

Barro, Lamissa; Tiendrebeogo, Aïcha; Nana, Issa; Mawuvi Ky, Landry Paul Armand

## Article

# Maternal education, economic empowerment and infant mortality in Burkina Faso

Economies

## Provided in Cooperation with:

MDPI – Multidisciplinary Digital Publishing Institute, Basel

*Suggested Citation:* Barro, Lamissa; Tiendrebeogo, Aïcha; Nana, Issa; Mawuvi Ky, Landry Paul Armand (2025) : Maternal education, economic empowerment and infant mortality in Burkina Faso, *Economies*, ISSN 2227-7099, MDPI, Basel, Vol. 13, Iss. 3, pp. 1-20, <https://doi.org/10.3390/economies13030073>

This Version is available at:

<https://hdl.handle.net/10419/329353>

## Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

## Terms of use:

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by/4.0/>

## Article

# Maternal Education, Economic Empowerment and Infant Mortality in Burkina Faso

Lamissa Barro <sup>1,\*</sup>, Aïcha Tiendrebeogo <sup>2</sup>, Issa Nana <sup>3</sup> and Landry Paul Armand Mawuvi Ky <sup>4</sup><sup>1</sup> Daniel OUEZZIN-COULIBALY University, Dedougou 01 BP 176, Burkina Faso<sup>2</sup> Ecole Polytechnique de Ouagadougou, Ouagadougou 18 BP 234, Burkina Faso; aichtie@gmail.com<sup>3</sup> Thomas Sankara University, Saaba, Ouagadougou 12 BP 417, Burkina Faso; issanana603@yahoo.fr<sup>4</sup> African Study and Research Centre for Economic Development (CAERED), Ouagadougou 03 BP 7210, Burkina Faso; armandpaulky.3@yahoo.com

\* Correspondence: lamissa.barro@univ-dedougou.bf

**Abstract:** Education levels in Burkina Faso, especially among women, remain low despite efforts made by government authorities and development partners to implement priority area 4 of the Sustainable Development Goals (SDGs). This situation presents difficulties for women in terms of their being economically and socially empowered. At the same time, the infant mortality rate in Burkina Faso is higher than the average for sub-Saharan Africa. This study analyses the combined effect of education level and women's economic empowerment on infant mortality in Burkina Faso. It uses a linear probability model with instrumental variables approach to demographic and health survey data. The results highlight the positive impact of women's level of education, understood in terms of literacy, and of their economic empowerment, in terms of probability of gain and decision-making power. Nevertheless, the impact of mothers' level of economic empowerment remains mixed. Based on the findings of this study, policymakers should strengthen policies related to girls' education, while improving the education system by integrating vocational training into the school curriculum. For better child well-being, mothers' economic empowerment policies must be accompanied by legal measures aimed at eradicating traditional gender norms and sociocultural values restrict which limit their decision-making power.



Academic Editor: Lourenco Paz

Received: 11 December 2024

Revised: 20 January 2025

Accepted: 26 January 2025

Published: 13 March 2025

**Citation:** Barro, L., Tiendrebeogo, A., Nana, I., & Ky, L. P. A. M. (2025). Maternal Education, Economic Empowerment and Infant Mortality in Burkina Faso. *Economics*, 13(3), 73. <https://doi.org/10.3390/economics13030073>

**Copyright:** © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

**Keywords:** maternal education; economic empowerment; infant mortality

## 1. Introduction

In terms of programmes related to social and economic development, Burkina Faso prioritizes education and health in conformity with the Sustainable Development Goals (SDGs). Indeed, objective two (02) of the recent National Economic and Social Development Plan 2016–2020 (PNDES) focuses on the development of human capital. The new development plan (PNDES II 2021–2025) also places human capital and the inequalities related to sex and gender within its scope of interests, by dedicating Section 2 to such interests. In addition, to put in place a universal health insurance system to this end, a National Health Insurance Fund was established in 2020. Another initiative is the free maternal and child health policy for children under the age of 5 years, ongoing since 2016. The programme integrates women empowerment, affirmative action in the award of scholarships and other grants for the benefit of young girls and special funds dedicated to women.

Despite these efforts by the Government of Burkina Faso, with the support of development partners, the situation for most of the population paints a grim picture. For example,

the 2019 general population and housing census of the National Institute of Statistics and Demography (INSD) reveals a low literacy rate (31.9%), with 36% and 27.9% for men and women, respectively (INSD, 2022). Indeed, although the numbers for primary school level are at acceptable levels (91%), those at secondary schools (35.96%) and tertiary institutions (4.23%) remain low (World Bank, 2021). In addition, this situation also reveals the difficulties faced by women in terms of their being economically and socially empowered. Thus, the unemployment rate for women over the past five years was relatively high, at an average of 6% (World Bank, 2021). Furthermore, according to the African Development Bank (BAD, 2021), more than 65.4% of women work in the informal sector and mainly within low paying jobs.

Moreover, Burkina Faso has high child mortality rates: 56.68 out of 1000 for infant mortality, 26.98 out of 1000 for neonatal mortality and 93.96 out of 1000 for infant and child mortality from 2015 to 2019. These rates are relatively higher than those of sub-Saharan African countries generally, which are at 54.42 out of 1000 for infant mortality, 28.5 out of 1000 for neonatal mortality and 80.64 out of 1000 for infant and child mortality. All these results indicate that Burkina Faso is characterized by a low level of women's education, a low level of women's empowerment and a high infant mortality rate. These observations lead to various questions being raised, notably: Is the lack of economic empowerment of women related to their low levels of education? Are the elevated levels of infant mortality related to the lack of economic empowerment of mothers?

Research studies indicate that education has tremendous advantages for a country's economic and social empowerment (Schultz, 1960; Becker, 1964). Recent empirical studies have shown that education improves women's empowerment and has a negative impact on child mortality through the mother (Hossain, 2015). According to the United Nations Entity for Gender Equality and the Empowerment of Women (UN Women, 2014), the empowerment of women is the best way to eradicate gender inequality and poverty, and promote inclusive economic growth. No less importantly, Eswaran (2002) demonstrated that the empowerment of women improves their negotiation power within the household, which reduces fertility and the rates of infant mortality. In the same manner, women's empowerment also translates into an improvement in the participation of women in decision making within the household (Essilfie et al., 2020). However, other studies, notably some that are empirical, highlight the limited role of the education of women on their level of economic empowerment (Samarakoon & Parinduri, 2015; Assaad et al., 2020) and also in the reduction of child mortality (Titaley et al., 2008; Cornish et al., 2019).

In relation to Burkina Faso specifically, the studies reveal that the enrolment of girls improves their participation in decision making within the household (Thiombiano, 2014; Pambè et al., 2014). However, other studies have demonstrated that the economic empowerment of women does not have an impact on their decision making within the household (Karimli et al., 2021), but improves their involvement in decision making in regard to the well-being of their children (Nikiema & Kponou, 2024; Karimli et al., 2021). Although the few existing studies were able to address the problems in regard to the specific context of Burkina Faso, the approaches used were purely from a statistical perspective, and thus did not take into consideration the aspect of time in the studies. Furthermore, none of the studies focused on specific elements linking the school enrolment of girls to child mortality through the economic empowerment of women.

The overall objective of this study is to examine the impact of mothers' education level on infant mortality with a focus on women's economic empowerment. More specifically, the study examines the impact of mothers' education level on economic empowerment, then the impact of the latter on infant mortality. The contribution of this study to Burkina Faso is twofold. First, unlike the static approach used in previous studies, this one takes

into account temporal dynamics through the methodological approach and the structure of survey data used. Secondly, it participates in the enrichment of economic policies oriented towards a significant reduction in infant mortality in general, and particularly in Burkina Faso.

The rest of the paper is structured as follows. The subsequent section focuses on a literature review regarding the impact of mothers' education on their economic empowerment, and the impact of mothers' economic empowerment on child mortality. Section 3 describes the methodology, model specifications, presentation of the main variables of the model and data sources. Section 4 presents econometric estimation results followed by their discussion, and Section 5 concludes the paper.

## 2. Literature Review

This section presents studies undertaken on the relationship between the level of education and the economic empowerment of mothers and the relationship between the empowerment of women and child mortality.

### *2.1. The Relationship Between the Levels of Education and Women's Empowerment According to Research Studies*

Women's empowerment can be defined as the process by which women acquire a greater capacity to make strategic life choices that were not possible for them in the past (Kabeer, 1999). In the process, the conceptualization of economic empowerment focuses on the examination of two inter-related results, namely the results from women in the labour market and the participation by women in decision making on economic issues within the household (Fox & Romero, 2017). In attaining these results, education is considered to be one of the main factors for the economic empowerment of women (Kien & Nguyen, 2020).

Conceptually, in regard to the results of women's participation in the labour market, the relationship between the level of education and women's empowerment could be linked to the human capital theory (Schultz, 1960; Becker, 1964, 1985; Schultz, 1990). According to the human capital theory, education could lead to changes in cognitive capacities and provide one with skills that are needed in the labour market (Becker, 1964; Schultz, 1990). As a result, according to the theory educated women are considered to be more attractive for employers given their higher levels of productivity, and such women often hold prestigious better paying jobs that require specific skills and know-how (Becker, 1994). Accordingly, Govinda (2008) indicated that a secondary school level of education or higher for women is one of the main determinants of economic empowerment, as long as they have an equal opportunity as men to being employed.

Moreover, in regard to the participation of women in household economic decisions, the relationship between the level of education and women's empowerment could be inscribed within the framework of the Intra-Household Bargaining Theory (Becker, 1981; McElroy & Horney, 1981). Overall, this theory models household decisions as a (no) cooperative game in which a woman and her partner resolve their differences through a solution from negotiation (Kien & Nguyen, 2020). A common assumption in most models of this theory is that the negotiating power of the woman is positively correlated to her human capital (Becker, 1981) and the quality of her economic opportunities (Duflo, 2012; Kien & Nguyen, 2020). Thus, by increasing the knowledge and economic resources of women, education increases their negotiation power within households (Kien & Nguyen, 2020).

Some studies provide empirical validation to the relationship between the level of education and the economic empowerment of women in some regions. For example, Adelere and Olomukoro (2015) demonstrated using Pearson's multiple regression and product-

moment correlation methods that through literacy programmes, women had greater access to loans and financing for their economic activities in Nigeria, which enabled them to increase their incomes. Comparable results were arrived at by [Oyitso and Olomukoro \(2012\)](#) in Nigeria. A study undertaken in Tamil Nadu revealed that better-educated women obtained better results than their less-educated counterparts in a composite index measuring their access to resources and their control of those resources, and thus their role in economic decision making ([Kabeer, 2005](#)). [Bussemakers et al. \(2017\)](#) used data from a World Bank survey collected from women in 139 countries using logistic regression models at several levels. They found that education is an important driver for the economic empowerment of women in the world, while pointing out that the results could vary from one country to the other. Recently, using panel data, the results obtained by [Almugren et al. \(2024\)](#) through the Generalized Method of Moments show that there is a positive relationship between quality education and women's empowerment in the MENA region. They stress the importance of quality governance in the transmission of education to women's empowerment.

Proof of the significant role played by women's education level in their socio-economic empowerment is also demonstrated by [Dhanaraj and Mahambare \(2019\)](#) in the case of India. Indeed, using a conditional logistic regression and instrumental variables approach, they found that women with a higher level of education are not constrained by cultural norms and traditions. Furthermore, they demonstrated that the level of education is likely to increase women's earning power as well as their quality of employment. In the same manner, [Kabeer \(2005\)](#) demonstrated through a critical analysis method that in the rural areas of Bangladesh, educated women participate in making a larger array of decisions than uneducated women. Whereas uneducated women participated in an average of 1.1 decisions, the number increased to 1.6, 2.0 and 2.3 among women that have undertaken primary school, intermediary level and secondary school studies, respectively.

However, the impact of education on the results of economic empowerment are likely to be subject to the socio-economic context of various countries ([Kabeer, 2005](#)). In societies that are characterized by extreme forms of gender inequality, not only is access to education constrained through various restrictions on their mobility and to their limited role in the economy in general, but also their impact could be much more limited ([Cameron et al., 2001](#); [Kabeer, 2005](#)) or non-existent ([Samarakoon & Parinduri, 2015](#); [Kien & Nguyen, 2020](#)). For example, [Samarakoon and Parinduri \(2015\)](#), using instrumental variables techniques, did not find any proof that education improves the decision-making power of women within households in Indonesia. Furthermore, other studies have demonstrated that more participation by women in income-generating activities could increase the overall workload of women and provoke conjugal violence ([Green et al., 2015](#); [Ismayilova, 2015](#)). More recently, [Assaad et al. \(2020\)](#), using multinomial logit models, estimated that there is a disconnect between the level of education and the economic participation of women in the Middle-East and in North Africa. According to these researchers, an increase in the level of education has not contributed to the participation of women in the labour market. Comparable results were arrived at by [Ahmed and Hyndman-Rizk \(2018\)](#) in a mixed methods case study focusing on Bangladesh. Similarly, using statistical analyses such as mean score, standard deviation and the Kruskal–Wallis H test, [Rana et al. \(2024\)](#) found that despite the high levels of education among women in Brazil, they still face the problem of economic empowerment.

In the case of Burkina Faso, [Baya \(1993\)](#) highlighted that among the active women in Bobo-Dioulasso, a town in Burkina Faso, the percentage share of salaried women increases with education levels. The results indicated that 23.5% of salaried women have a higher level of education, 19.2% have a secondary school level of education, 3.5% have a primary school level of education, and the percentage share is almost at 0% for those who are



illiterate. By examining data from the Burkina Faso Demographic and Health Survey (DHS) 2010, [Pambè et al. \(2014\)](#) used binary logistic regression to show that educated women are more likely to be well-informed in terms of negotiating for their participation in household decisions, and to a certain extent, also because they are better placed to have a salaried job. In the same manner, by examining the data from the DHS undertaken in Burkina Faso in 2010 also using a binary logistic regression, [Thiombiano \(2014\)](#) demonstrated that women with a secondary school level of education or higher have twice as many more chances of making decisions concerning their healthcare than those that are illiterate.

However, by examining the impact of an intervention through the strengthening of the economic capacity of poor women in Burkina Faso using a random controlled test, [Karimli et al. \(2021\)](#) observed that the intervention had no impact on the decision-making power of the women in the household economy (significant household purchases, use of the wife's income and the use of the husband's income). Nevertheless, the intervention had significant and positive impacts on the participation of women in decision-making activities on their children's school enrolment, marriage of children and children's healthcare ([Karimli et al., 2021](#)). The ineffectiveness of the intervention on the decision-making capabilities of women in the overall household economy reveals the possibility of how access to economic resources could limit the decision-making power of women.

## *2.2. The Relationship Between the Economic Empowerment of Women and Child Mortality in Literature*

The Demographic Transition Theory argues that, in general, economic development leads to a decrease in mortality ([Heer & Smith, 1968](#)). In applying the Gender Stratification Theory, recent studies have been particularly focused on the significance of the economic empowerment of women in the determination of the level of child mortality. Several studies have established that the economic status of women, conditioned by their level of education, strengthens their decision-making power in regard to children's healthcare. A study undertaken by [Pratley \(2016\)](#) focusing on developing countries indicated that financially independent women tend to channel a large part of the family's financial resources towards primary healthcare and to a variety of other social protection programmes that tend to reduce child mortality.

An empirical validation of the theory has been undertaken in research studies. For example, [Westeneng and D'Exelle \(2015\)](#) demonstrated how economic empowerment reduces the vulnerability of mothers in regard to reproductive health issues in Tanzania. Indeed, they argue that women who contribute to household income have a higher level of resorting to the use of prenatal care services and are less likely to give birth at home; factors that lead to a reduction in child mortality. Furthermore, some authors have argued that the babies of economically empowered women are less exposed to death as they benefit from a nutritional status that is favourable to their well-being ([Smith et al., 2004](#); [Essilfie et al., 2020](#)). These studies suggest that an increase in the economic empowerment of women is an important way of reducing child mortality through an improvement in children's nutritional status.

Nevertheless, numerous studies raise doubts on the relationship between economic empowerment and child mortality. For example, [Hossain \(2015\)](#) noted in the case of Bangladesh that the chances of an infant dying increased if the mothers participate in income-generating activities as compared to their counterparts. According to the study, the mother's employment could have an impact on the degree of care afforded to the baby coupled with less frequent breastfeeding, which would reduce the baby's survival chances. A similar result was arrived in Indonesia at by [Titaley et al. \(2008\)](#), using data from a demographic and health survey. Also, in the case of Sierra Leone, [Cornish et al. \(2019\)](#) argue that the economic empowerment of women reduces domestic conflicts and allows women to

take up various responsibilities. However, difficulties remain in regard to decision making in regard to child care since men remain as authority figures within households.

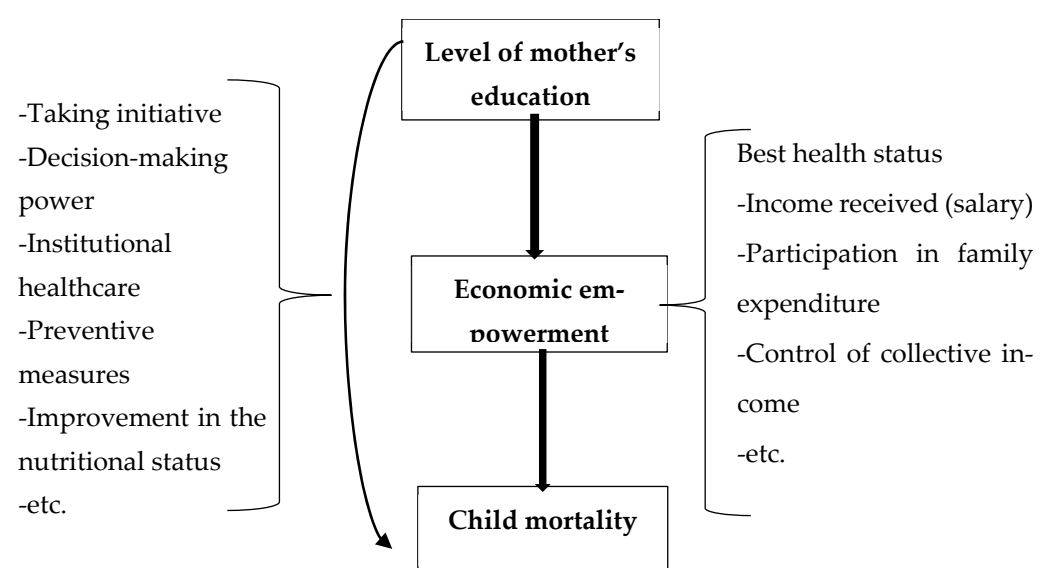
Finally, for Burkina Faso, [Nikiema and Kponou \(2024\)](#) examined the effect of women's empowerment on children's nutritional status. Using a composite indicator of women's empowerment, their results reveal a low level of women's empowerment but that it has beneficial effects on the nutritional status of children in rural households. Similarly, [Karimli et al. \(2021\)](#) used repeated measures data gathered from 360 adult women who are caregivers of children, within the framework of a cluster randomized controlled trial carried out within households living in a state of absolute poverty in Burkina Faso. The researchers noted that the advent of economic empowerment increased the involvement of women in decision making in regard to matters related to the well-being of their children but had no impact on the participation of women in decision making in regard to the household's overall economy.

### 3. Methodology and Data

In this section, we present the model of data analysis used to achieve our objectives.

#### 3.1. Econometric Models and Variables

The framework of conceptual analysis on the health of the child is based on a traditional paradigm of utility-maximizing parents ([McElroy & Horney, 1981](#); [Behrman et al., 1982](#); [Aslam & Kingdon, 2012](#); [Imai et al., 2014](#)). The model assumes that a household with two parents (father and mother), concerned about the quality of health and nutritional status of the children, are considered as “public goods” and are not decision makers. Each of the parents chooses their own consumption in order to maximize the well-being of the children (their health status). With the mother being the most likely to prioritize the well-being of children, a higher negotiation power on her part improves the health status of the children. Furthermore, a higher level of education for the mother improves her negotiation power within the household and, consequently, the nutritional status of the children. From existing studies and based on our research objectives, Figure 1 outlines our understanding of the transmission mechanisms of the impact of the education level of mothers on the health status of children through women's empowerment.



**Figure 1.** Transmission of effects of level of education of mothers on children's mortality. Source: Developed by the authors.

Our objective was to determine whether there is a causal effect of education on the economic empowerment of women within a household. Given that we have access to observation data from a quasi-experience framework, it was necessary to consider the role of unobserved variables that could potentially play a biased role in our estimations. The ordinary least squares (OLS) observation method leads to biased estimations on the impact of education on the economic empowerment of women. This bias could derive from the omission of key variables that influence factors linked to education and to the results of household decisions, from a poor specification of the model, or also the key (and unobservable) differences between the groups, which could be key drivers for the difference in results instead of the impact of education. With such considerations in mind, we used a rich set of covariables within a framework of instrumental variables (IV) to discover any causal impact of education on the level of women's economic empowerment. The same strategy was used to examine the impact of the level of mother's economic empowerment on child mortality.

We first estimated the impact of the educational policy on school enrolment or the literacy level of women using a specification described in Equation (1):

$$\text{Edu}_{irt} = \sigma \text{PolCohort}_i + X\varphi + \epsilon_{irt} \quad (1)$$

where PolCohort is a dummy variable taking the value of 1 for individuals exposed to an education policy or literacy.

We used the Framework Act and its various provisions as our reference point. This act notably institutes, among other things, compulsory schooling for children aged between 8 and 16 years. To facilitate this policy, several programmes have been developed to increase academic infrastructure and its accessibility. Thus, those aged 6 in 1996 were 13 years old in 2003, the year in which the first survey was undertaken. Since the survey focused on individuals aged between 15 and 49 years, we retained those that were aged between 8 and 16 years in 1996, and therefore between 15 and 23 years in 2003, as the cohort or the treatment group. These people were given the value of 1. Another variable of the policy is defined by referring to literacy policies. These are, among others, the alpha commando strategies (1985–1987) during the revolution and bantaaré<sup>1</sup> (1987–1989), which was followed by the creation of permanent centres for literacy and training (CPAF) in 1990. Those strategies targeted members of the population aged between 16 and 50 years. The sample focusing on individuals aged between 15 and 49 years who were 16 years old in 1985 were aged 34 in 2003 and 41 years in 2010 and were thus still eligible. Those aged 49 years in 2003 were 31 years of age in 1985, and those aged 49 years in 2010 were 24 years old in 1985. Our cohort or treatment group for this second policy variable thus comprised women who were aged between 16 and 31 years in 1985 for the 2003 survey and 16 and 24 years for the 2010 survey; all these were therefore given the value of 1.

Equation (2) allows us to capture the impact of education on the economic empowerment of women.

$$\text{Emp}_{irt} = \alpha_1 \hat{\text{Edu}}_{irt} + X_{irt}\beta + Y_{hrt}\theta + \vartheta_r + \gamma_t + \epsilon_{irt} \quad (2)$$

where the variable of the result Emp (economic empowerment) of the individual  $i$  in region  $r$  over the period  $t$  is regressed using the variable  $\hat{\text{Edu}}$  that is an indicator of the level of education of women; the period  $t$  corresponds to the years covered by the survey;  $X$  is a vector of control variables related to the woman; and  $Y$  is a vector of control variables related to the household. The regressions also include fixed temporal effects ( $\gamma_t$ ) and regional fixed effects ( $\vartheta_r$ ). Equation (2) was estimated using an IV.



Using Equation (3), we captured the impact of the empowerment of mothers on child mortality. We used the level of education as an instrument to control for the possibility of endogeneity related to the variable of economic empowerment.

$$\text{Mort}_{irt} = \alpha_2 \hat{\text{Emp}}_{mrt} + Z_{irt}\delta + X_{mrt}\eta + Y_{hrt}\Phi + \lambda_r + \kappa_t + \mu_{irt} \quad (3)$$

The models (formalized by Equations (1)–(3)) are limited dependent variable models. A linear probability model (LPM) was adopted for this study. LPM simplifies the interpretation of coefficients and allows for the estimation of more flexible specification that include temporal trends and proper shocks for each individual, which could lead to minor gains for limited dependent variable techniques (Beck, 2011; Bazzi & Blattman, 2014).

Based on previous studies, we retained three indicators to capture the economic empowerment of women, namely the benefits to the woman (in cash or in kind); the control by the woman of those benefits; and the decision making by the woman on her expenditure and her family. In regard to the variable on child mortality, we considered three indicators: neo-natal mortality, infant mortality and infant and child mortality. In regard to the variable on the level of education, we also retained three indicators: illiteracy, primary school level of education and higher level of education or level equivalent to secondary school. Tables 1 and 2 provide a more detailed presentation of the main variables of the model.

**Table 1.** Key variables of Equation (2).

Dependent Variables
Benefits for the woman in cash or in kind (1 if yes, 0 if not)
Control by the woman over the benefits (1 if yes, 0 if not)
Decisions over family expenditure (1 if the woman participates, 0 if not)
Explanatory Variables
Level of education of the woman (1 = illiterate; 2 = primary school; 3 = at least secondary school) or number of years of education or literacy level
Wealth index of the household (1 = poor; 2 = average; 3 = rich)
Area of residence (1 = urban; 2 = rural)
Marital status (1 = lives with a partner; 2 = lives on their own)
Age group of women (15–19; 20–24; 25–29; 30–34; 35–39; 40–44; 45–49)
Religion of the woman (1 = Muslim; 2 = Catholic; 3 = Traditional; 4 = Others)
Level of education of partner (1 = illiterate; 2 = primary; 3 = at least secondary)
Occupation of partner (1 = unemployed; 2 = senior executive; 3 = office clerk; 4 = self-employed; 5 = skilled labourer; 6 = others)

**Table 2.** Key variables of Equation (3).

Dependent Variables
Neo-natal mortality (1 if the child dies before the age of one month, 0 if not)
Infant mortality (1 if the child dies before the age of one year, 0 if not)
Child and infant mortality (1 if the child die before the age of five years, 0 if not)
Explanatory Variables
Benefits for the woman in cash or in kind (1 if yes, 0 if not)
Control by the woman over the benefits (1 if yes, 0 if not)
Decisions over family expenditure (1 if the woman participates, 0 if not)

**Table 2.** *Cont.*

Explanatory Variables
Sex of the child (1 = boy; 2 = girl)
Sex of the head of household (1 = man; 2 = woman)
Wealth index of the household (1 = poor; 2 = average; 3 = rich)
Area of residence (1 = urban; 2 = rural)
Place of birth (1 = health centre; 2 = other)
Marital status (1 = lives with a partner; 2 = lives on their own)
Age group of the mother (15–19; 20–24; 25–29; 30–34; 35–39; 40–44; 45–49)
Religion of the mother (1 = Muslim; 2 = Catholic; 3 = Traditional; 4 = Others)

### 3.2. Data Sources

The study used data that was accessible on demand. Indeed, major surveys have been undertaken in several countries in the world, often over various periods, in order to gather information on demography and health. The surveys contain plenty of information on a wide array of subjects, using a representative sample of the populations of countries participating in the DHS programme. For each country, the information collected is processed, tabulated and presented in a report that describes the living conditions and the socio-demographic and health status of each country.

The DHS databases provide much information covering the living conditions of households, maternal and child health, HIV/AIDS prevalence, etc. The databases also provide the possibility of examining the microeconomic data in a manner that provides an international comparison.

Furthermore, the DHS survey comprises several questionnaires. The questionnaire on women gathers data on the general characteristics of the women surveyed (for example, age, level of education, wealth quintile, professional status), and more specific data related to the empowerment of women, such as the income received in cash, wife's income amount as compared to that of the husband, the control and use of their own income and that of the husband, etc. Information related to child mortality is extracted from the questionnaire on births and deaths of children. The questionnaire also provides information on fertility behaviour that exposes children to a high mortality risk (for example, having children before the age of 18 years, after the age of 34 or after a birth interval that is less than 24 months). A complete record of births is given, whereby one can enumerate all the children born to a woman, including date of birth, gender, survival status, age (if they are alive) and date of death (if they are dead).

Several DHS and Malaria Indicator Surveys (MIS) have taken place in Burkina Faso, with a total of six survey phases (1993, 1998, 2003, 2010, 2014 and 2017), of which the last two were more focused on indicators of malaria (MIS). The availability of variables of interest for our study limits us to the use of two DHS surveys (2003 and 2010). The analysis involved compiling a large database using those surveys and allowing us to take the time factor into consideration. For the 2003 database, we took into account children born from 1998, whereas for the 2010 database we considered children born between 2003 and 2010. An observation of the trends of a range of factors over the duration of these two periods was related to distinct participants. Such a process allowed us access to data that provides information on children born between 1998 and 2010, and for mothers aged between 15 and 49 years.

## 4. Results and Analysis

This section presents the econometric results. First is the impact of the level of education on the economic empowerment of women, then the results of the impact of economic empowerment of mothers on child mortality.

### 4.1. Level of Education and the Economic Empowerment of Women

This section examines the impact of the level of education of women on their economic empowerment. Nevertheless, for testing robustness, we also focused on the impact of the number of years spent in school and access to literacy by women on their level of economic empowerment.

Table 3 presents the results of an analysis of the impact of the level of education of women on the probability of their economic empowerment.

**Table 3.** Level of education and economic empowerment of women.

	Ordinary Least Squares (OLS)			Two-Stage Least Squares (2SLS)		
	Income	Use	Expenditure	Income	Use	Expenditure
Level of education (Ref. Illiterate)						
Primary	0.0311 (0.0237)	0.0320 ** (0.0120)	−0.0011 (0.0113)	−0.9659 (0.5732)	−0.2958 (0.5041)	−1.351 (0.8975)
At least secondary school	0.0938 ** (0.0340)	−0.0001 (0.0092)	0.0681 ** (0.0241)	−0.9226 ** (0.3804)	−0.1290 (0.2018)	−0.2646 (0.4365)
Social class of the household (Ref. poor)						
Middle	−0.0210 (0.0263)	−0.0054 (0.0225)	−0.0131 (0.0137)	−0.0097 (0.0266)	−0.0016 (0.0268)	−0.0022 (0.0156)
Rich	0.0327 (0.0363)	−0.0078 (0.0181)	−0.0094 (0.0229)	0.0859 ** (0.0372)	0.0108 (0.0356)	0.0393 (0.0315)
Area of residence						
Rural	−0.1974 *** (0.0586)	−0.0479 * (0.0259)	−0.0283 (0.0303)	−0.3454 *** (0.0984)	−0.0835 * (0.0432)	−0.1701 (0.1114)
Marital status (Ref. Single)						
Living with a partner	−0.0801 ** (0.0268)	−0.0298 ** (0.0118)	−0.2250 *** (0.0359)	−0.0476 (0.0470)	−0.0227 (0.0205)	−0.1941 *** (0.0403)
Polygamous family	−0.0368 ** (0.0139)	0.0177 (0.0101)	−0.0407 ** (0.0152)	−0.0881 ** (0.0308)	−0.0034 (0.0291)	−0.0940 ** (0.0394)
Religion (Ref. Muslim)						
Catholic	−0.0296 (0.0265)	0.0171 (0.0140)	0.0450 ** (0.0192)	0.0310 (0.0391)	0.0307 (0.0233)	0.0987 * (0.0469)
Traditional	0.0155 (0.0201)	0.0229 (0.0143)	0.0185 (0.0177)	−0.0011 (0.0334)	0.0169 (0.0184)	0.0007 (0.0279)
Others	−0.0042 (0.0262)	−0.0432 (0.0374)	0.0263 (0.0323)	−0.0376 (0.0381)	−0.0587 (0.0384)	−0.0190 (0.0505)
Level of education of the spouse (Ref. Illiterate)						
Primary	0.0497 *** (0.0145)	−0.0206 * (0.0103)	0.0102 (0.0122)	0.2166 ** (0.0975)	0.0348 (0.0866)	0.2346 (0.1569)
At least secondary school	0.0625 ** (0.0278)	0.0232 (0.0140)	0.0394 * (0.0219)	0.5410 *** (0.1769)	0.0904 (0.1029)	0.2857 (0.2418)
Fixed effects region	Yes	Yes	Yes	Yes	Yes	Yes
DHS year (region)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11.182	3.615	12.368	11.153	3.609	12.333

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parentheses.

The results of the estimation of the two-stage least squares (2SLS) demonstrated that the level of education (primary) variable has a negative but insignificant impact on the various indicators of economic empowerment, namely participation by women in income generation, and their decision-making power in terms of the use of their own income and family expenditure. One possible explanation for why the primary school level of education variable lacks significance in regard to the economic empowerment of women could be the low income yields from primary school level education (Cameron et al., 2001). Fur-

thermore, when the level of education of the woman increases to that of secondary school it reduces her economic independence, notably in regard to contributing to household income. For example, when the level of education of the woman increases from primary to secondary level, income decreases by 0.92%. It is evident that the secondary school level of education has a negative impact on women's participation in contributing to household income and that the impact becomes significant with its improvement. Such a result is contrary to the economic theory on human capital (Schultz, 1960; Becker, 1964), which highlights the significant role played by education on economic growth and development. It is also contrary to the results of several empirical studies (see, for example, Bussemakers et al., 2017; Dhanaraj & Mahambare, 2019). However, the result agrees with the results of various researchers (Ahmed & Hyndman-Rizk, 2018; Assaad et al., 2020). This result could be due to the low participation of graduates in the labour market due to structural problems in Burkina Faso's economy, the mismatch between the economic fabric of society and the knowledge acquired through traditional education. Indeed, in Burkina Faso the dominant education system offers general education which does not create enough possibilities for the private sector in regard to the employment of educated women. This leads to a decrease in employment opportunities in the public sector which is seen as the main provider of jobs, resulting in a diminishing of the participation of educated women in the labour market. In addition, this result can be explained by the fact that despite women's level of education, they still encounter substantial obstacles in transforming their education into meaningful empowerment (Rana et al., 2024). These problems include restricted freedom and mobility, cultural and societal expectations, family obligations, economic factors, etc.

Further to the level of education, other factors influence the economic empowerment of women, such as the area of residence of the household and the level of education of the spouse. When the level of education of the spouse is above primary of secondary school, it leads to an improvement in the income of their partner which increases from 4.9% to 6.2%. Equally, the decision-making power of the partner increases in the same manner. One of the possible explanations for this result is that women with partners of a certain level of education have more freedom to enjoy their rights than those whose partners have a minimum level of education. This is because the existing literature on women's rights could be unknown to partners who are illiterate.

Moreover, living in rural areas reduces women's chances of increasing their income and decision-making power over the management of the income by 19.78% and 4.8% respectively. These results could be explained through the fact that due to socio-cultural burdens, the role of the woman in Burkina Faso is still traditional in rural areas, as compared to the urban areas. The woman's role is to take care of the needs of family members (among other domestic duties) that do not include the financial needs of the household. Also, rural areas offer fewer employment opportunities than urban areas.

Marital status also has an impact on the empowerment of women. In our study, women with a partner experienced a reduction in their probability of pay out, management power over their income and participation in family responsibilities by 8%, 3% and 2.2%, respectively. These results could be because the family obligations for women with partners are a hindrance to job seeking and income-generating activities. Similarly, it could be justified through the fact that women with a partner could choose to share those responsibilities with that person, whereas single women do not have a choice and have to do everything on their own. In regard to religion, the results highlighted the fact that women in Christian households have better opportunities for improving their participation in household responsibilities. This is probably because contrary to Christianity, Islam could limit access by women to various income-generating activities that could be proscribed by

Islamic law, for example. This limits access by such women to resources that could help them become economically empowered.

In order to verify the results of the level of education on the economic empowerment of women, we examined the various indicators of education, namely the number of years spent in school and the literacy level.

Table 4 presents the results of an analysis of the impact of the number of years spent in school on the economic empowerment of women in Burkina Faso.

**Table 4.** Number of years a woman spends in school and economic empowerment.

Dependent:	OLS			2SLS		
	Income	Use	Expenditure	Income	Use	Expenditure
Years spent in school	0.0049 * (0.0027)	0.0008 (0.0009)	0.0061 *** (0.0016)	−0.0458 * (0.0235)	0.0002 (0.0104)	0.0359 * (0.0189)
Social class of the household (Ref. poor)						
Middle	−0.0207 (0.0262)	−0.0051 (0.0226)	−0.0131 (0.0137)	−0.0192 (0.0267)	−0.0049 (0.0227)	−0.0154 (0.0132)
Rich	0.0339 (0.0361)	−0.0070 (0.0180)	−0.0096 (0.0229)	0.0491 (0.0352)	−0.0066 (0.0195)	−0.0196 (0.0226)
Area of residence						
Rural	−0.2010 *** (0.0589)	−0.0499 * (0.0259)	−0.0257 (0.0306)	−0.2545 *** (0.0723)	−0.0505 * (0.0275)	0.0084 (0.0376)
Marital status (Ref. Single)						
Living with a partner	−0.0805 ** (0.0273)	−0.0286 ** (0.0118)	−0.2263 *** (0.0363)	−0.0722 ** (0.0329)	−0.0291 ** (0.0114)	−0.2275 *** (0.0340)
Polygamous family	−0.0376 ** (0.0139)	0.0163 (0.0100)	−0.0399 ** (0.0152)	−0.0522 ** (0.0185)	0.0163 (0.0108)	−0.0312 * (0.0158)
Religion (Ref. Muslim)						
Catholic	−0.0286 (0.0261)	0.0172 (0.0142)	0.0435 ** (0.0186)	−0.0044 (0.0311)	0.0177 (0.0186)	0.0307 (0.0209)
Traditional	0.0155 (0.0203)	0.0227 (0.0141)	0.0190 (0.0176)	0.0080 (0.0260)	0.0229 (0.0148)	0.0241 (0.0187)
Others	−0.0043 (0.0264)	−0.0447 (0.0372)	0.0273 (0.0319)	−0.0125 (0.0256)	−0.0445 (0.0369)	0.0314 (0.0330)
Level of education of the spouse (Ref. Illiterate)						
Primary	0.0527 *** (0.0145)	−0.0161 (0.0103)	0.0067 (0.0123)	0.0876 *** (0.0143)	−0.0155 (0.0108)	−0.0182 (0.0178)
At least secondary school	0.0802 ** (0.0325)	0.0200 * (0.0105)	0.0381 * (0.0198)	0.3176 ** (0.1115)	0.0230 (0.0531)	−0.1070 (0.0884)
FE Region	Yes	Yes	Yes	Yes	Yes	Yes
DHS year (region)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11.183	3.615	12.369	11.154	3.609	12.334

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parentheses.

The results of the estimation using the 2SLS method, as illustrated in Table 4, indicate that the number of years spent in school has a negative impact on the participation of the woman in contributing to income. However, it is evident that there is a positive impact of the number of years spent in school on decision making in regard to household expenditure. Nevertheless, the negative impact related to the participation of the women in contributing to family income is higher in absolute value than the positive impact resulting from her participation in decision making. Consequently, the more the years spent in school, the more the economic empowerment of the woman increases. This therefore confirms the fact that the level of education promotes the economic empowerment of women.

Table 5 presents the results of an analysis of the impact of literacy on the economic empowerment of women.

**Table 5.** Literacy and economic empowerment of women.

Dependent:	OLS			2SLS		
	Income	Use	Expenditure	Income	Use	Expenditure
Literacy	0.0287 ** (0.0113)	0.0042 (0.0040)	0.0138 ** (0.0066)	0.0436 *** (0.0136)	−0.0016 (0.0055)	0.0244 ** (0.0087)
Social class of the household (Ref. poor)						
Middle	−0.0204 (0.0277)	−0.0051 (0.0225)	−0.0136 (0.0137)	−0.0212 (0.0260)	−0.0049 (0.0226)	−0.0144 (0.0137)
Rich	0.0330 (0.0313)	−0.0062 (0.0192)	−0.0091 (0.0223)	0.0306 (0.0356)	−0.0053 (0.0179)	−0.0100 (0.0234)
Area of residence						
Rural	−0.2012 *** (0.0620)	−0.0481 * (0.0251)	−0.0295 (0.0267)	−0.1977 *** (0.0585)	−0.0494 * (0.0244)	−0.0268 (0.0310)
Marital status (Ref. Single)						
Living with a partner	−0.0808 ** (0.0299)	−0.0288 ** (0.0117)	−0.2266 *** (0.0380)	−0.0816 ** (0.0271)	−0.0291 ** (0.0115)	−0.2267 *** (0.0365)
Polygamous family	−0.0370 *** (0.0128)	0.0170 (0.0103)	−0.0408 ** (0.0167)	−0.0358 ** (0.0137)	0.0166 (0.0097)	−0.0396 ** (0.0152)
Religion (Ref. Muslim)						
Catholic	−0.0281 (0.0231)	0.0174 (0.0135)	0.0451 ** (0.0203)	−0.0281 (0.0264)	0.0183 (0.0145)	0.0442 ** (0.0189)
Traditional	0.0154 (0.0187)	0.0230 (0.0149)	0.0178 (0.0193)	0.0170 (0.0200)	0.0233 (0.0145)	0.0175 (0.0172)
Others	−0.0034 (0.0257)	−0.0457 (0.0373)	0.0251 (0.0314)	−0.0014 (0.0262)	−0.0452 (0.0374)	0.0240 (0.0323)
Level of education of the spouse (Ref. Illiterate)						
Primary	0.0504 *** (0.0148)	−0.0167 (0.0100)	0.0092 (0.0165)	0.0487 *** (0.0142)	−0.0154 (0.0103)	0.0071 (0.0124)
At least secondary school	0.0755 *** (0.0269)	0.0196 * (0.0114)	0.0542 ** (0.0249)	0.0615 ** (0.0272)	0.0256 * (0.0120)	0.0433 * (0.0227)
Region	Yes	Yes	Yes	Yes	Yes	Yes
DHS (region)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11.172	3.612	12.357	11.143	3.606	12.322

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parentheses.

The results in Table 5 suggest that access to literacy programmes promotes the economic empowerment of women, notably through an improvement in the participation of women in terms of contributing to an improvement in household income and in decision making in regard to family expenditure. This result not only agrees with the economic theory of human capital (Schultz, 1990; Becker et al., 1994) but also with results from previous empirical studies (Oyitso & Olomukoro, 2012; Adolore & Olomukoro, 2015). One of their underlying arguments is that literacy programmes allow women who benefit from them to access more income-generating activities than those that do not benefit from them. In addition, this result differs from that of the impact of the number of years spent in school on the economic empowerment of women highlighted previously. This could be explained through the fact that contrary to the traditional system of education in which general education is emphasized, the strategies that literacy programmes implement are accompanied by specific vocational training made possible by setting up literacy and training centres.

In summary, in Burkina Faso, the level of education and the number of years spent in school do not improve the economic empowerment of women. However, literacy programmes for women have contributed to increasing their economic empowerment. This can be explained by the fact that the transmission of education for women's economic empowerment requires quality education (Almugren et al., 2024). Consequently, we can state that although the level of education of the women is necessary in order to improve their human capital, it is not enough to ensure their empowerment.



#### 4.2. Economic Empowerment of Women and Child Mortality

In this section, we propose an examination of the impact of economic empowerment on three main indicators of child mortality. To that effect, various results are given in Tables 6–8, through an examination of the mortality of children below one year of age (infant mortality), the mortality of children below one month of age (neonatal mortality) and the mortality of children aged below five years (infant child mortality) respectively as outcome variables. From various estimations, we used the education variable as an instrument.

**Table 6.** Economic empowerment of woman and infant mortality.

Dependent Variable	Child Mortality					
2SLS	Instrument: Years Spent in School			Instrument: Literacy		
Income	−0.1157 (0.0763)			−0.0641 (0.0535)		
Decision making		−0.6813 (0.9388)			−0.5839 (0.8723)	
Family expenditure			−0.1996 * (0.1026)			−0.2535 (0.2339)
		Decision on family healthcare (Ref. Woman alone)				
Jointly with her partner	0.0176 (0.0138)	0.0164 (0.0213)	0.0567 * (0.0296)	0.0128 (0.0110)	0.0154 (0.0194)	0.0704 (0.0608)
Jointly with someone else	−0.0012 (0.0441)	0.0146 (0.2021)	−0.0677 * (0.0362)	−0.0150 (0.0403)	0.0221 (0.1860)	−0.0769 (0.0491)
Solely by the partner	0.0024 (0.0080)	−0.0200 (0.0472)	−0.0658 (0.0386)	0.0061 (0.0066)	−0.0143 (0.0442)	−0.0860 (0.0872)
Someone else	0.0175 (0.0149)	0.0203 (0.0612)	−0.0610 (0.0469)	0.0213 (0.0130)	0.0258 (0.0588)	−0.0842 (0.1026)
		Social class of the family (Ref. Poor)				
Middle	−0.0159 ** (0.0072)	−0.0124 (0.0180)	−0.0144 ** (0.0058)	−0.0131 ** (0.0057)	−0.0108 (0.0173)	−0.0155 ** (0.0067)
Rich	−0.0084 (0.0051)	−0.0190 (0.0213)	−0.0170 *** (0.0048)	−0.0097 * (0.0045)	−0.0166 (0.0194)	−0.0177 ** (0.0059)
		Gender of the child (Ref. Boy)				
Girl	−0.0019 (0.0029)	−0.0049 (0.0075)	−0.0050 (0.0033)	−0.0022 (0.0028)	−0.0045 (0.0070)	−0.0051 (0.0035)
		Gender of the head of household (Ref. Man)				
Woman	0.0060 (0.0073)	−0.0037 (0.0157)	0.0131 (0.0078)	0.0060 (0.0072)	−0.0041 (0.0149)	0.0171 (0.0154)
		Area of residence				
Rural	−0.0200 (0.0239)	−0.0073 (0.0282)	0.0055 (0.0072)	−0.0048 (0.0178)	−0.0039 (0.0254)	0.0046 (0.0085)
		Religion (Ref. Muslim)				
Catholic	0.0034 (0.0047)	0.0031 (0.0075)	0.0033 (0.0061)	0.0031 (0.0045)	0.0028 (0.0076)	0.0042 (0.0089)
Traditional	0.0141 ** (0.0048)	0.0046 (0.0085)	0.0084 * (0.0045)	0.0163 *** (0.0048)	0.0048 (0.0086)	0.0070 (0.0080)
Others	0.0242 *** (0.0062)	0.0400 ** (0.0164)	0.0203 *** (0.0064)	0.0253 *** (0.0065)	0.0399 ** (0.0160)	0.0196 ** (0.0067)
		Place of birth (Ref. at home)				
In a health centre	−0.0091 ** (0.0041)	−0.0156 (0.0101)	−0.0141 *** (0.0042)	−0.0098 ** (0.0039)	−0.0149 (0.0095)	−0.0138 ** (0.0046)
		Marital status (Ref. Single)				
Living with a partner	−0.0266 (0.0219)	0.0111 (0.0266)	−0.0119 (0.0152)	−0.0199 (0.0193)	0.0085 (0.0261)	−0.0142 (0.0170)
		Age of mother at first birth (Ref. younger than 20 years)				
20 to 30 years	−0.0087 * (0.0041)	−0.0082 (0.0118)	−0.0059 (0.0039)	−0.0082 * (0.0040)	−0.0075 (0.0108)	−0.0049 (0.0042)
Older than 30 years	0.0395 (0.0406)	0.0875 * (0.0426)	0.0456 (0.0336)	0.0434 (0.0405)	0.0853 * (0.0420)	0.0464 (0.0328)
EF Year of birth	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21.582	7.574	24.758	21.564	7.568	24.738

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parentheses.

**Table 7.** Economic empowerment of woman and neonatal mortality.

Dependent Variable	Neonatal Mortality					
	2SLS	Instrument: Years Spent in School			Instrument: Literacy	
Income	−0.0152 (0.0578)			−0.0077 (0.0585)		
Decision making		−0.0792 (0.5512)			0.0315 (0.7149)	
Family expenditure			−0.0142 (0.0766)			−0.0396 (0.1416)
		Decision on family healthcare (Ref. Woman alone)				
Jointly with her partner	0.0081 (0.0090)	0.0053 (0.0109)	0.0098 (0.0215)	0.0073 (0.0090)	0.0032 (0.0145)	0.0162 (0.0381)
Jointly with someone else	0.0244 (0.0402)	0.1074 (0.1117)	0.0172 (0.0350)	0.0222 (0.0389)	0.1158 (0.1037)	0.0125 (0.0411)
Solely by the partner	0.0052 (0.0054)	−0.0003 (0.0286)	0.0015 (0.0288)	0.0056 (0.0053)	0.0049 (0.0349)	−0.0083 (0.0532)
Someone else	0.0120 (0.0094)	0.0139 (0.0346)	0.0073 (0.0353)	0.0124 (0.0096)	0.0197 (0.0437)	−0.0039 (0.0639)
		Social class of the family (Ref. Poor)				
Middle	−0.0046 (0.0033)	−0.0091 (0.0107)	−0.0033 (0.0034)	−0.0041 (0.0038)	−0.0074 (0.0131)	−0.0037 (0.0041)
Rich	−0.0041 (0.0035)	−0.0067 (0.0114)	−0.0058 * (0.0027)	−0.0043 (0.0034)	−0.0048 (0.0133)	−0.0061 ** (0.0025)
		Gender of the child (Ref. Boy)				
Girl	−0.0038 * (0.0020)	−0.0019 (0.0040)	−0.0066 *** (0.0021)	−0.0038 * (0.0020)	−0.0014 (0.0046)	−0.0066 *** (0.0021)
		Gender of the head of household (Ref. Man)				
Woman	0.0060 (0.0073)	−0.0037 (0.0157)	0.0131 (0.0078)	0.0060 (0.0072)	−0.0041 (0.0149)	0.0171 (0.0154)
		Area of residence				
Rural	−0.0045 (0.0165)	−0.0007 (0.0166)	−0.0039 (0.0034)	−0.0023 (0.0164)	0.0024 (0.0184)	−0.0043 (0.0033)
		Religion (Ref. Muslim)				
Catholic	0.0013 (0.0038)	0.0002 (0.0079)	0.0012 (0.0036)	0.0013 (0.0039)	−0.0002 (0.0087)	0.0017 (0.0051)
Traditional	0.0096 * (0.0044)	0.0042 (0.0057)	0.0076 * (0.0040)	0.0099 ** (0.0041)	0.0035 (0.0073)	0.0068 (0.0042)
Others	0.0117 * (0.0060)	0.0095 (0.0130)	0.0092 (0.0055)	0.0120 * (0.0059)	0.0101 (0.0132)	0.0092 (0.0054)
		Place of birth (Ref. at home)				
In a health centre	−0.0071 * (0.0035)	−0.0110 * (0.0054)	−0.0093 ** (0.0031)	−0.0072 * (0.0036)	−0.0108 ** (0.0049)	−0.0093 ** (0.0032)
		Marital status (Ref. Single)				
Living with a partner	0.0082 (0.0122)	0.0138 (0.0180)	0.0126 (0.0078)	0.0093 (0.0124)	0.0113 (0.0196)	0.0117 (0.0092)
		Age of mother at first birth (Ref. younger than 20 years)				
20 to 30 years	−0.0052 ** (0.0021)	−0.0049 (0.0084)	−0.0053 * (0.0026)	−0.0051 ** (0.0023)	−0.0040 (0.0106)	−0.0049 (0.0029)
Older than 30 years	0.0574 * (0.0300)	0.0968 * (0.0476)	0.0480 * (0.0262)	0.0579 * (0.0300)	0.0940 * (0.0483)	0.0483 * (0.0266)
EF Year of birth	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21.582	7.574	24.758	21.564	7.568	24.738

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parentheses.**Table 8.** Economic empowerment of woman and Under 5 mortality.

Dependent Variable	Infant and Child Mortality					
	2SLS	Instrument: Years Spent in School			Instrument: Literacy	
Income	−0.1388 * (0.0738)			−0.1091 * (0.0606)		
Decision making		−0.7527 (0.9395)			−1.314 (1.673)	
Family expenditure			−0.2621 ** (0.1055)			−0.4833 (0.3099)
		Decision on family healthcare (Ref. Woman alone)				
Jointly with her partner	0.0243 **	0.0183	0.0790 **	0.0215 **	0.0288	0.1351

Table 8. Cont.

Dependent Variable	Infant and Child Mortality					
2SLS	Instrument: Years Spent in School			Instrument: Literacy		
	(0.0104)	(0.0189)	(0.0288)	(0.0086)	(0.0293)	(0.0783)
Jointly with someone else	0.0192	−0.0167	−0.0281	0.0113	−0.0602	−0.0672
Solely by the partner	(0.0742)	(0.2046)	(0.0931)	(0.0741)	(0.2731)	(0.0999)
	0.0060	−0.0202	−0.0828 *	0.0083	−0.0468	−0.1668
Someone else	(0.0108)	(0.0514)	(0.0412)	(0.0100)	(0.0879)	(0.1178)
	0.0279	0.0084	−0.0749	0.0301	−0.0214	−0.1715
	(0.0241)	(0.0612)	(0.0521)	(0.0228)	(0.1024)	(0.1375)
Social class of the family (Ref. Poor)						
Middle	−0.0196 **	−0.0180	−0.0188 ***	−0.0180 **	−0.0266	−0.0231 **
	−0.0078	(0.0175)	(0.0055)	(0.0071)	(0.0296)	(0.0080)
Rich	−0.0113 *	−0.0273	−0.0223 ***	−0.0120 **	−0.0365	−0.0251 ***
	(0.0057)	(0.0186)	(0.0044)	(0.0050)	(0.0292)	(0.0067)
Gender of the child (Ref. Boy)						
Girl	−0.0019	−0.0091	−0.0058	−0.0022	−0.0110	−0.0057
	(0.0051)	−0.0082	(0.0054)	(0.0051)	(0.0119)	(0.0063)
Gender of the head of household (Ref. Man)						
Woman	−0.0038	−0.0150	0.0075	−0.0039	−0.0114	0.0236
	−0.0078	(0.0189)	(0.0103)	(0.0076)	(0.0226)	(0.0216)
Area of residence						
Rural	−0.0197	−0.0035	0.0096	−0.0109	−0.0178	0.0057
	(0.0251)	(0.0261)	(0.0084)	(0.0191)	(0.0399)	(0.0087)
Religion (Ref. Muslim)						
Catholic	−0.0039	−0.0026	−0.0026	−0.0041	−0.0004	0.0013
	(0.0055)	(0.0066)	(0.0067)	(0.0056)	(0.0087)	(0.0105)
Traditional	0.0216 **	0.0149	0.0151 **	0.0229 ***	0.0193	0.0088
	(0.0073)	(0.0112)	(0.0068)	(0.0067)	(0.0184)	(0.0122)
Others	0.0216 **	0.0418 **	0.0179 **	0.0223 **	0.0383	0.0168 **
	(0.0088)	(0.0180)	(0.0064)	(0.0089)	(0.0248)	(0.0073)
Place of birth (Ref. at home)						
In a health centre	−0.0193 ***	−0.0292 **	−0.0250 ***	−0.0197 ***	−0.0294 *	−0.0244 ***
	(0.0054)	(0.0126)	(0.0048)	(0.0054)	(0.0149)	(0.0053)
Marital status (Ref. Single)						
Living with a partner	−0.0205	0.0054	−0.0132	−0.0167	0.0193	−0.0221
	(0.0256)	(0.0287)	(0.0175)	(0.0234)	(0.0480)	(0.0210)
Age of mother at first birth (Ref. younger than 20 years)						
20 to 30 years	−0.0088	−0.0075	−0.0048	−0.0085	−0.0129	−0.0012
	(0.0057)	(0.0132)	(0.0048)	(0.0056)	(0.0186)	(0.0057)
Older than 30 years	0.0202	0.0751	0.0283	0.0225	0.0893	0.0311
	(0.0448)	(0.0430)	(0.0391)	(0.0453)	(0.0501)	(0.0405)
EF Year of birth	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21.582	7.574	24.758	21.564	7.568	24.738

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parentheses.

Overall, the results indicate that the economic empowerment of women seems to have a negative impact on the probability of the death of children. Indeed, when one considers the number of children as an instrument, then the participation of the mother in decision making in regard to family expenditure contributes to a decrease in child mortality in Burkina Faso. For example, the coefficient associated with the variable of participation by the woman in decision making on family expenditure was negative. More specifically, an increase in participation by the wife in decision making in regard to family expenditure was negative. These results are contrary to those arrived at in previous studies such as those in Indonesia (Titaley et al., 2008), Bangladesh (Hossain, 2015) and Sierra Leone (Cornish et al., 2019). However, economic empowerment measured by the participation of the mother in contributing to family income and her management of the family resources does not indicate any impact on the level of neonatal and infant mortality. Such results in the context of our study could be attributed to the existence of a socio-cultural burden that is restrictive and presents an improvement in the decision-making power of women within households (through their income and their contribution to the household budget)

which could translate into an improvement in the well-being of children in particular and the family in general.

In addition, the results demonstrate that economic empowerment continues to reduce infant and child mortality for mothers who have a certain level of education and participate in the generation of family income. For example, the probability of death among children aged 5 years and below (infant and child mortality) decreases by 13% when the mother participated in generating family income and by 26% when they participate in decisions concerning family expenditure. The underlying argument is thus that families in which the mothers are not only educated but also participate in decision making about household expenditure are more inclined towards dedicating a significant percentage of their income on healthcare expenditure and on maintaining good nutritional status that is favourable to their well-being (Smith et al., 2004; Carlson et al., 2015; Essilfie et al., 2020). Also, due to a better knowledge and sensitization on healthcare and the prevention of illnesses, educated mothers take care of their child and themselves during and after a pregnancy better than uneducated mothers do.

Thus, in conformity with the conceptual framework of this study, economic empowerment of mothers is presented by one of the channels of transmission of the impacts of the level of education of the woman on child mortality in Burkina Faso. However, the results corroborate those of various studies such as those of Carlson et al. (2015) and Essilfie et al. (2020).

Furthermore, the results reveal that the various mortality rates seem better explained through other socio-economic and demographic aspects; notably, the social class of the family (middle class or rich), the region in which the household lives, the place of birth of the child and the age of the mother at her first child birth have an impact on the probability of the death of the children. Indeed, if the wife belongs to the middle class or the rich, neonatal, infant and child mortality rates are reduced. Similarly, we noted that being born in a health centre reduces the probability of death. However, practising a traditional religion had a positive impact on neonatal, infant and child mortality. This could be explained by the fact that the gender norms are more pronounced within traditional communities. In addition, the healthcare decisions of a family have various impacts on child mortality. For example, if the decision is made by the mother and her partner, the probability of death among the children increases, whereas it decreases if the decision is made by the mother and someone else. The mother's age at the time of her first childbirth is also a determinant in explaining the risks of deaths among children. If the mother had her first child between 20 and 30 years of age, mortality reduces; however, if she is aged above 30 years, mortality increases.

In summary, we noted that, in Burkina Faso, the improvement in human capital of women is favourable to their economic empowerment. Indeed, access to education, in other words to training in school and in literacy classes for women, improves their income probability. Nevertheless, it seems not to have an impact on their decision-making capacity in regard to household income. It is also evident that the decision-making capacity in terms of household income reduces child mortality in Burkina Faso, especially in rural areas.

## 5. Conclusions

This study had two objectives: to highlight the role played by the level of education of women on their economic empowerment and, through a knock-on effect, the impact of the economic empowerment of mothers on child mortality. An instrumental variables approach was adopted for a linear probability model. We defined the variable on educational policy as an instrument by referring to the major reforms undertaken in the 1980s and 1990s.

Although the results revealed some clear responses, some of the responses were mixed and allowed us to confirm all the hypotheses in our analysis. The first examination of the level of education, measured through the level of primary school education or higher, does not allow for an improvement of the economic empowerment of the woman in Burkina Faso in all the aspects addressed. However, when the level of education is captured through participation in literary programmes, it becomes a determinant of economic empowerment of the woman in the country. This relationship can be explained by the fact that the literacy programmes implemented have been accompanied by vocational training, which often best meets the needs on the labour market. This result is consistent with the human capital theory propelled by [Becker \(1964\)](#), who emphasizes that educational attainment improves employability opportunities, which is a guarantee of autonomy for women. In the second part of our results, we found proof related to the role of economic empowerment of women in the reduction of child mortality. Indeed, our results show that the economic empowerment apprehended by its participation of mothers in decision making concerning family spending induces a decrease in both infant and child mortality. Nevertheless, economic independence, captured by the variable's participation in the contribution and management of income, did not seem to be a determinant in the reduction of child mortality. In future, this study could be extended beyond its focus on economic empowerment. The participation of women in politics and a more active participation by women in decision making within the household are other possibilities for future studies. Furthermore, government authorities should pursue efforts in school enrolment for young girls by investing more in education and improving the education system through integrating vocational training within the school curriculum so as to guarantee a pairing of the knowledge acquired through education with the demands of the labour market. Moreover, in regard to the traditional customs that are often discriminatory towards women, it is important that policies targeted towards supporting human capital through the well-being of children do not focus on only one action point, such as the enrolment of girls in educational institutions, but also on the larger institutional context of family and property rights.

**Author Contributions:** Conceptualization, L.B. and A.T.; methodology, L.B.; software, L.B.; validation, A.T., I.N. and L.P.A.M.K.; formal analysis, A.T.; investigation, A.T.; resources, I.N.; data curation, L.B.; writing—original draft preparation, L.B., A.T., I.N. and L.P.A.M.K.; writing—review and editing, L.B.; visualization, I.N.; supervision, A.T.; project administration, L.B.; funding acquisition, L.B. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was funded by African Economic Research Consortium (AERC), through grant number RC21616 And The APC was funded by African Economic Research Consortium (AERC).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data are available on request.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Note

<sup>1</sup> Bantaaaré and alpha commando are non-formal literacy and education policies implemented in Burkina Faso from the 1980s onwards.

## References

- Adelore, O. O., & Olomukoro, C. O. (2015). Influence of literacy education programmes on socio-economic empowerment of women in Edo and Delta states, Nigeria. *US-China Education Review B*, 5(5), 315–324.
- Ahmed, R., & Hyndman-Rizk, N. (2018). The higher education paradox: Towards improving women's empowerment, agency development and labour force participation in Bangladesh. *Gender and Education*, 32(4), 447–465. [[CrossRef](#)]

- Almugren, H. Z., Kijas, A. C. M., Sarabdeen, M., & Binsuwadan, J. (2024). Does quality education and governance matter for women's empowerment? The role of structural factors and governance in the MENA Region. *Sustainability*, *16*, 10277. [CrossRef]
- Aslam, M., & Kingdon, G. G. (2012). Parental education and child health—Understanding the pathways of impact in Pakistan. *World Development*, *40*(10), 2014–2032. [CrossRef]
- Assaad, R., Hendy, R., Lassassi, M., & Yassin, S. (2020). Explaining the MENA paradox: Rising educational attainment, yet stagnant female labor force participation. *Demographic Research*, *43*, 817–850. [CrossRef] [PubMed]
- Banque Africaine de Développement. (2021). *Note de diagnostic pays—Burkina Faso: Renforcer la résilience et accélérer la transformation structurelle de l'économie*. Available online: [https://www.afdb.org/sites/default/files/documents/projects-and-operations/note\\_de\\_diagnostic\\_pays\\_bf.pdf](https://www.afdb.org/sites/default/files/documents/projects-and-operations/note_de_diagnostic_pays_bf.pdf) (accessed on 12 August 2021).
- Baya, B. (1993). *Les Déterminants de la mortalité des enfants en milieu urbain au Burkina Faso: Cas de Bobo Dioulasso* [Unpublished doctoral these]. Département de Démographie, Université de Montréal.
- Bazzi, S., & Blattman, C. (2014). Economic shocks and conflict: Evidence from commodity prices. *American Economic Journal: Macroeconomics*, *6*(4), 1–38. [CrossRef]
- Beck, N. (2011). *Is OLS with a binary dependent variable really, OK? Estimating (mostly) TSCS models with binary dependent variables and fixed effects* [Unpublished manuscript]. NYU.
- Becker, G. S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education*. University of Chicago Press.
- Becker, G. S. (1981). Altruism in the family and selfishness in the marketplace. *Economica*, *48*(189), 1–15. [CrossRef]
- Becker, G. S. (1985). Human capital, effort, and the sexual division of labour. *Journal of Labor Economics*, *3*(1), S33–S58. [CrossRef]
- Becker, G. S. (1994). *Human capital: A theoretical and empirical analysis with special reference to education* (No. beck94-1). National Bureau of Economic Research.
- Becker, G. S., Murphy, K., & Tamura, R. (1994). Human capital, fertility, and economic growth. In D. G. Becker, & G. Becker (Eds.), *Human capital: A theoretical and empirical analysis with special reference to education*. National Bureau of Economic Research (NBER). Available online: <http://www.nber.org/chapters/c11239> (accessed on 12 August 2021).
- Behrman, J. R., Pollak, R. A., & Taubman, P. (1982). Parental preferences and provision for progeny. *Journal of Political Economy*, *90*(1), 52–73. [CrossRef]
- Bussemakers, C., van Oosterhout, K., Kraaykamp, G., & Spierings, N. (2017). Women's worldwide education–employment connection: A multilevel analysis of the moderating impact of economic, political, and cultural contexts. *World Development*, *99*, 28–41. [CrossRef]
- Cameron, L. A., Dowling, M. J., & Christopher, W. (2001). Education and labor market participation of women in Asia: Evidence from five countries. *Economic Development and Cultural Change*, *49*(3), 459–477. [CrossRef]
- Carlson, G. J., Kordas, K., & Murray-Kolb, L. E. (2015). Associations between women's autonomy and child nutritional status: A review of the literature. *Maternal & Child Nutrition*, *11*(4), 452–482.
- Cornish, H., Walls, H., Ndirangu, R., Ogbureke, N., Bah, O. M., Tom-Kargbo, J. F., Dimoh, M., & Ranganathan, M. (2019). Women's economic empowerment and health related decision-making in rural Sierra Leone. *Culture, Health & Sexuality*, *23*(1), 19–36.
- Dhanaraj, S., & Mahambare, V. (2019). Family structure, education and women's employment in rural India. *World Development*, *115*, 17–29. [CrossRef]
- Duflo, E. (2012). Women empowerment and economic development. *Journal of Economic literature*, *50*(4), 1051–1079. [CrossRef]
- Essilfie, G., Sebu, J., & Annim, S. K. (2020). Women's empowerment and child health outcomes in Ghana. *African Development Review*, *32*(2), 200–215. [CrossRef]
- Eswaran, M. (2002). The empowerment of women, fertility, and child mortality: Towards a theoretical analysis. *Journal of Population Economics*, *15*(3), 433–454. [CrossRef]
- Fox, L., & Romero, C. (2017). *In the mind, the household or the market? Concepts and measurement of women's economic empowerment* (World Bank Policy Research Working Paper No. 8079). World Bank.
- Govinda, R. (2008, June 11–12). *Towards gender equality in education: Progress and challenges in Asia-Pacific region*. Proceedings of the UNGEI Global Advisory Committee Asia-Pacific Technical Meeting, Kathmandu, Nepal.
- Green, E., Blattman, C., Jamison, J., & Annan, J. (2015). Women's entrepreneurship and intimate partner violence: A cluster randomized trial of microenterprise assistance and partner participation in post-conflict Uganda (SSM-D-14-01580R1). *Social Science & Medicine*, *133*, 177–188.
- Heer, D. M., & Smith, D. (1968). Mortality level, desired family size, and population increase. *Demography*, *5*(1), 104–121. [CrossRef]
- Hossain, B. (2015). Women empowerment and infant mortality in Bangladesh. *Applied Economics*, *47*(51), 5534–5547. [CrossRef]
- Imai, K. S., Annim, S. K., Kulkarni, V. S., & Gaiha, R. (2014). Women's empowerment and prevalence of stunted and underweight children in rural India. *World Development*, *62*, 88–105. [CrossRef]
- Institut National de la Statistique et de la Démographie. (2022). *Cinquième recensement general de la population et de l'habitation du Burkina Faso*. Ministère de L'économie, des Finances et de la Prospective.



- Ismayilova, L. (2015). Spousal violence in 5 transitional countries: A population-based multilevel analysis of individual and contextual factors. *American Journal of Public Health*, 105(1), 12–22. [\[CrossRef\]](#)
- Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, 30(3), 435–464. [\[CrossRef\]](#)
- Kabeer, N. (2005). Gender equality and women's empowerment. *Gender & Development*, 13(1), 13–24.
- Karimli, L., Lecoutere, E., Wells, R. C., & Ismayilova, L. (2021). More assets, more decision-making power? Mediation model in a cluster-randomized controlled trial evaluating the effect of the graduation program on women's empowerment in Burkina Faso. *World Development*, 137, 105–159. [\[CrossRef\]](#)
- Kien, L., & Nguyen, M. (2020). How education empowers women in developing countries. *The B.E. Journal of Economic Analysis & Policy*, 21(2), 511–536.
- McElroy, M. B., & Horney, M. J. (1981). Nash-bargained household decisions: Toward a generalization of the theory of demand. *International Economic Review*, 22(2), 333–349. [\[CrossRef\]](#)
- Nikiema, P. R., & Kponou, M. K. C. (2024). Women's empowerment and child nutritional outcomes in rural Burkina Faso. *Review of Economics of the Household*. [\[CrossRef\]](#)
- Oyitso, M., & Olomukoro, C. O. (2012). Enhancing women's development through literacy education in Nigeria. *Review of European Studies*, 4(4), 66–76. [\[CrossRef\]](#)
- Pambè, M. W., Gnoumou, B., & Kaboré, I. (2014). Relationship between women's socioeconomic status and empowerment in Burkina Faso: A focus on participation in decision-making and experience of domestic violence. *African Population Studies*, 28(2), 1146–1156. [\[CrossRef\]](#)
- Pratley, P. (2016). Associations between quantitative measures of women's empowerment and access to care and health status for mothers and their children: A systematic review of evidence from the developing world. *Social Science & Medicine*, 169, 119–131.
- Rana, M. Q., Lee, A., Bezerra, J. F. R., & Boas, G. H. V. (2024). Empowerment and Sustainability: Investigating Barriers to Women's Transition from Higher Education to Empowerment in Brazil. *Societies*, 14, 234. [\[CrossRef\]](#)
- Samarakoon, S., & Parinduri, R. (2015). Does education empower women? Evidence from Indonesia. *World Development*, 66, 428–442. [\[CrossRef\]](#)
- Schultz, T. (1960). Capital formation by education. *Journal of Political Economy*, 68(6), 571–583. [\[CrossRef\]](#)
- Schultz, T. (1990). *On human capital investment*. Beijing Institute of Economics Press.
- Smith, L., Ramakrishnan, U., Ndiaye, A., Haddad, L., & Martorell, R. (2004). The importance of women's status for child nutrition in developing countries. *Food and Nutrition Bulletin*, 24(3), 287–288. [\[CrossRef\]](#) [\[PubMed\]](#)
- Thiombiano, B. (2014). Genre et prise de décision au sein du ménage au Burkina Faso. *Cahier Québécois de démographie*, 43(2), 249–278. [\[CrossRef\]](#)
- Titaley, C. R., Dibley, M. J., Agho, K., Roberts, C. L., & Hall, J. (2008). Determinants of neonatal mortality in Indonesia. *BMC Public Health*, 8, 232. [\[CrossRef\]](#)
- UN Women. (2014). *World survey on the role of women in development 2014: Gender equality and sustainable development*. A report signed by the Secretary General and Executive Director. UN Women.
- Westeneng, J., & D'Exelle, B. (2015). How economic empowerment reduces women's reproductive health vulnerability in Tanzania. *The Journal of Development Studies*, 51(11), 1459–1474. [\[CrossRef\]](#)
- World Bank. (2021). *Sahel education white paper: The state of education in the Sahel*. World Bank.

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.