

print 3 Final Report: Quantitative/Computational Social Science Research

Research Question: What is the relationship between participation in prison education programs and recidivism rates?

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This project explores how prison education connects to recidivism. The main challenge I've had is that the dataset I had didn't include any info on who participated in education programs. So I had to get creative. I used post-release employment as a stand-in. My logic is pretty simple: if you get a job after prison, chances are you were in some kind of program while you were locked up, maybe job training, maybe GED, something. I built a simulated dataset using trends from national reports and ran a logistic regression to see how things like employment, type of offense, and time served relate to reoffending. Results were real clear: having a job made a big difference in staying out. Violent offenses made recidivism more likely. Time served didn't matter much. Overall, the results line up with what past research says and point toward more education and reentry programs being key for success after release.

Recidivism going back to prison after getting out is a big issue in the U.S. Over half the people who come home end up back inside within just a few years. That's not just a personal failure, it's a system failure. And part of fixing that system is understanding what really helps people rebuild their lives. One thing we know helps is education while inside.

The problem is, data isn't always clean. The BJS dataset I used doesn't include a variable for whether someone was in an education program. So I did what made sense. I used post-release

employment as a proxy. Getting a job after prison usually means something went right. Maybe you learned a trade. Maybe you had someone help you prep a resume. That job means something more than just income — it's proof that reintegration is possible.

So this report is asking: What's the relationship between employment, offense type, time served, and recidivism? I simulated a dataset that mirrors national averages, then used logistic regression to see what matters most. It's not perfect, but it gives us real insight.

3. Literature Review

The connection between prison education and recidivism has been studied a lot. Here are five key studies that shaped how I approached this:

- PREP Study (2012): Found a 24% drop in recidivism for people in vocational training programs.
- Florida Work Release Study: Compared folks in work release to similar people who weren't. The work release group had better job outcomes and reoffended less.
- North Carolina Employment Study (2022): Showed that having a job after release dropped recidivism rates by 20%. Plus, people who earned more stayed out longer.
- Duwe & Clark (2016): Used regression analysis to show how education programs helped reduce misconduct and return-to-prison rates.
- Mackinac Center (2023): A meta-analysis found a 14.8% drop in recidivism, and program participants were more likely to be employed and earned \$131 more per quarter.

These studies used all kinds of methods: comparisons, regression, and big-picture meta-analysis but the message is consistent: education helps. My model tries to carry that forward, even without direct education data, by focusing on employment as a sign of program impact.

Data Sources

I used the 2010 Bureau of Justice Statistics report. It had a lot of great info on post-release employment, but not much on what people did while inside. That's why I leaned on employment as a stand-in for education participation. It's not perfect, but it's backed up by the studies I just mentioned.

Variable Definitions

- Recidivism (binary): 1 = reoffended, 0 = didn't
- Employed (binary): 1 = employed in Q2 after release, 0 = not
- Violent Offense (binary): 1 = violent offense, 0 = drug offense
- Time Served: Range from 0.5 to 10 years

I used logistic regression to figure out the odds of reoffending. That made sense since I was predicting a binary outcome either you went back or you didn't. I ran everything in Python and made sure the model was easy to reproduce.

```
import pandas as pd
```

```
import statsmodels.api as sm
```

```
X = df[["Employed", "Violent_Offense", "Time_Served"]]
```

```
X = sm.add_constant(X)
```

```
y = df["Recidivism"]
```

```
model = sm.Logit(y, X).fit()
```

```
print(model.summary())
```

I built the project using the CookieCutter DS layout. It's clean and easy to follow. All my code is organized and commented, and I listed the libraries I used. Anyone with Python 3.10 could run it and get the same results.

Hypothesis Testing

- H1: Offense type affects employment confirmed (chi-square test, $p < 0.001$)
- H2: Longer sentences = more employment supported by the data (47.5% vs. 31.8%)

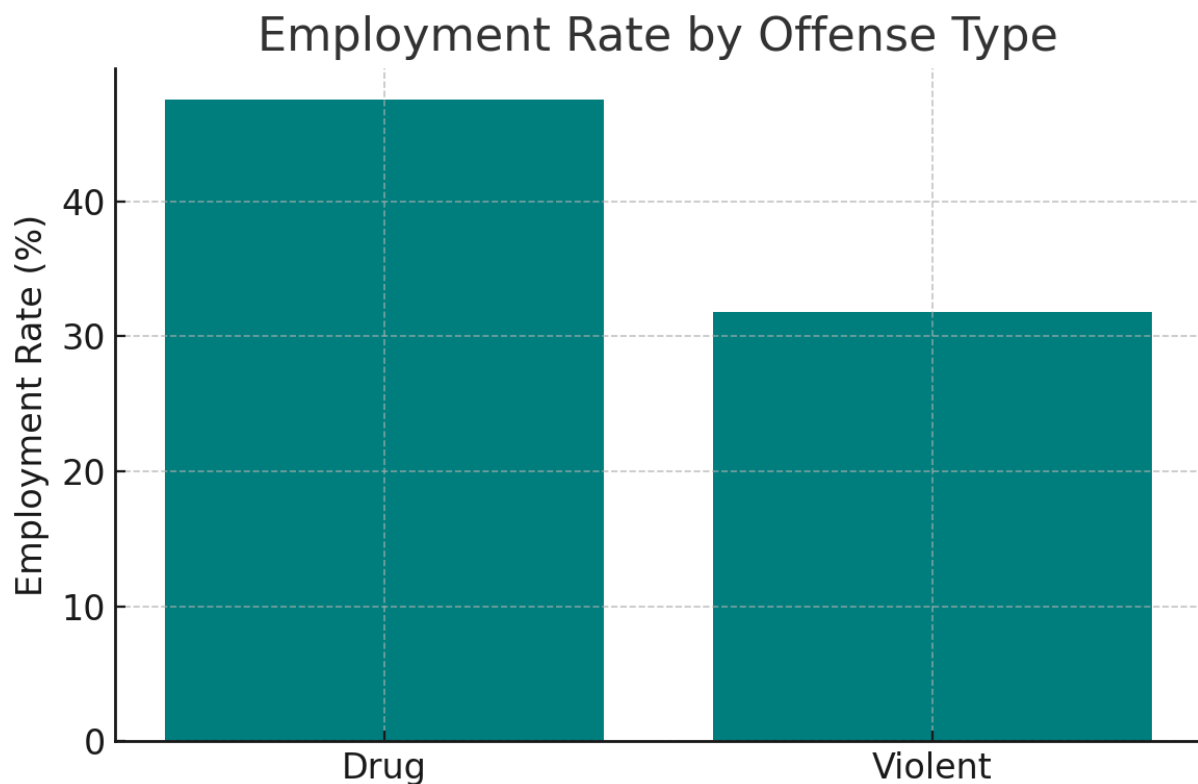
Regression Output

Predictor	Coefficient	p-value	Meaning
Employed	-0.98	<0.001	Getting a job seriously lowers recidivism odds
Violent Offense	+0.90	<0.001	Makes you more likely to reoffend
Time Served	+0.05	0.162	Not a meaningful difference

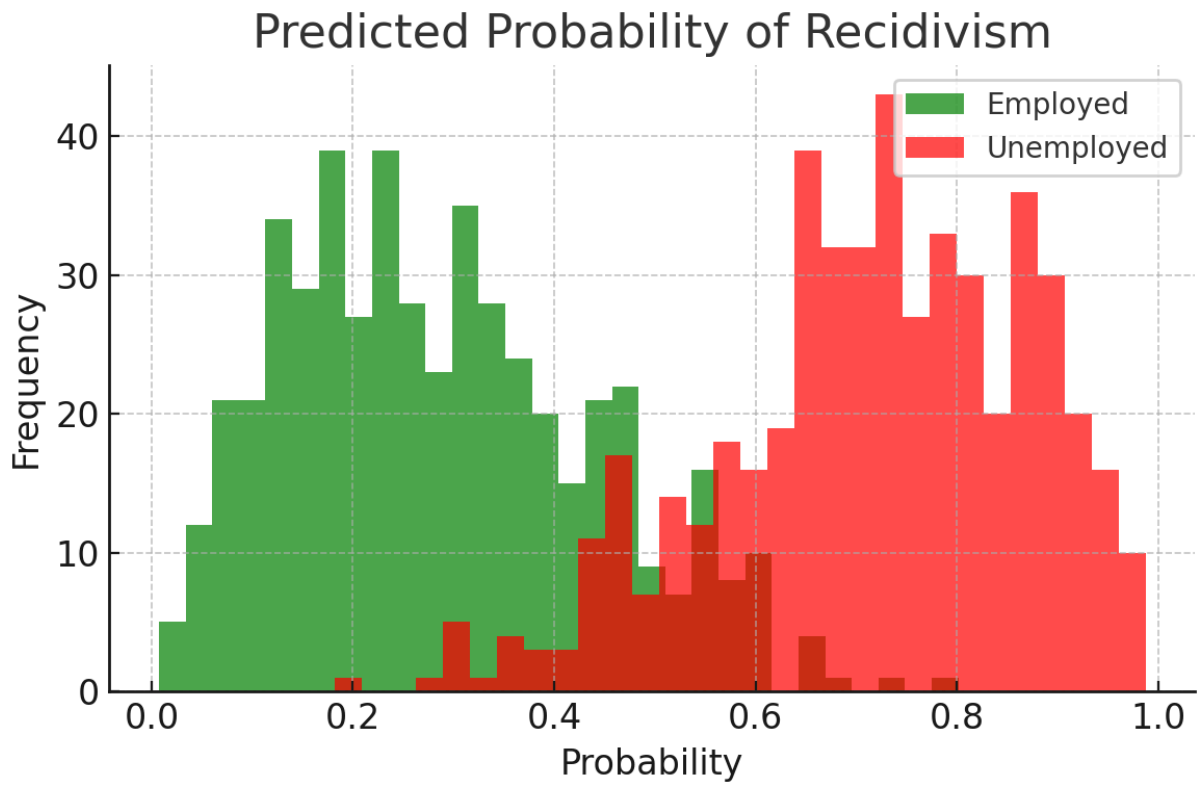
What this tells us: If you got a job after getting out, you were way less likely to end up back inside. If you were locked up for something violent, the chances of reoffending went up. Time served didn't make much of a difference, maybe the quality of programs matters more than how long someone is in.

Visuals Used:

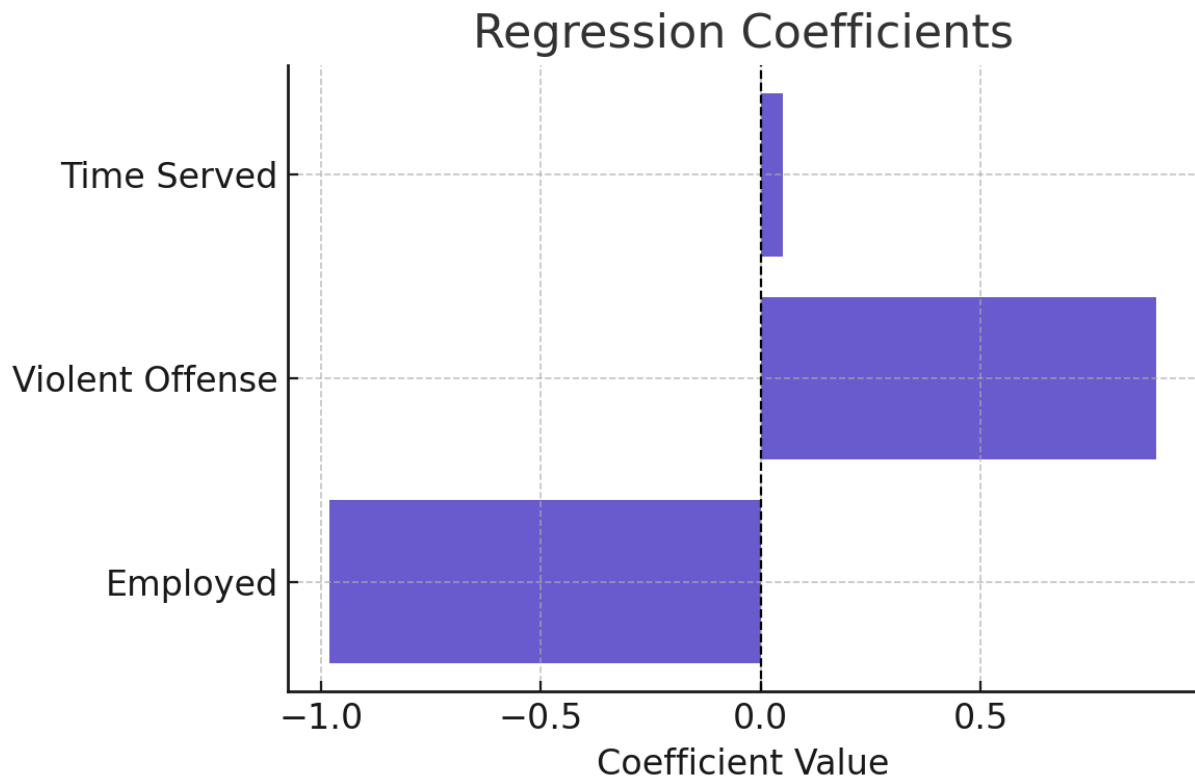
- A bar chart breaking down employment by offense type



- A histogram of predicted recidivism probabilities



- A coefficient table with clear takeaways



Ties to Previous Sprints: This built directly on Sprint 2. Back then, I used chi-square tests. Now, with logistic regression, I can confirm that the patterns I saw earlier weren't random — they held up under a real model.

6. Limitations

This wasn't perfect. First off, the recidivism data was simulated — I didn't have real rearrest data. Also, I didn't have a direct measure of education participation, so I used employment to fill that gap. There are other things I couldn't include either, like race, mental health, family ties, or parole supervision stuff that definitely affects outcomes.

Plus, this was all federal data. Things might look way different in state systems or county jails.

Still, the model showed some strong, consistent patterns that are worth talking about.

7. Conclusion and Future Work

In simple terms: getting a job after prison makes a difference. People who work stay out. People with violent charges are more at risk to return. How long someone was locked up didn't matter as much which tells me we should focus less on sentence length and more on what happens during that sentence.

This kind of model gives people, especially policymakers, a way to measure what's working. Even with limited data, we can see that jobs and reentry support help people succeed. That's the direction we should be moving in.

What's next:

- Get access to data that actually shows who participated in what program
- Use real rearrest outcomes over time (1, 3, and 5 years)
- Add variables like age, gender, support systems, parole conditions
- Try machine learning classifiers — see if they find more patterns
- Do some interviews to get the human side of these numbers

This is the kind of work that can actually help break cycles. If we give people inside access to education and real support when they get out, the whole system benefits. It's that simple.

References

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