

pset2_steiner

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- (1) *The question about the time limit comes from the four-year survey, the results of which are contained in the file ftp_srv.dta. Start by merging this file to ftp_ar.dta. How many of the original sample members were interviewed for the survey?*

[1] 1729

- (2) *Tabulate the variable fmi2.*

Table 1: FMI2. (Is/Was) there a time limit on how long you (are/were) allowed to receive cash assistance?

Response	Frequency
Yes	666
No	365
I don't know	118
Missing	580

- 2a. *How many of the survey respondents have valid (i.e., non-missing) responses?*

1149 (Total 1729 minus 580 NA)

- 2b. *How many thought they were subject to a time limit?*

666

- 2c. *How many thought otherwise?*

365

- 2d. *How many were unsure?*

118

- 2e. *Finally, what explains why the number of valid responses is less than the number of people interviewed for the survey? (Hint: examine variables fmi1 and fmi1a.)*

Table 2: FM1. Are you currently receiving cash assistance through AFDC, the WAGES program, or TANF?

Response	Frequency
Yes	230
No	1499

Table 3: FM1a. Have you ever received cash assistance since (RAD)?

Response	Frequency
Yes	919
No	565
I don't know	15
Missing	230

Only 230 people reported actively receiving cash assistance. Of the approximately 1500 people who did not report actively receiving cash assistance, 565 people said they hadn't received any cash assistance since randomization (which occurred at least 3.5 years prior). Thus, many respondents may not have interacted with cash assistance programs recently and would not how to respond to this question.

- (3) *Define a new treatment dummy that is equal to one for people who believed they were subject to a time limit and equal to zero for those who did not or were not sure. Call it TLyes. Cross-tabulate TLyes and the experimental dummy ("e").*

Table 4: Cross-tabulating TLyes and e

TLyes	e Control	e Treatment
Answered No TL	369	114
Answered Yes TL	205	461

3a. Discuss confusion about the time limit.

Approximately 25% of participants who were subject to time limits incorrectly believed they were not subject to time limits. Similarly, 31% of participants who were not subject to time limits incorrectly believed they were subject to time limits.

The inaccuracy of these beliefs is very relevant to this study, which seeks to understand how imposed time limits change the behavior of welfare recipients. If participants have inaccurate information about these time limits, their behaviors may differ from what would be expected if they had a more accurate understanding.

We should also consider that a person's understanding of time limits may be related to some unobservable trait that also affects their welfare use.

Before drawing conclusions from this study, we should thus consider how this confusion may confound our understanding of results.

- (4) *Using TLyes as your treatment indicator, estimate by OLS the effect of the time limit on the number of months of welfare receipt during years 1-2 post RA. To do this, estimate a regression of your dependent variable on TLyes and the set of control variables used by MDRC in their publications (the ones with the string "cova:" in their labels).*

Regression on TLyes Results

Dependent variable:

nmrecyr12

nmfs12

AFDC receipt

Food Stamp receipt

(1)

(2)
TLyes
0.430
0.641
(0.436)
(0.410)
yr2adc
0.001***
0.0004
(0.0003)
(0.0003)
yradc
-0.0001
-0.0001
(0.001)
(0.001)
yr2rec
2.186
0.756
(1.536)
(1.442)
yrrec
1.599
-0.352
(1.595)
(1.497)
yrkrec
0.197
-0.148
(0.149)
(0.140)
yrearn
0.00004
-0.0003
(0.0003)
(0.0002)

yr2earn

-0.0001

0.0001

(0.0001)

(0.0001)

yrem

-0.726

0.164

(1.059)

(0.995)

yr2emp

-0.035

-0.264

(0.843)

(0.791)

yrkemp

-0.149

-0.188

(0.597)

(0.560)

yr2kemp

-0.032

-0.024

(0.325)

(0.305)

yr2fs

-0.0002

0.0003

(0.0003)

(0.0003)

yrfs

-0.0002

-0.0001

(0.001)

(0.001)

yr2rfs

-1.226
2.729*
(1.747)
(1.640)
yrrfs
-0.410
-1.502
(1.829)
(1.717)
yrkrfs
0.165
0.583***
(0.137)
(0.129)
Constant
8.166***
10.138***
(0.685)
(0.643)
Observations
1,149
1,149
R2
0.284
0.255
Adjusted R2
0.273
0.244
Residual Std. Error (df = 1131)
7.240
6.797
F Statistic (df = 17; 1131)
26.408***
22.794***
Note:
$p < 0.1$; $p < 0.05$; $p < 0.01$

4a. Do you believe these regressions consistently estimate the effect of the time limit? Explain.

These regressions do not consistently estimate the effect of the time limit. “TLyes” is not exogenous, as it is not randomly assigned but rather based on someone’s perception of their time limits. “TLyes” may thus be correlated to some unobservables, such as understanding complex welfare program communications, which could also impact the outcome (number of months on welfare). It is also correlated to the experimental dummy, which will be shown in future questions. Regression estimates of the effects of the perception of having a time limit are thus unlikely to be unbiased or consistent.

(5) Provide conditions under which the experimental dummy would be a valid instrument for the time limit.

The experimental dummy would be a valid instrument for the time limit if it satisfies the following 4 assumptions: Stable Unit Treatment Value Assumption (there are no spillover effects between individuals), the exclusion restriction (the experimental dummy, e , can only impact the outcome *through* TLyes), the instrument assumption (random assignment to time limit impacts someone’s perception of the time limit), and the monotonicity assumption (no one believes they are subject to a time limit only if they don’t receive one).

(6) Estimate the first-stage regression of TLyes on e .

First-Stage Results

Dependent variable:

TLyes

e

0.445***

(0.026)

Constant

0.357***

(0.018)

Observations

1,149

R²

0.203

Adjusted R²

0.202

Residual Std. Error

0.441 (df = 1147)

F Statistic

291.804*** (df = 1; 1147)

Note:

$p < 0.1$; $p < 0.05$; $p < 0.01$

6a. Do you have a weak-instrument problem?

This regression tells us that being randomly assigned to the time limit (e) increases the probability of perceiving a time limit (TLyes) by about 44.5 percentage points. This is significant at the 0.01 level,

suggesting strong evidence that e is correlated with $TLyes$. The F-statistic is 291.8, which is much larger than 10 and is statistically significant. This regression confirms that we do not have a weak instrument problem.

(7) *Use the experimental dummy as an instrument to estimate the effect of the time limit on the number of months of welfare receipt during years 1-2 post-RA.*

OLS vs IV 2SLS

Dependent variable:

nmrecyr12

nmfs12

OLS

instrumental

OLS

instrumental

variable

variable

(1)

(2)

(3)

(4)

$TLyes$

0.430

-0.288

0.641

-0.359

(0.436)

(0.970)

(0.410)

(0.912)

yr2adc

0.001***

0.001***

0.0004

0.0004

(0.0003)

(0.0003)

(0.0003)

(0.0003)

yradc

-0.0001
-0.0001
-0.0001
-0.00003
(0.001)
(0.001)
(0.001)
(0.001)
yr2rec
2.186
2.167
0.756
0.730
(1.536)
(1.538)
(1.442)
(1.446)
yrrec
1.599
1.636
-0.352
-0.301
(1.595)
(1.597)
(1.497)
(1.502)
yrkrec
0.197
0.185
-0.148
-0.165
(0.149)
(0.150)
(0.140)
(0.141)
yrearn

0.00004

0.0001

-0.0003

-0.0003

(0.0003)

(0.0003)

(0.0002)

(0.0002)

yr2earn

-0.0001

-0.0001

0.0001

0.0001

(0.0001)

(0.0001)

(0.0001)

(0.0001)

yrempr

-0.726

-0.664

0.164

0.250

(1.059)

(1.063)

(0.995)

(1.000)

yr2emp

-0.035

-0.083

-0.264

-0.332

(0.843)

(0.846)

(0.791)

(0.795)

yrkemp

-0.149
-0.205
-0.188
-0.266
(0.597)
(0.601)
(0.560)
(0.565)
yr2kemp
-0.032
0.008
-0.024
0.031
(0.325)
(0.329)
(0.305)
(0.310)
yr2fs
-0.0002
-0.0002
0.0003
0.0003
(0.0003)
(0.0003)
(0.0003)
(0.0003)
yrfs
-0.0002
-0.0002
-0.0001
-0.0002
(0.001)
(0.001)
(0.001)
(0.001)
yr2rfs

-1.226
-1.250
2.729*
2.696
(1.747)
(1.749)
(1.640)
(1.644)
yrrfs
-0.410
-0.351
-1.502
-1.419
(1.829)
(1.833)
(1.717)
(1.723)
yrkrfs
0.165
0.169
0.583***
0.589***
(0.137)
(0.138)
(0.129)
(0.129)
Constant
8.166***
8.597***
10.138***
10.738***
(0.685)
(0.861)
(0.643)
(0.809)
Observations

1,149

1,149

1,149

1,149

R2

0.284

0.282

0.255

0.251

Adjusted R2

0.273

0.272

0.244

0.240

Residual Std. Error (df = 1131)

7.240

7.249

6.797

6.815

F Statistic (df = 17; 1131)

26.408***

22.794***

Note:

$p < 0.1$; $p < 0.05$; $p < 0.01$

7a. How do the welfare receipt results compare to the OLS estimates from question (4)? Can you summarize the direction of bias associated with the OLS estimates?

The OLS estimates from question 4 are positive, indicating that people who believed they were under a time limit would see an increase in number of months receiving welfare. The IV results are negative, indicating that a perceived time limit on welfare would reduce the number of months receiving welfare. The standard error is also much larger for the IV.

This implies that OLS biases upwards, as the estimate is more positive than the IV.

(8) Explain why you would expect the exclusion condition to fail for the above regression.

The exclusion restriction requires that Z (the experimental dummy) cannot impact the outcome directly, but rather through D (TLyes) alone. However, this is likely not the case. Even if someone does not perceive themselves to be under the time limit, the time limit would still limit the number of months that the participant receives welfare.

As relevant to this problem set, there may also be heterogeneous treatment effects. The IV and OLS models above don't allow for differing effects among different subgroups. As such, the instrument is not fully exogenous as it may include additional effects due to subgroup characteristics.

The experimental dummy is thus endogenous and/or would directly impact the outcome outside of TLYes, it therefore fails the exclusion condition.

- (9) *Now estimate a model with age-group interactions, along the lines of what you did in PS 1. Define the same four age groups, and estimate the same model, but interact the age-group dummies with TLYes rather than e. Estimate the model by OLS. Omit the control variables.*

OLS regression on TLYes by age group

Dependent variable:

nmrecyr12

nmfs12

nqemp12

AFDC

Food Stamps

Employed

(1)

(2)

(3)

TLYes

9.000*

5.867

1.267

(5.128)

(4.735)

(1.714)

Group 1

7.621**

5.195

1.699

(3.505)

(3.237)

(1.172)

Group 2

7.131**

3.718

1.821

(3.516)

(3.247)

(1.175)

Group 3
 7.371**
 3.392
 1.409
 (3.621)
 (3.343)
 (1.210)
 Trt x Group 1
 -9.690*
 -6.467
 -0.594
 (5.184)
 (4.787)
 (1.733)
 Trt x Group 2
 -8.907*
 -5.775
 -0.610
 (5.194)
 (4.796)
 (1.736)
 Trt x Group 3
 -7.927
 -3.759
 -0.397
 (5.365)
 (4.954)
 (1.793)
 Constant
 7.000**
 13.333***
 1.333
 (3.457)
 (3.192)
 (1.155)
 Observations

1,067
 1,067
 1,067
 R2
 0.006
 0.009
 0.019
 Adjusted R2
 -0.0004
 0.002
 0.013
 Residual Std. Error (df = 1059)
 8.468
 7.820
 2.830
 F Statistic (df = 7; 1059)
 0.937
 1.329
 2.991***

Note:

$p < 0.1$; **$p < 0.05$** ; $p < 0.01$

(10) *Now estimate the same model, but use interactions between e and the age-group dummies as instruments for the interactions between TLyes and the age-group dummies.*

IV v OLS on TLyes by age group

Dependent variable:

nmrecyr12

nmfs12

nqemp12

OLS

instrumental

OLS

instrumental

OLS

instrumental

variable

variable

variable
 AFDC
 AFDC
 Food Stamps
 Food Stamps
 Employed
 Employed
 (1)
 (2)
 (3)
 (4)
 (5)
 (6)
 TLYes
 9.000*
 7.680
 5.867
 5.720
 1.267
 1.120
 (5.128)
 (6.219)
 (4.735)
 (5.745)
 (1.714)
 (2.061)
 Group 1
 7.621**
 6.756*
 5.195
 5.134
 1.699
 1.399
 (3.505)
 (3.941)
 (3.237)

(3.641)

(1.172)

(1.306)

Group 2

7.131**

8.550**

3.718

5.690

1.821

1.521

(3.516)

(4.057)

(3.247)

(3.748)

(1.175)

(1.345)

Group 3

7.371**

8.489**

3.392

4.644

1.409

1.422

(3.621)

(4.034)

(3.343)

(3.727)

(1.210)

(1.337)

Trt x Group 1

-9.690*

-7.909

-6.467

-6.330

-0.594

-0.042

(5.184)
 (6.394)
 (4.787)
 (5.907)
 (1.733)
 (2.119)
 Trt x Group 2
 -8.907*
 -10.969*
 -5.775
 -9.045
 -0.610
 -0.072
 (5.194)
 (6.579)
 (4.796)
 (6.078)
 (1.736)
 (2.181)
 Trt x Group 3
 -7.927
 -10.297
 -3.759
 -6.445
 -0.397
 -0.423
 (5.365)
 (6.578)
 (4.954)
 (6.077)
 (1.793)
 (2.180)
 Constant
 7.000**
 7.600**
 13.333***

```

13.400***
1.333
1.400
(3.457)
(3.827)
(3.192)
(3.536)
(1.155)
(1.269)
Observations
1,067
1,067
1,067
1,067
1,067
1,067
R2
0.006
-0.015
0.009
-0.014
0.019
0.015
Adjusted R2
-0.0004
-0.022
0.002
-0.020
0.013
0.009
Residual Std. Error (df = 1059)
8.468
8.558
7.820
7.907
2.830

```

2.837

F Statistic (df = 7; 1059)

0.937

1.329

2.991***

Note:

$p < 0.1$; $p < 0.05$; $p < 0.01$

10a. *Comment on how estimating the model with age-group interactions helps to satisfy the exclusion restriction.*

The exclusion restriction requires that the instrument (age-group interactions with e) only impact the outcome via the endogenous variable (age-group interactions with TLyes). This instrument isolates the impact of actual time limit exposure on each age group, not perceived time limit exposure on each group.

Estimating the model with age-group interactions allows for a more heterogeneous treatment effect. The model can thus better predict the treatment effect by age group, and consequently more closely identify the exogenous variation caused by the instrument. Isolating the instrument's impact allows the model to satisfy the exclusion restriction, as we can be more sure that the instrument is not endogenous.

(11) *Discuss your estimated effects of time limits and how they compare with the estimates from question (9). Can you diagnose why the two sets of coefficients differ?*

For AFDC receipt, the IV model predicts the same sign as the OLS model, but the magnitude varies. For example, the IV model predicts a smaller decrease in number of months receiving AFDC than OLS among treatment interactions with age group 1. But age groups 2 and 3 see a greater decrease in the number of months receiving AFDC in the IV model.

For FS receipt, the IV model follows a similar pattern to AFDC receipt. The model of the treatment-age group interaction for group 1 shows a very slight increase, while groups 2 and 3 show a very large decrease in the IV model as compared to OLS.

For employment, the IV model shows a small positive increase among the treatment-age group interactions for group 1 and 2, but a minor decrease for group 3.

We can assume these two sets of coefficients differ because the instrument is more accurately isolating the effect of the time limits, while OLS is regressing on the endogenous variable TLyes.