Unequal Beginnings: Health Reform and Prenatal Care Disparities in Colombia

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Introduction / Research Question

Research Question:
How does the institutional and structural expansion of the Colombian healthcare system influence access to and utilization of pre-natal care in rural regions?

- Focus on effects of healthcare market design, insurer power, and policy decrees.
- Aim to identify impacts on preventive services in rural Colombia.
- Expand research question to non-rural, poor individuals across the country through insurance scheme.

Colombian Health Insurance Design

Healthcare System Structure

- **Managed competition model** introduced in 1993 with Law 100.
- Divides population into Contributory Scheme (CS) and Subsidized Scheme (SS).
- Ensures universal coverage with mandatory enrollment**.
- Affiliation type serves as a proxy for income level
- Right to pick insurance and benefits package. Before 2008, individuals in the CS had access to a more comprehensive benefits package.
- System is funded by tax contributions in the CS, as well as both fiscal and parafiscal contributions from the State

Challenges in Rural Areas:

- High rates of teenage pregnancy, higher infant mortality, poor infrastrucutre, difficult geography

Market Design and Healthcare Expansion

- While some individuals are uninsured, insurance coverage is not the main source of regional asymmetries.
- The quality of health services (and the access to particular benefits) are dimensions in which the market design impacts health outcomes
- Insurers compete on quality and network breadth rather than over premiums, co-pays, or co-insurance rates.
- Government oversight allows intervention in cases of low-quality service or financial instability.

Policy 1: Unification of the Health Benefits Plan
Gradual unification of health benefits (from 2009-2012) across the Contibutive and Subsdized schemes.

Policy 1: Unification of Health Benefits Plan

- From 1993 to 2008, the Subsidized Scheme benefits plan excluded over 2,000 medications, procedures, and specialized health services that the Contributory System affiliates had access to.
- The Constitutional Court, through Sentence T-760, mandated the gradual unification of the health benefits plan.
- Carried out through a series of agreements that extended the unified Health Benefits Plan to different age groups
  - Agreement 04 of 2009: Unified POS for population aged 0 to 12.
  - Agreement 11 of 2010: Unified POS for population aged 12 to 17.
  - Agreement 027 of 2011: Unified POS for adults aged 60+
  - Agreement 032 of 2012: Completed the unification for the adult population.
- Comprised over 12.6% of Colombia's total health budget in 2012.
  - Lamprea and Garcia (2021) point out the tension between policy ambition and the structure of its financing model.

Focus on Preventive Care in Rural Areas

- **Serna, McNamara (2024)** and **Gamba (2023)** have examined the effects of different healthcare payment models, including fee-for-service and capitation contracts, on different health outcomes (C-Sections, birth outcomes).
- However, limited research on preventive care access in rural areas of developing countries.
- **Pre-natal care** as a proxy for preventive care: reduces need for costly interventions.
- Possibility of studying the relation between pre-natal care and health outcomes
  - Outcomes at birth (eg. weight, length)
  - Fetal disease incidence (eg. hypoxia, slow fetal growth)

Policy 2: Law 1438 of 2011:
Expansion of compulsory health benefits plan, with special emphasis on pre-natal services.

Hypotheses: Policy Effects on Prenatal Care Equity

- **2011 Law × Post:** Expected to reduce disparities in prenatal care across rural areas after the law's implementation in 2011 —especially in regions with previously lower coverage.
- **Unification × Post:** Expected to reduce disparities in prenatal care between the Subsidized and Contributory regimes after implementation in 2010 and 2012, narrowing the gap between poorer and wealthier populations.

Data Sources

1. **Vital Statistics (EEVV):** Birth records and demographics, 2008-2015.
2. **Fetal Statistics (EEVV):** Fetal Deaths with ICD-10 Diagnostic Codes, 2008-2015
3. **CUBOS Affiliates Data :** Contains the number of enrollees for each EPS and each scheme for each month at the municipality level
4. **Colombian Location Data:** Maps municipalities to rural/urban categories.
5. **ICD 10 Codes Crosswalk:** Maps ICD-10 codes to disease names

Urban Enrollees Exceed Significantly Rural Enrollees under DANE Area Divisions

Year	Total Number of Events	Affiliation to CS	Affiliation to SS	Total in Urban Areas	Total in Populated Centers	Total in Dispered Rural Areas
2008	**550,759**	**257,768**	**292,991**	444,641	38,953	67,165
2009	545,843	249,206	296,637	438,392	40,304	67,147
2010	510,115	233,248	276,867	407,379	33,564	69,172
2011	545,691	239,525	306,166	428,026	39,372	78,293
2012	570,598	245,586	325,012	446,587	42,670	81,341
2013	580,424	254,637	325,787	457,237	42,390	80,797
2014	**599,980**	265,270	334,710	**477,367**	**42,914**	**79,699**

Source: Author's calculations using DANE data

Pre-Natal Visits Across All Areas Have Increased Over Time

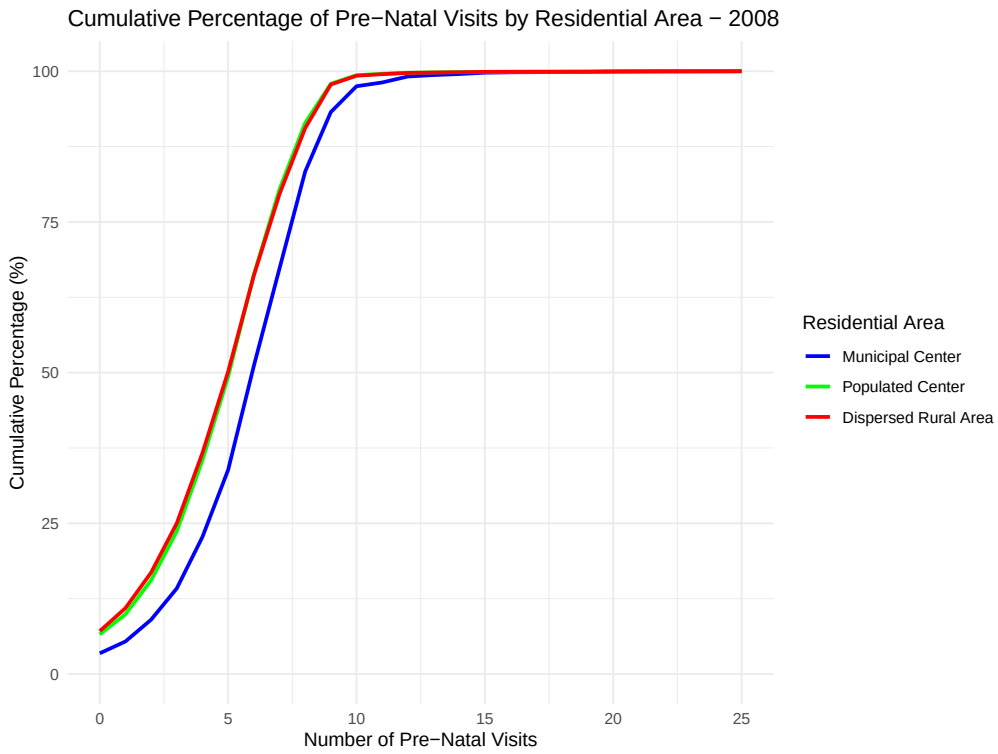


Figure: CDF of Pre-Natal Visits in 2008

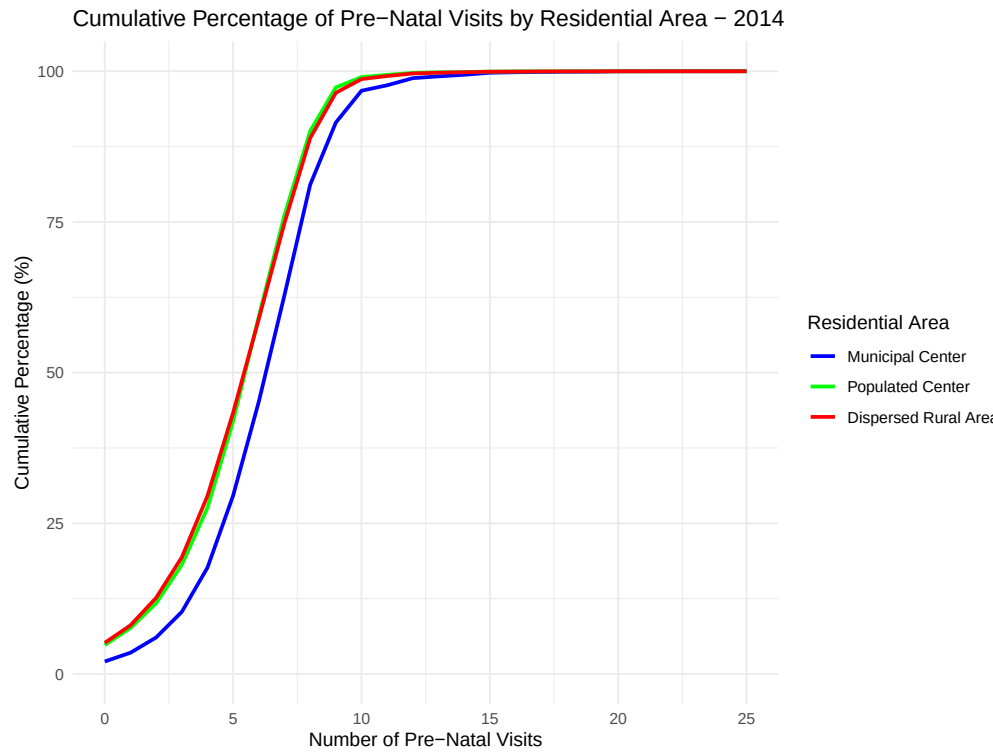
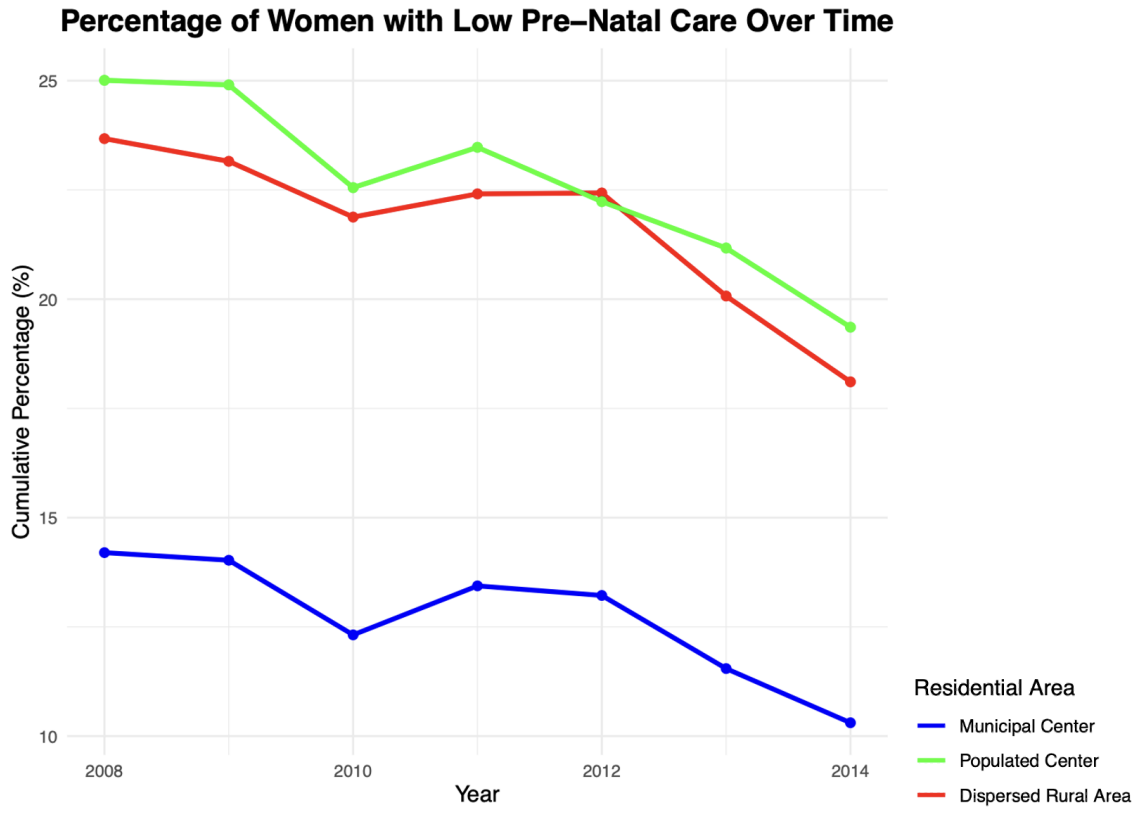


Figure: CDF of Pre-Natal Visits in 2014

Source: Author's calculations using DANE data

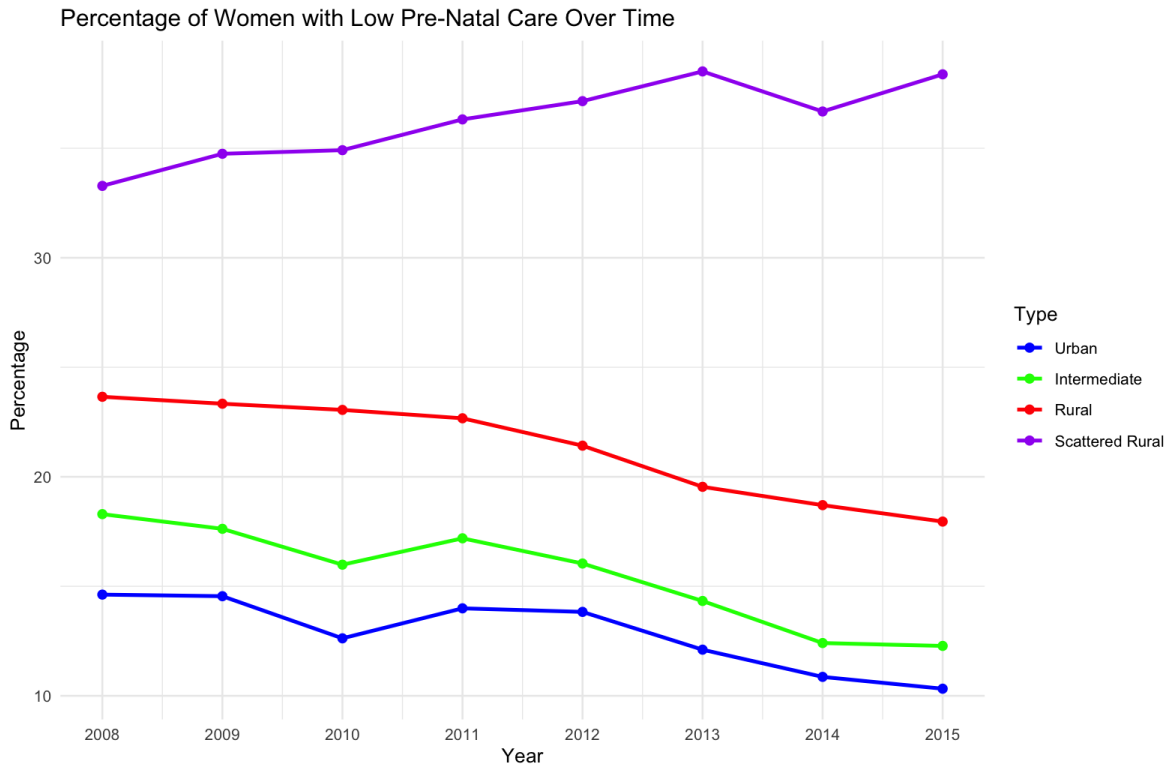
2011 Law: Disparities in Access to Basic Pre-Natal Care Are Narrowing



Observation: This graph considers the percentage of women who went to three or fewer pre-natal care visits for one pregnancy over time across the three area groups.

Source: Author's calculations using DANE data

But... when considering population density, pre-natal visits in the most rural areas have decreased significantly



Observation: This graph considers the percentage of women who went to three or fewer pre-natal care visits per pregnancy, displayed over time using DNP categories.

Source: Author's calculations using DANE data

Uneven Gains: Scattered Rural Areas Lag Behind in Prenatal Visit Uptake

Average Prenatal Visits by Rurality Category and Year

Year	Urban	Intermediate	Rural	Scattered-Rural
2008	6.23	5.63	5.28	4.67
2010	6.30	5.81	5.31	4.55
2012	6.15	5.69	5.35	4.35
2013	6.48	5.93	5.56	4.34
2014	6.55	6.08	5.71	4.44
2015	6.63	6.11	5.73	4.36

Source: Author's calculations using DANE data

2011 Law Difference-in-Differences Model

$$\begin{aligned}\log(Y_{it}) = \beta_0 &+ \beta_1 \text{NonUrban}_i + \beta_2 \text{Contributory}_{it} + \\ &\beta_3 \mathbb{1}_{\{t \geq 2011\}} \times \text{NonUrban}_i + \beta_4 \mathbb{1}_{\{t \geq 2011\}} \times \text{Contributory}_{it} + \\ &\beta_5 \left[\text{NonUrban}_i \times \text{Contributory}_{it}\right] + \\ &\beta_6 \left[\mathbb{1}_{\{t \geq 2011\}} \times \text{NonUrban}_i \times \text{Contributory}_{it}\right] + \gamma_m + \delta_t + \epsilon_{it}\end{aligned}$$

- i represents the individual and t the year of observation
- $\log(Y_{it})$: Log number of pre-natal visits.
- $\mathbb{1}(t \geq 2011)$: Indicator for post-2011 period.
- NonUrban_i: Indicator for non-urban municipalities.
- Contributory_{it}: Indicator for contributory insurance regime.
- β_3 is our main coefficient of interest.
- Regression Includes Year and Municipality Fixed Effects

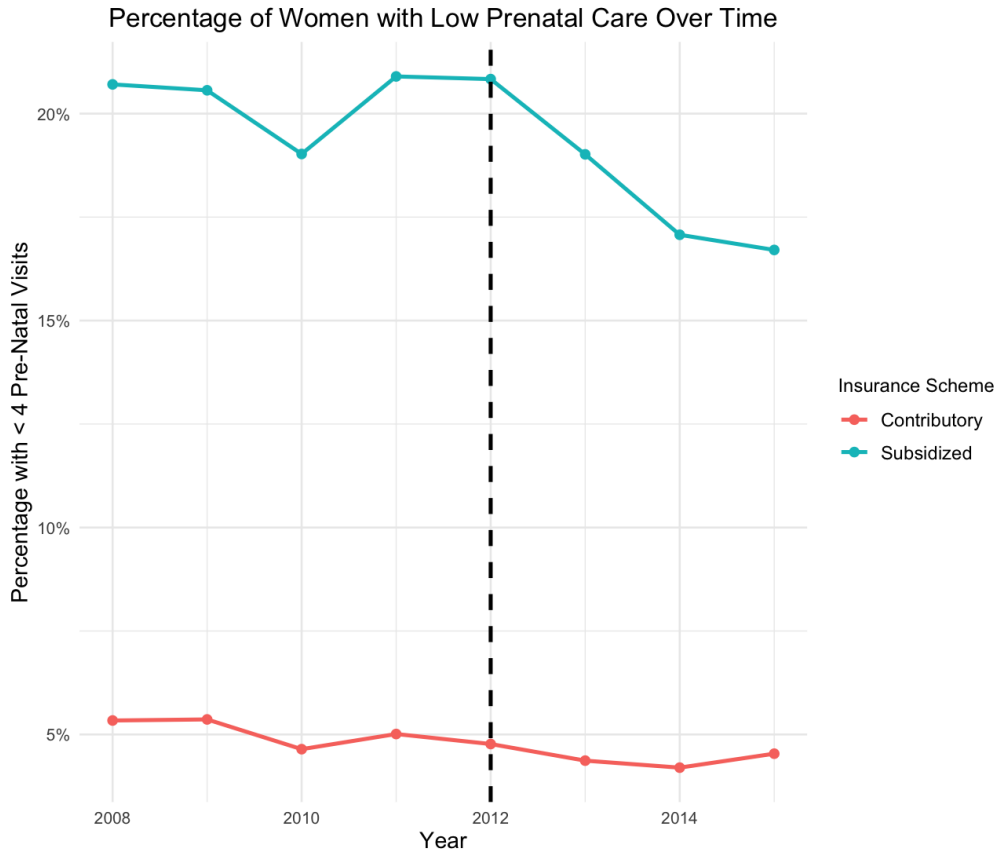
2011 Law: The Policy did not increase visits for the Rural Population

- β_3 is -0.0039 in this model ($p > 0.1$). This effect is driven by scattered rural areas.
- β_5 and β_2 motivate the study of the Unification Policy

Dependent Variable:	Logaritm of Prenatal Visits	
Model:	(1)	(2)
Variables		
Non-Urban	-0.0699***	
	(0.0209)	
Intermediate		0.0413**
		(0.0166)
Rural		0.0135
		(0.0208)
Scattered Rural		-0.1028***
		(0.0216)
Contributory	0.2795***	0.3021***
	(0.0329)	(0.0299)
Post × Non-Urban	-0.0039	
	(0.0108)	
Post × Contributory	-0.0160	-0.0170
	(0.0103)	(0.0114)
Non-Urban × Contributory	-0.0613**	
	(0.0270)	
Post × Intermediate		-0.0025
		(0.0165)
Post × Rural		0.0109
		(0.0120)
Post × Scattered Rural		-0.0753***
		(0.0232)
Year Fixed-Effects	Yes	Yes
Department Fixed-Effects	Yes	Yes
Observations	4,694,796	4,694,796
R^2	0.12496	0.12505
Within R^2	0.08109	0.08118

Clustered Department standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Benefits Plan Unification: Pre-Natal Care Levels in the Subsidized Scheme increase as benefits are unified



Observation: This graph considers the percentage of women who went to three or fewer pre-natal care visits per pregnancy, displayed over time by Health Regime.

Source: Author's calculations using DANE data

2010 Benefits Plan Unification for Minors
Difference-in-Differences Model

$$\log(Y_{it}) = \beta_0 + \beta_1 \text{Contributory}_{it} + \sum_{i=2}^{4} \beta_i \text{Rural\_type}_i + \beta_5 \mathbb{1}(t \geq 2010) \times \text{Contributory}_{it}$$
$$+ \sum_{i=2}^{4} \beta_{4+i} \left[\mathbb{1}(t \geq 2010) \times \text{Rural\_type}_i\right] +$$
$$\sum_{i=2}^{4} \beta_{7+i} \left[\text{Contributory}_{it} \times \text{Rural\_type}_i\right]$$
$$+ \sum_{i=2}^{4} \beta_{10+i} \left[\mathbb{1}(t \geq 2010) \times \text{Rural\_type}_i \times \text{Contributory}_{it}\right] + \gamma_m + \delta_t + \epsilon_{it}$$

- Dataset is restricted to Teenagers (12-17 years)
- $\log(Y_{it})$: Log number of pre-natal visits.
- $\mathbb{1}(t \geq 2010)$: Indicator for post-2010 period.
- Rural_Type_i: Dummy for rural categories (takes values from 1 to 4)
- β_5 is our main coefficient of interest.
- Regression Includes Year and Department Fixed Effects

Pre-Natal visits for Teenage Mothers in the Subsidized System increased

- The treatment effect led to a 3% reduction in disparities between the subsidized and contributory health systems.
- The only significant $\mathbb{1}(t \geq 2010) * \text{Rural\_type}_i$ is scattered rural, and it is around -0.1.

Dependent Variable:	Logaritm of Prenatal Visits	
Model:	(1)	(2)
Variables		
Non-Urban	-0.0671***	
	(0.0187)	
Intermediate		0.0520***
		(0.0172)
Rural		0.0343
		(0.0204)
Scattered Rural		-0.0652***
		(0.0216)
Contributory	0.2301***	0.2520***
	(0.0370)	(0.0332)
Post × Contributory	-0.0297**	-0.0320**
	(0.0117)	(0.0120)
Post × Non-Urban	-0.0121	
	(0.0122)	
Contributory × Intermediate		-0.1357***
		(0.0357)
Contributory × Rural		-0.1172**
		(0.0497)
Contributory × Scattered Rural		-0.0895**
		(0.0415)
Year Fixed-Effects	Yes	Yes
Department Fixed-Effects	Yes	Yes
Fit statistics		
Observations	1,069,123	1,069,123
R^2	0.07577	0.07522

2012 Benefits Plan Unification for Adults Difference-in-Differences Model

$$\begin{aligned}\log(Y_{it}) = {} & \beta_0 + \beta_1 \mathbb{1}_{\{t \geq 07/12\}} + \beta_2 \text{NonUrban}_i + \beta_3 \text{Contributory}_{it} + \beta_4 HHI_{mt} \\ & + \beta_5 \left[\mathbb{1}_{\{t \geq 07/12\}} \times \text{Contributory}_{it}\right] + \beta_6 \left[\mathbb{1}_{\{t \geq 07/12\}} \times \text{NonUrban}_i\right] \\ & + \beta_7 \left[\text{NonUrban}_i \times \text{Contributory}_{it}\right] + \beta_8 \left[HHI_{mt} \times \text{Contributory}_{it}\right] \\ & + \beta_9 \left[HHI_{mt} \times \text{Rural}_{it}\right] + \beta_{10} \left[\mathbb{1}_{\{t \geq 07/12\}} \times HHI_{mt}\right] \\ & + \beta_{11} \left[\text{NonUrban}_i \times \text{Contributory}_{it} \times \mathbb{1}_{\{t \geq 07/12\}}\right] \\ & + \beta_{12} \left[\text{NonUrban}_i \times \text{Contributory}_{it} \times HHI_{mt}\right] \\ & + \beta_{13} \left[\text{NonUrban}_i \times \text{Contributory}_{it} \times \mathbb{1}_{\{t \geq 07/12\}} \times HHI_{mt}\right] + \gamma_m + \delta_y + \epsilon_{it}\end{aligned}$$

- HHI: Calculated as the sum of the squared market shares of all firms in a market, with higher values indicating less competition and greater market dominance.
- i represents the individuals, m the municipality that individual i belongs to, and t the month-year tuple of observation
- Dataset is restricted to Adults and Regression Includes Yearly and Department Fixed Effects
- $\log(Y_{it})$: Log number of pre-natal visits.
- β_5 is our main coefficient of interest.

Insurer concentration (HHI) is higher in Poor Departments across both Schemes

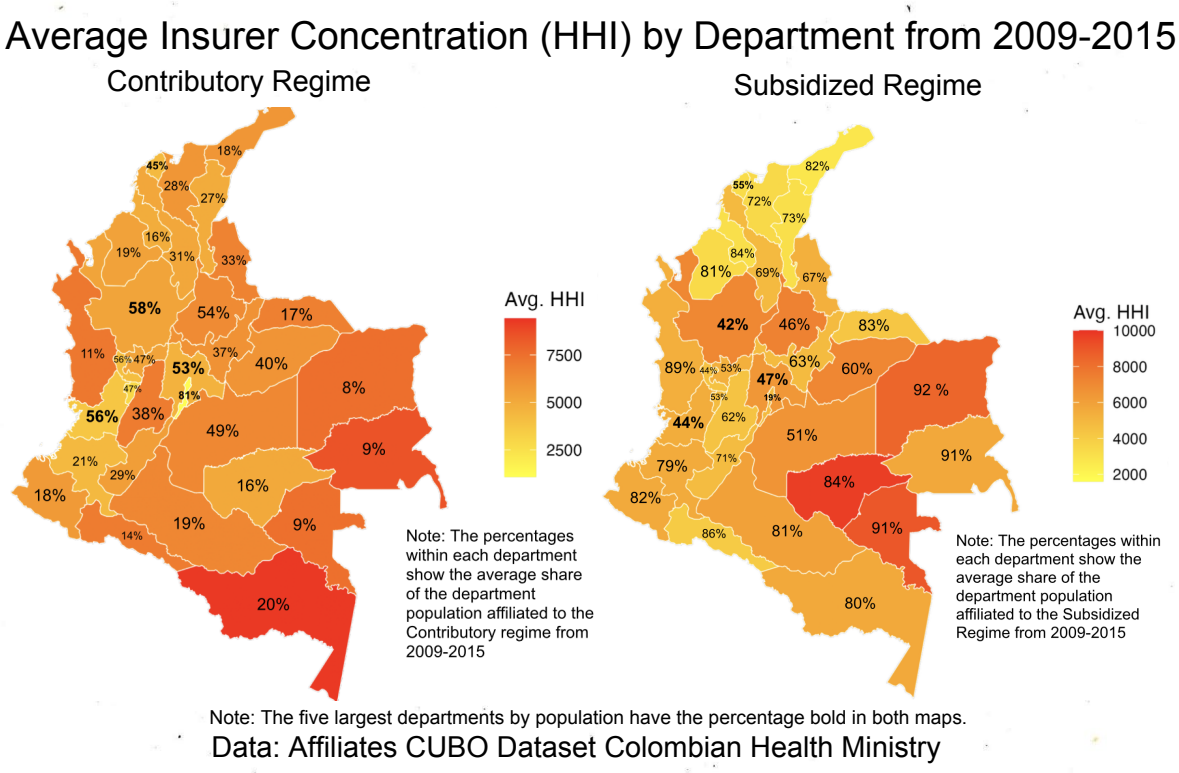


Figure: Maps of Mean Herfindahl-Hirschman Index (HHI) by Department from 2009–2015.

- Inverse relationship between the share of the affiliates and insurer concentration in the Contributory Scheme
- Across all municipality-month tuples from 2008-2015, the average HHI in the contributory Scheme is 2089 and it is 3478 in the subsidized Scheme

Pre-Natal visits for Adult Mothers in the Subsidized System also increased

- β_5 is between -2.6% and -3.7% and is significant at the 5% level.
- Pre and post reform, a 100 increase in HHI leads to around -0.4% less prenatal visits in the Contributory scheme. Pre and post reform, it leads to 0.1 to 0.2% more prenatal visits in the Subsidized scheme.
- Rurality categories matter: pre-and-post reform, scattered rural areas benefit from higher HHI. Effect of HHI in urban areas is scheme dependent.

Dependent Variable:	Logaritm of Prenatal Visits		
Model:	(1)	(2)	(3)
Variables			
Post	0.0272***	0.0282***	0.0489***
	(0.0055)	(0.0060)	(0.0118)
Contributory	0.2811***	0.3037***	0.4129***
	(0.0303)	(0.0274)	(0.0546)
Non-Urban	-0.0688***		-0.0507
	(0.0211)		(0.0359)
Post × Contributory	-0.0263***	-0.0276***	-0.0366**
	(0.0084)	(0.0088)	(0.0136)
Contributory × Non-Urban	-0.0559**		-0.0366
	(0.0251)		(0.0461)
100 × HHI			0.00178***
			(5.14×10^{-4})
Post × 100 × HHI			−0.00108**
			(5.23×10^{-4})
Contributory × 100 × HHI			−0.00542***
			(1.46×10^{-3})
Non-Urban × 100 × HHI			−0.000961
			(8.03×10^{-4})
Post × Contributory × 100 × HHI			0.00109**
			(5.32×10^{-6})
Year Fixed Effects	Yes	Yes	Yes
Department Fixed Effects	Yes	Yes	Yes
Observations	3,625,673	3,625,673	1,280,062
R^2	0.13353	0.13404	0.14026
Within R^2	0.08756	0.08810	0.09316

But... what if we want to analyze the treatment effect of the policy?

- Calculate an overall treatment effect through Callaway and Sant'Anna (2021) DiD with Multiple Time Periods.
- Expansion of parallel trends assumption: (1) never-treated units or (2) not yet treated units
- $Y_{it}(g)$: The potential outcome for unit i in period t if it were treated starting in period g.
- G_i: The time period when unit i first receives treatment. Units are grouped by their treatment adoption period, making G_i the defining group characteristic.
- Average Group Treatment Effect: $ATT(g,t) = \mathbb{E}[Y_t(g) - Y_t(0) \mid G = g]$
- Overall treatment Effect: $\theta_{OS} = \sum_{g=2}^{T} \theta_S(g) P(G = g)$ where $(\theta_S(g))$ is the average effect for group g, weighted by the proportion of units treated in g.

Staggered DiD also shows significant treatment effect

- Group 1 represents teenage mothers and group 2 adults. Time 1 is between 2010 and July 2012, time 2 is between July 2012 and December 2015.
- Caption: Group-Time Average Treatment Effects

Group	Time	ATT (g,t)	Std. Error	[95% Simult. Conf. Band]
1	1	0.0232	0.0018	[0.0187, 0.0277]
1	2	0.0284	0.0017	[0.0241, 0.0328]
2	1	0.0185	0.0012	[0.0154, 0.0215]
2	2	0.0145	0.0011	[0.0119, 0.0172]

- Caption: Overall Treatment Effect

ATT	Std. Error	[95% Conf. Interval]
0.0228	0.001	[0.0208, 0.0248]

Exploring health outcomes: Weight at Birth

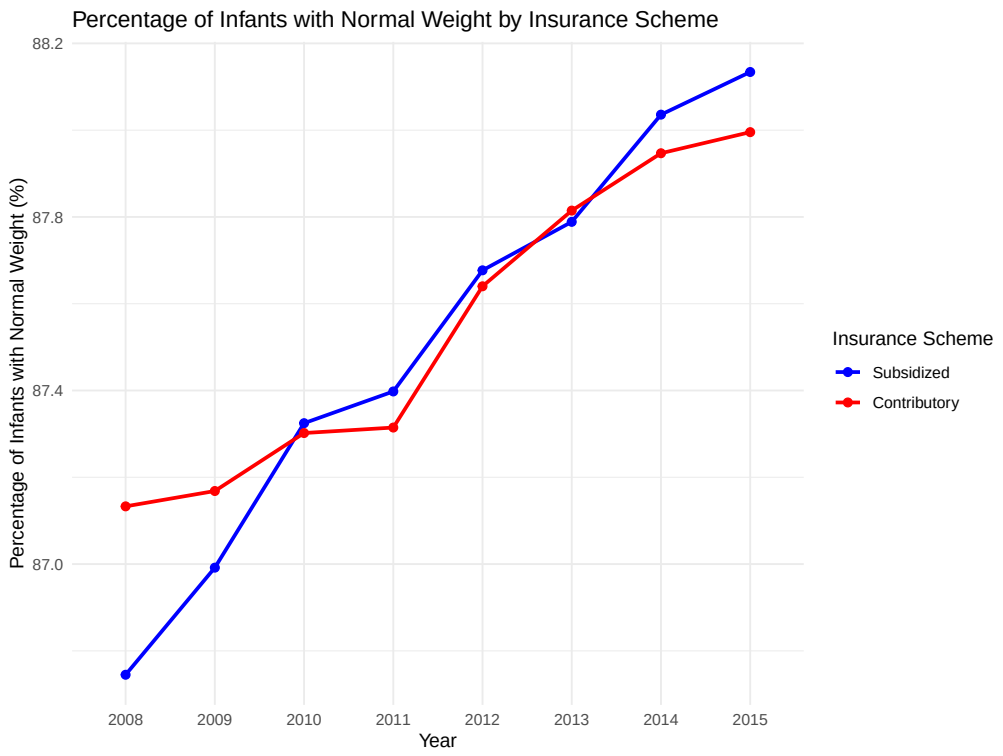


Figure: Annual Share of Newborns with Birth Weight Between 2.5 and 4 kg by Health Insurance Scheme

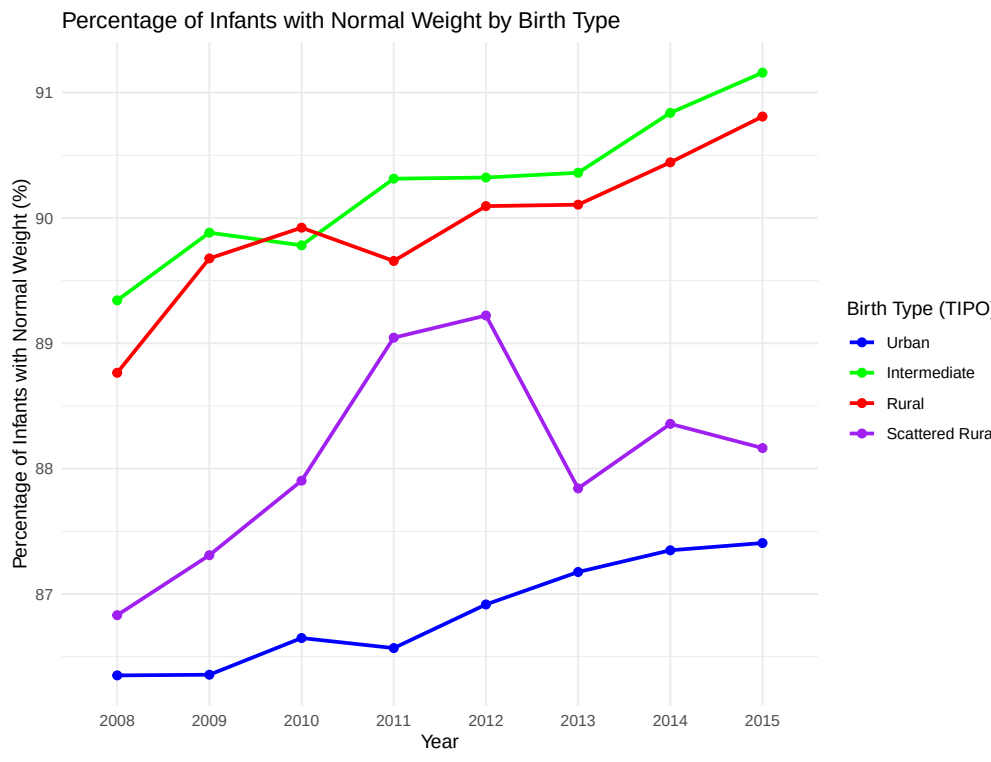


Figure: Annual Share of Newborns with Birth Weight Between 2.5 and 4 kg by Rurality Category

Source: Author's calculations using DANE data

Exploring health outcomes: Length at Birth

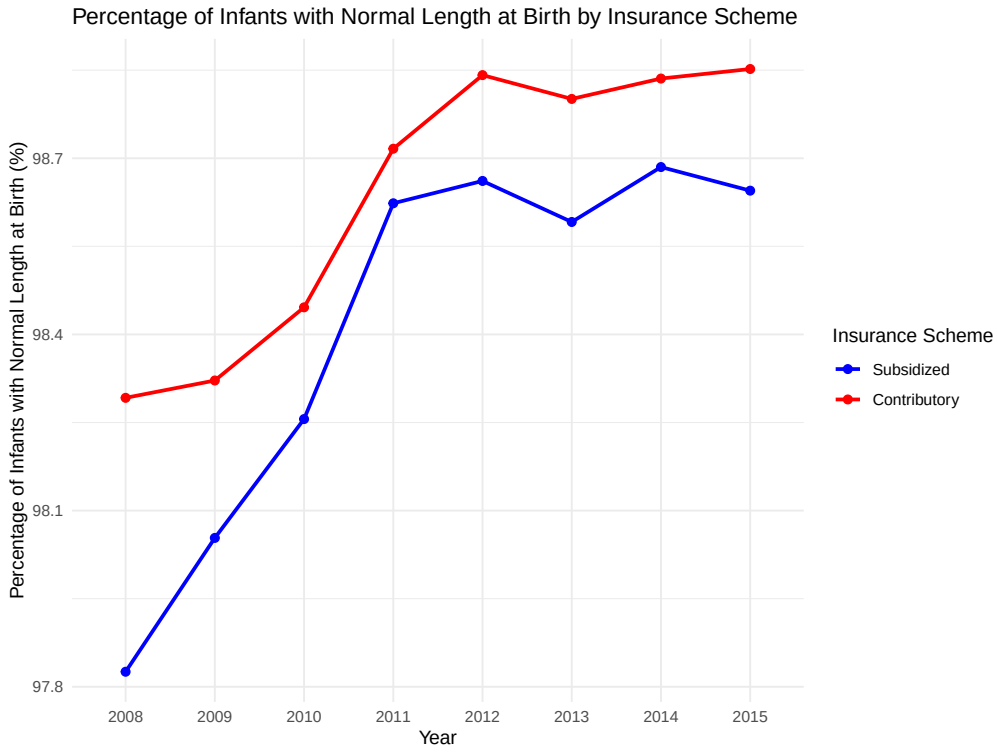


Figure: Annual Share of Newborns with Normal Length at Birth (40- 50 cm) by Health Insurance Scheme

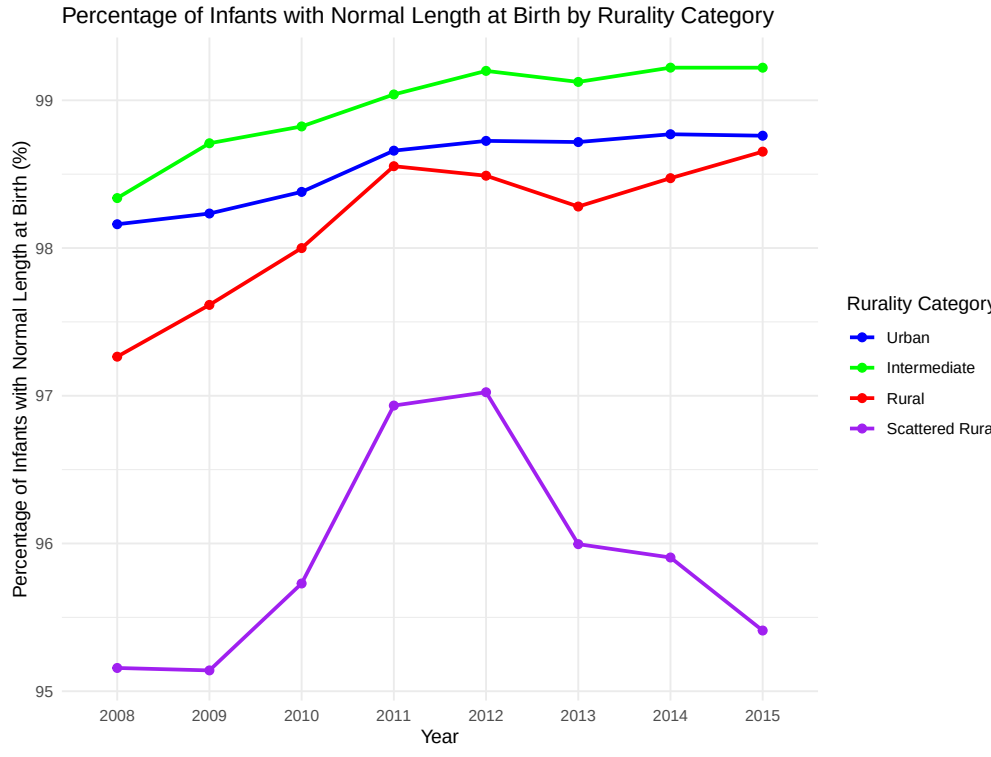


Figure: Annual Share of Newborns with Normal Length at Birth (40- 50 cm) by Rurality Category

Source: Author's calculations using DANE data

Exploring health outcomes: Gestation Time

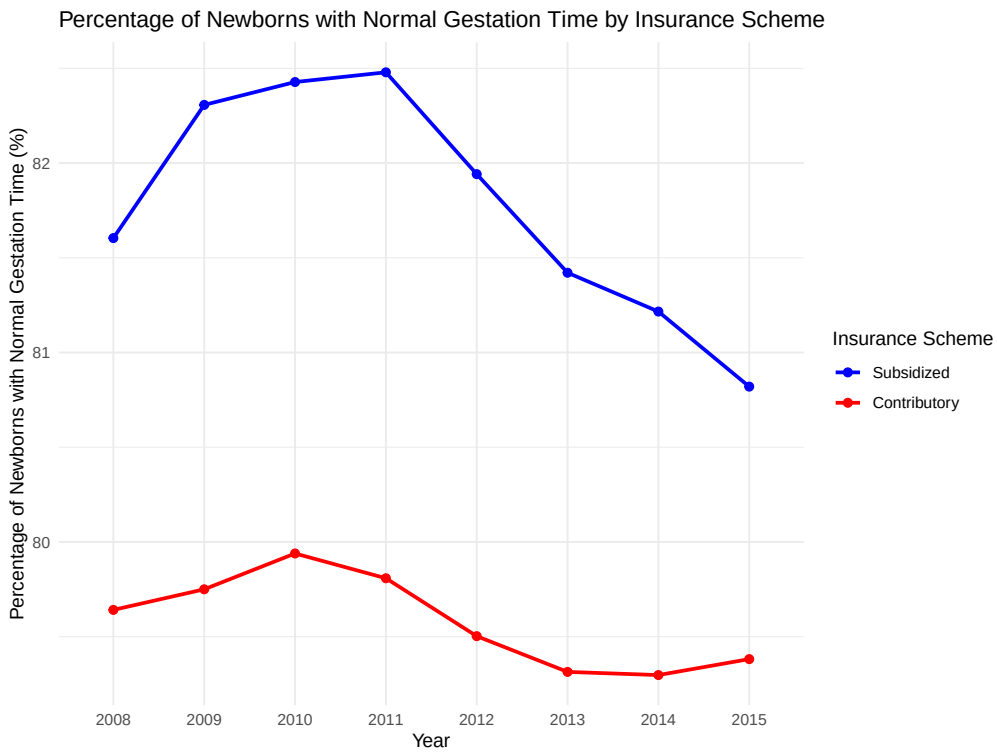


Figure: Annual Share of Newborns with Normal Gestation Time (38-41 weeks) by Health Insurance Scheme

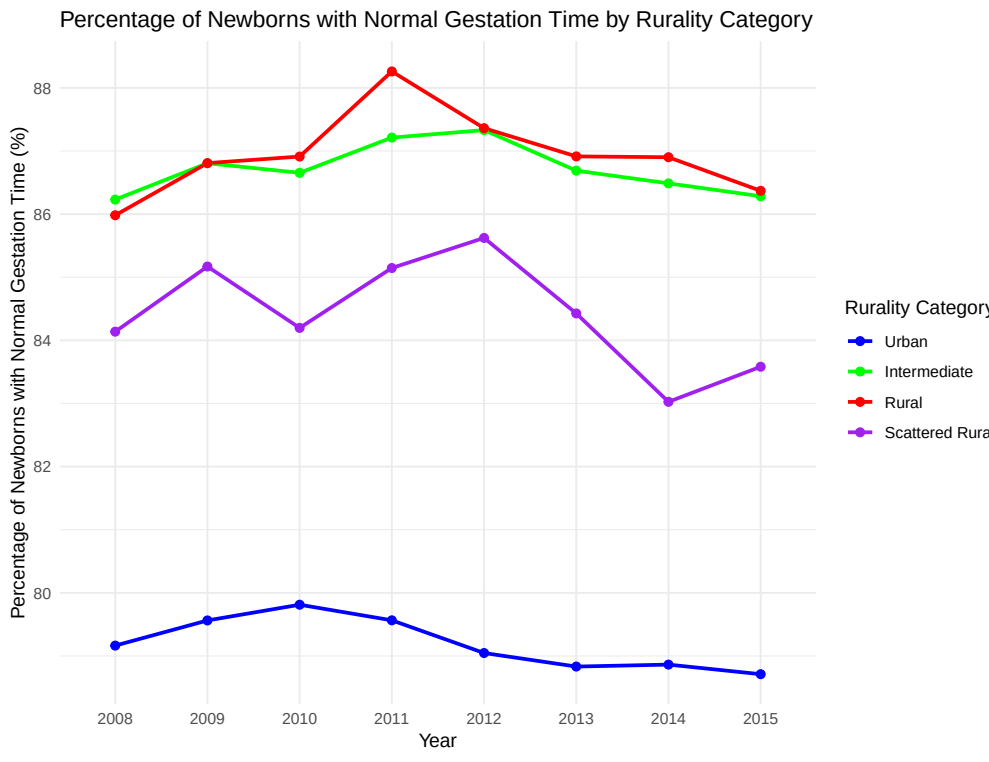


Figure: Annual Share of Newborns with Normal Gestation Time (38-41 weeks) by Rurality Category (right)

Source: Author's calculations using DANE data

How do we relate health outcomes at birth and prenatal care? Probability Model and Instrumental Variable Approach

- Since we can categorize birth outcomes as normal using this dataset, we use a logit model to estimate the probability of a normal birth outcome.
- Challenge: Prenatal visits are endogenous – mothers who seek more prenatal care may differ systematically in unobserved ways that also influence birth outcomes.
- To address this, I implement a Difference-in-Differences Instrumental Variables (DDIV) approach, where the number of prenatal visits is instrumented using variation induced by the Unification of Health Benefits.
- The first stage follows the DiD models studied previously, with the interaction Post $\times$ Contributory capturing the policy-induced increase in prenatal care for vulnerable groups.
- This interaction term serve as a valid instrument because it is strongly correlated with prenatal care (relevance) and plausibly exogenous, as policy timing and targeting were determined at the institutional level and not by individual maternal characteristics.**

Prenatal Visits Improve Health Outcomes, But Very High Levels May Signal Risk

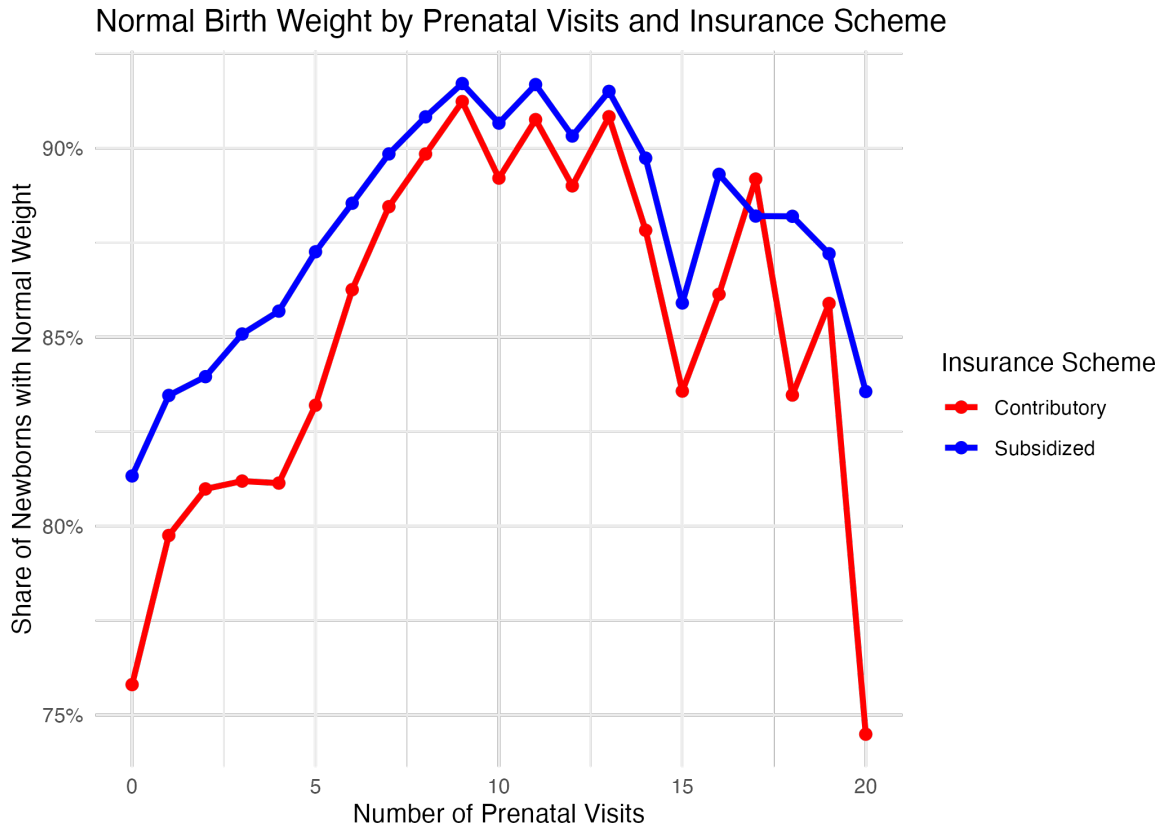


Figure: Share of Newborns with Normal Birth Weight by Number of Prenatal Visits and Insurance Type.

- Who are the women going to more than 10 visits? Partial Answer

Prenatal Visits Improve Health Outcomes, But Very High Levels May Signal Risk

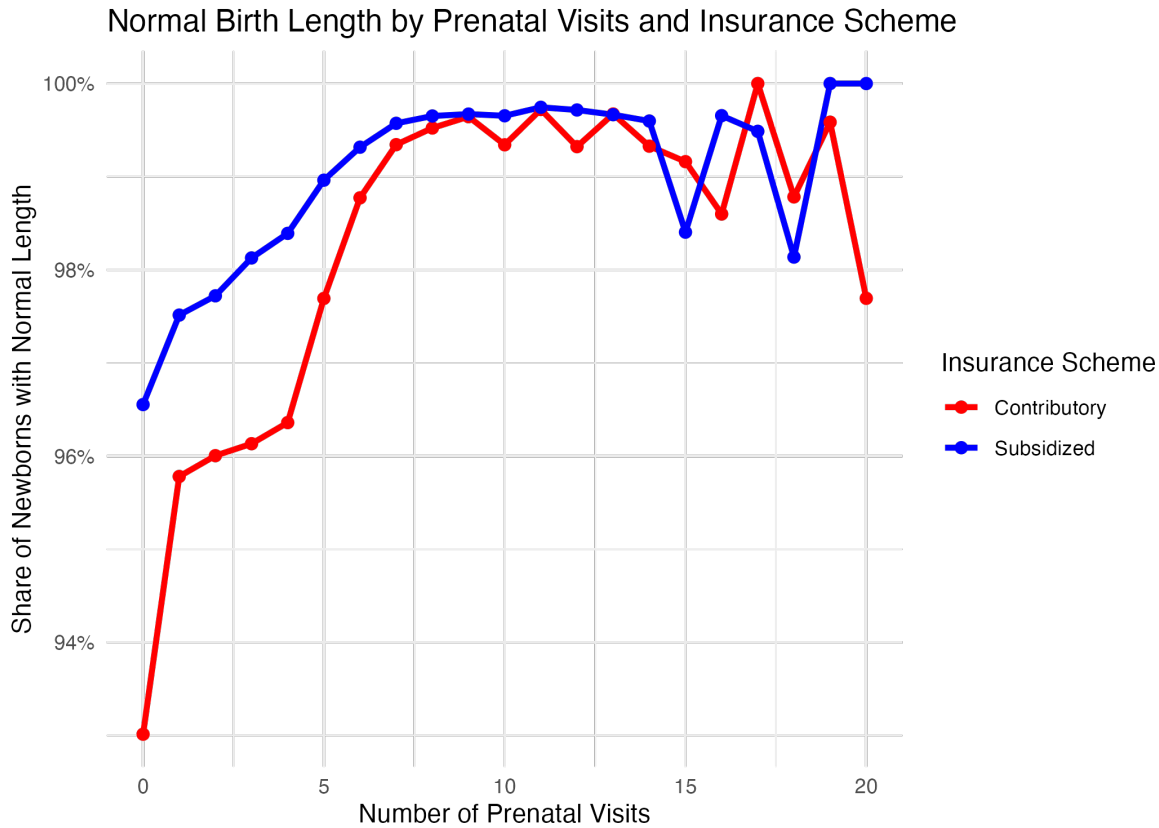


Figure: Share of Newborns with Normal Birth Length by Number of Prenatal Visits and Insurance Type.

Prenatal Visits Improve Health Outcomes, But Very High Levels May Signal Risk

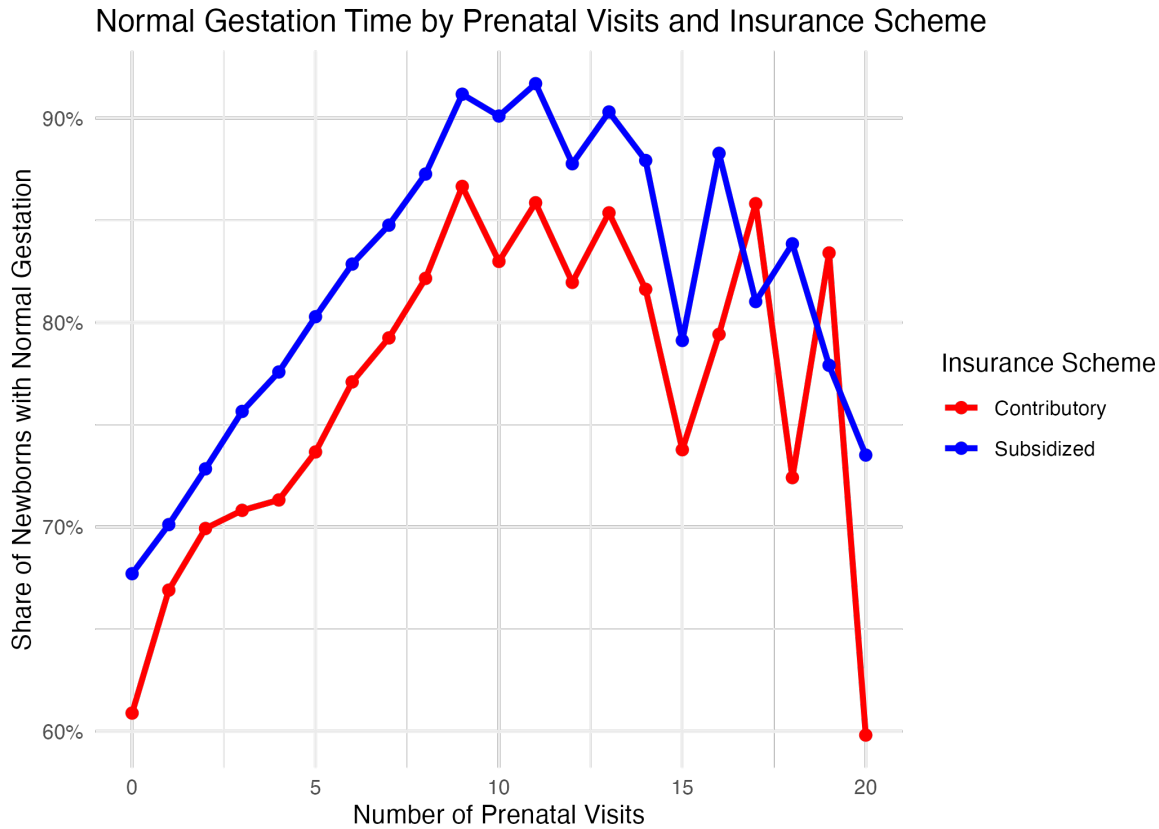


Figure: Share of Newborns with Normal Gestation Time by Number of Prenatal Visits and Insurance Type.

- Gestation time seems to be greatly determined by prenatal visits, and the reverse causality story seems plausible

DDIV Model for the Unification of Benefits Plan

First Stage: Effect of Policy on Prenatal Visits

$$\begin{aligned} S_{it} = \gamma_0 + \gamma_1 \text{Contributory}_i + \gamma_2 \text{NonUrban}_i + \gamma_3 \left(\mathbb{1}_{\{t \geq x\}} \times \text{NonUrban}_i \right) \\ + \gamma_4 \left(\mathbb{1}_{\{t \geq x\}} \times \text{Contributory}_i \right) + \gamma_5 \left(\text{NonUrban}_i \times \text{Contributory}_i \right) \\ + \gamma_6 \left(\mathbb{1}_{\{t \geq x\}} \times \text{NonUrban}_i \times \text{Contributory}_i \right) + \boldsymbol{X}_{it} + \delta_m + \lambda_t + \eta_{it} \end{aligned}$$

This first stage recovers exogenous variation in prenatal visits due to policy targeting.

Second Stage: Effect of Fitted Prenatal Visits on Birth Outcomes

$$\begin{aligned} \log \left(\frac{\mathbb{P}(Y_{it} = 1)}{\mathbb{P}(Y_{it} = 0)} \right) = \beta_0 + \beta_1 \hat{S}_{it} + \beta_2 \text{Contributory}_{it} + \beta_3 \text{NonUrban}_i \\ + \boldsymbol{X}_{it} + \delta_m + \lambda_t + \epsilon_{it} \end{aligned}$$

The second stage estimates the causal effect of prenatal visits on the probability of a normal birth outcome.

Preventive Care Story: Fetal Mortality and Prenatal Care

- For pregnancies that were not delivered, there is no information on prenatal visits
- Fetal deaths are associated to ICD-10 diagnosis codes: voluntary terminations and generic codes can be excluded
- The analysis will be performed at the disease-specific level
- We define mortality associated with disease i in municipality j and year t as:

$$\text{mortality}_{ijt} = \frac{\text{Deaths}_{ijt}}{\text{Deaths}_{ijt} + \text{Deaths}_{-i,jt} + \text{Births}_{jt}}$$

Where:

- Deaths_{ijt} = Fetal deaths due to disease i in municipality j and year t
- $\text{Deaths}_{-i,jt}$ = Fetal deaths from all other causes (excluding i) in municipality j, year t
- Births_{ijt} = Live births in municipality j, year t

While Mortality Rates by Diseases have Decreased, the Behavior varies across Regions and Health Schemes

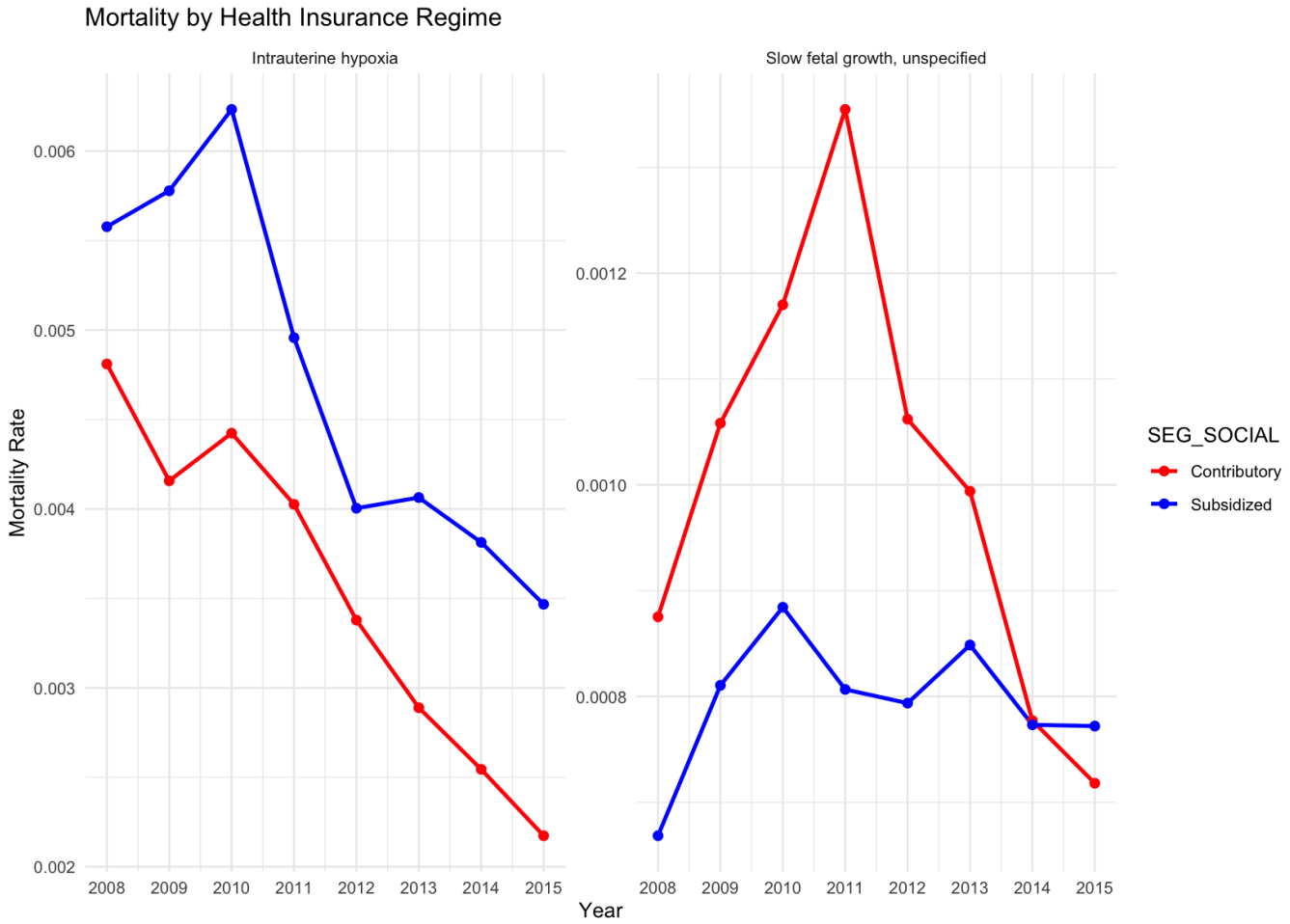


Figure: Mortality for Hypoxia and Slow Fetal Growth Across Health Regimes

While Mortality Rates by Diseases have Decreased, the Behavior varies across Regions and Health Schemes

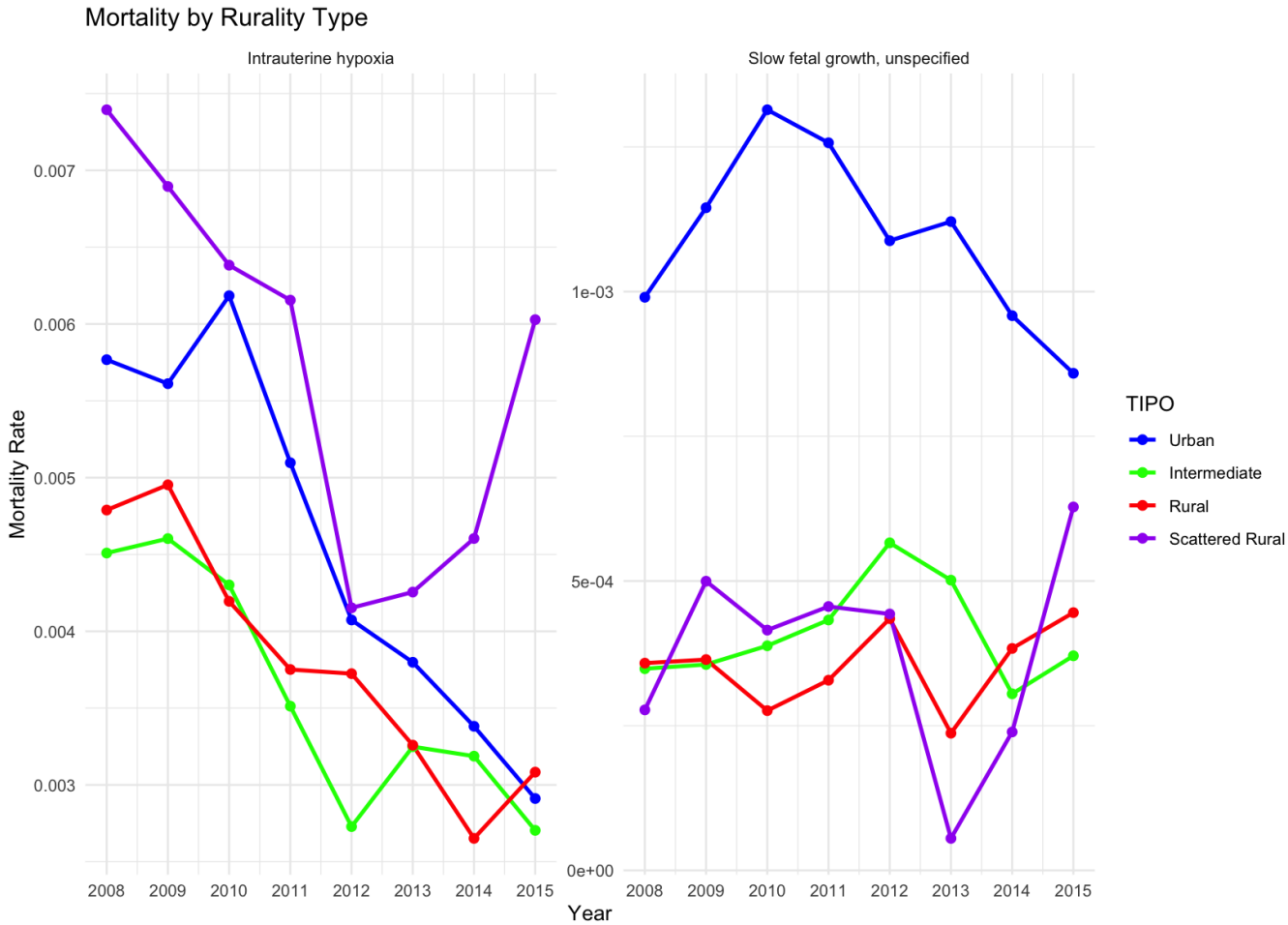


Figure: Mortality for Hypoxia and Slow Fetal Growth Across Rurality Categories

Panel Model at the Municipal Level Relating Mortality Rate from Fetal Diseases to Prenatal care

- To relate the Birth Records and Deceased datasets, I analyzed the impact of pre-natal care on mortality rates at the municipal level.
- I ran the following regression:

$$\text{Mortality}_{ijt} = \beta_0 + \beta_1 \,\text{MeanPrenatalVisits}_{jt} + \beta_2 \,\text{Contributory}_{jt} + \beta_3 \,\text{NonUrban}_j + \gamma_j + \delta_t + \epsilon_{ijt}$$

- Indices:
  - i: medical condition
  - j: municipality
  - t: year
- Fixed effects:
  - γ_j: municipality fixed effects
  - δ_t: year fixed effects
- I ran 4 for the top four medical conditions contributing to child mortality from 2008–2015 **

Higher Average Pre-Natal Care at the Municipal Level is Associated with Lower Mortality Rates

- For 2 out of the 4 regressions, β_1 was negative and statistically significant. For the remaining 2, it was not statistically significant.
- Average hypoxia-related mortality rate is around 2%, so the coefficient should be interpreted as follows: an extra prenatal visit is estimated to reduce this rate to 1.94%.

Dependent Variable:	Mortality Rate			
Associated Illness:	Hypoxia	Placenta Abnormalities	Slow Growth	Chorioamnionitis
Model:	(1)	(2)	(3)	(4)
Variables				
Avg. Prenatal Visits	-0.0063*	-0.0013*	0.0006	-0.0004
	(0.0033)	(0.0007)	(0.0006)	(0.0003)
Contributory	0.0281	0.0047	0.0033*	-0.0004
	(0.0288)	(0.0064)	(0.0018)	(0.0006)
Non-Urban	-0.0058	0.0025	0.0049	0.0043
	(0.0046)	(0.0030)	(0.0036)	(0.0034)
Avg. Prenatal Visits × Contributory	-0.0046	-0.0006	-0.0005*	6.84×10^{-5}
	(0.0048)	(0.0010)	(0.0003)	(8.84×10^{-5})
Avg. Prenatal Visits × Non-Urban	0.0008	-0.0006	-0.0009	-0.0007
	(0.0008)	(0.0005)	(0.0005)	(0.0005)
Contributory × Non-Urban	-0.0310	-0.0099	-0.0076*	-0.0010
	(0.0287)	(0.0162)	(0.0040)	(0.0038)
Fixed-effects				
Municipality	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Fit statistics				
Observations	1,856	684	554	187
R^2	0.95745	0.95472	0.99899	0.99995
Within R^2	0.08658	0.02863	0.05541	0.16190

Clustered Municipality standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Discussion/Conclusion

- The Unification of Health Benefits is associated with a strong improvement in pre-natal care for those in the Subsidized Regime
- Positive, yet insignificant association between 2011 Law and rural pre-natal care
- Worsening of prenatal care in rural dispersed areas. Points to limits of demand-side reforms when not complemented by supply-side investments
- Pre-natal visit and expansion of healthcare show correlation with better health outcomes at birth and "before" birth
- The relevance of these findings lies in the nature of prenatal care as a high-return, low-cost preventive investment
- Contribution: I document how insurance structure and policy design interact with geography and market concentration to shape the distributional effects of reform.
- Middle-income country lesson: Expanding formal coverage is necessary, but insufficient; targeting infrastructural and institutional bottlenecks is crucial to ensure equity in actual access and outcomes.