

# Congenital Disability and Parents' Labor Supply: Evidence from the Zika Virus Outbreak

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- One in six people alive experience some form of significant disability (WHO)
- Child disability is a hugely consequential life shock for parents
- Increased demands on both parental time and money.
- Work understanding the economic impacts on parents is still lagging

- How does congenital disability affect the labor outcomes of the parents?
- We exploit sudden Zika virus outbreak in Brazil as natural experiment:
  - Thousands of children born with microcephaly
  - Unexpected nature helps address selection concerns
- We find mothers of children with microcephaly face a 66% higher motherhood penalty, but no effect on fathers.

- A small but growing literature has estimated negative effects of child disability on maternal employment.
  - Salkever (1984) and Powers (2003) in cross-sectional data,
  - Gunnsteinsson and Steingrimsdottir (2019), Wondemu et al. (2022) with longitudinal data
- More broadly, literature on health shocks in the family (Breivik & Costa-Ramón 2024), and the motherhood penalty.
- Broadly finds mothers drop out, mixed effects on fathers.

- Potential identification issue: hard to rule out some selection bias.
  - e.g. health concerns (folate supplementation) may be correlated with attachment to the labor force
- We contribute providing a case where risk of disability changed exogenously and suddenly

- Background
- Empirical Strategy
- Results

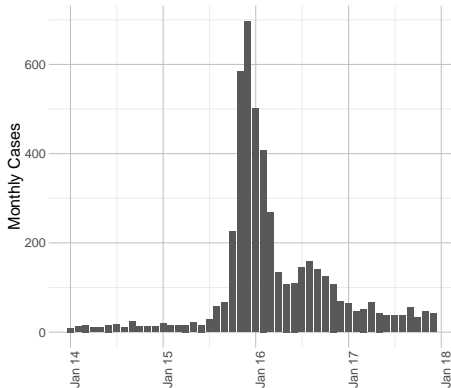
## Background: Zika Virus

- Zika Virus is spread by the *Aedes aegypti* mosquito
- Infection causes rashes and fever, but mild and often asymptomatic
- However, infection of pregnant women can cause microcephaly in infants
  - Severe, lifelong disability
  - Intellectual and motor deficits, often accompanied by other issues
- This link between zika and microcephaly was **not known** before 2015

## Background: the 2015 outbreak

- Initial outbreak in late 2015
- Public warning around December
- Unlikely that prevention was the main driver of decrease in early 2016
- Zika especially likely to cause microcephaly in **early pregnancy** (Cauchemez et al., 2016)

Figure 1: Microcephaly cases





- Unexpected -> No preventive behavior

- Unexpected
  - > No preventive behavior
- Fast timeline
  - > Not enough time for response

## Background: Characteristics

- Unexpected
  - > No preventive behavior
- Fast timeline
  - > Not enough time for response
- No lasting effects on adults
  - > No direct effects on parents

## Background: Characteristics

- Unexpected
  - > No preventive behavior
- Fast timeline
  - > Not enough time for response
- No lasting effects on adults
  - > No direct effects on parents
- Difficult to identify *in utero*
  - > Selective abortion is unlikely

## Three Key Administrative Datasets:

1. SINASC/SUS (Universe of Births)
  - Municipality and date of delivery
  - Mother's residence and date of birth
  - Microcephaly diagnosis
2. RAIS (Formal Employment)
  - Individual employment histories
  - Monthly earnings and hours
  - Maternity leave dates
3. Single Registry
  - Links datasets
  - Social program recipients

## Matching Approach:

- Compare mothers of children with microcephaly to matched control group
- Match on:
  - Age
  - Educational level
  - Month of birth
  - Municipality
- Compare labor force participation post-maternity leave

## Matching Approach:

- Key assumption: Conditional Independence
- 1 Theoretical reasons. Place and time capture exposure to the disease. Age and education are often cited as risk factors.
  - 2 We use a LASSO with variables from the Single Registry and RAIS to predict microcephaly, and use the chosen variables
  - 3 We check balance in unmatched variables: race, previous income and workforce participation

## Results

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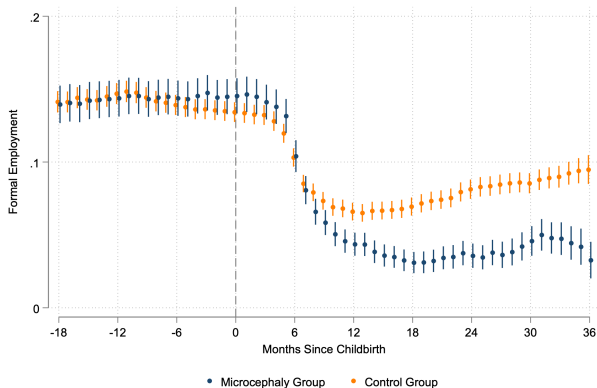


- Formal Employment
- Informal Employment
- Role of Social Assistance
- Fertility & Family Structure
- Spillovers in Fertility

## > **Formal Employment**

- Informal Employment
- Role of Social Assistance
- Fertility & Family Structure
- Spillovers in Fertility

# Results: Employment of Mothers

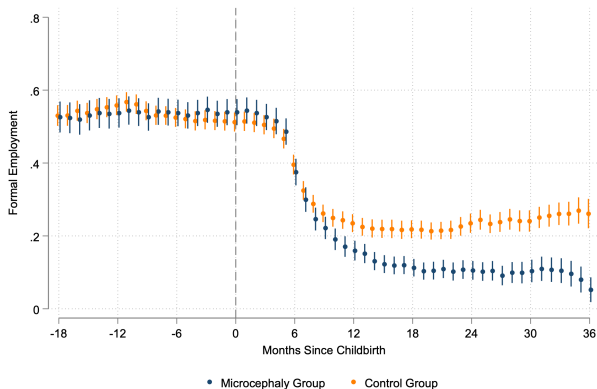


- Motherhood penalty in control: 6 p.p.
- Motherhood penalty in treated: 10 p.p.

Earnings

Hours

# Results: Employment of Mothers with Formal Experience

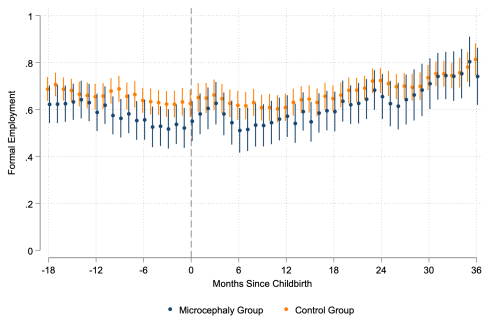


- Motherhood penalty in control: 27 p.p.
- Motherhood penalty in treated: 40 p.p.

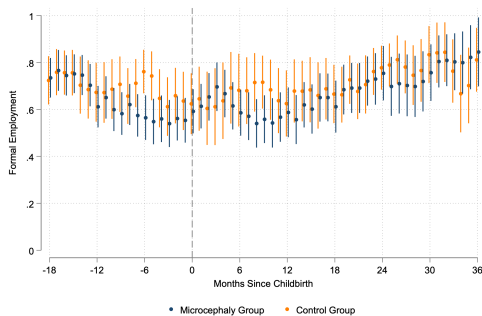
Hours

# Results: Employment of Fathers

## Full Sample

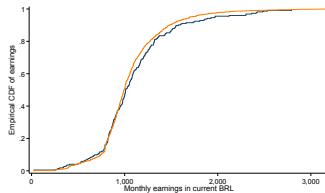


## Experienced Sample

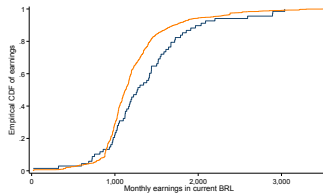


# Distribution of Wages

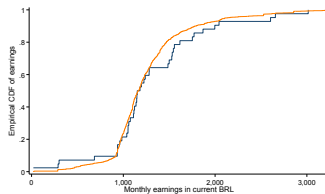
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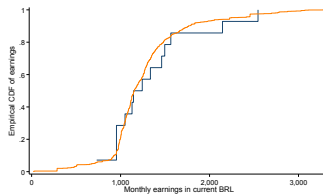
Month = 12



Month = 24

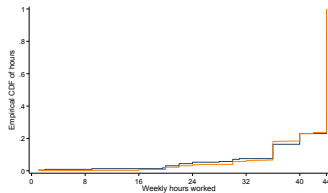


Month = 36

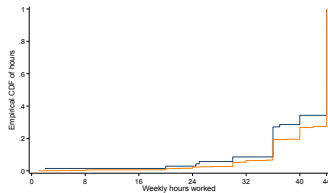


# Distribution of Work Hours

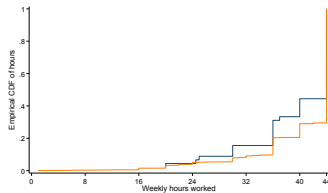
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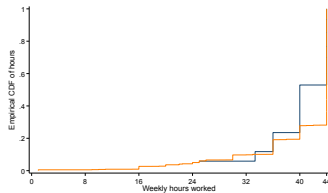
Month = 12



Month = 24



Month = 36



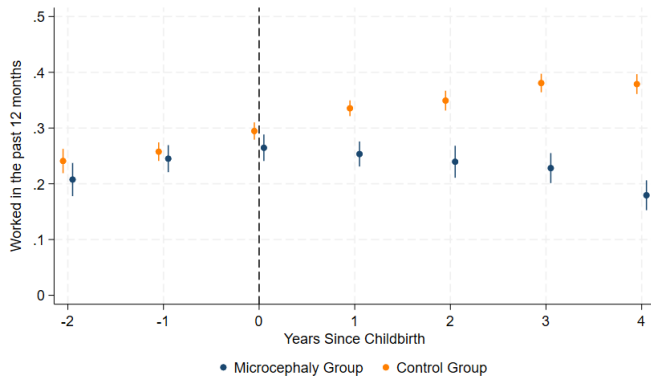
- ~~Formal Employment~~
- > **Informal Employment**
  - Role of Social Assistance
  - Fertility & Family Structure
  - Spillovers in Fertility



## Results: Formal & Informal Work

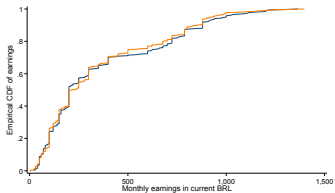
- Look at self-declared work in Single Register
- Pro: includes formal and informal work
- Cons: self-declared, incentive to under-report

## Results: Formal & Informal Work

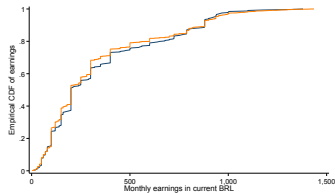


# Distribution of Wages

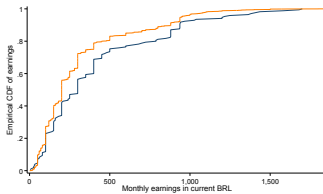
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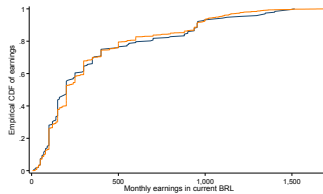
Year = 1



Year = 2



Year = 3



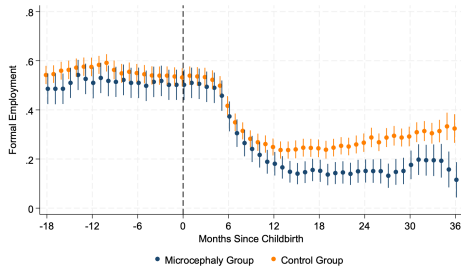
- ~~Formal Employment~~
- ~~Informal Employment~~
- > **Role of Social Security**
  - Fertility & Family Structure
  - Spillovers in Fertility

## Results: Social Security

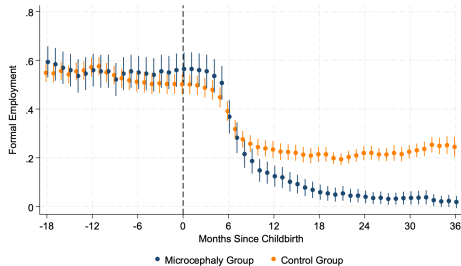
- Poorer families with a disabled member are eligible for a social security (BPC)
- Payment may allow more specialization in the household
- Split sample by receivership
  - We observe recipients in 2018, so results are suggestive

# Results: Social Security (Experienced Sample)

Never Received BPC

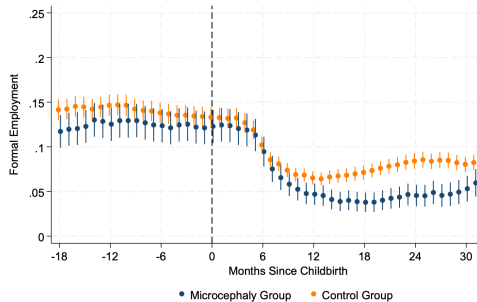


Did Receive BPC

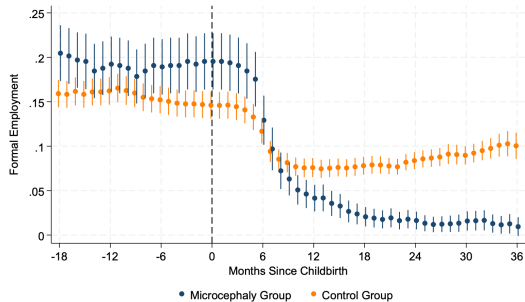


# Results

Never Received BPC



Did Receive BPC



- ~~Formal Employment~~
- ~~Informal Employment~~
- ~~Role of Social Assistance~~
- > **Fertility & Family Structure**
  - Spillovers in Fertility



## Subsequent Fertility

	Total Children After Treated/Control Child			
	(1)	(2)	(3)	(4)
Microcephaly	.000087 (.0081)	-.005 (.0087)	-.022* (.013)	.0076 (.014)
Constant	.13*** (.003)	.13*** (.0044)	.15*** (.0069)	.13*** (.0065)
Number of Obs	36856	36457	17093	18970
Number of Clusters	1729	1717	1289	1457
Match FE	No	Yes	Yes	Yes
Sample	Full	Full	Firstborn	Not firstborn

## Family Composition

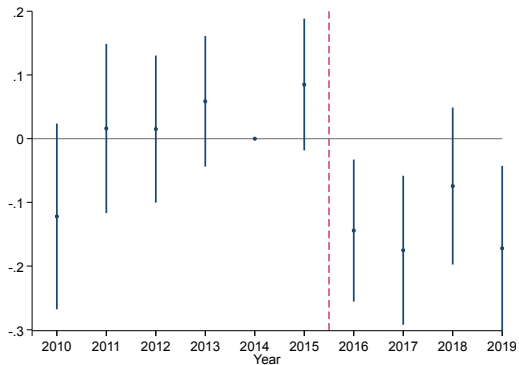
	Father Present in 2017	Father Present in 2019	
	(1)	(2)	(3)
Microcephaly	.013 (.0098)	.0085 (.0093)	-.0028 (.0039)
Father present 2017			.86*** (.0095)
Constant	.19*** (.0049)	.16*** (.0046)	.0023 (.0033)
Number of Obs	37,089	37,089	37,089
Number of Clusters	1,728	1,728	1,728
Match FE	Yes	Yes	Yes

- ~~Formal Employment~~
  - ~~Informal Employment~~
  - ~~Role of Social Assistance~~
  - ~~Fertility & Family Structure~~
- > **Spillovers in Fertility**

- Anecdotal reports of people delaying fertility due to fear of Zika
- We compare fertility in municipalities with at least one case to municipalities with zero cases
- TWFE specification

# Spillover in Fertility

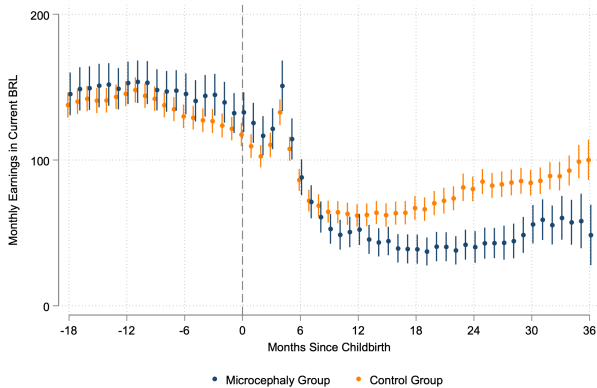
Spillover Effects on Fertility



## Key Takeaways:

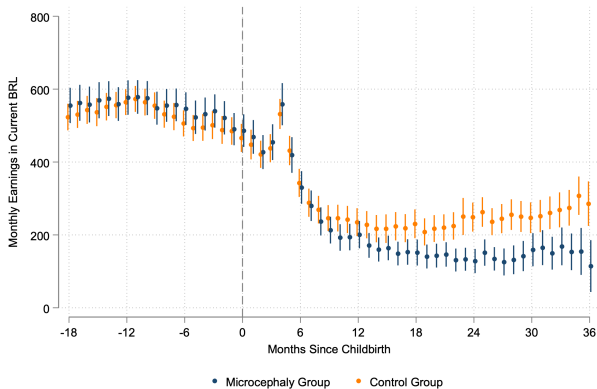
- Large, persistent effects on maternal employment
- Gender-specific impact highlights role of social norms
- Important implications for:
  - Social insurance design
  - Support for caregivers
  - Gender equality in labor markets

# Results: Earnings of Mothers



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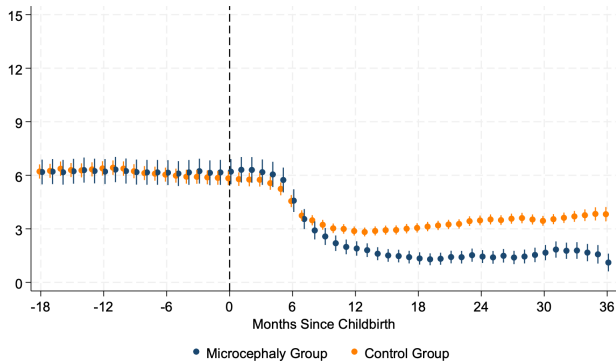
# Results: Earnings of Mothers with Formal Experience



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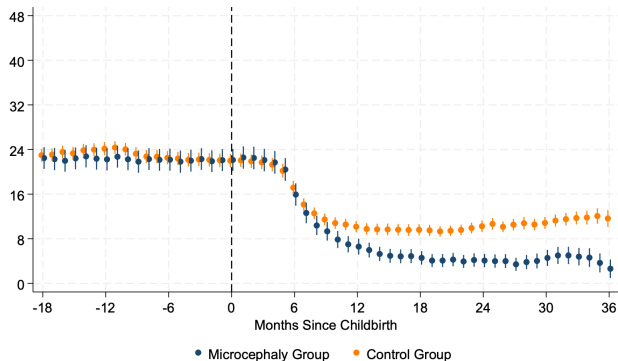


# Results: Work Hours of Mothers



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# Results: Work Hours of Mothers with Formal Experience



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