-0.087	0.228*	-0.020
	(0.067)	(0.061)	(0.097	(0.087)	(0.092)	(0.073)
24-47 Months	-0.012	0.055	0.052	-0.060	0.183*	-0.070
	(0.055)	(0.060)	(0.077)	(0.076)	(0.091)	(0.065)
Child's Characteristics						
Age 9-17 Months	0.207**	0.126*	0.200**	0.248**	0.147*	0.110^{+}
	(0.050)	(0.055)	(0.070)	(0.086)	(0.072)	(0.061)
Age 18-23 Months	0.312**	0.230**	0.369**	0.331**	0.217**	0.212**
	(0.050)	(0.062)	(0.078)	(0.086)	(0.070)	(0.071)
Birth size (Larger)	-0.072	-0.167**	-0.028	-0.094^{+}	-0.239**	-0.121*
	(0.045)	(0.031)	(0.074)	(0.055)	(0.054)	(0.049)
Diarrhoea	0.085*	0.016	0.045	0.104*	0.035	-0.012
	(0.037)	(0.029)	(0.058)	(0.045)	(0.042)	(0.052)
Birth type (Multiple)	0.247	0.239^{+}	-0.041	0.545**	0.136	0.327
	(0.160)	(0.143)	(0.171)	(0.178)	(0.206)	(0.206)

Table continues to the next page

Table 2.6 Continued...

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Birth order						
2nd -3rd born	-0.008	0.033	0.050	-0.055	0.114	-0.034
	(0.080)	(0.064)	(0.106)	(0.119)	(0.079)	(0.086)
4th – 5th born	0.010	0.047	0.164	-0.112	0.005	0.118
	(0.090)	(0.056)	(0.126)	(0.128)	(0.079)	(0.100)
6th and above	-0.013	0.052	0.104	-0.095	0.136	0.023
	(0.086)	(0.067)	(0.125)	(0.131)	(0.102)	(0.097)
Breastfed in 1 hr after birth	-0.076*	-0.023	-0.102+	-0.076	-0.034	-0.006
	(0.037)	(0.033)	(0.055)	(0.048)	(0.050)	(0.042)
Female (child)	-0.082*	-0.137**				
	(0.036)	(0.038)				
Comparative Wealth Index						
Poor	0.020	0.029	-0.016	0.041	0.080	-0.019
	(0.061)	(0.061)	(0.082)	(0.082)	(0.107)	(0.064)
Middle	-0.027	0.124*	-0.030	-0.038	0.161*	0.078
	(0.051)	(0.053)	(0.075)	(0.069)	(0.064)	(0.063)
CWI x Employment						
Poor x **E**mployed	0.029	-0.009	0.028	0.019	0.038	-0.027
	(0.063)	(0.072)	(0.086)	(0.087)	(0.109)	(0.082)
Poor x Non-employed	-0.049	0.146+	-0.337+	0.188	0.210	0.005
	(0.155)	(0.078)	(0.175)	(0.212)	(0.151)	(0.095)
Middle x Employed	-0.023	0.125*	0.004	-0.065	0.199**	0.052
	(0.054)	(0.059)	(0.078)	(0.074)	(0.063)	(0.075)
Middle x Non-employed	-0.050	0.122	-0.285	0.146	0.046	0.159
	(0.128)	(0.096)	(0.188)	(0.170)	(0.139)	(0.120)
Region						
Western	0.049	0.143*	0.053	0.057	0.175+	0.137*
	(0.067)	(0.056)	(0.108)	(0.082)	(0.101)	(0.061)
East	0.003	-0.045	0.027	0.003	-0.137	0.027
	(0.065)	(0.055)	(0.086)	(0.100)	(0.099)	(0.062)
North	-0.027	0.070+	-0.051	0.004	0.076	0.058
	(0.045)	(0.040)	(0.069)	(0.062)	(0.066)	(0.059)
Residence (Urban)	0.104	-0.014	0.181+	0.004	0.009	-0.009
	(0.074)	(0.049)	(0.103)	(0.119)	(0.077)	(0.054)
Observations	**635**	**587**	**304**	**331**	**291**	**296**

Note:

- Standard errors in parentheses
- ** p<0.01, * p<0.05, + p<0.1
- **Reference groups include;**
- Mothers characteristics: No education, mother non-employed, 35+ years of age, normal BMI, 48+ months of birth interval
- Children's characteristics: 8 months old or below, birth size: small/very small, no diarrhoea, single birth, first born, not breastfed in one hour after birth, male child
- Comparative Wealth Index: Rich
- Region: Central
- Residence: Rural

In line with the previous results we also observe that in 2011 children in the western region are more likely to be stunted than those in the central region on average by 14 percent. These could be explained by the poor feeding practices in the region. This result is also reflected in the summary statistics shown in table 2.3 above, in which the western region has the biggest percentage of stunted children amongst those that were fed on less than 4 food varieties in 24 hours before each of the surveys.

In addition to the above analysis, we incorporate other measures of child nutrition such as underweight and wasting to compare our results for robustness (See Tables 2.8 and 2.9 in Appendix-respectively). Although results are not as statistically significant as those for stunting, the message is the same. In 2011 children of employed mothers in poor and middle households are more likely to be underweight compared to their counterparts in rich households. In the same survey, children of employed mothers in middle-income households are more likely to be wasted compared to their counterparts in rich households. The comparison between children in middle-income households and poor households is less clear because some coefficients are statistically insignificant but in general the two groups are worse off compared to their counterparts in reach households.

2.6 Conclusion

We conclude this study by first identifying a few limitations; we acknowledge the fact that there is no adequate information on childcare arrangements at home in the DHS data sets for both 2006 and 2011 surveys, and this would have been useful in our analysis. In addition, we do not control for mother's type of employment as it would severely affect our sample size. Finally, with better income data we may have been able to say more. Despite the relatively weak measure of wealth that is available in the DHS data we still managed to find results that are indicative of a more nuanced story. In general, although much of the existing literature shows that improved household wealth or an increase in mothers' incomes improves child health (Engelhardt et al., 2004; Ikeda et al., 2013; Thomas, 1990; Thomas et al., 1990; Tucker and Sanjur, 1988), this study finds that this is only true after a given level of wealth/income. Poor households

were found to have a higher probability of having healthier children (with lower probability of stunted growth) than middle income households. This implies that other direct health interventions are required to reduce child stunting (Demirchyan et al., 2016; Haddad et al., 2003; Smith and Haddad, 2002; Subramanyam et al., 2011) other than just focusing on increasing the wealth or incomes in a household. Such interventions also need to cut across all income groups, regions or areas of residence to avoid imbalances in child health outcomes throughout the country.

We recommend that appropriate policies be implemented by the government to support employed mothers (especially middle-income working mothers), in coping with both childcare and employment. There is also a need for increased investment and support in childcare services. For example, building childcare centres or kindergarten schools where parents can take their children whilst at work, can be of great help. Revising the maternity protection conventions to extend and/or offer leave to both parents will save many children's lives in developing countries.

Appendix:

Table 2. 7: Determinants of child stunting (using Simple Wealth Index -SWI) by Survey and Gender (Average Marginal Effects)

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Mother's Characteristics						
Secondary Education+	-0.104**	-0.104*	-0.0708	-0.127*	-0.159**	-0.061
	(0.037)	(0.046)	(0.0478)	(0.053)	(0.053)	(0.063)
Primary education	-0.024	-0.041	-0.006	-0.029	-0.045	-0.041
	(0.024)	(0.031)	(0.037)	(0.031)	(0.033)	(0.044)
Mother employed	-0.001	0.009	0.045	-0.038	-0.023	0.042
	(0.033)	(0.021)	(0.046)	(0.043)	(0.026)	(0.032)
Age at birth <20 Years	0.099*	0.115*	0.141*	0.052	0.0754	0.147**
	(0.046)	(0.046)	(0.063)	(0.066)	(0.063)	(0.048)
Age at birth 20-34 Years	0.041	0.071+	0.075+	0.006	0.090+	0.058
	(0.031)	(0.039)	(0.043)	(0.044)	(0.051)	(0.049)
BMI: Small	0.018	0.014	0.028	0.011	0.030	0.002
	(0.030)	(0.031)	(0.044)	(0.042)	(0.036)	(0.049)
BMI: Overweight/obese	-0.091**	-0.079**	-0.096*	-0.092**	-0.077*	-0.073+
	(0.027)	(0.028)	(0.042)	(0.033)	(0.038)	(0.038)
Height (=1 if below Average of 159 cm**)**	0.142**	0.134**	0.132**	0.148**	0.138**	0.117**
	(0.019)	(0.017)	(0.029)	(0.027)	(0.025)	(0.022)
Birth Interval						
<24 Months	0.035	0.046	0.091+	-0.008	0.086	0.000
	(0.035)	(0.035)	(0.049)	(0.050)	(0.058)	(0.045)
24-47 Months	0.014	0.030	0.094*	-0.054	0.065	-0.015
	(0.029)	(0.033)	(0.042)	(0.044)	(0.053)	(0.046)
Child's Characteristics						
Age 9-17 Months	0.217**	0.164**	0.206**	0.245**	0.174**	0.147**
	(0.035)	(0.028)	(0.045)	(0.054)	(0.042)	(0.049)
Age 18-35 Months	0.343**	0.300**	0.348**	0.358**	0.338**	0.260**
	(0.028)	(0.023)	(0.038)	(0.043)	(0.041)	(0.045)
Age 36-59 Months	0.294**	0.204**	0.282**	0.324**	0.207**	0.198**
	(0.028)	(0.021)	(0.039)	(0.046)	(0.039)	(0.043)
Birth size (Larger)	-0.103**	-0.114**	-0.127**	-0.080**	-0.122**	-0.096**
	(0.023)	(0.019)	(0.033)	(0.031)	(0.038)	(0.024)
Diarrhoea	0.060**	0.040*	0.066*	0.054+	0.082**	-0.004
	(0.021)	(0.019)	(0.031)	(0.028)	(0.027)	(0.030)
Birth type (Multiple)	0.183*	0.181**	0.052	0.296**	0.187+	0.169*
	(0.083)	(0.063)	(0.104)	(0.109)	(0.104)	(0.080)

Table continues to the next page

Table 2.7 Continued

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Birth order						
2nd -3rd born	0.030	-0.001	-0.004	0.065	-0.061	0.035
	(0.040)	(0.036)	(0.058)	(0.050)	(0.053)	(0.054)
4th – 5th born	0.040	-0.005	-0.011	0.085	-0.114*	0.089
	(0.045)	(0.034)	(0.065)	(0.057)	(0.051)	(0.056)
6th and above	0.052	0.033	0.018	0.082	-0.043	0.091+
	(0.044)	(0.036)	(0.065)	(0.059)	(0.053)	(0.052)
Breastfed within 1 hr of birth	-0.044*	0.004	-0.040	-0.050+	-0.005	0.019
	(0.019)	(0.020)	(0.027)	(0.026)	(0.028)	(0.030)
Female (child)	-0.063**	-0.086**				
	(0.018)	(0.022)				
Simple Wealth Index						
Poor	0.047+	0.024	0.027	0.068+	0.060	-0.004
	(0.027)	(0.028)	(0.040)	(0.035)	(0.044)	(0.033)
Middle	0.049+	0.094**	0.090*	0.021	0.121**	0.067
	(0.028)	(0.035)	(0.039)	(0.037)	(0.043)	(0.048)
SWI x Employment						
Poor x Employed	0.056*	0.012	0.047	0.066+	0.046	-0.012
	(0.028)	(0.032)	(0.040)	(0.035)	(0.047)	(0.043)
Poor x Non-employed	-0.017	0.059	-0.113	0.081	0.101	0.020
	(0.073)	(0.045)	(0. 090)	(0.092)	(0.062)	(0.053)
Middle x Employed	0.061*	0.116**	0.113**	0.021	0.169**	0.064
	(0.029)	(0.039)	(0.042)	(0.039)	(0.051)	(0.054)
Middle x Non-employed	-0.026	0.026	-0.072	0.016	-0.019	0.075
	(0.071)	(0.058)	(0.092)	(0.095)	(0.072)	(0.082)
Region						
Western	0.087*	0.081**	0.001	0.156**	0.094**	0.058*
	(0.034)	(0.022)	(0.046)	(0.041)	(0.028)	(0.029)
East	0.003	-0.071+	-0.036	0.038	-0.076	-0.079*
	(0.034)	(0.042)	(0.046)	(0.048)	(0.051)	(0.047)
North	-0.001	-0.020	-0.043	0.039	-0.039	-0.018
	(0.024)	(0.025)	(0.035)	(0.033)	(0.041)	(0.032)
Residence (Urban)	-0.055	-0.097**	-0.064	-0.038	-0.076	-0.118**
	(0.037)	(0.034)	(0.050)	(0.052)	(0.049)	(0.034)
Observations	**2,465**	**2,130**	**1,236**	**1,229**	**1,067**	**1,063**

Note:

- Standard errors in parentheses
- ** p<0.01, * p<0.05, + p<0.1
- **Reference groups include:**
- Mothers characteristics: No education, non-employed mother, 35+ years of age, normal BMI, 48+ months of birth interval
- Children's characteristics: 8 months old or below, birth size- small/very small, no diarrhoea, single birth, first born, not breastfed in one hour after birth, male child
- Simple Wealth Index: Rich
- Interactions: rich mothers
- Region: Central
- Residence: Rural

Table 2. 8: Determinants of underweight among children by Survey and Gender (Average Marginal Effects)

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Mother's Characteristics						
Secondary Education+	-0.109**	-0.018	-0.064	-0.152**	-0.032	-0.015
	(0.035)	(0.039)	(0.045)	(0.051)	(0.0511)	(0.044)
Primary education	-0.035*	-0.016	0.0001	-0.067**	-0.007	-0.033
	(0.017)	(0.021)	(0.028)	(0.021)	(0.028)	(0.028)
Mother employed	0.010	-0.006	0.0211	-0.002	-0.033	0.017
	(0.022)	(0.019)	(0.030)	(0.033)	(0.028)	(0.020)
Age at birth <20 Years	0.009	0.003	0.006	0.018	0.004	-0.017
	(0.036)	(0.042)	(0.049)	(0.054)	(0.061)	(0.053)
Age at birth 20-34 Years	-0.022	-0.022	-0.047	0.015	-0.005	-0.044
	(0.025)	(0.026)	(0.033)	(0.037)	(0.037)	(0.036)
BMI: Small	0.041	0.040	0.064+	0.031	0.085+	0.003
	(0.026)	(0.032)	(0.037)	(0.034)	(0.043)	(0.036)
BMI: Overweight/obese	-0.066**	-0.048*	-0.066**	-0.069*	-0.035	-0.062*
	(0.019)	(0.021)	(0.025)	(0.027)	(0.030)	(0.029)
Height (=1 if below Average of 159 cm**)**	0.042**	0.066**	0.037+	0.044*	0.078**	0.046*
	(0.015)	(0.012)	(0.022)	(0.021)	(0.022)	(0.022)
Birth Interval						
<24 Months	0.071*	0.040	0.057	0.084*	0.049	0.027
	(0.029)	(0.025)	(0.040)	(0.041)	(0.034)	(0.041)
24-47 Months	0.035	0.007	0.018	0.045	0.013	-0.002
	(0.024)	(0.022)	(0.035)	(0.037)	(0.025)	(0.036)
Child's Characteristics						
Age 9-17 Months	0.105**	0.025	0.112**	0.106**	0.027	0.020
	(0.025)	(0.027)	(0.034)	(0.039)	(0.035)	(0.041)
Age 18-35 Months	0.048*	0.045*	0.049	0.051	0.080*	0.007
	(0.022)	(0.022)	(0.030)	(0.033)	(0.033)	(0.031)
Age 36-59 Months	0.010	-0.012	-0.005	0.036	-0.003	-0.017
	(0.021)	(0.022)	(0.029)	(0.034)	(0.031)	(0.030)
Birth size (Larger)	-0.100**	-0.101**	-0.119**	-0.085**	-0.129**	-0.076**
	(0.014)	(0.013)	(0.023)	(0.020)	(0.022)	(0.018)
Diarrhoea	0.067**	0.045*	0.089**	0.045*	0.095**	-0.020
	(0.014)	(0.018)	(0.021)	(0.020)	(0.018)	(0.026)
Birth type (Multiple)	0.180**	0.155**	0.224**	0.148**	0.146*	0.159**
	(0.044)	(0.036)	(0.067)	(0.056)	(0.059)	(0.036)

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Table 2.8 Continued

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Birth order						
2nd -3rd born	0.001	0.039	-0.024	0.022	0.035	0.027
	(0.027)	(0.027)	(0.045)	(0.033)	(0.040)	(0.034)
4th – 5th born	0.011	0.034	-0.018	0.036	0.016	0.042
	(0.032)	(0.027)	(0.050)	(0.039)	(0.039)	(0.038)
6th and above	0.016	0.052	-0.002	0.036	0.071	0.015
	(0.033)	(0.032)	(0.049)	(0.046)	(0.045)	(0.039)
Breastfed within 1 hr of birth	-0.020	0.009	-0.010	-0.030	0.021	-0.003
	(0.015)	(0.017)	(0.020)	(0.020)	(0.020)	(0.024)
Female (child)	-0.037*	-0.024				
	(0.015)	(0.015)				
Comparative Wealth Index						
Poor	0.020	0.071**	0.0120	0.027	0.083**	0.070**
	(0.022)	(0.015)	(0.0304)	(0.032)	(0.027)	(0.023)
Middle	-0.006	0.041*	0.0115	-0.024	0.043+	0.041
	(0.020)	(0.020)	(0.0275)	(0.028)	(0.026)	(0.029)
CWI x Employment						
Poor x Employed	0.028	0.075**	-0.026	0.029	0.060*	0.099**
	(0.022)	(0.015)	(0.032)	(0.032)	(0.028)	(0.024)
Poor x Non-employed	-0.031	0.061	-0.081	0.015	0.148**	-0.021
	(0.052)	(0.034)	(0.061)	(0.083)	(0.046)	(0.041)
Middle x Employed	0.004	0.040+	0.019	-0.012	0.031	0.051
	(0.021)	(0.024)	(0.027)	(0.030)	(0.025)	(0.035)
Middle x Non-employed	-0.072	0.044	-0.041	-0.096+	0.078	0.009
	(0.048)	(0.032)	(0.076)	(0.058)	(0.054)	(0.055)
Region						
Western	0.006	0.029	-0.012	0.016	0.042	0.010
	(0.026)	(0.023)	(0.037)	(0.034)	(0.029)	(0.030)
East	-0.060*	-0.052	-0.125**	-0.012	-0.070	-0.041
	(0.025)	(0.032)	(0.037)	(0.033)	(0.045)	(0.033)
North	-0.014	0.001	0.001	-0.033	-0.005	-0.009
	(0.017)	(0.019)	(0.025)	(0.027)	(0.030)	(0.023)
Residence (Urban)	-0.017	-0.047+	0.0024	-0.043	-0.027	-0.062*
	(0.028)	(0.027)	(0.035)	(0.043)	(0.039)	(0.030)
Observations	**2,465**	**2,130**	**1,236**	**1,229**	**1,067**	**1,063**

Note:

- Standard errors in parentheses
- ** p<0.01, * p<0.05, + p<0.1
- **Reference groups include:**
- Mothers characteristics: No education, non-employed mother, 35+ years of age, normal BMI, 48+ months of birth interval
- Children's characteristics: 8 months old or below, birth size- small/very small, no diarrhoea, single birth, first born, not breastfed in one hour after birth, male child
- Comparative Wealth Index: Rich
- Interactions: rich mothers
- Region: Central
- Residence: Rural

Table 2. 9: Determinants of child wasting (lower weight for height) by Survey and Gender (AMEs)

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Mother's Characteristics						
Secondary Education+	0.003	-0.027	0.022	-0.026	-0.011	-0.044*
	(0.019)	(0.017)	(0.026)	(0.029)	(0.029)	(0.019)
Primary education	-0.002	-0.017	-0.002	-0.006	-0.011	-0.025^{+}
	(0.011)	(0.012)	(0.018)	(0.013)	(0.020)	(0.013)
Mother employed	0.003	-0.023*	0.001	-0.001	-0.026	-0.023
	(0.014)	(0.011)	(0.020)	(0.017)	(0.018)	(0.018)
Age at birth <20 Years	-0.024	0.015	0.000	-0.046	0.023	-0.010
	(0.024)	(0.019)	(0.034)	(0.033)	(0.025)	(0.026)
Age at birth 20-34 Years	-0.026	-0.013	-0.018	-0.036	0.007	-0.044^{+}
	(0.017)	(0.018)	(0.022)	(0.023)	(0.020)	(0.025)
BMI: Small	0.030^{+}	0.050**	0.045	0.022	0.046*	0.056*
	(0.017)	(0.016)	(0.029)	(0.020)	(0.020)	(0.025)
BMI: Overweight/obese	-0.006	-0.006	-0.003	-0.014	0.006	-0.016
	(0.013)	(0.018)	(0.019)	(0.019)	(0.023)	(0.024)
Height (=1 if below Average of 159 cm**)**	0.001	-0.016^{+}	0.007	-0.009	-0.010	-0.033*
	(0.009)	(0.008)	(0.014)	(0.014)	(0.012)	(0.015)
Birth Interval						
<24 Months	0.006	0.009	-0.012	0.013	0.013	0.009
	(0.018)	(0.019)	(0.027)	(0.022)	(0.026)	(0.025)
24-47 Months	0.001	0.007	-0.007	0.003	-0.001	0.019
	(0.016)	(0.014)	(0.024)	(0.020)	(0.023)	(0.017)
Child's Characteristics						
Age 9-17 Months	0.028*	-0.027**	0.047*	0.013	-0.013	-0.037**
	(0.013)	(0.009)	(0.021)	(0.016)	(0.017)	(0.014)
Age 18-35 Months	-0.029*	-0.052**	-0.021	-0.045*	-0.021	-0.091**
	(0.013)	(0.013)	(0.020)	(0.018)	(0.016)	(0.019)
Age 36-59 Months	-0.094**	-0.077**	-0.090**	-0.093**	-0.059**	-0.096**
	(0.018)	(0.017)	(0.026)	(0.023)	(0.023)	(0.023)
Birth size (Larger)	-0.032**	-0.037**	-0.028	-0.034*	-0.051**	-0.022
	(0.011)	(0.010)	(0.019)	(0.015)	(0.015)	(0.014)
Diarrhoea	0.024*	0.006	0.037*	0.013	0.026*	-0.019
	(0.010)	(0.009)	(0.015)	(0.013)	(0.013)	(0.014)
Birth type (Multiple)	0.074**	0.023	0.136**	0.012		0.056**
	(0.024)	(0.017)	(0.034)	(0.035)		(0.020)

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Table 2.9 Continued

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Birth order						
2nd -3rd born	-0.004	0.017	-0.027	0.010	0.032*	-0.013
	(0.023)	(0.013)	(0.036)	(0.027)	(0.014)	(0.026)
4th – 5th born	-0.010	0.008	-0.025	-0.002	0.018	-0.010
	(0.024)	(0.012)	(0.040)	(0.028)	(0.015)	(0.027)
6th and above	-0.007	0.021	-0.012	-0.013	0.048*	-0.017
	(0.024)	(0.018)	(0.039)	(0.029)	(0.021)	(0.027)
Breastfed within 1 hr of birth	0.013	-0.005	0.023	0.007	0.015	-0.027*
	(0.011)	(0.010)	(0.015)	(0.014)	(0.014)	(0.015)
Female (child)	-0.023*	0.005				
	(0.010)	(0.010)				
Comparative Wealth Index						
Poor	-0.002	0.003	-0.010	0.008	0.003	0.015
	(0.015)	(0.012)	(0.023)	(0.016)	(0.020)	(0.016)
Middle	0.002	0.018+	0.004	0.004	0.007	0.033+
	(0.012)	(0.010)	(0.020)	(0.017)	(0.015)	(0.018)
CWI x Employment						
Poor x Employed	0.001	0.011	-0.015	0.016	0.008	0.025+
	(0.014)	(0.011)	(0.022)	(0.017)	(0.017)	(0.014)
Poor x Non-employed	-0.018	-0.021	0.023	-0.040	-0.014	-0.013
	(0.040)	(0.033)	(0. 061)	(0.041)	(0.058)	(0.045)
Middle x Employed	0.008	0.029*	0.010	0.011	0.024	0.038*
	(0.013)	(0.015)	(0.021)	(0.018)	(0.020)	(0.017)
Middle x Non-employed	-0.037	-0.017	-0.036	-0.037	-0.042	0.020
	(0.033)	(0.031)	(0.047)	(0.042)	(0.049)	(0.054)
Region						
Western	0.018	-0.007	0.026	-0.002	-0.001	-0.018
	(0.016)	(0.013)	(0.022)	(0.021)	(0.019)	(0.017)
East	-0.030	-0.016	-0.061+	-0.012	0.003	-0.045+
	(0.020)	(0.018)	(0.033)	(0.022)	(0.023)	(0.027)
North	-0.003	-0.002	0.009	-0.020	0.005	-0.014
	(0.012)	(0.011)	(0.018)	(0.015)	(0.016)	(0.014)
Residence (Urban)	0.016	-0.003	0.015	0.019	-0.012	0.010
	(0.019)	(0.018)	(0.025)	(0.025)	(0.023)	(0.020)
Observations	**2,465**	**2,130**	**1,236**	**1,229**	**1,067**	**1,063**

Note:

- Standard errors in parentheses
- ** p<0.01, * p<0.05, + p<0.1
- **Reference groups include:**
- Mothers characteristics: No education, non-employed mother, 35+ years of age, normal BMI, 48+ months of birth interval
- Children's characteristics: 8 months old or below, birth size- small/very small, no diarrhoea, single birth, first born, not breastfed in one hour after birth, male child
- Comparative Wealth Index: Rich
- Interactions: rich mothers
- Region: Central
- Residence: Rural

Table 2. 10: Determinants of Child Stunting by Survey and Gender (Average Marginal Effects) using non-employment as the base for interactions

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Mother's Characteristics						
Secondary Education+	-0.107**	-0.080+	-0.082+	-0.124*	-0.139*	-0.029
	(0.037)	(0.046)	(0.049)	(0.054)	(0.056)	(0.062)
Primary education	-0.025	-0.035	-0.011	-0.028	-0.037	-0.034
	(0.025)	(0.029)	(0.038)	(0.031)	(0.033)	(0.043)
Mother employed	-0.009	0.006	0.044	-0.058	-0.03	0.037
	(0.033)	(0.021)	(0.046)	(0.043)	(0.024)	(0.033)
Age at birth <20 Years	0.105*	0.104*	0.151*	0.059	0.063	0.138**
	(0.047)	(0.046)	(0.063)	(0.067)	(0.064)	(0.050)
Age at birth 20-34 Years	0.045	0.064	0.082+	0.005	0.085+	0.05
	(0.031)	(0.039)	(0.043)	(0.045)	(0.050)	(0.049)
BMI: Small	0.017	0.012	0.029	0.009	0.029	0.003
	(0.031)	(0.031)	(0.044)	(0.043)	(0.036)	(0.049)
BMI: Overweight/obese	-0.091**	-0.076**	-0.101*	-0.088**	-0.081*	-0.067+
	(0.028)	(0.029)	(0.041)	(0.034)	(0.038)	(0.039)
Height (=1 if below Average of 159 cm**)**	0.145**	0.139**	0.132**	0.158**	0.141**	0.121**
	(0.020)	(0.017)	(0.030)	(0.028)	(0.025)	(0.023)
Birth Interval						
<24 Months	0.037	0.047	0.088+	-0.001	0.089	0.003
	(0.035)	(0.035)	(0.049)	(0.051)	(0.058)	(0.044)
24-47 Months	0.016	0.029	0.092*	-0.053	0.060	-0.010
	(0.029)	(0.032)	(0.043)	(0.044)	(0.053)	(0.047)
Child's Characteristics						
Age 9-17 Months	0.220**	0.165**	0.206**	0.247**	0.181**	0.148**
	(0.035)	(0.027)	(0.045)	(0.053)	(0.043)	(0.049)
Age 18-35 Months	0.345**	0.300**	0.348**	0.360**	0.342**	0.260**
	(0.028)	(0.023)	(0.038)	(0.043)	(0.040)	(0.045)
Age 36-59 Months	0.295**	0.206**	0.280**	0.326**	0.212**	0.201**
	(0.029)	(0.022)	(0.039)	(0.046)	(0.038)	(0.044)
Birth size (Larger)	-0.101**	-0.113**	-0.129**	-0.077**	-0.122**	-0.092**
	(0.022)	(0.018)	(0.033)	(0.031)	(0.037)	(0.024)
Diarrhoea	0.060**	0.039*	0.067*	0.056*	0.081**	-0.006
	(0.020)	(0.019)	(0.031)	(0.027)	(0.029)	(0.030)
Birth type (Multiple)	0.178*	0.181**	0.058	0.279**	0.180+	0.175*
	(0.082)	(0.061)	(0.102)	(0.110)	(0.101)	(0.079)

Table continues to the next page

Table 2.10 Continued

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Birth order						
2nd -3rd born	0.032	-0.002	-0.004	0.076	-0.058	0.032
	(0.040)	(0.035)	(0.058)	(0.050)	(0.052)	(0.055)
4th – 5th born	0.042	-0.006	-0.005	0.095	-0.117*	0.091
	(0.045)	(0.034)	(0.065)	(0.057)	(0.051)	(0.057)
6th and above	0.055	0.033	0.02	0.094	-0.038	0.091+
	(0.044)	(0.037)	(0.064)	(0.058)	(0.053)	(0.053)
Breastfed within 1 hr of birth	-0.046+	0.003	-0.04	-0.052+	-0.006	0.017
	(0.019)	(0.021)	(0.027)	(0.026)	(0.028)	(0.031)
Female (child)	-0.063**	-0.090**				
	(0.019)	(0.022)				
Comparative Wealth Index						
Poor	-0.014	-0.019	-0.054	0.023	0.008	-0.035
	(0.026)	(0.027)	(0.037)	(0.034)	(0.032)	(0.046)
Rich	-0.047+	-0.106**	-0.057	-0.043	-0.102**	-0.112**
	(0.026)	(0.031)	(0.037)	(0.034)	(0.038)	(0.039)
CWI x Employment						
Poor x Employed	-0.029	-0.030	0.097	-0.160+	-0.108*	0.046
	(0.070)	(0.039)	(0.089)	(0.094)	(0.049)	(0.047)
Middle x Employed	0.047	0.072*	0.090	0.014	0.099+	0.038
	(0.057)	(0.034)	(0.077)	(0.070)	(0.053)	(0.054)
Rich x Employed	-0.048	-0.008	-0.067	-0.025	0.045	0.025
	(0.047)	(0.030)	(0.063)	(0.059)	(0.044)	(0.049)
Region						
Western	0.040	0.081**	0.009	0.082**	0.101**	0.054+
	(0.027)	(0.023)	(0.037)	(0.036)	(0.029)	(0.030)
East	0.009	-0.083*	-0.032	0.049	-0.092*	-0.094*
	(0.035)	(0.038)	(0.047)	(0.047)	(0.046)	(0.042)
North	0.013	-0.036	-0.042	0.071+	-0.055	-0.037
	(0.029)	(0.023)	(0.041)	(0.038)	(0.038)	(0.035)
Residence (Urban)	-0.057	-0.076*	-0.068	-0.043	-0.067	-0.080*
	(0.037)	(0.035)	(0.050)	(0.053)	(0.051)	(0.036)
Observations	**2,465**	**2,130**	**1,236**	**1,229**	**1,067**	**1,063**

Note:

- Standard errors in parentheses
- ** p<0.01, * p<0.05, + p<0.1
- **Reference groups include:**
- Mothers characteristics: No education, non-employed mother, 35+ years of age, normal BMI, 48+ months of birth interval
- Children's characteristics: 8 months old or below, birth size- small/very small, no diarrhoea, single birth, first born, not breastfed in one hour after birth, male child
- Comparative Wealth Index: Middle wealth
- Interactions: Non-employed mothers
- Region: Central
- Residence: Rural

Table 2. 11: Determinants of Child Stunting by Survey and Gender (Average Marginal Effects) using Poor households as the base for Comparative Wealth Index

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Mother's Characteristics						
Secondary Education+	-0.107**	-0.080+	-0.082+	-0.124*	-0.139*	-0.029
	(0.037)	(0.046)	(0.049)	(0.054)	(0.056)	(0.062)
Primary education	-0.025	-0.035	-0.011	-0.028	-0.037	-0.034
	(0.024)	(0.029)	(0.038)	(0.031)	(0.033)	(0.043)
Mother employed	-0.009	0.006	0.044	-0.058	-0.030	0.037
	(0.033)	(0.021)	(0.046)	(0.043)	(0.024)	(0.033)
Age at birth <20 Years	0.105*	0.104*	0.151*	0.059	0.063	0.138**
	(0.047)	(0.046)	(0.063)	(0.067)	(0.064)	(0.050)
Age at birth 20-34 Years	0.045	0.064	0.082+	0.005	0.085+	0.050
	(0.031)	(0.039)	(0.043)	(0.045)	(0.050)	(0.049)
BMI: Small	0.017	0.012	0.029	0.009	0.029	0.003
	(0.031)	(0.031)	(0.044)	(0.043)	(0.036)	(0.049)
BMI: Overweight/obese	-0.091**	-0.076**	-0.101*	-0.088**	-0.081*	-0.067+
	(0.028)	(0.029)	(0.040)	(0.034)	(0.038)	(0.039)
Height (=1 if below Average of 159 cm**)**	0.145**	0.139**	0.132**	0.158**	0.141**	0.121**
	(0.019)	(0.017)	(0.030)	(0.028)	(0.025)	(0.023)
Birth Interval						
<24 Months	0.037	0.047	0.088+	-0.001	0.089	0.002
	(0.035)	(0.035)	(0.049)	(0.051)	(0.058)	(0.044)
24-47 Months	0.016	0.029	0.092*	-0.053	0.060	-0.010
	(0.029)	(0.032)	(0.043)	(0.044)	(0.053)	(0.047)
Child's Characteristics						
Age 9-17 Months	0.220**	0.165**	0.208**	0.247**	0.181**	0.148**
	(0.035)	(0.027)	(0.045)	(0.053)	(0.043)	(0.049)
Age 18-35 Months	0.345**	0.300**	0.348**	0.360**	0.342**	0.260**
	(0.028)	(0.023)	(0.038)	(0.043)	(0.040)	(0.045)
Age 36-59 Months	0.295**	0.206**	0.280**	0.329**	0.212**	0.201**
	(0.028)	(0.022)	(0.039)	(0.046)	(0.038)	(0.044)
Birth size (Larger)	-0.101**	-0.113**	-0.129**	-0.077*	-0.122**	-0.092**
	(0.022)	(0.018)	(0.033)	(0.031)	(0.037)	(0.024)
Diarrhoea	0.060**	0.039*	0.067*	0.056*	0.080**	-0.006
	(0.020)	(0.019)	(0.031)	(0.027)	(0.029)	(0.030)
Birth type (Multiple)	0.178*	0.181**	0.058	0.279*	0.180+	0.175*
	(0.082)	(0.061)	(0.102)	(0.112)	(0.101)	(0.079)

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Table 2.11 Continued

VARIABLES	2006	2011	2006 Male	2006 Female	2011 Male	2011 Female
Birth order						
2nd -3rd born	0.032	-0.002	-0.004	0.076	-0.058	0.032
	(0.040)	(0.035)	(0.058)	(0.050)	(0.052)	(0.055)
4th – 5th born	0.042	-0.006	-0.005	0.095+	-0.117*	0.091
	(0.045)	(0.034)	(0.065)	(0.057)	(0.051)	(0.057)
6th and above	0.055	0.033	0.020	0.094	-0.038	0.091+
	(0.044)	(0.036)	(0.064)	(0.058)	(0.052)	(0.053)
Breastfed within 1 hr of birth	-0.046*	0.003	-0.040	-0.052*	-0.006	0.017
	(0.019)	(0.020)	(0.027)	(0.026)	(0.028)	(0.031)
Female (child)	-0.063**	-0.090**				
	(0.019)	(0.022)				
Comparative Wealth Index						
Middle	0.014	0.019	0.054	-0.023	-0.008	0.035
	(0.026)	(0.027)	(0.037)	(0.034)	(0.032)	(0.046)
Rich	-0.033	-0.087**	-0.003	-0.066+	-0.110*	-0.077+
	(0.030)	(0.029)	(0.044)	(0.038)	(0.049)	(0.042)
CWI x Employment						
Middle x Employed	0.023	0.043	0.054	0.000	0.041	0.034
	(0.026)	(0.033)	(0.039)	(0.034)	(0.043)	(0.049)
Middle x Non-employed	-0.048	0.053	0.054	-0.161	-0.152**	0.040
	(0.081)	(0.038)	(0.100)	(0.106)	(0.054)	(0.062)
Rich x Employed	-0.037	-0.083**	-0.023	-0.049	-0.098+	-0.082+
	(0.031)	(0.031)	(0.046)	(0.038)	(0.052)	(0.048)
Rich x Non-employed	-0.013	-0.098*	0.132	-0.168	-0.146*	-0.062
	(0.081)	(0.049)	(0.097)	(0.107)	(0.071)	(0.057)
Region						
Western	0.040	0.081**	-0.009	0.082*	0.101**	0.054+
	(0.026)	(0.023)	(0.037)	(0.036)	(0.029)	(0.030)
East	0.009	-0.083*	-0.032	0.049	-0.092*	-0.094*
	(0.035)	(0.038)	(0.047)	(0.047)	(0.046)	(0.042)
North	0.013	-0.036	-0.042	0.070+	-0.055	-0.037
	(0.029)	(0.023)	(0.041)	(0.038)	(0.038)	(0.035)
Residence (Urban)	-0.057	-0.076*	-0.067	-0.043	-0.067	-0.080*
	(0.037)	(0.035)	(0.050)	(0.053)	(0.051)	(0.036)
Observations	**2,465**	**2,130**	**1,236**	**1,229**	**1,067**	**1,063**

Note:

- Standard errors in parentheses
- ** p<0.01, * p<0.05, + p<0.1
- **Reference groups include:**
- Mothers characteristics: No education, non-employed mother, 35+ years of age, normal BMI, 48+ months of birth interval
- Children's characteristics: 8 months old or below, birth size- small/very small, no diarrhoea, single birth, first born, not breastfed in one hour after birth, male child
- Comparative Wealth Index: Rich
- Interactions: poor mothers
- Region: Central
- Residence: Rural

CHAPTER 3

Maternal Employment and the Choice of Employment Sector

3.1 Introduction

Although the literature shows that mothers with a higher income have increased bargaining power in a household (Hoddinott and Haddad, 1995; Luke and Munshi, 2011; Thomas, 1990), other evidence shows that, compared to self-employment, wage employment may curtail their flexibility to deal with family issues, such as childcare. A study on adult graduate students from four urban universities and individuals enrolled in continuing professional development courses from two other universities in North-eastern United States (Parasuraman and Simmers, 2001) find that self-employed persons enjoy greater autonomy, flexibility at work and report higher levels of job satisfaction than employees. We analyse mother's decision to work, and her choice of employment sector.

This study focuses on a group of mothers who are exposed to the challenge of combining work with childcare. These are mothers with children that are less than five years of age[21], many of whom are meant to be breastfed, fed on a balanced diet, and whose health needs greater monitoring. It is the primary responsibility of parents to provide such care for their children; however, the growing demand of economic survival has made this hard, especially in developing countries where the market for childcare facilities is still underdeveloped. This study investigates what influences the mothers' decisions to work, despite having childcare responsibilities; and what influences their decision to take up specific forms of employment if they choose to participate in the labour market.

In the analysis we use a logistic model to estimate the likelihood of a mother choosing to work rather than staying at home. The assumption is that mothers who choose not to work make themselves available to care for their children. In

[21] Note that unlike in chapter 2 above where the unit of analysis is children below the age of five, here the unit of analysis is their mothers.

the model we control for the demographic characteristics of mothers, children, household characteristics, region and residence (urban/rural). A multinomial logit model is used to investigate the determinants of choice of employment type/sector. The dependent variable has three alternatives: family work, wage employment or self-employment. In both models we retrieve marginal effects to simplify the interpretation of the relevant coefficients. Findings from the logistic model replicate the existing literature on determinants of female employment, namely, mothers with higher levels of education are more likely to work (Dildar 2015; Faridi et al., 2009); mothers in richer households are less likely to work; that religion reduces female labour participation (Dildar 2015; Francavilla and Giannelli, 2011), that being in urban areas may reduce female labour participation given limited family work alongside patriarchal values (Dildar, 2015).

Results on the choice of employment type indicate that: Mothers with secondary education or higher, are more likely to be in wage employment and less likely to be in family employment compared to their counterparts with no education; mothers in richer households are more likely to be in self-employment and less likely to be in family work, compared to mothers in poorer households; meanwhile in reference to mothers in rural areas, mother in urban areas are more likely to be in wage employment and less likely to do family work, compared to mothers in rural areas. Additionally, we find mothers who give birth at an early age, namely those below 20 years of age, are more likely not to take up employment. Those who do, are more likely to be employed by a family member than being in wage or self-employment. Although not all coefficients are significant, the sign of the coefficients is indicative. In addition, mothers from polygamous marriages are more likely to be self-employed compared to mothers in monogamous marriages, but at the same time less likely to do family work compared to their counterparts. On the other hand, unmarried mothers are more likely to be in wage employment and less likely to be in self-employment compared to those in monogamous marriages.

In the rest of this chapter we discuss the existing empirical literature on female employment in section 2. Data and methods are outlined in section 3. Results are

presented in section 4, with a sensitivity analysis provided in section 5. Section 6 concludes.

3.2 Background Literature

In this section we review the relevant literature on determinants of maternal employment as well as determinants of the choice of employment sector for both the developing and developed world. With specific focus on the Ugandan context we also examine two additional areas that have received limited attention in the literature, namely, the effect of having children at an early age, and marital status on employment.

3.2.1 Literature on Determinants of Maternal Employment and Choice of Sector

There is a vast literature on determinants of female labour supply which identifies that sectoral shifts, female education, household wealth, fertility and attitudes associated with fertility, cultural norms and values, as well as religion, are important determinants.

A recent study by Heath and Jayachandran (2017) shows that a shift from brawn-based industries or activities to brain-based industries or services, as well as policies that increase female participation, boost female labour supply. If countries enact policies to end the legal discrimination against female workers or reduce the time cost of home production and childcare, women can benefit from this shift and supply more labour. Jayachandran (2015) advanced a similar view that a sectoral shift away from agriculture towards services, as well as the technological advances that reduce time needed for household chores and the declining rate of childbearing all increase female labour supply. Their view that sectoral shift towards services increases female labour participation is also supported by literature which shows that women are more likely to enter the service industry (Bates, 1995).

Education has also been found to be key in determining female labour supply. A study by Faridi et al. (2009) found that female labour force participation is greatly influenced by their level of education. Using non-formal education as the reference group, they found that females who were educated only up to middle

level were unable to get jobs. Females educated up to Matric level were more likely to participate in the labour market by 36.7 percentage points. Other studies, such as Dildar (2015) have also echoed the role of education in boosting female labour participation.

Although policies directed towards increasing access to female education are relevant in increasing female labour market participation (Heath and Jayachandran, 2017), Lázaro et al., (2000) regard this as insufficient. They argue that measures to reconcile family and professional life are required in order to achieve a complete integration of women in the labour force. Studies have also analysed family events such as the effect and timing of childbirth on women's labour-market participation. Examining the likelihood of leaving and re-entering the labour market, (Stier and Yaish, 2008) find that childbirth in Israel increases the women's chances of withdrawing from work. The study also identified the role of human capital in boosting female labour participation as well as structural factors such as occupation and the sector of employment.

Cultural norms, and attitudes against women in the labour market in some parts of the world is equally a pertinent issue in the literature. Jayachandran (2015) investigates the roots of gender inequality in developing countries and analyses the trends of male and female labour force participation in different regions including the Americas, Asia and Oceania, Europe, middle East and north Africa as well as sub-Saharan Africa. Using World development indicators, Jayachandran (2015) found that India stood out for the under-representation of women in the labour force, followed by the Middle East and North Africa. The study attributes this to the less progressive attitudes towards women in the labour force in these regions. Dildar (2015) also finds that patriarchal values in Turkey have a negative impact on female labour supply and that it is worse for women in urban areas because those in rural areas can still participate in unpaid family work under which conservative values are not violated.

The issue of cultural norms is not far from restrictions arising due to religion. Some of these, like seclusion, limit women's physical mobility (Munro et al., 2018). In some countries, religion is an aspect of daily life (Dildar, 2015) which dominates a woman's day, allowing no time for employment. In India, Hindu

and Muslim women were found with a lower probability of working compared to Christian women (Francavilla and Giannelli, 2011).

In a study that reviewed the literature on the labour supply of women in Australia, Birch (2005), provides a useful summary of the economic, demographic and institutional factors which influence women's labour supply decisions. An increase in women's wages and the cost of living, educational attainment, more labour-market experience, duration of residence and availability of suitable jobs all significantly increase labour force participation and the number of hours worked. On the other hand, an increase in family income and number of dependants reduce women's labour supply. The impact of fertility on mother's employment was also investigated within several developing nations. Cáceres-Delpiano (2012), uses the incidence of multiple-birth as an instrumental variable for fertility, and finds that having children, has a negative impact on female employment. Childcare obligations reduce participation in the labour market (Dildar, 2015) and a high fertility rate would bring such challenges.

On the other hand, if mothers are household heads, then even with children they may have to work. A study on Ghana and Bolivia by Kishor (1996) finds that, married women with children have a significantly higher probability of being currently employed if they are household heads. However, the probability significantly lowers if they have a child younger than 6 years of age in Ghana. Similarly, in Bolivia current household heads are more likely than their counterparts to be currently employed. However, married women are only one-fifth as likely as formally married women to be in current employment. This tallies with the finding by Orloff (2002) who also finds that marriage influences women's employment decisions.

Besides being a household head, household wealth influences the likelihood of women working. The literature shows that there is a negative relationship between household wealth and women's participation in the labour market (Dildar, 2015; Birch, 2005). However, this may only be the case for two-parent families and could be difficult for female household heads to achieve. In Zimbabwe, Horrell et al., (2008) find that De jure female headed households

have access to a reasonable range of assets, but they cannot utilize them to maximum potential. So, are more likely to become income poor. They find that widowed households have significantly lower yields than male headed households in cotton production. It reveals that both de facto and de jure female-headed households are hampered in their activities. They show less diversification in crop production and are disadvantaged by the prices they receive in selling produce and pay for buying inputs. The study shows that they should access extension services and participate in networks to address such a problem. This implies that having household resources is not enough. It may require more work for sustenance especially for female headed households which may instead increase their labour market participation.

In our study, we control for many of the covariates discussed above including education, whether a mother is a household head, household wealth, number of children in the household, household size, marital status and religion. What we did not control for are cultural norms and sectoral shift, but by controlling for religion we proxy for some of the social values. Also controlling for variables like area of residence (urban or rural) may proxy for chances in types of employment opportunities accessible by women (sectoral shifts).

In terms of choice of employment sector, Pardo and Ruiz-Tagle (2017) show that + tend to prefer wage employment to self-employment. However, literature also shows that women in self-employment are more likely to report lifestyle and family reasons for self-employment instead of financial gains (Dawson et al., 2009). Although this may sound reasonable, other studies show that self-employment instead brings more stress to individuals than wage employment (Cardon and Patel, 2015; Blanchflower, 2004) and that the self-employed may have less time for family because of the extended normal work day and the rarity of having weekends off (Jamal and Badawi, 1995).

Despite the fact financial capital constraints shape self-employment entry decisions, Bates (1995) also underscores the nature of education and experience an individual possesses. The author argues that the main barrier constraints to self-employment entry in manufacturing and wholesaling-for example are clearly financial in nature, but educational qualifications are the most important

in entering self-employment in the growing skilled services industries and that personal wealth holdings are secondary. Bates (1995) also mentions that factors influencing entry differ among men and women. That because women are more likely to enter self-employment in skilled services, then human capital variables such as education can best predict their entry.

In Peru, Escobal (2001) investigates what determines people's participation in more than one economic activity in a view of boosting their incomes. The study shows that access to public goods and services together with an adequate endowment of private holdings including education and credit, can increase participation in self-employment as well as wage employment.

The above literature discusses the general factors that influence both maternal employment and choice of sector decisions in general. We now embark on specific details relating to variables that form part of our findings in this study. We discuss more literature relating to early marriages and births because we find this impacting on both women's choice of employment and choice of sector. We also discuss polygamy as it is revealed to influence women's decisions for choice of employment sector.

3.2.3 Early Marriages in Uganda

Within the literature on female employment two areas are of particular interest with respect to Uganda. We partly associate having children at a young age with early marriages and informal relationships that result in early pregnancies. Among the studies on early marriages Schlecht et al., (2013) define child marriage as marriage before 18 years of age and investigate its extent in two populations in Uganda: the internally displaced persons in Mucwini transit camp in northern Uganda; and the Congolese refugees in Nakivale refugee settlement in southwest Uganda. What they find as the main predictors of early marriages (which we associate with early births) is poverty, splintering of families and lack of education. With the inability of parents to provide financially for their children, families consider early relationships. Meanwhile, breaking families as a result of conflicts destroys family networks and reduces cross-generational communications regarding dating and marriage. They find that other early marriages were due to dropping out of school at an early age.

Another study on early marriages in Africa by Walker (2012), explores the effects of early marriages in terms of impact on health, education and economic well-being of girls. Walker (2012) examines regional and local initiatives and progress in curbing early marriages. Uganda is one of the countries identified as having made some progress in efforts to increase the marriage age and the age at first birth. Other countries with progress include Kenya, Zimbabwe and Senegal. Kenya's success was attributed to the retention of girls in school and the success of their female economic interventions.

In table 3.1 below, we show reported cases in our sample where mothers had their first births while underage (below 18 for the case of Uganda). The table shows that there are 376 and 377 mothers that reported their age at first birth falling into "underage" category for the respective surveys. This makes up 5 and 6 percent of our survey samples[22] respectively. Although these are small percentages, based on findings from existing studies (Beguy et al., 2009; Neal and Hosegood, 2015), the expectation is that the actual numbers of births for underage adolescents is more than what is reported. Neal and Hosegood (2015) acknowledge that overstatement of age by adolescents is a plausible explanation for underestimation of early adolescent births and marriages among respondents aged 15-19. There are different reasons for overstatement of age. Beguy et al. (2009) find that while young men feel pressure to over report sexual experiences during adolescence, it is the opposite among young women because of the negative attitudes towards women's sexual activities at a young age or outside marriage. There are also varying rules across countries relating to the legal age of marriage, female education and birth registration, all of which could influence accuracy of reporting, as well as affecting the extent to which young women feel obliged to overstate their age (Neal and Hosegood, 2015).

[22] Full samples are 6,915 for 2006 survey and 6,628 for 2011 survey.

Table 3. 1: Showing the mean age at which mothers gave birth as represented in our sample

Age at 1st birth	Survey	Obs	Mean age	SD	Min	Max
Underage	2006	376	16.9	0.8	13.4	17.9
	2011	377	16.9	0.8	13.8	17.9
Aged 18<20	2006	684	19.0	0.6	18.0	19.9
	2011	621	19.0	0.6	18.0	19.9

***Source**:* Own tabulations based on UDHS 2006 and 2011 data as a proportion of our sample

Therefore, although some literature shows that Uganda has registered progress in increasing the marriage age (Walker, 2012), we worry that an increase in reported marriage age could be arising from the increasing overstatements of age for those who had their first births that falls below the legal age. We therefore interpret our results on mother's age at birth with caution (Neal and Hosegood, 2015). However, because overstatement of age is the most probable outcome of adolescents that are married or have had a child (Neal and Hosegood, 2015) our results on employment and employment sector choice may be different (perhaps more significant) if all cases of underage births were reported.

3.2.4 Polygamy in Uganda

According to Al-Sharfi et al., (2016), polygamy is a marital relationship that involves multiple spouses and occurs in different forms; the most common of which is polygyny where a man has more than one wife at the same time[23]. For simplicity, we shall use the term polygamy[24] to refer to polygyny, given that it is the most common type.

Polygamy is still legal in many countries in the Middle East and Africa. In Africa polygamous marriages are most prevalent in sub-Saharan Africa (Smith-Greenaway and Trinitapoli, 2014), in the confined area that is known as the polygamous belt which stretches from Senegal to Tanzania (Fenske, 2015;

[23] Polyandry is another form, where a woman has more than one husband, and polygynandry is when more than one husband is married to more than one wife, but both of these are rare cases and socially unacceptable in many communities across the globe.
[24] We use polygamy to refer to polygyny because it is a more familiar term to the audience. Also, the data (UDHS) only has records on polygyny.

Jacoby, 1995). Although polygamous marriages are more common in West African countries such as Burkina Faso and Guinea (Smith-Greenaway and Trinitapoli, 2014), Uganda has the highest rate in the East of the polygamous belt, followed by Tanzania. (See Figure 1 in the Appendix which plots women in polygamous marriages in the sample that have latitudinal and longitudinal coordinates; a red dot indicates polygamy, and a blue dot indicates monogamy). Countries in West Africa with a relatively higher percentage of Muslims, such as Burkina Faso (61 percent) and Guinea (84 percent) (Kettani, 2010), also have high rates of polygamy (55 and 57 percent respectively (Smith-Greenaway and Trinitapoli, 2014). Uganda has a smaller population of Muslims, about 12 percent in the years 2000-2010 (Kettani, 2010), but experiences relatively high levels of polygamy. According to the Uganda Demographic and Health Surveys (UDHS) for 2006 and 2011 the proportion of women in polygamous marriages was 28 and 25 percent in the respective surveys (Uganda Bureau of Statistics (UBOS) and ICF International Inc, 2012). The implication also is that communities other than Muslims in Uganda practise polygamy which is corroborated by the UDHS data.

In traditional societies the associated advantages of polygamy include: enabling widows and orphans to be incorporated into other existing families, thereby allowing them to access financial and emotional support (Hassouneh-Phillips, 2001); and a way of increasing fertility rates among men, and as a result boosting family labour. However, it is also known to result in many complex relationships within families that impact particularly on children and their mothers. A review of 13 studies by Al-Sharfi et al. (2016) found that children in polygamous families had more mental health and social problems, and lower academic achievement compared to those in monogamous families. Other studies reveal that polygamy has detrimental effects on women's mental health (Shepard, 2013). There is also evidence of severe economic, emotional and social deprivations that are incurred by wives and children of polygamous families (Al-Krenawi and Graham, 1999). Other studies have found evidence of polygamy being responsible for high levels of child mortality (Adedini and Odimegwu, 2017; Smith-Greenaway and Trinitapoli, 2014; Strassmann, 1997).

In Uganda steps were taken through the Domestic Relations Bill to try to regulate polygamy and provide guidelines on the economic support of all wives (Von and Susan, 2004); however, this bill has not been passed to date. This implies that mothers in polygamous families in Uganda continue to face the associated challenges.

This study hypothesises that the form of marriage mothers commit themselves to influences their employment decisions. Mothers in polygamous marriages may face special constraints in combining work with childcare compared to their counterparts in monogamous marriages. This is based on the existing evidence that husbands allocate little time for childcare compared to their wives (Nkwake, 2009) and, as a result, mothers in polygamous marriages are most likely to be on their own. Studies also indicate that there is competition amongst co-wives (Al-Krenawi et al., 1997; Slonim-Nevo and Al-Krenawi, 2006), which implies that mothers in polygamous marriages may not solicit help with childcare from each other.

3.3 Data and Methods

The study uses the 2006 and 2011 waves of the Uganda Demographic and Health Surveys (UDHS). In the 2006 UDHS survey, 8,870 households were successfully interviewed. In the 2011 UDHS a total 8,674 were interviewed (Uganda Bureau of Statistics (UBOS) and ICF International Inc, 2012). In this study we use only mothers with at least one child under the age of five, resulting in a sample of 6,915 mothers in 2006 and 6,628 in 2011. The DHS sample used in this chapter is the same DHS sample used in chapter 2. The difference being the unit of analysis which is mothers and children respectively. In addition, in chapter 2 we restrict the sample further to children who were in the household a day before the survey date.

3.3.1 Variables

We formulate two choice models; a logistic model to estimate the mother's choice to be employed and a multinomial model for the choice of employment type.

In the logit model the dependent variable is maternal employment which takes the value of 1 if employed and 0 otherwise. In the multinomial logit model, the dependent variable is maternal employment sector which is either family work, wage employment or self-employment. Mothers were asked if they had done any work in the last 12 months before the survey and if so, whether they do or have done it for any member of the family, for someone else (wage employment) or are self-employed. Family work involves working on a family farm or in a family business (own labour), wage employment involves taking up a job for which one is paid in cash or kind (it includes off-farm agricultural work) while self-employment includes those involved is selling something or owning a business. Mothers who did not work in the last 12 months before the survey are recorded as 'not employed'. We also control for mother's characteristics including age at first birth; marital relationship; media exposure (access to radio or newspapers); whether she is the household head; level of education; number of children ever born; household characteristics such as wealth index; religion; household size; urban/rural residence; as well as region and children's age.

3.3.2 Methods

In case of employment decision choice, we estimate a logistic model of the form: $P\left(y_i = 1/x_i\right) = \Lambda\left(x_i^{'}\beta\right)$. Where y_i is the probability that a mother i decides to take up employment given covariates x_i . β represents the vector of coefficients for the predictors.

For choice of employment sector, we assume that mothers who chose to work face three alternatives: family work, wage employment or self-employment. We then estimate a multinomial logit model to suit the three choices with the following likelihood function: Let y be mother's choice of employment sector, then;

$f(y) = p_1^{y_1} + p_2^{y_2} + p_3^{y_3} = \prod_{j=1}^{3} p_j^{y_j}$. Where $j = 1,...,...J$ are the choice alternatives with $J = 3$

$$L = \prod_{i=1}^{N}\prod_{j=1}^{3} p_{ij}^{y_{ij}} \quad \text{.....(1)}$$

$i = 1,.....,.....N$ represents each individual mother i with a total of N mothers in a given survey sample. We follow a household utility maximization model (Gramm, 1975; Bourguignon and Chiappori, 1992) and assume mothers rationally maximise their utility such that mother i chooses alternative j if the utility derived from this alternative j (U_{ij}) exceeds that derived from all other alternatives in set; {$U_{i1},..,...U_{iJ}$}. So, we estimate;

$U_{ij} = x_i^{'}\beta_j + \varepsilon_{ij} \quad for\ i = 1,.....,...N\ and\ j = 1,...,.....J$

Where N is the total number of mothers in a given survey sample and J is the number of alternative choices in each mother's employment decision. U_{ij} is latent and only observable when it exceeds the utility derived from all other alternatives in $U_{i1},..,...U_{iJ}$. That is $y_i = j\ \ if\ U_{ij} > U_{is}\ \forall\ s \neq j$ and the probability that mother i chooses alternative j is given by;

$$p_{ij} = \Pr\{Y_i = j\} = \Pr\left\{\max(U_{i1},...,..U_{iJ}) = U_{ij}\right\}$$

$$p_{ij} = \frac{e^{x_i^{'}\beta_j}}{\sum_{j=1}^{J} e^{x_i^{'}\beta_j}} \quad \text{.....(2)}$$

Where, x_i is a vector of non-varying covariates across the alternatives and β_j are the coefficients for each alternative choice. We then compute the average marginal effects (given discrete covariates) to facilitate the interpretation of results.

3.4 Results

3.4.1 Descriptives

Table 3.2 below shows the descriptive statistics for both the dependent and independent variables by wave for the total sample and for mothers engaged in either family, wage or self-employment.

Table 3. 2: Descriptive Statistics on Background Characteristics

Variables	**Entire Sample**			**Employed**		
Employment sector	**2006**	**2011**	***Ttest***	**2006**	**2011**	***Ttest***
Family work	0.22	0.11	0.00	0.25	0.14	0.00
Wage employed	0.07	0.10	0.00	0.08	0.13	0.00
Self employed	0.58	0.54	0.00	0.67	0.73	0.00
Not employed	0.13	0.25	0.00			
Mother education						
No education	0.25	0.19	0.00	0.26	0.19	0.00
Incomplete Primary	0.51	0.48	0.00	0.52	0.48	0.00
Complete Primary	0.10	0.11	0.13	0.10	0.11	0.02
Incomplete Secondary	0.11	0.17	0.00	0.09	0.16	0.00
Complete Secondary or Higher	0.03	0.05	0.00	0.03	0.06	0.00
Relationship						
Not in union	0.12	0.12	0.36	0.12	0.12	0.53
Polygamous	0.25	0.23	0.03	0.26	0.24	0.94
Monogamous	0.63	0.65	0.01	0.62	0.64	0.52
Rank in polygamy						
Rank 1 (first)	0.12	0.11	0.06	0.12	0.11	0.02
Rank 2 or more	0.13	0.13	0.32	0.14	0.13	0.89
Mothers' age at first birth						
Below 20 years	0.15	0.15	0.66	0.14	0.13	0.10
20 -34 years	0.71	0.72	0.17	0.71	0.73	0.04
35-49 years	0.14	0.13	0.17	0.15	0.14	0.34
Religion						
Catholics	0.46	0.44	0.02	0.47	0.45	0.04
Protestants	0.33	0.29	0.00	0.33	0.29	0.00
Muslims	0.11	0.13	0.00	0.10	0.11	0.00
Pentecostal	0.06	0.11	0.00	0.06	0.11	0.00
Others	0.03	0.03	0.09	0.04	0.03	0.27
Female head	0.22	0.22	0.69	0.22	0.23	0.12
Urban	0.10	0.20	0.00	0.07	0.18	0.00
Access to radio	0.77	0.82	0.00	0.76	0.84	0.00
Access to news papers	0.16	0.21	0.00	0.14	0.21	0.00

Table continues to the next page

Table 3.2 Continued

	Entire Sample			Employed		
Variables	**2006**	**2011**	***Ttest***	**2006**	**2011**	***Ttest***
Number of children	4.81	4.51	0.00	4.93	4.65	0.00
Child's age						
Below 8 months	0.17	0.17	0.94	0.16	0.16	1.00
9-17 months	0.17	0.16	0.63	0.16	0.16	0.52
18-35 months	0.30	0.30	0.89	0.30	0.30	0.94
36-59 months	0.36	0.37	0.66	0.37	0.37	0.58
Household Size	6.74	6.58	0.00	6.80	6.57	0.00
Comparative wealth Index						
Poor	0.37	0.42	0.00	0.40	0.43	0.46
Middle	0.33	0.29	0.00	0.34	0.30	0.00
Rich	0.30	0.30	0.28	0.27	0.27	0.00
Region						
Central	0.22	0.23	0.05	0.18	0.21	0.00
Eastern	0.25	0.24	0.36	0.26	0.23	0.00
Northern	0.43	0.31	0.00	0.45	0.30	0.00
Western	0.11	0.22	0.00	0.11	0.26	0.00
Sample	**6915**	**6628**		**6010**	**4974**	

The proportion of self-employed mothers in the entire sample was 58 percent in 2006 and reduced to 54 percent in 2011. It is true that Uganda experienced a relatively good performance economically between 2005 and 2008 with an average growth rate of 5 percent, although this declined later to 2.3 percent during the period 2009-2012 (World Bank, 2013). Although the share of self-employment in the entire sample was reducing, the self-employment rate was instead increasing amongst the mothers in employment: from 67 percent to 73 percent. Those in wage employment increased from 7 percent to 10 percent in the entire sample, and from 8 percent to 13 percent amongst mothers who were employed. This corresponds to other data presented by Brownbridge and Bwire (2016), which shows that between 2005-2006 and 2009-2010 the proportion of the total male and female workforce in paid employment (equivalent to wage employment) increased from 15 percent to 27 percent.

The share in family work fell from 22 to 11 percent for the entire sample, and from 25 to 14 percent among employed mothers.

In terms of education, a large proportion of mothers either have not completed primary education or have no education at all: this constitutes about 76 percent of the entire sample in the 2006 survey and 67 percent in the 2011 survey. The proportions remain almost the same among the employed mothers: 78 and 67 percent in the respective surveys. Overall, there was a slight improvement in education, as the percentage of those without education at all and those with incomplete primary education reduced between the two surveys, while the percentages for those with complete primary education and above increased.[25]

As regards to mothers' economic welfare, we analyse the Comparative Wealth Index (CWI) instead of the ordinary DHS Wealth Index. The CWI was computed for 172 DHS surveys conducted between 1990 and 2012 for 69 countries including Uganda.[26] From Table 3.2 above, the statistics show a slight shift in the proportion of mothers in poorer households from middle income households between the surveys.

We now consider the form of marriage: more than 60 percent of mothers are in monogamous marriages in each of the surveys. The proportion of mothers in monogamous marriages increased between the surveys while those in polygamous marriages reduced, but those not in a union remained constant. Mothers in polygamy are in marriages that include from two to seven co-wives. The rank is up to seven, with rank 1 meaning the first wife and rank 7, the seventh wife. Although monogamy can largely be attributed to the dominance of the Christian faith in the country (in our data, Catholics, Pentecostals, Protestants make up 84 percent of the sample and Muslims only 11 percent), we find that although polygamy is traditionally linked to Muslims, it is practised among all religions. It is the case however, that it is relatively higher among Muslims because of their faith.

[25] The introduction of Universal Primary Education (UPE) in 1997 (Nishimura, Yamano and Sasaoka, 2008) did not benefit the majority of our sample because many were older than the primary school age at that time; only mothers who were below the age of 20 and 25 years in 2006 and 2011 surveys respectively could have benefited.

[26] According to Rutstein and Staveteig (2014), the CWI is superior because it enables the comparison of welfare across surveys, regions and countries. It is effective in producing aggregate results that tend to comport with the per capita income measures for countries and regions.

Regionally, statistics show that a large proportion of mothers in the sample are in rural areas: 90 percent in 2006 survey and 80 percent in 2011 survey. The Northern region has the largest proportion of the sample in the two respective surveys, with 43 percent and 31 percent. This region includes the West Nile and the Northern region; the Eastern region includes East Central and Eastern regions; whilst the Central region includes Kampala - the capital city, Central 1 and Central 2; the Western region includes the Southwest and the Western regions.

3.4.2 Estimated Results

Table 3.3 below provides the estimated results for the 2006 survey. We discuss these results by relating each variable first to the choice of employment (column 1) if the variable is significant in that column, and then showing its impact on the choice of employment sector if a mother decides to work. We use the same controls in survey 2006 and survey 2011 which are ordered in the same sequence.

Table 3. 3: Determinants of Maternal Employment and Choice of employment Sector 2006 Survey

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.009	0.039*	-0.026*	-0.012
	(0.02)	(0.02)	(0.01)	(0.02)
Complete Primary	0.000	0.052	-0.035*	-0.017
	(0.02)	(0.03)	(0.02)	(0.03)
Incomplete Secondary	-0.012	0.032	0.013	-0.045
	(0.02)	(0.03)	(0.02)	(0.03)
Complete secondary or Higher	0.068**	-0.054	0.334**	-0.280**
	(0.02)	(0.06)	(0.07)	(0.06)
Comparative wealth Index (ref. Poorer)				
Middle	-0.027+	-0.024	-0.011	0.035
	(0.02)	(0.02)	(0.01)	(0.02)
Richer	-0.058**	-0.100**	0.014	0.086**
	(0.02)	(0.02)	(0.01)	(0.03)
Mother's age at birth (ref. 35-49 years)				
Less than 20 years	-0.046+	0.024	-0.016	-0.008
	(0.02)	(0.04)	(0.02)	(0.04)
20-34 years	-0.012	0.002	-0.012	0.010
	(0.02)	(0.03)	(0.01)	(0.03)
Region (ref. Central)				
Eastern	0.114**	0.127**	-0.024+	-0.103**
	(0.02)	(0.02)	(0.01)	(0.03)
Northern	0.123**	0.084**	-0.003	-0.081**
	(0.02)	(0.02)	(0.01)	(0.02)
Western	0.108**	0.181**	0.046**	-0.228**
	(0.02)	(0.03)	(0.02)	(0.03)
Household size	0.001	0.007*	-0.002	-0.005
	(0.00)	(0.00)	(0.00)	(0.00)
Household head (female)	-0.003	-0.022	-0.007	0.029
	(0.01)	(0.02)	(0.01)	(0.02)

Table continues to the next page

Table 3.3 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Urban	-0.087**	-0.103**	0.046**	0.0572
	(0.01)	(0.04)	(0.01)	(0.04)
Access to radio	-0.017	0.032*	-0.018	-0.014
	(0.02)	(0.02)	(0.01)	(0.02)
Access to newspapers	0.003	0.045+	0.022+	-0.067*
	(0.01)	(0.03)	(0.01)	(0.03)
Number of children	0.006*	-0.002	-0.002	0.005
	(0.00)	(0.00)	(0.00)	(0.00)
Child's age (ref. below 8 months)				
9-17 months	0.020+	-0.022	-0.014	0.036+
	(0.01)	(0.02)	(0.01)	(0.02)
18-35 months	0.031**	-0.030*	-0.006	0.037*
	(0.01)	(0.01)	(0.01)	(0.02)
36-59 months	0.035**	-0.040**	-0.006	0.045**
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.023	-0.001	0.080**	-0.079**
	(0.01)	(0.03)	(0.02)	(0.03)
Monogamous	0.007	-0.053**	-0.006	0.059**
	(0.01)	(0.02)	(0.01)	(0.02)
Religion (ref. Muslim)				
Catholic	0.047**	0.005	0.016	-0.021
	(0.02)	(0.03)	(0.01)	(0.03)
Protestant	0.050**	0.041	0.007	-0.048
	(0.02)	(0.03)	(0.01)	(0.03)
Pentecostal	0.055*	-0.044	0.024	0.020
	(0.02)	(0.04)	(0.02)	(0.04)
Other	0.087**	-0.006	0.002	0.004
	(0.03)	(0.04)	(0.02)	(0.04)
N	**6915**	**6010**	**6010**	**6010**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Starting with the level of education, compared to mothers with no education at all, mothers who completed secondary education or higher are 7 percent more likely to be employed; they are also 34 percent more likely to be in wage employment, and 28 percent less likely to be in self-employment. This finding is supported by Pardo and Ruiz-Tagle (2017) who find that individuals who are more educated usually prefer wage to self-employment. Other studies have also

shown that female education is positively related their participation in the labour market (Faridi et al., 2009; Heath and Jayachandran, 2017; Dildar, 2015) compared to their counterparts with low or no education at all.

On grounds of socio-economic class; compared to mothers in poorer households, mothers in rich households are 6 percent less likely to be employed. This aligns with studies which indicate that the higher the household's socio-economic status/ income the less likely the child's mother is to work (Belsky and Eggebeen 1991; Francavilla and Giannelli 2011). In terms of choice of employment sector mothers in richer households are 10 percent less likely to participate in family work compared to those in poorer households. This is possibly because it is largely unpaid work, however, they are 9 percent more likely to be in self-employment compared to their counterparts in poorer households. This could be explained by their relatively higher potential in terms of resources required to enter self-employment. This finding conforms to that of Henley (2004) who finds that individuals with initial housing wealth have a high likelihood of choosing self-employment by becoming private sector renters.

Results also indicate that mothers that give birth at an early age (below 20 years of age), are less likely to be in employment, and if they are, then they are more likely to work for a family member. Although not all coefficients are significant for this finding, the sign of the coefficients is in the correct direction. In the 2006 survey mothers that gave birth at an age below 20 years are 5 percent less likely to be in employment than their counterparts who gave birth between 35-49 years of age (see table 3.3 above). In 2011 survey, the same group is 7 percent less likely to be in employment but if they are then they are 6 percent more likely to be in family employment (other than wage or self-employment) as compared to their counterparts that give birth at 35-49 years of age.

This finding can be attributed to lower levels of education for mothers whose first births were below the age of 20. Our statistics for both surveys show that only 1 percent of these mothers have completed secondary education or higher, while the majority (56-59 percent) have incomplete primary education. Education and training are therefore necessary to prepare an individual for wage employment or self-employment when they give birth at an early age. Bates

(1995) mentions that women require educational qualifications to successfully enter self-employment especially in the growing service industry where the majority end up. This view of early birth limiting education and training possibilities is well supported in the literature. Jensen and Thornton (2003) find that many women in the developing world are subject to marriage at an early age and as a result tend to have less education. They instead begin child rearing earlier and have less decision-making power in the households.

Singh and Samara (1996) find that the incidence of very early marriages ranges from 10 percent to 27 percent in seven sub-Saharan countries including Uganda. Their study identifies that women who marry at a young age are likely to find motherhood the sole focus of their lives at the expense of development in other areas such as education and training for employment, work experience and personal growth. This gives an explanation as to why mothers that give birth early are less likely to get into employment and if they do, they are more likely to be employed by a family member.

In terms of regions, we find that mothers in the central region which includes the capital city (Kampala) are less likely to be in employment compared to those outside the city in the eastern, northern and western regions. This is possibly because most women are employed in agriculture and others have related work in the informal sector which are mainly carried out outside the city. This result is matched with a negative coefficient on the urban variable showing that women in urban areas are less likely to work. This finding is also supported by literature (Francavilla and Giannelli, 2011; Dildar, 2015) which shows that being in an urban area is negatively related to female employment.

In line with existing literature (Dildar, 2015; Kishor, 1996) having young children may limit female employment. From our results we can see that mothers with older children (9 months and above) are more likely to take up employment compared to their counterparts whose children are below 8 months of age. However, results also indicate that these are more likely to be in self-employment other than wage or family employment. This could be explained by the flexibility associated with self-employment and as a result they can get time to take care of their children.

In terms of marriage relationships, compared to mothers in monogamous marriages, mothers that are not in any union are 8 percent more likely to take up wage employment and 8 percent less likely to be in self-employment. On the other hand, mothers in polygamous marriages are 5 percent less likely to participate in family work compared to mothers in monogamous marriages. More interestingly, mothers in polygamous marriages are 6 percent more likely to be in self-employment compared to mothers in monogamous marriages. Although we find no literature relating forms of marriage to the choice of employment type, Spierings, Smits and Verloo (2010) find lower employment rates for women living in polygamous households compared to those not in polygamous households. Hundley (2000) finds that female earnings decline with marriage while male earnings instead increase with marriage. The researcher argues that when both are in self-employment the females tend to specialise more intensively in housework, while the men specialise more intensively in market work; as a result, the study indicates that marriage has higher negative effects on female earnings from self-employment than on female earnings from wage employment. In relation to our study, this would suggest that married mothers would prefer wage employment to self-employment. We cannot determine if they prefer wage employment, but we can see from our data that they are more likely to be in self-employment.

In terms of religion, Christians (Catholics, Pentecostals and Protestants) are more likely to be in employment than their Muslim counterparts, and this is true in both surveys. This finding also matches that of Francavilla and Giannelli (2011) which found that Hindu and Muslim women had a lower probability of working compared to Christian women.

Our results for the survey 2011 (see table 3.4 below) match results for the 2006 survey. For the survey in 2011, we still find that mothers in polygamous marriages are 2 percent more likely to be in employment than their counterparts in monogamous marriages. They are 2 percent less likely to be in family employment but 3 percent more likely to take up self-employment compared to those in monogamous marriages, but this is only significant at 10 percent. Mothers not in union are 5 percent more likely to be in wage employment and 5

percent less likely to be self-employed. This still conforms to the finding from the 2006 survey. We further observe that the results focussing on education confirm that mothers with complete secondary education or higher are 17 percent more likely to be employed than those with no education at all; they are more likely to be in wage employment and less likely to be in self-employment by 35 percent than their counterparts; this result aligns well with that from the 2006 survey.

Table 3. 4: Determinants of Maternal Employment and Choice of employment Sector 2011 Survey

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.013	-0.037+	0.006	0.031
	(0.02)	(0.02)	(0.02)	(0.03)
Complete Primary	0.055*	-0.034	-0.008	0.042
	(0.02)	(0.03)	(0.02)	(0.03)
Incomplete Secondary	0.020	-0.018	0.059*	-0.041
	(0.02)	(0.03)	(0.03)	(0.04)
Complete secondary or Higher	0.169**	0.002	0.352**	-0.354**
	(0.03)	(0.05)	(0.06)	(0.06)
Comparative wealth Index (ref. Poorer)				
Middle	-0.018	0.003	-0.023	0.020
	(0.02)	(0.02)	(0.02)	(0.02)
Richer	-0.072**	-0.010	-0.015	0.0245
	(0.03)	(0.02)	(0.02)	(0.02)
Mother's age at birth (ref. 35-49 years)				
Less than 20 years	-0.073*	0.062*	-0.037	-0.024
	(0.03)	(0.03)	(0.03)	(0.04)
20-34 years	-0.020	0.021	-0.020	-0.001
	(0.02)	(0.03)	(0.02)	(0.03)
Region (ref. Central)				
Eastern	0.024	0.122**	-0.016	-0.106**
	(0.02)	(0.03)	(0.02)	(0.03)
Northern	0.031	0.002	-0.043**	0.041
	(0.02)	(0.02)	(0.02)	(0.03)
Western	0.177**	-0.068**	-0.031+	0.099**
	(0.02)	(0.02)	(0.02)	(0.03)

Table continues to the next page

Table 3.4 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	**Family**	**Wage**	**Self**
Household size	-0.007*	0.006*	-0.002	-0.004
	(0.00)	(0.00)	(0.00)	(0.00)
Household head (female)	0.028	-0.042*	0.033*	0.009
	(0.01)	(0.02)	(0.01)	(0.02)
Urban	-0.046*	-0.065**	0.054**	0.011
	(0.02)	(0.02)	(0.02)	(0.02)
Access to radio	0.109**	0.018	-0.023	0.005
	(0.02)	(0.02)	(0.01)	(0.02)
Access to newspapers	0.019	-0.044*	0.039**	0.005
	(0.02)	(0.02)	(0.02)	(0.02)
Number of children	0.013**	0.002	-0.009**	0.007
	(0.00)	(0.00)	(0.00)	(0.00)
Child's age (ref. below 8 months)				
9-17 months	0.012	-0.030^{+}	0.006	0.023
	(0.01)	(0.02)	(0.02)	(0.02)
18-35 months	0.029*	-0.016	-0.002	0.0171
	(0.01)	(0.01)	(0.01)	(0.02)
36-59 months	0.028**	-0.030*	0.007	0.0234
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.029	-0.008	0.054**	-0.046^{+}
	(0.02)	(0.02)	(0.02)	(0.02)
Monogamous	0.023^{+}	-0.021^{+}	-0.009	0.030^{+}
	(0.01)	(0.01)	(0.01)	(0.02)
Religion (ref. Muslim)				
Catholic	0.055**	-0.032	0.010	0.022
	(0.02)	(0.02)	(0.02)	(0.03)
Protestant	0.022	-0.053*	0.032^{+}	0.022
	(0.02)	(0.02)	(0.02)	(0.03)
Pentecostal	0.037^{+}	-0.026	0.012	0.014
	(0.02)	(0.03)	(0.03)	(0.03)
Other	0.085^{+}	0.016	-0.018	0.002
	(0.04)	(0.04)	(0.03)	(0.05)
N	**6628**	**4974**	**4974**	**4974**

Note: Standard errors in parentheses. + p < 0.10, * p < 0.05, ** p < 0.01

The main contribution of our study to existing literature is that age of a mother at first birth, and the form of marriage a mother gets into do influence her decision on the sector of employment. A mother who is underaged is more likely to do family work compared to older counterparts. in addition, a mother who is in polygamous marriage is more likely to choose self-employment and less likely to choose family work compared to one in a monogamous marriage. Existing literature mainly shows that marriage influences maternal employment (see Orloff, 2002) but we find no study focusing on the impact of forms of marriage on mother's choice of employment sector. Although a study by Munro et al. (2018) finds no evidence that polygamous households are less efficient than monogamous counterparts it does indicate that women in a polygynous community of Hausa (Nothern Nigeria) have a significant degree of economic autonomy and they engage in variuos small scale entrprises, while many are traders or active producers. However, the study does not associate this with economic autonomy with the form of their marriage.

3.5 Sensitivity Analysis

Our first key result is that mothers who have children when they are young are less likely to be employed and if they do, they are more likely to be employed by family (other than being in wage or self-employment) as they are likely to lack educational qualifications (Jensen and Thornton 2003) and usually concentrate on motherhood instead (Singh and Samara 1996). To examine this further we re-group the "age of a mother at birth" variable by splitting the group for "below 20 years of age" into "underage (below 18 years of age)" and "18<20 years old". We run new models for each survey and find that our results on underage women are still consistent. Mothers under the age of 18 are less likely to be employed (though this is only significant in 2011 survey) but if employed, are more likely to be employed by a family member in each of the surveys, see table 3.9 and table 3.10 in appendix.

We further check the robustness of our results by dropping mothers who are household heads. This is because these mothers may in some way behave as mothers in monogamous marriages in terms of likelihood of accessing resources. We discuss this further next, but the analysis still confirms our original results.

Another finding indicates that mothers in polygamous marriages are more likely to be self-employed but less likely to participate in family work compared to mothers in monogamous marriages. We argue that mothers in polygamous marriages are less likely to participate in family work because the literature (Al-Krenawi, A., Graham and Al-Krenawi, S., 1997; Slonim-Nevo and Al-Krenawi, 2006) shows that co-wives can be jealous and compete among themselves. It is likely that, because of this, many will instead focus on independence (hence seeking self-employment) rather than family work, where there is virtually no pay, yet the beneficiaries include other co-wives. This argument, however, becomes counterintuitive if amongst mothers in polygamous marriages, there are female household heads. In fact, looking at our statistics, almost half of the mothers in polygamous families are household heads (49 and 48 percent in 2006 and 2011 surveys respectively) while a smaller percentage of mothers in monogamous marriages are household heads (10 and 12 percent in the respective surveys). Female household heads may have a louder voice, even in polygamous marriages, since they are essentially the breadwinners, and as a result may have a strong hand in making household decisions. For that matter, such mothers may have almost the same advantages as have the mothers in monogamous marriages.

To address this challenge, we now concentrate on the sample of mothers who are not household heads. On examining the results, we show that our finding still holds, but with relatively bigger coefficients. With reference to tables B5 and B6 below, we can see that mothers in polygamous marriages are now 7 percent more likely to be self-employed and 6 percent less likely to do family work in the 2006 survey compared to their counterparts in monogamous marriages. In the 2011 survey, they are 4 percent more likely to be in self-employment (now significant at 5 percent) and 3 percent less likely to participate in family work (though this is only significant at 10 percent level of significance). Therefore, we find that our results are robust even after removing

female household heads from our sample. The result that mothers not in union are less likely to be self-employed but more likely to take wage employment, compared to mothers in monogamous marriages, still holds in both surveys. The size of the coefficients in this case is more pronounced, implying that mothers who are not household heads are keener on making these decisions than their counterparts who are household heads.

We also do check whether the rank of women in polygamous marriages makes a difference. In their study on the Hausa people in northern Nigeria, Munro et al. (2018) find that first wives in polygamous marriages do no worse than women in monogamy and it is the second wives whose earnings are significantly lower. So, we include ranks in our regressions (see Table 3.7 and 3.8 in Appendix) replacing polygamy with rank 1 meaning the first wife and rank 2 or more meaning the second, third etc. (up to 7). Although, we do not find consistently significant results in both surveys[27], signs of coefficients indicate less preference for family work and more preference for self-employment among wives in polygamy.

The potential limitation to our study is that, although we restrict it to mothers with younger children, we cannot explicitly compare these findings to women without children because we do not have them in our sample. The best we can do is to compare these results to the existing literature on determinants of female employment choices and choice of employment type; such literature is on female employment, irrespective of whether these are mothers or not.

[27] See table 3.7 and 3.8 in appendix. In 3.7, wives of rank 2 or more are less likely to engage in family work but more likely to be self-employed compared to those in monogamous marriages. In table 3.8, wives of rank 2 or more are more likely to be in employment than those in monogamous marriages. On the other hand, wives of rank 1 are less likely to be in wage employment but more likely to be in self-employed compared to ones in monogamous marriages.

Table 3. 5: Determinants of Maternal Employment and Choice of employment Sector 2006 Survey for those who are not household heads

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.001	0.033	-0.013	-0.020
	(0.02)	(0.02)	(0.01)	(0.02)
Complete Primary	-0.002	0.026	-0.017	-0.009
	(0.02)	(0.03)	(0.02)	(0.03)
Incomplete Secondary	-0.017	0.034	0.010	-0.044
	(0.03)	(0.04)	(0.02)	(0.04)
Complete secondary or Higher	0.081**	-0.106*	0.307**	-0.201**
	(0.02)	(0.05)	(0.08)	(0.08)
Comparative wealth Index (ref. Poorer)				
Middle	-0.029+	-0.022	-0.016	0.038
	(0.02)	(0.02)	(0.01)	(0.02)
Richer	-0.061**	-0.104**	0.010	0.093**
	(0.02)	(0.03)	(0.02)	(0.03)
Mother's age at birth (ref. 35-49 years)				
Less than 20 years	-0.030	0.054	-0.038+	-0.015
	(0.03)	(0.04)	(0.02)	(0.05)
20-34 years	-0.009	0.022	-0.025	0.002
	(0.02)	(0.03)	(0.02)	(0.03)
Region (ref. Central)				
Eastern	0.119**	0.127**	-0.023+	-0.104**
	(0.02)	(0.03)	(0.01)	(0.03)
Northern	0.129**	0.077**	0.003	-0.080**
	(0.02)	(0.02)	(0.01)	(0.03)
Western	0.115**	0.169**	0.040+	-0.209**
	(0.02)	(0.03)	(0.02)	(0.04)
Household size	0.002	0.004	-0.002	-0.002
	(0.00)	(0.00)	(0.00)	(0.00)
Urban	-0.102**	-0.084+	0.043*	0.041
	(0.02)	(0.04)	(0.02)	(0.05)
Access to radio	-0.022	0.033	-0.011	-0.023
	(0.02)	(0.02)	(0.01)	(0.02)
Access to newspapers	0.004	0.050	0.024+	-0.074*
	(0.02)	(0.03)	(0.01)	(0.03)
Number of children	0.006*	0.001	-0.002	0.001
	(0.00)	(0.00)	(0.00)	(0.01)

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Table 3.5 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	**Family**	**Wage**	**Self**
Child's age (ref. below 8 months)				
9-17 months	0.005	-0.017	-0.019	0.036
	(0.01)	(0.02)	(0.01)	(0.02)
18-35 months	0.019	-0.032+	-0.016+	0.048**
	(0.01)	(0.02)	(0.01)	(0.02)
36-59 months	0.022+	-0.033*	-0.006	0.039*
	(0.01)	(0.02)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.008	0.079+	0.080*	-0.159**
	(0.02)	(0.04)	(0.03)	(0.04)
Monogamous	0.016	-0.059**	-0.009	0.068**
	(0.02)	(0.02)	(0.01)	(0.02)
Religion (ref. Muslim)				
Catholic	0.063**	0.079+	0.080*	-0.159**
	(0.02)	(0.04)	(0.03)	(0.04)
Protestant	0.071**	0.045	-0.006	-0.038
	(0.02)	(0.03)	(0.02)	(0.03)
Pentecostal	0.069**	-0.036	0.015	0.020
	(0.03)	(0.04)	(0.02)	(0.04)
Other	0.099**	0.014	-0.020	0.005
	(0.03)	(0.05)	(0.02)	(0.05)
N	**5382**	**4685**	**4685**	**4685**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3. 6: Determinants of Maternal Employment and Choice of employment Sector 2011 Survey for those who are not household heads

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.007	-0.019	-0.001	0.019
	(0.03)	(0.02)	(0.01)	(0.03)
Complete Primary	0.041	-0.004	-0.045*	0.048
	(0.03)	(0.03)	(0.02)	(0.04)
Incomplete Secondary	0.019	-0.015	0.058+	-0.043
	(0.03)	(0.03)	(0.03)	(0.05)
Complete secondary or Higher	0.172**	0.039	0.297**	-0.336**
	(0.03)	(0.07)	(0.07)	(0.07)
Comparative wealth Index (ref. Poorer)				
Middle	-0.018	-0.005	-0.030	0.035
	(0.02)	(0.02)	(0.02)	(0.03)
Richer	-0.067*	-0.016	-0.016	0.032
	(0.03)	(0.02)	(0.03)	(0.03)
Mother's age at birth (ref. 35-49 years)				
Less than 20 years	-0.040	0.082*	-0.055*	-0.027
	(0.03)	(0.04)	(0.03)	(0.04)
20-34 years	0.002	0.047	-0.025	-0.023
	(0.03)	(0.03)	(0.02)	(0.03)
Region (ref. Central)				
Eastern	0.047+	0.120**	0.007	-0.126**
	(0.03)	(0.03)	(0.02)	(0.04)
Northern	0.030	0.003	-0.021	0.018
	(0.02)	(0.03)	(0.02)	(0.03)
Western	0.196**	-0.075**	-0.020	0.095**
	(0.02)	(0.03)	(0.02)	(0.04)
Household size	-0.006	0.007+	-0.003	-0.003
	(0.00)	(0.00)	(0.00)	(0.00)
Urban	-0.068*	-0.078**	0.061**	0.0174
	(0.03)	(0.03)	(0.02)	(0.03)
Access to radio	0.101**	0.019	-0.034*	0.014
	(0.02)	(0.02)	(0.01)	(0.02)
Access to newspapers	0.014	-0.042+	0.033+	0.009
	(0.02)	(0.02)	(0.02)	(0.03)
Number of children	0.015**	0.003	-0.005	0.002
	(0.00)	(0.00)	(0.00)	(0.01)

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Table 3.6 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Child's age (ref. below 8 months)				
9-17 months	0.008	-0.030	0.003	0.027
	(0.02)	(0.02)	(0.02)	(0.02)
18-35 months	0.025+	-0.012	0.002	0.0094
	(0.01)	(0.02)	(0.01)	(0.02)
36-59 months	0.029**	-0.027*	0.008	0.0191
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	-0.009	-0.020	0.142**	-0.122*
	(0.04)	(0.03)	(0.04)	(0.05)
Monogamous	0.022	-0.033*	-0.009	0.041*
	(0.01)	(0.02)	(0.01)	(0.02)
Religion (ref. Muslim)				
Catholic	0.061**	-0.037	0.008	0.030
	(0.02)	(0.03)	(0.02)	(0.03)
Protestant	0.028	-0.061+	0.039+	0.023
	(0.03)	(0.03)	(0.02)	(0.03)
Pentecostal	0.063*	-0.026	0.023	0.004
	(0.03)	(0.04)	(0.03)	(0.04)
Other	0.111*	0.019	-0.019	0.000
	(0.05)	(0.05)	(0.04)	(0.06)
N	**5140**	**3815**	**3815**	**3815**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

In another irony, one would expect the results to be quite different within agriculture, where family work, self-employment and waged work have distinct meanings that differ from those outside agriculture. Family work may equate to own-farm work in rural areas. We run a regression for each of the surveys for the rural sample to investigate this possibility. However, we do not find any significant difference in the results (see Table 3.11 and 3.12 in appendix). For both surveys, results indicate that mothers with secondary education or higher are more likely to be in wage employment but less likely to be in self-employment compared to those with no education at all. Mothers in rich households are more likely to be in self-employment and less likely to be in family employment compared to those in poor households. In addition, mothers in polygamous marriages are more likely to be self-employment but less likely

to be family employment compared to their counterparts in monogamous marriages. Results for the 2011 survey also show that mothers that give birth before the age of 20 are less likely to be in employment compared to mothers that are 35-49 years of age. These results typically match those under the section of estimated results above.

3.6 Conclusion

This paper is set out to examine the determinants of employment for women with children under the age of five. In line with the existing literature we found that female education increases labour market participation, while household wealth, being in urban areas and religion can reduce female labour market participation. However, drawing on two additional areas in the literature that have received less attention we investigate and analyse how early births, and the different forms of marriage, impact on the employment choices of mothers with younger children in Uganda. We find that mothers who have children under the age of 20, and especially those whose first birth was under the age of 18, are less likely to be in employment. If they are, they are more likely to be in family employment. We confirm this from our statistics for both surveys that mothers whose first birth age is below 20 years of age have low levels of education. Only 1 percent of these have completed secondary school or higher while the majority have incomplete primary education (56-59 percent). Meanwhile, literature (Jensen and Thornton 2003; Singh and Samara 1996) also shows that they will usually lack education and training which is key for entry into sectors such as self-employment in service industry that is usually taken up by most women (Bates 1995). So as a last resort, the softer entry point is family employment.

In addition, we find that mothers in polygamous marriages are more likely to be self-employed than their counterparts in monogamous marriages. We attribute this to the fact that, given the jealousy and competition portrayed by co-wives (Al-Krenawi et al., 1997; Slonim-Nevo and Al-Krenawi, 2006), mothers in such relationships are more likely to seek independence than their counterparts in monogamous marriages. This is also reflected in the result that mothers in polygamous marriages are also less likely to participate in family work, compared to their counterparts in monogamous marriages. This is possibly

because of expecting little benefits from pooled resources especially if allocation is controlled by the husband and the first wife is favoured. This is supported by the finding by Munro et al. (2018) in which polygamous women investment is found to be lower in households where allocation from the common pool is controlled by the husband. This is because the allocation of investments made by men favours first wives over juniors. Family work is taken to yield less benefits for especially those who are not first wives, so it is not surprising that mothers in polygamous marriages would opt out of family work and would seek more work that enables independence and provides individual earnings, such as self-employment. On the other hand, we find that mothers who are not in any union are more likely to be in wage employment but less likely to be in self-employment, compared to mothers in monogamous marriages. Although the literature shows that the married are less likely to leave self-employment than their counterparts the unmarried (Georgellis, Sessions and Tsitsianis, 2007) - thereby supporting our finding - we do not find any literature specifically relating the unmarried with those in monogamous or polygamous marriages.

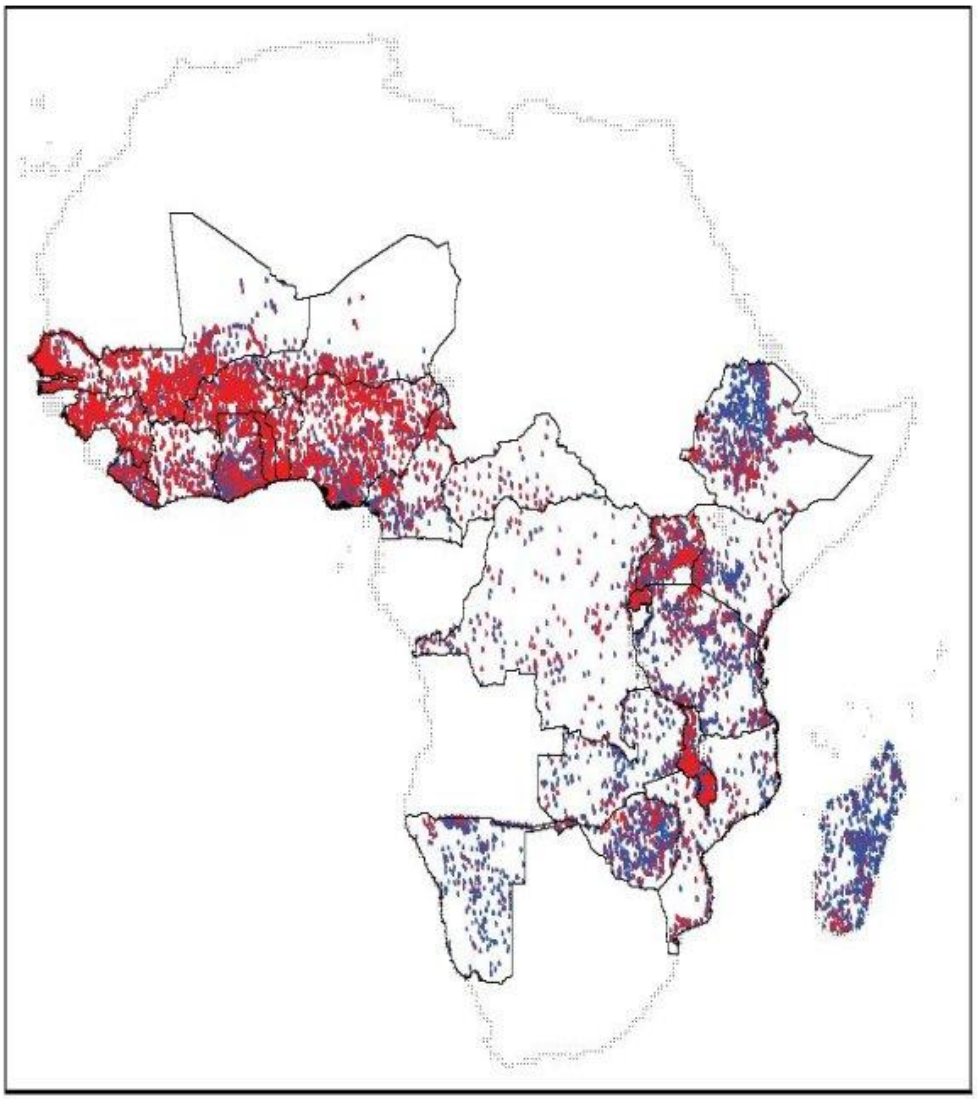
We do not find a shift in the determinants for employment choice: what we find is that the more educated mothers are the more likely to be employed compared to those with no education at all. This finding is similar to that of Faridi et al. (2009) which realises a positive relationship between females' levels of education and their labour-market participation. Mothers in richer households are less likely to work, compared to their counterparts in poor households. This matches the finding by Francavilla and Giannelli (2011) in which the wealth index coefficient was found negative and significant, implying that mothers in wealthier households are more likely to be stay-home mums in relation to their counterparts. Their study also reveals that mothers in urban areas are less likely to be employed compared to those in rural areas, which corresponds with our findings. Our results also show that the higher the number of children a mother has, the more likely it is for her to work compared to mothers with fewer children, and this matches the finding by Spencer (1973).

We conclude that our results on the impact of early births are just indicative because the literature (Neal and Hosegood 2015) shows that overstatement of

age at birth among young adolescents exists in Demographic and Health Surveys. Despite this reservation we show that early births limit mothers to enter employment or confine them to family employment, while forms of marriage, female education, household wealth as well as religion are important in understanding female labour market participation. We recommend that the government implements appropriate policies that boost education, which is not gender biased, policies that can reduce discrimination against a specific gender, and addressing childcare and home production chores. All of these will help to integrate women in the employment sector.

Appendix

Figure 3. 1: The Polygamous Belt in Africa



Source: *African Polygamy; Past and Present (Fenske, 2015)*

Women in marriage

Red dots*= Polygamous*

Blue dots*= Monogamous*

Table 3. 7: Determinants of Maternal Employment and Choice of employment Sector 2006 Survey by wife's rank

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.009	0.039*	-0.027*	-0.013
	(0.02)	(0.02)	(0.01)	(0.02)
Complete Primary	0.000	0.053+	-0.035*	-0.018
	(0.02)	(0.03)	(0.02)	(0.03)
Incomplete Secondary	-0.012	0.034	0.012	-0.046
	(0.02)	(0.03)	(0.02)	(0.03)
Complete secondary or Higher	0.068**	-0.052	0.331**	-0.280**
	(0.02)	(0.06)	(0.07)	(0.06)
Comparative wealth Index (ref. Poorer)				
Middle	-0.027+	-0.024	-0.011	0.035
	(0.02)	(0.02)	(0.01)	(0.02)
Richer	-0.058**	-0.100**	0.014	0.086**
	(0.02)	(0.02)	(0.01)	(0.03)
Mother's age at birth (ref. 35-49 years)				
Less than 20 years	-0.046+	0.023	-0.016	-0.007
	(0.02)	(0.04)	(0.02)	(0.04)
20-34 years	-0.012	0.001	-0.012	0.011
	(0.02)	(0.03)	(0.01)	(0.03)
Region (ref. Central)				
Eastern	0.114**	0.126**	-0.024+	-0.102**
	(0.02)	(0.02)	(0.01)	(0.03)
Northern	0.123**	0.085**	-0.00337	-0.081**
	(0.02)	(0.02)	(0.01)	(0.02)
Western	0.108**	0.182**	0.046**	-0.228**
	(0.02)	(0.03)	(0.02)	(0.03)
Household size	0.001	0.007*	-0.002	-0.005
	(0.00)	(0.00)	(0.00)	(0.00)
Household head (Female)	-0.003	-0.020	-0.007	0.028
	(0.01)	(0.02)	(0.01)	(0.02)
Urban	-0.087**	-0.102**	0.046**	0.057
	(0.01)	(0.04)	(0.01)	(0.04)
Access to radio	-0.017	0.032+	-0.018	-0.014
	(0.02)	(0.02)	(0.01)	(0.02)
Access to newspapers	0.004	0.046+	0.022+	-0.068*
	(0.01)	(0.03)	(0.01)	(0.03)

Table continues to the next page

Table 3.7 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	**Family**	**Wage**	**Self**
Number of children	0.006*	-0.003	-0.002	0.005
	(0.00)	(0.00)	(0.00)	(0.00)
Child's age (ref. below 8 months)				
9-17 months	0.020+	-0.022	-0.014	0.035+
	(0.01)	(0.02)	(0.01)	(0.02)
18-35 months	0.031**	-0.030*	-0.006	0.037*
	(0.01)	(0.01)	(0.01)	(0.02)
36-59 months	0.035**	-0.040**	-0.006	0.045**
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.024	0.004	0.061**	-0.065**
	(0.02)	(0.03)	(0.01)	(0.03)
Rank1	0.008	-0.0307	-0.014	0.0442
	(0.02)	(0.02)	(0.02)	(0.03)
Rank 2 and above	0.006	-0.077**	-0.002	0.079**
	(0.02)	(0.03)	(0.01)	(0.03)
Religion (ref. Muslim)				
Catholic	0.047**	0.005	0.016	-0.022
	(0.02)	(0.03)	(0.01)	(0.03)
Protestant	0.050**	0.042	0.007	-0.049
	(0.02)	(0.03)	(0.01)	(0.03)
Pentecostal	0.055*	-0.044	0.024	0.020
	(0.02)	(0.04)	(0.02)	(0.04)
Other	0.087**	-0.007	0.002	0.004
	(0.03)	(0.04)	(0.02)	(0.04)
N	**6915**	**6010**	**6010**	**6010**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3. 8: Determinants of Maternal Employment and Choice of employment Sector 2011 Survey by wife's rank

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.012	-0.037+	0.005	0.032
	(0.02)	(0.02)	(0.02)	(0.03)
Complete Primary	0.054*	-0.033	-0.010	0.043
	(0.02)	(0.03)	(0.02)	(0.03)
Incomplete Secondary	0.019	-0.017	0.057*	-0.040
	(0.02)	(0.03)	(0.03)	(0.04)
Complete secondary or Higher	0.170**	0.003	0.349**	-0.352**
	(0.03)	(0.05)	(0.06)	(0.06)
Comparative wealth Index (ref. Poorer)				
Middle	-0.018	0.003	-0.024	0.020
	(0.02)	(0.02)	(0.02)	(0.02)
Richer	-0.072**	-0.010	-0.015	0.025
	(0.03)	(0.02)	(0.02)	(0.03)
Mother's age at birth (ref. 35-49 years)				
Less than 20 years	-0.071*	0.061*	-0.037	-0.024
	(0.03)	(0.03)	(0.03)	(0.04)
20-34 years	-0.017	0.021	-0.019	-0.002
	(0.03)	(0.03)	(0.02)	(0.03)
Region (ref. Central)				
Eastern	0.031	0.122**	-0.016	-0.106**
	(0.02)	(0.03)	(0.02)	(0.03)
Northern	0.026	0.001	-0.042*	0.041
	(0.02)	(0.02)	(0.02)	(0.03)
Western	0.176**	-0.068**	-0.032+	0.099**
	(0.02)	(0.02)	(0.02)	(0.03)
Household size	-0.007*	0.006*	-0.002	-0.004
	(0.00)	(0.00)	(0.00)	(0.00)
Household head (Female)	0.026	-0.042*	0.032*	0.010
	(0.02)	(0.02)	(0.01)	(0.02)
Urban	-0.047*	-0.065**	0.054**	0.011
	(0.02)	(0.02)	(0.02)	(0.02)
Access to radio	0.109**	0.018	-0.023	0.005
	(0.02)	(0.02)	(0.01)	(0.02)
Access to newspapers	0.019	-0.044*	0.038*	0.006
	(0.02)	(0.02)	(0.01)	(0.02)

Table continues to the next page

Table 3.8 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	**Family**	**Wage**	**Self**
Number of children	0.013**	0.002	-0.008**	0.007
	(0.00)	(0.00)	(0.00)	(0.00)
Child's age (ref. below 8 months)				
9-17 months	0.012	-0.030+	0.007	0.023
	(0.01)	(0.02)	(0.02)	(0.02)
18-35 months	0.029*	-0.016	-0.001	0.017
	(0.01)	(0.01)	(0.01)	(0.02)
36-59 months	0.028**	-0.030*	0.008	0.023
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.031	-0.007	0.049**	-0.041+
	(0.02)	(0.02)	(0.02)	(0.02)
Rank1	-0.005	-0.0126	-0.048*	0.061**
	(0.02)	(0.02)	(0.02)	(0.02)
Rank 2 and above	0.048**	-0.027	0.007	0.020
	(0.02)	(0.02)	(0.02)	(0.02)
Religion (ref. Muslim)				
Catholic	0.055**	-0.033	0.011	0.022
	(0.02)	(0.02)	(0.02)	(0.03)
Protestant	0.022	-0.053*	0.032*	0.021
	(0.02)	(0.02)	(0.02)	(0.03)
Pentecostal	0.038+	-0.026	0.013	0.014
	(0.02)	(0.03)	(0.03)	(0.03)
Other	0.086+	0.015	-0.016	0.000
	(0.04)	(0.04)	(0.03)	(0.05)
N	**6628**	**4974**	**4974**	**4974**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3. 9: Determinants of Maternal Employment and Choice of employment Sector 2006 Survey for underage

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.009	0.039*	-0.026*	-0.012
	(0.02)	(0.02)	(0.01)	(0.02)
Complete Primary	-0.001	0.052	-0.035*	-0.018
	(0.02)	(0.03)	(0.02)	(0.03)
Incomplete Secondary	-0.012	0.032	0.013	-0.045
	(0.02)	(0.03)	(0.02)	(0.03)
Complete secondary or Higher	0.068**	-0.053	0.334**	-0.281**
	(0.02)	(0.06)	(0.07)	(0.06)
Comparative wealth Index (ref. Poorer)				
Middle	-0.027+	-0.024	-0.011	0.035
	(0.02)	(0.02)	(0.01)	(0.02)
Richer	-0.058**	-0.100**	0.014	0.087**
	(0.02)	(0.02)	(0.01)	(0.03)
Mother's age at birth (ref. 35-49 years)				
Underage (<18)	-0.041	0.083+	-0.017	-0.065
	(0.03)	(0.04)	(0.02)	(0.05)
18 but <20 years	-0.049*	-0.007	-0.015	0.022
	(0.02)	(0.04)	(0.02)	(0.04)
20-34 years	-0.012	0.003	-0.012	0.009
	(0.02)	(0.03)	(0.01)	(0.03)
Region (ref. Central)				
Eastern	0.114**	0.127**	-0.024+	-0.103**
	(0.02)	(0.02)	(0.01)	(0.03)
Northern	0.123**	0.084**	-0.003	-0.081**
	(0.02)	(0.02)	(0.01)	(0.02)
Western	0.109**	0.182**	0.046**	-0.229**
	(0.02)	(0.03)	(0.02)	(0.03)
Household size	0.001	0.006*	-0.002	-0.005
	(0.00)	(0.00)	(0.00)	(0.00)
Household head (Female)	-0.003	-0.023	-0.007	0.030
	(0.01)	(0.02)	(0.01)	(0.02)
Urban	-0.087**	-0.103**	0.046**	0.057
	(0.01)	(0.04)	(0.01)	(0.04)
Access to radio	-0.0173	0.031+	-0.018	-0.014
	(0.02)	(0.02)	(0.01)	(0.02)

Table continues to the next page

Table 3.9 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	**Family**	**Wage**	**Self**
Access to newspapers	0.004	0.045+	0.022+	-0.067*
	(0.01)	(0.03)	(0.01)	(0.03)
Number of children	0.006*	-0.002	-0.002	0.004
	(0.00)	(0.00)	(0.00)	(0.00)
Child's age (ref. below 8 months)				
9-17 months	0.020+	-0.022	-0.014	0.035+
	(0.01)	(0.02)	(0.01)	(0.02)
18-35 months	0.031**	-0.030*	-0.006	0.036*
	(0.01)	(0.01)	(0.01)	(0.02)
36-59 months	0.035**	-0.041**	-0.006	0.047**
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.023	-0.003	0.080**	-0.077**
	(0.01)	(0.03)	(0.02)	(0.03)
Monogamous	0.007	-0.053**	-0.006	0.059**
	(0.01)	(0.02)	(0.01)	(0.02)
Religion (ref. Muslim)				
Catholic	0.047**	0.006	0.016	-0.022
	(0.02)	(0.03)	(0.01)	(0.03)
Protestant	0.050**	0.041	0.007	-0.048
	(0.02)	(0.03)	(0.01)	(0.03)
Pentecostal	0.055*	-0.043	0.024	0.019
	(0.02)	(0.04)	(0.02)	(0.04)
Other	0.087**	-0.006	0.002	0.004
	(0.03)	(0.04)	(0.02)	(0.04)
N	**6915**	**6010**	**6010**	**6010**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3. 10: Determinants of Maternal Employment and Choice of employment Sector 2011 Survey for underage

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.013	-0.037+	0.006	0.031
	(0.02)	(0.02)	(0.02)	(0.03)
Complete Primary	0.055*	-0.033	-0.008	0.041
	(0.02)	(0.03)	(0.02)	(0.03)
Incomplete Secondary	0.020	-0.017	0.059*	-0.041
	(0.02)	(0.03)	(0.03)	(0.04)
Complete secondary or Higher	0.170**	0.003	0.352**	-0.355**
	(0.03)	(0.05)	(0.06)	(0.06)
Comparative wealth Index (ref. Poorer)				
Middle	-0.018	0.003	-0.023	0.020
	(0.02)	(0.02)	(0.02)	(0.02)
Richer	-0.072**	-0.010	-0.015	0.025
	(0.03)	(0.02)	(0.02)	(0.02)
Mother's age at birth (ref. 35-49 years)				
Underage (<18)	-0.068*	0.071*	-0.038	-0.034
	(0.03)	(0.03)	(0.03)	(0.04)
18 but <20 years	-0.075*	0.056+	-0.037	-0.019
	(0.03)	(0.03)	(0.03)	(0.04)
20-34 years	-0.019	0.022	-0.020	-0.002
	(0.02)	(0.03)	(0.02)	(0.03)
Region (ref. Central)				
Eastern	0.031	0.122**	-0.016	-0.106**
	(0.02)	(0.03)	(0.02)	(0.03)
Northern	0.024	0.002	-0.043**	0.041
	(0.02)	(0.02)	(0.02)	(0.03)
Western	0.177**	-0.068**	-0.031+	0.099**
	(0.02)	(0.02)	(0.02)	(0.03)
Household size	-0.007*	0.006*	-0.002	-0.004
	(0.00)	(0.00)	(0.00)	(0.00)
Household head (Female)	0.028	-0.042*	0.033*	0.009
	(0.02)	(0.02)	(0.01)	(0.02)
Urban	-0.046*	-0.065**	0.054**	0.011
	(0.02)	(0.02)	(0.02)	(0.02)
Access to radio	0.109**	0.018	-0.023	0.005
	(0.02)	(0.02)	(0.01)	(0.02)

Table continues to the next page

Table 3.10 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	**Family**	**Wage**	**Self**
Access to newspapers	0.019	-0.044*	0.039**	0.005
	(0.02)	(0.02)	(0.01)	(0.02)
Number of children	0.012**	0.002	-0.009**	0.007
	(0.00)	(0.00)	(0.00)	(0.00)
Child's age (ref. below 8 months)				
9-17 months	0.012	-0.030+	0.006	0.024
	(0.01)	(0.02)	(0.02)	(0.02)
18-35 months	0.028*	-0.016	-0.002	0.017
	(0.01)	(0.01)	(0.01)	(0.02)
36-59 months	0.028**	-0.031*	0.007	0.024
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.029	-0.009	0.054**	-0.045+
	(0.02)	(0.02)	(0.02)	(0.02)
Monogamous	0.023+	-0.021+	-0.009	0.030+
	(0.01)	(0.01)	(0.01)	(0.02)
Religion (ref. Muslim)				
Catholic	0.055**	-0.032	0.010	0.022
	(0.02)	(0.02)	(0.02)	(0.03)
Protestant	0.022	-0.053*	0.032+	0.022
	(0.02)	(0.02)	(0.02)	(0.03)
Pentecostal	0.037+	-0.026	0.012	0.014
	(0.02)	(0.03)	(0.03)	(0.03)
Other	0.084+	0.016	-0.018	0.002
	(0.04)	(0.04)	(0.03)	(0.05)
N	**6628**	**4974**	**4974**	**4974**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3. 11: Determinants of Maternal Employment and Choice of employment Sector for Rural Sample-2006 Survey

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.001	0.040*	-0.016	-0.024
	(0.01)	(0.02)	(0.01)	(0.02)
Complete Primary	-0.005	0.048	-0.030*	-0.017
	(0.02)	(0.03)	(0.01)	(0.03)
Incomplete Secondary	-0.010	0.046	0.032	-0.078*
	(0.02)	(0.03)	(0.02)	(0.04)
Complete secondary or Higher	0.045	-0.088	0.520**	-0.433**
	(0.03)	(0.06)	(0.09)	(0.08)
Comparative wealth Index (ref. Poorer)				
Middle	-0.026+	-0.029	-0.012	0.041+
	(0.01)	(0.02)	(0.01)	(0.02)
Richer	-0.046*	-0.099**	0.008	0.091**
	(0.02)	(0.03)	(0.01)	(0.03)
Mother's age at birth (ref. 35-49 years)				
Less than 20 years	-0.021	0.023	-0.021	-0.002
	(0.02)	(0.04)	(0.02)	(0.04)
20-34 years	-0.005	0.001	-0.012	0.011
	(0.02)	(0.03)	(0.01)	(0.03)
Region (ref. Central)				
Eastern	0.094**	0.128**	-0.022+	-0.105**
	(0.02)	(0.03)	(0.01)	(0.03)
Northern	0.097**	0.086**	0.004	-0.090**
	(0.02)	(0.02)	(0.01)	(0.03)
Western	0.084**	0.192**	0.048**	-0.240**
	(0.02)	(0.03)	(0.02)	(0.03)
Household size	0.002	0.006*	-0.000	-0.006+
	(0.00)	(0.00)	(0.00)	(0.00)
Household head (Female)	-0.017	-0.024	0.001	0.023
	(0.01)	(0.02)	(0.01)	(0.02)
Access to radio	-0.024	0.032	-0.019+	-0.013
	(0.02)	(0.02)	(0.01)	(0.02)

Table continues to the next page

Table 3.11 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	**Family**	**Wage**	**Self**
Access to newspapers	-0.002	0.050+	0.018	-0.068*
	(0.02)	(0.03)	(0.01)	(0.03)
Number of children	0.004	-0.002	-0.001	0.002
	(0.00)	(0.00)	(0.00)	(0.00)
Child's age (ref. below 8 months)				
9-17 months	0.017	-0.020	-0.016	0.036+
	(0.01)	(0.02)	(0.01)	(0.02)
18-35 months	0.024*	-0.033*	-0.006	0.039*
	(0.01)	(0.02)	(0.01)	(0.02)
36-59 months	0.025**	-0.042**	-0.008	0.050**
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.006	0.008	0.049**	-0.058*
	(0.02)	(0.03)	(0.02)	(0.03)
Monogamous	0.008	-0.052**	-0.011	0.062**
	(0.01)	(0.02)	(0.01)	(0.02)
Religion (ref. Muslim)				
Catholic	0.051*	0.000	0.007	-0.007
	(0.02)	(0.03)	(0.02)	(0.03)
Protestant	0.050*	0.035	0.001	-0.036
	(0.02)	(0.03)	(0.01)	(0.03)
Pentecostal	0.067**	-0.055	0.018	0.036
	(0.03)	(0.04)	(0.03)	(0.04)
Other	0.090**	-0.007	0.000	0.007
	(0.03)	(0.04)	(0.02)	(0.05)
N	**6,204**	**5568**	**5568**	**5568**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3. 12: Determinants of Maternal Employment and Choice of employment Sector for Rural Sample-2011 Survey

Variable	Logit Model	Multinomial Logit Model		
	Employed	Family	Wage	Self
Mother's educ (ref. No educ)				
Incomplete Primary	0.002	-0.045*	0.006	0.039
	(0.02)	(0.02)	(0.01)	(0.03)
Complete Primary	0.045+	-0.024	-0.003	0.026
	(0.03)	(0.03)	(0.02)	(0.04)
Incomplete Secondary	-0.008	-0.028	0.042	-0.014
	(0.03)	(0.03)	(0.03)	(0.04)
Complete secondary or Higher	0.147**	-0.017	0.542**	-0.526**
	(0.04)	(0.06)	(0.08)	(0.06)
Comparative wealth Index (ref. Poorer)				
Middle	-0.029+	0.008	-0.026	0.018
	(0.02)	(0.02)	(0.02)	(0.03)
Richer	-0.065*	-0.019	-0.018	0.038
	(0.03)	(0.02)	(0.02)	(0.03)
Mother's age at birth (ref. 35-49 years)				
Less than 20 years	-0.056+	0.047	-0.025	-0.022
	(0.03)	(0.03)	(0.02)	(0.04)
20-34 years	-0.023	0.018	-0.006	-0.011
	(0.03)	(0.03)	(0.02)	(0.03)
Region (ref. Central)				
Eastern	0.032	0.143**	-0.032	-0.111**
	(0.03)	(0.03)	(0.02)	(0.04)
Northern	0.005	0.008	-0.046*	0.038
	(0.02)	(0.02)	(0.02)	(0.03)
Western	0.175**	-0.071**	-0.033+	0.104**
	(0.02)	(0.02)	(0.02)	(0.03)
Household size	-0.009**	0.007*	-0.002	-0.006
	(0.00)	(0.00)	(0.00)	(0.00)
Household head (Female)	0.001	-0.046*	0.034*	0.012
	(0.024)	(0.02)	(0.02)	(0.03)
Access to radio	0.116**	0.019	-0.027*	0.009
	(0.02)	(0.02)	(0.01)	(0.02)

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Table 3.12 Continued

Variable	Logit Model	Multinomial Logit Model		
	Employed	**Family**	**Wage**	**Self**
Access to newspapers	0.004	-0.055*	0.014	0.041
	(0.02)	(0.03)	(0.02)	(0.03)
Number of children	0.011**	-0.000	-0.004	0.004
	(0.00)	(0.00)	(0.00)	(0.00)
Child's age (ref. below 8 months)				
9-17 months	0.021	-0.021	0.003	0.018
	(0.02)	(0.02)	(0.02)	(0.02)
18-35 months	0.017	-0.014	0.000	0.014
	(0.01)	(0.01)	(0.01)	(0.02)
36-59 months	0.010	-0.023+	0.000	0.022
	(0.01)	(0.01)	(0.01)	(0.02)
Relationship (ref. Monogamous)				
Not in union	0.014	-0.017	0.035	-0.018
	(0.03)	(0.02)	(0.02)	(0.03)
Monogamous	0.028+	-0.023+	-0.011	0.034*
	(0.02)	(0.01)	(0.01)	(0.02)
Religion (ref. Muslim)				
Catholic	0.040+	-0.043	0.005	0.038
	(0.02)	(0.03)	(0.02)	(0.03)
Protestant	-0.013	-0.057+	0.023	0.034
	(0.02)	(0.03)	(0.02)	(0.04)
Pentecostal	0.030	-0.035	0.009	0.026
	(0.03)	(0.04)	(0.02)	(0.04)
Other	0.070	0.021	-0.028	0.006
	(0.05)	(0.05)	(0.03)	(0.06)
N	**5,305**	**4089**	**4089**	**4089**

Note: Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

CHAPTER 4

The Impact of Maternal Employment on Children's Happiness

4.1 Introduction

The relentless efforts to reduce the gender income gap and inequality the world over, have been spearheaded by the promotion of female labour force participation in the labour market. In the European Union, efforts have been made to promote female labour force participation as well as improving childcare provisions (Villa and Smith, 2013). Meanwhile, the UK government has also greatly invested in the provision of childcare subsidies especially for school-going children in order to encourage mothers to join the labour market (Sani and Scherer, 2018). In addition, presence of flexible working hours in the form of part-time and zero-hour contracts have eased pressure somewhat on mothers as they do not have to be away from their children all day, although there are other associated challenges. Female labour force participation is known to provide resources to women and freedom to decide and be able to direct their lives compared to homemakers (Korpi et al., 2013). As for the UK there have been several challenges in efforts to increase female labour market participation, one of these is the failure of the public to respond to childcare support provided by the government. Sani and Scherer (2018) find that despite government subsidies for childcare, informal childcare is the most common care solution among working mothers in the UK and this is true for even full-time working mothers. It is therefore more probable for working mothers on part-time and zero hours contract to resort to informal childcare arrangements because unlike those in full-time employment, these women face irregular schedules for work and fluctuations in income levels which put constraints on their abilities to meet formal care arrangements.

Informal childcare arrangements are associated with various problems, the major one being the unregulated quality of services provided. However, it is known to increase female labour force participation especially among the less educated women with younger children (Arpino et al., 2010). This therefore implies that

children of working mothers are most likely to be subjected to poor childcare arrangements which would greatly affect their well-being or emotions. We investigate the impact of maternal employment on children's happiness or well-being as measured by their subjective assessment of life as a whole and feelings about family and friends from self-administered questionnaires. Existing literature on the impact of maternal employment on children's well-being is diverse with mixed results but it is mainly focused on toddlers and usually restricted to cognitive development. A recent review on the impact of early maternal employment (EME) on infant well-being and attachment (Nicol and Hardy, 2017) shows that children of women engaged in EME have fewer behavioural problems, are higher achieving and more likely to secure paid employment later in life with a higher probability of holding managerial posts than their counterparts whose mothers are not in employment. A multilevel analysis of British mothers born in 1958 (Verropoulou and Joshi, 2009) investigates whether maternal employment while children are very young affects their development. The study finds mixed and minor results with reading abilities significantly and slightly poorer where less educated mothers work in the child's first year of life. This contrasts with the finding by Paul et al. (2005) which shows that for more educated mothers (instead), full-time work before the child is 18 months could have adverse effects on children's long-term development although this is quantitatively small and sometimes insignificant. Other studies find minimal effects (Ruhm, 2004) or no evidence of detrimental effects (Harvey, 1999; McMunn et al., 2011) of maternal employment in the early years of child development.

There is limited literature focusing on maternal employment effects on adolescents' well-being and these include Mendolia (2014) who investigates the impact of mothers' working hours on children's well-being in the UK but still finds no evidence that hours of work during the child's adolescence are related to their risk of having low levels of psychological well-being. Another study is that of Powdthavee and Vernoit (2013) which focuses on the impact of parental unemployment on children's happiness. They find that children were more likely to be less happy rather than happier with their life overall when one of their parents is unemployed. Both studies use data from the British Household Survey

(BHPS). We however follow Antaramian et al. (2008) as well as Gilman et al. (2000) who in addition to the general measure of life satisfaction also consider multi-dimensional measures of satisfaction in adolescents such as family, friend, school, self and living environment satisfaction. The argument is that although global conceptualization uses a single score to represent life satisfaction, research suggests that individuals' judgements in various life domains may be differentially affected by personal and environmental influences (Gilman et al., 2000) which makes multidimensional conceptualizations yield more differentiated information (Antaramian et al., 2008).

Using data from a large and recent representative UK panel data set[28] we contribute to this debate by examining the impact of maternal employment on children's happiness and investigate whether children of mothers in employment are happier than their counterparts whose mothers are out of the labour force. We also investigate whether a mother working full-time rather than part-time imposes more constraints on children's happiness or whether having a routine job[29], an intermediate job or a professional job makes any difference. Our study is not only unique given the updated data set but also unlike earlier studies, for specific reasons (see section 4.3.2) we consider different measures of children's happiness in terms of how they feel about their family or friends in addition to how they feel about their life in general. We include women with at least one child (either biological or adopted) aged 10-15 years.

[28] We use six waves (2009-2015) of Understanding Society data set

[29] Routine jobs include; lower supervisory, lower technical craft and lower technical process operative occupations, semi-routine sales, semi-routine services, semi-routine clerical, semi-routine childcare, semi-routine agricultural, semi-routine technical and semi-routine operative operations, Routine sales and services, production, technical operative and agricultural operations. Intermediate jobs include; intermediate clerical and administration, intermediate sales and services occupations, intermediate technical and auxilially occupations, intermediate engineering occupations, employers of small establishments (excluding agriculture), employers of small establishments (including agriculture), own account workers non-professional and own account workers in agriculture. On the other hand, professional jobs include; employers in large establishments, higher managerial and administrative occupations, higher professional "traditional" occupations, higher professional "new" employee occupations, higher professional "new" self-employed occupations, lower professional/higher technical traditional, lower professional/higher technical new employee or new self-employed, lower managerial and administrative occupations.

We estimate Fixed Effects and pooled OLS models controlling for children, mothers, household and fathers' characteristics including both regional and time dummies to investigate the impact of maternal employment and mother's job category on children's happiness measured by their satisfaction in terms of general life, family and friend satisfaction. We find that maternal employment negatively impacts on children's happiness as measured by general life and family satisfaction. We instead find a positive impact of maternal employment on children's happiness in the form of friend satisfaction. In terms of job category, children of mothers in full-time employment are less happy than their counterparts whose mothers are in part-time employment, while children whose mothers are in professional jobs are happier than their counterparts whose mothers have routine jobs. We check for robustness of our results by estimating an ordered logit model to compare results.

For the rest of this paper we provide the background and literature in section 2, data and descriptive analysis, in section 3, estimation strategy and results in section 4, sensitivity analysis in section 5 and conclusion in section 6.

4.2 Background and Literature

Children are known to be generally happy (Holder, 2012) whether based on self-rated reports or on their parents. Among the youth, happiness or high life satisfaction is associated with good adaptation and optimal mental health while low life satisfaction is associated with psychological, social and behavioural problems (Park, 2004). There is vast literature on the determinants of children's outcomes, and this is embedded in varying disciplines including Economics, Social Sciences and Psychology. However, research on child outcomes such as happiness, esteem and life satisfaction that reflect emotional well-being of children have traditionally been more embodied in Psychology than other disciplines such as Economics. The concept of happiness has had varying theoretical perspectives in literature; it can be related to enabling mechanisms which are cognitive processes of an individual which allow a system to fulfil its functions and make happiness possible, or to an individual's personal

characteristics (Averill and More, 1993). Mahon and Yarcheski (2002) conduct a study to determine which of these two categories explains happiness better. They identify three variables for each category for the analysis. For enabling mechanisms, they use esteem, optimism and future time perspective which are process oriented and which stimulate challenges, activities and individual growth that in turn contribute to happiness. In the other set of personality characteristics, they use vigour, social support and change. Their findings show that the enabling mechanisms set of variables have a higher explanatory power for happiness than the personal characteristics set of variables.

A study by Mahon et al. (2005) suggests that nurses working with adolescents need to be mindful of studies that do and do not support socialization theories of happiness learned in the educational process and apply the findings to their evidence-based practice. Their study relates happiness to health-related variables and establishes a positive correlation between the two. It also reveals that boys and girls do not differ in their expression of happiness which is contrary to findings in another study by Brody and Hall (1993) which suggests boys and girls are socialized to express emotions such as happiness differently. It is still debatable in literature as to what contributes more to happiness. For instance, studies on youth (Csikszentmihalyi and Hunter, 2003; 2014) reveal that particular activities are associated with varying degrees of happiness. School activities rate below average scores in happiness while social, active and passive leisure activities are above average. The authors also find that being alone rates the lowest levels of happiness while being with friends corresponds to the highest and that higher social class and age correlate to lower levels of happiness. These studies elevate the role of environmental factors in influencing happiness in children and support the view of examining other domains of life satisfaction in addition to the general measure.

Given these social underpinnings to happiness, we now embark on literature regarding the role of family in children's happiness. As quoted by Becker (1981), Adam Smith underscores the role of family in influencing children's happiness or misery when he says "Every man feels his own pleasures and-his own pains more sensibly than those of other people.... After himself, the members of his

own family, those who usually live in the same house with him, his parents, his children, his brothers and sisters, are naturally the objects of his warmest affections. They are naturally and usually the persons upon whose happiness or misery his conduct must have the greatest influence." This gives us insights into how choices or actions of parents can potentially influence children's happiness or well-being. A recent study by Gudmundsdottir et al. (2016), finds that children who live with both their parents and those who spend more time with their parents are happier than their counterparts. The study also asserts that increase in happiness was detected among all groups except those with parents who had only basic education and never spent time with their parents, or children who found it difficult to get emotional support from their parents.

In another study on the association of victimization, peer and adult relationships with children's life satisfaction, esteem, anxiety and depressive symptoms, Guhn et al. (2012) find that positive relationships with adults and peers were most strongly associated with life satisfaction and self-esteem while victimisation was most strongly associated with depressive symptoms and anxiety. In a related study, social relations have also been emphasised as strong predictors of children's happiness. Children's interactions with friends and/or family are found to be stronger predictors of children's happiness than the demographic variables related to family such as number of siblings, ages of parents and marital status of the parents (Holder and Coleman, 2009). Similarly, active leisure (physical activities such as sports) for children is found to be positively correlated with their well-being (Holder et al., 2009) while passive leisure such as watching television or video games is negatively related to their well-being. In addition, children who are more social and active, less shy, emotional and anxious are found to be happier than their counterparts (Holder and Klassen, 2010).

The above literature emphasises the social stance for children's happiness either with their parents or peers. We now revisit the literature that concerns parents' activities, particularly participation in the labour market, and its influence on children's well-being. Although the trend towards women leaving home-based employment and entering the paid work force is usually an overlooked

demographic reality in industrialization, technological advancements in cooking and cleaning have eased the burden at home and more women are entering the labour force (Johnston, 1991).The impact of this trend on children's well-being is found to be ambiguous in literature (Hsin and Felfe, 2014; McMunn et al., 2011; Verropoulou and Joshi, 2009), some studies find negative effects on children's well-being, while others find a positive impact. Negative effects could partly be explained by the view that, in many places across the world, work schedules for employees have changed from the traditional schedules of working from Monday to Friday. Parents today even work at the weekends or during other awkward times which gives them with little time to interact with their children. McMenamin (2007) finds that 12 percent of working mothers in the US work during non-standard times and their schedules do not fit the traditional 9am-5pm Monday-Friday schedule. This is common in work such as hospitality and the service industry and mainly occurs among the less advantaged mothers.

Using a longitudinal data set of British youth, Powdthavee and Vernoit (2013) estimate how parents' exposure to unemployment influences the overall happiness of adolescents. They establish a positive relationship between parents' job loss and overall happiness for young children. This relationship however became either strongly negative or statistically insignificant when the children grew older. Another study on British adolescents that controlled for fixed effects, compared full-time and part-time maternal employment and their related impact on children's smoking behaviour, life satisfaction, self-esteem and their intention to leave school at 16 (Mendolia, 2014). The study finds that maternal full-time employment during adolescence is not harmful as regards to specific indicators of children's well-being such as psychological well-being, risk of smoking or intention to leave school. The author argues that a mother's ability to discipline and monitor her child is not reduced by the fact that she spends more time outside the house and that positive working effects (such as promotion of child independence) may offset negative effects. A related finding is from Aughinbaugh and Gittleman (2004) who find no evidence that mother's employment, whether early in the child's life or during adolescence, affects the likelihood of participation in risky behaviour such as smoking, drinking alcohol or taking other drugs which affect their well-being.

Lemmon et al. (2018) investigate whether family structure moderates the relationship between mother labour force participation and mother adolescent time and relationship. Mother adolescent time included; mother accessible time or availability before the child goes to school, after school while at home and when the child goes to bed. It also included mother's engaged time in which the children reported activities they did with their residential mothers in the past four weeks. Mother-adolescent relationship quality was measured by how close the child feels to his/her mother, how warm and loving the mother is, and how satisfied the child is with communication or relationship with the mother. The study reveals that the association between mother's labour force participation and her accessible time before and after school is significantly weaker in stepfather families relative to 2 parent biological families. Mothers working part-time in stepfather families are found more available before school than those in two parent biological families, while those in stepfather families on overtime were more available after school than their counterparts in two parent biological families. However, the study finds no significant results on mother engaged time, communication and relationship with their children.

Other literature investigates whether maternal employment negatively affects children through reduced time with parents and whether time with parents affects child outcomes (Hsin and Felfe, 2014). Overall authors find that effects of maternal employment are ambiguous because employment does not necessarily reduce children's time with parents; that working mothers even trade quantity of time for better quality time and that not all types of parental time benefit child development as some activities may be detrimental to child development.

Existing literature on the effects of maternal employment on children's outcomes mainly concentrates on its impact on educational or cognitive abilities. James-Burdumy (2005) investigates the effect of maternal labour force participation on child development and finds little evidence that maternal employment negatively affects children's development as measured by early test scores[30]. The study

[30] Peabody Picture Vocabulary Test (PPVT) and Peabody Individual Achievement Test (PIAT) scores

however acknowledges that there may be some negative effects of maternal employment during the first year of the child's life. Meanwhile Ermisch and Francesconi (2013) reveal that full-time maternal employment when a child is 0-5 years has a negative effect on his/her educational attainment of the months of employment and that there are stronger adverse effects for children of less educated mothers. In addition, having a mother who works full-time and uses childcare for one year, is associated with a reduction in ability test scores by 1.8 percent (Bernal, 2008).

In Norway a natural experiment was carried out to increase incentives of mothers to stay at home with their children up to the age of three. A universal cash-for-care program that paid any parent an allowance if they did not use a public subsidized day care for a child of 1-2 years was implemented. Many eligible children had older siblings who could have been affected by parents' absence for work-and the study investigates how this program affected the long run educational outcomes of older siblings. It reveals a significant positive treatment effect on older siblings which could be explained by the reduced mother labour force participation (Bettinger et al., 2014). Other studies find that the impact of maternal employment on a children's cognitive outcomes is worse in the first five years of their life (Bernal and Keane, 2010; Liu, Mroz and Van der Klaauw, 2010) although James-Burdumy (2005) finds mixed results on the impact of maternal employment on children's Peabody Individual Achievement Test (PIAT) scores in Maths. The study shows that the number of weeks worked in a year have negative effect in the first year but have no effect in the second year and a positive effect in the third year.

The net impact of maternal employment on children's outcomes may be influenced by different factors. Powdthavee and Vernoit (2013) argue that in order to maximise their utilities, parents choose between time spent working in the market which has a positive effect on their standard of living and time to input into human capital production of their children which has a positive effect on their standards of living in the future through their children's incomes. So, when the income effect is held constant, maternal labour supply may have a

negative influence on the children's cognitive development as it reduces the time spent in enriching environments (Powdthavee and Vernoit, 2013).

An area which has received limited coverage in literature especially in economics literature is the impact of maternal employment on children's emotional outcomes such as happiness measured with different dimensions. Literature in this area is mainly from Psychology; one of these studies includes that of Miller (1975) who investigates the impact of maternal employment on daughter's sex role perception, interests and self-esteem. The study finds that parental roles are less traditional in families where the mother is employed outside the home leading to less traditional stereotypes among daughters. The study finds daughter's self-esteem was not related to maternal employment, but her interests may be affected in rather a complicated way. The study also finds evidence that daughters of working mothers may be more aggressive and less passive than their counterparts. Another study used five measures of socio-emotional functioning including compliance, inhibition, attachment insecurity, sociability and behavioural problems to investigate the impact of maternal employment. The study constructed two composite measures for the analysis; Adjustment equals behavioural problems total plus insecurity minus compliance; Shy equals inhibited minus sociability. Comparing children after their first three years of life findings show that children whose mothers were employed full-time beginning in the first or second year of life scored more poorly on a composite measure of adjustment than did those whose mothers were not employed during the first three years (Belsky and Eggebeen, 1991).

A more recent study is one which examines whether mothers' positive work-related experience, work engagement and recovery from work are indirectly linked to their children's life satisfaction through their mothers' life satisfaction-basing on spill-over and crossover models (Mauno et al., 2017). The study reveals that mothers' work engagement and recovery from work were positively and indirectly associated with their children's life satisfaction through the mother's life satisfaction and her being close to them. The study suggests that work-to-family crossover of work-related experiences do occur from mothers to

children and employers should take note of this when considering both mother's and children's life satisfaction.

4.3 Data and Descriptive Analysis

4.3.1 The Understanding Society Survey

In this chapter we use data from Understanding Society which is a longitudinal survey of approximately 40,000 households in the United Kingdom. These households are visited each year to collect information on changes to their circumstances both at household and individual levels. Understanding Society Survey was first conducted in 2009 (wave one) and replaces the British Household Panel which ended in 2008. By 2015 six surveys had been conducted in which questionnaires were designed to collect data from adult individuals in all households who are aged 16 years and above. Another category was a self-completion questionnaire for the youth aged 10-15 years. The youths join the adult survey when they turned 16 years of age while those who turned 10 years joined the youth survey. Such exits and entries make this an unbalanced panel since not all children appear in all six waves. This panel provides useful longitudinal data on subjects such as education, work, family, health and social life which reflect the social and economic situation or general well-being of the UK population.

Our study focuses on the youth who are 10-15 years old and live with at least one of their parents. We match children in the youth panel to their parents in the adult survey and keep children who have at least one parent whether natural or adoptive. Our sample consists of households with single mothers and those with single fathers although the number of single fathers is substantially smaller.

The key variable of interest "maternal employment", was extracted from one question provided in the adult questionnaire which asked the respondent/parent: *Which of these, best describes your current employment situation? The options are; Self-employed, in paid employment (full or part-time), unemployed, retired, on maternity leave, looking after family or home, full-time student, long-term*

sick or disabled, on government training scheme, unpaid work in family business, working in an apprenticeship or doing something else. We further breakdown the employment variable into two other variables that describe the category of employment for the mother. These are full-time/part time employment and routine/intermediate or professional jobs variables. Another variable of interest is children's happiness which is captured by six questions in the youth questionnaire. Children were asked to select options (faces) that come closest to expressing how they feel about their; *schoolwork, appearance, family, friends, the school they go to and their life as a whole.* Answers to the questions are coded 1, 2 …7 with 1=completely happy and 7=completely unhappy. This makes up 7 categories of the dependent variable (1=completely happy, to 7=completely unhappy). For easy analysis we reverse the coding such that higher values represent more happiness by having 1= completely unhappy and 7=completely happy.

4.3.2 Measure of a Child's Happiness

Earlier studies have used life satisfaction to measure children's happiness (Knies, 2017; Powdthavee and Vernoit, 2013), like some other studies for happiness in adults (see Clark and Oswald, 1994). Although this is a good measure for happiness in adults, we consider it an inadequate measure of happiness in children for various reasons. In a self-completion child questionnaire, we believe children are more likely to be accurate on ranking how happy they are with their family, with their friends but less accurate on the overall score of life satisfaction because this question requires reflecting on several life experiences that a child may not consider significant at that moment but were in the past though forgotten. In answering the question of how far we can predict adult life satisfaction at different earlier points in a person's life; researchers reveal (Frijters et al., 2011; Richard et al., 2014) that life satisfaction is extremely difficult to predict even at 10 and only slightly easier at the age of 16. Cognitive processing must play a role in the way the question for life satisfaction is answered and the cognitive skill could change how individuals calculate life-satisfaction (Richard et al., 2014). In addition, Antaramian et al., 2008, argue that the general measure of life satisfaction may mask distinctions made by adolescents among important domains in their lives. More so,

individuals' judgements in various life domains may be differentially affected by personal and environmental influences and as a result, a multidimensional conceptualization may yield more differentiated information (Gilman et al., 2000).

Literature has attempted to present happiness and life satisfaction in adults separately even in the same analysis for example, Blanchflower and Oswald (2004) present happiness in the USA and life satisfaction in Britain as though the two concepts are different but possibly because different questions were asked for each of the two measures. In this way life satisfaction is treated differently from happiness. Other researchers consider that happiness is in general understood as a basic indicator of subjective well-being while satisfaction is another cognitive dimension of subjective well-being (Boye, 2018). Therefore, to understand happiness in children it is imperative to deal with the individual questions that represent children's feelings, say about life in general, family and friends, the schools they go to, schoolwork as well as their appearance independent of one another. This gives grounds for incorporating different measures of child happiness which this study considers.

Meanwhile, studies indicate that children's happiness in preschool may be more related to their friendship groups or other things which are beyond adults' expectations. Children's spaces can take a variety of forms, including virtual, imaginary or social functions but they are limited to adult-imposed reasoning (Clark, 2010). From a child's point of view advantageous approaches to happiness in early childhood education and care are to experience friendship, engage in free play, to sense nature, colours or artwork, to be challenged and to experience things out of the ordinary (Boye, 2018). In this study, when explaining what makes them feel happy children mentioned educators only two times in nearly 200 occasions. They were also asked to take photos of what makes them happy and describe activities that make them happy. Neither did they take photos nor mention activities involving educators such as meals, circle time or at the bathroom. Two other studies (Clark, 2010; Einarsdottir, 2005) also found educators missing on children's photos, although our study is on older children, we consider this to be common in all children. The other literature that

we have reviewed (Gudmundsdottir et al., 2016; Holder and Coleman, 2009; Holder and Klassen, 2010; Holder et al., 2009) also shows that children are happier in a social setting which mainly involves their parents or friends.

Our study looks at all the six questions about a child's feelings, but we mainly concentrate on the first three questions (about family, friends and general life) for reasons that will follow shortly. Table 4.1 below shows children's self-reported responses and the distribution of their scores in each of the questions with 7 representing completely happy and 1 completely unhappy.

Table 4. 1: The distribution of scores among different dimensions

score	Family	Friend	Satisfn	School	Schoolwork	Appearance
1	0.4	0.42	0.63	2.59	1.25	1.8
2	0.62	0.49	1.01	1.94	1.32	3.21
3	1.44	1.15	2.15	3.74	4.12	5.82
4	3.72	3.1	7.18	9.05	11.39	13.45
5	8.5	9.22	17.53	18.01	25.54	23.37
6	22.21	30.37	35.69	29.38	35.76	29.37
7	63.11	55.25	35.81	35.29	20.62	22.99
Total sample	**19,812**	**19,812**	**19,812**	**19,635**	**19,635**	**19,635**

Concentrating on the first three questions, is based on the pattern of answers for the first three questions on children's feelings (about family, friends and general life satisfaction) with the biggest proportion of children giving the scores of 6 and 7, we however argue that children attach more value to happiness from family, friends than from other dimensions. The relatively lower values of happiness in form of school, schoolwork and appearance is depicted in the overall measure of satisfaction (in which they are incorporated) as it takes on a similar pattern of scores that are relatively lower than for family and friend satisfaction. 63 percent of the children gave a score of 7 (completely happy) for the family question and 55 percent for friend question. For general life question it is 36 percent while for the rest of the questions the score of 7 is between 21 and 35 percent. We therefore focus on family and friend satisfaction with the highest scores for happiness together with general life satisfaction whose scores are more correlated to the rest of the questions. This pattern of responses could perhaps be explained by implicit theories of happiness in which people may have

fixed mind-sets versus growth mind-sets about happiness which are social cognitive beliefs that have received limited attention in literature (Molden and Dweck, 2006). Children could have growth mind-sets about happiness from life, family and friends (a belief that this happiness with life, family and friends is changeable) and fixed mind-sets with how they feel about their appearance, schoolwork and the school they go to, a belief that happiness from these is less malleable. For example, a child who is constantly praised or rebuked for school performance may develop a fixed belief that his/her performance is fixed which would make the motivation towards schoolwork somewhat fixed. On the other hand, a child who is repeatedly told that hard work improves performance will always be motivated by his/her schoolwork because there is hope for improved outcomes.

Mind-sets are known to have consequences on both motivation and perception (Dweck and Leggett, 1988). For example, children may be more concerned with their happiness in relation to life, friends and family than they feel about their appearance, schoolwork and the school they go to. Tongeren and Burnette (2018) find that unlike fixed mind-sets, growth mind-sets are associated with higher rates of self-reported well-being or happiness (the fact we see in children's responses to questions about how they feel with their life in general, family and friends). The study concludes that the salutary belief that happiness is malleable may motivate several processes aimed at securing such a desirable end-state and that it seems to find happiness, one has to believe that such a result is actually achievable. What we argue here is that children may value happiness with their life in general, family and friends more than happiness from other forms because they consider this more achievable and less fixed.

We therefore mainly focus on analysing children's happiness in form of how they feel about their family or friends in addition to the general measure of life satisfaction. Questions on how children feel about their appearance, their schoolwork and the school they go to, have also been analysed and comments added in the results section. Results on schoolwork and school match our main results (but less significant) while those on appearance are statistically insignificant.

Prior to the analysis, we present a correlation matrix for the dependent variables which is shown below.

Table 4. 2: Correlation Matrix for all the six dimensions of Happiness

	Life	Family	Friend	School work	School	Appearance
Life	1					
Family	0.507*	1				
Friend	0.404*	0.350*	1			
School work	0.398*	0.278*	0.248*	1		
School	0.420*	0.309*	0.348*	0.456*	1	
Appearance	0.516*	0.343*	0.310*	0.332*	0.322*	1

A star (*) implies the coefficient is significant at 5 percent

The results from the table above indicate schoolwork, school and appearance are more highly correlated to general life satisfaction than they are to friend and family satisfaction. For this reason (and others as explained earlier), we mainly focus and present results on the general life, family and friend satisfaction although we comment on results for all dimensions of happiness.

4.3.3 Control Variables

We use several covariates to including children characteristics such as age and gender, household characteristics that include household income adjusted to inflation[31] and the number of children in the household, and parents' characteristics such as age, level of education and employment status. We also include mother's job characteristics such as part-time/full-time, and whether it is a routine, intermediate or a professional job. We present specifications in which both parents live together, a case where the mother is single and the case for married mothers in employment.

[31] Using consumer price index from the Office of National Statistics provided at https://www.ons.gov.uk/economy/inflationandpriceindices/bulletins/consumerpriceinflation/march2018

4.3.4 Descriptive Statistics

Under this section we base our analysis on mother's job characteristics such as full or part-time employment, routine or non-routine jobs. This is to enrich our discussion on the impact of maternal employment on a child's happiness. However, we have summary statistics on children of employed versus out of employment mothers (see, appendix, Table 4.11).

We begin by looking at the characteristics of full-time and part-time working mothers (Table 4.3 above) in order to identify how each form of employment influences a child's happiness. In line with existing studies, we define part-time workers as those who work less than 30 hours a week (see, for example, Manning and Petrongolo, 2008).

Table 4. 3: Descriptive statistics on determinants of children's happiness (Coupled parents by full and part-time employment)

	Full-time		Part-time		Ttest
Variable	**Mean**	**SD**	**Mean**	**SD**	**Pval**
Mother's Characteristics					
Education					
Diploma and above (=1)	0.55	0.50	0.40	0.49	0.00
A, AS and Higher Grade (=1)	0.08	0.28	0.11	0.31	0.00
GCSE/O, CSE, O-Grade (=1)	0.20	0.40	0.29	0.45	0.00
Lower educ. qualifications (=1)	0.17	0.38	0.20	0.40	0.00
Employment					
Routine Job	0.23	0.42	0.43	0.49	0.00
Intermediate Job	0.22	0.42	0.28	0.45	0.00
Professional Job	0.55	0.50	0.29	0.46	0.00
Mother's Ethnicity	0.83	0.38	0.87	0.33	0.00
Mother's age	42.36	5.54	42.16	5.43	0.07
Child's characteristics					
Satisfaction					
General life satisfaction	5.93	1.10	5.98	1.07	0.02
Family satisfaction	6.37	1.00	6.43	0.97	0.00
Friend satisfaction	6.34	0.96	6.34	0.94	0.88
Number of Children	2.27	0.86	2.48	0.91	0.00
Age10	0.14	0.35	0.17	0.38	0.00
Age11	0.15	0.36	0.18	0.39	0.00
Age12	0.17	0.37	0.17	0.37	0.78
Age13	0.18	0.38	0.17	0.38	0.46
Age14	0.18	0.38	0.16	0.37	0.04
Age15	0.18	0.39	0.14	0.35	0.00
Child's gender (male=1)	0.51	0.50	0.49	0.50	0.09
Father's Characteristics					
Education					
Diploma and above (=1)	0.35	0.48	0.35	0.48	0.93
A, AS and Higher Grade (=1)	0.08	0.28	0.08	0.27	0.18
GCSE/O, CSE, O-Grade (=1)	0.22	0.41	0.24	0.43	0.01
Lower educ. qualifications (=1)	0.21	0.41	0.21	0.40	0.55
Missing father's Education	0.11	0.32	0.12	0.32	0.88
Father Employed	0.82	0.38	0.83	0.37	0.36
Household income	5744.78	2812.15	4860.62	2711.58	0.00
Number of observations	**5,018**		**5,237**		

In line with literature (Fuchs, 2017) that finds a negative relationship between full-time employment and fertility, we find that mothers in full-time employment on average have fewer dependent children[32] in a household compared to those in part-time employment. This could be influenced by levels of education because parents in full-time employment are more likely to have higher education qualifications than their part-time counterparts and according to the literature (Martin, 1995; Keats, 2018) higher education may imply lower fertility rates. However, the impact of education on fertility, may not necessarily be negative. For example, in Belgium, highly educated women labour market participation is found to be positively related to childbearing (Wood and Neels, 2017) and in other studies education is found to have no impact on fertility (Kan and Lee, 2018). Mothers in full-time employment also have fewer children at the ages of 10 and 11 but with more at the ages of 13 to 15 compared to mothers in part-time employment. In other words, mothers in full-time employment have more older children than their counterparts which could explain their choice for full-time employment. In terms of job category, table 4.3 shows that 55 percent of mothers in full-time employment are in professional jobs and only 23 percent in routine jobs and the rest in intermediate jobs. On the other hand, among mothers in part-time employment only 29 percent are in professional jobs and about 43 percent are in routine jobs.

We now establish the differences in the levels of satisfaction reported by the children whose mothers are in full-time employment and those whose mothers are in part-time employment. We find a significant difference in the means (using a Ttest) of general life satisfaction showing that children of mothers in part-time employment are more satisfied with life in general compared to their counterpart whose mothers are in full-time employment. This potentially relates to the literature that women in part-time work are more satisfied with their jobs and life in general (see, Booth and Van Ours, 2009) and their children may benefit from the spill-over effects. We also find a statistically significant difference in family satisfaction between the two groups of children and those

[32] BHPS defines dependent children as those under the age of 16 living in the household, especially children of primary school age.

whose mothers are in part-time employment were more satisfied on average. However, we do not find the difference in friend satisfaction between children of mothers in part-time and those in full-time employment statistically significant. We are yet to investigate further in regression analysis if this is the case, later in this section.

In the case of fathers, we do not find a significant difference in the education of fathers between children whose mothers are in part-time employment and those in full-time employment, except for those with GCSE/O levels. Finally, we find that household income for full-time mothers is higher than in households where mothers work part-time. This is in line with literature which shows that part-time workers are generally concentrated in low-paid, low-status jobs (see, Manning and Petrongolo, 2008).

To investigate children satisfaction more, we now categorise our sample into routine and non-routine jobs. This is meant to unveil job related characteristics of the mother that may impact on a child's happiness (see, table 4.4 below).

Table 4. 4: Descriptive statistics on determinants of children's happiness (Coupled parents by type of employment)

	Routine Jobs		Intermediate and professional jobs		Ttest
Variable	**Mean**	**SD**	**Mean**	**SD**	**Pval**
Mother's characteristics					
Education					
Diploma and above (=1)	0.24	0.43	0.58	0.49	0.00
A, AS and Higher Grade (=1)	0.09	0.28	0.10	0.30	0.01
GCSE/O, CSE, O-Grade (=1)	0.35	0.48	0.20	0.40	0.00
Lower educ qualifications (=1)	0.32	0.47	0.12	0.33	0.00
Mother's Ethnicity (=1)	0.84	0.37	0.86	0.35	0.01
Mother's age	41.06	5.73	42.85	5.27	0.00
Child's characteristics					
Satisfaction					
General life satisfaction	5.88	1.13	5.99	1.06	0.00
Family satisfaction	6.37	1.04	6.42	0.95	0.01
Friend satisfaction	6.34	0.95	6.34	0.95	0.88
Number of Children	2.52	1.02	2.31	0.81	0.00
Age10	0.15	0.36	0.16	0.37	0.10
Age11	0.16	0.37	0.17	0.38	0.26
Age12	0.17	0.38	0.16	0.37	0.18
Age13	0.17	0.38	0.18	0.38	0.66
Age14	0.17	0.38	0.17	0.37	0.39
Age15	0.17	0.38	0.16	0.37	0.32
Child's gender (male=1)	0.48	0.50	0.51	0.50	0.01
Father's characteristics					
Education					
Diploma and above (=1)	0.24	0.43	0.40	0.49	0.00
A, AS and Higher Grade (=1)	0.07	0.26	0.08	0.28	0.09
GCSE/O, CSE, O-Grade (=1)	0.28	0.45	0.21	0.41	0.00
Lower qualifications (=1)	0.28	0.45	0.17	0.38	0.00
Missing father's Education	0.11	0.31	0.12	0.32	0.09
Father Employed (=1)	0.82	0.38	0.83	0.37	0.15
Household income	4201	1944	5831	2989	0.00
Number of observations	**3,382**		**6,873**		

Table 4.4 shows that children of mothers in routine jobs are less happy than their counterparts whose mothers are in professional or intermediate jobs which are

relatively higher paying jobs. This is because both the mean values of general life and family satisfaction are higher for children whose mothers are in non-routine jobs compared to those whose mothers are in routine jobs. The difference between the mean for the two groups is statistically significant. One of the possible reasons for higher happiness among children of mothers in professional jobs, could be related to the financial gains of employment and the associated satisfaction that may spill over (Mauno et al., 2017) to their children. given that routine jobs pay relatively lower wages. We observe that households in which mothers are in routine jobs, have relatively low average income (£4200) compared to households where mothers are either in professional or intermediate jobs, with an average of £5830 and the difference is statistically significant.

In line with Holmes (2011) who shows that in the UK, people in professional jobs are more likely to have higher academic qualification level 4-5; those in intermediate are more likely to have academic level 2-3 qualification and vocational level 4-5 qualifications while those in in routine jobs are less likely to have higher academic qualifications (level 2-5 and vocational level 4-5 qualification), we find related results.

We find that mothers in routine jobs have relatively lower levels of education with only 24 percent having a diploma and above compared to 58 percent of mothers in professional and intermediate jobs who have a diploma qualification or above. About 32 percent of mothers in routine jobs have lower levels of educational qualification (below GCSE/O levels) compared to only 12 percent who are in intermediate and professional jobs. This pattern also appears among their husbands such that those in routine jobs also have husbands with relatively lower levels of education: only 24 percent have a diploma and above-compared to their counterparts in non-routine jobs - over 40 percent have a diploma/degree or higher. Our findings are also supported by a cross country-study on OECD countries (Marcolin et al., 2016) which finds that routine-intensive occupations are associated with lower skills although the relationship was not strong or very strong.

4.3.5 Panel Structure

We now briefly describe the structure of our panel. The table below shows the attrition rate of children in the six waves.

Table 4. 5: Attrition of Children in the Panel

Number of Children	Wave					
	1	**2**	**3**	**4**	**5**	**6**
Observed in each wave	4,397	3,647	3,276	3,062	2,794	2,636
Observed in the previous wave		4,397	3,647	3,276	3,062	2,794
Observed in any other previous wave (not recent)			4,397	3,647	3,276	3,062

The diagram shows that due to the high rate of attrition, the sample almost declined by half between 2006 and 2011.

4.4 Estimation Strategy and Results

4.4.1 Theoretical Strategy

Our theoretical analysis is based on a well-being function proposed by Blanchflower and Oswald, (2004) which is widely used in literature (see Latif, 2010; Powdthavee and Vernoit, 2013) and it is of the form;

$$\mathrm{r} = h\big(u(\mathrm{z},\mathrm{p},\mathrm{s},\mathrm{t})\big) + e \qquad \text{(I)}$$

Where r is the self-reported level of happiness by the child, *u*(...) is the true child's level of well-being which is a function of children's characteristics (z), parents' characteristics (p), household characteristics (s) and the time dummies (t). e is the error term which captures other influencing factors that are not included and the inability of the child to communicate accurately his/her true level of happiness. *h*(…) is a function that relates actual to the reported levels of happiness. We then transform this into a more specific model in the next section.

4.4.2 Empirical Strategy

Under this section, we estimate the determinants children's happiness using a linear fixed-effects regression, controlling for maternal employment, other job-specific characteristics and family characteristics to identify the drivers of child

happiness, and whether they evolve over time in response to lifetime events. Specifically, we estimate a linear regression of the form:

$$H_{it} = \beta x_{it} + \alpha_i + u_{it} \quad (2)$$

Where H_{it} captures child *i*'s happiness at time *t*, represented by how a child feels about; life, family or friends. x_{it} is a vector of family and parents job characteristics, α_i captures time invariant individual specific effects that are constant over time, and u_{it} is a random disturbance term.

In specifying a linear regression, we are assuming that a child's measure of satisfaction is a cardinal rather than an ordinal construct. In other words, we assume that the difference in happiness between values of say 2 and 3 is the same as the difference in happiness between values of 6 and 7. The advantage of this approach is that the linear results are easier to interpret, while producing similar empirical results to ordinal measures of subjective well-being (see, Ferrer-i-Carbonell and Frijters, 2004; Clark et al., 2010).

4.4.3 Driscoll-Kraay (1998) Estimator

To estimate our linear regression, we use the estimator by Driscoll and Kraay (1998) as adjusted by Hoechle (2007) to cater for both balanced and unbalanced panels as well as panels with missing observations. The original contribution of Driscoll-Kraay Estimator is restricted to balanced panels.

We choose to use this estimator for several reasons. First, our panel is unbalanced, with missing observations. This makes it suitable to use the Hoechle adjusted Driscoll-Kraay estimator. Secondly, according to Hoechle (2007), microeconometric panels are likely to exhibit various forms of cross-sectional and temporal dependence which if ignored leads to invalid statistical inference as panel regression results will have overly optimistic standard error estimates. The argument is that because cross-sectional units in panels may exhibit social norms, herd behaviour or psychological behavioural patterns which enter panel regressions as unobservable common factors, complex forms of spatial and temporal dependence may arise irrespective of whether the units are randomly and independently selected.

In our case however, assuming a linear regression implies that the unobservable common factors are not correlated with the explanatory variables. This implies that the coefficient estimates from the standard error estimators such as Fixed Effects and Pooled OLS are still consistent but inefficient.

Although there are popular covariance matrix estimators for ensuring valid statistical inferences, according to Hoechle (2007) many do not account for cross-sectional dependence (for example Huber (1967), Eicker (1967), White (1980), Arellano (1987), Rogers (1993)) while those that account for panel correlations like Parks (1967) or Parks-Kmenta method and Beck and Katz (1995) have limitations on the size of T and N dimensions[33]. On the other hand, Driscoll-Kraay estimator places no restriction on the limiting behaviour of the number of panels. The size of the cross-sectional dimension in finite samples does not constitute a constraint on its feasibility. This makes it the best estimator in this study where time dimension T is much smaller than the number of cross-sectional units N. In addition, Driscoll-Kraay standard errors have considerably better small-sample properties than those of commonly applied alternative techniques for estimating standard errors when cross-sectional dependence is present (Hoechle, 2007).

Using Pesaran (2004, 2015) cross sectional dependence tests, which cater for both balanced and unbalanced panels, we investigate whether residuals in the error term are cross-sectionally uncorrelated (Null). Test results confirm the presence of cross-sectional dependence in both Pooled OLS and Fixed Effects models. We then test for the existence of specific fixed effects and to support the use of fixed effects with Driscoll and Kraay (1998) standard errors for linear panel models as suggested by Hoechle, (2007). According to Hoechle (2007), the Pooled OLS regression yields inconsistent coefficient estimates if the true model is the FE model. Therefore, we need to test for the presence of individual specific fixed effects.We use the Hausman test suggested by Wooldridge (2002) as quoted by Hoechle (2007) which is robust to cross-sectional dependence. Test results indicate the presence of specific fixed effects as we reject the null

[33] Parks-Kmenta method is infeasible if panel's time dimension T is smaller than the cross-section dimension N, while Beck and Katz (1995) estimator is poor if N is greater than T and according to Hoechle (2007) it produces unacceptably small standard error estimates.

hypothesis of no fixed effects. This implies that estimates from the Pooled OLS are inconsistent. We therefore present the Fixed Effects results in our main text and the Pooled OLS results in the Appendix (Tables C12, C13 and C14).

Before we present our main results, we consider how they will be presented. We use three of the domains of satisfaction namely; the general measure of life satisfaction, family satisfaction, and friend satisfaction as our dependent variables. Each domain answers the question; how do you feel about your life as whole? about your family? and about your friends? respectively. The responses to these questions range from 1 to 7 and in our estimation 7 refers to completely happy while 1 is completely unhappy. We present results on general life satisfaction, family satisfaction and the friend satisfaction in that order**.**

4.4.4 Results

In Table 4.6 below, we present results on how maternal employment and other job characteristics influence a child's happiness in form of the general measure of life satisfaction. The table has three columns; the first column (Model 1) only includes mothers who stay with the husband in the same household, the second column (Model 2) is for single mothers who stay only with their children, while the last one (Model 3) is for those mothers who stay with the husband in the same household and they are employed.

Table 4. 6: Results from a Fixed Effects model showing the impact of maternal employment on children's Life satisfaction

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.17**	(0.06)	0.23*	(0.09)	-0.26**	(0.07)
A, AS and Higher Grade (=1)	-0.30*	(0.15)	0.42	(0.29)	-0.35*	(0.15)
Gcse/O, CSE, O-Grade (=1)	-0.25	(0.15)	-0.89**	(0.23)	-0.40*	(0.16)
Current age	0.01	(0.08)	0.11*	(0.05)	-0.04	(0.07)
Employed (=1)	-0.06**	(0.02)	-0.24**	(0.05)		
Job category (Ref: Professional job)						
Routine (=1)					-0.08**	(0.03)
Intermediate (=1)					-0.09*	(0.05)
Full-time (=1)					-0.06**	(0.01)
Ethnicity (White=1**)**						
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.28*	(0.14)	-0.22	(0.31)	0.34	(0.21)
Age11 (=1)	0.26*	(0.10)	-0.08	(0.26)	0.29+	(0.16)
Age12 (=1)	0.23**	(0.08)	-0.11	(0.19)	0.30*	(0.12)
Age13 (=1)	0.15**	(0.05)	-0.19	(0.16)	0.17*	(0.08)
Age14 (=1)	0.04	(0.03)	-0.12	(0.10)	0.07+	(0.04)
No. of children in a household	-0.01	(0.02)	-0.03	(0.06)	-0.11**	(0.04)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	0.10+	(0.05)			0.10*	(0.05)
A, AS and Higher Grade (=1)	0.43**	(0.10)			0.57**	(0.07)
Gcse/O, CSE, O-Grade (=1)	0.15**	(0.05)			0.11*	(0.06)
Missing education record (=1)	0.12**	(0.03)			0.04	(0.09)
Employed (=1)	0.16**	(0.02)			0.09*	(0.04)
Household Income	-0.04+	(0.02)	0.03	(0.03)	-0.02	(0.06)
Constant	5.40**	(0.51)	5.41**	(0.55)	6.23**	(0.89)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Hausman test: F	105.41		63.78		5.39	
Prob> F	0.00		0.00		0.00	
Observations	**15,029**		**4,783**		**10,255**	
Number of Groups	**6,615**		**2,324**		**4,701**	

Note: Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

From the table above, we find a negative impact of maternal education on children's life satisfaction for coupled mothers (Model 1 and 3). One would

expect that having an educated mother would make a child happier, for example you would expect them to have more nutritional knowledge which according to Gibson et al. (1998) improves children's fruit intake (an important health behaviour), and according to Fararouei et al. (2013) adoption of a health behaviour does not only make adolescents healthier but happier. A possible explanation could be that highly educated mothers are more likely to be employed full-time which could reduce the time they spend with their children because Fararouei et al., (2013) acknowledges that having time with family makes adolescents happier.

Results also indicate that children of highly educated single mothers are happier than those whose mothers have low levels of education. This can be explained by their potential for economic progress. Single mothers with higher education qualifications are more likely to have better economic progress (Zhan & Pandey, 2004) which may improve their children's wellbeing as well as happiness. The impact of mothers' education on children's happiness may perhaps be overtaken by the impact of fathers' education on children's happiness. They both show negative coefficients in a model for couples yet in the model for single mothers, there are positive coefficients. This requires further investigation which we do not focus on in this study.

In addition, we find a negative coefficient on maternal employment and significant at 1 percent level. This implies that maternal employment can reduce children's happiness in terms of life satisfaction irrespective of whether a mother is single or coupled. Although the availability of parents may not necessarily have positive effects on children outcomes (Hsin and Felfe, 2014), we argue that mothers who work may have limited time with their children, to support them emotionally, engage them in pro-active events that would make them happier. This reasoning is in line with literature (Holder and Klassen, 2010) which finds that children who are more social, active and less shy, emotional and anxious are happier. We further investigate mother's job characteristics such as a mother being in full-time employment or the type of job she does. Results show that children of mothers in routine jobs are less likely to be happy compared to those of mothers in professional jobs. This can be attributed to different reasons; first,

literature shows that mothers in routine jobs are usually with lower levels of education qualifications (Holmes, 2011; Marcolin et al., 2010) and this keeps them in low paying jobs and as a result they are less satisfied with their lives. Mother's life satisfaction can spill over to their children (Mauno et al., 2017), which implies that if a mother is not satisfied with her job may be because of a lower pay (routine jobs) the frustration is likely to impact her children's happiness.

In terms of full-time employment, results indicate that this is negatively related to children's life satisfaction and as a result yield to them lower levels of happiness compared to when a mother is in part-time employment. The negative impact could be related to not having enough time with parents, although Hsin and Felfe, (2014) find that some parents trade quantity with quality time with their children. Our finding is however in line with literature (Mendolia, 2014) which finds that maternal full-time employment during adolescence is harmful to a child's psychological well-being.

In line with existing literature, (Csikszentmihalyi and Hunter, 2003; 2014) which shows that happiness reduces with age, we find that young children are happier with their life compared to older children perhaps because as people grow older they are exposed to more challenges in life and with children, childcare may diminish as they grow older which may affect their mental health which according to Park, (2004) reduces happiness. A study on happiness in transition by Namazie and Sanfey (2001) also finds a negative relationship between age and life satisfaction. Meanwhile, Park and Peterson (2006) find modest effects of birth order on children's happiness. They find that youngest children were happier than oldest children-the difference however is that their data was based on parental descriptions unlike in our case of child self-rated questionnaires. The message is that young children are happier than older children which may arise because they are able to make quicker adjustments to new environments or situations.

In case of fathers, we find that their employment is positively related to children's life satisfaction and so do their education qualifications. This is supported by the argument that economic provision is one feature of fatherhood that is probably viewed as central by most if not all the defining stakeholders (Lamb, 2000). Therefore, children will be happier if their father is working and is able to support the family than when he is not working. In terms of education, the more educated the father is the more likely to be in employment which boosts children's wellbeing and happiness.

We now turn to another set of results. Table 4.7 below presents estimated results for our second measure of satisfaction (family satisfaction). We find that similar results hold when we change the measure of satisfaction to family satisfaction. Like in the case of life satisfaction, we still find a negative relationship between children's family satisfaction and maternal employment, but the coefficient is now smaller. A mother being in a routine job or in full-time employment is also negatively related to family satisfaction or happiness.

Table 4. 7: Results from a Fixed Effects model showing the impact of maternal employment on children's family satisfaction

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.17*	(0.07)	0.04	(0.09)	-0.22**	(0.06)
A, AS and Higher Grade (=1)	-0.17**	(0.06)	0.40	(0.28)	-0.26**	(0.05)
Gcse/O, CSE, O-Grade (=1)	-0.41**	(0.07)	0.25	(0.35)	-0.30**	(0.09)
Current age	-0.01	(0.04)	-0.05	(0.04)	-0.08	(0.05)
Employed (=1)	-0.04*	(0.02)	-0.03	(0.03)		
Job category (Ref: Professional job)						
Routine (=1)					-0.17**	(0.04)
Intermediate (=1)					-0.05*	(0.02)
Full-time (=1)					-0.10**	(0.03)
Ethnicity (White=1**)**						
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.30*	(0.13)	0.33	(0.67)	0.41**	(0.11)
Age11 (=1)	0.29**	(0.10)	0.26	(0.54)	0.36**	(0.08)
Age12 (=1)	0.20**	(0.08)	0.17	(0.38)	0.28**	(0.06)
Age13 (=1)	0.11+	(0.06)	-0.00	(0.28)	0.14**	(0.04)
Age14 (=1)	0.02	(0.03)	-0.08	(0.15)	0.04	(0.02)
Gender (male=1)						
No. of children in a household	-0.02+	(0.01)	-0.10+	(0.06)	0.03	(0.03)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.08**	(0.03)			-0.09**	(0.04)
A, AS and Higher Grade (=1)	-0.08	(0.07)			-0.02	(0.15)
Gcse/O, CSE, O-Grade (=1)	0.07**	(0.02)			0.06	(0.05)
Missing education record (=1)	0.07**	(0.02)			-0.01	(0.05)
Employed (=1)	0.04*	(0.02)			-0.01	(0.03)
Household Income	0.07**	(0.02)	0.04*	(0.02)	0.02**	(0.01)
Constant	5.63**	(0.28)	6.42**	(0.58)	6.18**	(0.35)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Hausman test: F	21.44		58.37		51.67	
Prob>F	0.00		0.00		0.00	
Observations	**15,029**		**4,783**		**10,255**	
Number of groups	**6,615**		**2,324**		**4,701**	

Note: Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

What we find that is different from previous results is that the coefficient on the number of children in the household is now statistically significant but still negative. This shows a negative relationship between the number of children in a household and a child's family satisfaction. The possible reason being, given that time is a constrained resource in household consumption or production, an increase in the number of children reduces the individual time a child has, to interact with his or her parents and could also reduce his/her share from other resource such as food. This reduces a child's happiness. Our finding is also supported by literature (Powdthavee, 2008) which finds that conditional on household size, the number of children in a household is strongly negatively associated with self-reported life satisfaction. The story may however be different for satisfaction in adults, Angeles (2010) finds that for married people (unlike the unmarried), having children at home increases life satisfaction.

The last part of our main results is the estimation that shows the impact of maternal employment on a child's friend satisfaction. This is shown in Table 4.8 below;

Table 4. 8: Results from a Fixed Effects model showing the impact of maternal employment on children's friend satisfaction

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	0.04	(0.10)	0.33**	(0.09)	-0.00	(0.09)
3A, AS and Higher Grade (=1)	-0.18	(0.16)	0.69**	(0.10)	-0.36**	(0.14)
Gcse/O, CSE, O-Grade (=1)	-0.40**	(0.15)	-0.12	(0.33)	-0.48**	(0.15)
Current age	-0.13+	(0.08)	0.56**	(0.05)	-0.13*	(0.05)
Employed (=1)	0.04*	(0.02)	-0.01	(0.03)		
Job category (Ref: Professional job)						
Routine (=1)					-0.11**	(0.04)
Intermediate (=1)					0.01	(0.06)
Full-time (=1)					-0.04**	(0.01)
Ethnicity (White=1**)**						
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	-0.02	(0.10)	0.27	(0.18)	0.13	(0.15)
Age11 (=1)	0.01	(0.09)	0.24	(0.15)	0.11	(0.13)
Age12 (=1)	0.02	(0.07)	0.23*	(0.10)	0.12	(0.10)
Age13 (=1)	0.04	(0.04)	0.15*	(0.08)	0.10+	(0.06)
Age14 (=1)	0.04	(0.03)	0.07	(0.06)	0.05	(0.04)
Gender (male=1)						
No. of children in a household	0.05**	(0.01)	-0.13**	(0.02)	0.08*	(0.04)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.23**	(0.05)			-0.16**	(0.04)
A, AS and Higher Grade (=1)	0.11	(0.08)			0.38**	(0.06)
Gcse/O, CSE, O-Grade (=1)	-0.03	(0.05)			-0.10	(0.06)
Missing education record (=1)	0.14**	(0.02)			0.21**	(0.05)
Employed (=1)	0.17**	(0.02)			0.22**	(0.04)
Household Income	-0.00	(0.03)	-0.01	(0.02)	-0.03	(0.05)
Constant	6.97**	(0.27)	2.05**	(0.47)	7.06**	(0.29)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Hausman test: F	32.30		56.25		15.13	
Prob> F	0.00		0.00		0.00	
Observations	**15,029**		**4,783**		**10,255**	
Number of groups	**6,615**		**2,324**		**4,701**	

Note: Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

From the table of results above, apart from maternal employment, we find that results on other variables still hold when we change the measure of satisfaction to friend. In terms of maternal employment, results indicate that children of

mothers in employment are more likely to be happy with their friends compared to those whose mothers are not in employment. There are various reasons that we can attribute to this finding. First, a mother being away for work may enable the child to engage in free play without any restriction from a parent, they can have a chance to do extra-ordinary things which makes children happy according to the literature (see, Boye, 2018). In addition, because a mother going to work implies seeking childcare especially if the father works to, it is the opportunity for children to meet their friends and according to literature (Holder and Klassen, 2010) interactions with friends increase happiness.

We make further analysis by considering the full sample of children. This combines both children of coupled mothers and children of single mothers in one regression. One of the tables of results considers maternal employment as the key independent variable (see Appendix Table 4.15), while the other one (Table 4.16) considers maternal employment types (such as Routine, full-time jobs) as key variables. Using Table 4.15 in appendix, we can see that even with a full sample maternal employment is negatively related to children's happiness in form of general life and family satisfaction but positively to friend satisfaction. In addition, Table 4.16 also shows that children of mothers in routine and full-time jobs are more vulnerable to being less happy compared to their counterparts in professional and part-time jobs respectively. These results match those of sub-samples discussed above.

We also rerun regressions for life, family and friend satisfaction but for each of these, we include other dimensions as control variables (see tables 4.17, 4.18 and 4.19 in appendix). Results indicate that the coefficient on maternal employment is still negative and statistically significant for life and family satisfaction and positive and statistically significant for friend satisfaction. However, coefficients on routine work and full-time employment remain statistically significant for only family satisfaction. In addition, we consider results for the other 3 dimensions[34] of how children feel about; the school they go to, their schoolwork and their appearance. Results for the school the child goes to match our earlier

[34] Results are not presented in the thesis but are available on request.

results of negative coefficients on maternal employment, routine jobs and full-time employment and are statistically significant (except for full-time employment). On the other hand, although the coefficients on job type (routine jobs, full-time employment) in the model for children's schoolwork are still negative and statistically significant, the coefficient on maternal employment is now positive and statistically significant. This implies that maternal employment makes children happier with their schoolwork. This could be explained by the academic support children of employed mothers are likely to receive through private tuition as their mothers can afford to pay. Results from children's appearance match with signs on coefficients of maternal employment and routine jobs but not on full-time employment, however, none of the coefficients is statistically significant.

In general, although maternal employment has a negative impact on a child's happiness in terms of family and general life (as well as school satisfaction), we also find that it has a positive impact on happiness in terms of friend satisfaction (and schoolwork satisfaction). This analysis of a child's happiness with different dimensions unveils a key aspect which cannot be identified when we only focus on the general life satisfaction measure for happiness as used in the existing literature (Knies, 2017; Powdthavee and Vernoit, 2013). It is possible that the positive and negative effects counter each other when we use the general measure which could limit us from revealing the accurate effect on a child's happiness. Each of these findings deserve unique attention and can guide on policy implications.

4.5 Sensitivity Analysis

Although we use linear regression models in our earlier analysis for simplicity or easy interpretations, we do agree that our dependent variable(s) are non-interval and ordinal in nature. In which case a pooled ordered logit model would be appropriate because, although we may know that one child is happier than the other, we cannot tell by how much when we look at the categories from the score of 1 to 7. For robustness of our results, we verify if our results from the linear regression do not differ significantly from those of an ordered logit model. In other words, we support the assertion by Clark et al., (2010) and Ferrer-i-Carbonell and Frijters, (2004) that assuming ordinality or cardinality of happiness or well-being scores either produces similar results or makes little difference in results.

Formulating the Ordered Logistic model:

We assume that Ch_i^* captures how a child i feels about: life as a whole, family or friends (or any other dimension of satisfaction). This is influenced by maternal employment, or the category of employment (whether full-time or not, in a professional job or not) and several other covariates besides the unobservable factors captured in the error term ε_i . We can represent this in the following pooled model:

$$\mathrm{Ch}_{it}^* = \alpha + \gamma \mathrm{Employment/category}_{it} + \mathrm{x}_{it}'\beta + \mathrm{T}_t + \varepsilon_{it} \quad i = 1, \dots \mathrm{N} \quad \mathrm{t} = 1, \dots \mathrm{T}' \qquad (2)$$

Where Ch_{it}^* is the happiness reported by a child i at time t (where, $\mathrm{T}' = 6$) that we cannot observe, γ is our coefficient of interest for maternal employment or job category (routine, intermediate or professional job; full-time or part-time job), x captures the vector of covariates (including regional dummies) in form of children, parents and household characteristics. β represents the corresponding vector of coefficients while T_t represents year or wave dummies and ε_{it} is the error term. We can only observe child $i's$ happiness at time t if Ch_{it}^* crosses a specific threshold α_j $(j = 1, 2, 3 \dots 7)$ into another category as shown below;

$$\mathrm{Ch}_{it} = j \quad if \ \alpha_{j-1} < \mathrm{Ch}_{it}^* \leq \alpha_j$$

Assuming that all explanatory variables including the time dummies are represented by vector ψ, and θ represents the corresponding vector of

coefficients, we estimate the probability that child i's happiness falls in category j as:

$$\mathrm{P}_{ij} = \mathrm{P}(\mathrm{Ch}_{ij} = \mathrm{Ch}) = \mathrm{P}(\alpha_{j-1} < \mathrm{Ch}^{*}_{it} \leq \alpha_j) = \mathrm{F}(\alpha_j - \psi'_{it}\theta) - \mathrm{F}(\alpha_{j-1} - \psi'_{it}\theta).$$

The ordered logit model is therefore of the form;

$$\ln\left(\frac{\mathrm{P}_j}{1-\mathrm{P}_j}\right) = \alpha_j + \psi'_{it}\theta \qquad (3)$$

Where P_j is the probability for outcome j and α_j is the intercept for each outcome j. Table 4.9 below show the estimated logit coefficients from the ordered logit model, equation (3) shown above. Coefficients represent the completely happy alternative (j=7).

Results indicate negative coefficients for maternal employment under family and general life satisfaction, and a positive coefficient under friend satisfaction. However, the coefficient for family satisfaction is the only significant one an indication of parental pressure causing relative unhappiness Literature shows that children who spend more time with their parents are happier (Gudmundsdottir et al., 2016).The signs match our earlier results that children of employed mothers are less likely to be happy in terms of both family and general life satisfaction compared to their counterparts whose mothers are not in employment. Although insignificant, the positive coefficient under friend satisfaction is consistent with the result that children of employed mothers are more likely to be happy in terms of friend satisfaction compared to their counterparts whose mothers are not in employment. In addition, coefficients on the type of work (full-time, routine jobs) under both general life satisfaction and family are negative and three of them statistically significant which matches our earlier results that children of mothers in routine jobs (likely to be lower paid), and in full-time employment are less happy. In general, results from the ordered logit model match our results from Fixed Effects estimation.

Table 4. 9: Ordered Logit Estimation (Coefficients) showing the impact of maternal employment of children's happiness

VARIABLES	Life Satisfaction			Family Satisfaction			Friend Satisfaction		
	Model2	Model3	Model1	Model2	Model3	Model1	Model2	Model3	Model1
Mother's Characteristics									
Education level (Ref. Low)									
Diploma and above (=1)	-0.09	-0.04	-0.14+	-0.29**	-0.16	-0.19*	-0.16**	0.02	-0.18*
	(0.06)	(0.09)	(0.08)	(0.07)	(0.10)	(0.09)	(0.06)	(0.09)	(0.07)
A, AS and Higher Grade (=1)	-0.21**	0.14	-0.25*	-0.29**	-0.08	-0.21+	-0.20*	0.18	-0.16+
	(0.08)	(0.14)	(0.10)	(0.09)	(0.16)	(0.12)	(0.08)	(0.14)	(0.10)
Gcse/O, CSE, O-Grade (=1)	0.02	-0.23*	-0.07	-0.07	-0.17	0.01	-0.08	-0.03	-0.08
	(0.06)	(0.09)	(0.08)	(0.07)	(0.10)	(0.09)	(0.06)	(0.09)	(0.07)
Current age	0.02	0.01	-0.02	-0.03	-0.05	-0.05+	-0.02	0.03	-0.05*
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)
Employed (=1)	-0.07	0.03		-0.19**	0.11		0.07	0.10	
	(0.05)	(0.08)		(0.06)	(0.09)		(0.05)	(0.08)	
Job category (Ref: Prof. job)									
Routine (=1)			-0.18**			-0.06			-0.04
			(0.06)			(0.08)			(0.06)
Intermediate (=1)			0.00			0.04			-0.02
			(0.06)			(0.07)			(0.06)
Full-time (=1)			-0.12*			-0.12*			0.03
			(0.05)			(0.05)			(0.05)
Ethnicity (White=1**)**	-0.16**	-0.05	-0.11	-0.03	-0.19+	0.03	-0.08	-0.02	-0.10
	(0.06)	(0.09)	(0.08)	(0.07)	(0.10)	(0.09)	(0.06)	(0.09)	(0.07)
Children's characteristics									
Child's age (ref. 15)									
Age10	0.69**	0.79**	0.70**	1.44**	1.52**	1.46**	0.46**	0.58**	0.47**
	(0.06)	(0.11)	(0.07)	(0.07)	(0.12)	(0.08)	(0.06)	(0.11)	(0.07)
Age11	0.63**	0.71**	0.60**	1.14**	1.20**	1.13**	0.39**	0.42**	0.38**
	(0.05)	(0.09)	(0.07)	(0.06)	(0.10)	(0.07)	(0.06)	(0.10)	(0.07)
Age12	0.44**	0.49**	0.48**	0.76**	0.78**	0.80**	0.29**	0.50**	0.32**
	(0.05)	(0.09)	(0.06)	(0.06)	(0.10)	(0.07)	(0.05)	(0.10)	(0.07)
Age13	0.24**	0.13	0.26**	0.36**	0.35**	0.38**	0.21**	0.19*	0.23**
	(0.05)	(0.08)	(0.06)	(0.05)	(0.09)	(0.06)	(0.05)	(0.09)	(0.06)
Age14	0.06	0.06	0.12*	0.12*	0.06	0.10+	0.11*	0.09	0.07
	(0.04)	(0.08)	(0.05)	(0.05)	(0.08)	(0.05)	(0.05)	(0.09)	(0.06)

Table continues to the next page

Table 4.9 Continued

	Life Satisfaction			Family Satisfaction			Friend Satisfaction		
VARIABLES	Model2	Model3	Model1	Model2	Model3	Model1	Model2	Model3	Model1
Gender (Male=1)	0.15**	0.34**	0.18**	-0.05	0.10	-0.07	-0.04	0.01	-0.00
	(0.04)	(0.07)	(0.05)	(0.05)	(0.08)	(0.06)	(0.04)	(0.07)	(0.05)
No. of children in a household	-0.05**	0.03	-0.16**	-0.09**	0.05	-0.22**	0.03+	0.08*	-0.05+
	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)	(0.03)	(0.02)	(0.03)	(0.03)
Father's Characteristics									
Education level (Ref. Low)									
Diploma and above (=1)	0.08		0.05	-0.02		-0.03	-0.06		-0.04
	(0.06)		(0.07)	(0.07)		(0.08)	(0.06)		(0.07)
A, AS and Higher Grade (=1)	0.20*		0.17+	0.13		0.05	0.07		0.03
	(0.08)		(0.10)	(0.09)		(0.11)	(0.08)		(0.09)
Gcse/O, CSE, O-Grade (=1)	0.12*		0.11	0.06		0.03	0.04		0.08
	(0.06)		(0.07)	(0.07)		(0.08)	(0.06)		(0.07)
Missing education record (=1)	0.14+		0.10	-0.01		0.06	0.10		0.15
	(0.08)		(0.12)	(0.09)		(0.13)	(0.08)		(0.12)
Employed (=1)	0.21**		0.24*	0.06		0.17	0.04		0.05
	(0.07)		(0.10)	(0.07)		(0.11)	(0.06)		(0.10)
Household Income	0.03	-0.05	0.07	0.04	-0.14	0.03	0.04	-0.11	0.03
	(0.04)	(0.09)	(0.06)	(0.05)	(0.09)	(0.07)	(0.04)	(0.08)	(0.06)
Constant cut1	-4.48**	-4.86**	-5.01**	-5.53**	-6.40**	-6.12**	-5.29**	-5.41**	-6.04**
	(0.38)	(0.67)	(0.56)	(0.43)	(0.73)	(0.62)	(0.38)	(0.68)	(0.54)
Constant cut2	-3.49**	-3.92**	-3.94**	-4.59**	-5.44**	-4.95**	-4.49**	-4.72**	-5.10**
	(0.37)	(0.67)	(0.54)	(0.42)	(0.71)	(0.60)	(0.36)	(0.66)	(0.52)
Constant cut3	-2.65**	-3.00**	-3.05**	-3.77**	-4.38**	-4.02**	-3.69**	-3.80**	-4.30**
	(0.37)	(0.66)	(0.53)	(0.41)	(0.70)	(0.60)	(0.36)	(0.65)	(0.51)
Constant cut4	-1.49**	-1.86**	-1.87**	-2.78**	-3.43**	-3.01**	-2.73**	-2.89**	-3.33**
	(0.36)	(0.66)	(0.53)	(0.41)	(0.70)	(0.59)	(0.36)	(0.64)	(0.51)
Constant cut5	-0.28	-0.71	-0.61	-1.78**	-2.47**	-2.01**	-1.58**	-1.78**	-2.17**
	(0.36)	(0.66)	(0.53)	(0.41)	(0.70)	(0.59)	(0.35)	(0.64)	(0.51)
Constant cut6	1.32**	0.73	1.07*	-0.44	-1.26+	-0.62	0.04	-0.25	-0.51
	(0.36)	(0.66)	(0.53)	(0.41)	(0.70)	(0.59)	(0.36)	(0.64)	(0.51)
Observations	**15,029**	**4,783**	**10,255**	**15,029**	**4,783**	**10,255**	**15,029**	**4,783**	**10,255**

Note: Year and Regional dummies were included, Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

4.6 Conclusion

The current study explores the impact of maternal employment on children's happiness. We use a nationally representative sample from the British Household Survey- "Understanding Society" data set, to investigate this impact. We specifically focus on whether a mother is employed or not, whether in full-time employment or part-time and whether the mother is employed in routine jobs vs intermediate and professional jobs.

Findings indicate that although children of employed mothers are less happy in terms of general life satisfaction and family satisfaction, they are happier in terms of friend satisfaction compared to their counterparts whose mothers are out of the labour force. Furthermore, the effect of mother's employment on general life satisfaction is small – it does not make the children unhappy as such, just possible less happy. This finding underscores the use of different measures of happiness to understand better the dynamics of a child's happiness. Using a single measure would conceal this detail which requires specific attention. In addition, we find that children of mothers in routine and full-time jobs are less likely to be happy (across all domains) compared to children of mothers in professional and part-time jobs respectively, possibly because routine jobs are associated with lower pay. The overall implication is that the impact of maternal employment on a child's general happiness may be mitigated by the combination of (slight) negative effects on family, school satisfaction and positive impact on friend and schoolwork satisfaction. This could explain why literature that uses the general measure of satisfaction as a measure of happiness often finds no significant impact of maternal employment on children's well-being. We also find that, in line with literature, being in full-time employment has a slight negative impact on children's happiness.

Appendix

Table 4. 10: Detailed description of variables

Dependent Variables	**Description**
Happiness-1. Feel about life as a whole (yphlf) 2. Feel about family (yphfm), 3. Feel about friends (yphfr)	The original variables (yphlf, yphfm, yphfr) are measured on a 7-point-scale (1-7) with 1=completely happy and 7=completely unhappy. We now reverse this to have 1=completely unhappy and 7=completely happy and then reduce it to a 3-point scale instead of 7 (only for ordered logit models). 1=Not as happy, 2=averagely happy and 3= Very happy. However, results remain the same in both cases.
Independent Variables	
Number of Children in a household	Number of children in the household including biological and adopted children
Log-Household income	Total household net income-no deductions in 2014 prices
Child's age (dvage)	Child's age and ranges between 10-15-year-old
Child's gender (male=1)	Please tick whether you are male or female. Male =1 Female=0
Parent's Education (qfhigh_dv)	Can you tell me the highest educational or school qualification you have obtained? 1. University Higher degree (e.g. MSc, PhD), 2. First degree level qualification, including foundation degrees, graduate membership of a professional Institute, PGCE 3. Diploma in high education 4. Teaching qualification (excluding PDCE) 5. Nursing or other Medical qualification 6. Other higher degree 7. A level 8. Welsh Baccalaureate 9. International Baccalaureate 10. AS level 11. Higher grade/advanced higher (Scotland) 12. Certificate of sixth year studies 13. GCSE/O level 14. CSE 15. Standard/Ordinary (O) Grade/Lower (Scotland) 16. Other school (Inc. school leaving exam certificate or matriculation) 96. None of the above
Diploma/Degree and other high qualifications (=1)	Parent has a diploma/ a degree or other higher qualifications-yes=1 if qualification is 1-6, 0= Otherwise
A, AS levels and Highers (=1)	Parent has A levels AS or Highers-yes=1 if qualification is 7-12, 0= Otherwise
GCSE/O levels and other lower qualifications (=1)	Parent has GCSE/O levels or lower qualification-yes=1 if qualification is 13, Otherwise=0
Lower educational qualifications (=1)	No qualification-Yes=1 if qualification is 14-16 or 96, Otherwise=0
Mother's age (dvage)	The age of the respondent at last birthday-derived from the exact date of birth and the date of the interview. Where the date of birth information is missing the estimated age is used. Respondent's age ranges from 16 and about.
Single parent (single_dv=1)	Parent is single in a household

Table 4.10 Continued

Ethnic group (white=1)	White =British/English/Scottish/Welsh/Northern Irish/ Irish, 0=Asians, Mixed or Black
Parent's employment status (jbstat)	Which of these, best describes your current employment situation? 1. Self-employed 2. In paid employment (full or part-time) 3. Unemployed 4. Retired 5. On maternity leave 6. looking after family or home 7. Full-time student 8. Long-term sick or disabled 9. On gov't training scheme 10. Unpaid work in family business 97. doing something else
In employment (yes=1)	Parent in employment (self-employed, in paid employment, employed by family)-yes=1, 0=in other categories
Routine jobs (=1)	Routine jobs include; lower supervisory, lower technical craft and lower technical process operative occupations, semi-routine sales, semi-routine services, semi-routine clerical, semi-routine childcare, semi-routine agricultural, semi-routine technical and semi-routine operative operations, Routine sales and services, production, technical operative and agricultural operations. Yes=1 if any of the above applies
Intermediate jobs (=1)	Intermediate jobs include; intermediate clerical and administration, intermediate sales and services occupations, intermediate technical and auxilially occupations, intermediate engineering occupations, employers of small establishments (excluding agriculture), employers of small establishments (including agriculture), own account workers non-professional and own account workers in agriculture. Yes=1 if any of the above applies
Professional jobs (=1)	Professional jobs include; employers in large establishments, higher managerial and administrative occupations, higher professional "traditional" occupations, higher professional "new" employee occupations, higher professional "new" self-employed occupations, lower professional/higher technical traditional, lower professional/higher technical new employee or new self-employed, lower managerial and administrative occupations. Yes=1 if any of the above applies
In full-time employment (yes=1)	Parent in full-time employment (self or paid employment)-yes=1 0=full-time or other categories

Table 4. 11: Descriptive statistics determinants of children's happiness by employment status of the mother (Coupled mothers)

	Employed Mother		Mother Not Employed		Ttest
Dependent variable	**Code**	**%**	**Code**	**%**	**Pval**
Variable	**Mean**	**SD**	**Mean**	**SD**	**Pval**
Mother's Characteristics					
Education (Ref: low educ)					
Diploma and above	0.47	0.50	0.22	0.42	0.00
A, AS and Higher Grade (=1)	0.09	0.29	0.09	0.29	0.59
GCSE/O, CSE, O-Grade (=1)	0.25	0.43	0.29	0.45	0.00
Lower educational qualifications	0.19	0.39	0.39	0.49	0.00
Mother's Ethnicity	0.85	0.36	0.60	0.49	0.00
Mother's age	42.33	5.46	40.22	6.11	0.00
Child's Characteristics					
Satisfaction					
Life Satisfaction	5.95	1.09	5.94	1.18	0.36
Family Satisfaction	6.40	0.98	6.47	0.99	0.00
Friend Satisfaction	6.34	0.95	6.33	1.00	0.39
Number of Children in a household	2.38	0.90	3.23	1.46	0.00
Age10 (Ref: Age15)	0.16	0.36	0.17	0.38	0.02
Age11	0.17	0.37	0.18	0.38	0.15
Age12	0.17	0.37	0.17	0.38	0.21
Age13	0.18	0.38	0.17	0.37	0.11
Age14	0.17	0.37	0.16	0.37	0.28
Age15	0.17	0.37	0.15	0.36	0.02
Child's gender (male=1)	0.50	0.50	0.51	0.50	0.05
Father's Characteristics					
Education (Ref: low educ)					
Diploma and above	0.35	0.48	0.26	0.44	0.00
A, AS and Higher Grade (=1)	0.08	0.27	0.07	0.26	0.16
GCSE/O, CSE, O-Grade (=1)	0.23	0.42	0.20	0.40	0.00
Lower qualifications	0.21	0.41	0.36	0.48	0.00
Missing father's Education	0.11	0.32	0.13	0.33	0.02
Father Employed	0.83	0.38	0.65	0.48	0.00
Household income	5298	2808	3510	2195	0.00
Number of observations	**10,304**		**4,783**		

Table 4. 12: Pooled OLS results showing the impact of maternal employment on children's general life satisfaction

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.04*	(0.02)	0.02	(0.06)	-0.06	(0.05)
A, AS and Higher Grade (=1)	-0.11**	(0.04)	0.07	(0.06)	-0.14**	(0.04)
Gcse/O, CSE, O-Grade (=1)	0.01	(0.03)	-0.11*	(0.05)	-0.02	(0.05)
Current age	0.05**	(0.01)	0.01	(0.02)	-0.00	(0.01)
Employed (=1)	-0.02	(0.02)	0.04+	(0.02)		
Job category (Ref: Professional job)						
Routine (=1)					-0.09**	(0.03)
Intermediate (=1)					0.03	(0.02)
Full-time (=1)					-0.07**	(0.02)
Ethnicity (White=1**)**	-0.09**	(0.03)	-0.03+	(0.02)	-0.05**	(0.01)
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.36**	(0.05)	0.42**	(0.03)	0.38**	(0.05)
Age11 (=1)	0.34**	(0.06)	0.44**	(0.07)	0.32**	(0.05)
Age12 (=1)	0.26**	(0.03)	0.29**	(0.04)	0.28**	(0.02)
Age13 (=1)	0.15**	(0.03)	0.09	(0.07)	0.16**	(0.02)
Age14 (=1)	0.04**	(0.01)	0.04	(0.07)	0.08**	(0.00)
Gender (Male=1)	0.09**	(0.02)	0.24**	(0.08)	0.10**	(0.03)
No. of children in a household	-0.03**	(0.00)	0.02	(0.01)	-0.09**	(0.01)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	0.08**	(0.02)			0.06*	(0.02)
A, AS and Higher Grade (=1)	0.15*	(0.06)			0.15*	(0.06)
Gcse/O, CSE, O-Grade (=1)	0.10**	(0.02)			0.10**	(0.02)
Missing education record (=1)	0.11**	(0.01)			0.07+	(0.04)
Employed (=1)	0.14**	(0.03)			0.15**	(0.02)
Household Income	0.02	(0.02)	-0.01	(0.02)	0.05*	(0.02)
Constant	5.32**	(0.21)	5.56**	(0.21)	5.37**	(0.17)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Observations	**15,029**		**4,783**		**10,255**	
Number of Groups	**6,615**		**2,324**		**4,701**	

Note: Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

Table 4. 13: Pooled OLS results showing the impact of maternal employment on children's family satisfaction

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.10**	(0.01)	-0.09	(0.06)	-0.06+	(0.03)
A, AS and Higher Grade (=1)	-0.09**	(0.01)	-0.06*	(0.02)	-0.07**	(0.03)
Gcse/O, CSE, O-Grade (=1)	-0.02	(0.04)	-0.06*	(0.03)	0.02	(0.05)
Current age	-0.02	(0.02)	-0.04+	(0.02)	-0.04**	(0.01)
Employed (=1)	-0.08**	(0.01)	0.06**	(0.02)		
Job category (Ref: Professional job)						
Routine (=1)					-0.05	(0.03)
Intermediate (=1)					0.00	(0.01)
Full-time (=1)					-0.06**	(0.01)
Ethnicity (White=1**)**	-0.01	(0.01)	-0.07**	(0.02)	0.02	(0.03)
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.53**	(0.03)	0.71**	(0.02)	0.55**	(0.03)
Age11 (=1)	0.46**	(0.03)	0.57**	(0.02)	0.46**	(0.02)
Age12 (=1)	0.33**	(0.03)	0.41**	(0.05)	0.35**	(0.02)
Age13 (=1)	0.16**	(0.03)	0.19**	(0.01)	0.18**	(0.02)
Age14 (=1)	0.05**	(0.02)	0.00	(0.03)	0.05**	(0.01)
Gender (Male=1)	-0.02	(0.01)	0.06*	(0.03)	-0.02**	(0.01)
No. of children in a household	-0.05**	(0.00)	0.02+	(0.01)	-0.11**	(0.01)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.00	(0.01)			0.01	(0.01)
A, AS and Higher Grade (=1)	0.08**	(0.02)			0.07**	(0.01)
Gcse/O, CSE, O-Grade (=1)	0.04**	(0.02)			0.04*	(0.01)
Missing education record (=1)	0.01	(0.02)			0.03	(0.06)
Employed (=1)	0.04	(0.03)			0.07**	(0.02)
Household Income	0.03	(0.02)	-0.05+	(0.03)	0.03	(0.03)
Constant	6.17**	(0.17)	6.50**	(0.15)	6.28**	(0.25)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Observations	**15,029**		**4,783**		**10,255**	
Number of Groups	**6,615**		**2,324**		**4,701**	

Note: Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

Table 4. 14: Pooled OLS results showing the impact of maternal employment on children's friend satisfaction

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.06**	(0.02)	0.00	(0.06)	-0.07**	(0.02)
A, AS and Higher Grade (=1)	-0.10**	(0.02)	0.03	(0.03)	-0.08**	(0.03)
Gcse/O, CSE, O-Grade (=1)	-0.03	(0.03)	-0.01	(0.03)	-0.02	(0.04)
Current age	-0.02*	(0.01)	0.02	(0.02)	-0.05**	(0.01)
Employed (=1)	0.04**	(0.01)	0.07*	(0.03)		
Job category (Ref: Professional job)						
Routine (=1)					-0.02*	(0.01)
Intermediate (=1)					-0.01	(0.02)
Full-time (=1)					0.00	(0.01)
Ethnicity (White=1**)**	-0.05**	(0.02)	-0.00	(0.04)	-0.06**	(0.01)
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.17*	(0.07)	0.24**	(0.03)	0.17*	(0.07)
Age11 (=1)	0.15*	(0.06)	0.20**	(0.02)	0.14*	(0.06)
Age12 (=1)	0.13**	(0.05)	0.22**	(0.03)	0.14**	(0.04)
Age13 (=1)	0.09*	(0.04)	0.09*	(0.04)	0.10**	(0.03)
Age14 (=1)	0.05	(0.04)	0.06+	(0.03)	0.04	(0.03)
Gender (Male=1)	0.03	(0.04)	0.03	(0.05)	0.04	(0.04)
No. of children in a household	0.01+	(0.00)	0.03**	(0.01)	-0.03**	(0.00)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.01	(0.02)			-0.01	(0.02)
A, AS and Higher Grade (=1)	0.06+	(0.03)			0.05	(0.06)
Gcse/O, CSE, O-Grade (=1)	0.04+	(0.02)			0.06*	(0.03)
Missing education record (=1)	0.07**	(0.01)			0.11**	(0.03)
Employed (=1)	0.06	(0.04)			0.09**	(0.01)
Household Income	0.02+	(0.01)	-0.03	(0.03)	0.02**	(0.01)
Constant	6.22**	(0.09)	6.20**	(0.16)	6.35**	(0.11)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Observations	**15,029**		**4,783**		**10,255**	
Number of Groups	**6,615**		**2,324**		**4,701**	

Note: Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

Table 4. 15: Results from a Fixed Effects model showing the impact of maternal employment on children's Happiness (full sample)

VARIABLES	Happiness (Satisfaction)		Happiness (Family)		Happiness (Friends)	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.06	(0.06)	-0.12*	(0.05)	0.08	(0.10)
A, AS and Higher Grade (=1)	-0.15	(0.23)	-0.01	(0.13)	0.02	(0.13)
Gcse/O, CSE, O-Grade (=1)	-0.28+	(0.15)	-0.28*	(0.12)	-0.25*	(0.10)
Current age	0.05	(0.05)	-0.01	(0.02)	0.15	(0.13)
Single (=1)	0.02	(0.03)	-0.09**	(0.03)	0.01	(0.03)
Employed (=1)	-0.09**	(0.02)	-0.04**	(0.02)	0.04*	(0.02)
Ethnicity (White=1**)**						
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.09	(0.16)	0.22+	(0.12)	0.09	(0.07)
Age11 (=1)	0.12	(0.13)	0.21*	(0.10)	0.09	(0.07)
Age12 (=1)	0.11	(0.09)	0.14*	(0.07)	0.10*	(0.04)
Age13 (=1)	0.04	(0.07)	0.05	(0.05)	0.08**	(0.03)
Age14 (=1)	-0.01	(0.03)	-0.02	(0.03)	0.05*	(0.03)
Gender (Male=1)						
No. of children in a household	0.00	(0.01)	-0.02+	(0.01)	0.01	(0.01)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	0.18**	(0.02)	0.09+	(0.05)	-0.20**	(0.04)
A, AS and Higher Grade (=1)	0.65**	(0.08)	0.15*	(0.06)	0.24**	(0.06)
Gcse/O, CSE, O-Grade (=1)	0.23**	(0.06)	0.11*	(0.06)	-0.01	(0.04)
Missing education record (=1)	0.13**	(0.03)	0.09**	(0.02)	0.13**	(0.03)
Employed (=1)	0.18**	(0.01)	0.07**	(0.02)	0.18**	(0.01)
Household Income	-0.03+	(0.02)	0.05*	(0.02)	-0.01	(0.03)
Constant	5.50**	(0.48)	5.97**	(0.23)	5.08**	(0.89)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Hausman test: F	27.29		113.92		10.87	
Prob> F	0.00		0.00		0.00	
Observations	**15,029**		**4,783**		**10,255**	
Number of Groups	**6,615**		**2,324**		**4,701**	

Note: Hausman test passed, Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

Table 4. 16. Results from a Fixed Effects model showing the impact of types of maternal employment on children's Happiness (full sample)

VARIABLES	Happiness (Satisfaction)		Happiness (Family)		Happiness (Friends)	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.13	(0.08)	-0.14*	(0.05)	0.05	(0.10)
A, AS and Higher Grade (=1)	-0.05	(0.23)	0.10	(0.10)	-0.24	(0.15)
Gcse/O, CSE, O-Grade (=1)	-0.17	(0.15)	-0.03	(0.13)	-0.30*	(0.12)
Current age	0.01	(0.02)	-0.05	(0.03)	0.15	(0.12)
Single (=1)	0.09*	(0.04)	-0.06	(0.06)	-0.01	(0.04)
Job category (Ref: Professional job)						
Routine (=1)	-0.05	(0.03)	-0.13**	(0.02)	-0.15**	(0.03)
Intermediate (=1)	-0.03	(0.05)	-0.02	(0.03)	0.05	(0.03)
Full-time (=1)	-0.04**	(0.01)	-0.11**	(0.03)	-0.05**	(0.02)
Ethnicity (White=1**)**						
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.02	(0.18)	0.41**	(0.14)	0.01	(0.11)
Age11 (=1)	0.05	(0.14)	0.36**	(0.12)	0.01	(0.10)
Age12 (=1)	0.09	(0.11)	0.26**	(0.08)	0.06	(0.07)
Age13 (=1)	0.01	(0.08)	0.13*	(0.06)	0.04	(0.05)
Age14 (=1)	0.01	(0.04)	0.02	(0.03)	0.02	(0.04)
Gender (Male=1)						
No. of children in a household	-0.08*	(0.03)	-0.00	(0.02)	0.07*	(0.03)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	0.18**	(0.02)	0.11	(0.07)	-0.14**	(0.04)
A, AS and Higher Grade (=1)	0.72**	(0.05)	0.16	(0.12)	0.42**	(0.06)
Gcse/O, CSE, O-Grade (=1)	0.22**	(0.07)	0.12	(0.09)	0.00	(0.05)
Missing education record (=1)	0.03	(0.09)	0.02	(0.04)	0.15**	(0.05)
Employed (=1)	0.09*	(0.04)	0.00	(0.03)	0.18**	(0.04)
Household Income	-0.01	(0.04)	0.03**	(0.01)	-0.01	(0.05)
Constant	5.33**	(0.31)	5.90**	(0.44)	4.89**	(0.73)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Hausman test: F	3.01		63.45		16.96	
Prob> F	0.00		0.00		0.00	
Observations	**13,237**		**13,237**		**13,237**	
Number of Groups	**5,993**		**5,993**		**5,993**	

Note: Hausman test passed, Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

Table 4. 17 Results from a Fixed Effects model showing the impact of maternal employment on children's Life satisfaction (other dimensions included)

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.14	(0.10)	0.04	(0.06)	-0.16	(0.10)
A, AS and Higher Grade (=1)	-0.18+	(0.09)	0.08	(0.20)	-0.05	(0.09)
Gcse/O, CSE, O-Grade (=1)	0.00	(0.12)	-1.24**	(0.37)	-0.03	(0.11)
Current age	0.04	(0.08)	0.04	(0.05)	0.02	(0.08)
Employed (=1)	-0.04*	(0.01)	-0.17**	(0.04)		
Job category (Ref: Professional job)						
Routine (=1)					0.01	(0.04)
Intermediate (=1)					-0.06	(0.04)
Full-time (=1)					-0.01	(0.02)
Ethnicity (White=1**)**						
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.06	(0.14)	-0.24	(0.26)	-0.04	(0.15)
Age11 (=1)	0.05	(0.10)	-0.15	(0.22)	-0.04	(0.12)
Age12 (=1)	0.10	(0.08)	-0.13	(0.17)	0.05	(0.08)
Age13 (=1)	0.08	(0.06)	-0.14	(0.12)	0.04	(0.06)
Age14 (=1)	0.02	(0.02)	-0.07	(0.09)	0.02	(0.02)
Gender (Male=1)						
No. of children in a household	-0.02+	(0.01)	0.02	(0.03)	-0.12**	(0.01)
Satisfaction with;						
Family	0.25**	(0.01)	0.24**	(0.02)	0.24**	(0.01)
Friends	0.13**	(0.01)	0.11**	(0.01)	0.14**	(0.01)
School work	0.10**	(0.01)	0.12**	(0.01)	0.09**	(0.00)
School	0.11**	(0.00)	0.11**	(0.02)	0.11**	(0.00)
Appearance	0.21**	(0.01)	0.19**	(0.04)	0.21**	(0.01)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	0.17**	(0.04)			0.16**	(0.04)
A, AS and Higher Grade (=1)	0.34**	(0.05)			0.36**	(0.05)
Gcse/O, CSE, O-Grade (=1)	0.17**	(0.03)			0.14**	(0.03)
Missing education record (=1)	0.10**	(0.03)			0.01	(0.08)
Employed (=1)	0.11**	(0.02)			0.03	(0.04)
Household Income	-0.06**	(0.02)	0.01	(0.03)	-0.02	(0.05)
Constant	1.07*	(0.45)	1.57**	(0.44)	1.47+	(0.81)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Observations	**14,902**		**4,733**		**10,173**	
Number of Groups	**6,599**		**2,315**		**4,689**	

Note: Hausman test passed, Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

Table 4. 18 Results from a Fixed Effects model showing the impact of maternal employment on children's family satisfaction (other dimensions included)

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.15*	(0.07)	-0.12	(0.10)	-0.15**	(0.05)
A, AS and Higher Grade (=1)	-0.07	(0.07)	0.14	(0.21)	-0.10	(0.07)
Gcse/O, CSE, O-Grade (=1)	-0.27**	(0.10)	0.35	(0.34)	-0.11*	(0.05)
Current age	0.01	(0.05)	-0.19**	(0.05)	-0.04	(0.06)
Employed (=1)	-0.03+	(0.02)	0.03	(0.04)		
Job category (Ref: Professional job)						
Routine (=1)					-0.13**	(0.03)
Intermediate (=1)					-0.02	(0.01)
Full-time (=1)					-0.08**	(0.03)
Ethnicity (White=1**)**						
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	0.20	(0.14)	0.28	(0.63)	0.27**	(0.08)
Age11 (=1)	0.19+	(0.10)	0.17	(0.51)	0.24**	(0.06)
Age12 (=1)	0.12	(0.08)	0.12	(0.37)	0.17**	(0.04)
Age13 (=1)	0.06	(0.06)	0.01	(0.25)	0.08**	(0.03)
Age14 (=1)	0.00	(0.02)	-0.07	(0.14)	0.01	(0.02)
Gender (Male=1)						
No. of children in a household	-0.03*	(0.01)	-0.08*	(0.04)	0.04	(0.03)
Satisfaction with;						
Life	0.22**	(0.00)	0.21**	(0.01)	0.22**	(0.01)
Friends	0.16**	(0.01)	0.16**	(0.01)	0.13**	(0.01)
School work	0.06**	(0.01)	0.04**	(0.01)	0.05**	(0.01)
School	0.04**	(0.00)	0.02*	(0.01)	0.02**	(0.00)
Appearance	0.03**	(0.00)	0.07**	(0.01)	0.03**	(0.01)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.06+	(0.03)			-0.09*	(0.04)
A, AS and Higher Grade (=1)	-0.22**	(0.05)			-0.24+	(0.14)
Gcse/O, CSE, O-Grade (=1)	0.05	(0.04)			0.05	(0.03)
Missing education record (=1)	0.02	(0.01)			-0.04	(0.07)
Employed (=1)	-0.02	(0.02)			-0.07	(0.04)
Household Income	0.07**	(0.02)	0.04**	(0.01)	0.03+	(0.02)
Constant	2.72**	(0.45)	4.51**	(0.42)	3.22**	(0.56)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Observations	**14,902**		**4,733**		**10,173**	
Number of Groups	**6,599**		**2,315**		**4,689**	

Note: Hausman test passed, Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

Table 4. 19: Results from a Fixed Effects model showing the impact of maternal employment on children's friend satisfaction (other dimensions included)

VARIABLES	Model1 Couple		Model2 Single		Model3 Couple	
Mother's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	0.09	(0.06)	0.20+	(0.11)	0.09+	(0.05)
A, AS and Higher Grade (=1)	-0.09	(0.11)	0.49**	(0.09)	-0.19	(0.12)
Gcse/O, CSE, O-Grade (=1)	-0.26*	(0.12)	-0.29	(0.31)	-0.27*	(0.13)
Current age	-0.13*	(0.05)	0.52**	(0.04)	-0.10**	(0.03)
Employed (=1)	0.07**	(0.02)	0.06*	(0.03)		
Job category (Ref: Professional job)						
Routine (=1)					-0.04	(0.03)
Intermediate (=1)					0.04	(0.05)
Full-time (=1)					-0.01	(0.01)
Ethnicity (White=1**)**						
Child's characteristics						
Child's age (ref. 15)						
Age10 (=1)	-0.23+	(0.12)	0.30	(0.20)	-0.16	(0.11)
Age11 (=1)	-0.19	(0.12)	0.23	(0.14)	-0.14	(0.10)
Age12 (=1)	-0.11	(0.08)	0.24*	(0.10)	-0.07	(0.09)
Age13 (=1)	-0.03	(0.05)	0.21**	(0.05)	-0.01	(0.04)
Age14 (=1)	0.02	(0.03)	0.12**	(0.03)	0.02	(0.03)
Gender (Male=1)						
No. of children in a household	0.04**	(0.01)	-0.09**	(0.03)	0.10**	(0.03)
Satisfaction with;						
Life	0.14**	(0.01)	0.11**	(0.01)	0.16**	(0.02)
Family	0.19**	(0.01)	0.18**	(0.01)	0.17**	(0.01)
School work	0.02**	(0.00)	0.02	(0.02)	0.02**	(0.01)
School	0.12**	(0.01)	0.10**	(0.01)	0.13**	(0.01)
Appearance	0.08**	(0.01)	0.05**	(0.01)	0.08**	(0.00)
Father's Characteristics						
Education level (Ref. Low education)						
Diploma and above (=1)	-0.24**	(0.05)			-0.16**	(0.05)
A, AS and Higher Grade (=1)	0.01	(0.05)			0.22**	(0.08)
Gcse/O, CSE, O-Grade (=1)	-0.04	(0.05)			-0.08	(0.07)
Missing education record (=1)	0.11**	(0.02)			0.19**	(0.04)
Employed (=1)	0.12**	(0.01)			0.17**	(0.04)
Household Income	-0.01	(0.03)	-0.02	(0.02)	-0.01	(0.04)
Constant	4.12**	(0.25)	-0.47	(0.53)	3.63**	(0.28)
Year dummies	Yes		Yes		Yes	
Regional dummies	Yes		Yes		Yes	
Observations	**14,902**		**4,733**		**10,173**	
Number of Groups	**6,599**		**2,315**		**4,689**	

Note: Hausman test passed, Robust standard errors in parentheses, ** p<0.01, * p<0.05, + p<0.10

CHAPTER 5

5.1 Conclusion

This thesis includes two essays on maternal employment and child health outcomes in Uganda. The first investigates the impact of maternal employment and social economic status on children's health measured by stunted growth, and below we draw links to the second essay on determinants of mothers' decisions to work and for joining different employment sectors, which also has implications on children's wellbeing. Our findings suggest that children of employed mothers in poor households have a higher probability of being healthier (lower probability of stunted growth) than those of employed mothers in middle-wealth households. However, children of employed mothers in rich households have relatively lower chances of stunted growth compared to those of employed mothers in both poor and middle-wealth households. This finding places children of employed mothers in middle-wealth households more vulnerable compared to those of employed mothers in poor and rich households and it is a key finding.

In the analysis to investigate mothers' decisions to work and to join different types of employment (chapter 3), we find that mothers' age at first birth and the form of marriage they engage in, crucially influences their decisions to work and or join a given form of employment. Specifically, compared to mature mothers, underaged mothers are less likely to work but if they do, are more likely to be employed on a family farm or in family business. Meanwhile compared to those in monogamous marriages, those in polygamous marriages are more likely to be in self-employment but less likely to work on a family farm or in family business.

The third essay addresses a related topic using a rich British data set from "Understanding Society" to investigate the impact of maternal employment and different forms of employment (such as routine, professional or intermediate work, full or part-time work) on different dimensions of a child's happiness. We find that although the relationship between maternal employment and children's happiness as measured by general life, family and schoolwork satisfaction is negative (but positive for friend and schoolwork satisfaction), the impact is slight because in general children report high levels of happiness. The evidence

suggests that the adverse effect of an employed mother on a child's happiness is offset by the higher school and friend happiness, so that there is only a slight (negative) effect on overall life satisfaction or happiness.

Despite these interesting findings we acknowledge the following limitations. The DHS survey data for 2006 and 2011 do not contain adequate information on childcare arrangements at home which makes it difficult to relate childcare with maternal employment. This information would help to support our conclusion about higher rates of stunted growth among children of employed mothers in middle-wealth households compared to those of employed mothers in poor and rich households. In addition, we do not control for mothers' employment type in chapter 2 which would also support our conclusion. Although the Comparative Wealth Index (CWI) gives an absolute measure of economic poverty that is regarded as better than the relative measure (in the original DHS surveys) according to Rutstein and Staveteig (2014), the authors acknowledge that the approach of computing the CWI indirectly includes data on education in the assessment of a point for economic dependency in anchoring scores yet the original purpose of the wealth index was to construct a measure of economic status that is independent of education or health. This could bias the coefficient for mother's education variable in our estimates. The other issue is, because assets give a more stable picture of household economic status than income especially in developing countries (as many people earn seasonal incomes) the DHS wealth index gives a better measure of permanent income than the CWI although it is not comparable across countries and time. The concept of permanent income is difficult to use with CWI since prices of assets (as well as services or amenities) and people's abilities to buy vary across countries and time even after controlling for the purchasing power parity (Rutstein and Staveteig, 2014-pages 37-38). So, the measure of economic status given by CWI is rendered unstable.

Although we investigate mothers' decisions on whether to work and in which sector in order to draw out the links between essays 1 and 2, in essay 2 we do not establish how different forms of maternal employment influence child health given that the unit of analysis was mothers. There is no information on fathers' attributes to include in the essays on Uganda, and only limited information to

include as controls in the third essay on British data (many had missing information on levels of education). This could have affected the robustness of our findings. Another limitation for our analysis in the third essay (chapter 4) is the availability of short runs of the panel data whereby many children in the sample are only observed a few times in the six years and not necessarily in consecutive waves which makes fixed effects estimations quite hard using ordinary methods. Also, because in our main results we do not include other dimensions as independent variables for each of the models (to avoid endogeneity issues), this may have resulted into an omitted variable bias which could lead to either an underestimation or overestimation of the coefficients presented.

The thesis however provides a detailed analysis into the effects of maternal employment on child health (as measured by stunted growth) and children's wellbeing (measured by the different dimensions of children's happiness) as well as investigating determinants for mothers' employment decisions. All these add important strands to the existing literature as earlier identified. In view of the above limitations to the thesis, we recommend directions for future research. In line with the first essay (chapter 2), further research is necessary to incorporate childcare arrangements in the analysis of the impact of maternal employment on child health. In addition, future research is necessary to modify the Comparative Wealth Index such that it can provide a more stable measure of economic status across countries and time in order to maximise the benefits of using an absolute measure of economic status as compared to the relative measure. Adjustments may include, as suggested by Rutstein and Staveteig (2014), using other methods in identifying the baseline survey, using non-linear methods or finding another functional form for computing coefficients used in the calculation of CWI and investigating alternative comparable poverty lines applicable to CWI.

In terms of the second essay, further research is necessary to investigate how mothers' decisions to enter specific forms of employment affect their children's health. Although we partly handle the impact of full-time, routine and intermediate jobs on children's happiness in the third essay, comparing the impact of family work, waged work and self-employment on child health or wellbeing would be interesting. For our main results in chapter 4 (3rd essay), a

further analysis can be made with a methodology that is robust to both omitted variable bias and endogeneity, as well as controlling for the problem of short panels.

In general therefore, although this thesis hypotheses that maternal employment could lead to negative effects on child health (child's growth) and wellbeing (happiness) as discussed in both chapter 2 and 4 respectively, findings show that this does not apply across all income groups as we see that children of employed mothers in poor households are relatively better off compared to their counterparts of employed mothers in middle-wealth households for Uganda. The implications could be that some income groups face special constraints in adjusting to both childcare and maternal employment (such as the middle-wealth mothers). In addition, the negative effect of maternal employment on children's happiness is not high because despite the negative coefficients, on average children report high scores of happiness across all the dimensions. What could be done is for governments to design appropriate policies that can enable mothers cope with both childcare and employment such that both children and mothers can maximise the associated benefits. Specific forms of maternal employment associated with lower child health or wellbeing deserve further investigation.

CHAPTER 6

6.1 Bibliography

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