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

This Paper

- 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.

Antecedents

- 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.
- Mainly finds mothers drop out, mixed effects on fathers.

Antecedents

- 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

Roadmap

- Background
- Empirical Strategy
- Results

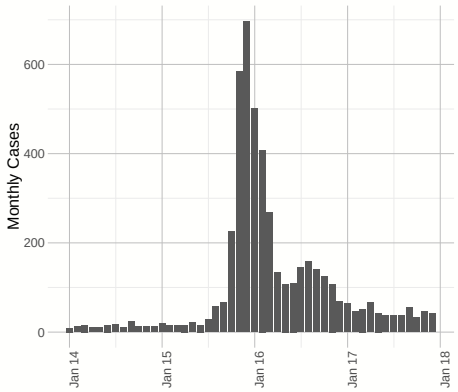
Background: Zika Virus

- 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



Background: Characteristics

- Unexpected

-> No preventive behavior

Background: Characteristics

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- Fast timeline

-> No preventive behavior

-> Not enough time for response

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- No lasting effects on adults

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-> 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

Data

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

Empirical Strategy

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

Empirical Strategy

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

Results Roadmap

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

Results Roadmap

-> **Formal Employment**

- Informal Employment
- Role of Social Assistance
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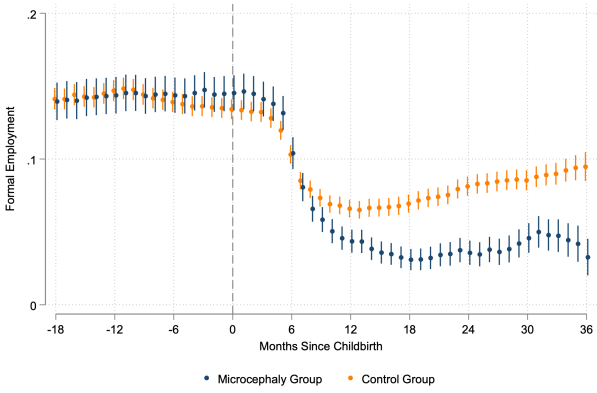
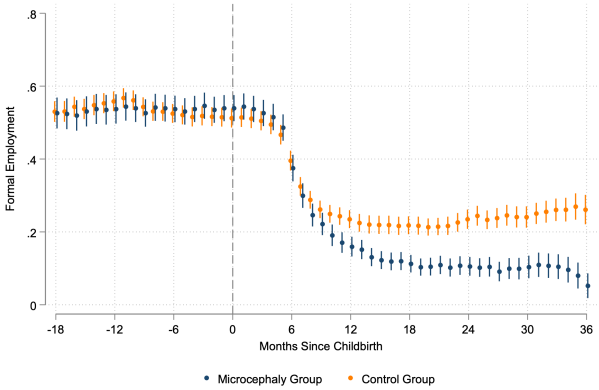
Results: Employment of Mothers



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

Earnings Hours

Results: Employment of Mothers with Formal Experience

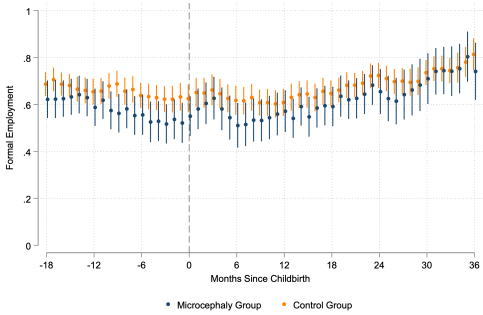


- Motherhood penalty in control: 27 p.p.
- Motherhood penalty in treated: 40 p.p.

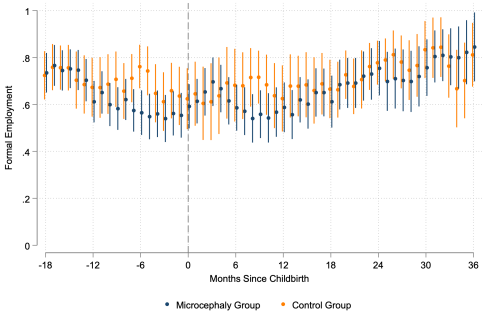
Earnings Hours

Results: Employment of Fathers

Full Sample

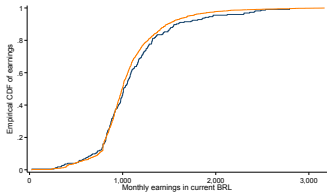


Experienced Sample



Distribution of Wages

Month = 0



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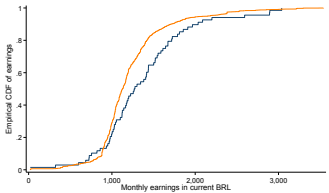

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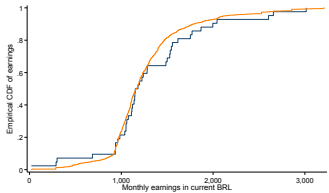

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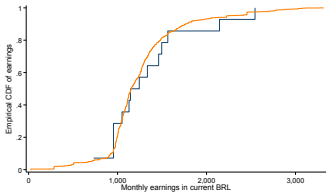

Distribution of Work Hours

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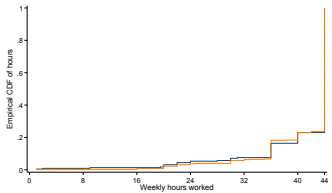

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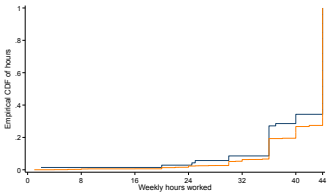

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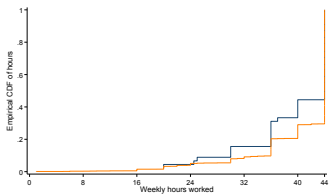

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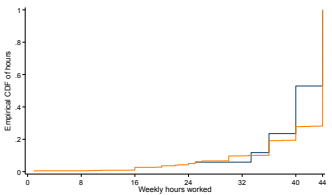


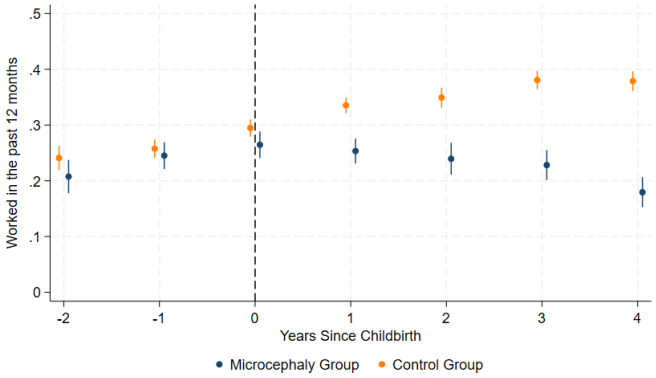
Results Roadmap

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

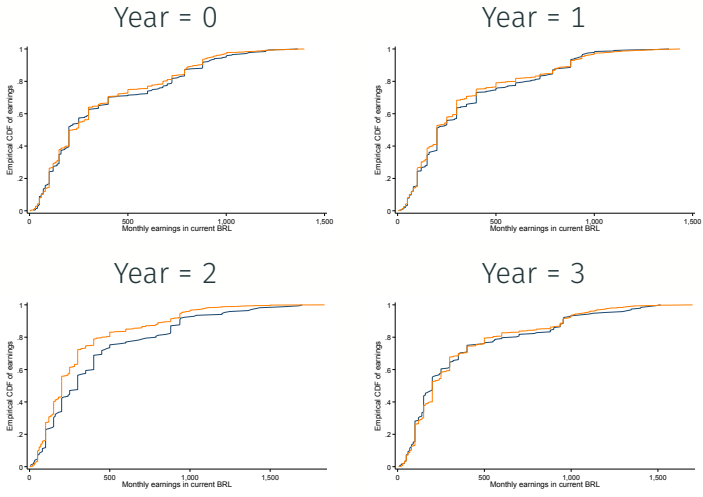
Results: Formal & Informal Work

- 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



Results Roadmap

- Formal Employment
- Informal Employment

-> **Role of Social Security**

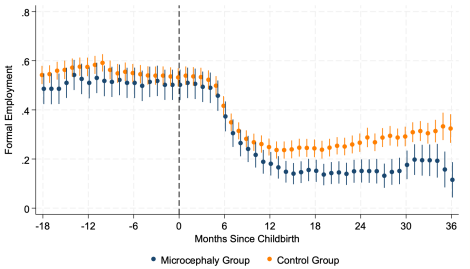
- Fertility & Family Structure
- Spillovers in Fertility

Results: Social Security

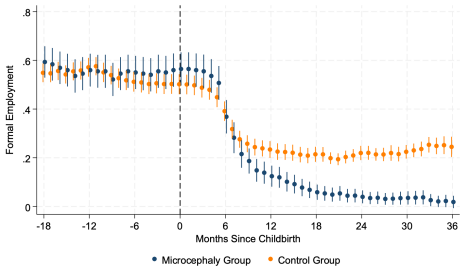
- Poorer families with a disabled member are eligible for a social security (BPC)
- Payment may allow more specialization in the household
- Split sample by receivership
  - We observe recipients in 2018, so results are suggestive

Results: Social Security (Experienced Sample)

Never Received BPC



Did Receive BPC



Results Roadmap

- Formal Employment
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- Role of Social Assistance

-> **Fertility & Family Structure**

- Spillovers in Fertility

Subsequent Fertility

	Total Children After Treated/Control Child			
	(1)	(2)	(3)	(4)
Microcephaly	.000087	-.005	-.022*	.0076
	(.0081)	(.0087)	(.013)	(.014)
Constant	.13***	.13***	.15***	.13***
	(.003)	(.0044)	(.0069)	(.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	.0085	-.0028
	(.0098)	(.0093)	(.0039)
Father present 2017			.86***
			(.0095)
Constant	.19***	.16***	.0023
	(.0049)	(.0046)	(.0033)
Number of Obs	37,089	37,089	37,089
Number of Clusters	1,728	1,728	1,728
Match FE	Yes	Yes	Yes

Results Roadmap

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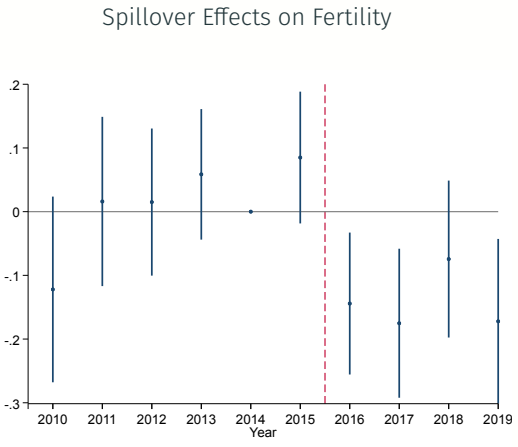
-> **Spillovers in Fertility**

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

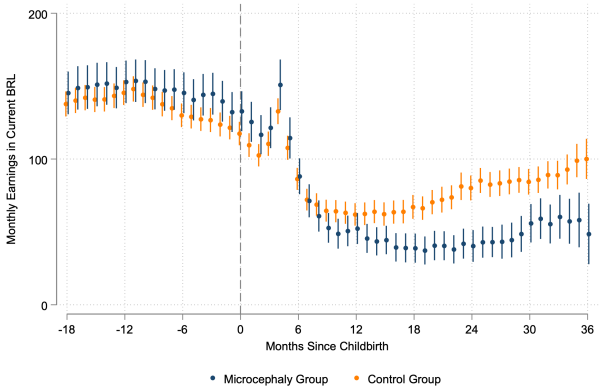


Conclusion

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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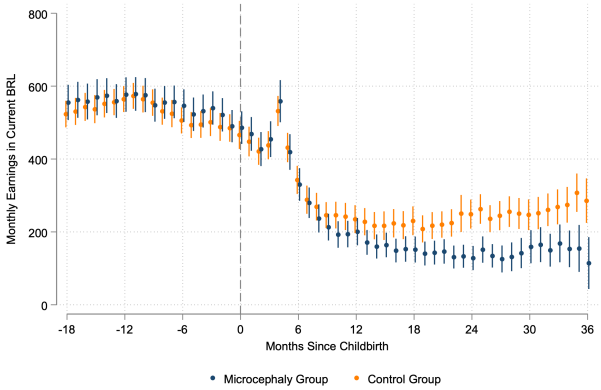
Results: Earnings of Mothers with Formal Experience



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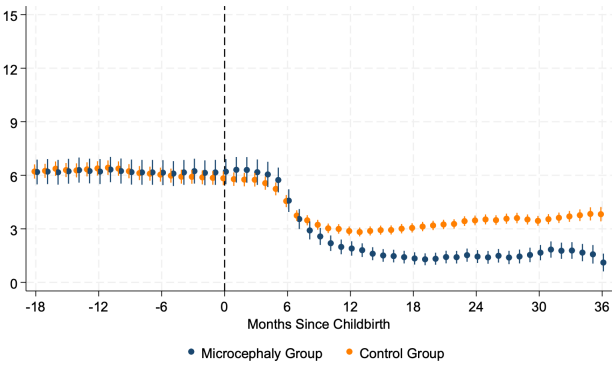
Results: Work Hours of Mothers



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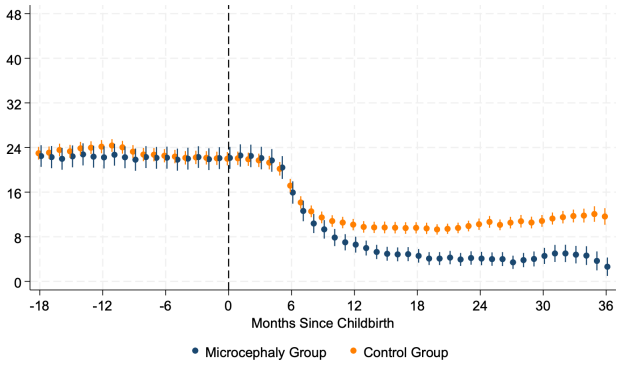

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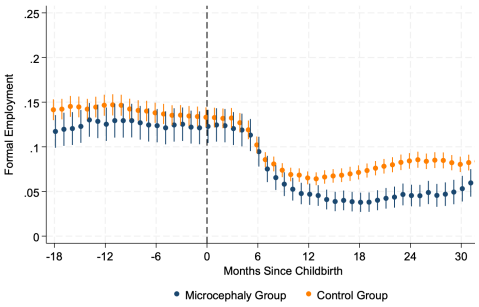
Results

Never Received BPC



Did Receive BPC