# Preschool for Mothers: How Universal Preschool Affects Maternal Employment in Vermont

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## ABSTRACT

Given the burden childcare places on female labor market outcomes, reducing public childcare costs through universal preschool provision may increase the likelihood women join the workforce. Extensive research on the impact of childcare cost-reducing policies generally indicates a positive effect of cost-reducing policies on female labor force participation, but universal preschool is a relatively novel policy in the United States; as a result, there are few studies on American universal preschool's effect on maternal employment. Building on previous work analyzing the impact of universal preschool programs in Georgia, Oklahoma, District of Columbia, Florida, and Vermont, this paper investigates how a **2014 policy to implement state-funded preschool for all three, four, and five-year-old children in Vermont affects employment of mothers of young children** using difference in differences and triple differences methods and interaction of the treatment effect with covariates on American Community Survey microdata from 2012-2019.

The study finds a **significant 8.5 percentage point effect** (12.1 percent increase from baseline) on maternal employment from universal preschool provision in Vermont using an inverse propensity weighted triple differences model, with even stronger effects on white, single, uneducated mothers not in poverty. Comparing this result and the specifics of the Vermont policy with research on policies in other states lends guidance to future policy construction.

## POLICY BACKGROUND

Broadly speaking, universal preschool refers to programs that provide preschool coverage with **eligibility criteria based exclusively on a child's age**, and not on other factors such as family income (see Table below). Although 44 states provide some state funding to universal preschool, only 16 states and the District of Columbia provide coverage based only on age. Through Act 166 of 2014, the state of Vermont joined the minority of states that provide universal preschool. The National Institute for Early Education Research (NIEER) defines states with universal preschool as states with an age-eligibility program that have at least 70 percent of four-year-old children enrolled in preschool. **Just three states -- Vermont, Florida, Oklahoma – and the District of Columbia meet this requirement.** In contrast, New Hampshire is one of just six states with no state-funded preschool as of the 2020-2021 school year. Although some families in this state pay for private preschool, New Hampshire is a useful comparison group because the guarantee of public funding for all preschool-aged children in Vermont can be contrasted with the complete lack of state funding for preschool in New Hampshire.

**Figure 1**: **Overview of Universal Preschool Policies**

*Notes: *Iowa has two statewide programs; only one is available for three-year-old children. Universal and nearly universal indicate state has only age eligibility criteria and at least 70% enrollment and slightly less than 70% enrollment of four-year-old children, respectively. Public type means preschool provision is only in public schools, while mixed delivery includes vouchers/funding for private programs. Enrollment of four-year-old children refers to 2019-2020, prior to the effects of the Covid-19 pandemic.*

| States/Districts | Ages Served | Delivery Type | Weekly Hours | Enrollment of Four-Year-Old Children |
|---|---|---|---|---|
| *Universal* | | | | |
| Vermont | 3 to 5 | Mixed | 10 | 76% |
| Florida | 4 to 5 | Mixed | Locally determined | 72% |
| Oklahoma | 4 to 5 | Public | 12.5 | 70% |
| District of Columbia | 3 to 5 | Mixed | 32.5 | 84% |
| *Nearly Universal* | | | | |
| Wisconsin | 4 to 5 | Mixed | 12.5 | 68% |
| West Virginia | 4 to 5 | Mixed | 25 | 68% |
| Iowa | 3 to 5* | Public | Locally determined | 66% |
| Georgia | 4 to 5 | Mixed | 32.5 | 59% |

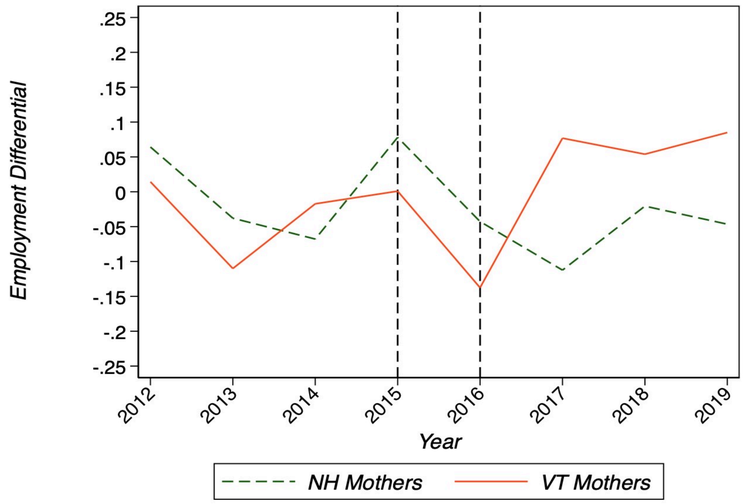
## DATA/PARALLEL TRENDS

The data set for this study is the American Community Survey (ACS) 1-Year Microdata from 2012 to 2019. This period avoids labor force impacts from the Great Recession and the labor market shocks of the Covid-19 pandemic. I limit my sample to individuals from Vermont (the treatment group) and New Hampshire (the control group) of working age – namely, between the ages of 16 and 65. I also limit my sample to parents of children under the age of six who are not enrolled in kindergarten or grade school. I then divide this sample into three categories: parents of children in the target age range of the policy (three- to five-year-old children not enrolled in kindergarten), parents of children in the control age range (two-year-old children), and parents of children in the placebo age range (zero- and one-year-old children).

One important robustness check for the triple differences model is the **parallel trends assumption**. Specifically, the difference in employment rate between mothers of treated children aged three to five children and the control two-year-old children must be relatively constant for New Hampshire and Vermont prior to policy implementation. This appears to be roughly met in Figure 2 below, with just 2014 serving as an outlier.

**Figure 2: Employment Differential Between Treated and Control Age Group by State**

*Notes: Employment differential is the difference between the percentage of parents of children aged three to five employed and the percentage of parents aged two employed. The vertical dotted lines indicate the policy implementation period.*




## EMPIRICAL MODEL

The preferred model specification is a **triple differences** model with employment as the dependent variable. This model adds robustness to a DID model by accounting for state-level trends and polices contemporary to universal preschool implementation. The model is:

$$Employed_{it} = \beta_0 + \beta_1 VermontPost_{it} + \beta_2 TargetAge_i + \beta_3 VermontPost_{it} \cdot TargetAge_i + \beta_4 X_{it} + \alpha_t + \lambda_i + \varepsilon_{it}$$

- *Employed* = 1 if mother is employed, 0 if mother is not employed,
- *VermontPost* = 1 if mother lives in Vermont post-2016, 0 if not
- *TargetAge* = 1 if mother has child aged 3 to 5, 0 if not
- *X* = a vector of covariates (age, race, marital status, education, disabilities of mother/child, number of children, poverty status, and presence of grandparents in home
- $\alpha$ = year fixed effects
- $\lambda$ = state fixed effects

## RESULTS

I run two versions of the triple differences model: the baseline and an alternative specification in which I add inverse propensity weighting (IPW). Inverse propensity weights place more weight on the most similar individuals between states. The triple differences model returns a **10.2 percentage point effect** on employment of mothers of three- to five-year-old children in Vermont when controlling for treatment group, period, and target age range, which is significant at the 5 percent level. When adding inverse propensity weighting, the effect falls to **8.5 percentage points**, but this effect is still significant at the 10 percent level.

I also interact the treatment effect with four covariates to investigate heterogeneity. I separate the sample into subsamples of each level of the covariate in question (for instance, married and unmarried mothers), and run the model separately. The treatment effect is greatest on mothers who are: **unmarried, white, relatively uneducated, and not in poverty.**

**Figure 3: Mothers Triple Differences Model Estimation**

*Notes: Robust standard errors in parentheses. *** designates p<0.01, ** designates p<0.05, and * designates p<0.1. Table omits covariates.*

| VARIABLES | (1) Baseline | (2) IPW |
|---|---|---|
| Treated Individual | -0.0823 | -0.069 |
| | (0.0508) | (0.051) |
| Targeted Age Range (3-5) | -0.0189 | -0.018 |
| | (0.0210) | (0.022) |
| Treated Individual x Target Age Range | 0.102** | 0.085* |
| | (0.0499) | (0.050) |
| Vermont | 0.0311 | 0.030 |
| | (0.0241) | (0.024) |
| 2013 | -0.0297 | -0.042 |
| | (0.0279) | (0.030) |
| 2014 | -0.0619** | -0.067** |
| | (0.0279) | (0.029) |
| 2017 | -0.00721 | -0.013 |
| | (0.0298) | (0.031) |
| 2018 | -0.0105 | -0.023 |
| | (0.0302) | (0.031) |
| 2019 | 0.0440 | 0.039 |
| | (0.0295) | (0.031) |
| Observations | 2,956 | 2,956 |
| R-squared | 0.101 | 0.107 |

## POLICY IMPLICATIONS/CONCLUSION

There are policy implications from this study and its comparison with others on preschool efficacy:

- Universal preschool can **significantly increase maternal employment.**
- Extending universal preschool from ages 4-5 to ages 3-5 may increase the effect magnitude.
- Increasing enrollment and allowing private and public provision (not just public) may also increase effect magnitude.
- Part-time programs (like Vermont) can have a positive effect, but full-time programs (like D.C.) may have greater magnitudes.
- Universal preschool, especially full-time, entails significant state expenditures (e.g., $58 million in VT, $248 million in D.C.).
- Targeted programs might have greater employment effects on unmarried mothers and mothers with no college degree.

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## REFERENCES

1. Friedman-Krauss, Allison H., W. Steven Barnett, Karin A. Garver, Katherine S. Hodges, G.G. Weisenfeld, Beth Ann Gardiner, Tracy Merriman Jost. 2022. *The State of Preschool 2021*. National Institute for Early Education Research, Rutgers Graduate School of Education.
2. Keidan, Hannah. 2022. "Universal Preschool and Maternal Labor Force Participation: Evidence from Florida and Vermont." Undergraduate thesis, Oberlin College, 2022.
3. Li, Hao. 2020. "The Effect of Universal Pre-kindergarten Policy on Female Labor Force Participation—A Synthetic Control Approach." Southern Economic Journal 87: 440-482.
4. Malik, Rasheed. 2018. "The Effects of Universal Preschool in Washington, D.C." Center for American Progress. September 26, 2018.