



Does a ban on informal health providers save lives?

Evidence from Malawi

Yutong Yuan

October 25th, 2021

Susan Godlonton, Edward N. Okeke,
Does a ban on informal health providers save lives? Evidence from Malawi,
Journal of Development Economics,
Volume 118, 2016, Pages 112-132,
ISSN 0304-3878,
<https://doi.org/10.1016/j.jdeveco.2015.09.001>.
(<https://www.sciencedirect.com/science/article/pii/S0304387815001029>)

CONTENTS

- Introduction: Paper result and our extension direction
- Data resource
- Methods
- Results
- Robustness checks
- Conclusion

Introduction

- Background
 - ❑ Malawi has one of the highest maternal mortality ratios globally, currently estimated at **439 maternal deaths per 100k live births in 2021***
- The article investigated:
 - ❑ The effect of **a ban on informal (traditional) birth attendants** imposed by the Malawi government in 2007
- The author found and believed:
 - ❑ **Not find any evidence** of a statistically **significant reduction in newborn mortality** on average.
 - ❑ The findings show **that increasing the use** of formal health providers and facilities **does not lead to significant improvements in health outcomes**

*Source: USAID website

Data

- 2010 Malawi Demographic and Health Survey
 - a stratified, two-stage cluster design
 - includes 849 **clusters** (or villages)—158 in urban areas and 691 in rural areas
 - within each selected **household**, women of reproductive age (15–49 years old), and household heads are interviewed
 - women are asked about all births within the preceding five years
- 2015-2016 Malawi Demographic and Health Survey

Strategy

- Difference-in-Difference strategy
 - To estimate the causal effect of the ban on outcomes
 - exploits variation across time and space in the “**intensity of exposure**” to the ban
 - **High-exposure areas***: correspond to a meaningfully high fraction of informal attendant use. We argue that such areas are likely to experience greater enforcement
 - High exposure VS Low exposure area

* Here we assume that a high-exposure village as one where baseline prevalence of informal attendant use exceeds the 75th percentile

Our questions and extensions

- Does this ban law really have NO positive effect on health?
- We consider:
 - ❑ Except mortality rate, there are more measurements on health outcome
 - ❑ **1. Newborn weight**
 - ❑ **2. HIV test result**
 - ❑ **3. Newborn alive rate**

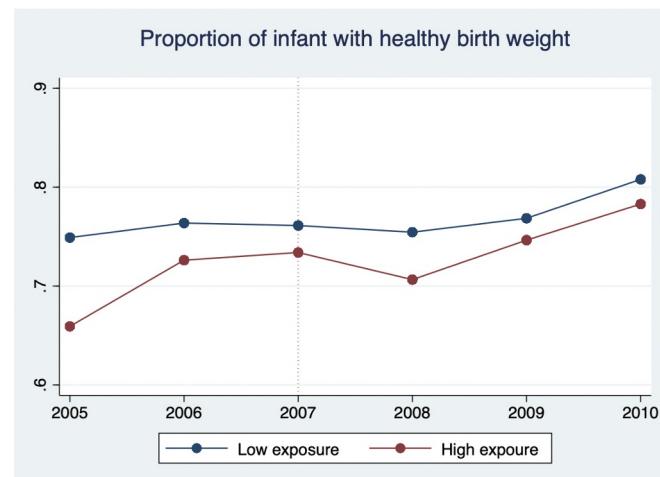
Does any of them lead to significant improvement on newborn health?

$$Y_{icdt} = \alpha_1 + \alpha_2 Post_t + \delta HighExposure_c + \gamma HighExposure_c * Post_t + X_{ict}\beta + \eta_d + \tau_t + \epsilon_{icdt}$$

- Extension 1.1
 - ❑ New measurement 1 on health: **Newborn weight**
 - ❑ estimate the causal effect of the ban law on Newborn weight
- Extension 1.2
 - ❑ New measurement 2 on health: **HIV test result**
 - ❑ estimate the causal effect of the ban law on HIV test result
- Extension 1.3
 - ❑ New measurement 3 on health: **Newborn alive**
 - ❑ estimate the causal effect of the ban law on Newborn alive

1.1 : Newborn Weight

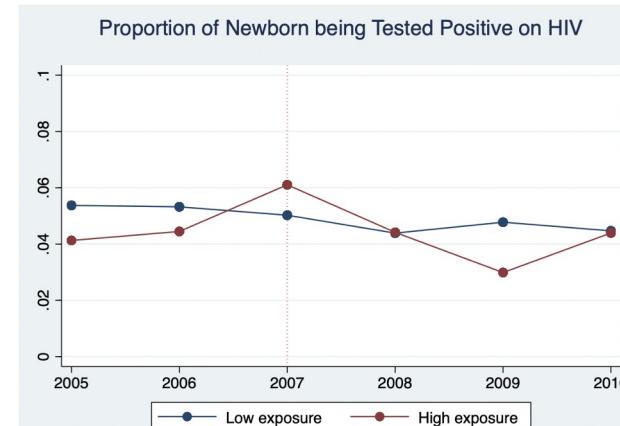
- How was the causal effect of the ban law on newborn weight?
 - Based on WHO Child Growth Standards:
 - girl 2.4kg-4.2kg, boy 2.5kg-4.4kg
 - Data we use: m19 (birth weight)
 - Generate dummy variables for girl and boy
 - In the healthy range or not
 - Method: DD
 - Assumption: Parallel trend
 - Apply DD in high exposure area and low exposure area
 - High exposure: treatment group; Low exposure: control group
 - $$Y_{icdtW} = \alpha_1 + \alpha_2 Post_t + \delta HighExposure_c + \gamma HighExposure_t \\ Post_t + X_{ict}\beta + \eta_d + \tau_t + \epsilon_{icdt},$$
 - Result: Increasing the exposure of ban law does not lead to significant improvements in newborn healthy weight level outcomes.



VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Newborn baby with healthy weight						
High	-0.0337** (0.0159)	-0.0224 (0.0148)	-0.0253 (0.0151)	-0.0288* (0.0159)	-0.0180 (0.0185)	
Post				-0.0487 (0.103)	0.103 (0.147)	0.0947 (0.138)
High X Post	0.00766 (0.0171)	0.00669 (0.0176)	0.0114 (0.0192)	0.0153 (0.0197)	0.0144 (0.0222)	0.00642 (0.0196)
Constant	0.800*** (0.00203)	0.789*** (0.0579)	0.791*** (0.0570)	-0.0343 (0.302)	-2.060*** (0.440)	0.668*** (0.116)
Observations	12,532	11,916	11,916	11,916	7,231	11,916
R-squared	0.013	0.023	0.025	0.021	0.028	0.101
Controls	No	Yes	Yes	Yes	Yes	Yes
Controls X Post	No	No	Yes	Yes	Yes	Yes
District-specific trend	No	No	No	Yes	Yes	No
Trimmed data	No	No	No	No	Yes	No
Cluster fixed effect	No	No	No	No	No	Yes
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

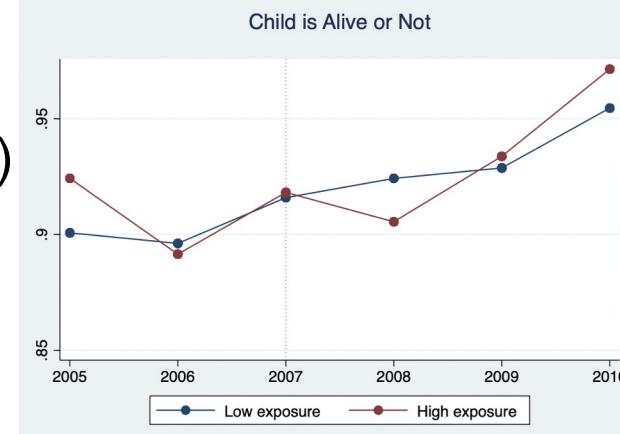
1.2 : HIV test result

- Data we use: s1317 (result of HIV test)
- Method:
 - ❑ Assumption: NOT Parallel trend
 - ❑ Cannot apply DD



1.3 : Newborn Alive

- Data we use: b5 (child is alive until the survey time)
- Method:
 - ❑ Assumption: NOT Parallel trend
 - ❑ Cannot apply DD



Any other models can be applied to test the ban law effects?

- ❑ **OLS Regression** Cannot estimate the causal effect of the ban on outcomes
- ❑ **Discontinuous Regression** Can not define the threshold

Extension 1 Conclusion: 3 new health measurements

- **Newborn Weight, HIV Test result, Newborn alive until the survey**
- To estimate the causal effect of the ban on outcomes
- Use Difference in Difference
- Newborn Weight. Not statistically significant improvements in newborn healthy weight level outcomes.
- Cannot measure HIV Test result, Newborn alive
- **Although transform from informal to formal, not statistically significant improvements on health.**

Investigation Mind Map

BANNED

The Ban Law



Not Significant

Newborn Health



Informal to Formal Transformation



Transformation

- Results from the Table 5 in the paper use the DD method to estimate the effect of the policy on the **informal attendant** (Panel A) and the **formal attendant** (Panel B).
- Informal attendant decrease by **18.9%**, and formal attendant increase by **14.5%**. The shifting by this policy exists.

Table 5

What was the effect of the ban on the use of formal and informal sector providers?

Variables	(1)	(2)	(3)	(4)	(5)	(6)
A. Birth attendant is informal attendant						
High exposure × Post	-0.189*** (0.0146)	-0.190*** (0.0130)	-0.184*** (0.0141)	-0.187*** (0.0144)	-0.154*** (0.0126)	-0.188*** (0.0146)
High exposure	0.344*** (0.0143)	0.321*** (0.0131)	0.318*** (0.0123)	0.320*** (0.0127)	0.267*** (0.0110)	
Post				0.0134 (0.0667)	-0.0655 (0.0908)	-0.000915 (0.0679)
Constant	0.0411*** (0.00204)	0.0537 (0.0415)	0.0512 (0.0410)	1.848*** (0.284)	3.525*** (0.440)	0.265*** (0.0637)
Observations	19,607	18,673	18,673	18,673	12,491	18,673
R-squared	0.138	0.149	0.150	0.148	0.113	0.209
B. Birth attendant is formal sector provider						
High exposure × Post	0.145*** (0.0157)	0.144*** (0.0136)	0.143*** (0.0153)	0.146*** (0.0152)	0.109*** (0.0152)	0.150*** (0.0165)
High exposure	-0.317*** (0.0177)	-0.270*** (0.0150)	-0.269*** (0.0152)	-0.271*** (0.0149)	-0.206*** (0.0155)	
Post				0.0660 (0.0794)	0.132 (0.0889)	0.00746 (0.0974)
Constant	0.808*** (0.00257)	0.726*** (0.0431)	0.730*** (0.0429)	-1.668*** (0.391)	-2.433*** (0.479)	0.446*** (0.0995)
Controls	No	Yes	Yes	Yes	Yes	Yes
Controls × Post	No	No	Yes	Yes	Yes	Yes
District-specific trend	No	No	No	Yes	Yes	No
Trimmed data	No	No	No	No	Yes	No
Cluster fixed effects	No	No	No	No	No	Yes
Observations	19,607	18,673	18,673	18,673	12,491	18,673
R-squared	0.088	0.132	0.134	0.131	0.104	0.218

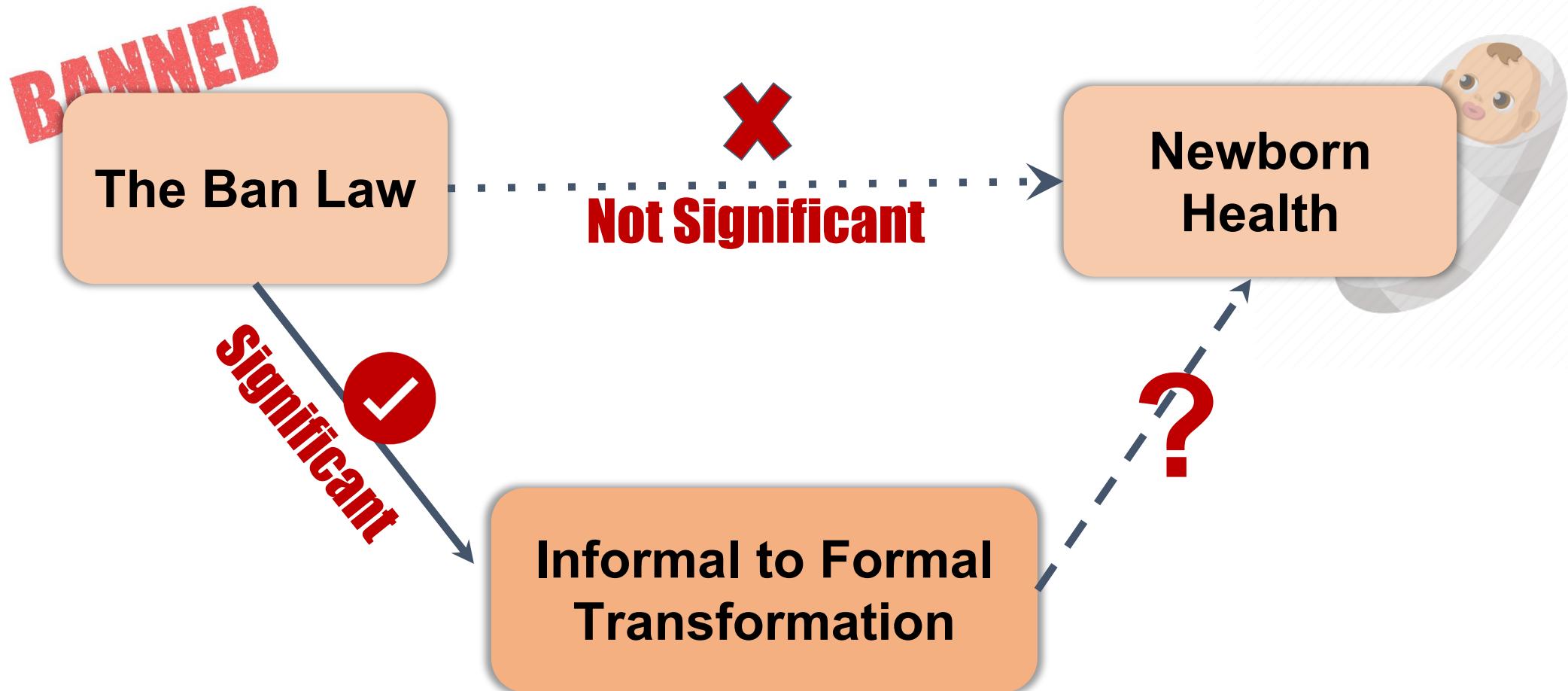
Notes: for Panel A the dependent variable is an indicator for a birth attended by an informal birth attendant. For Panel B the dependent variable is an indicator for a birth attended by a formal-sector provider. Controls include an indicator for male births, an indicator for a multiple birth, birth order, dummies for mother's level of schooling, dummies for mother's age at birth, an indicator for women who are married or living with a partner, dummies for ethnicity and religion, dummies for the partner's educational attainment, distance to the nearest health facility, wealth quintile dummies, and a rural–urban indicator. Each column includes district and year × month fixed effects. Full set of coefficients is not shown to conserve space (see Table A.1). In Column 5, we exclude villages with baseline prevalence of 0 or 1 to account for 'floor' and 'ceiling' effects. Column 6 is equivalent to Column 3 except that district fixed effects have been replaced with cluster fixed effects. Post = 1 if birth occurs after December 2007. Standard errors in parentheses are clustered at the district level (there are 27 districts).

*** p < 0.01.

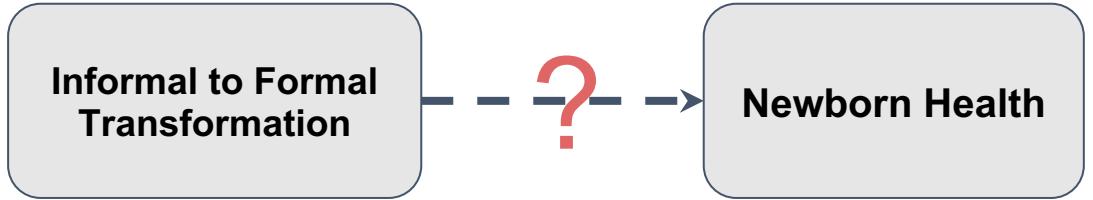
** p < 0.05.

* p < 0.1.

Investigation Mind Map



Extension 2



- The effectiveness of transformation from informal to formal on the children's health level.
- Is there any difference on the quality of medical care between on delivery?
 - Mortality rate within one week
 - Mortality rate within one month
 - Survival until the survey
 - Newborn health by weight

Extension 2 OLS regression

- **Why OLS?**
 - Compared with causality, we care more about the difference between formal & informal sectors.
- **Why not DD, RD or IV?**
 - No parallel trend
 - No discontinues change
 - No threshold
 - No random assignment
- $Y_{icd} = \alpha_0 + \alpha_1 * FORMAL_{icd} + \beta * X_{icd} + \epsilon_{icd}$
 - Y_{icd} the probability of children i in cluster c in district d:
 - Mortality within one week
 - Survival until the survey
 - Mortality within one month
 - Newborn health by weight
 - $FORMAL_{icd}$ whether the children i in cluster c in district d in born in formal or informal
 - X_{icd} all the control variable including gender, religion, education level, wealth level, district, cluster and etc. for the children i in cluster c in district d.

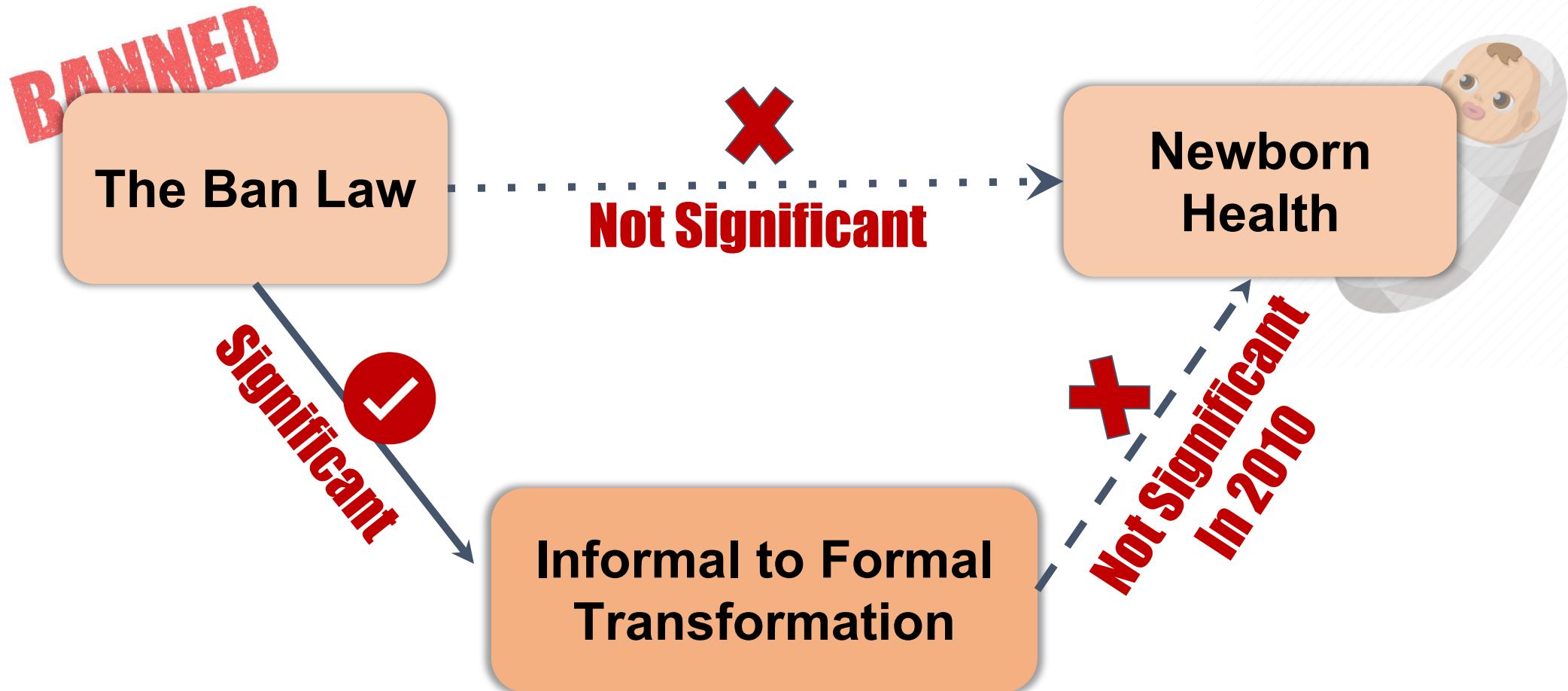
Extension 2 Results

- For all of 4 models, we find no significance on mortality within one week, one month, whether survival until the survey or newborn health by weight.
- There is no statistically difference on the healthcare level between formal sector and informal sector.

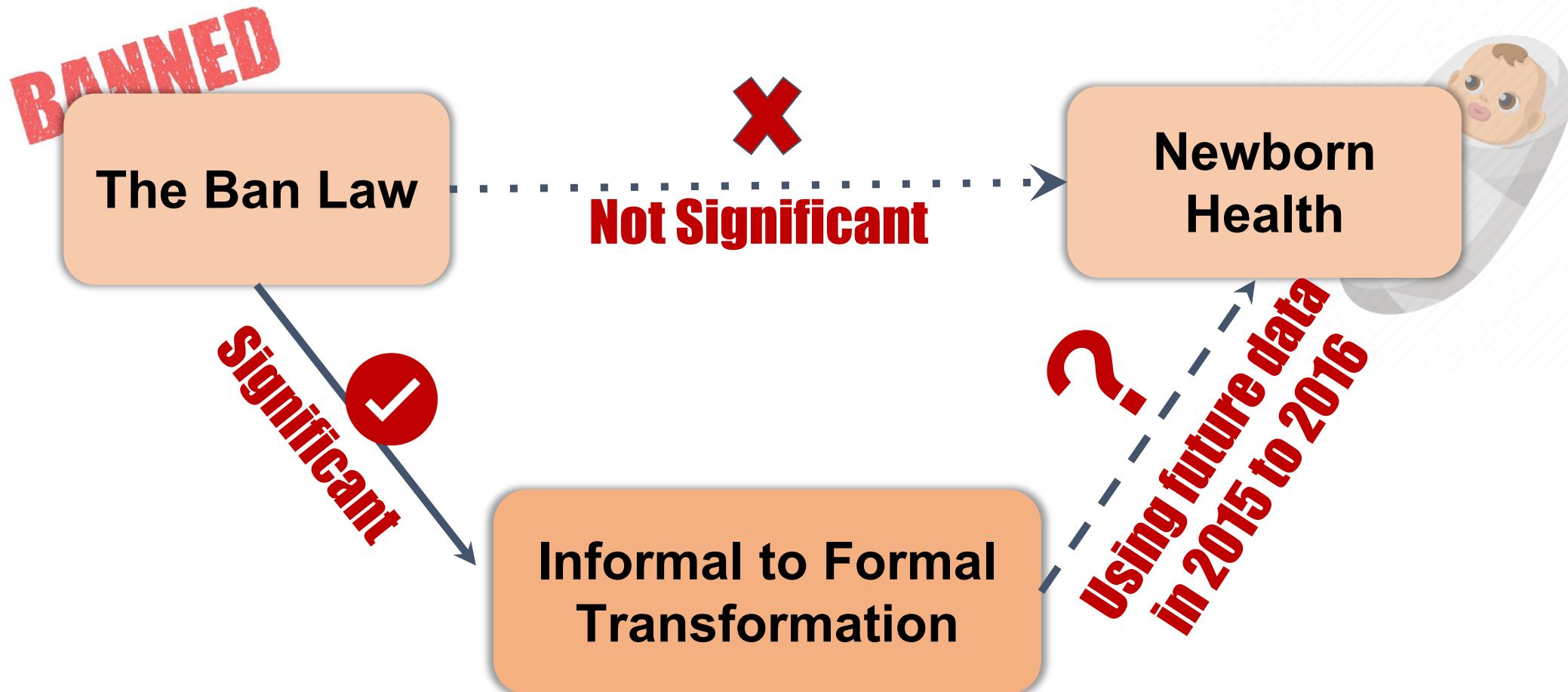
VARIABLES	(1) Child is alive	(2) Dead in a month	(3) Dead in a week	(4) Born with healthy weight
Use of formal sectors	0.0234* (0.0132)	-0.0104* (0.00595)	-0.00413 (0.00462)	0.0324* (0.0181)
Constant	0.933*** (0.0417)	-0.000687 (0.0188)	-0.00828 (0.0124)	0.761*** (0.0652)
Observations	11,905	11,905	11,905	11,905
R-squared	0.009	0.007	0.005	0.016
Control	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Investigation Mind Map



Investigation Mind Map



Extension 2 Further Study

- We use the 2010 Malawi Demographic and Health Survey data in our study, at that time the health expenditure per capita in Malawi is US\$68, which this number have a **77% increase.***
- We might argue that as the medical expenditure increase, the difference between formal and informal might also increase.
- The 2015-2016 Malawi Demographic and Health Survey data* will be used.



*Source: World Bank, <https://data.worldbank.org/indicator/SH.XPD.CHEX.PP.CD?end=2018&locations=MW>
The DHS Program, https://dhsprogram.com/data/dataset/Malawi_Standard-DHS_2015.cfm

Conclusion

1. No statistically significant nor economically significant impact of policy on the probability of newborn baby having healthy weight.
 2. Use of formal sector providers does not affect
 - Probability of death within a week
 - Probability of death within a month,
 - Whether the child is still alive
 - Whether a baby is weighted in the healthy range
- => Use of formal sector or not does not make real changes to a baby's health

Limitation

- **Measurement error**
 - dataset is from the 2010 survey, while the ban law was enforced in 2006 => Recall bias
- **Suboptimal Choice of Control and Treatment Group**
 - Districts with low exposure towards the policy is considered as control
 - Households in the control group are somehow exposed to the policy and their behaviors may change due to the policy
- **Omitted Variable Bias**
- **External Validity**
 - Malawi is unique and the result may not generalize

Final Thoughts

- This policy is more of an empty talk right now.
- With poverty issues, and insufficient financial support to the healthcare facilities, banning the use of informal birth attendance could increase the economic burden of the citizens.
- Malawi government should improve its healthcare quality and its infrastructure first.
- In long run, we are optimistic about the impact of the ban on use of informal sectors.