­**Title**

Good morning everyone. My name is Shu Cong, and today, I am presenting our research on the effectiveness of the National Supported Work Job Training Program. This study was conducted jointly with my mentor, Xiaoya, and I am grateful for her help.

**Outline**

Today's presentation will cover the following:

1. Introduction and Background
2. Model Settings
3. Methodology
4. Data Application
5. Conclusion

**Slide 1/12: Background**

The NSW Job Training Program was initiated in the mid-1970s to help disadvantaged workers who lacked basic job skills. The aim was to provide them with work experience and counseling in a sheltered environment. Our research is motivated by Lalonde's 1986 study, which evaluated the effects of the NSW program using econometric methods. But in this project we will use kaosal(causal) inference method to address confounding isssue.

**Slide 2/12: Project Purpose**

Our research question is: Does participating in the NSW Job Training Program improve real earnings in 1978? We aim to perform a kaosal(causal) analysis to evaluate the program's effectiveness.

**Slide 3/12: Model Settings – Diagram**

In our study:

* T is the treatment indicator for participation in the NSW program.
* Y is the outcome, representing earnings in 1978.
* Z includes all other relevant variables such as age, education, race, marital status, and whether the individual has a degree.

Here, we illustrate the causal relationships between the treatment (T), confounders (Z), and the outcome (Y). The arrows represent the kaosal(causal) influence between these variables.

**Slide 4/12: Model Settings - Models**

We utilize two models:

1. Response Model: Predicts earnings (Y) based on treatment and confounders.
2. Propensity Score Model: Estimates the probability of receiving the treatment given the observed covariates.

**Slide 5/12: Methodology - Propensity Score Method**

Propensity scores help us control for confounding by estimating the probability of treatment assignment conditional on covariates. This method allows us to compare treated and control groups more accurately.

**Slide 6/12: Propensity Score Matching**

We use logistic regression to estimate propensity scores. Here we introduce two matching approaches:

1. 1:1 Nearest Neighbor Matching: Pairs each treated unit with the closest control unit.
2. Full Matching: Matches every treated unit to at least one control and vice versa, ensuring all units are utilized.

Full matching utilizes all available units. It can reduce bias and improve balance across covariates. So we chose full matching in our experiment.

**Slide 7/12: Check Balance and Estimate Treatment Effect**

We assess the balance using the Standardized Mean Difference (SMD) to ensure the matched samples are comparable. The Average Treatment Effect (ATE) is estimated through regression in the matched sample and g-computation.

**Slide 8/12: Data Application - Dataset**

Our dataset, nsw\_mixtape, includes data from the NSW program, with 445 observations and variables such as age, education, race, marital status, and earnings.

**Slide 9/12: Love Plot**

The love plot demonstrates the balance of covariates before and after matching. The open circles represent the standardized mean differences for the unmatched data, showing substantial imbalance. The filled circles represent the matched data, indicating significantly improved balance across all covariates, with standardized mean differences near zero. This demonstrates the effectiveness of the matching process in creating comparable groups.

Here we present our results on the Estimate Table. The estimated treatment effect on 1978 earnings is $1977, with a standard error of $704, and the p-value is 0.00501, indicating statistical significance.

**Slide 10/12: Analyze**

Our analysis showed that:

* Full matching on propensity scores provided adequate balance.
* The estimated ATE indicates a positive impact of the program on earnings.
* Full matching ensured no units were discarded, achieving good balance across covariates.

**Slide 11/12: Conclusion**

In conclusion:

* Our analysis using Propensity Score Matching suggests a positive effect of the NSW program on earnings.
* The confidence interval also confirms the job training program helps on earnings.
* Limitations include potential unobserved confounders and reliance on observed covariates. Future work may involve advanced causal methods and long-term impact analysis.

**Slide 12/12: References**

Thank you for your attention.