"The role of the minimum wage in reducing inequality (2018-2024): Counterfactual evaluation of wage distribution in Mexico"

Guillermo Mc Naught

El Colegio de México - Tecnológico de Monterrey

August 2025

Research Relevance

- This research aims to investigate the effect of minimum wage increases on income inequality in Mexico.
- Recent administrations have implemented significant wage hikes to redistribute income and reduce inequality, especially for low-income households.
- The actual impact is uncertain: minimum wage increases could reduce inequality, have no effect, or even worsen it through job losses or higher informality.
- Empirical evaluation is key to understanding the effectiveness of these policies and informing future strategies.

Literature Review – Main Insights

- The minimum wage is a key policy for reducing wage inequality, especially at the bottom of the distribution.
- Studies in the U.S. (e.g., Lee 1999; Autor et al. 2016) find that declining real minimum wages contributed to rising inequality.
- Evidence of **spillover effects** suggests that minimum wage increases may benefit workers slightly above the threshold.
- Context matters: the effectiveness depends on enforcement, labor market structure, and level of the minimum wage.

Data and Sample Characteristics

- Source: ENOE (INEGI), nationally representative labor force survey.
- Analysed period: 2018 and 2024 (during this years the minimum wage rose from \$88.15 to \$191.18).
- Population: salaried workers aged 18–65 (both formal and informal).
- Cleaning: Top and bottom 1% of hourly wages trimmed.
- Subgroup analysis: By gender and formality status.

Income Imputation

- Surveys, such as ENOE, have been facing a problem of no income declaration.
- The percentage has been increasing in the last years.
- This wouldn't be a problem if people deciding not to declare were randomly distributed.

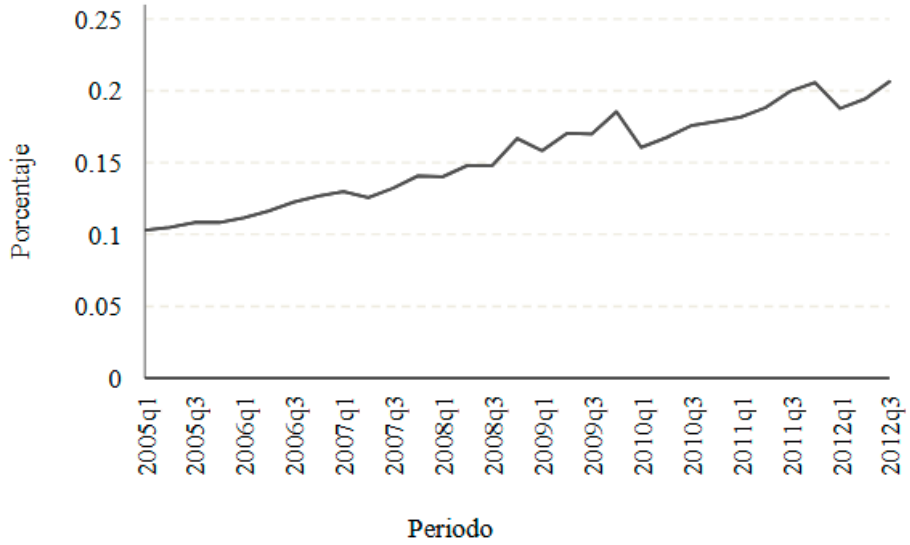
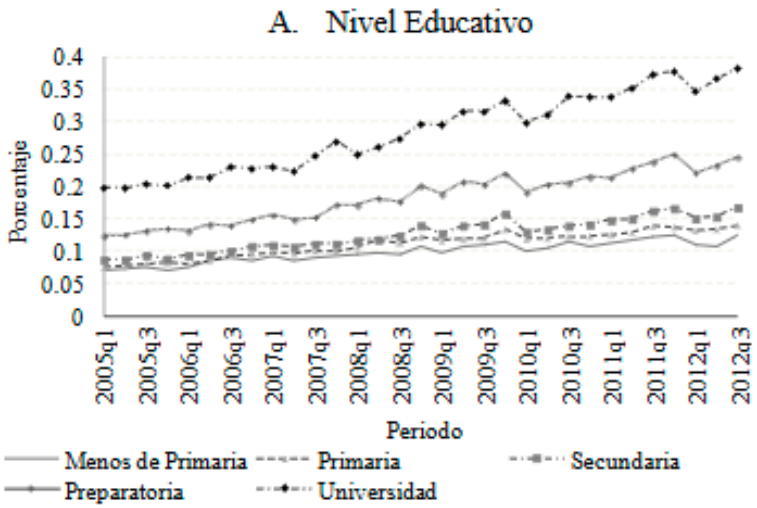
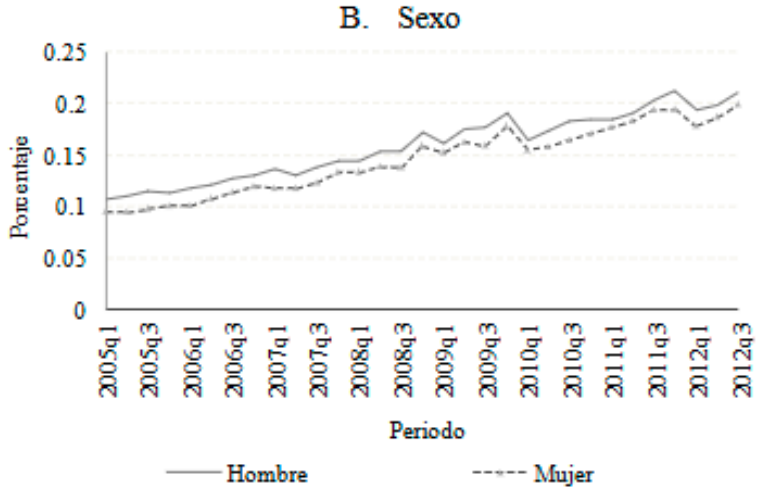


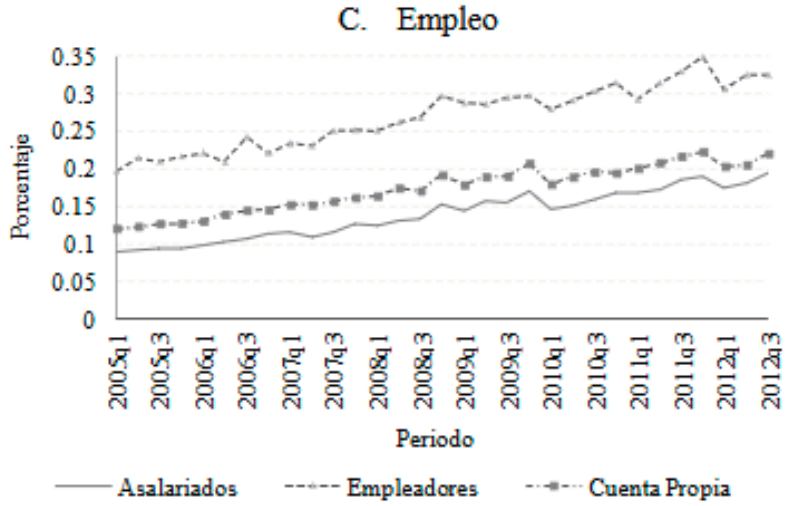
Figure: Percentage of workers who do not declare income.[1]

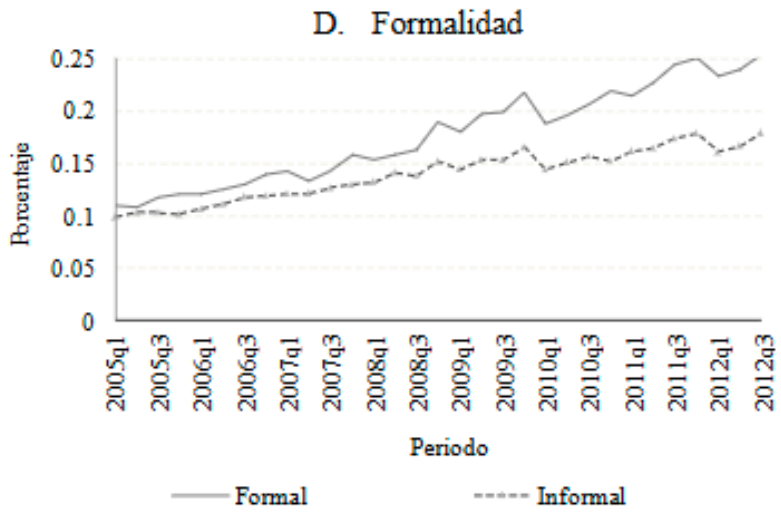
[1] Source: Campos-Vázquez (2013)

Who decides no to declare?









Predictive Mean Matching

Semi-parametric imputation method.

- Step 1: Estimate a regression model for the variable with missing values.
- Step 2: Compute predicted values for missing cases.
- Step 3: Identify observed cases with the closest predicted values (donors).
- Step 4: Randomly select one donor and assign its observed value.

Advantages:

- Preserves the original data distribution.
- Avoids implausible or out-of-range values.
- Useful for continuous variables with skewness or outliers.

Descriptive Statistics by Year

Indicator	2018		2024	
	Count	%	Count	%
Population below minimum wage	7,373	1.7%	32,339	6.4%
By Gender				
Men	256,132	59.0%	285,964	56.8%
Women	178,379	41.0%	217,060	43.2%
By Social Security Access				
With access	274,341	63.2%	324,319	64.5%
Without access	158,002	36.4%	175,277	34.8%
Not specified	2,168	0.5%	3,428	0.7%
Total	434,511		503,024	

Workers Earning Less Than the Minimum Wage

Characteristic	2018	2024
Population below minimum wage	1.7%	6.42%
By Gender		
Men	52.03%	53.25%
Women	47.97%	46.75%
By Business Type		
Independent or family business	69.25%	69.02%
Private company	30.75%	30.95%
Other	–	0.02%
By Educational Level		
No education	4.92%	3.35%
Basic education	57.94%	50.04%
Middle education	22.46%	28.00%
Higher education	14.68%	18.61%
By Social Security Access		
With access	22.43%	24.90%
Without access	77.38%	74.12%
Not specified	0.19%	0.98%

Objective and Methodology

- This study analyzes the impact of recent minimum wage increases on wage inequality in Mexico.
- Method: DiNardo, Fortin, and Lemieux (DFL, 1996) decomposition.
- We want to answer:

  What would the 2024 wage distribution look like if policy conditions had remained as those in 2018?
- It combines:
  - **The wage structure of 2018** (before policy change),
  - With the **worker characteristics of 2024** (e.g., age, education, formality, sector).
- Technically: we reweight 2018 data to match the distribution of observable characteristics in 2024.

DFL – Method Overview

1. **Estimate the reweighting function:**
   - Logit model where the dependent variable is the year (1 if 2024, 0 if 2018).
   - Covariates: age, gender, schooling, state, urban/rural, sector, marital status, formality, employer type.
   - Estimate $\phi(x) = \Pr(T = 1 \mid x)$ and compute weights:

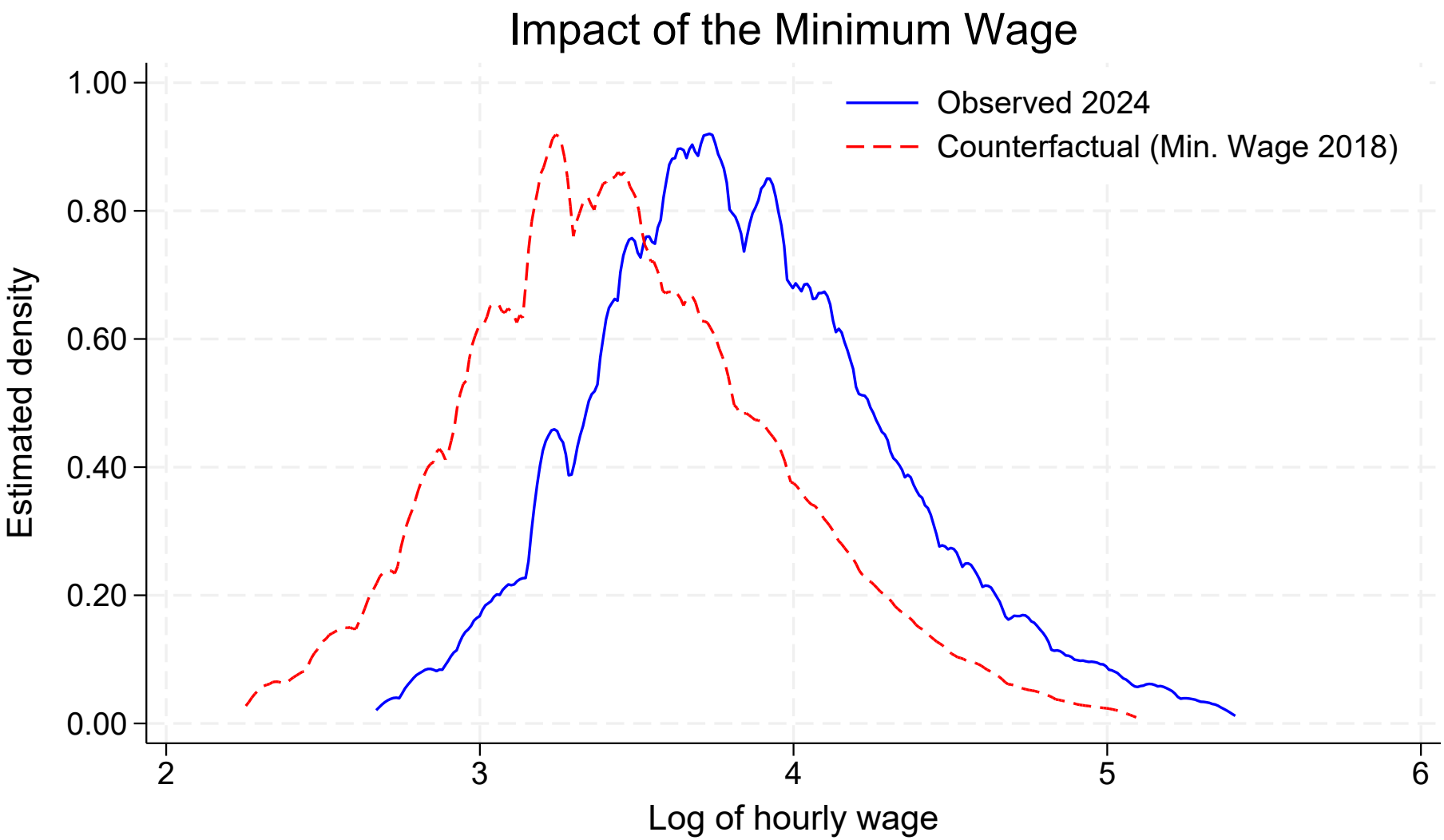
$$\omega(x) = \frac{\phi(x)}{1 - \phi(x)}$$

2. **Construct the counterfactual distribution:**
   - The counterfactual density is:

$$f_{2024}^{CF}(w) = \int f_{2018}(w \mid x) \cdot \frac{P(T = 1 \mid x)}{P(T = 0 \mid x)} \cdot f_{2018}(x)\, dx$$

   - It simulates wages in 2024 had policy conditions remained at 2018 levels.

Results

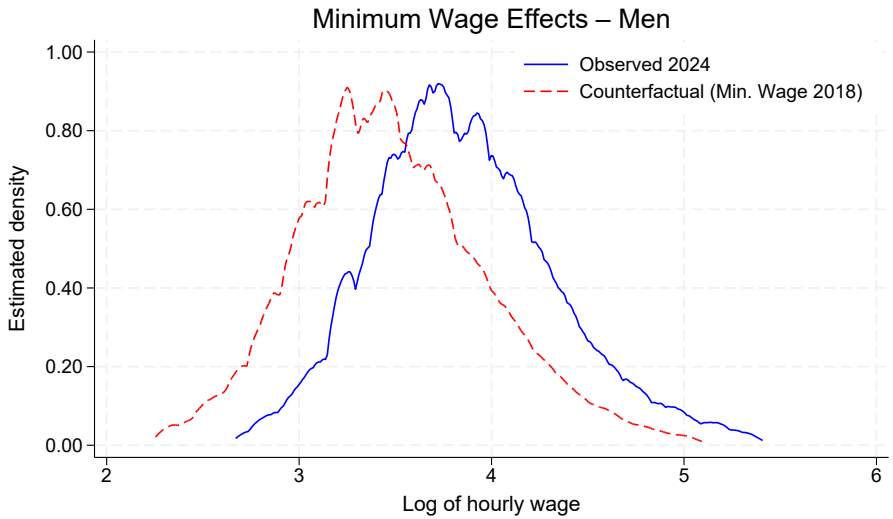

Impact of the Minimum Wage
Observed 2024
Counterfactual (Min. Wage 2018)
Estimated density
1.00
0.80
0.60
0.40
0.20
0.00
2
3
4
5
6
Log of hourly wage

Inequality Measures – Total Population

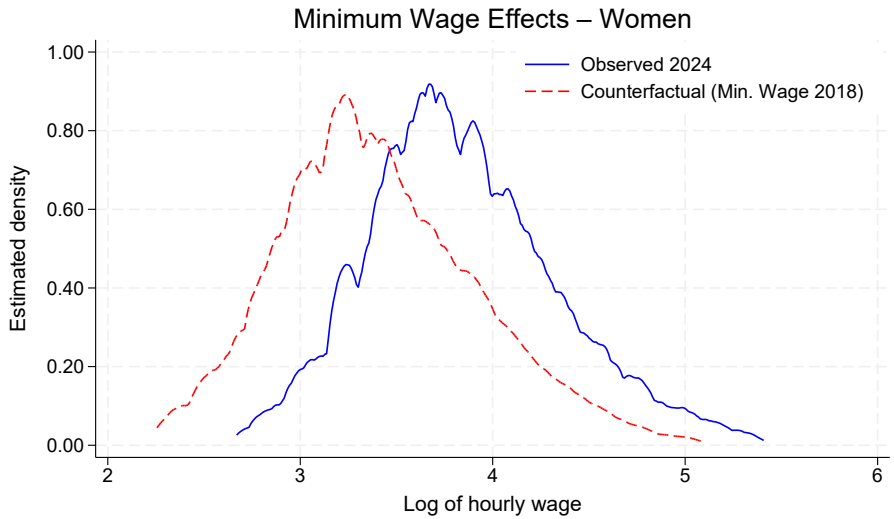
Table: Summary of Inequality Indicators

Indicator	**Real (2024)**	**Counterfactual (2018 MW)**	**Change (%)**
Gini Index	0.2813	0.2878	-2.25%
Palma Ratio	1.0127	1.0410	-2.72%
P90/P10	3.5769	3.7894	-5.61%
P50/P10	1.9476	2.0066	-2.94%

Results – Men vs. Women



Men



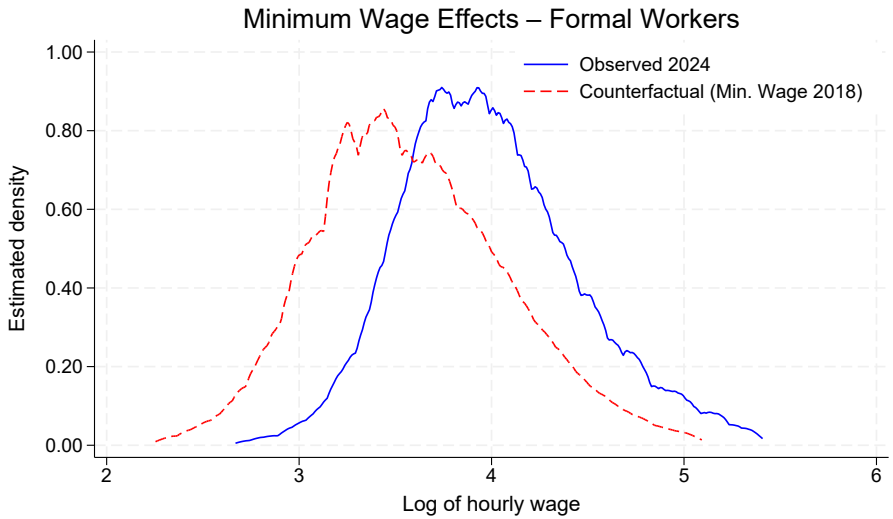
Women

Inequality Measures by Gender

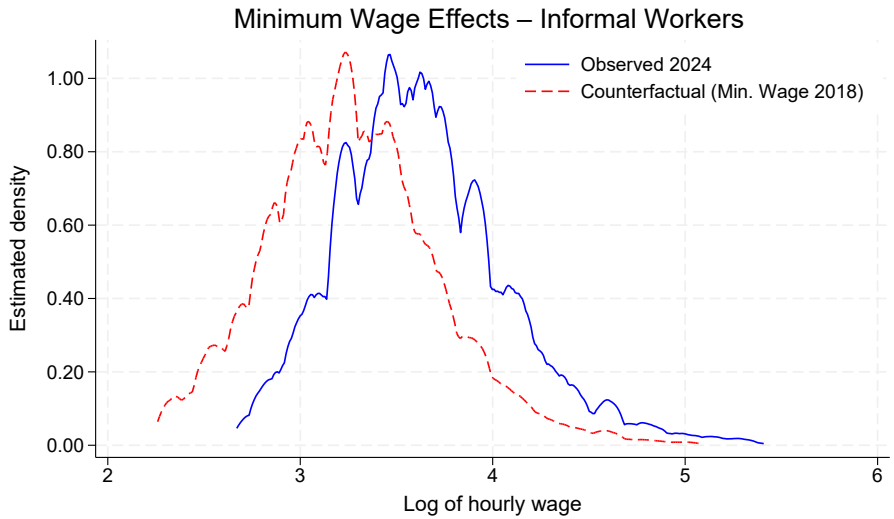
Table: Inequality Measures – Men vs. Women

Measure	**Men**			**Women**		
	Observed	Counterfactual	Change	Observed	Counterfactual	Change
Gini Index	0.2773	0.2821	-1.70%	0.2866	0.2985	-3.99%
Palma Ratio	0.9970	1.0040	-0.70%	1.0557	1.0906	-3.20%
P90/P10	3.5082	3.6897	-4.92%	3.7300	3.9151	-4.72%
P50/P10	1.9377	2.0011	-3.17%	1.9450	2.0025	-2.87%

Results – Formal vs. Informal Workers



Formal Workers



Informal Workers

Inequality Measures by Sector Type

Table: Inequality Meausres – Formal vs. Informal

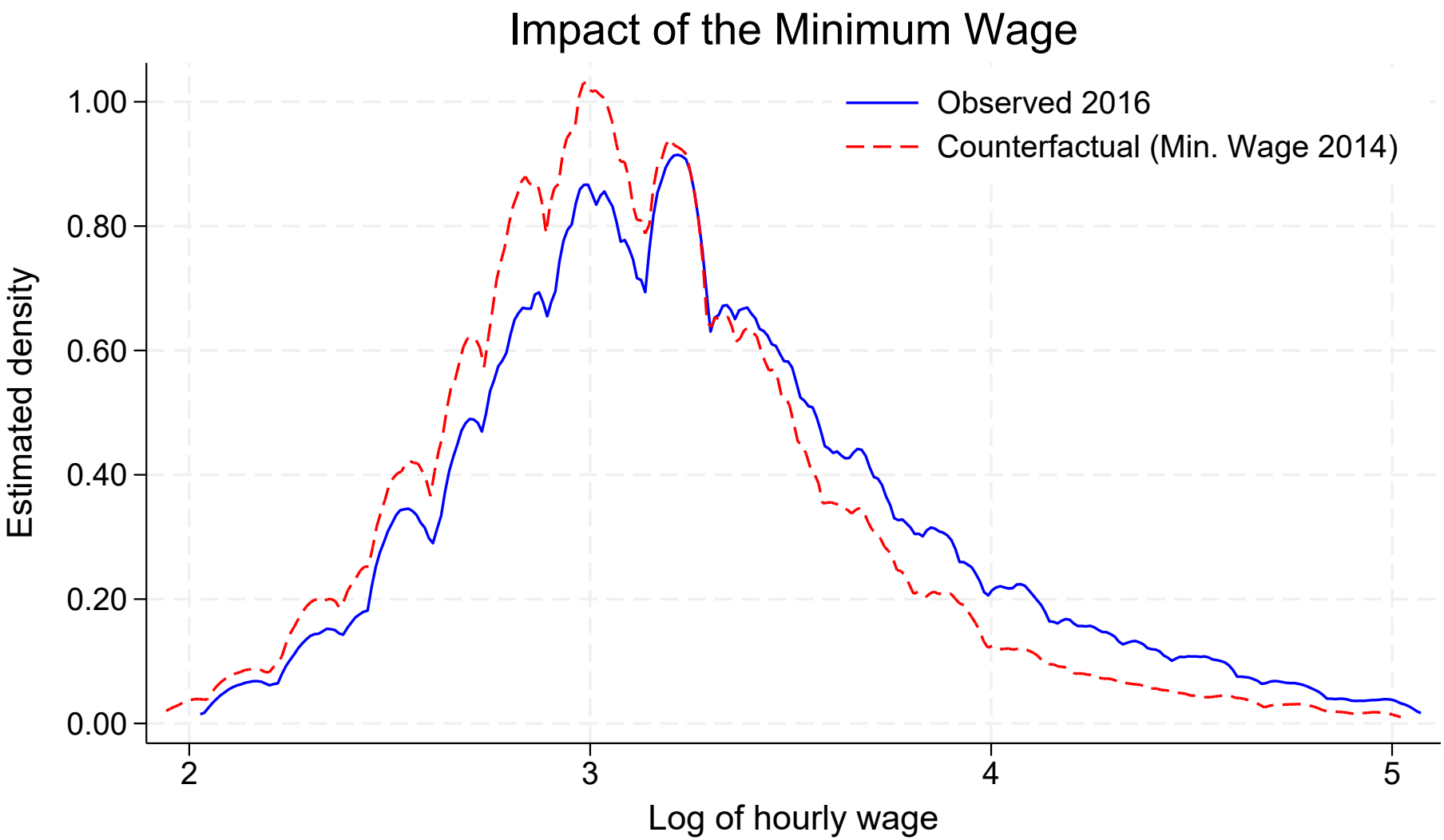
Measure	**Formal**			**Informal**		
	Observed	Counterfactual	Change	Observed	Counterfactual	Change
Gini Index	0.2667	0.2832	-5.82%	0.2603	0.2578	+0.97%
Palma Ratio	0.9368	1.0059	-6.87%	0.9449	0.9002	+4.97%
P90/P10	3.3099	3.7386	-11.46%	3.0868	3.2360	-4.61%
P50/P10	1.8433	1.9742	-6.63%	1.7902	1.9135	-6.45%

Conclusions

- The DFL decomposition was used to simulate a 2024 wage distribution under 2018 policy conditions.
- Results show a consistent reduction in inequality indicators—especially for lower-income groups.
- Stronger effects are observed for:
  - **Women** – systematic improvement across all measures.
  - **Formal workers** – clear reductions in inequality.
- Mixed results for informal workers: some improvements in relative measures, but higher dispersion in the tails.
- Overall, 2024 policies (such as minimum wage increases) appear to have helped compress the wage distribution between 2018 and 2024.

Thanks! Questions?

Results (2014-2016)



Inequality Measures – Total Population (2016 vs. 2014 Policy)

Table: Summary of Inequality Indicators

Indicator	**Real (2016)**	**Counterfactual (2014 MW)**	**Change (%)**
Gini Index	0.3285	0.2904	+13.13%
Palma Ratio	1.3155	1.0880	+20.93%
P90/P10	4.1870	3.5366	+18.40%
P50/P10	2.0561	1.9482	+5.54%

Objective of the Analysis

Objective: Assess the impact of the minimum wage increase on income distribution in Mexico, replicating the analysis done by Bouchot Viveros (2018).

- Analyze how the minimum wage increase affects different percentiles of the wage distribution.
- Compare the effects between zones A and B using the Difference-in-Differences (DiD) approach.

Identification Strategy

Identification Strategy: We use the Difference-in-Differences (DiD) approach to identify the causal impact of the minimum wage increase.

- In 2015, the Mexican government implemented a national minimum wage unification policy.
- The wage increase in October 2015 only affected the zone B, creating an exogenous variation.
- Zone A did not experience any change and serves as the control group.

Assumption: Parallel trends assumption between both zones before the treatment.

Why 2015?

- Prior to 2015, there were two minimum wage zones, with zone A having a higher wage due to higher economic development.
- On October 1, 2015, the government unified the minimum wage across the country, raising zone B's minimum wage to the same level as zone A (from \$68.28 to \$70.10).
- This creates an exogenous variation to isolate the causal effect of the minimum wage on income distribution.
- We consider zone A as the control and zone B as the treated group.

Empirical Strategy

DiD Model using Recentered Influence Function (RIF) for each percentile of the income distribution:

$$RIF_{it}(q) = \alpha + \beta_1 \cdot Post_t + \beta_2 \cdot Treated_i + \beta_3 \cdot (Post_t \times Treated_i) + \theta_i + \epsilon_{it}$$

- $Post_t$: Indicator variable, 1 for Q4 2015, 0 for Q3 2015.
- $Treated_i$: Indicator variable, 1 for zone B and 0 for zone A.
- θ_i: Individual-level fixed effects.

Why RIF? The Recentered Influence Function (RIF) allows us to study the distributional effects of the minimum wage increase at different percentiles of the income distribution.

Preliminary Results