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Female say on income and child outcomes

Evidence from Nigeria

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Abstract: This paper delves into the effect of female bargaining power on child education and labor outcomes in Nigeria. Female bargaining power is proxied by female say on labor income, rather than by female income per se. This is motivated by the fact female labor force participation might be low in some contexts, while control over income is by all means what matters the most. The empirical methodology accounts for a number of empirical issues, including endogeneity and sample selection issues of female say on labor income, the multi-equation and mixed process features of the child outcomes, as well as the fact that hours of work are left-censored. My findings are consistent with the overall idea that female say on income leads to better child outcomes, rather than female income earning per se. Nevertheless, the type of income under female control, child gender and child outcome matter.

Keywords: child education, child labour, female bargaining power, female say on income, Nigeria

JEL classification: D19, I21, I24, J13, J16, J21

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1 Introduction

Gender issues in general, and women's empowerment in particular, are increasingly acknowledged as cross-cutting issues in many development agendas and programs. It is argued that "women's empowerment and gender equality produce the *double dividend* of benefiting both women and children, in that women's influence in key decisions improves the life of women themselves and have positive effects on child well-being as well as on development (UNICEF, 2006).

In current literature, the dynamics of household decision-making processes are better described within the framework of collective models of household behavior. One basic assumption underlying the models is that individual's bargaining power is positively associated with their influence on household decision-making and their share of/contribution to household income. Hence, the use of female's contribution to household income (first proxy) and female say on household decision-making (second proxy) as proxies for female's bargaining power is common in the research literature.

Nevertheless, using such proxies poses some issues. The first issue relates to female's contribution to household income (the first proxy) and is conceptual. When it comes to defining individual's contribution to household welfare, it is worth distinguishing between *actual* and *perceived* contribution, particularly in case of women. Indeed, not only the actual value of contribution matters when it comes to bargaining power, but also its *visibility*. The latter is closely associated with the orientation of the contribution (market exchange versus subsistence consumption), form (cash versus in kind) and location (inside household versus outside) (Kabeer, 1995; Acharya and Bennett, 1983). In case of low- and middle-income countries, women's actual contribution to household welfare is obvious and incontestable, however their perceived contribution is often lower for two reasons. On the one hand, due to prevailing gender division of labor, women predominantly contribute with domestic unpaid labor (including childcare), which is less visible. On the other hand, paid job opportunities may be scarce in some contexts (for example in rural areas), and women may additionally face some gender-specific constraints preventing them from taking (full-time) paid work even though they otherwise could. This idea is developed and referred to as *choice without option* in Kabeer (2012).

The second issue is that income earning is not the most important factor : control over income is of paramount importance, as without control over income, individual does not have much decision-making power about its allocation. Unequal say on household expenditures at the expense of women characterizes many households in sub-Saharan Africa (SSA) (UNICEF, 2006).

The third issue concerns the so-called *final say* approach, which relies on individuals' final say on given decision-making items so as to proxy their bargaining

power. There are multiple potential decision-making matters, and the relative accuracy of some of them as real bargaining power proxies can be put into perspective. Female say in some domains, such as in child-related matters, may result from gender-ascribed roles rather than from real bargaining power. Female's greater say on and (seemingly) stronger preferences for child-related spending can even result from gender discrimination (Doepke and Tertilt, 2011).

The fourth and last issue, common to both proxies, is endogeneity. Indeed, the traditional collective model generally regards the welfare weights (balance of power) as exogenous to the household decision-making. This is potentially a major lacuna in the collective model of households, as the power balance can, in turn, depend on the household's choice vector (Basu, 2006). For instance, a woman's income share depends on the labor supply of her spouse, which in fact, is a choice variable of the household. Thus, the woman's decision-making power is endogenous.

Using data from the 2012-2013 Nigerian General Household Survey, this paper delves into the effect of female say on labor income, a proxy for female's bargaining power, on child education and labor outcomes in Nigeria. The study of such relationships is not new but this paper contributes to existing literature in a number of ways. *First*, as a matter of conceptualization, I proxy female's bargaining power by her say on the use of both male and female labor income, rather than solely on her own contribution to the household labor income. In that way, the scope of female's contributions is not limited merely to her financial contributions since "*No Wage*" is not necessarily "*No Say*". Additionally, woman's ability to control her income, rather than merely a share of their income, is given particular attention.

Second, I argue that, as compared to female say over any child-specific decision item (for example say over spending on children), female say on the use of labor income is a better proxy for her bargaining power for two reasons. First, related to the third issue, decision-making on the use of labor income is less likely to be a female-ascribed role, particularly when we talk about male income. On the other hand, there is a trade-off between a decision item's specificity (to children) and its accuracy as a proxy of bargaining power. Indeed, when a female is reported as the decision-maker when it comes to spending on children, it could be that she is just in charge of managing a given amount of money allocated to her for children's needs. The woman herself might not have any influence on the prior allocation process of the overall household income into expenditure categories (including spending on children). Under such circumstances, female say on the (general) use of (overall) income is definitely a better proxy of her real bargaining power.

As a final introductory note, the case of Nigeria is relevant for few reasons. The first reason relates to data availability. The kind of data necessary to address the research question requires individual-level data on income earning and man-

agement. Such detailed data, particularly at a nationwide scope, are not usually available for many countries in Africa. Even in the present case of Nigeria, and as we will highlight it when describing the dataset, there is no more than one nationwide and recent (wave of) dataset that we can use for the purpose of our study. The second reason is that, relative to other sub-Saharan countries, the case of Nigeria is more interesting with regards to its socio-cultural and ethnic diversity (Kritz and Makinwa-Adebusoye, 1999; Uthman, 2008). This translates into inter-ethnic and spatial variations in women’s socio-economic outcomes, including for example their labor force participation, decision-making power, and agricultural productivity (Kritz and Makinwa-Adebusoye, 1999; Lamidi, 2016; Oseni et al., 2014). Last but not the least, Nigeria’s economy is the largest in Africa and it is the most populous country of the continent (ranked 7th worldwide) with more than 16% of the entire African population, hence it is often referred to as the *giant of Africa*.

The remainder of the paper is organized as follow. Section 2 reviews the related literature. Section 3 presents the dataset and statistically describes the data at hand. Section 4 deals with the empirical strategy. Section 5 presents our empirical findings while Section 6 concludes.

2 Related literature

This paper is related to two strands of literature. The first strand is the literature on intra-household balance of power. In the so-called non-unitary models of household behavior, household members, say male and female, may have distinct and possibly conflicting preferences (see Vermeulen, 2005, for a thorough review of these models). The collective model of household behavior (Chiappori, 1988; Bourguignon and Chiappori, 1992) posits that household decisions result from a bargaining process between household members, wherein the balance of power determines whose preferences get a higher weight in the Pareto-efficient household’s final outcomes. The Pareto weight, representing the relative power of a given household member, is a function of a variety of factors, including those which also affect preferences and/or budget constraints. For the collective model to be testable, there must exist some exogenous variables, the so-called extra-environmental parameters (McElroy, 1990) or distribution factors (Browning et al., 1994), that affect household decisions but not the preferences, nor the budget constraint. The choice of such distribution factors is crucial and sometimes problematic. For a list of the most common distribution factors in the literature, we refer to Browning et al. (2014).

An individual’s relative income/wage is widely acknowledged as a determinant and proxy for their relative bargaining power. However, this idea is subjected to

endogeneity issues because labor supply, and so labor income, is itself endogenous to the set of household's choices (Basu, 2006). Moreover, even when one thinks of the prevailing market wage as an alternative, it is still arguable that what is really important for one's bargaining power is not the potential wage rate *per se* but, rather, the actual earnings. As the latter depend on hours worked, a typical choice variable within the household, the endogeneity issue is still worrisome. Thus, there is need for some techniques allowing to account for such feedback effect. As for non-labor income, though it is appealing in a static framework (Thomas, 1990; Schultz, 1990), it is no longer valid when issues of inter-temporal allocation of household resources are considered (Rangel, 2006).

Given the collective models' idea that the partner with greater power should have more influence over the household decision-making, several studies have resorted to an approach that identifies who make(s) the major decisions within the household. Female say on household major decisions is then used as a proxy of her bargaining power within the household. In the literature following the final say approach, multiple decision-making items have been used. Faced with the multiplicity of decision-making items, the accuracy of some of them as good proxies of real bargaining power in some contexts have been questioned or put into perspective. For instance, Doepke and Tertilt (2011) warn that female say over children-related decision-making could simply result from gender-ascribed roles, while due to gender discrimination at their expenses, female may appear to have stronger preferences towards spending on children.

In the context of Nigeria, a number of studies exists analyzing the determinants of female's decision-making within the household (Gammage, 1997; Kritiz and Makinwa-Adebusoye, 1999; Oyediran and Odusola, 2006; Lamidi, 2016). Female decision-making power appears to be substantially shaped by socio-cultural factors, such as ethnicity: when compared to women from the Kanuri ethnic group, women from Yoruba and Ibo ethnic groups enjoy greater decision-making authority (Kritiz and Makinwa-Adebusoye, 1999). Such factors shape women's labor force participation and, thus, the amount of resources in their hands. Additionally, they shape the effect of female's characteristics on her decision-making power. As for the role of religion, Lamidi (2016) shows that women living in states that practice *Sharia* law enjoy significantly lower decision-making power than women living in *non-Sharia* states.

In Nigeria, socio-cultural factors (including ethnicity and religion) vary substantially across, and much less within, states and regions in Nigeria. For instance, the southern region of Nigeria is home to the most of Yoruba, Ibo and Ijaw ethnic groups that are predominantly of christian confession, whereas the northern region of Nigeria is home to Hausa and Kanuri ethnic groups that are predominantly of muslim confession. To that extent, the Nigerian socio-cultural diversity correlates

well with cross-regional gender differences in socio-economic outcomes. For example, in their study of gender differentials in agricultural productivity in Nigeria, [Oseni et al. \(2014\)](#) find a significant gender gap in agricultural productivity at the expense of female plot managers (relative to their male counterparts) in the North, but not in the South¹. [Oseni et al. \(2014\)](#) attribute such north-south discrepancy to differences in gender relations between the two regions.

Second, this paper is related to the literature on the effects of female’s bargaining power / female’s earning power/ gender of the income recipient on child outcomes. In South Africa, [Duflo \(2003\)](#) finds that the gender of the income recipient matters : pensions received by grandmothers, not by grandfathers, had a large impact on the anthropometric status of their grandchildren, particularly girls. Using human capital and individual assets at the time of marriage as proxies for bargaining power, [Quisumbing and Maluccio \(2003\)](#) find that women’s assets increase expenditure shares on education in Bangladesh and South Africa. Using the extension of alimony rights as an exogenous source of female’s bargaining power increase in Brazil, [Rangel \(2006\)](#) shows that more decision power in the hands of women impacts investments in the education of children. [Afridi \(2010\)](#) finds that a mother’s education and autonomy, two proxies of her empowerment, are associated with a significantly smaller gap in educational attainment by sons and daughters. [Reggio \(2011\)](#) finds that an increase in a mother’s bargaining power is associated with fewer hours of work for her daughters but not for her sons. Child labor and education are by all means joint decisions. There is evidence that child labor adversely affects child education outcomes ([Psacharopoulos, 1997](#); [Fentiman et al., 1999](#); [Colclough et al., 2000](#); [Buonomo Zabaleta, 2011](#); [Canelas, 2015](#)). Thus, when modelling child labor and education outcomes, one should account for their interdependence by simultaneously estimating them ([Rosati and Rossi, 2003](#); [Zapata et al., 2011](#); [Kis-Katos, 2012](#)).

3 Data

3.1 The dataset

This paper uses data from the 2012-2013 Nigeria General Household Survey-Panel (henceforth GHS-Panel), which is the second wave of household panel surveys. The survey was carried out throughout the country in two visits, the post-planting visit

¹In the north of Nigeria, after controlling for observed factors of production, female plot managers are 28% less productive than their male counterparts. However, this is not the case in the south when controlling for observed factors of production. Decomposition results prove that the gender gap in the south is explained by unequal access to inputs (the so-called *endowment effect*), while unequal returns to factors of production (the so called *structural effect*) explains the most of the gap in the north.

(September-November 2012) and post-harvest visit (February-April 2013). The survey instruments consist of three questionnaires - the household, agriculture and community questionnaires - for each of the two visits. The GHS-Panel 2012-2013 sample comprises 4,716 households that are in both post-planting and post-harvest visits, and is designed to be representative at the national and zonal (urban and rural) level.

The household questionnaire gathers detailed information pertaining to education and labor for each and every household member aged 5 years and above. In particular, the labor module provides information on the employment record of each household member from 5 years and above, the amount of cash earnings received in return, and on who in the household decides (up to two members) on the use of those earnings. It is worth pointing out that the first wave (2010-2011) of the GHS-Panel lacks such information about "*who manage(s) which income(s)*", hence we do not use both waves of the data.

3.2 Summary statistics

Earning of and say on labor income. Table 1 displays that there are 3,449 households with complete labor information for both spouses in the post-harvest visit. In 1,681 households (i.e. 48.74 %), neither the male nor the female earns any income at all. As for the remainder of households with some labor income, that is 1,768 households, (i) both spouses earn an income in 975 households (i.e. 28.27 %), (ii) male is the only income earner in 621 households (i.e. 18.01 %), while (iii) female is the only income earner in 172 households (i.e. 4.99 %). With regard to the spouses' say on income management, it appears that each spouse's income is more likely to be managed by the spouse who earns it, then jointly by both spouses and finally only by the other spouse. Still, some gender biases emerge at the expense of females. First, while a clear majority of male (60.84 %) solely decides on the use of their income, barely 50 % of female income earners solely decide on the use of their income. Next, female's income is 6 percentage points more likely to be jointly managed by both spouses than male's income (i.e. in 43.85 % versus 37.53 % of households). Last, female have no say on the use of their income in 5 % of households, while for male such total lack of say on their own income happens in 1.63 % of households only ².

²These percentages come from summing up the share of households wherein a given spouse income is managed by the other spouse or by unspecified someone else.

Table 1: Labor income earning and management

Item	Income	Say on	Say on
	earning	Male Inc.	Fem. Inc
	N (%)	N (%)	N (%)
None	1,681 (48.74)	19 (1.19)	11 (0.96)
Male only	621 (18.01)	971 (60.84)	52 (4.53)
Female only	172 (4.99)	7 (0.44)	581 (50.65)
Both male & female	975 (28.27)	599 (37.53)	503 (43.85)
Total	3,449 (100)	1,596 (100)	1,147 (100)

Note: The first column sums up to the total number of households with complete labor information on both spouses during the post-harvest visit.

Household and child characteristics. Household characteristics are described in Table 2. I present them by household income status, that is for households without any income *versus* households with some income, as a way to give a glimpse of how the two types of households are different in terms of those characteristics. The average household total annual wage income amounts to 1,097,863 Naira (equivalent to USD 3,482³) to which female contribute with 29 % on average. Incomeless households are larger and more likely to be polygamous than households with some income, but conditional on polygamy, the number of wives is statistically the same in both types of households. When compared to incomeless households, the households with some income feature a low dependency ratio, fewer children (not above five children) and a higher share of girls. Both males and females from households with some income have more years of schooling than their counterparts from incomeless households. Neither males' nor females' age seem to vary (at conventional significance level) across types of households, but females' age at marriage is significantly lower within incomeless households.

Table 3 summarizes some characteristics of children aged 5 years and above by their gender. On average, boys are 12.7 years old while girls are 12.11 years old. Both boys and girls start school at the same age, namely at around 5 years, but boys are slightly more likely to enroll at school and achieve slightly more years of schooling than girls. With regard to child labor, boys are almost twice more likely to work than girls (13 % versus 7 %), particularly on a farm owned or rented by a member of the household, but they supply roughly the same amount of labor as girls, that is 35 and 34 hours of work per week, respectively.

³As of October 14, 2016.

Table 2: Household characteristics by hh income status

	Households		<i>t</i> -Test Difference of means
	Without any income (N=1,681)	With some income (N=1,768)	
HH total wage income	0.00 [0.00]	1.10e+06 [6.60e+06]	-1.10e+06*** [160999.64]
Female wage share	0.00 [0.00]	0.29 [0.31]	-0.29*** [0.01]
HH size	7.16 [3.04]	6.79 [2.86]	0.38*** [0.10]
Polygamous HH (dv)	0.29 [0.46]	0.23 [0.42]	0.07*** [0.02]
Number of wives in polygamous HH	2.14 [0.50]	2.08 [0.54]	0.06 [0.04]
HH dependency ratio	117.14 [86.74]	108.41 [81.03]	8.73** [2.91]
Number of children	4.86 [2.46]	4.58 [2.35]	0.29** [0.09]
Share of children above 5 years	0.80 [0.22]	0.80 [0.22]	-0.01 [0.01]
Share of girls	0.43 [0.27]	0.47 [0.28]	-0.04*** [0.01]
Male years of schooling	4.48 [4.70]	8.27 [5.28]	-3.79*** [0.17]
Female years of schooling	3.21 [4.23]	6.83 [5.26]	-3.62*** [0.16]
Mother of the hh male educated (dv)	0.33 [0.47]	0.27 [0.45]	0.06*** [0.02]
Father of the hh male educated (dv)	0.40 [0.49]	0.42 [0.49]	-0.01 [0.02]
Mother of the hh female educated (dv)	0.35 [0.48]	0.32 [0.47]	0.03* [0.02]
Father of the hh female educated (dv)	0.42 [0.49]	0.44 [0.50]	-0.01 [0.02]
Male age	50.93 [14.92]	49.72 [13.51]	1.21* [0.49]
Female age	39.57 [12.86]	39.29 [11.33]	0.28 [0.42]
Female age at marriage	19.10 [7.59]	19.96 [7.08]	-0.85*** [0.26]

Note: "dv" indicates a dummy variable. Standard deviations in brackets.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Child characteristics by the gender of the child

	Boys	Girls	<i>t</i> -Test Diff. of means
Child's age	12.68 [5.38]	12.08 [5.07]	0.60*** [0.15]
Child's school starting age	4.96 [1.67]	4.93 [2.59]	0.04 [0.07]
Child's school enrollment (dv)	0.90 [0.31]	0.87 [0.33]	0.02* [0.01]
Child's years of schooling	5.49 [4.40]	5.17 [4.38]	0.32** [0.13]
Child's overall labor (dv)	0.13 [0.34]	0.07 [0.26]	0.06*** [0.01]
Child's labor - outside HH (dv)	0.01 [0.11]	0.01 [0.09]	0.00 [0.00]
Child's labor - on farm (dv)	0.10 [0.30]	0.05 [0.21]	0.06*** [0.01]
Child's labor - for own account (dv)	0.03 [0.16]	0.02 [0.14]	0.01 [0.00]
Child's weekly hours of work	35.17 [16.29]	33.68 [17.16]	1.49 [1.61]
Child's biological mother lives in the HH (dv)	0.94 [0.24]	0.94 [0.24]	-0.00 [0.01]
Child's biological mother is the HH female (dv)	0.79 [0.41]	0.79 [0.41]	-0.00 [0.01]

Note: "dv" indicates a dummy variable. Standard deviations in brackets.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4 Empirical strategy

4.1 The empirical setting

The relationship of interest I estimate is the effect of female say on labor income on children's education and labor outcomes. There is a clear intuition that the two child outcomes are interdependent. For example, the more a child is involved in labor supply, the less time they can devote to their studies and, subsequently, the lower their school performance is. Therefore, it is judicious to jointly estimate both the child education and child labor equations. The full system of equations to estimate is as follows:

$$Fullsystem : \left\{ \begin{array}{l} \left\{ \begin{array}{l} \text{Child education}_{ihs} = f_e(FSOSI_{hs}, \mathbf{X}e) \\ \text{Child labor}_{ihs} = f_l(FSOSI_{hs}, \mathbf{X}l) \end{array} \right. \\ FSOSI_{hs} = \begin{cases} 1 & \text{if } (FSOSI_{hs}^* \equiv c_2 + \Theta_2(\mathbf{Z}) + \epsilon_{2hs} > 0) \ \& \ SEI_{hs} = 1 \\ 0 & \text{if } (FSOSI_{hs}^* \equiv c_2 + \Theta_2(\mathbf{Z}) + \epsilon_{2hs} \leq 0) \ \& \ SEI_{hs} = 1 \\ . & \text{if } SEI_{hs} = 0 \end{cases} \\ SEI_{hs} = \begin{cases} 1 & \text{if } SEI_{hs}^* \equiv c_3 + \Theta_3(\mathbf{W}) + \epsilon_{3hs} > 0 \\ 0 & \text{if } SEI_{hs}^* \equiv c_3 + \Theta_3(\mathbf{W}) + \epsilon_{3hs} \leq 0 \end{cases} \end{array} \right.$$

where:

- Child education_{ihs} and Child labor_{ihs} are the education and labor outcomes⁴, respectively, for child i within household h and state s .
- $FSOSI_{hs}$ is a dummy that equals 1 if a Female has a Say On spouse \mathbf{S} 's Income ($\mathbf{S} \in \{Male, Female\}$), within household h and state s (and 0 otherwise). This is our proxy for female's bargaining power. $FSOSI_{hs}^*$ is its corresponding latent variable.
- SEI_{hs} is a dummy indicating whether the spouse \mathbf{S} ever Earned a labor Income and SEI_{hs}^* is its corresponding latent variable. If this dummy equals 0, whether the female has a say on spouse \mathbf{S} labor income or not becomes a moot point (i.e. $FSOSI_{hs} = .$).
- $\mathbf{X}e$ and $\mathbf{X}l$ are the sets of exogenous controls in the child education and labor equations, respectively, and which can be observed at child individual level (therefore subscripted by $ihse$ and $ihsl$, respectively), household level (therefore subscripted by hse and hsl , respectively) or state level (therefore subscripted by se and sl , respectively).

⁴For the choice of such outcomes, see the next sub-section.

- \mathbf{Z} is the set of controls (observable at household level with subscript hs or state level with subscript s) in the equation of (endogenous) female's bargaining power, Θ_2 the set of corresponding slope coefficients and $\epsilon_{2hs} \sim N(0, 1)$ the corresponding error term.
- \mathbf{W} is the set of controls (observable at household level with subscript hs or state level with subscript s) in the selection equation of whether the household ever earns an income, Θ_3 the set of corresponding slope coefficients and $\epsilon_{3hs} \sim N(0, 1)$ the corresponding error term.

The empirical problem as depicted above involves multiple features to properly account for in the empirics. The *First* feature pertains to the likely idea that child education and labor outcomes co-move as a result of some third (observable or unobservable) variable that is correlated with both. As a consequence, the two equations for child education and child labor are expected to be correlated through their error terms and should then be simultaneously estimated. *Second*, our proxy of female bargaining power (which is at household level) is endogenous since whether the female decides on the use of labor income is expected to be an outcome of some bargaining process taking place between the male and the female in the household. Failure to account for this endogeneity would result in biased results. A solution to this is to find a good distribution factor, that is to say an exogenous variable that affects our proxy of female's bargaining power and not directly household members' preferences, nor constraints. *Third*, our proxy of female bargaining power is subjected to a sample selection issue since female say on spouse S labor income is relevant, that is to say observed, only if the spouse S ever earns a labor income. This means that $\text{corr}(\epsilon_{2hs}, \epsilon_{3hs}) = \rho_2 \neq 0$, and failure to account for this *Heckman*-type sample selection (Heckman, 1976, 1979) would also result in biased results. The *fourth* feature relates to the choice of the child labor outcome. For instance, if the latter is measured by child hours of work, the child labor equation falls under the well known class of Type I Tobit models (Tobin, 1958; Amemiya, 1973, 1984).

Overall, an appropriate empirical strategy should seek to properly address (i) the joint estimation of child outcomes equations, (ii) the endogeneity of *female say on labor income* in the system of both child outcomes equations, (iii) the sample selection in the *female say on labor income* equation, as well as (iv) the Type I Tobit feature of the child labor equation if the labor outcome is the number of hours of work. This is a quite complex problem beyond easy estimation in a sort of all-in-one approach. In practice, this empirical strategy is implemented in two steps. In the first place, I follow Reggio (2011) by separately estimating the female bargaining power while additionally accounting for the sample selection issue. I do so by estimating the female say on (labor) income as a probit model with sample

selection, as described in [Step 1 Eq. System](#). I refer to [de Ven and Praag \(1981\)](#) for further details on this model. At this stage, two notes are worthwhile. On the one hand, for the parameters in both the selection equation and female say equation to be well identified and estimated, the *exclusion restrictions* need to be satisfied: at least one control variable must be included in the selection equation but not in the female say equation. On the other hand, it is assumed that the (proxy of) female's bargaining power is a function of exogenous variables that affect the female's bargaining power but not the preferences, nor budget constraints. These are the so-called *extra environmental parameters* in the terminology of [McElroy \(1990\)](#) or *distribution factors* in the terminology of [Browning et al. \(1994\)](#) and [Bourguignon et al. \(2009\)](#). Therefore, the challenge here is to find suitable *exclusion variable(s)* and *distribution factor(s)* (see next sub-section).

$$\begin{cases} FSOSI_{hs} = (c_2 + \Theta_2 \mathbf{Z} + \epsilon_{2hs} > 0) \text{ if } SEI_{hs} = 1 \\ SEI_{hs} = (c_3 + \Theta_3 \mathbf{W} + \epsilon_{3hs} > 0) \end{cases} \quad (\text{Step 1 Eq. System})$$

Different outcomes exist that can represent child education and labor. As a benchmark, I use the *child grade for age* index as the child education outcome and *child weekly hours of work* as the child labor outcome. I leave some alternative outcomes for the robustness check. For each child i , the child grade index is computed as follows:

$$\text{Grade for age}_i = \left[\frac{\text{years of schooling}_i}{(\text{age}_i - 6 (\equiv \text{official age of starting school}))} \right] * 100$$

By construction, the grade for age index for a child who started school at the official age and did not repeat any class amounts to 100. A value of the index below 100 signals either late starting of school, grade repetition or a combination of the two. In principle, the index's value can also exceed 100, in which case the child would have started school earlier than official school starting age or would have skipped class by intellectual merit. But also, measurement errors in child's age and years of school can result in such cases. In such (rather scarce) cases, I recode the index as 100.

Under the assumption that the selection and endogeneity issues are appropriately dealt with in the first stage, the second stage comes down to plugging the predicted value of female say on spouse S (labor) income, that is $FSOSI_{hs}$, in the system of child outcomes equations as in [Step 2 Eq. System](#) below, which I estimate using the *cmp* estimator/command developed by [Roodman \(2011\)](#).

$$\begin{cases} CG4A_{iht} = c_{1e} + \beta_{1e}(FS\widehat{OS}I_{ht}) + \Theta_{1e}\mathbf{X}e + \epsilon_{1iht} \\ CHW_{iht} = \begin{cases} CHW_{iht}^* & \text{if } (CHW_{iht}^* \equiv c_{1l} + \beta_{1l}(FS\widehat{OS}I_{ht}) + \Theta_{1l}\mathbf{X}l + \epsilon_{1iht}) > 0 \\ 0 & \text{if } (CHW_{iht}^* \equiv c_{1l} + \beta_{1l}(FS\widehat{OS}I_{ht}) + \Theta_{1l}\mathbf{X}l + \epsilon_{1iht}) \leq 0 \end{cases} \end{cases}$$

(Step 2 Eq. System)

where $CG4A$ and CHW stand for *Child Grade For Age* and (observed) *Child Hours of Work*, respectively. CHW^* is the latent variable of CHW and subscripts i , h and s are the same as before.

4.2 The choice of exogenous variables

To address the endogeneity and sample selection of the female bargaining power proxy, the first challenge is to find some exogenous variables that affect our proxy of female's bargaining power (i.e. female say on income) and not directly child outcomes. Existing literature shows that sex ratio, defined as the headcount of men over that of women in a reference population, has significant effect on female bargaining power. Earlier examples of theoretical contributions on this include the marriage market models of [Becker \(1973\)](#) as well as those of [Grossbard-Shechtman \(1984\)](#). In [Chiappori et al. \(2002\)](#), the authors extended the collective labor supply model to allow for distribution factors, including the sex ratio notably. Their empirical application for the US, as well as empirical studies by [Angrist \(2002\)](#) for the US, [Reggio \(2011\)](#) for Mexico and, very recently, [Bulte et al. \(2015\)](#) for China all lend support to the robust positive association between sex ratios and various proxies of female bargaining power. Thus, I use sex ratio at state level⁵ as the exogenous variable in the female say equation.

The second challenge is to satisfy the exclusion restriction condition, so that at least one control variable should significantly enter the selection equation and not the female say equation. I use the *unemployment rate* at state level⁶ as the exclusion variable. By all theory and intuition, there should be a significant negative relationship between the unemployment rate and the probability to get a job.

5 Econometric results

5.1 Effect of distribution factors on female say on income

The results from the first step estimation of female say on labor income ([Step 1 Eq. System](#)) with correction for the sample selection are presented in [Table 4](#). Column

⁵From the Nigeria National Bureau of Statistics.

⁶From the Nigeria National Bureau of Statistics.

(1) is about estimation of female say on male income, whereas the subsequent column (2) is about female say on female income. Within each column, the first sub-column displays the (outcome) *female say* equation while the second sub-column displays the selection equation⁷.

With regard to the selection equations, results from sub-columns (1.2) and (2.2) show that unemployment rate (at state level) has the expected negative impact on the likelihood that the male and female, respectively, participate to the labor force and so earn an income. The older the female, the higher the likelihood that she earns an income, whereas male's age seems to not matter for male income earning. Both female's and male's (primary) education increase the likelihood of male earning an income, but the likelihood of female earning an income increases with male's (primary) education only. Male's parents education increases the likelihood of male earning an income and, more significantly, the likelihood of his wife's income earning., Female's parents education does not have the same effect. Finally, males and females from larger households, as well as females from urban households are more likely to be income earners.

As for the female say equations, the coefficient of sex ratio (ratio of men over women) is (non-linearly) positive and significant only for female say on male income. This means that female say on male labor income tends to be higher in the states where male headcount is relatively higher. This finding is consistent with previous empirical and theoretical studies discussed above. The fact that sex ratio does not matter for female say on her own income possibly indicates that female say on her own income is not that accurate proxy of female bargaining power (as a reminder, almost all females, that is over 94%, control their own income).

The coefficient of spousal age gap (defined as male's age minus female's age) is not significant in neither type of female say on income, but that of female age at marriage is positive and significant in both types of female say on income. This suggests that the later a female gets married, the higher the probability that she has a say on how to spend the income, particularly her own income.

The positive coefficient of spousal schooling gap (i.e. the gap between male's years of schooling and female's years of schooling) in sub-column (1.1) suggests that female say on male's income is greater in households where husbands are relatively more educated than their wives. This finding is consistent with the idea that male's education can shape their attitude in a way that is conducive to greater female say, particularly over male-ascribed domains (Ngenzebuke et al., 2016). Furthermore, unlike the education of female's own parents, that of her parents in law (i.e. male's parents) is positively associated with the likelihood of female say on female income. Finally, consistent with existing literature for Nigeria, religion matters for female decision-making: one one hand, when compared to females in

⁷Both outcome and selection equations change across columns (1) and (2).

households headed by christians, those in households headed by muslims have less say on male income. On the other hand, however, when it comes to female control over their own income, females from households headed by christians enjoy the least say.

As a last note on this first-step estimation of female say on income, I delve into the spatial variation of the predicted probabilities of female say on male and female income, respectively. I plot their state-level averages in Figures 1 and 2, respectively, in Appendix. Figure 1 portrays well the greater (lower) levels of female say on male income in southern (northern) states. To a lesser extent, Figure 2 also displays the different patterns of female say on female income in the south compared to north. Furthermore, *t*-test differences of means from Table 8 in Appendix show that the average predicted probabilities of female say on male income and female say on female income are significantly larger, even double in the case of female say on male income, in southern states when compared to Northern states. This is consistent with existing literature in Nigeria.

Table 4: Estimation of female say on labor income.

	(1)		(2)	
	Female Say on Male income (FSOMI)		Female Say on Female income (FSOFI)	
	(1.1) Outcome Equation FSOMI_d	(1.2) Selection Equation MEI_d	(2.1) Outcome Equation FSOFI_d	(2.2) Selection Equation FEI_d
Sex ratio	69.58** (2.45)		-21.33 (-0.37)	
Sex ratio squared	-0.345** (-2.45)		0.113 (0.40)	
Unemployment rate		-0.835*** (-4.29)		-0.714*** (-3.85)
Unemployment rate squared		0.0616*** (4.38)		0.0544*** (4.26)
Spousal Age gap	-0.00642 (-0.13)	0.0200 (1.42)	-0.0253 (-0.18)	-0.00577 (-0.50)
Spousal Age gap squared	0.000409 (0.28)	-0.000269 (-0.61)	0.0206 (1.34)	0.000103 (0.32)
Male age		0.0277 (1.63)		
Male age squared		-0.000432*** (-2.68)		
Female age				0.0629*** (3.02)
Female age squared				-0.000710*** (-3.11)
Female age at marriage	0.0419** (2.51)		0.272** (2.58)	
Spousal schooling gap	0.168** (2.16)		0.0695 (0.63)	
Spousal schooling gap squared	-0.0140* (-1.94)		-0.00756 (-0.62)	
Female primary education (dv)		0.172** (1.97)		0.128 (1.40)
Male primary education (dv)		0.349*** (4.22)		0.284*** (3.14)
Male's income (dv)	0 (.)		0.553 (1.15)	
Female's income (dv)	-0.0181 (-0.09)		0 (.)	
Female wage share	0.284 (0.27)		-1.409 (-0.80)	
Female wage share squared	-0.662 (-0.57)		1.254 (0.73)	
HH size	-0.0234 (-1.09)	0.0337** (2.47)	0.00951 (0.31)	0.0254* (1.89)
HH dependency ratio	0.000161 (0.24)	0.00000973 (0.02)	-0.000617 (-0.71)	0.000286 (0.62)
Share of children under 5		0.0638 (0.28)		-0.373 (-1.55)
Urban hh (dv)	-0.147 (-1.19)	0.183 (1.55)	0.319* (1.79)	0.181* (1.67)

Continued on next page...

... Table 4 continued

	(1)		(2)	
	Female Say on Male income (FSOMI)		Female Say on Female income (FSOFI)	
	(1.1)	(1.2)	(2.1)	(2.2)
	Outcome Equation FSOMI_d	Selection Equation MEI_d	Outcome Equation FSOFI_d	Selection Equation FEI_d
Female's parents both uneducated	0 (.)	0 (.)	0 (.)	0 (.)
One female's parent educated	0.0719 (0.44)	0.00830 (0.08)	0.115 (0.56)	-0.0670 (-0.67)
Female's parents both educated	-0.0143 (-0.08)	-0.0202 (-0.17)	-0.536 (-1.61)	-0.155 (-1.40)
Male's parents both uneducated	0 (.)	0 (.)	0 (.)	0 (.)
One male's parent educated	-0.154 (-1.21)	0.198* (1.72)	0.762*** (2.91)	0.292*** (3.21)
Male's parents both educated	-0.0897 (-0.56)	0.220 (1.61)	1.096*** (2.69)	0.275** (2.18)
Polygamous HH (dv)=0	0 (.)		0 (.)	
Polygamous HH (dv)=1	-0.256 (-1.57)		-0.226 (-0.98)	
HH head religion is Christianity	0 (.)	0 (.)	0 (.)	0 (.)
HH head religion is Islam	-0.566*** (-3.27)	0.0642 (0.52)	0.444* (1.90)	0.0745 (0.62)
HH head religion is Traditional/Other	-0.219 (-0.70)	0.368 (1.39)	6.194*** (9.61)	0.0189 (0.09)
Constant	-3509.0** (-2.45)	0.474 (0.70)	992.0 (0.35)	-1.202* (-1.66)
Observations	3035		3024	
Fixed effects	Region	Region	Region	Region

Note: "MEI_d" ("FEI_d", respectively) is a dummy indicating whether the Male (Female, respectively) Earns an Income. "dv" or "d" indicates a dummy variable. The estimates are weighted in accordance with the survey design. *t*-statistics in parentheses based on Bootstrap Standard Errors (100 replications). Fixed effects at region (North Central, North East, North West, South East, South South and South West) level included, along with their interaction terms with distribution factors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 Effects of female say on income on child outcomes

Table 5 presents the results (marginal effects) from the second step where we put the (household-level) predicted probabilities of female say on income as the covariate of main interest in the child outcomes equations. There are four main (double) columns corresponding to four model specifications. In the first model (column (1)), I focus on households with at least a male income and control for the predicted probability of female say on male income. In the second model (column (2)), I focus on households with at least a female income and control for the predicted probability of female say on female income. In the third and fourth models, I focus on households with both male and female incomes and control for both predicted probabilities. Model (3) differs from Model (4) in that the two predicted probabilities of female say on male and female income, respectively, are included without interaction in Model (3), whereas they are additionally interacted in Model (4)⁸. All estimation specifications also control for a number of covariates following the economic theory and existing empirical literature⁹.

Results show that the marginal effect of the predicted female say on male income is significantly positive in the child's education equation, and negative for the child's labor equations. In other words, greater female say on male income is conducive to higher child grade for age index and fewer hours of child work. This is consistent across model's specifications. The estimates' magnitudes indicate that if a female who has no say on her partner's income is entitled the right to decide on the use of that income, on the one hand the child's grade for age index would increase by (more or less) 15 points, depending on the model's specification. For a 12 years old child, which is the average child's age as well as the expected age of finishing primary school, this corresponds to a gain of 0.94 years of schooling when focusing on Model (4). This is almost one year and given that boys and girls achieve 5.49 and 5.17 years of school on average, respectively, this is not a small effect as it would be enough to ensure that each and every child completes primary school on average. On the other hand, one-unit increment in the probability of female say on male income would cause child labor to decrease by more than 5

⁸Note that their interaction term, as well as all other interaction terms controlled for, do not appear on the table simply because I report marginal effects.

⁹Note that these covariates do not include geographic variables other than urban versus rural dummy. Indeed, when I try to control for zone- or state-level fixed effects in the child outcomes equations, this results in non-convergence of the estimation. I suspect this to be due to the fact that in previous-stage estimations (income earning equation and female say equation) I control for a number of state-level characteristics (for e.g. sex ratio, unemployment rate, ...), while I also control for zone fixed effects along with their interaction terms with the main distribution factors, as motivated by the strong spatial patterns of female empowerment in Nigeria. Somehow, by controlling for the predicted female say in the child outcomes, geographic patterns are also accounted for.

hours per week when focusing on Model (3) or (4). Given the average number of child labor of 33 to 35 hours per week according to the child's gender, the latter effect is quite substantial as it represents around 15% of the child's workload per week. As for female say on her own income, its effect is ambiguous and inconclusive: from one specification to another, the marginal effects switch sign or/and change significance status. Here again, I argue that this may stem from the weakness of female say on her own income as a good proxy for female bargaining power. In any case, my findings are consistent with the idea that female say on male income overwhelmingly matters, more than female say on female income, for female empowerment and child welfare.

With regard to other controls, most of their estimated (marginal) effects are as expected and overall consistent with existing literature. Focusing on Model (4), on the one hand a child's grade for age index decreases with the child's age and birth order, male's age and share of children under five. On the other hand, it increases with whether the child's biological mother is the household female whose say on whichever income is being considered, female's and male's education, female's age, household per capita expenditures and whether the child lives in an urban household. As for child's labor, older children, especially when they are among the oldest among their siblings, and children of older fathers tend to work more. Girls seem to work less than boys, whereas children of more educated mothers and from wealthier households tend to supply fewer hours of work per week.

Table 5: Effect of female say on income on child's grade for age (CG4A) and child hours of work (CHW): marginal Effects.

	(1)		(2)		(3)		(4)	
	HH with a male income at least	CHW	CG4A	CHW	CG4A	CHW	CG4A	CHW
Pr(FSOML_d=1)	14.82*** (7.77)	-3.220*** (-5.05)			15.66*** (6.71)	-5.107*** (-6.33)	15.54*** (6.65)	-5.406*** (-6.52)
Pr(FSOFI_d=1)			0.893 (0.21)	-3.649*** (-2.75)	-7.564* (-1.68)	-1.505 (-1.05)	-6.374 (-1.41)	-1.445 (-0.95)
Male's income (dv)			2.439 (0.65)	-1.007 (-0.77)				
Female's income (dv)	1.407 (0.60)	-0.428 (-0.52)						
Female wage share	-1.835 (-0.31)	0.767 (0.34)	0.837 (0.26)	-1.296 (-1.18)	-0.483 (-0.12)	-0.411 (-0.32)	-0.800 (-0.20)	-0.627 (-0.50)
Child's age	-0.719*** (-3.95)	0.399*** (6.38)	-0.518** (-2.52)	0.211*** (2.99)	-0.649*** (-2.87)	0.217*** (3.00)	-0.661*** (-2.93)	0.205*** (2.90)
Child birth order	-2.632*** (-4.93)	-0.503*** (-2.89)	-1.210** (-2.00)	-1.180*** (-4.89)	-1.538** (-2.33)	-1.001*** (-4.24)	-1.572** (-2.37)	-1.022*** (-4.41)
Girl (dv)	-1.266 (-1.26)	-1.328*** (-3.67)	-0.428 (-0.38)	-1.626*** (-3.72)	-0.332 (-0.28)	-1.213*** (-2.76)	-0.324 (-0.27)	-1.255*** (-2.88)
Child's biological mother is the HH female (dv)	1.790 (1.20)	-0.0498 (-0.11)	3.528** (2.03)	-0.0747 (-0.13)	3.400* (1.85)	0.183 (0.33)	3.354* (1.82)	0.133 (0.24)
Female years of schooling	1.026*** (7.32)	-0.105** (-2.18)	1.074*** (6.64)	-0.259*** (-4.40)	0.775*** (4.56)	-0.118* (-1.95)	0.765*** (4.51)	-0.127** (-2.14)
Male years of schooling	0.989*** (7.66)	-0.173*** (-4.41)	1.125*** (7.44)	-0.00836 (-0.18)	1.005*** (6.21)	-0.0160 (-0.32)	1.004*** (6.21)	-0.0188 (-0.38)
Female age	0.537*** (3.82)	-0.0119 (-0.31)	0.678*** (4.28)	0.0281 (0.65)	0.818*** (4.72)	0.0529 (1.13)	0.817*** (4.70)	0.0461 (1.00)
Male age	-0.0788 (-0.76)	0.0562** (2.06)	-0.298*** (-2.73)	0.0477 (1.56)	-0.305*** (-2.62)	0.0470 (1.52)	-0.305*** (-2.62)	0.0473 (1.55)
Female age at marriage	-0.178** (-1.97)	-0.0199 (-0.69)	0.112 (1.06)	-0.109*** (-2.75)	-0.116 (-1.00)	-0.0517 (-1.30)	-0.0922 (-0.78)	-0.0305 (-0.78)
Log (hh per capita expenditures)	2.925*** (2.90)	-1.815*** (-4.70)	-0.391 (-0.32)	-1.622*** (-3.59)	2.657** (2.00)	-2.707*** (-4.88)	2.528* (1.91)	-2.815*** (-5.07)
HH size	0.523** (2.47)	-0.0162 (-0.21)	-0.177 (-0.73)	0.216** (2.46)	0.0995 (0.37)	0.146 (1.60)	0.101 (0.37)	0.143 (1.58)
HH dependency ratio	-0.00322 (-0.31)	0.00121 (0.43)	0.00596 (0.53)	-0.00305 (-0.83)	0.0233* (1.70)	-0.00442 (-1.11)	0.0219 (1.60)	-0.00570 (-1.49)
Share of children under 5	-14.23** (-2.46)	-2.248 (-1.29)	-28.53*** (-4.28)	-1.247 (-0.60)	-25.94*** (-3.71)	-1.208 (-0.56)	-25.78*** (-3.69)	-0.980 (-0.46)
Urban hh (dv)	6.046*** (5.36)	-0.745* (-1.75)	3.919*** (3.14)	0.105 (0.22)	5.780*** (4.10)	-0.550 (-1.08)	5.819*** (4.12)	-0.473 (-0.95)
Observations	4027	4027	2902	2902	2533	2533	2533	2533

Note: Estimates are corrected for the Heckman selection in child hours equation. Estimates are weighted in accordance with the survey design. *t*-statistics in parentheses based on robust standard errors. *dv* indicates a dummy variable. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Is there a child gender bias? The literature discussed in Section 2 provided some evidence supporting that boys and girls may be unequally affected by female bargaining power. In the present study, does female say on income affect boys and girls differently? I delve into this by re-estimating the child outcomes equations for boys and girls separately. From the results presented in Table 6, a number of comments come in order.

Regarding female say over male income, its effect on child grade for age appears to be significant for boys and girls but its magnitude is relatively wider for girls. Next, its (negative) effect on child's hours of work is significant for boys and girls, but its magnitude is relatively wider boys. As for female say over female income, two types of heterogeneity in the results emerge. On the one hand, while its effect on boys' grade for age index is sign-ambiguous and insignificant, its effect on girls' grade for age index is negative and particularly significant when focusing on Models (3) and (4). This finding is quite surprising in view of the expected (positive) dividend of female empowerment for children. As argued before, this may stem from the weak potential of female say on female income as a good proxy for her bargaining power. On the other hand, the negative effect of female say over her own income on child's hours of work turns out to be significant *only* for girls in Models (2) and (3), but not in Model (4). Overall, results from Table 6 are consistent with the argument that female say on male income overwhelmingly matters, more than female say on female income, for female empowerment and child welfare.

Does labor type matter? To check the sensitivity of our findings to the definition of child labor, it is interesting to examine the effect of female say on income on child labor when the latter is disaggregated by its type.

As a reminder, the data at hand distinguishes three types of (child) labor, namely (i) labor outside the household¹⁰, (ii) on-farm labor¹¹ and (iii) labor for a household's business enterprise¹²; and informs well about which of these three types of labor each and every child (or individual in general) has been involved in. Yet, the reported time of work is the aggregate time spent working, regardless of the type of labor. As a consequence, it is not possible to relate each type of work to the specific time spent on it. By way of an example, if a child has been involved in labor types A, B and C, the aggregate time of work is known but there is no way

¹⁰This includes work for someone who is not a member of the household, for example, an enterprise, company, the government or any other individual.

¹¹This includes work on a farm owned or rented by a member of the household, either in cultivating crops or in other farming tasks, or care for own livestock or belonging to a member of the household.

¹²Including work in an own business enterprise or belonging to a member of the household, for example as a trader, shop-keeper, barber, dressmakers, carpenter or taxi driver.

Table 6: Estimation of child outcomes: *Boys versus Girls*, marginal effects.

	(1) HH with a male income at least		(2) HH with a female income at least		(3) HH with both incomes		(4) HH with both incomes (Interaction model)	
	CG4A (1.1)	CHW (1.2)	CG4A (2.1)	CHW (2.2)	CG4A (3.1)	CHW (3.2)	CG4A (4.1)	CHW (4.2)
Panel A. Pooled sample.								
Pr(FSOMI_d=1)	14.82*** (7.77)	-3.220*** (-5.05)			15.66*** (6.71)	-5.107*** (-6.33)	15.54*** (6.65)	-5.406*** (-6.52)
Pr(FSOFI_d=1)			0.893 (0.21)	-3.649*** (-2.75)	-7.564* (-1.68)	-1.505 (-1.05)	-6.374 (-1.41)	-1.445 (-0.95)
Observations	4027	4027	2902	2902	2533	2533	2533	2533
Panel B. Boys' sample.								
Pr(FSOMI_d=1)	11.50*** (4.51)	-3.840*** (-4.15)			13.57*** (4.24)	-5.595*** (-4.83)	13.24*** (4.15)	-5.674*** (-4.89)
Pr(FSOFI_d=1)			7.441 (1.32)	-0.141 (-0.07)	-1.238 (-0.19)	1.541 (0.73)	0.844 (0.13)	1.198 (0.55)
Observations	2157	2157	1565	1565	1357	1357	1357	1357
Panel C. Girls' sample.								
Pr(FSOMI_d=1)	19.30*** (6.55)	-1.930** (-2.35)			19.04*** (5.44)	-3.549*** (-3.47)	19.04*** (5.43)	-4.239*** (-3.66)
Pr(FSOFI_d=1)			-9.426 (-1.53)	-5.863*** (-3.35)	-17.92*** (-2.87)	-4.010** (-2.31)	-17.93*** (-2.95)	-2.428 (-1.21)
Observations	1870	1870	1337	1337	1176	1176	1176	1176

Note: Other covariates included as in Table 5. Estimates are corrected for the Heckman selection in child hours equation. Estimates are weighted in accordance with the survey design. t -statistics in parentheses based on robust standard errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

the latter can be disaggregated. The only cases where such time disaggregation is possible is when the child has been involved in one and only one type of work.

I use such (restricted) cases where the child has been involved in only one type of labor to assign the reported aggregate time of work as also specific to that type of work. Obviously, this is not the first-best approach of doing the analysis of interest as it comes with some loss of information and limitations, but given the data limitations discussed above, it is the best alternative. While keeping in mind the limitations, the approach results in informative findings.

Results, presented in Table 7, display the marginal effects of female say over (male and female, respectively) income on child outcomes under different sample restrictions based on the child labor types. First of all, on the one hand it appears that female say on male income does not affect child workload outside the household (i.e. labor type I in Panel B). On the other hand, both (i) child hours of *on-farm* work (i.e. labor type II in Panel C) and (ii) child hours of work on a household's business enterprise (i.e. labor type III in Panel D) still respond adversely to female say on male income. Next, the sign and/or significance of the effect of female say over female income turns out to be ambiguous (i) across specifications within the same type of labor, and (ii) across types of labor within the same specification. By way of example, focusing on Model (4), female say on female income seems to increase child workload outside the household by 2.5 hours per week (Panel B), but does not matter for child *on-farm* workload (Panel C), while it decreases child work on household's business enterprise by 2 hours per week (Panel D).

5.3 Further results and robustness checks

5.3.1 Disentangling child labor by its type and child gender

Through the gender socialization process, boys and girls may specialize in different types of work, for example with girls specializing in housework while boys specialize in work outside the home. Thus, the potential heterogeneity in the effect of female say over income by type of labor and gender of the child, simultaneously, is worth investigating. Conditional on child labor type, I further investigate whether the previous results are homogenous for boys versus girls.

Results are presented in Table 9 in Appendix and raise a number of comments. First, female say on male income seems not to matter for workload outside the household, neither for boys nor for girls. Second, it turns out that the negative effect of female say over male income on child *on-farm* labor (type II labor) is consistently significant for boys, whereas for girls it is only slightly significant when focusing on Models (3) and (4). In any case, its magnitude is relatively smaller for girls. Third, the effect of female say over male income on child type

Table 7: Effect of female say on income on child's outcomes: Disentangling by child labor type, marginal Effects

	(1)		(2)		(3)		(4)	
	HH with a male income at least		HH with a female income at least		HH with both incomes		HH with both incomes (Interaction model)	
	CG4A	CHW	CG4A	CHW	CG4A	CHW	CG4A	CHW
	(1.1)	(1.2)	(2.1)	(2.2)	(3.1)	(3.2)	(4.1)	(4.2)
Panel A. Pooled sample								
Pr(FSOMI_d=1)	14.82*** (7.77)	-3.220*** (-5.05)			15.66*** (6.71)	-5.107*** (-6.33)	15.54*** (6.65)	-5.406*** (-6.52)
Pr(FSOFI_d=1)			0.893 (0.21)	-3.649*** (-2.75)	-7.564* (-1.68)	-1.505 (-1.05)	-6.374 (-1.41)	-1.445 (-0.95)
Observations	4027	4027	2902	2902	2533	2533	2533	2533
Panel B. Labor Type I: Work outside the household								
Pr(FSOMI_d=1)	14.83*** (7.77)	-0.258 (-1.11)			15.62*** (6.69)	-0.313 (-0.90)	15.50*** (6.63)	-0.327 (-0.90)
Pr(FSOFI_d=1)			0.877 (0.21)	0.651 (0.81)	-7.561* (-1.68)	2.083* (1.74)	-6.382 (-1.41)	2.486** (2.02)
Observations	4027	4027	2902	2902	2533	2533	2533	2533
Panel C. Labor Type II: On-farm work								
Pr(FSOMI_d=1)	14.83*** (7.77)	-1.173** (-2.47)			15.62*** (6.69)	-2.667*** (-4.49)	15.50*** (6.63)	-2.677*** (-4.50)
Pr(FSOFI_d=1)			0.874 (0.21)	-0.388 (-0.46)	-7.561* (-1.68)	0.254 (0.26)	-6.382 (-1.41)	0.201 (0.22)
Observations	4027	4027	2902	2902	2533	2533	2533	2533
Panel D. Labor Type III: Work on household's business enterprise								
Pr(FSOMI_d=1)	14.85*** (7.78)	-1.667*** (-3.17)			15.64*** (6.70)	-2.324*** (-2.89)	15.52*** (6.64)	-3.944*** (-3.37)
Pr(FSOFI_d=1)			0.859 (0.20)	-2.004*** (-2.65)	-7.586* (-1.69)	-1.792** (-2.41)	-6.404 (-1.41)	-2.024** (-2.36)
Observations	4027	4027	2902	2902	2533	2533	2533	2533

Note: Other covariates included as in Table 5. Estimates are corrected for the Heckman selection in child hours equation. Estimates are weighted in accordance with the survey design. t -statistics in parentheses based on robust standard errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

III labor turns out to be negative and significant for both boys and girls. Fourth, with regard to female say on her own income, the positive effect on child labor outside the household (type I) is significant for girls only (Panel B.2, Model (4)). The negative effect on child labor on a household's business enterprise (type III) is significant for girls only (Panel D.2, Models (2) and (3)). Still, overall the fact remains that its effect is not clear-cut.

5.3.2 Alternative child outcomes

I check the robustness of the main results to the use of alternative child education and labor outcomes. For child education, the alternative outcomes are (i) a dummy indicating whether a child has achieved *full grade for his age* (i.e. equal to 1 if the child grade for age index equals 100) and (ii) a dummy that indicates whether a child above 12 years of age has obtained the first school leaving certificate (i.e. successful completion of primary school). As for child labor, the alternative outcome is a dummy indicating whether the child works or not. Results are presented in Table 10 in Appendix. In panel A, I estimate the benchmark child education outcome along with the alternative child labor outcome, whereas in panels B and C, I estimate the two alternative child education outcomes, respectively, along with the alternative child labor outcome.

The results prove to be consistent with the pooled sample benchmark results presented in Table 5. In particular, female say on male income is negatively associated with the probability of child labor occurrence, whereas it is positively associated with (i) the probability of child achieving the best grade for their age, as well as (ii) the probability of child's successful completion of primary school. Yet, in line with the benchmark results, the effect of female say on her own income on child education outcomes is still not clear-cut.

6 Conclusion

Female's empowerment is increasingly acknowledged as a cross-cutting issue in many development agendas and it is argued that it produces the double dividend of benefiting both women and children. The collective model of household behavior posits that household decisions result from a bargaining process between household members, and through which the partner with greater power should have more influence over the household decision-making. An individual's relative contribution to household income is widely acknowledged as a proxy of their relative bargaining power, but this idea is subjected to a number of shortcomings. One of them is that such a proxy is likely to undervalue female bargaining power. Indeed, due to either prevailing gender division of labor or prevailing gender-specific constraints

to access the labor market, the bulk of females' contributions to household welfare is domestic and unpaid, thus less visible. Moreover, earning an income is not all that matters, and by all means control over income is what ultimately matters.

Using data from the 2012-2013 Nigerian General Household Survey, this paper delved into the effect of female say on labor income, a proxy of her bargaining power, on child education and labor outcomes. I followed an empirical strategy that jointly estimated child education and labor outcomes. Furthermore, I properly accounted for the endogeneity and sample selection issues of female say on labor income, as well as the Type I Tobit feature of child hours of work - the benchmark outcome in the child labor equation.

My findings show that the effect of *female say on labor income* on child outcomes depends on whose income is in question, child gender as well as the type of the outcome. Female say on male labor income is conducive to higher child grade for age, particularly for girls, and fewer child hours of work, particularly for boys. Disaggregated analysis by type of labor shows that, on the one hand, female say on male income does not decrease child workload outside the household. Yet, it still adversely affects child on-farm workload, particularly for boys, as well as child workload on a household's business enterprise. Unlike female say on male income, female say on female income does not matter for child welfare in a clear-cut, consistent and robust way. I put forward that the weakness of female say on female income as a proxy for female empowerment may underlie its ambiguous effect.

From a policy perspective, my findings have some interesting implications. They brought to the fore that female say on male income is an important aspect of female empowerment, in that it is a good proxy of female decision-making power and produces the expected dividend for children. Therefore, any policies aiming at achieving gender equality in socio-economic opportunities should go hand in hand with any intervention that promotes inclusive management/control of household income and male income in the first place, particularly in contexts where male income is the only source of labor income available for the household. Ultimately, such inclusive control over household financial resources can serve as a lever for any policy targeting child welfare. Nevertheless, it should be kept in mind that child's gender and labor type may entail some disparities.

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Appendix

Figure 1: Predicted probability of Female Say on Male Income across states in Nigeria.

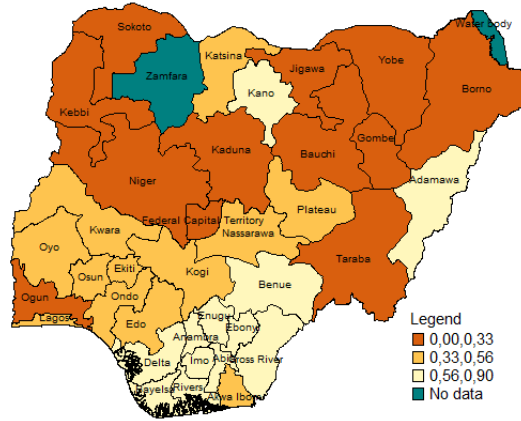


Figure 2: Predicted probability of Female Say on Female Income across states in Nigeria.

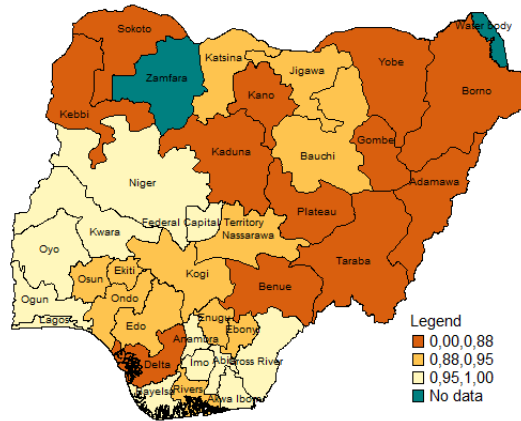


Table 8: Predicted female say on income by North versus South

	Southern States (N=17)	Northern States (N=19)	t-Test Diff. of means
Average Pr(FSOMI_d==1)	0.62 [4.12]	0.31 [0.00]	0.30*** [0.07]
Average Pr(FSOFI_d==1)	0.95 [0.04]	0.76 [0.25]	0.19** [0.06]

Note: Standard deviations in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Estimation of child outcomes: Disentangling by child labor type and child gender, Marginal Effects

	(1)		(2)		(3)		(4)	
	HH with a male income at least		HH with a female income at least		HH with both incomes		HH with both incomes (Interaction model)	
	CG4A (1.1)	CHW (1.2)	CG4A (2.1)	CHW (2.2)	CG4A (3.1)	CHW (3.2)	CG4A (4.1)	CHW (4.2)
Panel B.1. Labor Type I, Boys.								
Pr(FSOMI_d=1)	11.50*** (4.51)	-0.122 (-0.43)			13.59*** (4.24)	-0.289 (-0.62)	13.27*** (4.16)	-0.283 (-0.61)
Pr(FSOFI_d=1)			7.425 (1.32)	1.897 (1.41)	-1.302 (-0.20)	2.869 (1.50)	0.752 (0.12)	2.872 (1.41)
Observations	2157	2157	1565	1565	1357	1357	1357	1357
Panel B.2. Labor Type I, Girls.								
Pr(FSOMI_d=1)	19.30*** (6.55)	-0.480 (-1.19)			19.00*** (5.44)	-0.0717 (-0.06)	19.00*** (5.43)	-0.469 (-0.37)
Pr(FSOFI_d=1)			-9.336 (-1.51)	-1.363 (-0.57)	-17.88*** (-2.86)	2.331 (0.75)	-17.89*** (-2.93)	12.89*** (2.88)
Observations	1870	1870	1337	1337	1176	1176	1176	1176
Panel C.1. Labor Type II, Boys.								
Pr(FSOMI_d=1)	11.51*** (4.51)	-2.200*** (-2.99)			13.59*** (4.24)	-3.349*** (-3.81)	13.26*** (4.16)	-3.368*** (-3.83)
Pr(FSOFI_d=1)			7.416 (1.31)	0.112 (0.09)	-1.294 (-0.20)	1.484 (0.96)	0.774 (0.12)	1.208 (0.80)
Observations	2157	2157	1565	1565	1357	1357	1357	1357
Panel C.2. Labor Type II, Girls.								
Pr(FSOMI_d=1)	19.31*** (6.55)	0.451 (0.81)			18.85*** (5.39)	-1.103* (-1.84)	18.85*** (5.38)	-1.063* (-1.78)
Pr(FSOFI_d=1)			-9.300 (-1.51)	-0.934 (-1.01)	-17.80*** (-2.84)	-1.102 (-1.13)	-17.83*** (-2.92)	-1.226 (-1.17)
Observations	1870	1870	1337	1337	1176	1176	1176	1176
Panel D.1. Labor Type III, Boys.								
Pr(FSOMI_d=1)	11.50*** (4.51)	-1.188* (-1.93)			13.59*** (4.24)	-2.289** (-2.05)	13.26*** (4.16)	-3.066** (-2.33)
Pr(FSOFI_d=1)			7.429 (1.32)	-0.658 (-0.71)	-1.299 (-0.20)	-0.0763 (-0.08)	0.754 (0.12)	-0.531 (-0.50)
Observations	2157	2157	1565	1565	1357	1357	1357	1357
Panel D.2. Labor Type III, Girls.								
Pr(FSOMI_d=1)	19.35*** (6.57)	-1.959** (-2.46)			19.05*** (5.46)	-2.208** (-2.27)	19.04*** (5.45)	-5.064*** (-2.99)
Pr(FSOFI_d=1)			-9.552 (-1.55)	-2.374** (-2.04)	-18.12*** (-2.90)	-2.244** (-2.00)	-18.04*** (-2.96)	-2.041 (-1.47)
Observations	1870	1870	1337	1337	1176	1176	1176	1176

Note: Other covariates included as in Table 5. Estimates are corrected for the Heckman selection in child hours equation. Estimates are weighted in accordance with the survey design. t -statistics in parentheses based on robust standard errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Estimation of child outcomes: Alternative child's outcomes.

	(1) HH with a male income at least	(2) HH with a female income at least	(3) HH with both incomes	(4) HH with both incomes (Interaction model)
Panel A:				
<i>Education outcome</i> Child Grade For Age - index (CG4A)				
<i>Labor outcome</i> child labor - dummy (CL_d)				
	CG4A	CL_d	CG4A	CL_d
Pr(FSOMI_d=1)	13.58*** (4.33)	-0.624*** (-3.13)		
			15.08*** (3.95)	-1.092*** (-4.28)
			19.85 (0.77)	-6.095*** (-3.10)
Pr(FSOFI_d=1)			1.916 (0.46)	-0.174 (-0.31)
			-3.130 (-0.63)	0.118 (0.18)
			-1.091 (-0.10)	-1.786* (-1.74)
Observations	4027		2902	2533
			2533	2533
Panel B:				
<i>Education outcome</i> Child has Full Grade For Age - dummy (CFG4A_d)				
<i>Labor outcome</i> child labor - dummy (CL_d)				
	CFG4A_d	CL_d	CFG4A_d	CL_d
Pr(FSOMI_d=1)	0.239** (2.30)	-0.629*** (-3.14)		
			0.324** (2.36)	-1.100*** (-4.31)
			0.122 (0.14)	-6.104*** (-3.10)
Pr(FSOFI_d=1)			0.0512 (0.27)	-0.185 (-0.33)
			0.0401 (0.20)	0.114 (0.18)
			-0.0451 (-0.11)	-1.788* (-1.75)
Observations	4041		2911	2541
			2541	2541
Panel C:				
<i>Education outcome</i> Child above 12 years has achieved First School Leaving enior Certificate - dummy (CFSLC_d)				
<i>Labor outcome</i> child labor - dummy (CL_d)				
	CFSLC_d	CL_d	CFSLC_d	CL_d
Pr(FSOMI_d=1)	0.984*** (5.12)	-0.627*** (-3.13)		
			1.152*** (4.06)	-1.100*** (-4.32)
			0.929 (0.62)	-6.101*** (-3.10)
Pr(FSOFI_d=1)			0.244 (0.53)	-0.184 (-0.32)
			-0.440 (-0.94)	0.114 (0.18)
			-0.543 (-0.65)	-1.787* (-1.75)
Observations	3990		2871	2506
			2506	2506

Note: Other covariates included as in Table 5. Estimates are weighted in accordance with the survey design. *t*-statistics in parentheses based on robust standard errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.