The Effect of California's Minimum Wage Increase on Unemployment and Prices

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Abstract

This paper investigates the impact of California's recent minimum wage hike on both the state's unemployment rate and Consumer Price Index (CPI). Utilizing a difference-in-differences (DiD) framework, we compare California to Texas using data from the State of California Department of Industrial Relations, Texas Open Data Portal, and the Bureau of Labor Statistics. Theoretical expectations suggest that minimum wage increases may lead to adjustments in both unemployment and CPI, with potential effects on employment levels and price dynamics. Our analysis reveals that the rise in California's minimum wage coincided with increases in CPI and decreases in unemployment.

JEL: J3, E31, E24

Key Words: Minimum Wage, Inflation, Unemployment, California, Texas

1. Introduction

In the aftermath of the COVID-19 pandemic, a significant and unusual surge in inflation has unfolded, surpassing conventional norms. This prompts an investigation into the policy choices that could impact the economic landscape, with a specific focus on the minimum wage. Amidst debates surrounding minimum wage adjustments, understanding their implications is crucial for policymakers, economists, and businesses alike. This study aims to shed light on the effects of California's minimum wage increases, which commenced in July 2014, on key economic indicators such as consumer price index (CPI) and unemployment rates. By employing a Difference-in-Differences (DiD) approach and regression analysis, we seek to answer the question: What is the effect of California's minimum wage increases on CPI and unemployment rates compared to a control state like Texas? Through this investigation, we aim to contribute valuable insights to the ongoing discourse on minimum wage policies and their broader economic ramifications.

Extensive research has been conducted to understand the impact of minimum wage adjustments on various economic indicators. In particular, the literature examining the relationship between minimum wage increases and inflation, as measured by the Consumer Price Index (CPI), is relatively sparse. However, existing studies suggest that minimum wage hikes tend to exert upward pressure on prices, albeit to varying degrees across different contexts. Furthermore, while the precise magnitude of this effect remains subject to debate, empirical evidence generally indicates a positive association between minimum wage increases and inflationary pressures.

Conversely, a substantial body of literature has investigated the effects of minimum wage changes on unemployment rates. Numerous studies have examined the labor market outcomes

following minimum wage hikes, with findings generally indicating a modest increase in unemployment. However, the magnitude of this effect varies depending on factors such as the level of the minimum wage relative to the prevailing wage distribution and the elasticity of labor demand. Despite the nuanced nature of these findings, the consensus from aggregate data suggests that the impact of minimum wage increases on unemployment tends to be modest, albeit statistically significant.

Drawing from the insights of previous research, our hypothesis posits that California's minimum wage increases, implemented since July 2014, have exerted upward pressure on CPI while simultaneously leading to a modest increase in unemployment rates. This hypothesis is grounded in the notion that firms facing higher labor costs resulting from minimum wage hikes must navigate trade-offs between reducing employment, lowering profits, or passing on increased costs to consumers through price adjustments. While empirical evidence generally supports the expectation of rising prices and modest increases in unemployment following minimum wage hikes, exceptions exist, highlighting the complexities inherent in assessing the full impact of such policy interventions.

This study utilizes official economic indicators obtained from various sources. The California Consumer Price Index (CPI) data were sourced from the California Department of Finance, providing bi-monthly insights into inflation trends. Similarly, monthly CPI data for Texas were obtained from the Texas government's official data portal. The Bureau of Labor Statistics provided monthly unemployment data for both California and Texas.

The selected date range spans from August 2009 to August 2019. This period captures relevant economic shifts, including California's minimum wage increases beginning in July 2014, when it rose from $8 to $9. As of January 1st, 2024, California's minimum wage stands at

$16. In contrast, Texas has maintained its minimum wage at $7.25 since July 2009, reflecting federal standards.

The paper is organized as follows: Following this introduction, the subsequent sections provide a comprehensive review of the literature concerning the impact of minimum wage adjustments on inflation and unemployment. The data and methodology section outlines the sources of data, the selected time frame, and the analytical approach employed in the study. Results from the empirical analysis are then presented, followed by a discussion of the findings in light of existing literature and potential limitations. Finally, the conclusion offers a summary of key insights, policy implications, and suggestions for future research.

2. Literature Review

The existing economic literature on the relationship between minimum wage and inflation reveals several key insights. Firstly, there is a noticeable dearth of research in this area compared to other topics such as monetary and fiscal causes of inflation. Moreover, the varying results across different economic models and geographical locations underscore the complexity of this relationship. Cuong (2011) challenges the conventional notion that minimum wage increases lead to inflation based on their study in Vietnam, highlighting the importance of considering core and non-core inflation factors. Similarly, Dervishi (2023) offers insights from North Macedonia, where minimum wage adjustments are tied to purchasing power and inflation figures, contrasting with the situation in the USA. Elwell (2013) demonstrates how the stagnation in the national minimum wage has failed to keep pace with inflation, emphasizing the policy implications of minimum wage adjustments. Lemos (2004) provides a comprehensive survey of methodologies used in the literature, revealing the diverse approaches and their respective findings. Majchrowska (2022) adds to this body of work by examining the impact of

minimum wage increases on inflation in Poland, highlighting regional and temporal variations in these effects. All reviewed literature emphasizes the significance of prudent policymaking regarding minimum wage adjustments to mitigate adverse inflationary effects and ensure the purchasing power of individuals. Given the prevailing research findings, it is plausible to hypothesize that raising the minimum wage in California will contribute to inflationary pressures. This paper aims to contribute to this ongoing discourse by evaluating the effects of minimum wage increases on inflation in California.

In addition to the impact on inflation, the literature also extensively explores the relationship between minimum wage adjustments and unemployment rates. Brown et al. (1981) delve into time-series evidence to assess the influence of minimum wage regulations on youth employment and unemployment, revealing a consistent trend of reduced teenage employment due to minimum wage hikes. Building on this work, Brown (1988), the same author from the previous study, critically evaluates the prevailing assumptions regarding the impact of minimum wage laws on labor market dynamics, challenging the notion of a substantial influence on employment outcomes. Gorry (2013) examines the interaction between minimum wages and youth unemployment, revealing potentially significant increases in unemployment rates, particularly among high school-educated workers. Furthermore, Kim and Lim (2018) offer empirical insights into the relationship between minimum wage policies and unemployment across OECD countries, emphasizing the nuanced nature of this relationship and the limited impact of modest minimum wage increases on employment levels. Clemens and Wither (2019) explore the effects of minimum wage increases during the Great Recession on low-skilled workers' employment and income trajectories, highlighting significant negative effects on employment levels among targeted individuals. Integrating these findings, this study aims to

investigate how changes in California's minimum wage affect both inflation dynamics and unemployment rates, contributing to a comprehensive understanding of the economic consequences of minimum wage adjustments.

Economic Model/ Theory

The Phillips curve (see Figure 1) lays the groundwork for understanding the strategic decisions firms face when the government increases the minimum wage. As depicted in the curve, there exists a traditional trade-off between inflation and unemployment. This trade-off gains particular significance in the context of our study on minimum wage impacts. When the government mandates a minimum wage hike, firms grapple with a crucial decision: whether to pass on elevated production costs to consumers by adjusting prices, reducing labor costs, or absorbing the impact on profits. Notably, if firms predominantly choose to reduce labor costs by cutting employment, according to the Phillips curve, a decrease in employment should be associated with a decrease in inflation. This aligns with the inverse relationship between unemployment and inflation implied by the Phillips curve. Conversely, if firms opt to raise prices, it signifies an inflationary impact. However, such price increases might also be accompanied by reduced employment if consumer demand decreases due to higher prices. This study uniquely contributes by providing an analysis of whether the minimum wage increases in California have led to inflation and unemployment, shedding light on the specific impacts of firms' choices in response to changes in minimum wage policy. Through our investigation, we aim to elucidate the complex interplay between minimum wage adjustments, inflation, and unemployment rates, thus providing valuable insights for policymakers and economists grappling with the implications of minimum wage policies on both macroeconomic indicators.

3. Data and Methodology

Data Source

The data for this study were sourced from official economic indicators. The California Consumer Price Index (CPI) data, obtained from the California Department of Finance, provides a bi-monthly perspective on cpi trends in the state. To ensure consistency, missing months were removed from the CPI regression analysis. Monthly CPI data for Texas was sourced from the Texas government's official data portal, with adjustments made to include only months where complete data for both Texas and California were available. California and Texas monthly unemployment data were obtained from the Bureau of Labor Statistics. It should be noted that the monthly unemployment rate after January 2019 is subject to possible revision, potentially impacting our findings.

The date range used in both regressions spans from August 2009 to August 2019. August 2009 was selected as Texas increased its minimum wage in tandem with the federal minimum wage hike on July 24, 2009. Since then, Texas has not raised its minimum wage, making it a suitable control variable in the difference-in-differences model. Coincidentally, July 2014 marked the beginning of California's minimum wage increase, affording us a five-year period before and after the treatment to analyze its effects.

Figure 2 illustrates the plotted trends of California and Texas CPI over the study period, providing a visual depiction of how prices have evolved in these states. Initially, both graphs exhibit similar shapes, with California's CPI consistently higher, reflecting its distinct economic profile. Notably, as the graph progresses, California's CPI lead appears to widen over Texas,

particularly in the latter half of the period. This divergence may suggest the influence of different economic policies, such as minimum wage adjustments, during that time, impacting CPI trends.

In Figure 3, the unemployment rates in California and Texas are depicted over the same period. At the outset, significantly higher unemployment rates are observed, indicative of the aftermath of the "Great Recession," which concluded at the beginning of the examined period. The graph illustrates a gradual recovery in employment over time. A comparison between California and Texas reveals a notable reduction in the gap between the two states' unemployment rates, from a considerable disparity at the beginning of the period to nearly convergence by the end. This trend may reflect policy interventions aimed at addressing the higher unemployment rate experienced in California during the recession compared to Texas.

In addition to analyzing trends and patterns, summary statistics provide valuable insights into the central tendencies and variability of the data. For the California CPI, the summary statistics reveal a mean CPI of 248.54 with a standard deviation of 16.31, indicating relatively stable inflation trends with occasional fluctuations. The minimum CPI recorded was 224.35, while the maximum reached 281.25, showcasing the range of price movements over the study period. In comparison, the Texas CPI demonstrates a lower mean of 214.39 and a slightly narrower standard deviation of 10.76, reflecting comparatively steadier price dynamics. The unemployment statistics depict California's mean unemployment rate at 7.95%, indicating persistent labor market challenges, with a standard deviation of 3.07 highlighting significant fluctuations. Texas, on the other hand, exhibits a lower mean unemployment rate of 5.71% with a smaller standard deviation of 1.65, indicating a more stable employment environment. These summary statistics offer valuable context for interpreting the regression results and understanding the economic dynamics between California and Texas over the specified period.

Empirical Methodology

In this study, we employ the difference-in-differences (DiD) economic model twice to examine the causal impact of changes in minimum wage on prices and unemployment in California. The DiD model enables a comparison of the average changes in the CPI and unemployment between the treated group (California) and the control group (Texas) over time. Key assumptions include the parallel trends assumption, suggesting that, in the absence of the treatment, both states would have followed similar trends, and the common trends assumption, positing that any unobserved factors affecting the two groups have common trends over time. The parallel trends assumption may be violated after examining the nature of our data. California was hit harder by the recession than Texas was according to the unemployment levels. Further comparison of unemployment levels between California and Texas is warranted. The DiD model is expressed as:

$$Y_{i,s,t} = \beta_0 + \beta_1 TREAT_{i,s} + \beta_2 POST_t + \beta_3 \left(TREAT_{i,s} * POST_t\right) + e_{i,s,,t}$$

where $Y_{i,s,t}$ is the dependent variable (CPI and unemployment), $TREAT_{i,s}$(1 for California, 0 for Texas) and $POST_t$(1 for after July 2014, and 0 for before) are variables for the treatment group and the post-treatment period, respectively, and $e_{i,s,,t}$ is the error term. Through this model, we aim to provide a nuanced understanding of how changes in minimum wage relate to inflation and unemployment by conducting case studies that elucidate the economic implications of our research question.

4. Results

The empirical analysis conducted in this study aims to investigate the causal impact of changes in minimum wage on both prices (CPI) and unemployment in California. Two

regression models were employed using the difference-in-differences (DiD) approach to compare the treated group (California) with the control group (Texas) over time.

Model 1: DiD for CPI

The regression results reveal a significant positive effect of being in California (the treatment group) on CPI, with a coefficient of 29.3422 ($p < 0.001$). This suggests that California has approximately 29.34 points higher CPI compared to Texas. Additionally, the coefficient for the post period is 16.9049 ($p < 0.001$), indicating an additional increase of 16.90 points in the CPI after the July 2014 regardless of location. It is worth noting that the positive coefficient for the "Post" variable aligns with the expected trend of prices rising over time, as inflation is usually positive. Moreover, the interaction term between being in California and the post-treatment period shows a further significant increase in CPI, with a coefficient of 9.4550 ($p = 0.002$), implying an additional impact on CPI due to the treatment during the post-treatment period. The R-squared value of 0.864 suggests that the model explains 86.4% of the variation in CPI, indicating a good fit.

Model 2: DiD for Unemployment

The regression results for unemployment indicate a significant positive effect of treatment (California) on unemployment, with a coefficient of 3.5729 ($p < 0.001$), indicating that there was approximately 3.57 percentage points higher unemployment in California compared to Texas. The post period shows a significant negative effect on unemployment, with a coefficient of -2.9065 ($p < 0.001$), suggesting an average decrease of 2.91 percentage points in the unemployment rate after the July 2014 in both states. The interaction term between treatment and post indicates another significant decrease in unemployment, with a coefficient of -2.6035 ($p <$

0.001), implying an additional impact on unemployment due to the treatment during the post-treatment period. The R-squared value of 0.837 indicates that the model explains 83.7% of the variation in unemployment, suggesting a good fit.

Comparison with Previous Studies and Limitations

The findings of this study are consistent with previous research that suggests an increase in minimum wage leads to higher prices. However, the fall in unemployment is inconsistent with the studies that suggested that firms would respond to the new minimum wage by reducing employment. The inconsistency here may result from the small effect on economic indicators that the minimum wage has, as pointed out by Brown (1988) compared to the march larger effect of recovery after the recession. However, raising the minimum wage was part of California's economic policy and it is feasible that the higher wages could have led to an increase in aggregate demand. One limitation of this study is the potential endogeneity of minimum wage policies, which may confound the estimated effects. Additionally, the use of aggregated state-level data may mask heterogeneity within states and limit the generalizability of the findings. Trade-offs exist in choosing state-level data, as it allows for a broader analysis but may overlook important within-state dynamics. For example, regions within the state of Texas, such as Austin did raise their minimum wage during this time.

Interpretation of Empirical Tests

The empirical tests conducted in this study support the hypothesis that minimum wage increases in California lead to both higher prices (CPI) and lower unemployment compared to Texas. These results are consistent with theoretical predictions and provide empirical evidence of the impact of minimum wage policies on the economy.

However, it is essential to acknowledge the limitations and potential confounding factors inherent in the analysis. While the difference-in-differences (DiD) approach helps mitigate some of these concerns by comparing changes over time between treated and control groups, it relies on the assumption that California and Texas would have followed similar trajectories in the absence of the minimum wage increase. We cannot definitively conclude that the observed effects are solely attributable to the minimum wage policy, as California and Texas exhibit inherent differences in economic structure, demographics, and policy environments.

Moreover, the period under investigation coincided with the aftermath of the recession, which may have exacerbated the observed effects. California, in particular, was more severely affected by the recession in 2009 compared to Texas. The economic recovery following the recession could have influenced both CPI and unemployment rates independently of minimum wage policies.

Despite these limitations, the findings of this study contribute to the understanding of the effects of minimum wage increases on prices and unemployment, highlighting the trade-offs and complexities associated with the analysis of state-level data. Further research incorporating more granular data and alternative methodologies, such as instrumental variable approaches or natural experiments, could provide additional insights into the causal mechanisms underlying these relationships.

5. Conclusion

In conclusion, this study sheds light on the complex interplay between minimum wage policies, prices (CPI), and unemployment, particularly in the context of California and Texas. By employing a difference-in-differences (DiD) approach, we have demonstrated the causal impact

of minimum wage increases on CPI and unemployment in California compared to Texas. Our preliminary results suggest that minimum wage hikes in California lead to higher prices and lower unemployment rates. However, the magnitude of these effects and potential heterogeneity across states warrant further investigation.

Moving forward, future research could explore several avenues to enhance our understanding of the relationship between minimum wage policies and economic outcomes. One avenue is to examine the long-term effects of minimum wage increases on other macroeconomic indicators, such as income distribution, poverty rates, and labor market dynamics. Additionally, incorporating more granular data at the regional or industry level could provide insights into differential effects across sectors and geographic areas. Moreover, employing advanced econometric techniques, such as panel data analysis or instrumental variable approaches, may help address potential endogeneity and identify causal mechanisms more robustly. Overall, continued research in this area is essential for informing evidence-based policymaking and understanding the broader implications of labor market interventions on economic welfare.

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Appendix

Figure 1: Phillips Curve Reference

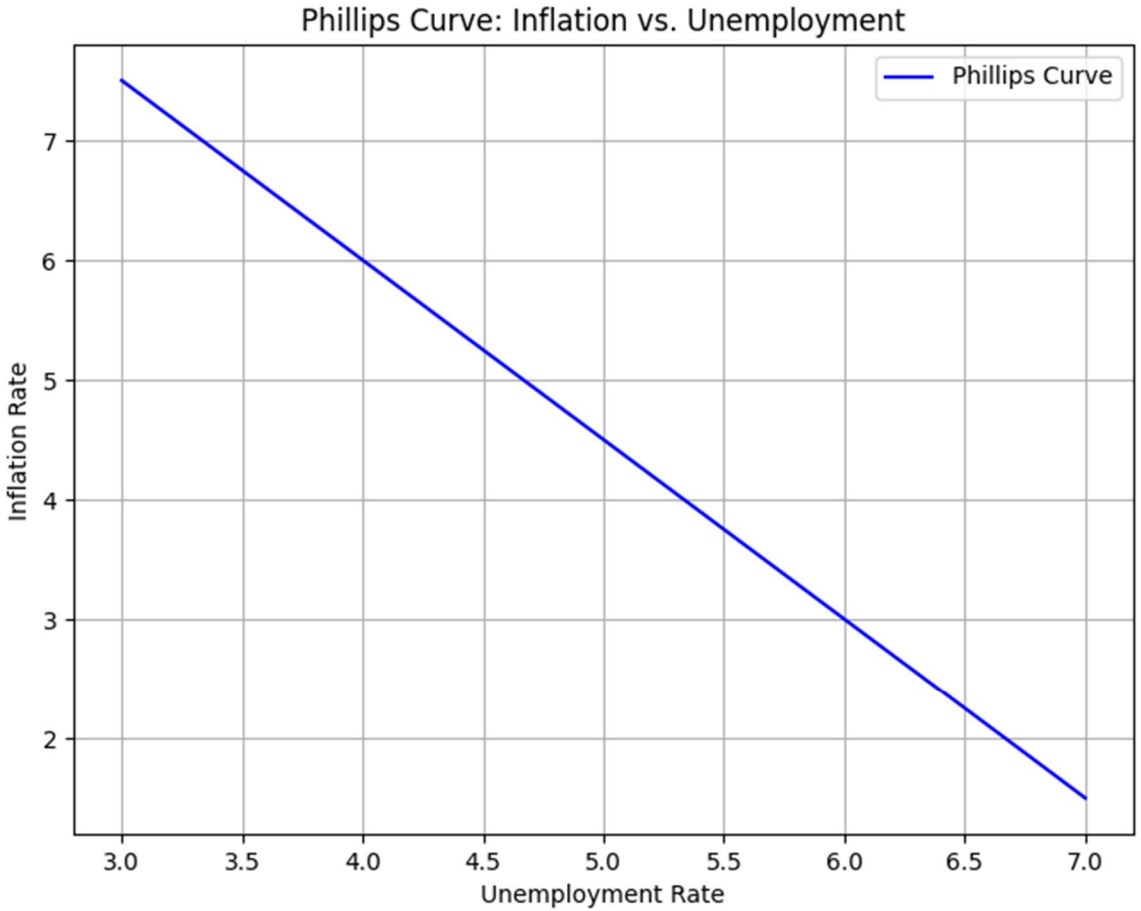

Figure 2: Texas and California CPI (August 2009- August 2019

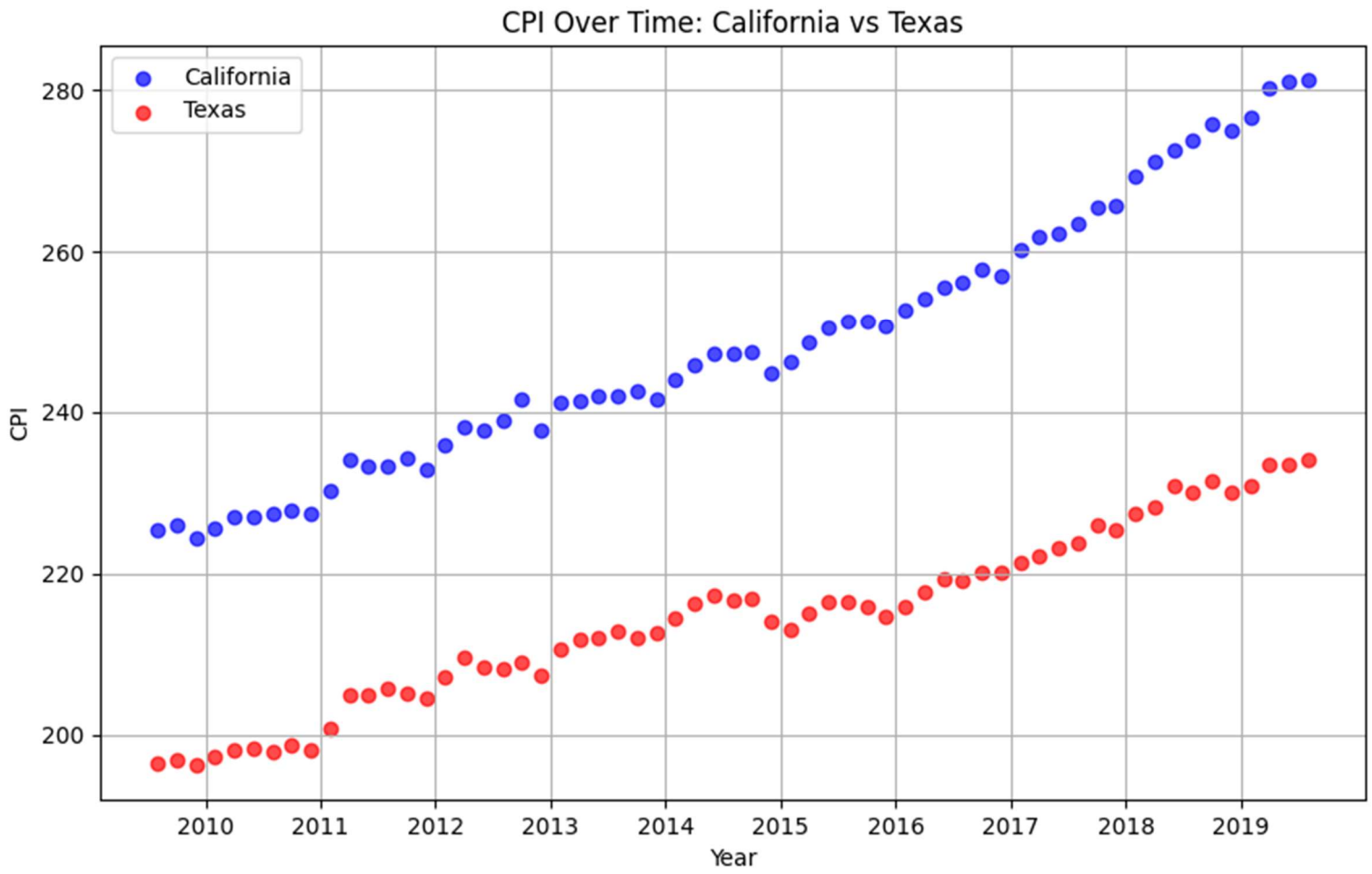

Figure 3: Texas and California Unemployment (August 2009-Augsut 2019)

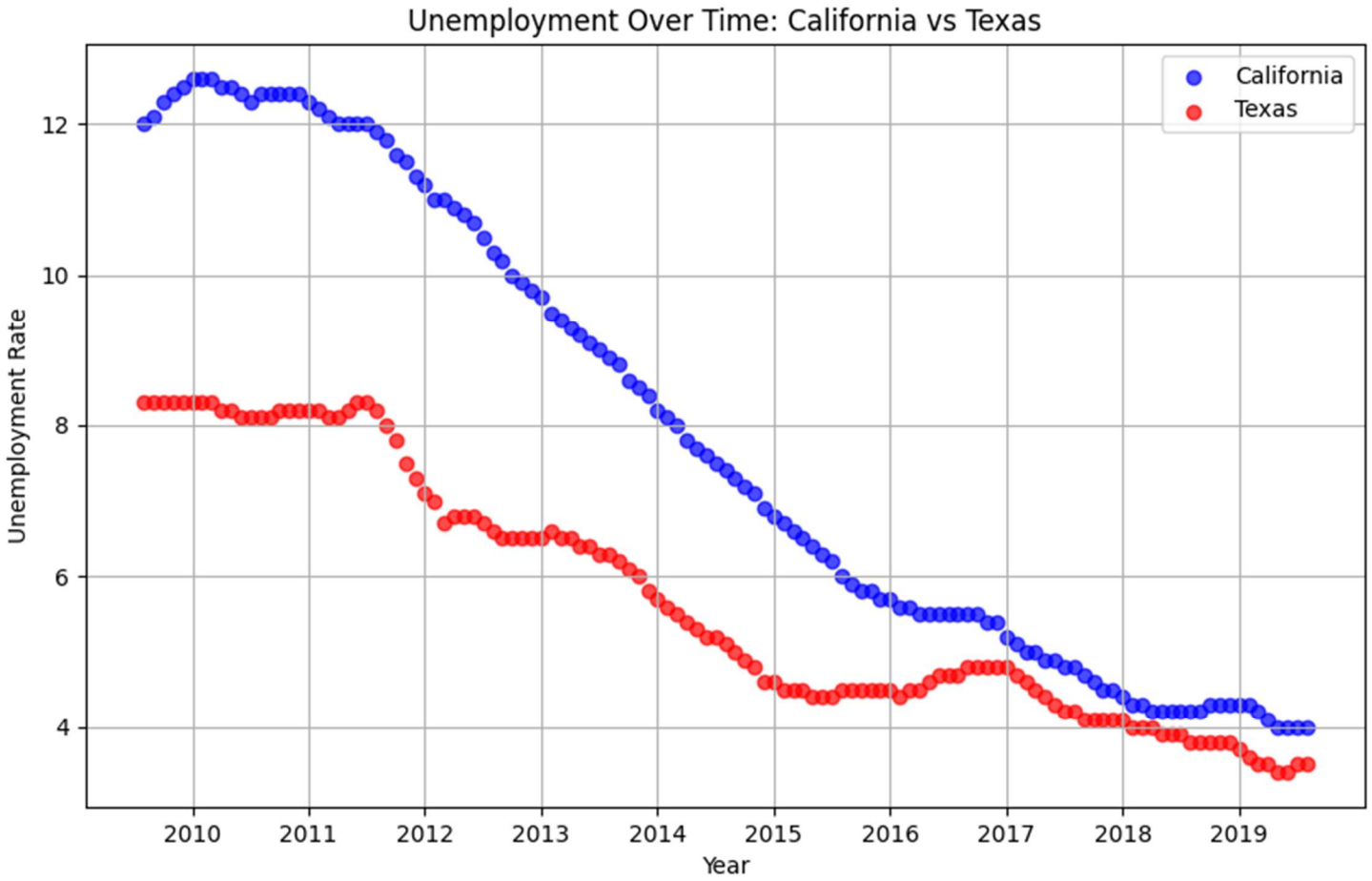

Table 1: Regression Result

Model 1: DiD for CPI

Variable	Coefficient	Std. Error	t-value	P-value
const	205.8018	1.500	137.231	0.000
Treatment	29.3422	2.121	13.835	0.000
Post	16.9049	2.104	8.036	0.000
Treatment * Post	9.4550	2.975	3.178	0.002

Additional Statistics:

- R-squared: 0.864
- Adj. R-squared: 0.860
- F-statistic: 249.6
- Prob (F-statistic): 6.55e-51
- Log-Likelihood: -427.99
- AIC: 864.0
- BIC: 875.2
- No. Observations: 122
- Df Residuals: 118
- Df Model: 3

Model 2: DiD for Unemployment

Variable	Coefficient	Std. Error	t-value	P-value
const	7.2000	0.143	50.343	0.000
Treatment	3.5729	0.202	17.665	0.000
Post	-2.9065	0.200	-14.547	0.000
Treatment * Post	-2.6035	0.283	-9.214	0.000

Additional Statistics:

- R-squared: 0.837
- Adj. R-squared: 0.835
- F-statistic: 407.8
- Prob (F-statistic): 1.81e-93
- Log-Likelihood: -364.11
- AIC: 736.2
- BIC: 750.2
- No. Observations: 242
- Df Residuals: 238
- Df Model: 3