

Does a mother's exposure to drought in utero increase the resistance of her offspring to in utero shocks?

Yaya S. Jallow

University of Leicester

June 7, 2018

## Introduction

- In utero shocks not only affect child health, but also affect educational outcomes, wages and the likelihood of suffering from chronic illnesses later in life.
- A mother's exposure to a negative shock in utero can have adverse effects on her and her offspring.
- An increase in the occurrence of extreme weather events in the Sub Saharan Africa has led to an increase in a certain group; the double exposed.

## Introduction

- In utero shocks not only affect child health, but also affect educational outcomes, wages and the likelihood of suffering from chronic illnesses later in life.
- A mother's exposure to a negative shock in utero can have adverse effects on her and her offspring.
- An increase in the occurrence of extreme weather events in the Sub Saharan Africa has led to an increase in a certain group; the double exposed.

The aim of this paper is to:

- Determine whether resistance to in utero shocks is passed from mother to child.
- Show that first and second generation models can be estimated in the same econometric model.

## Background on Shocks

- Senegal is a country in West Africa, with a population of 15 million. Since 1980, the country has experienced 5 drought events, with 2 of these classed as major (1983/4 and 2011).

## Background on Shocks

- Senegal is a country in West Africa, with a population of 15 million. Since 1980, the country has experienced 5 drought events, with 2 of these classed as major (1983/4 and 2011).
- The 1983/4 drought was the worst in the country's recorded history, with over 1.2 million affected and agricultural output only 30% of the previous year's. GDP and value added per agricultural worker were down by 5.3% and 24% respectively.
- The 2011 drought was less severe but affected an estimated 800,000 people. GDP growth was under 1%, due to diversification of the economy away from agriculture relative to 1983.

## Identification and Data

- Two drought events (both random) 28 years apart were identified.
- Use pregnancy history to test for culling effect with a Heckman Two-Stage regression.

## Identification and Data

- Two drought events (both random) 28 years apart were identified.
- Use pregnancy history to test for culling effect with a Heckman Two-Stage regression.
- The 2014 Continuous DHS for Senegal is used in the paper.
- The children (under 5s) in our sample are divided into 4 groups: control, immediate, intergenerational and double exposed.
- Mothers born between November 1983 and February 1985 are considered treated, whilst children born between November 2011 and February 2013 are considered. treated.
- A difference-in-difference model is estimated with controls for child, mother and village attributes included in model.

## Identification and Data

- Two drought events (both random) 28 years apart were identified.
- Use pregnancy history to test for culling effect with a Heckman Two-Stage regression.
- The 2014 Continuous DHS for Senegal is used in the paper.
- The children (under 5s) in our sample are divided into 4 groups: control, immediate, intergenerational and double exposed.
- Mothers born between November 1983 and February 1985 are considered treated, whilst children born between November 2011 and February 2013 are considered. treated.
- A difference-in-difference model is estimated with controls for child, mother and village attributes included in model.

The main model, estimated using difference-in-difference:

$$y_{is} = \beta_0 + \delta_0 d_0 + \delta_1 d_1 + \delta_2 d_0 d_1 + C' \phi_c + X' \phi_x + V' \phi_v + u_i, \quad (1)$$



## Results

Table: Results of DiD Regression

	Birth weight	Weight-for-Age	Weight-for-Height	Height-for-Age
Child Exposed	-7.673 [27.860]	-0.307 [0.052]***	-0.211 [0.049]***	-0.363 [0.058]***
Mother Exposed	-91.15 [93.889]	-0.215 [0.137]	-0.165 [0.109]	-0.19 [0.152]
Both Exposed	144.174 [131.106]	0.347 [0.171]**	0.271 [0.128]**	0.217 [0.207]
R-Squared	0.04	0.05	0.02	0.05

\* 10%; \*\* 5%; \*\*\* 1%

<sup>1</sup> All 4 models were regressed using the survey's sample weights and standard errors were clustered at the cluster level.

## Results

Table: Results of DiD Regression

	Birth weight	Weight-for-Age	Weight-for-Height	Height-for-Age
Child Exposed	-7.673 [27.860]	-0.307 [0.052]***	-0.211 [0.049]***	-0.363 [0.058]***
Mother Exposed	-91.15 [93.889]	-0.215 [0.137]	-0.165 [0.109]	-0.19 [0.152]
Both Exposed	144.174 [131.106]	0.347 [0.171]**	0.271 [0.128]**	0.217 [0.207]
R-Squared	0.04	0.05	0.02	0.05

\* 10%; \*\* 5%; \*\*\* 1%

<sup>1</sup> All 4 models were regressed using the survey's sample weights and standard errors were clustered at the cluster level.

- Double exposed children have better weight-for-age and weight-for-height measures than child exposed and mother exposed children.
- The net effect for double exposed children is -0.175 (0.347-0.307-0.215) standard deviations versus -0.307 for child exposed and -0.215 for mother exposed.
- The resistance wipes out the negative effect of the mother exposed effect.

## Results Cont'd

Table: Results of Fixed Effects at Settlement cluster Level

	Birth weight	Weight-for-Age	Weight-for-Height	Height-for-Age
Child Exposed	-25.242 [38.204]	-0.486 [0.052]***	-0.225 [0.055]***	-0.701 [0.055]***
Mother Exposed	-63.562 [95.622]	-0.301 [0.158]*	-0.222 [0.121]*	-0.306 [0.161]*
Both Exposed	121.905 [146.100]	0.418 [0.195]**	0.335 [0.135]**	0.419 [0.224]*
R-Squared	0.03	0.04	0.01	0.07
Observations	1,870	4,865	4,844	4,849

\* 10%; \*\* 5%; \*\*\* 1%

## Results Cont'd

Table: Results of Fixed Effects at Settlement cluster Level

	Birth weight	Weight-for-Age	Weight-for-Height	Height-for-Age
Child Exposed	-25.242 [38.204]	-0.486 [0.052]***	-0.225 [0.055]***	-0.701 [0.055]***
Mother Exposed	-63.562 [95.622]	-0.301 [0.158]*	-0.222 [0.121]*	-0.306 [0.161]*
Both Exposed	121.905 [146.100]	0.418 [0.195]**	0.335 [0.135]**	0.419 [0.224]*
R-Squared	0.03	0.04	0.01	0.07
Observations	1,870	4,865	4,844	4,849

\* 10%; \*\* 5%; \*\*\* 1%

- Results of the FE similar in signs to the DiD, with a Hausmann test showing the FE as the preferred model.
- In the end, both models give the same results, with the FE giving stronger effects.
- Height-for-age is now significant with regards to the mother and double exposed parameters.

## Other Results and Robustness Checks

### Other Results

- Estimated Pooled OLS, with survey rounds as time periods.
- Include trimester of exposure for child to see whether there is a differential.

### Robustness Checks

- Created synthetic shocks to serve as placebo tests. Both for pure controls only and for the whole sample of children.
- Use 1983 only as the drought gives the same (qualitative) results.
- Split sample by: Gender of children, Age group of children and Urban/Rural.

Thank you