

# **Linking armed conflicts and children undernutrition in Nigeria : the mitigating effects of maternal bargaining power**

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# Introduction

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## Context and motivation

- Research consistently indicates that children are at a higher risk of experiencing **undernutrition** in the context of armed conflict (Mansour and Rees, 2012; Minoiu and Shemyakina, 2014; Ekhator-Mobayode and Asfaw, 2019).
  - certain flaw due to the **heterogeneity** of the studied population.
- Out of the various factors contributing to heterogeneity, the level of **Bargaining Power** (BP) held by mothers of the children is particularly crucial (Duflo, 2003; Qian, 2008; Lépine and Strobl, 2013).
  - the impact of conflicts' exposure on children's nutrition would vary between those born to mothers with **high** and **low** BP.

# Research question

## Research question

Can maternal BP play a mitigating role that could reduce the negative impact of armed conflict exposition on children's undernutrition?

# This paper

Use the case study of Boko Haram (BH) insurgency in Nigeria as:

- decrease in total **agricultural output** (Adelaja and George, 2019);
- higher level of **food insecurity** (Kaila and Azad, 2023) particularly affecting children (Ekhator-Mobayode and Asfaw, 2019);
- affects access to **maternal healthcare** services (Chukwuma and Ekhator Mobayode, 2019).

# This paper

What I do :

- build an intensity-based measure of exposure to the BH insurgency;
- use several proxies to define women's BP;
- exploit within-family variation in BH conflict exposure.

What I find :

- children born to women with high bargaining power are less likely to be affected by conflict induced-undernutrition;
- access to health care services is an important driver of the results;
- results remain consistent across several alternative specifications.

# Contributions

- It is already known that :
  - conflict exposition increases the risk of malnutrition (Minoiu and Shemyakina, 2014; Ekhator-Mobayode and Asfaw, 2019);
  - BP promotes child nutrition in a context **without conflict** (Duflo, 2003; Qian, 2008; Lépine and Strobl, 2013).
- The contributions of this paper :
  - analyzing one source of heterogeneity  $\implies$  the role of maternal BP;
  - investigating the role of BP during an ongoing crisis;
  - enhancing understanding of the channels through which BP promotes children's nutrition  $\iff$  mechanism.

## **Data sources and methodology**

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# Data sources

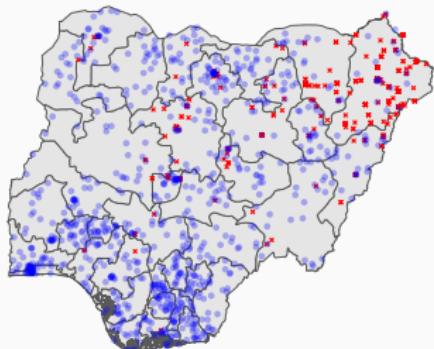
- Data on the BH conflict were collected from the Armed Conflict Location and Event Data (ACLED). [▶ map](#)
- Individual characteristics are drawn from three rounds of the Nigerian Demographic and Health Survey (NDHS) collected in 2008 (before the BH insurgency started), 2013 and 2018 (after the BH insurgency started) :
  - the sample is composed of 35,339 children (between 0 and 5) born to 23,521 mothers.
- Outcome variables include child's anthropometric indicators :
  - Weight for Height Z-score (WHZ) ~ short term;
  - **Weight for Age Z-score (WAZ)** ~ medium term;
  - Height for Age Z-score (HAZ) ~ long term.

## How can the exposure to conflicts be defined?

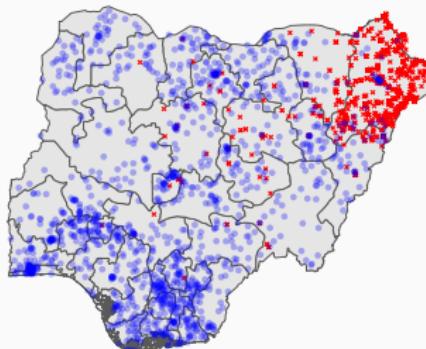
- There are various definitions of exposure to conflicts in the literature:
  - some are based on the geographic location of individuals (Camacho, 2008; Mansour and Rees, 2012) ⇒ false treatment and intensity of exposure;
  - others authors use a narrower buffer zones (1 to 10 km) in radius (Chukwuma and Ekhator Mobayode, 2019; Howell et al. 2020; Eseosa Ekhator-Mobayode et al. 2022) ⇒ selection bias or few treated (loss of power).
- Exposition variable : nbr of conflict related to BH which happen between the child date of birth till the day of the interview within a buffer zone of **10 km** of the hh.'s cluster (4.45 percent of the children are treated for an average of 19 conflicts.).

# BH conflict in Nigeria

2009 – 2013



2014 – 2018



✗ BH conflict

● DHS cluster buffer of 10km

Data sources: NDHS and ACLED (Author's own calculation).

## How can BP be defined ?

Various proxies are used in the literature to assess women's BP in the household :

- some are based on **direct** measures : decision making ability on major hh. purch., daily expenditures (Shroff et al. 2011; Story and Burgard, 2012);
- some others use **indirect** proxies : spouses age gap, gap in the level of education, working status, earnings (Duflo, 2003; Maitra, 2004);
- others build more sophisticated indicators of BP using both **direct** and **indirect** proxies (Reggio, 2011; Lépine and Strobl, 2013).

## How can BP be defined?

- Therefore, this paper considers proxies of maternal BP that indicate access to financial resources (jointly with the husband or alone) :
  - decision making ability on major household purchases (such as buying a car, house, land etc...);
  - autonomy on own earnings;
  - autonomy on husband's earnings;
  - earning more than husband.
- These measures are not correlated to the conflict. ▶ table

# Stylized facts

**Table 1:** Mean WAZ by child's and mother's status.

	0			1		
	No conflict 10 km around	At least one conflict 10 km around	Difference	No conflict 10 km around	At least one conflict 10 km around	Difference
	N = 18,831	N = 1,167		N = 14,935	N = 406	
Aut. maj. hh purch. (Yes = 1, No = 0)	-1.165(1.408)	-1.541(1.396)	0.38***	-0.776(1.256)	-1.131(1.564)	0.36***
Total		<b>-1.19(1.99)</b>			<b>-0.785(1.60)</b>	
Aut. own. earn. (Yes = 1, No = 0)	N = 15,597	N = 705		N = 18,169	N = 868	
	-1.024(1.400)	-1.335(1.393)	0.31***	-0.966(1.318)	-1.516(1.494)	0.55***
Total		<b>-1.04(1.96)</b>			<b>-0.991(1.77)</b>	
Aut. on. husb. earn. (Yes = 1, No = 0)	N = 22,759	N = 1,267		N = 11,007	N = 306	
	-1.081(1.381)	-1.542(1.432)	0.46***	-0.811(1.286)	-0.993(1.454)	0.18***
Total		<b>-1.11(1.93)</b>			<b>-0.815(1.67)</b>	
Earn. more than husb. (Yes = 1, No = 0)	N = 31,376	N = 1,510		N = 2,390	N = 63	
	-1.009(1.362)	-1.444(1.451)	0.43***	-0.779(1.263)	-1.220(1.465)	0.44***
Total		<b>-1.03(1.88)</b>			<b>-0.791(1.61)</b>	

Note : Mean value are provided and the standard errors are in parentheses. \*Significant at the 0.1 level, \*\*Significant at the 0.05 level, Significant at the 0.01 level.

## **Identification strategy**

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# OLS with fixed effects

## A baseline model

$$Y_{imc} = \alpha_1 nbrEvents_{ic} \times highBP_{im} + \alpha_2 nbrEvents_{ic} + \alpha_3 highBP_{im} + \alpha_4 X_{imc} + \mu_i^M + \mu_i^Y + \mu_{imc}^{SY} + \mu_{imc}^c + \mu_c^{IM} + \epsilon_{imc}$$

- $Y_{imc}$  are child's  $i$  anthropometric indicators (WAZ, HAZ, WHZ);
- $nbrEvents_{ic}$  is the count of armed conflicts related to BH within a 10km radius experienced by child  $i$  from his **birth till the interview day**;
- $highBP_{im}$  is the child's  $i$  mother  $m$  BP level dummy (low or high);
- $X_{imc}$  are child's  $i$  and mother  $m$  characteristics;
- $\mu_{im}^c$  is the cluster FE;
- $\mu_i^M$  is the child's month of birth FE;
- $\mu_i^Y$  is the child's year of birth FE;
- $\mu_i^{SY}$  is the survey year FE;
- $\mu_c^{IM}$  represents the interview month FE.

This model has a limitation due to **unobservable heterogeneity**  
(woman's health and nutrition knowledge, genetic predispositions or care practices and hygiene etc)  $\implies$  sibling model.

# OLS with fixed effects

## A sibling model

$$Y_{imc} = \beta_1 nbrEvents_{ic} \times highBP_{im} + \beta_2 nbrEvents_{ic} + \beta_3 X_{ict} + \mu_{im}^m + \mu_i^M + \mu_i^Y + \mu_c^{IM} + \epsilon_{imc}$$

- $Y_{imc}$  are child's  $i$  anthropometric indicators (WAZ, HAZ, WHZ);
- $nbrEvents_{ic}$  is the count of armed conflicts related to BH within a 10km radius experienced by the child  $i$  from **birth to the interview day**;
- $highBP_{im}$  is the child's  $i$  mother  $m$  BP level dummy (low or high);
- $X_{ic}$  are child's  $i$  characteristics;
- $\mu_{im}^m$  is the mother's FE;
- $\mu_i^M$  is the child's month of birth FE;
- $\mu_i^Y$  is the child's year of birth FE;
- $\mu_c^{IM}$  represents the interview month FE.

## Results

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# First estimates

**Table 2:** The estimated effect of the BH conflict on WAZ.

	Specification:					
	Baseline				Sibling	
	(1)	(2)	(3)	(4)	(5)	(6)
aut. maj.		aut. own	aut. on	earn. more		
hh purch.		earn.	husb. earn.	than husb.		
Nbr events	−0.33*** (0.11)	−0.33*** (0.11)	−0.34*** (0.11)	−0.33*** (0.11)	−0.33*** (0.11)	−0.57*** (0.22)
High bargaining		4.62** (1.82)	−4.42** (1.73)	0.40 (1.82)	−0.98 (3.08)	
Mean outcome	−101.28	−101.28	−101.28	−101.28	−101.28	−101.28
Cluster fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Mother fixed effects	No	No	No	No	No	Yes
Observations	35,339	35,339	35,339	35,339	35,339	35,339
R <sup>2</sup>	0.22	0.22	0.22	0.22	0.22	0.84
						22,180

\* Note: the estimated model is an OLS model. The baseline regressions include controls for mother ethnicity, her age and age squared, mother and father number of years of education, their working in agriculture sector binaries, the sexe of the head, the number of household members and under five children and the NDHS poverty quintile. The two specifications (baseline and sibling) include controls for child characteristics, such as a binary variable for twin status and sex, child birth order, and current age. The birth month and year of the child and interview's month FE are included in all regressions. Standard errors in parentheses are clustered at the NDHS cluster level. •Significant at the 0.1 level, \*\*Significant at the 0.05 level, \*\*\*Significant at the 0.01 level.

# First estimates

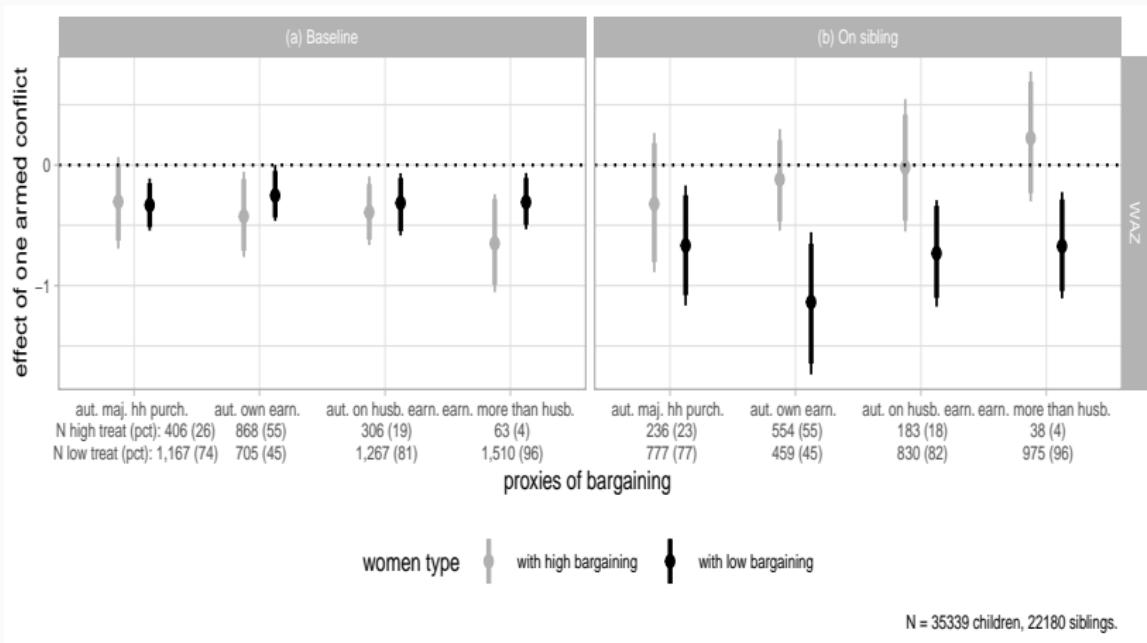
**Table 3:** The estimated effect of the BH conflict on WAZ.

	<i>Specification:</i>							
	Baseline				Sibling			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	aut. maj.	aut. own	aut. on	earn. more	aut. maj.	aut. own	aut. on	earn. more
	hh purch.	earn.	husb. earn.	than husb.	hh purch.	earn.	husb. earn.	than husb.
Nbr events	<b>-0.33***</b> (0.11)	<b>-0.25**</b> (0.12)	<b>-0.31**</b> (0.13)	<b>-0.31***</b> (0.12)	<b>-0.67***</b> (0.26)	<b>-1.14***</b> (0.30)	<b>-0.73***</b> (0.23)	<b>-0.67***</b> (0.23)
Nbr events * High bargaining	0.03 (0.18)	-0.17 (0.20)	-0.08 (0.16)	-0.34 (0.23)	0.34 (0.34)	<b>1.02***</b> (0.31)	<b>0.71**</b> (0.31)	<b>0.90**</b> (0.37)
High bargaining	4.61** (1.82)	-4.26** (1.73)	0.45 (1.82)	-0.74 (3.09)				
Mean effect (High BP)	-0.3***	-0.42**	-0.39***	-0.64***	-0.32	-0.12	-0.02	0.22
Cluster fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
Mother fixed effects	No	No	No	No	Yes	Yes	Yes	Yes
Observations	35,339	35,339	35,339	35,339	22,180	22,180	22,180	22,180
R <sup>2</sup>	0.22	0.22	0.22	0.22	0.74	0.74	0.74	0.74

\* Note : the estimated model is an OLS model. The baseline regressions include controls for mother ethnicity, her age and age squared, mother and father number of years of education, their working in agriculture sector binaries, the sexe of the head, the number of household members and under five children and the NDHS poverty quintile. The birth month and year of the child and interview's month FE are included in all regressions. Standard errors in parentheses are clustered at the NDHS cluster level. ·Significant at the 0.1 level, --Significant at the 0.05 level, ---Significant at the 0.01 level.

# First estimates

Figure 1: The estimated effect of the BH conflict on the WAZ.



# Threats to identification and mechanisms

- Threats to identification :
  - selective survival  $\Rightarrow$  **not evidence**; [▶ figure](#)
  - short term realised fertility  $\Rightarrow$  **not evidence**; [▶ figure](#)
  - missing data  $\Rightarrow$  **not evidence**. [▶ table](#)
- Mechanisms :
  - child vaccination  $\times$ ; [▶ table](#)
  - maternal care (prenatal and postnatal care)  $\checkmark$ ; [▶ table](#)
  - barrier to health  $\checkmark$ . [▶ table](#)

# Sensibility analysis

Sensibility analysis :

- intrauterine exposure ✓ ; [▶ figure](#)
- non migrant ✓ ; [▶ figure](#)
- sensibility to the exposition variable (all types of conflicts and dist. to the event) ✓ ; [▶ figures](#)
- control for drought ✓ ; [▶ figure](#) [▶ figure](#)
- extensive margin ✗. [▶ table](#)

## Conclusion

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# Conclusion

## To summarize

- ✓ There was no mitigating effect of maternal bargaining power on WHZ and HAZ.
- ✓ Children born to women with high bargaining power are less likely to be underweight than children born to women with low bargaining power.
- ✓ Healthcare services access is an important mechanism that can explain the findings.
- ✓ Policies designed to mitigate the negative impact of BH conflict on children can exploit progress in maternal bargaining alongside other protective measures.

Thank you for your time and consideration!

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## Appendix

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# Stylized facts

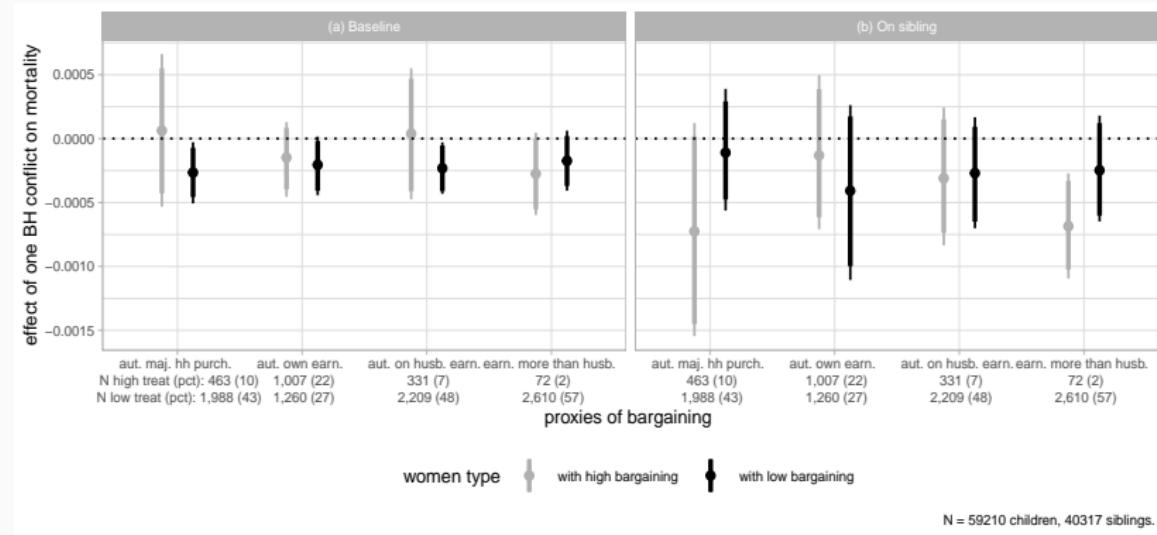
Characteristics of children	Baseline, N = 35339			Sibling, N = 22180		
	No conflict 10 km around N = 33,766 <sup>1</sup>	At least one conflict 10 km around N = 1,573 <sup>1</sup>	p-value <sup>2</sup>	No conflict 10 km around N = 21,167 <sup>1</sup>	At least one conflict 10 km around N = 1,013 <sup>1</sup>	p-value <sup>2</sup>
Child anthropometric						
- WAZ	-0.993 (1.357)	-1.435 (1.452)	< 0.001***	-0.999 (1.341)	-1.435 (1.444)	< 0.001***
- HAZ	-1.293 (1.925)	-1.424 (1.955)	0.009***	-1.286 (1.906)	-1.390 (1.959)	0.10
- WHZ	-0.345 (1.524)	-0.893 (1.686)	< 0.001***	-0.351 (1.505)	-0.906 (1.705)	< 0.001***

\* Note : <sup>1</sup>n (%); Mean, <sup>2</sup>Fisher's Exact Test for Count Data; Welch Two Sample t-test. WAZ : Weight for Age Z-score; HAZ : Height for Age Z-score; WHZ : Weight for Height Z-score. ·Significant at the 0.1 level, ..Significant at the 0.05 level, ...Significant at the 0.01 level.

▶ (back)

# Threats to identification

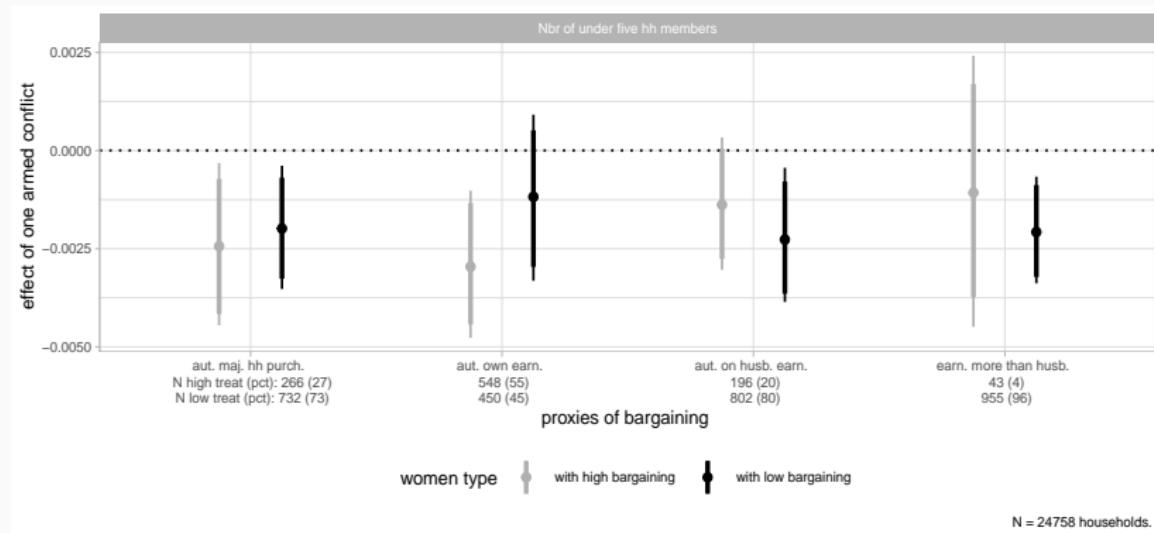
Figure 2: The effect of one additional BH conflict on infant mortality



▶ (back)

# Threats to identification

**Figure 3:** The effect of one additional BH conflict on the probability of having an alive under five child.



# Threats to identification

**Table 5:** The effect of one BH conflict on BP.

	<i>Outcome variables</i>			
	aut. maj. hh purch.	aut. own earn.	aut. on husb. earn.	earn. more than husb.
Nbr Events	0.0008 (0.0012)	-0.0011 (0.0012)	0.0012 (0.0014)	-0.0020 (0.0021)
Observations	23521	23521	23521	23516
Survey year fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Pseudo R2	0.1918	0.0989	0.1302	0.0768

Note : the estimated model is a logit model. The outcome variable is a binary for each proxy of BP. The regressions include controls for woman ethnicity, her age and age squared, woman and husband number of years of education, their working in agriculture sector binaries, the sexe of the head, the number of household members and under five children and the NDHS poverty quantile. Standard errors in parentheses are clustered at the NDHS cluster level. -Significant at the 0.1 level, --Significant at the 0.05 level, ---Significant at the 0.01 level.

# Threats to identification

**Table 6:** The estimated effect of one BH conflict migration.

	Outcome variable: migrant ( <i>Yes = "1", No="0"</i> )			
	aut. maj. hh purch.	aut. own earn.	aut. on husb. earn.	earn. more than husb.
Nbr Events	0.0029 (0.0018)	0.0009 (0.0020)	0.0032 (0.0019)	0.0034 (0.0018)
Nbr Event * High bargaining	0.0015 (0.0024)	0.0051- (0.0020)	0.0017 (0.0019)	-0.0008 (0.0057)
High bargaining	-0.1393- (0.0700)	-0.0736 (0.0675)	0.0193 (0.0677)	0.0396 (0.1012)
Observations	24524	24524	24524	24524
Survey year fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Pseudo R <sup>2</sup>	0.4494	0.4496	0.4492	0.4491

Note : the estimated model is a logit model. The outcome variable is a binary for migrant household. The regressions include controls for woman ethnicity, her age and age squared, woman and husband number of years of education, their working in agriculture sector binaries, the sexe of the head, the number of household members and under five children and the NDHS poverty quantile. Standard errors in parentheses are clustered at the NDHS cluster level. ·Significant at the 0.1 level, ··Significant at the 0.05 level, ···Significant at the 0.01 level.

# Threats to identification

**Table 7:** The effect of one BH conflict on the proba of WAZ being missing.

	Outcome variable: WAZ is missing			
	aut. maj. hh purch.	aut. own earn.	aut. on husb. earn.	earn. more than husb.
Nbr Events	-0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Nbr Events * High bargaining	-0.13 (0.01)	-0.01 (-0.02)	-0.18 (0.01)	10.01... (0.17)
High bargaining	0.14 (0.08)	-0.21.. (0.07)	0.12 (0.08)	-0.00 (0.16)
Observations	53964	53964	53964	53964
Survey year fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Pseudo R <sup>2</sup>	0.06	0.06	0.06	0.06

Note: the estimated model is a logit model. The outcome is a binary for WAZ being missing. The regressions include controls for mother ethnicity, her age and age squared, mother and father number of years of education, their working in agriculture sector binaries, the sexe of the head, the number of household members and under five children and the NDHS poverty quantile. They also include controls for child characteristics, such as a binary variable for twin status and gender, child birth order, and current age. Standard errors in parentheses are clustered at the NDHS cluster level. -Significant at the 0.1 level, ..Significant at the 0.05 level, ...Significant at the 0.01 level.

# Mechanisms

## Mechanisms

$$\log \frac{P_{mhc}}{1-P_{mhc}} = \alpha_1 nbrEvents_{hc} \times highBP_m + \alpha_2 nbrEvents_{hc} + \alpha_3 highBP_m + \alpha_4 X_{mhc} + \mu_{mhc}^{SY} + \mu_{mhc}^{St} + \epsilon_{mhc}$$

- $P_{mhc}$  is the probability of a mother  $m$  from household  $h$  in cluster  $c$  engaging in a specific mechanism,
- $nbrEvents_{hc}$  is the count of armed conflicts related to BH within a 10km radius experienced by the household from **2009 to the interview day**;
- $highBP_m$  is the mother  $m$  BP level dummy (low or high);
- $X_{mhc}$  are mother's  $m$  and household's  $h$  characteristics;
- $\mu_{mhc}^{SY}$  is the survey year FE (account for the survey's year-specific characteristics);
- $\mu_{mhc}^{St}$  is the state FE (account for the state's specific characteristics);

▶ (back)

# Mechanisms

Outcome : child vaccination (1 = « Yes » and 0 = « No »)				
	aut. maj. hh purch.	aut. own earn.	aut. on husb. earn.	earn. more than husb.
Nbr events	0.0087... (0.0016)	0.0094... (0.0026)	-0.0074... (0.0018)	0.0071... (0.0020)
Nbr events * High bargaining	0.0062 (0.0046)	0.0037 (0.0032)	-0.0016 (0.0056)	-0.0089 (0.0122)
High bargaining	0.1598... (0.0524)	0.4500... (0.0490)	0.1299... (0.0545)	0.0680 (0.0969)
Observations	24202	24202	24202	24202
Survey year fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Pseudo R <sup>2</sup>	0.14	0.15	0.14	0.14

Note : the estimated model is a logit model. The outcome variable is binary, indicating the vaccination status of children between 3 and 5 years old. The vaccines include diphtheria, tetanus, polio (DTP), measles, BCG, and vitamin A. The regressions incorporate controls for mother's ethnicity, her age and age squared, mother and father's number of years of education, their working status in the agriculture sector (binary), the sex of the head of the household, the number of household members, the count of under-five children and the NDHS poverty quantile. They also include controls for child characteristics, such as a binary variable for twin status and gender, child birth order, and current age. Standard errors in parentheses are clustered at the NDHS cluster level. -Significant at the 0.1 level, --Significant at the 0.05 level, ---Significant at the 0.01 level.

# Mechanisms

	Outcome : maternal care (1 = «Yes» and 0 = «No»)			
	aut. maj. hh purch.	aut. own earn.	aut. on husb. earn.	earn. more than husb.
Nbr Events	-0.0001 (0.0010)	-0.0017* (0.0007)	-0.0002 (0.0010)	0.0003 (0.0009)
Nbr Events * High bargaining	0.0008 (0.0007)	0.0057*** (0.0014)	0.0035* (0.0014)	0.0055*** (0.0007)
High bargaining	0.2580*** (0.0644)	0.1982*** (0.0593)	0.2536*** (0.0753)	0.3111.. (0.1027)
Observations	23521	23521	23521	23521
Survey year fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Pseudo R2	0.32	0.32	0.32	0.32

Note : maternal care include postnatal (after child birth) and antenatal care (before child birth). The estimated model is a logit model. The outcome variable is a binary for any prenatal or postnatal care the woman is provided. The regressions incorporate controls for mother's ethnicity, her age and age squared, mother and father's number of years of education, their working status in the agriculture sector (binary), the sex of the head of the household, the number of household members, the count of under-five children and the NDHS poverty quantile. Standard errors in parentheses are clustered at the NDHS cluster level.-Significant at the 0.1 level, ..Significant at the 0.05 level, \*\*\*Significant at the 0.01 level.

# Mechanisms

**Table 8:** The effect of one additional BH conflict on barriers to health.

	Barriers to health (1 = «Yes» and 0 = «No»)			
	aut. maj. hh purch.	aut. own earn.	aut. on husb. earn.	earn. more than husb.
Nbr Events	0.0016** (0.0005)	0.0028*** (0.0004)	0.0012* (0.0006)	0.0005 (0.0004)
Nbr Events * High bargaining	0.0033*** (0.0006)	-0.0047*** (0.0007)	-0.0041* (0.0016)	0.0029 (0.0018)
High bargaining	0.0233 (0.1064)	-0.1100 (0.0667)	-0.0991 (0.0898)	-0.0932 (0.0879)
Observations	23521	23521	23521	23521
Survey year fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Pseudo R2	0.12	0.12	0.12	0.12

Note : barriers to health access can play an important role in preventing women and their children from having access to proper healthcare. The estimated model is a logit model. The regressions incorporate controls for mother's ethnicity, her age and age squared, mother and father's number of years of education, their working status in the agriculture sector (binary), the sex of the head of the household, the number of household members, the count of under-five children and the NDHS poverty quantile. Standard errors in parentheses are clustered at the NDHS cluster level. · Significant at the 0.1 level, \*\*Significant at the 0.05 level, \*\*\*Significant at the 0.01 level.

# Mechanisms

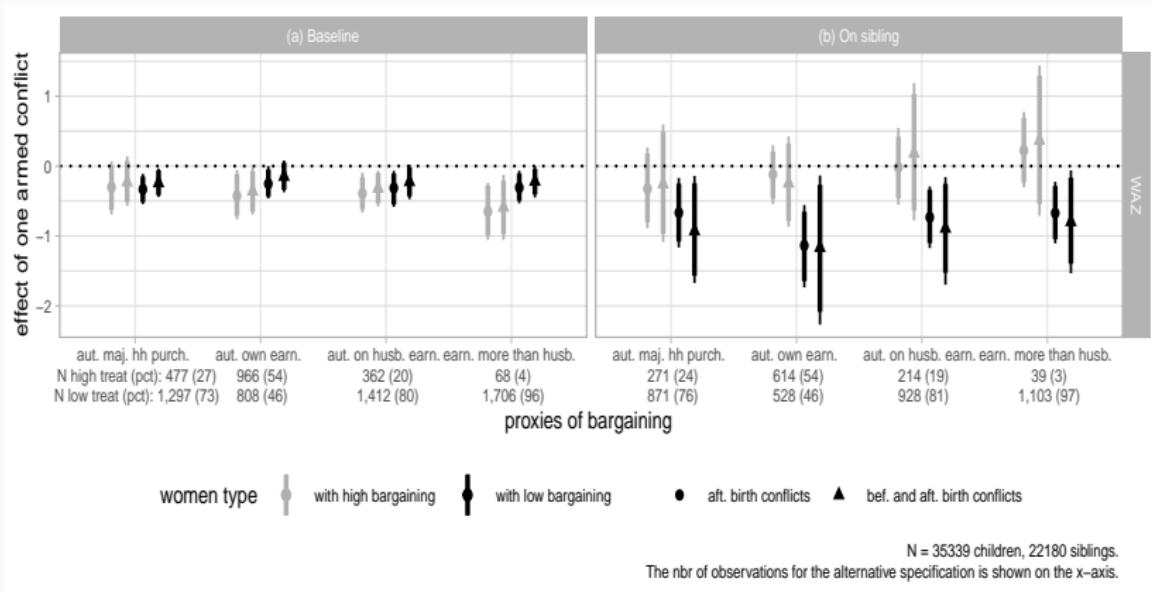
**Table 9:** The effect of one additional BH conflict on health insurance.

	<i>Health insurance (1 = «Yes» and 0 = «No»)</i>			
	aut. maj. hh purch.	aut. own earn.	aut. on husb. earn.	earn. more than husb.
Nbr Events	0.0042... (0.0012)	0.0046... (0.0010)	0.0052... (0.0010)	0.0060... (0.0009)
Nbr Events * High bargaining	0.0024 (0.0013)	0.0018 (0.0012)	0.0021... (0.0010)	-0.0301 (0.0297)
High bargaining	0.1647 (0.1207)	0.0266 (0.1181)	0.0942 (0.0971)	0.2573... (0.1181)
Observations	20134	20134	20134	20134
Survey year fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Pseudo R <sup>2</sup>	0.2298	0.2297	0.2297	0.2309

*Note :* health insurance can play a major role on children nutritional status as it promote healthcare services utilization. The regressions incorporate controls for mother's ethnicity, her age and age squared, mother and father's number of years of education, their working status in the agriculture sector (binary), the sex of the head of the household, the number of household members, the count of under-five children and the NDHS poverty quantile. Standard errors in parentheses are clustered at the NDHS cluster level. · Significant at the 0.1 level, .. Significant at the 0.05 level, ... Significant at the 0.01 level.

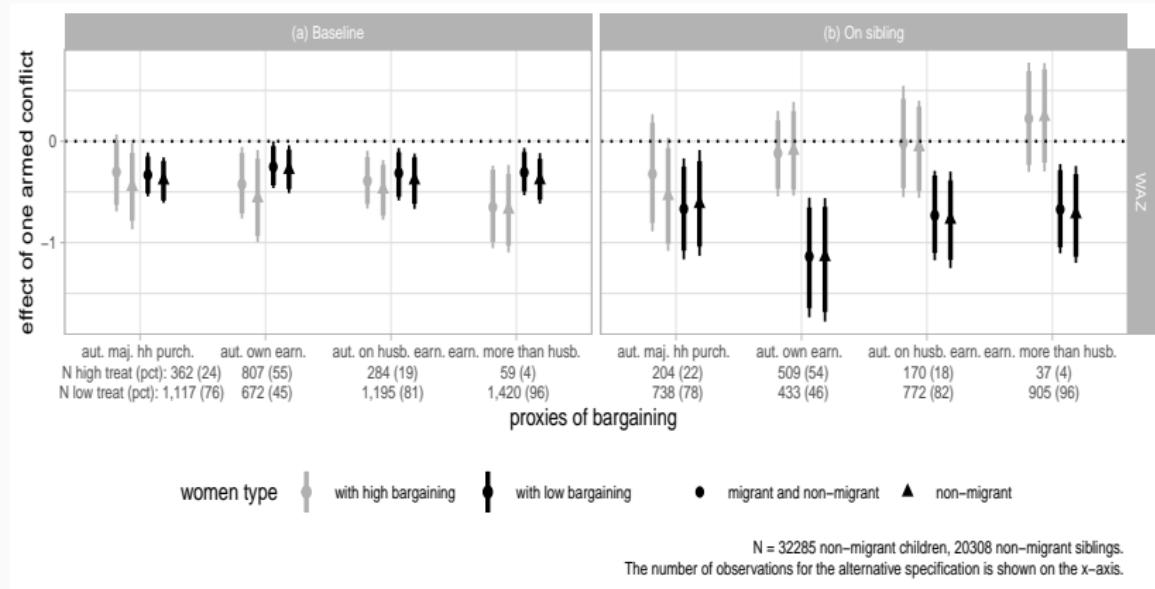
# Sensitivity analysis

**Figure 4:** The effect of one additional BH conflict on malnutrition.



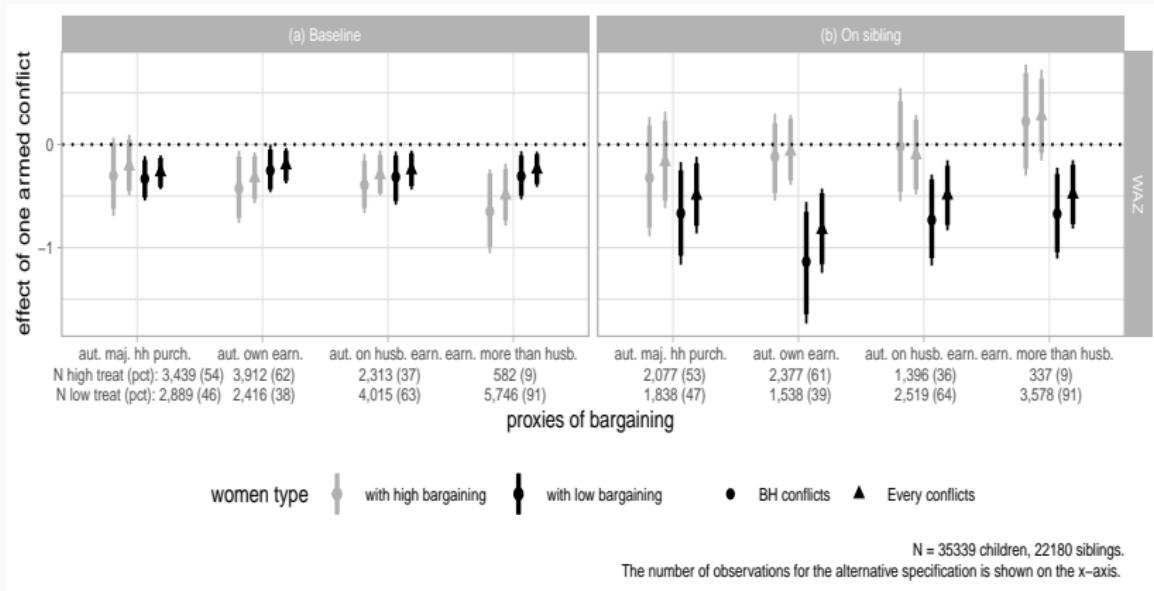
# Sensitivity analysis

**Figure 5:** The effect of one additional BH conflict on malnutrition for migrant and non migrant



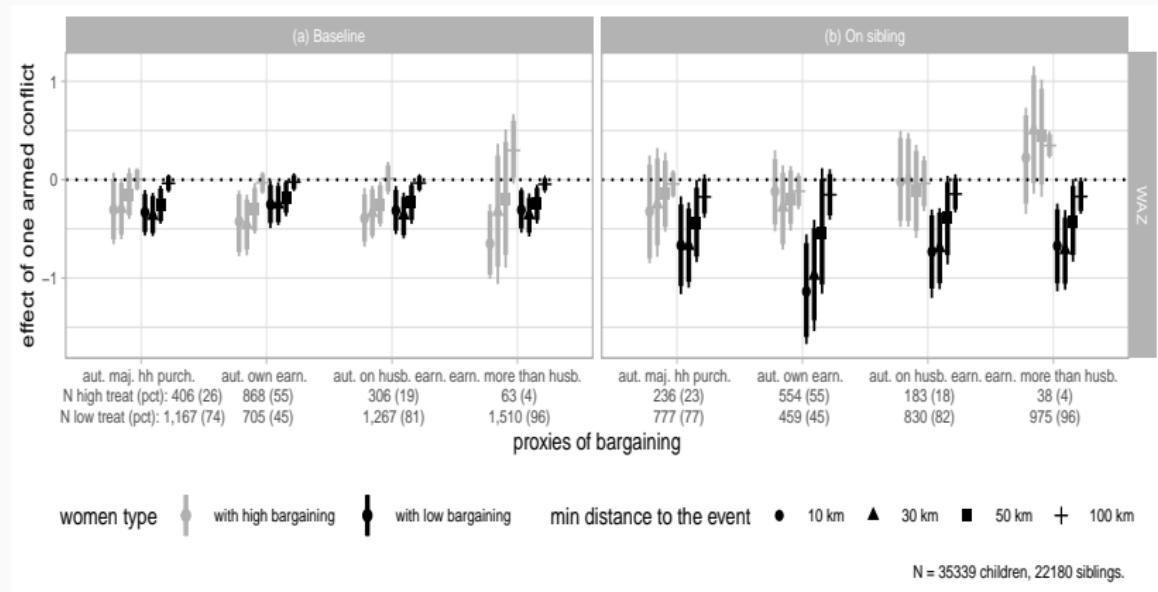
# Sensitivity analysis

**Figure 6:** The effect of one additional BH conflict on malnutrition.



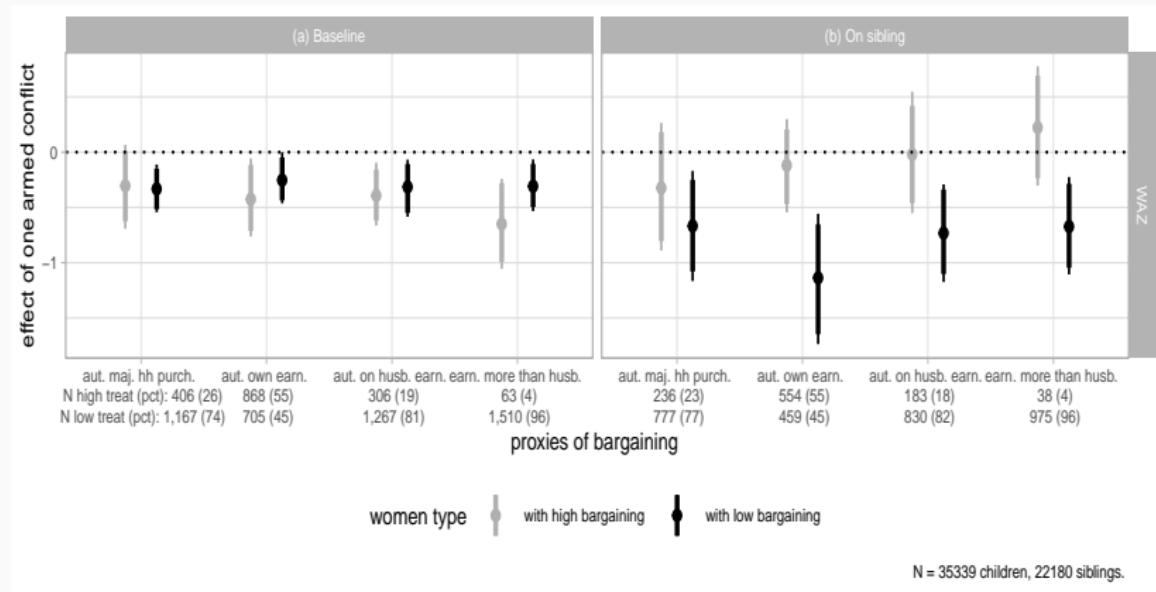
# Sensitivity analysis

**Figure 7:** The effect of one additional BH conflict on malnutrition.



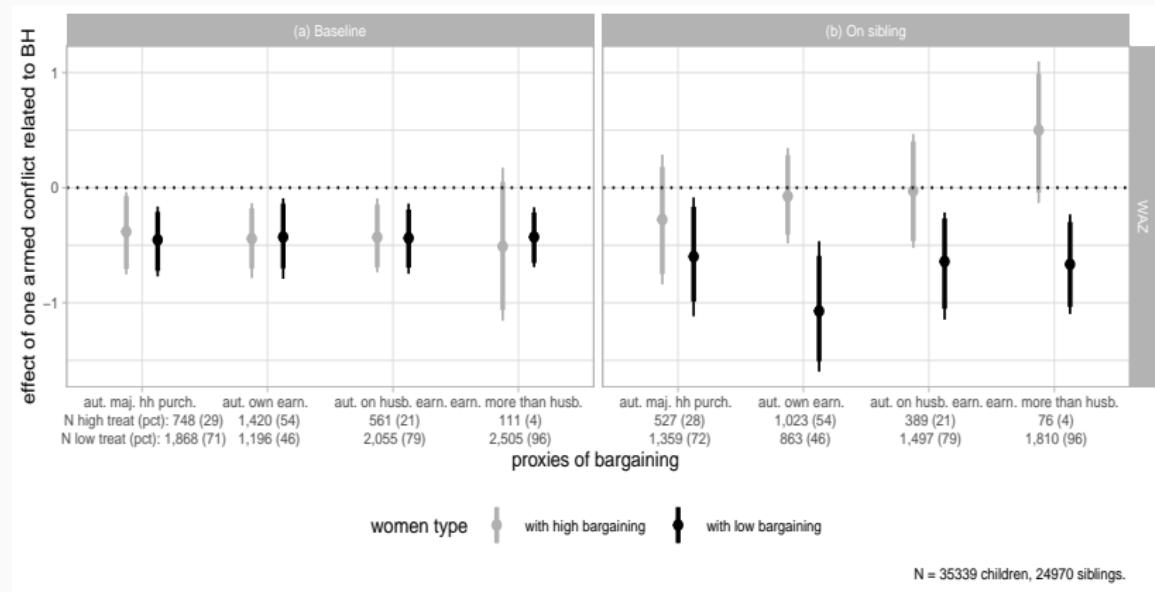
# Sensitivity analysis

Figure 8: The effect of one additional BH conflict on malnutrition (10 km).



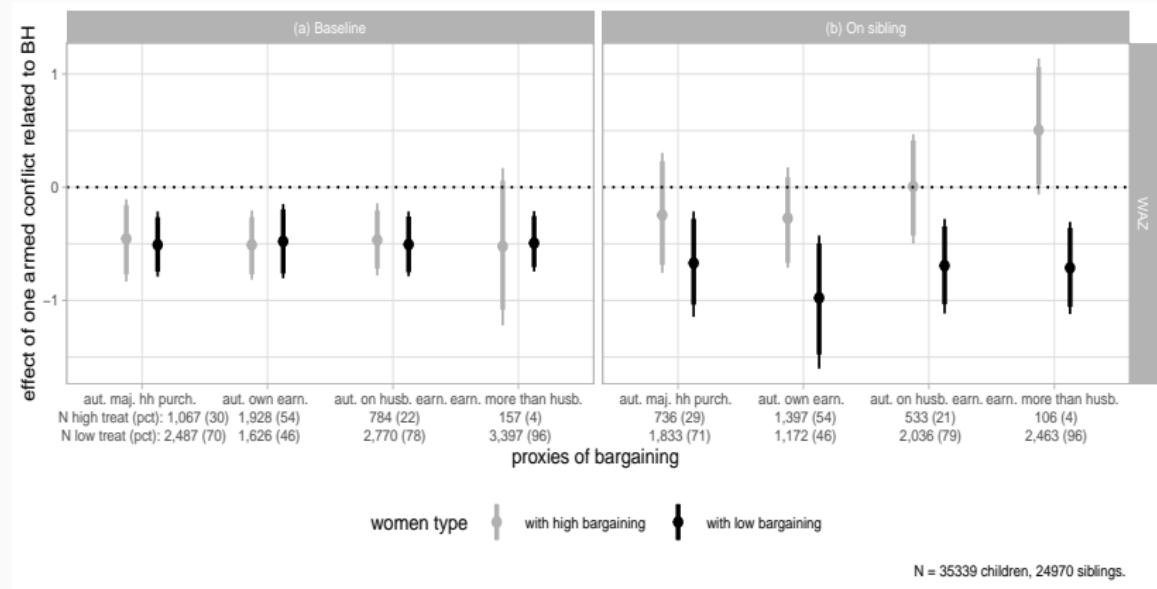
# Sensitivity analysis

**Figure 9:** The effect of one additional BH conflict on malnutrition (20 km).



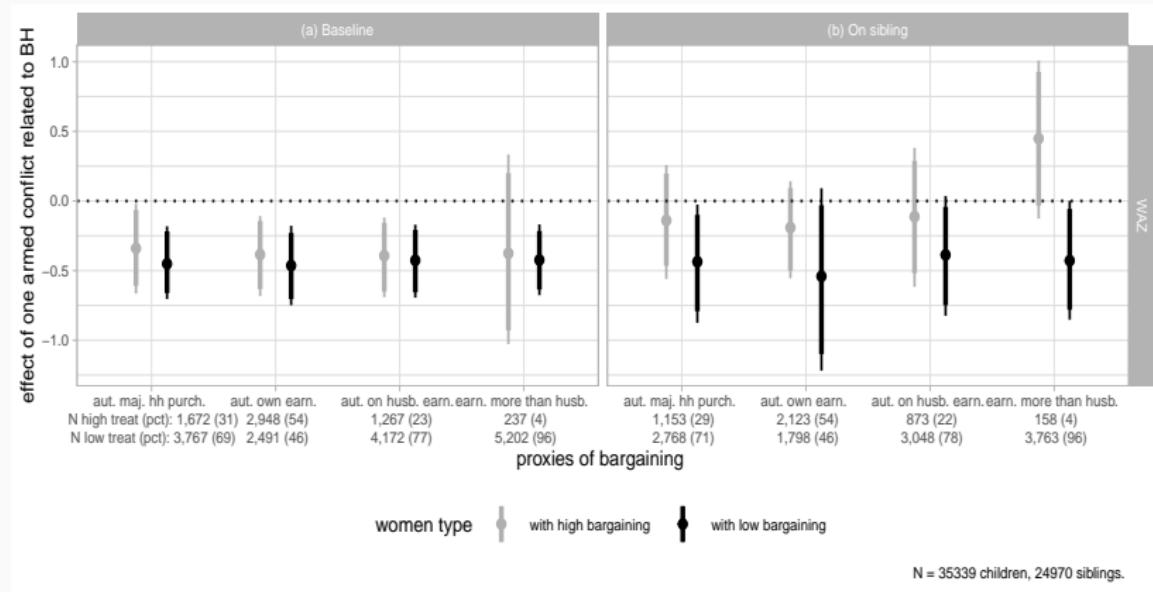
# Sensitivity analysis

**Figure 10:** The effect of one additional BH conflict on malnutrition (30 km).



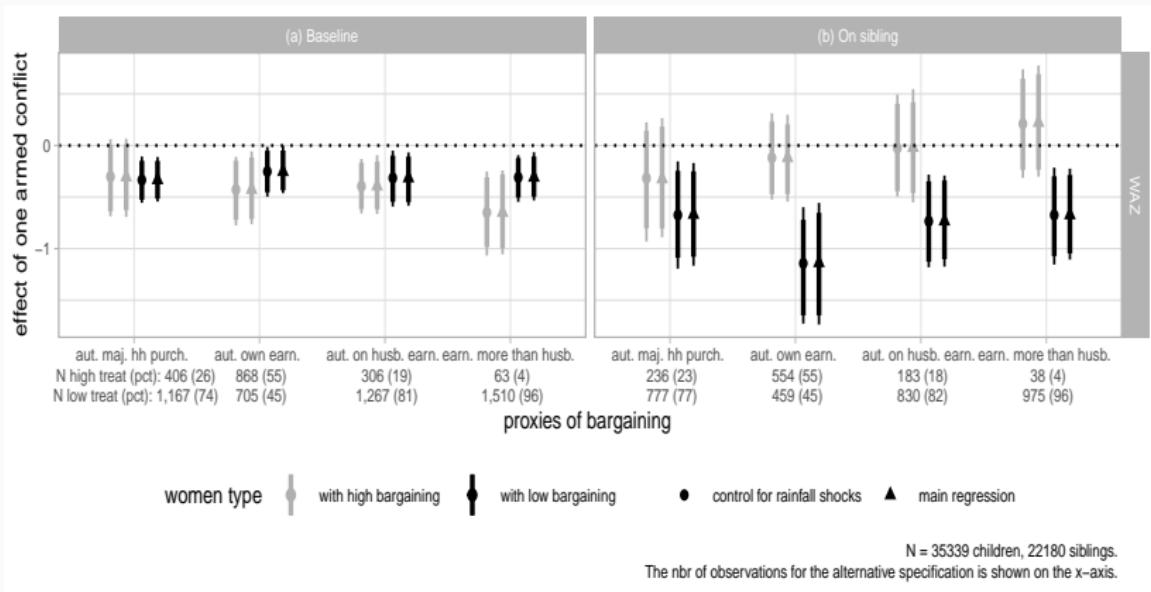
# Sensitivity analysis

**Figure 11:** The effect of one additional BH conflict on malnutrition (50 km).



# Sensitivity analysis

Figure 12: The effect of one additional BH conflict on malnutrition.



# Sensitivity analysis

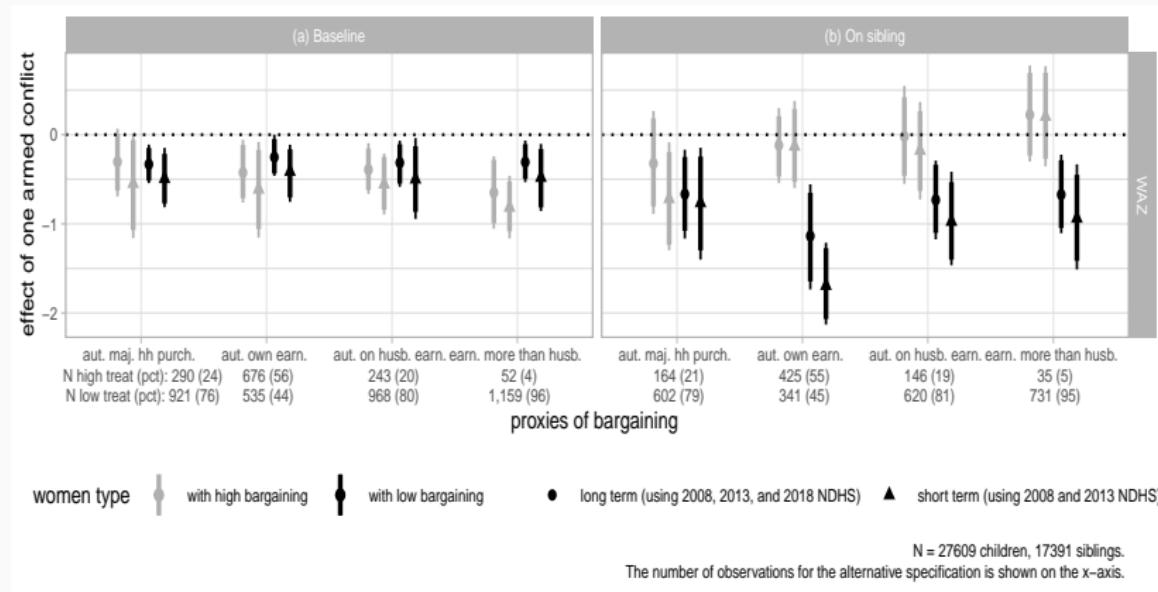
**Table 10:** The estimated effect of one BH conflict on the WAZ.

Specification:								
	Baseline				Sibling			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	aut. maj.	aut. own	aut. on	earn. more	aut. maj.	aut. own	aut. on	earn. more
Exposed Binary	.6.39 (8.44)	-6.03 (9.33)	-9.38 (8.32)	-8.13 (8.00)	-9.07 (9.75)	-16.15 (13.85)	-8.23 (10.18)	-3.47 (9.51)
Exposed Binary * High bargaining	.8.29 (11.42)	-5.42 (8.62)	1.72 (12.88)	-26.13 (16.50)	18.52 (20.89)	23.23 (18.97)	21.35 (22.71)	0 (0.00)
High bargaining	1.33 (1.81)	-0.08 (1.78)	-2.46 (1.84)	-1.25 (3.08)				
Survey year FE	Yes	Yes	Yes	Yes	No	No	No	No
Cluster FE	Yes	Yes	Yes	Yes	No	No	No	No
Mother FE	No	No	No	No	Yes	Yes	Yes	Yes
Observations	35,339	35,339	35,339	35,339	24,970	24,970	24,970	24,970
R2	0.30	0.30	0.30	0.30	0.77	0.77	0.77	0.77

\* Note: the estimated model is an OLS model. The baseline regressions include controls for mother ethnicity, her age and age squared, mother and father number of years of education, their working in agriculture sector binaries, the sexe of the head, the number of household members and under five children and the NDHS poverty quintile. The two specifications (baseline and sibling) include controls for child characteristics, such as a binary variable for twin status and gender, child birth order and current age. The birth month and year of the child are included in all regressions. The birth month and year of the child and interview's month FE are included in all regressions. Standard errors in parentheses are clustered at the NDHS cluster level. ·Significant at the 0.1 level, ..Significant at the 0.05 level, ...Significant at the 0.01 level.

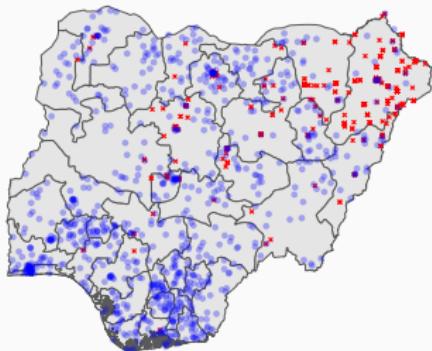
# Sensitivity analysis

Figure 13: The effect of one additional BH conflict on malnutrition.

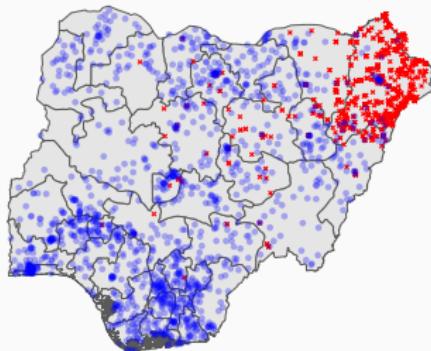


# BH conflict in Nigeria

2009 – 2013



2014 – 2018



✖ BH conflict

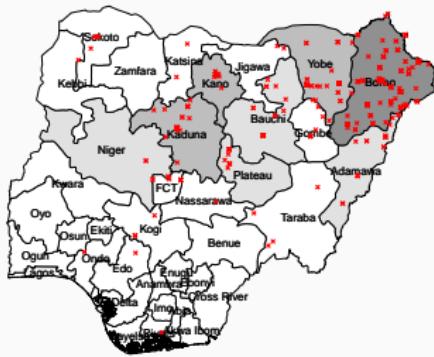
● DHS cluster buffer of 10km

Data sources: NDHS and ACLED (Author's own calculation).

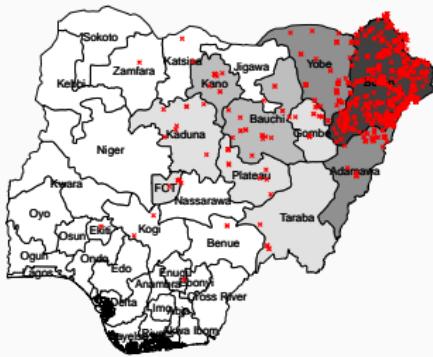
▶ (back)

# BH conflict in Nigeria

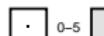
2009 – 2013



2014 – 2018



Number of armed conflicts related to BH



0-5



5-20



20-100



100-200



>200

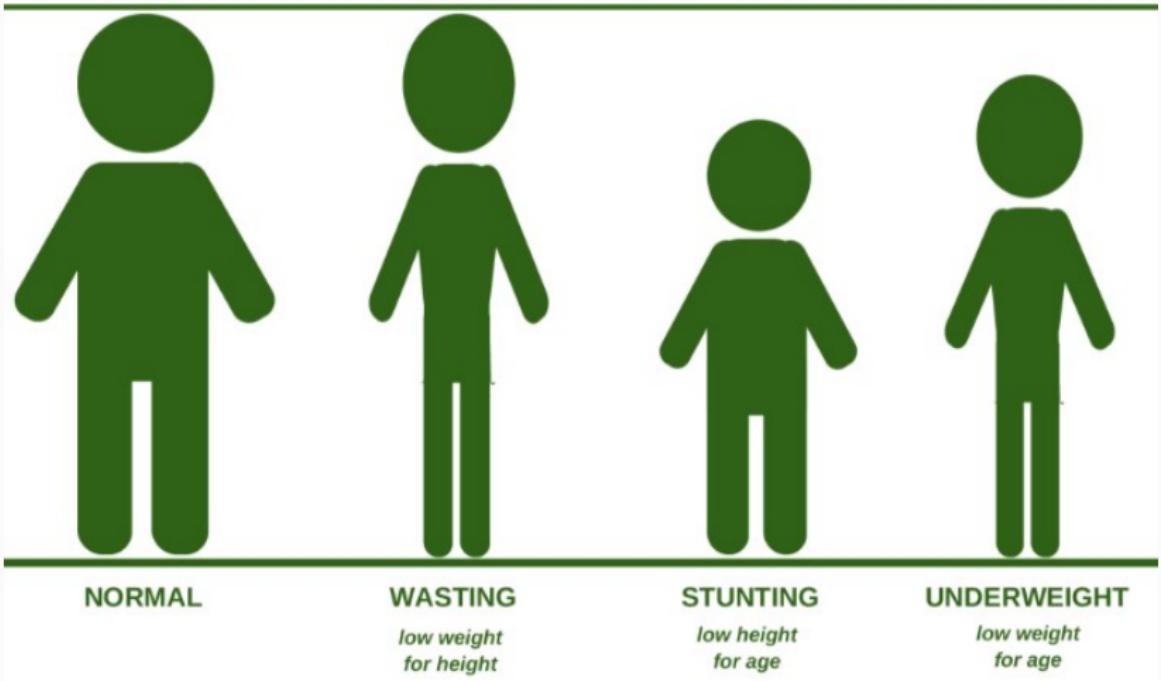


BH conflict

Data sources: ACLED (Author's own calculation).

▶ (back)

# Malnutrition



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