The Impact of a Case Management Program on Debt Rates and Employment Rates:

A Difference-in-Difference Analysis

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Background

Child support programs are essential in the US for assuring children's financial security. However, non-custodial parents (NCPs) who miss payments may accrue child support arrears and face legal repercussions. A state child support agency put into place a program that gave NCPs comprehensive case management assistance to address this problem. The program aims to improve NCPs' connections with their children and custodial parents while also assisting them in finding work and paying their child support responsibilities.

This study aims to evaluate how well the program works at increasing employment rates for single mothers and NCPs, decreasing child support debt, and eventually improving outcomes for non-custodial parents and their kids.

Methodology

To assess the impact of the case management assistance program, fixed effect models can be employed to address endogeneity concerns. Fixed effect models involve the inclusion of dummy variables that account for unobserved unit-level differences in outcomes across various units. By incorporating fixed effects, the models address confounding variables and provide a comprehensive evaluation of the case management assistance program's impact, ensuring a more accurate analysis of its effectiveness.

The Difference in Difference (DD) research design is well-suited for analyzing panel data, which consists of multiple observations for various units over time (Bailey, 2021). In the context of the intensive case management program, the implementation of the program at different points in time makes DD analysis an appropriate approach to address the research question (Athey, 2018). By comparing the outcomes of treated and control sites before and after the program's implementation, the DD approach effectively controls for unobserved factors that may confound the results. This design enhances the reliability of the estimated effects, capturing both the observed and unobserved influences on the outcomes of interest.

The Difference in Difference (DD) research design relies on several key assumptions to analyze the impact of the intensive case management program on child support debt and employment rates. Firstly, we assume that the treated and control groups would have followed similar trends over time in the absence of the intervention, known as parallel trends. This allows us to attribute any differences in outcomes to the program itself. Secondly, we assume that both groups are influenced by the same time-varying factors, ensuring common time trends and enabling us to isolate the program's causal effect. Lastly, we assume independence, meaning that the assignment of treatment is unrelated to the expected outcomes. By meeting these assumptions, the DD design provides a robust framework to estimate the program's influence on child support debt and employment rates, taking into account both observed and unobserved factors.
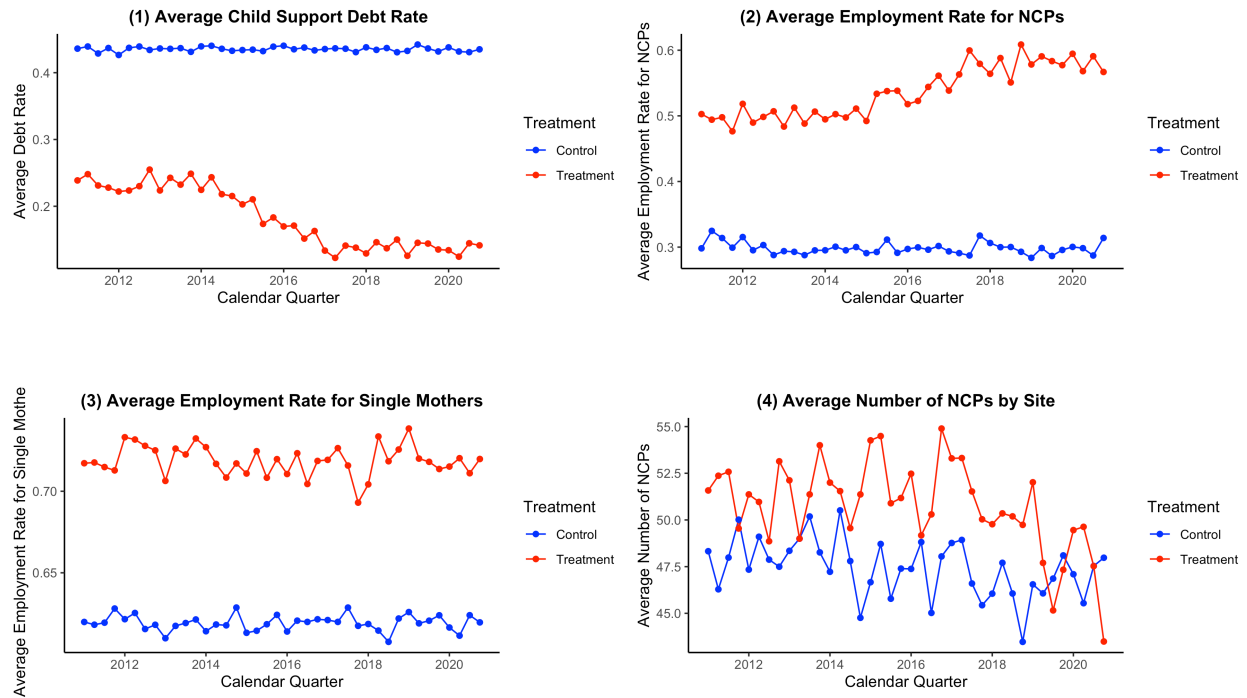
Analysis & Results

Figure 1. Averages of Key Variables for the Treatment and Control Groups

Figure 1 illustrates the trends observed in the control and treatment groups. In the control group, both the debt rate and employment rate exhibit relatively stable patterns over time. Conversely, in the treatment group, there is a noticeable decrease in the debt rate starting around 2014, and an increase in the employment rate starting around 2015. The employment rate for single mothers remains relatively stable throughout the observation period. Additionally, the number of non-custodial parents (NCPs) fluctuates over time.

DD Coefficients for Debt Rate

DD Coefficients for Employment Rate

DD Coefficients for Single Mother Employment Rate
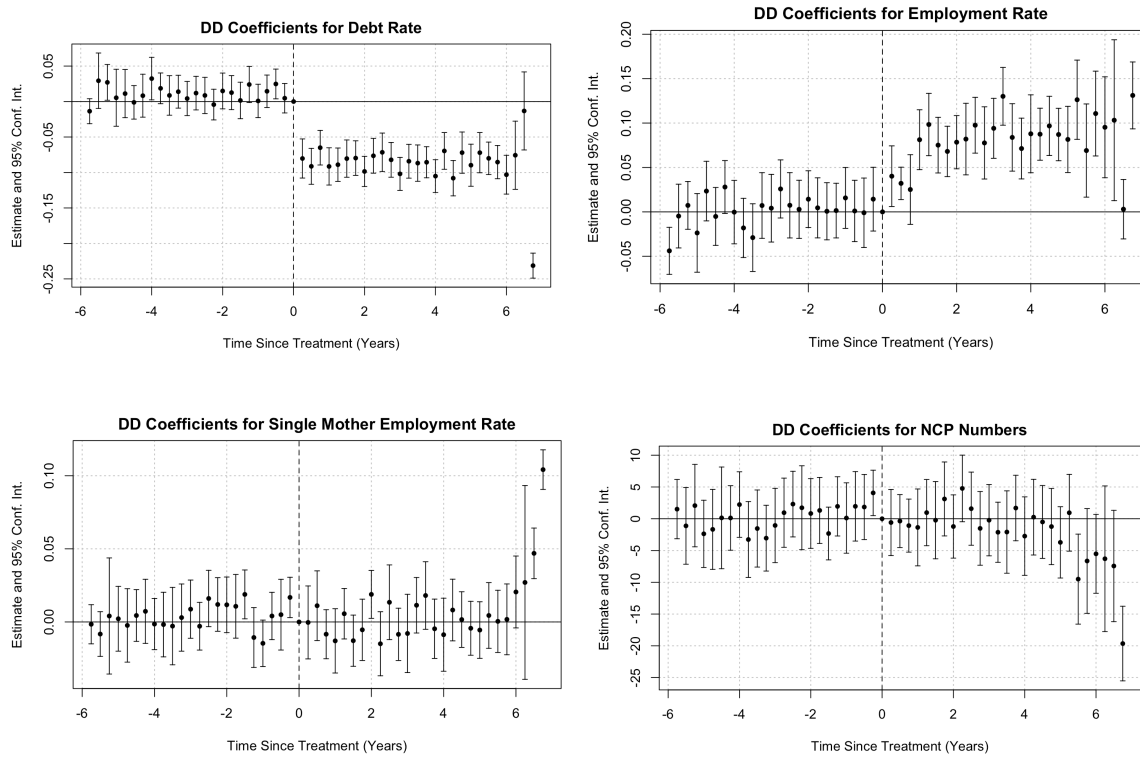
DD Coefficients for NCP Numbers

Figure 2. Dynamic Treat Effect Across Key Variables

The estimation of dynamic treatment effects aligns with the average effect estimation, indicating that the case management program consistently enhances the employment rate of NCPs and reduces the proportion of NCPs with child support debt. However, there is no discernible impact on the employment of single mothers. Notably, these effects remain stable over time, with no evidence of increasing or decreasing effects as time progresses.
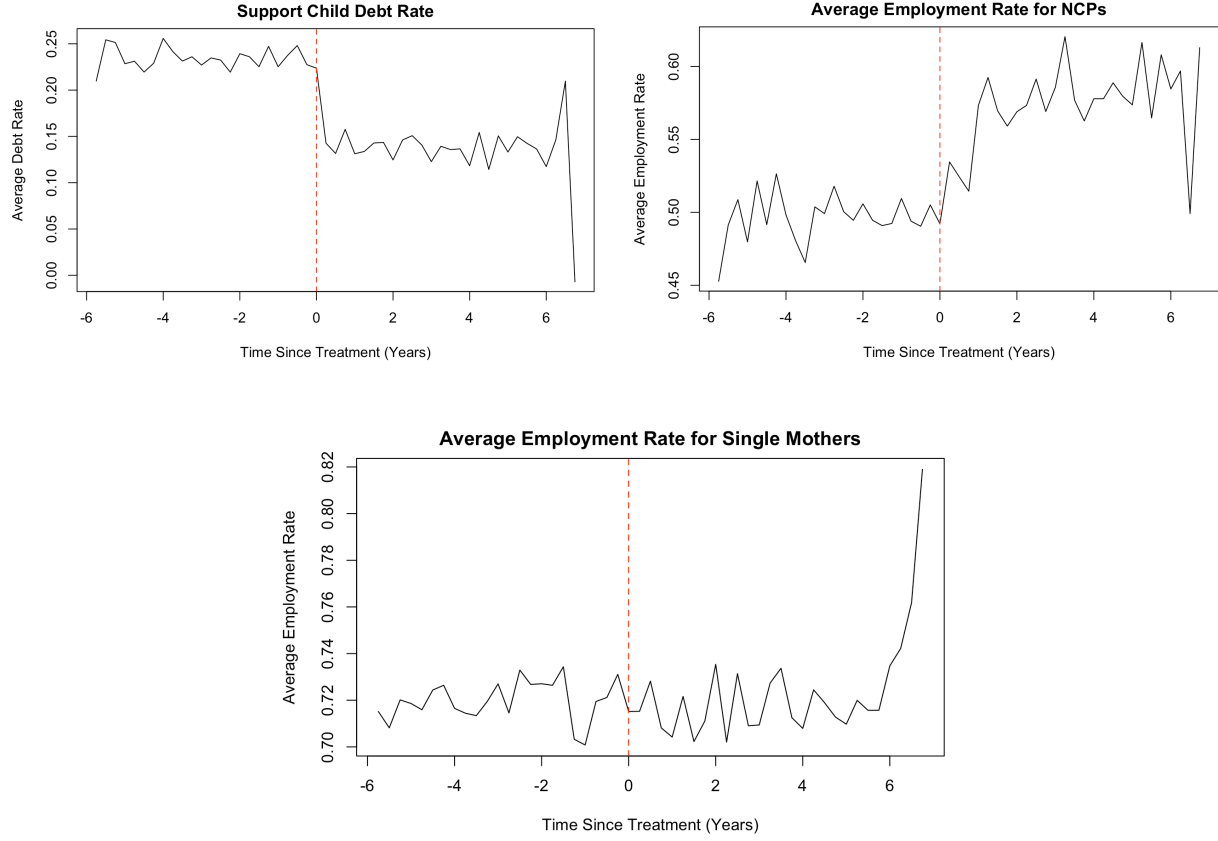
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Figure 3. Time Since Treatment Comparison

When examining the data over time, we observe a significant decline in the debt rate and a notable increase in employment. And the employment rate for single mothers only shows a significant increase after nearly six years of the program. To determine the significance of the effect of the case management program on the employment rate and debt rate, we can utilize the following function.

$$Y_{syq} = \beta_0 + \sum_{k=-g}^{-1} \lambda_k D_{sk} + \sum_{k=1}^{T} \beta_k D_{sk} + \alpha_s + \gamma_y + \delta_q + \epsilon_{syq}$$

In this context, λ_k and β_k represent the changes in the treatment-control gap before and after the implementation of the case management program, respectively. I anticipate the λ_k coefficients to have no statistical significance, indicating consistent differences between the treatment and control groups prior to the program. This signifies that the parallel trends assumption is valid.

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                          model 1            model 2                      model 3
Dependent Var.:    NCP Debt Rate NCP Employment Rate Single Mother Employment Rate

After Treatment -0.095*** (0.003)    0.073*** (0.005)                -0.004 (0.003)
Fixed-Effects:  ----------------- ------------------- -----------------------------
Site ID                       Yes                 Yes                           Yes
Year Quarter                  Yes                 Yes                           Yes
_____ _____ _____ _____
S.E. type                     IID                 IID                           IID
Observations                7,440               7,440                         7,440
R2                          0.846               0.606                         0.386
Within R2                   0.161               0.035                        0.0003
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Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
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Table 1. Average Effect of Case Management Program

In Model 1, the program has a significant negative effect (-0.095) on the NCP debt rate, reducing it by 9.5 percentage points on average. In Model 2, the program has a significant positive effect (0.073) on the NCP employment rate, increasing it by 7.3 percentage points on average. The estimated coefficient for the single mother employment rate is non-significant, indicating that there is no strong evidence of the program's impact on their employment. It is possible that the case management program primarily focuses on assisting non-custodial parents (NCPs) in finding employment and meeting child support obligations, rather than directly targeting single mothers.
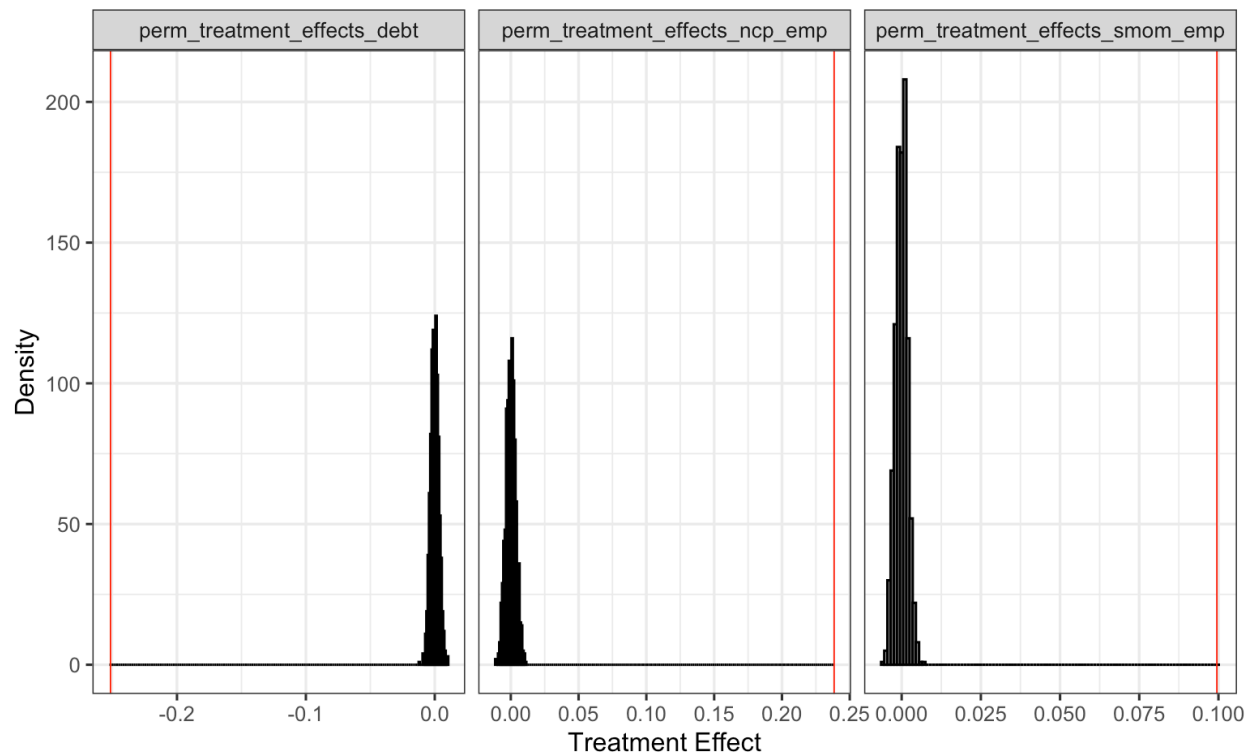
Robustness Check

Figure 3. Permutation Test

Robustness checks play a critical role in the Difference in Difference (DD) research

design to ensure the reliability and validity of the estimated treatment effects. These checks

involve evaluating how sensitive the results are to variations in the analysis, such as different

model specifications, control variables, or sample sizes (Vergeer & Kleinknecht, 2012). By

conducting robustness checks, researchers can assess whether the estimated treatment effects

remain consistent across different scenarios. This process helps to reinforce the credibility of the

findings and ensures that the treatment effects are not solely driven by specific assumptions or

model choices. Ultimately, robustness checks provide a more comprehensive evaluation of the

program's impact and contribute to the overall robustness of the analysis.

The robustness check, as illustrated in Figure 3, provides additional evidence supporting the reliability of the treatment effect. The results consistently demonstrate that the case management program effectively increases the employment rate and reduces the debt rate.

Conclusion

The case management program demonstrates remarkable effectiveness by substantially enhancing employment rates among non-custodial parents (NCPs) and significantly reducing their risk of accumulating child support debt.

Reference

Athey, S. (2018). Design-based Analysis in Difference-In-Differences Settings with Staggered Adoption. National Bureau of Economic Research.

Bailey, M. J. (2021). Real econometrics. Oxford University Press.

Vergeer, R., & Kleinknecht, A. (2012). Do Flexible Labor Markets Indeed Reduce Unemployment? A Robustness Check. Review of Social Economy, 70(4), 451–467. https://doi.org/10.1080/00346764.2012.681113