An exploration of associations between
Female Household Headship and Children's Educational Outcomes
using survey data from the Dominican Republic

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Theory and Practice of Public Informatics

Abstract

This paper aims to use data from the Dominican Republic to test the theory that children in female headed households have better educational outcomes than their counterparts in male-headed households. The goal is to inform policy makers whether there is an opportunity to jointly benefit two major development goals, women empowerment and children's education.

Based on previous studies in India, Africa, and other parts of Latin America, this study attempts to account for many of the factors that are found relevant in the literature. One important factor that this study will focus on is head of household marital status. The study will use OLS regression models with interaction terms to test relevant theories.

This study finds that children in cohabited female-headed households tend to have worse education outcomes than counterparts in male-headed households.

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I. Introduction

Improving education systems is a major goal for nearly all developing economies. For many people in these countries, education is the primary method of economic mobility. The children of today are the adults of tomorrow, and investing in education provides long-term benefits in terms of poverty alleviation and increased quality of human capital. However, improving education is a very broad goal, and educational budgets in many developing countries are not large enough to provide the necessary resources in achieving this goal. Additional classrooms and teachers go a long way, but educational attainment is more complex than just the availability of resources. Policy makers should explore additional avenues through which they can improve children's educational outcomes. Children in developing countries will find many variables beyond their control that will influence their ability to attain an education. Exploration and analysis of these factors may offer policy makers new methods through which they can meet educational development goals.

Women represent another key population for policy makers to focus on when it comes to topics like poverty alleviation, health outcomes, and educational achievement. Women, specifically mothers, are a major focus of many development initiatives, as they often carry a disproportional burden of poverty in developing countries. The obstacles these women face can differ across the world, as different cultures, economies, and locations have varying ranges of gender inequality. However, a common thread is that if mothers suffer from poverty, their children tend to suffer as well. Therefore, empowering women often means empowering their children to complete their education and gain opportunities to break the cycle of poverty. For policy makers there is the potential of seeing a dual positive effect from focusing welfare and

educational policy on women with children, as both vulnerable populations can see material benefits in both the short and long term.

Women empowerment is in and of itself simply an idea. From the public informatics and development economics point of view, it is imperative to find variables that measure aspects of empowerment, or lack thereof. Older studies have used education level or income share within a household to measure a women's bargaining power (Haddad et al. 1995). However, newer studies have found that household headship status provides a robust measure of a women's relative decision making power. It is typically the head of household that is making decisions of which food to buy or whether or not to send children to school. Studies in India and some African countries have found that households in which women have great bargaining power typically have better educational and nutritional outcomes for their children. Therefore, there is value in examining the relationship between female household headship and an important development indicator like children's' educational attainment. The potential spillover effect on children's education from aiding female-headed households may offer policy makers a way to achieve greater returns on public investment in welfare for these vulnerable populations.

Unfortunately, research concerning the association between female-headed households and educational outcomes of their children is limited, particularly in Latin American countries like the Dominican Republic. Existing literature has mostly focused on India and Africa, where household structures and union formation are typically more rigid than what is commonly found across Latin America. This translates to higher rates of marriage but also lower independence and household bargaining power for many women. Latin America is an often overlooked area of the world in the literature on this topic. Countries in Central America, South America, and the Caribbean offer a unique opportunity to examine female headship in a setting where gender

inequality is less culturally pronounced and union formation is much more fluid. For example, Latin American countries have very high rates of cohabitation, where two unmarried adults live together. Furthermore, the D.R. has one of the highest rates of cohabitation within Latin America (Lopez-Gay et al. 2014). Female headship in a context with much greater heterogeneity in household structure may lead to different results when modeling the association with children's educational outcomes, even when using models similar to those from the literature on India and Africa.

In this paper, I use nationally representative data from the D.R. to test whether a child in a female-headed household is likely to have different education outcomes than their counterpart in a male-headed household. Given the unique relationship structure of families in the D.R., I will be paying special mind to heterogeneity within female-headed households in the form of different relationship structures, such as marriage and cohabitation.

In the spirit of transparency, I would like to inform the reader that this analysis is modeled after an analysis I completed using 2013 DHS data for Peru to test similar hypotheses. Parts of the literature review, data review, and methodology in this analysis reflect work done for that project. The goal of that analysis was different, as it was focused on the econometrics and methodology and did not discuss the policy implications of its results. The Peru study was done in Stata, and this D.R. study followed similar methodology but the full analysis was redone in R. This paper uses the Peru study as methodological framework, but seeks to expand on the results and discuss potential policy changes in depth. The Peru study was completed in 2017 for undergraduate studies at Wesleyan University. I cite my previous study in the bibliography.

II. Literature Review

According to the Borgen Project, the Dominican Republic has one of the most underperforming educational systems in the world (Lipp 2017). There are many serious issues in the Dominican educational system. Teachers are a scarce resource and typically very underpaid, classrooms tend to be very crowded, facilities are of poor quality, and curriculums are outdated (Lipp 2017). It is reported that about 40% of students drop out of school before eighth grade (Lipp 2017). Reforms have been promised and even implemented, with the construction of new buildings and extending the school day, but there remain significant hurdles to achieving an adequate educational system (Manning 2014).

One principal at small rural school states his opinion that some of the issues stem from the country's culture, and that "a lot of the time, families don't understand the importance of their children's education responsibilities" (Manning 2014). While policy cannot dictate culture, certain policies may help gradually shift what Dominicans consider important. If theories about female headship and improved conditions from children prove true in the D.R., they may offer an avenue for policy makers to focus welfare efforts on households that are expecting see the best results for their children. Better educated children will grow up to be the adults of the next few decades, and a culture that puts more importance on education may eventually emerge on its own.

The Dominican Republic boasts a decent amount of public expenditure in welfare programs designed to help its poorest residents. Social assistance accounted for 25% of executed social spending in 2004, reported as being more than either health or education spending (Regalia et al. 2005). However, researchers examining Dominican welfare programs find that assistance is poorly targeted and generally limited in its impact on alleviating poverty and

inequality (Regalia et al. 2005). This is why an analysis of specific populations, like female-headed households, may prove beneficial to policy makers. If certain segments of the population respond better to welfare, especially in the long run, it may make sense to focus social welfare spending there. One welfare program titled, "Tarjeta de Asistencia Escolar," is actually focused on increasing children's access and attendance in the school system and promoting equity for mothers (Regalia et al. 2005). The program targets rural and marginalized communities, and offers a cash transfer of RD$300 (about USD $7.27 in 2004) to families conditional on the attendance of the children at school (Regalia et al. 2005). One target population of this program was female heads of household. However, there is no data or reports available on the success of failure of this program. Nonetheless, it is promising that the idea of boosting education rates while supplementing women's empowerment through welfare programs already exists and is implemented in the Dominican Republic. There is potential for policy makers to expand and further fund programs like this if there is evidence that they work. Analyzing this particular program is beyond the scope of this study given that data on participants is not readily available. However, this analysis will test the theories that programs like this are based on.

From Singh's literature review on female headship, wealth measures, and cohabitation in Latin America (Singh 2017):

> The theory that increased female bargaining power results in better outcomes for the children of the household stems from studies that found that measures of female bargaining power, such as share of income and education, were positively related with food expenditure and children's educational outcomes. For example, using data from the Ivory Coast, Haddad and Hoddinott (1995) found that as a women's share of household income increased, there was an increase in the amount of food bought, compared to when

that share became smaller, and there was an increase in expenditure on demerit goods like alcohol and tobacco. Similarly, in a review of the literature, Paul Schulz (2002) finds that empirical research indicates a significant positive relationship between mother's education and the educational outcomes of her children. Research done by Chudgar (2009) showed that, in India, a marginal improvement in a mother's literacy had significantly large effects on schooling outcomes for her children.

Unlike share of income and education level, headship status is a much more consequential indicator of bargaining power. A household's head is the one making both major decisions as well as day-to-day ones, like what to buy at the market and whether to send the kids to school or have them work. Despite the tendency of women to act in the best interests of their households, there remains an issue that many female-headed households in developing countries are poorer then male-headed households to the extent that they are unable to act on their preferences. In an extensive review of the literature surrounding the relationship between female headship and poverty, Buvinic and Gupta (1997) claim that although female-headed households "prefer to invest scarce resources in children," studies have found that female-headed households can both protect and further expose children to poverty.

One issue with the literature reviewed by Buvinic and Gupta (1997) is the unreliability of wealth variables. Chudgar (2011) points out that measures of income and expenditure, used in many of the studies reviewed by Buvinic and Gupta (1997) are too reliant on an individual's financial situation at the time of the survey. Instead Chudgar (2011) advocates the use of wealth indices that are developed from principal components analysis on a set of asset indicators. By considering the assets that an individual has,

rather than expenditure in any given time, a wealth index like the one found in DHS surveys represent a much better measure of someone's long-term economic status (Rutstein, Johnson 2004). Although the relationship between female headship and poverty is difficult to establish, the use of a wealth index, like the one in used in DHS surveys, will be key in controlling for resource levels across households.

When controlling for wealth, the relationship between female headship and children's nutritional and educational outcomes is less controversial. In their study on the Dominican Republic, Johnson and Rogers (1993) found that despite being poorer than two parent male-headed households, children in female-headed households were healthier and consumed more calories. Looking at education, Lloyd and Blanc (1996) used data from several African countries to find that children in female-headed households had better educational outcomes across all the samples when controlling for wealth. Similarly, in her analysis on India, Chudgar (2011) finds that children in female-headed households were more likely to remain enrolled and finish more years of school, and that widow-headed households were less likely to discriminate between the boys and girls in their household. Interestingly enough, despite these findings in India and Africa, studies in Latin America have not shown the same results. Although there is a significant lack of literature on Latin America, one study from Ecuador by Bilsborrow and Degraff (1993) found that children in female-headed households, especially those headed by widows, were less likely to be enrolled in school than their counterparts in male-headed households.

The heterogeneity within female-headed households that is discussed by studies like Chudgar (2011) indicate that any analysis must take into account family and

relationship structures that are specific to the area or country of study. In their survey of unmarried cohabitation in Latin America, Lopez-Gay, et al. rank the D.R. in the top 5 for countries with high rates of cohabitation. Colombia, Cuba, Panama, Peru, and, of course, the Dominican Republic, have median cohabitation rates above 60% (Lopez-Gay et al. 2014). Moreover, the recent rise in cohabitation across Latin America has resulted in a parallel rise in female headship (Liu et al. 2017), partly due to the instability of informal unions. The difference in family structure between married households and cohabited households is important and significant enough to take into account, especially in a country with rates of cohabitation as high as the Dominican Republic (Liu et al. 2017).

III. Research Question

This paper seeks to address the question: Is a child in a female-headed household more, or less, likely to complete as many years of schooling as their counterparts in male-headed households? By addressing this question using data from the D.R., I will test the findings of studies focused on India and Africa in a setting with a vastly different structure of union formation. Namely, in a culture with much higher rates of cohabitation.

I also ask: are female children in female-headed households more, or less, likely to be discriminated against when it comes to educational outcomes, compared to their counterparts in male-headed households?

The problem that underlies nearly all of the analyses concerning female headship is that female headship may not be completely exogenous, despite numerous controls. It is nearly impossible, particularly with survey data, to account for all possible factors that may be associated with both education outcomes and female headship. For example, unaccounted for

pre-relationship and pre-survey conditions may influence how a women becomes head of a household. This simply means that when examining results to these research questions I cannot, nor seek to, imply causality.

IV. Data

I used publicly available data from the Demographic and Health Surveys Program (DHS). The dataset comes from 2013 Standard DHS-VI survey data on a nationally representative sample of households in the D.R. The survey was originally conducted in 2013, and DHS researchers interviewed individuals across a sample of 11,464 households. The original survey provides basic information on all members of the household, including age, gender, relationship to head of household, and education. This analysis uses the Individual Recode of the dataset in conjunction with the Household Recode. This means that each observation is an individual, but the dataset also accounts for household level measures using household identification numbers.

The target sample is primary school aged children under the care of their parent or parents. The sample used for this analysis is made up of 4,653 individuals aged 6-14 that were identified as sons or daughters of the head of household.

V. Variables

Dependent Variables:

The dependent variable in this analysis is the continuous outcome variable, *Education in Single Years (EDUC)*, indicating an individual's education level in single years. It is constructed from a categorical variable indicating an individual's education level (i.e. preschool, primary, secondary, etc.) and a continuous variable indicating the highest grade completed by the

individual. Since the observations in the sample are all children aged 6-14, I am focused on primary school aged children.

Independent Variables:

I chose several independent variables, motivated by previous literature and models used in other countries. Four variables indicate characteristics of the child: child's age, child's birth order, child's sex, and a dummy variable indicating whether the child has an older male sibling or not. Other controls are at household level: household size, wealth index, whether the household is in a rural area, and what region of the D.R. the household is located in. Lastly, I include controls for the head of household including age, gender, education level, and dummy variables indicating whether the head of household is married or cohabited.

The main independent variable of interest is *Female Head of Household (FHH),* a dummy variable indicating the gender of the child's household head. This variable comes directly from a survey question that asks respondents for the sex of their head of household. Note that typically, in DHS data, respondents answering household level survey equations are typically heads of the household (ICF International 2012). The value for *FHH*, like other household level variables, is shared by every individual in the same household. As seen in ***Table 1***, female-headed households account for 39.6% of all households in the sample.

One common issue with data on household headship is the discrepancy in who is reported as the de jure head of household, and who acts as the actual de facto head of household (Chudgar 2011). For example, an elderly grandmother may be reported as the household head out of respect, even though her son is the one that makes all the decisions. This issue is partly alleviated by restricting the sample being analyzed to school age children that are sons and daughters of the

head of household. I believe there is a negligible chance that an elderly grandmother will have children aged 6-14, and therefore I do not believe this will be an issue in this analysis.

The independent variables indicating characteristics of the child control for variation in education associated with the child's age and sex, the child's birth order, and whether the child has an older male sibling or not. Child's age and sex are reported by the respondent, who is asked for information about each member of the household. *Birth Order* and *Older Male Sibling* are constructed, and the process is described below.

The literature communicates the concern that educational outcomes within a household may differ for children who are born after their siblings (Chudgar 2011). For example, the oldest sibling may have the most resources put into them, or alternatively they may be forced to work much at an earlier age than their brothers and sisters. Therefore, I control for a child's birth order among their siblings, and whether the child has older male siblings. These variables were calculated by sorting all children in each household by age before limiting the dataset to children aged 6-14. This ensured that the *Birth Order* and *Oldest Male Sibling* was accounting for all children in a household, not just those that fell within the age gap the final sample focuses on.

Some of the household control variables were easily constructed using answers to the original survey questions. The variables indicating household size, age of household head, and sex of household head come directly from survey questions asking the respondents exactly those questions. Similarly, variables indicating what region of the D.R. and whether a household is located in an urban or rural area are also directly from the survey results, although this information would be available to researchers without asking respondents. See ***Figure 1*** for a map of where each region is located.

The variable indicating wealth index score is a continuous variable that is used to control for the wealth of each household. Obviously, household wealth has a significant effect on a child's educational possibilities, so it is vital to control for it. The wealth index score used in this analysis is calculated by DHS based on various survey questions they ask respondents. The DHS Wealth Index Score is meant to be a better measure of long-term household wealth than income or expenditure statistics. This index is created using a principal components analysis on various measures of household well-being like material used on house walls, roof, floor, whether clean water is available on premise, whether toilets are shared, along with indicators for possessions like refrigerators and televisions. For this analysis I use the actual continuous variable, *Wealth Index Score*¸ instead of the categorical economic class variable that is derived from it.

For the education of the head of household, I chose to use categorical dummy variables indicating the highest level of education completed by the head. These variables come from a survey question asking the respondents for the highest level of education completed by the head of their household. This variable was recoded into four dummy variables, *Preschool, Primary, Secondary,* and *Higher*. Anyone with higher than a high school education is included in *Higher* and anyone with unknown level of education is dropped. The literature argues that the return on education is significantly different for those who have completed their secondary education (i.e. 12 years) compared to those who have not (i.e. only finished 11 years) (Chudgar 2011). Similarly, individual's children's welfare outcomes are effected more by the jump from illiteracy to literacy, then from an additional year of education (Chudgar 2009). Moreover, using a continuous education variable for household heads, like single years of education, ignores the fact that the returns for educational attainment, both for an individual and their children, are more closely tied to the completion of certain benchmark levels of education than they are to

continuous measures of education like years of schooling. Thus, in this case, the categorical education level variables will be used as the measure of household head education.

Finally, one of the most important controls in this analysis is the marital status of the head of household. There are two dummy variables to indicate whether the marital status of the head of household is married or cohabiting. These variables are recoded from the categorical survey variable that indicates the marital status of the head of the household. Thus, the base group is everyone who is not married or living with someone, so those who were never married, are widowed, or are divorced. This category can be considered to be all female-heads who are single.

Marital status is a key variable, as it represents certain household structures that may affect a child's educational attainment. As discussed in the literature review, there is a significant lack of literature that addresses the heterogeneity in marital status within female headed households, especially in Latin America. However there is some literature that suggests that there may be differences in how households make decisions if they are married as opposed to just living together (Lopez-Gay et al. 2014). Since cohabitation represents the majority of the households in the Dominican Republic, and about 54.6% of households in the sample, it is important to control for its effects on a child's educational outcomes. Controlling for marital status alongside its interaction with female headship will better account for the heterogeneity within female headed households. This will allow me to test the theory that female heads may make different decisions for their children depending on if they are single, married, or cohabiting.

VI. Methodology

The first model in this analysis is an ordinary least squares (OLS) regression model of *EDUC*, child's education in single years, on the independent variable *Female Head of Household (FHH)*, with all child and household level controls included. It is specified as:

$$EDUC = \beta_0 + \alpha_{FHH} FHH + \boldsymbol{\beta X} + \varepsilon_i \qquad (1)$$

In this equation, β_0 is the constant, α_{FHH} represents the additional years of schooling associated with having a female head of household (with male-headed households as the reference group), $\boldsymbol{\beta}$ is a vector of coefficients, and $\boldsymbol{X}$ is the matrix of child and household level controls. By estimating this model, I test the following hypotheses:

$$H_0 : \alpha_{FHH} = 0$$

$$H_1 : \alpha_{FHH} \neq 0$$

Where the null hypothesis is that female household headship has no additional effect on the educational outcome of a child, compared to the reference group of male-headed households. See ***Table 3, column 1*** for the OLS estimates obtained by estimating Equation 1.

The second step of the analysis is to account for heterogeneity related to marital status within female-headed households. To do this I create two interaction terms between *FHH* and the two marital status dummy variables, *Married Head of Household* and *Cohabited Married Head of Household*. These interactions terms will allow the model to account for differences in the educational outcome of a child across female-headed households due to the marital status of

the head. First, however, it is important to test the joint significance of the variables to decide whether they should even be included in the specification. This model is specified as:

$$EDUC = \beta_0 + \alpha_{FHH}FHH + \alpha_{FMHH}FMHH + \alpha_{FCHH}FCHH + \boldsymbol{\beta X} + \varepsilon_i \qquad (2)$$

Where *FMHH* is the interaction term between *FHH* and *Married*, and *FCHH* is the interaction term between *FHH* and *Cohabited*. In this specification, α_{FMHH} is the difference in the number of years of schooling attained by a child living in a female-headed married household compared to one living in a single mother household. Similarly, α_{FCHH} is the difference in the number of years of schooling attained by a child in a female-headed cohabited household compared to one living in a single mother household. With the new interaction terms, α_{FHH} represents the reference group of single female heads, when *FMHH* and *FCHH* are both zero and *FHH* is one.

Thus, the model can now account for heterogeneity across female-headed households. See ***Table 3, column 2*** for OLS estimates from Equation 2.

The third step of the analysis will address the question regarding whether the effect of female headship on the educational attainment of female children is any different from the effect of female headship on the educational attainment of male children. To test this, I include an interaction term between *FHH* and *FEMALE*, called *FFHH*. This variable will allow me to consider the difference in educational attainment between males and females within female headed households. The final model is specified as:

$$EDUC = \beta_0 + \alpha_{FHH}FHH + \alpha_{FFHH}FFHH + \alpha_{FMHH}FMHH + \alpha_{FCHH}FCHH + \boldsymbol{\beta X} + \varepsilon_i \quad (3)$$

In this model, α_{FFHH} represents the difference in single years of education attained between girls and boys within female headed households. Now, the α_{FHH}, when *FFHH, FMHH,* and *FCHH* are zero, represents the reference group of males in single female-headed households. See ***Table 3, column 3*** for OLS estimates from Equation 3.

VII. Results and Interpretations

Results for regression runs specified by Equation 1, 2, and 3 are in ***Table 3***.

From the first regression, specified in Equation 1, the coefficient on *FHH* is statistically significant at the 95% level, allowing for the rejection that a child in a female-headed household would have the same educational outcomes as if they were male-headed household. The sign of the coefficient is negative, indicating that in the D.R., children in female-headed households are generally attaining less education compared to their counterparts in male-headed households. According to the model, a child in female headed households can expect to complete 0.116 fewer years (~1.4 months) of education than a child in a male-headed household. Although, the magnitude is not incredibly large, the coefficient is still statistically significant. However, this model does not account for the variety of family structures amongst female-headed households, and therefore is limited in the evidence it provides.

The second regression, specified in Equation 2, addresses the heterogeneity amongst female-headed households. With the inclusion of *FMHH* and *FCHH* into the model, the coefficient on *FHH* is no longer statistically significant, disallowing the rejection of H_0 : $\alpha_{FHH} = 0$. This means that for single female-headed households, children are no better, or worse, off than their counterparts in male headed households. Although α_{FHH} is insignificant, an

F-test run on *FMHH* and *FCHH,* indicates that these variables have a jointly significant effect on child's educational attainment (p = 0.0286, significant at the 95% confidence level).

In this same model, the coefficient on *FCHH* is statistically significant, even though the coefficient on *FMHH* is not. The negative value of α_{FCHH} represents a negative relationship between cohabitation and children's educational attainment amongst female-headed households. It indicates that children in female-headed cohabited households can be expected to -0.185 (coefficient on *FHH* plus coefficient on *FCHH*) fewer years of education (~2.2 months) than their counterparts in male-headed households. Furthermore, this illustrates the negative effect of female headship seen in Equation is largely driven by this effect from female-headed cohabited households. This effect can be compared to the positive effect of cohabitation indicated by the statistically significant positive coefficient on *Cohabitation*, which represents the reference group of male-headed households. This means that while cohabitation may have a positive effect for children in male-headed households, children in female-headed households generally suffer from the presence of their mother's live-in partners. The second specification suggests that the negative effect associated with *FHH* in the first specification comes mostly from the negative effect of *FCHH*.

The third regression, specified by Equation 3, examines whether there exists a difference between male and female children within female headed households. Since the coefficient on *FFHH* is statistically insignificant, the effect of female headship on *EDUC* is the same for both boys and girls.

Therefore, the main findings of this analysis are that children in female-headed households are generally expected to achieve less schooling than their counterparts in male headed households. When isolating the effect of cohabited female-headed households, it is

illustrated that children in those households are driving a large part of the negative relationship between female-headship and schooling for children. This indicates that children in cohabited female-headed households are achieving demonstrably less education than counterparts in male-headed households, but also married and single female-headed households.

There does not seem to be significant discrimination between male and female children in female-headed households. Unlike studies in India and Africa, this study actually finds that female children in the D.R. generally complete more school than male counterparts, regardless of who their head of household is, as indicating by the significant positive coefficient on the variable *Female*. The results of Equation 3 represent the need for development economics literature specific to this context. It seems from the results this analysis that gender inequality in the Dominican Republic is vastly different, at least in terms of education, than what the literature finds in South Asia and Africa.

VIII. Conclusion

This analysis finds that female-led cohabited households are negatively associated with educational outcomes for children in those households. Again, only correlation can be implied, not causality. In order to imply a causal relationship, researchers could design a randomized control trial, a common methodology in development economics, in order to control for any unobserved variables that are otherwise left in a model that uses general survey data. Ideally, this study would keep track of students and examine how they did over time. Participants in the previously mentioned welfare program "Tarjeta de Asistencia Escolar," would be good subjects for a study like this. This would allow researchers to examine how welfare given to female heads conditional on their children's attendance of school materializes in the short and long term

educational outcomes of their children. This would not be an easy, nor cheap, undertaking, especially using traditional in-person surveying techniques. However, as access to the internet slowly proliferates through countries like the Dominican Republic, these types of studies may be able to utilize new technologies to make data collection easier and more efficient.

This study finds results that go against the findings of researchers who examined India and Africa. Life in Latin America is very different from these areas, and it is not surprising that phenomenon seen in Africa and India are not seen in the Dominican Republic. As the second and third specifications show, an important proponent of this difference is the high rate of cohabitation in the Dominican Republic, which is found to have a negative effect on children's education in female-headed households. The dilemma here is that although the D.R. differs from places like India and Africa in terms of having better gender inequality and fluidity of unions for women, the effects may manifest negatively for children. However, from a government perspective it is difficult to enact policy focused on this subject. After all, governments cannot dictate the culture that may be leading to certain household structures. However, governments can enact policy that gradually changes this culture. Better educated girls become more economically independent and empowered women, and in turn these women may take different approaches to union-building which may eventually come back around as improved opportunities for their own children.

Along the same line of thought, one concern may be that social welfare programs like "Tarjeta de Asistencia Escolar" may encourage individuals to cohabit if it means gaining access to government benefits. However, it was clear that programs like "Tarjeta de Asistencia Escolar" do not provide enough to drive individuals to make decisions about family building based solely on gaining access to a small amount welfare (I mean, we're talking ~$7 a month for this

particular program). I also believe that enrollment in welfare programs would have been a useful control within this analysis.

Another note is that this analysis found that children in male-headed households with live-in female partners actually did better in terms of educational outcomes. The issue at large is not that cohabitation causes poorer education outcomes. This analysis does not determine causation, and the issue is definitely not that clear cut. Within the tangled web of associations between poverty, development initiatives, household structure, gender inequality, and children's education are various connections that may offer possible ways for policy makers to address multiple development goals concurrently. This is obviously difficult when data must be collected on the ground through in-person survey, but the age of big data may bring change to this, even in very impoverished areas. I still believe that exploring how household structure affects educational outcomes is an important task for policy makers in the Dominican Republic. Women empowerment and children's education are two very major development goals, and I believe there is the potential for policy to have complementary benefits for both.

As educational tools evolve, they may also open up new ways for children to achieve higher rates of school completion, as well as offer researchers new tools to collect and analyze data. More than a decade has passed since the 2013 DHS survey, and in many ways that data is outdated. In the last decade there have been huge strides in access to the internet and smart devices across the globe. The Dominican Republic saw an internet penetration rate of 78.9% rate in 2021, compared to 36.4% in 2013, when the DHS data in this analysis is from (Statista 2021). With internet access being more than twice as common now, it is clear that the context for analyzing education and opportunity for children has changed drastically. Greater internet access may alleviate the gaps in education between various types of households, various income levels,

genders, etc. However, this benefit may not be equal to all, and the most vulnerable in the D.R. may not be seeing substantial change. The analysis undertaken in this paper is a good first step, but in order to inform education policy today, researchers would need to use newer data. The purpose of this paper was to explore one potential path through which policy makers may be able to improve the situation, but the issue is complicated and newer, more informed studies are needed to fill in the research gap.

IX. Tables and Figures

Table 1: *List of Variables and Descriptive Statistics*

Variable	*Mean*	*Standard Deviation*
Dependent Variables		
Years of Education Completed	4.065	2.542
Independent Variables [Child]		
Female	0.481	0.500
Age	10.20	2.556
Has Older Male Sibling	0.683	0.465
Birth Order	1.994	1.063
Independent Variables [Household]		
Household Size	5.070	1.627
Wealth Index Factor Score	4,378	91,139
Age of Head of Household	39.22	8.181
Female Head of Household	0.396	0.489
Education Level of Head Household		
Preschool	0.00189	0.0435
Primary	0.508	0.500
Secondary	0.272	0.445
Higher	0.162	0.369
Marital Status of Head of Household		
Married	0.211	0.408
Cohabited	0.546	0.498
Rural	0.293	0.455
Region Dummy Variables		
Region 0	0.169	0.374
Region I	0.114	0.318
Region II	0.102	0.303
Region III	0.0961	0.295
Region IV	0.108	0.310
Region V	0.110	0.313
Region VI	0.112	0.315
Region VII	0.0892	0.285
Region VIII	0.100	0.301

Figure 1: *Map of Dominican Republic & Survey Regions*

Source: Centro de Estudios Sociales y Demográficos (CESDEM). (2014). *Encuesta Demográfica y de Salud Republica Dominicana 2013*. ICF International Rockville, Maryland, EEUU.

Table 3: *OLS estimates for multiple regression models of dependent variable "Education in Single Years"*

Variable	*[1]* *w/o Interaction Terms*	*[2]* *w/ Marital Status Interaction Terms*	*[3]* *w/ Marital Status & Child Gender Interaction Terms*
Main Independent Variable			
Female Head of Household (FHH)	-0.116**	0.159	0.186
	(-0.0494)	(-0.118)	(-0.124)
Interaction Terms			
Female Head/Married Household		-0.299*	-0.298*
(FMHH)		(-0.154)	(-0.154)
Female Head/Cohabitation Household		-0.344***	-0.341***
(FCHH)		(-0.129)	(-0.129)
Female Head/Female Child			-0.0598
(FFHH)			(-0.0744)
Individual Controls			
Female	0.454***	0.453***	0.476***
	(-0.0522)	(-0.0521)	(-0.0578)
Age	0.832***	0.834***	0.834***
	(-0.008)	(-0.008)	(-0.00802)
Had Older Male Sibling	-0.0427	-0.0424	-0.0416
	(-0.06)	(-0.06)	(-0.06)
Birth Order	0.000704	0.00233	0.00224
	(-0.0235)	(-0.0235)	(-0.0235)
Household Controls			
Household Size	0.832***	0.834***	0.834***
	(-0.008)	(-0.008)	(-0.00802)
Wealth Index Factor Score	4.63e-06***	4.56e-06***	4.56e-06***
	(-2.76E-07)	(-2.77E-07)	(-2.77E-07)
Age of Head of Household	-0.00219	-0.0022	-0.00221
	(-0.00289)	(-0.00289)	(-0.00289)
Married Head of Household	0.119*	0.367***	0.365***
	(-0.0652)	(-0.12)	(-0.119)
Cohabitated Head of Household	0.0347	0.293**	0.291**
	(-0.0555)	(-0.114)	(-0.114)
Education Level of Head of Household			
Preschool	-1.052	-1.087	-1.092
	(-0.898)	(-0.902)	(-0.904)
Primary	0.340***	0.337***	0.338***
	(-0.0927)	(-0.0927)	(-0.0928)
Secondary	0.577***	0.570***	0.570***
	(-0.0968)	(-0.097)	(-0.097)
Higher	0.691***	0.685***	0.685***
	(-0.105)	(-0.105)	(-0.105)

Table 3: *continued*

Variable	*[1]* *w/o Interaction Terms*	*[2]* *w/ Marital Status Interaction Terms*	*[3]* *w/ Marital Status and Child's Gender Interaction Terms*
Rural	0.205***	0.198***	0.198***
	(-0.0469)	(-0.0469)	(-0.0469)
Region Dummy Variables			
Region I	-0.00764	-0.00315	-0.00476
	(-0.0715)	(-0.0715)	(-0.0715)
Region II	-0.0476	-0.0474	-0.0479
	(-0.0693)	(-0.0693)	(-0.0693)
Region III	-0.0139	-0.0131	-0.0138
	(-0.0736)	(-0.0734)	(-0.0735)
Region IV	0.0476	0.0521	0.0502
	(-0.0746)	(-0.0749)	(-0.0751)
Region V	-0.163**	-0.162**	-0.163**
	(-0.0688)	(-0.0688)	(-0.069)
Region VI	0.245***	0.246***	0.245***
	(-0.0733)	(-0.0733)	(-0.0733)
Region VII	0.346***	0.340***	0.340***
	(-0.0712)	(-0.0716)	(-0.0716)
Region VIII	-0.028	-0.0278	-0.0282
	(-0.073)	(-0.073)	(-0.073)
Constant	-4.760***	-4.991***	-5.001***
	(-0.17)	(-0.194)	(-0.194)
Observations	4,753	4,753	4,753
R-squared	0.761	0.761	0.761

Robust standard errors in parentheses

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

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