



The Causal Effect of Federal Work-Study on Student Outcomes in the Ohio Public University System

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Background: Student Employment

- Cost of college is rising while family incomes decline:
 - Unmet need: In 2010, grants and tax benefits only 37% of tuition and fees (College Board, 2012)
- Students are working more:
 - 1970 → 2003, average hours worked increased from 5.0 to 9.6 per week (Scott-Clayton, 2012)
- Ex ante, not clear how work effects students:
 - Student work may detract from the time spent on studies
 - On the other hand, working on campus may help students integrate into campus life

Background: Federal Work Study Program

- Federal Work-Study Program:
 - \$1 billion spent on FWS in 2010-2011 (College Board, 2012)
 - Subsidizes 50-80% of student wages
 - FWS given to students with low Estimated Family Contributions (EFC)
 - FWS allocated as a lump-sum to institutions
 - Some portion of allocation remains consistent from year to year (“base guarantee”), other portion may fluctuate (“fair share”) (Smole, 2005)
- FWS in Ohio:
 - In OH, an additional \$100 FWS \approx 12.5 to 20 hours of work a semester
 - Students encouraged to find a job related to course of study, majority work on-campus
 - In OH, 65% of institutional allocation is base guarantee (Smole, 2005)

What do we know about the causal effect of working during the semester?

- Off-campus work:
 - Some authors find negative effect on GPA, positive effect on credits earned (DeSimone, 2008; Dadger, 2012)
 - Some evidence of a negative effect on cumulative credits earned (Darolia, 2014)
- On-campus work:
 - Some evidence of negative effect on GPA (Stinebrickner & Stinebrickner, 2003)
 - Negative effects on GPA/BA completion for women and positive effect on GPA/credits earned for men (Scott-Clayton, 2011)
- Our contribution:
 - Larger sample than previous studies
 - OH characteristics similar to national averages (gender, ethnicity, median income, percent receiving FWS)
- Our research question: **What is the effect of working on-campus, during the semester, on academic outcomes for students attending a four-year public university in Ohio?**



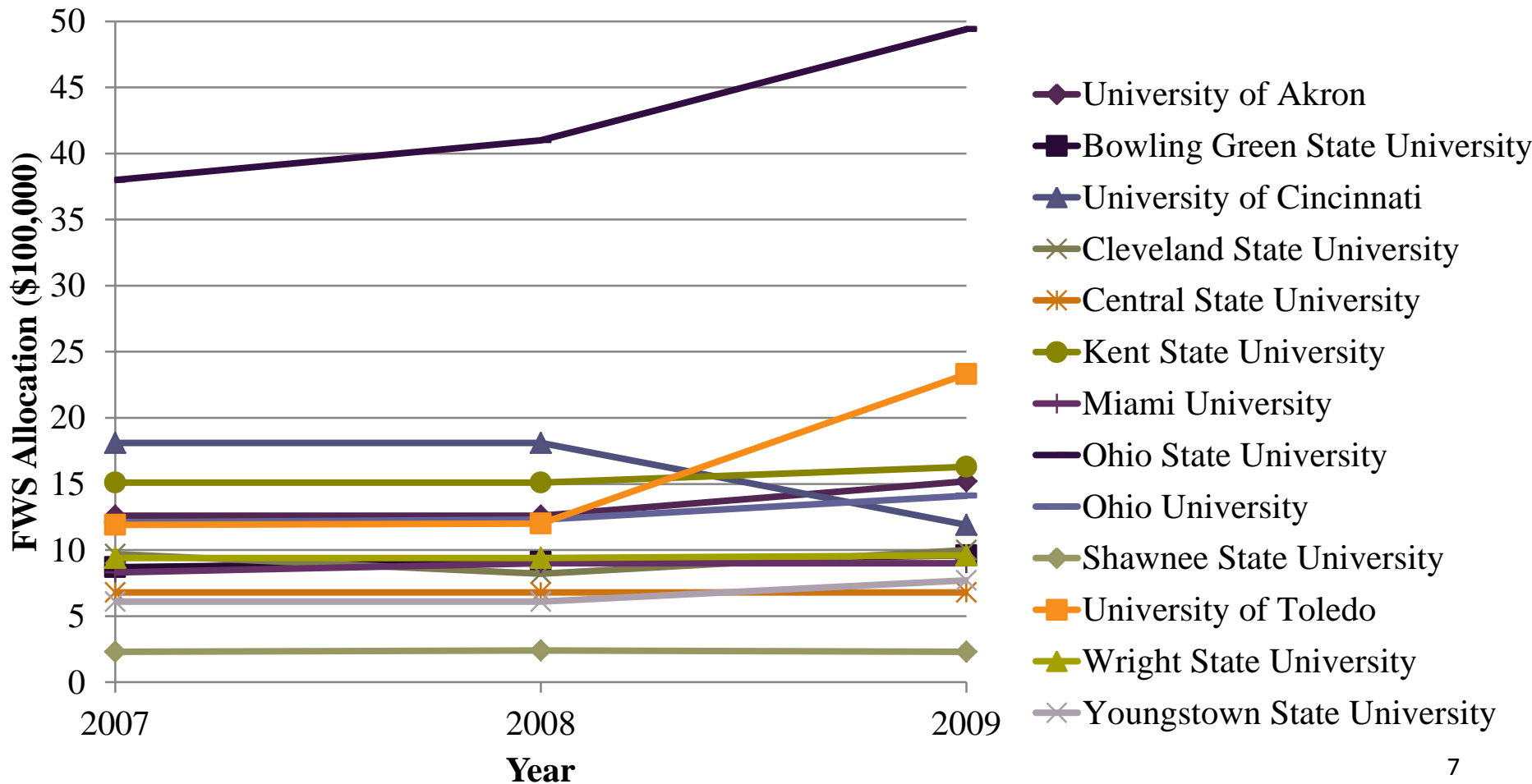
Data & Estimation Strategy

Data & Sample

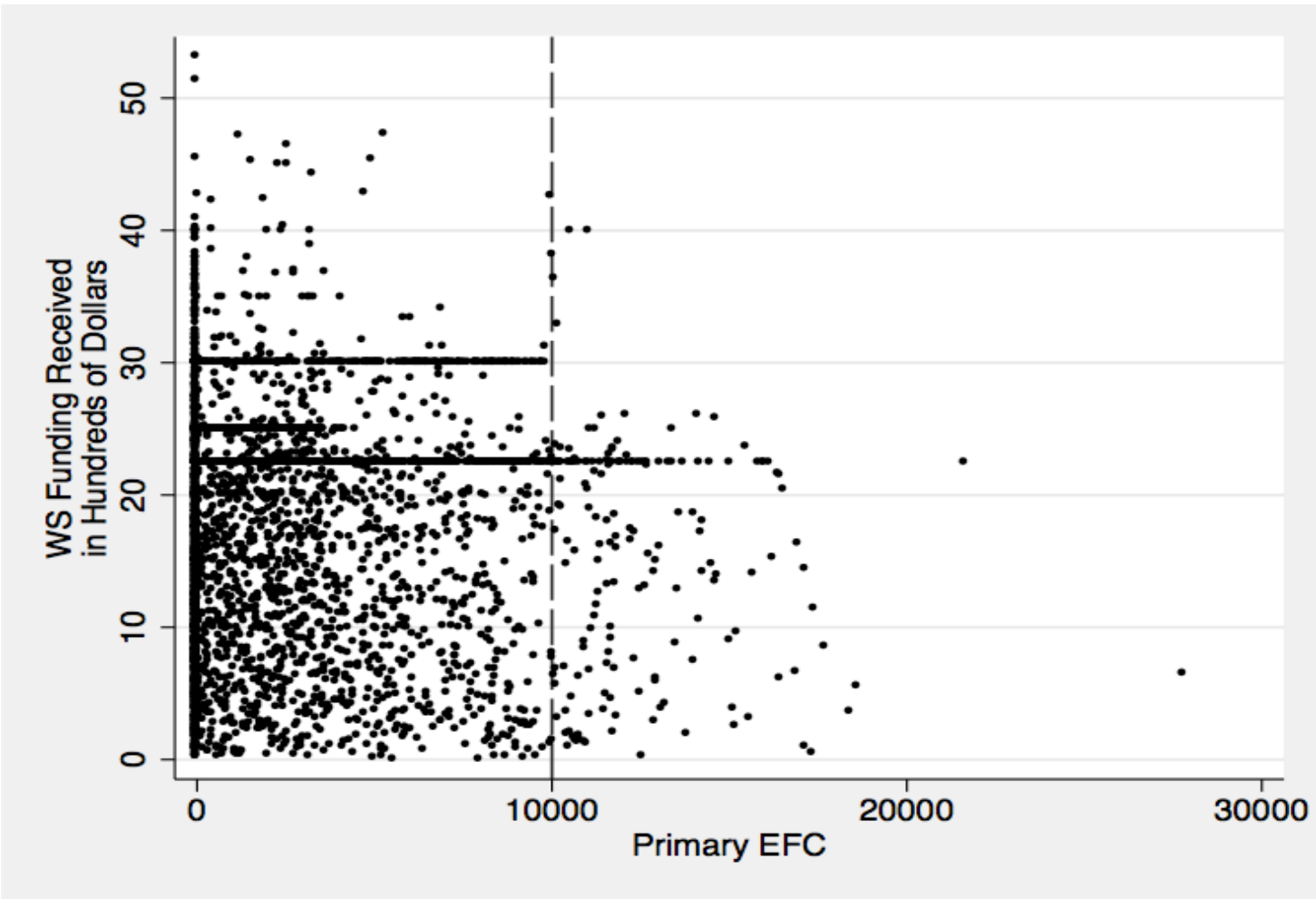
- Administrative Data from Ohio Board of Regents
 - Enrollment files
 - Term by term credits and GPA
 - Detailed financial aid files
- Sample
 - First time, full-time freshmen
 - 2007, 2008, 2009 cohorts
 - Students attending a four-year campus
 - 70,800 students with complete FA files

Female	0.53
White	0.78
Black	0.14
Hispanic	0.02
Asian	0.02
Dependent	0.95
Mother's Education	1.61
Has Work Study	0.06
First Semester GPA	2.74
Second Semester GPA	2.69
1st Semester Credits Earned	13.11
1st Year Cumulative Credits	30.98
Persisted to Sophomore Year	0.85
N	70800

Variation Across Institutions in FWS Allocations 07-09



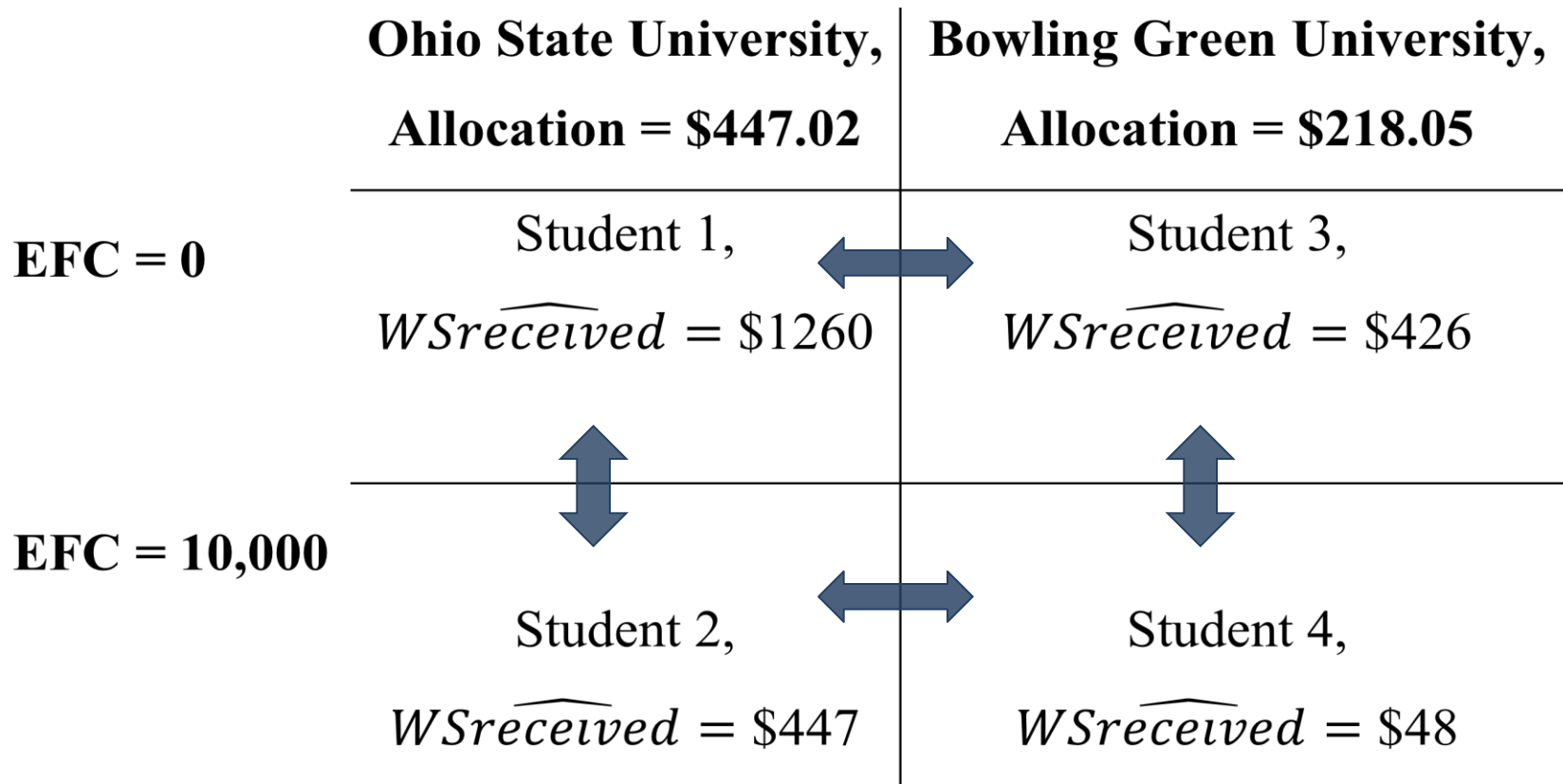
Variation Across EFC in FWS Funds Received



Estimation Strategy

- Want to estimate the effect of participating in work study on student outcomes
 - Participating in WS may be correlated with unobserved characteristics
 - Use instrumental variables to overcome selection issue
- Instrumental variables model:
 - Need a source of variation correlated with WS received, but uncorrelated with student outcomes
 - First stage: regress amount FWS received on interaction of institutional FWS allocation and student EFC (“instrument”)
 - Second stage: regress students’ academic outcomes on amount FWS received predicted in the first stage

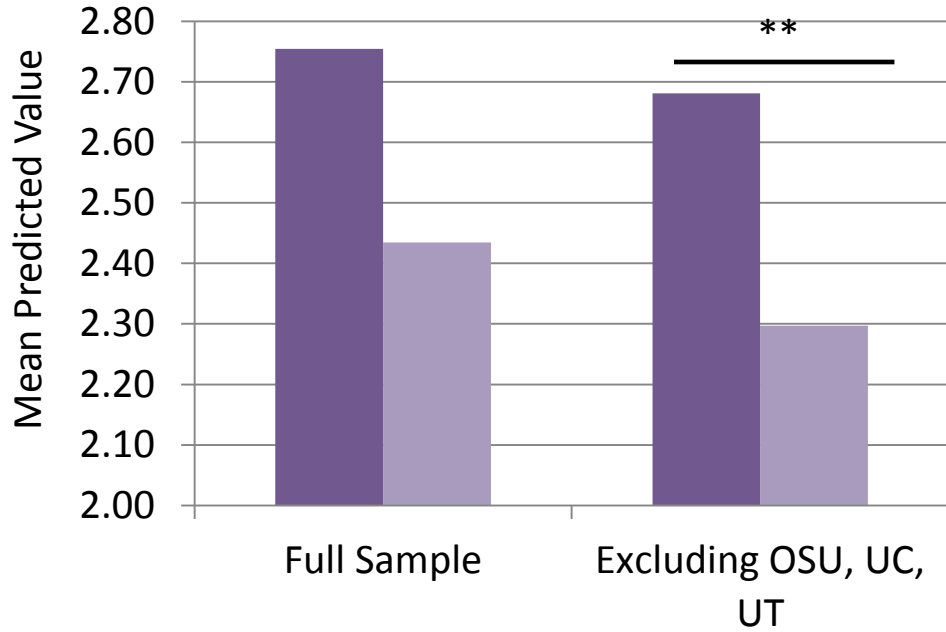
Source of Variation in our Instrument



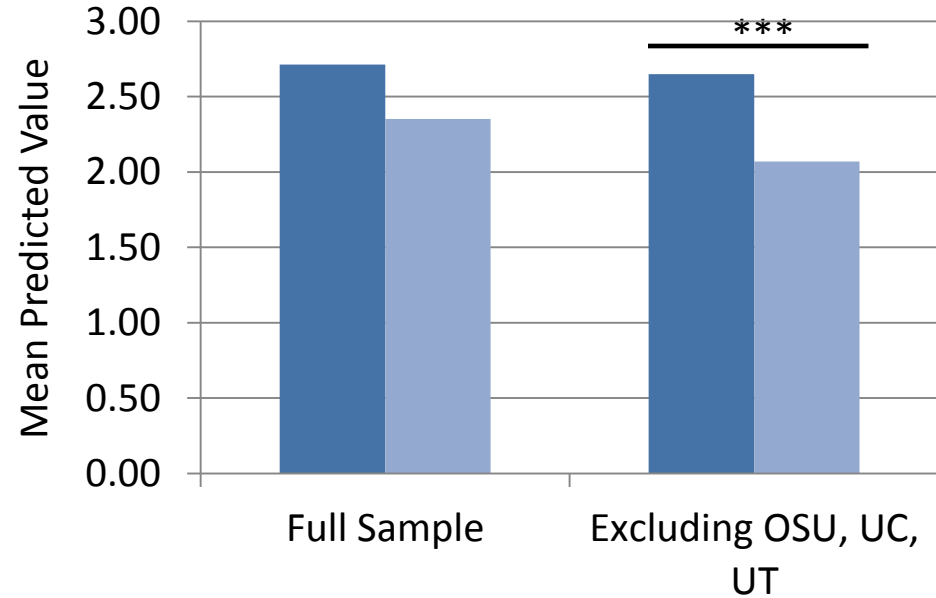


Results

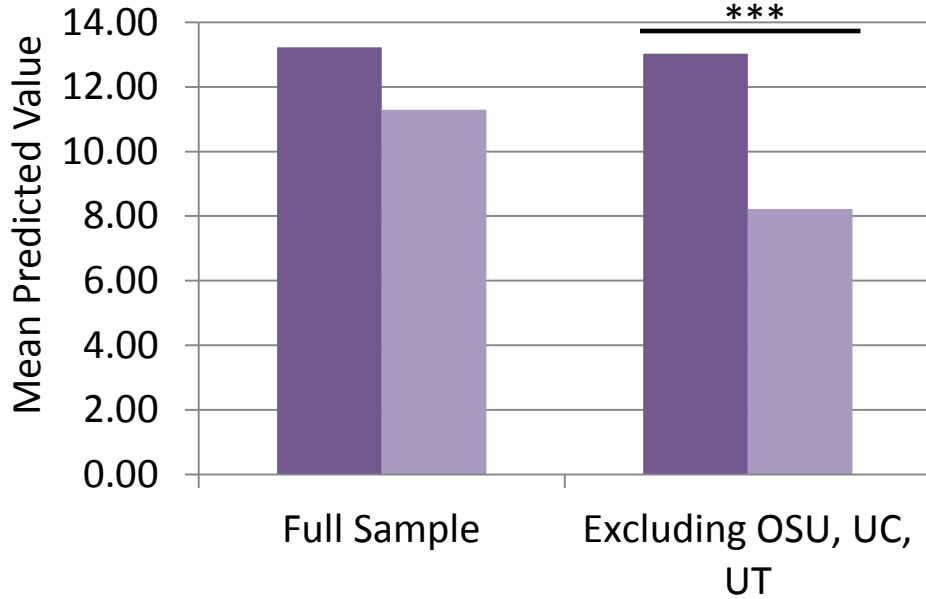
First Semester GPA



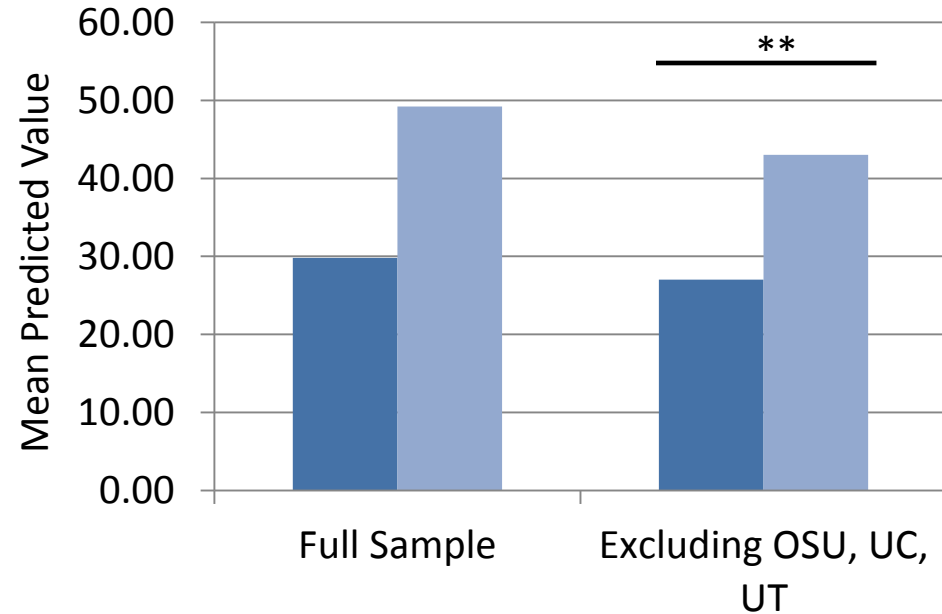
First Year GPA



First Semester Credits



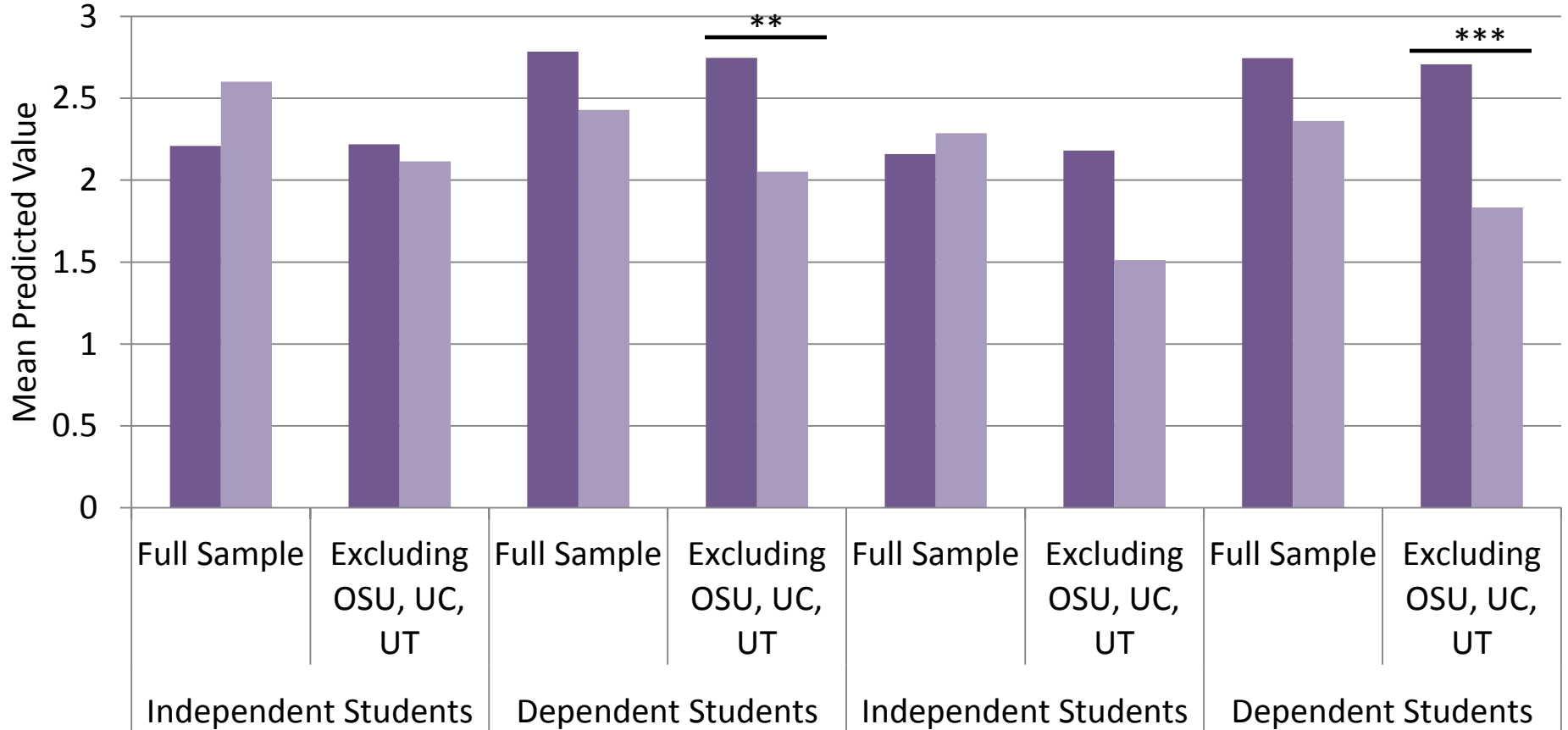
First Year Credits



Subgroup Analysis

First Semester GPA

First Year GPA



Main Findings

- Some evidence participating in work study has a small, negative effect on GPA, similar to previous studies (Stinebrickner & Stinebrickner, 2003; DeSimone, 2008; Scott-Clayton, 2011; Dadger, 2012)
- Evidence that having a work-study job has a positive effect on credits earned, similar to previous studies (Dadger, 2012; Scott-Clayton, 2011)

Policy Implications

- We find only limited evidence that receiving FWS helps student persist or succeed in school.
- Only 6% 2007, 2008, 2009 cohorts participated in work-study program, while 40% of the 2006 cohort worked off campus. The detrimental effects to academic outcomes are minimal and it may be better than working off campus.
- Moreover, students may be gaining labor market skills that we can't observe.
- FWS may be an attractive policy option if it helps students get experience that will help them in the labor market while also providing an alternative to off-campus work.

Thank you!

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Appendix

Ohio Compared to the National Average

*Analytic Sample
Including all 13 Universities ** Fall 2007 Cohort

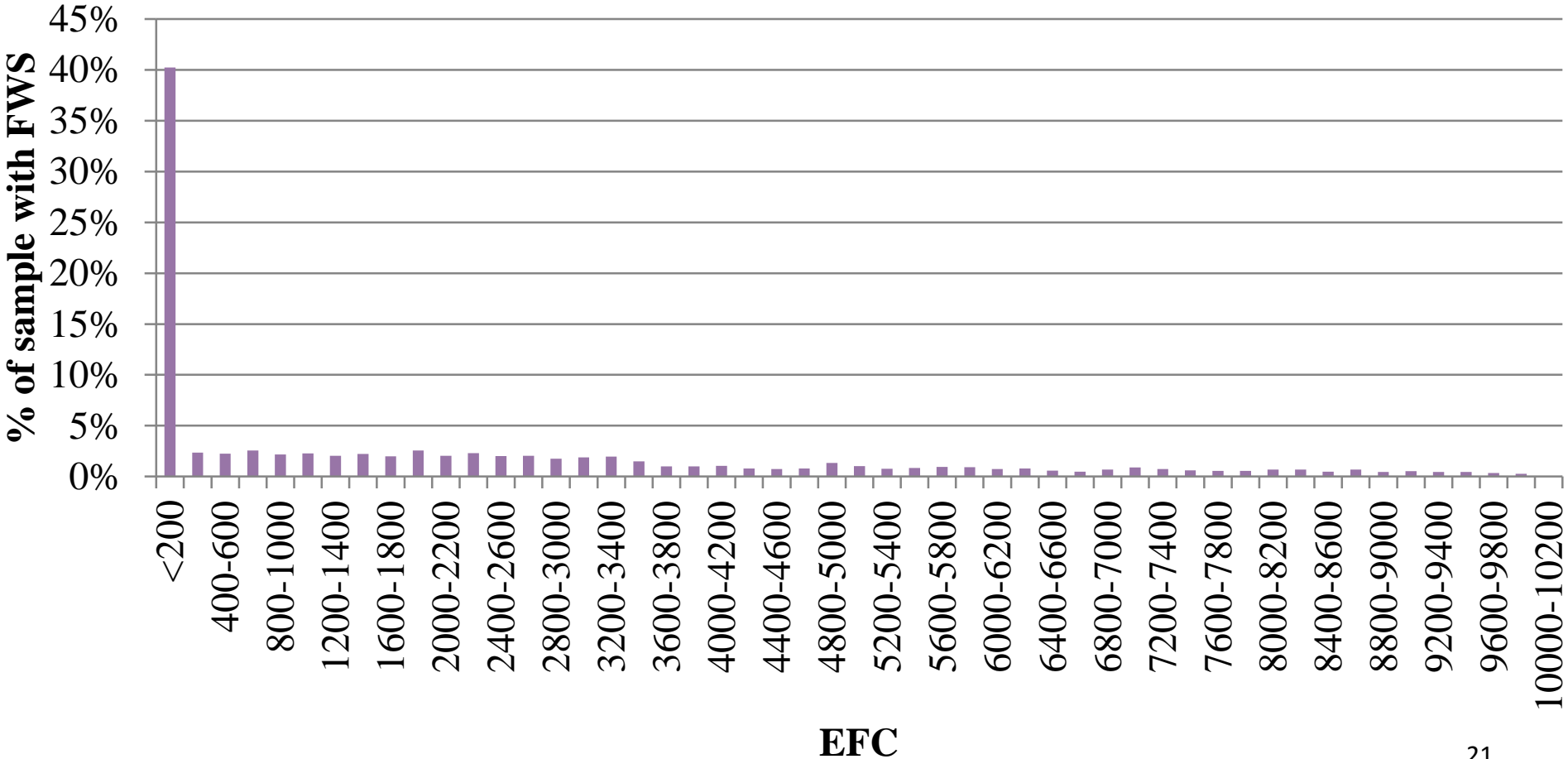
Female	0.53	0.55
White	0.78	0.67
Black	0.14	0.13
Hispanic	0.02	0.1
Asian	0.02	0.07
Dependent	0.95	0.5
EFC=0	0.17	0.17
Received FWS	0.06	0.05
N	70,800	7,166,661

*Data Source: OBR **Data Source: Digest of Education
Statistics 2009

FWS disbursements, 2007 and 1983-2011

	FWS Disbursement			
	2007 Figures		Average 1983-2011	
	Total Amount	Per Pell Recipient	Total Amount	Per Pell Recipient
Central State University	\$678,852	\$624	\$573,326	\$527
Ohio State University	\$4,448,273	\$447	\$3,749,094	\$377
Miami University	\$905,027	\$339	\$768,195	\$288
University of Toledo	\$1,456,773	\$335	\$966,546	\$222
Wright State University	\$1,074,900	\$317	\$1,035,364	\$306
University of Cincinnati	\$1,570,382	\$287	\$957,307	\$175
Cleveland State University	\$779,759	\$241	\$739,257	\$228
University of Akron	\$1,438,207	\$238	\$1,155,516	\$191
Bowling Green State University	\$995,852	\$218	\$875,996	\$192
Ohio University	\$1,120,338	\$185	\$1,166,231	\$193
Kent State University	\$1,685,374	\$180	\$1,618,115	\$173
Youngstown State University	\$677,119	\$146	\$466,581	\$101
Shawnee State University	\$174,624	\$107	\$137,608	\$84

Who receives work-study funding?



OLS	First Semester GPA	Second Semester GPA	First Semester Credits Earned	First Year Cumulative Credits	Persisted to Sophomore Year
	1	2	3	4	5
WS Amount	0.0077***	0.0088***	0.0252*	0.0743***	0.0023*
Received (\$100)	(0.0023)	(0.0024)	(0.013)	(0.0149)	(0.0011)
Constant	2.429*** (0.0571)	2.409*** (0.0524)	12.30*** (0.276)	22.94*** (0.487)	0.386*** (0.0271)
Covariates	Y	Y	Y	Y	Y
Observations	70,800	70,800	70,800	70,800	70,800
R-squared	0.138	0.185	0.267	0.662	0.03

- Simple regressions suggest positive relationship between participating in FWS and academic outcomes
- However, FWS participation may be correlated with un-observables also affecting outcomes

Instrumental Variables Model

1st Stage: $WSreceived_{ij} = \beta_1(EFCXalloc)_{ij} + \beta_2(EFC)_i + \beta_3(alloc)_j + \delta_i + \gamma_j + \varepsilon_{ij}$

- “WSreceived” is FWS funding received freshman year divided by 100
- “alloc” is FWS allocation per Pell-eligible student for college j in 2007
- “EFC” is the estimated family contribution of student i
- δ_i are fixed effects for 18 bins of EFC
- γ_j are fixed effects for 13 four-year universities in OH

2nd Stage: $y_{ij} = \beta_0 + \beta_1(Estimated\ WSreceived)_{ij} + \beta_2(X)_i + \varepsilon_{ij}$

- y are academic outcomes
- X is a vector of covariates including ethnicity, mother’s ed, dependency status

Instrumental Variables First Stage

- Interaction of student EFC with institutional FWS award is negatively correlated with FWS received
- Relationship is highly statistically significant
- First stage F-statistic > 10

First Stage:	Amount of Work Study Received
EFC X Award Per Pell Recipient	-0.0004*** (0.0001)
EFC	0.124*** (0.0401)
Award Per Pell Recipient	0.0030*** (0.0003)
Constant	-0.204 (0.375)
Covariates	Y
Observations	70,800

Instrumental Variables Results

	First Semester GPA	Second Semester GPA	First Semester Credits Earned	First Year Cumulative Credits	Persisted to Sophomore Year
Second Stage:	1	2	3	4	5
WS Amount Received (\$100)	-0.0127 (0.022)	-0.0146 (0.028)	-0.0862 (0.183)	1.135** (0.5)	-0.0037 (0.0055)
Constant	2.616*** (0.0732)	2.596*** (0.0656)	11.50*** (0.377)	26.43*** (1.991)	0.396*** (0.0264)
Covariates	Y	Y	Y	Y	Y
Observations	70,800	70,800	70,800	70,800	70,800

- Some evidence of a negative relationship between FWS and GPA, though not statistically significant
- Positive, statistically significant effect of participating in FWS on first-year cumulative credits earned

Subgroup Analysis

Instrumental Variables First Stage

First Stage:	Dependent	Independent
	Students	Students
	Amount of Work Study Received	
	1	2
EFC X Award Per Pell Recipient	-0.0002* (0.0001)	-0.0003** (0.0001)
EFC	0.0693 (0.0397)	0.0886* (0.0418)
Award Per Pell Recipient	0.0030*** (0.0004)	0.0030*** (0.0005)
Constant	0.177 (0.213)	-1.279 (1.733)
Covariates	Y	Y
Observations	57,967	3,607

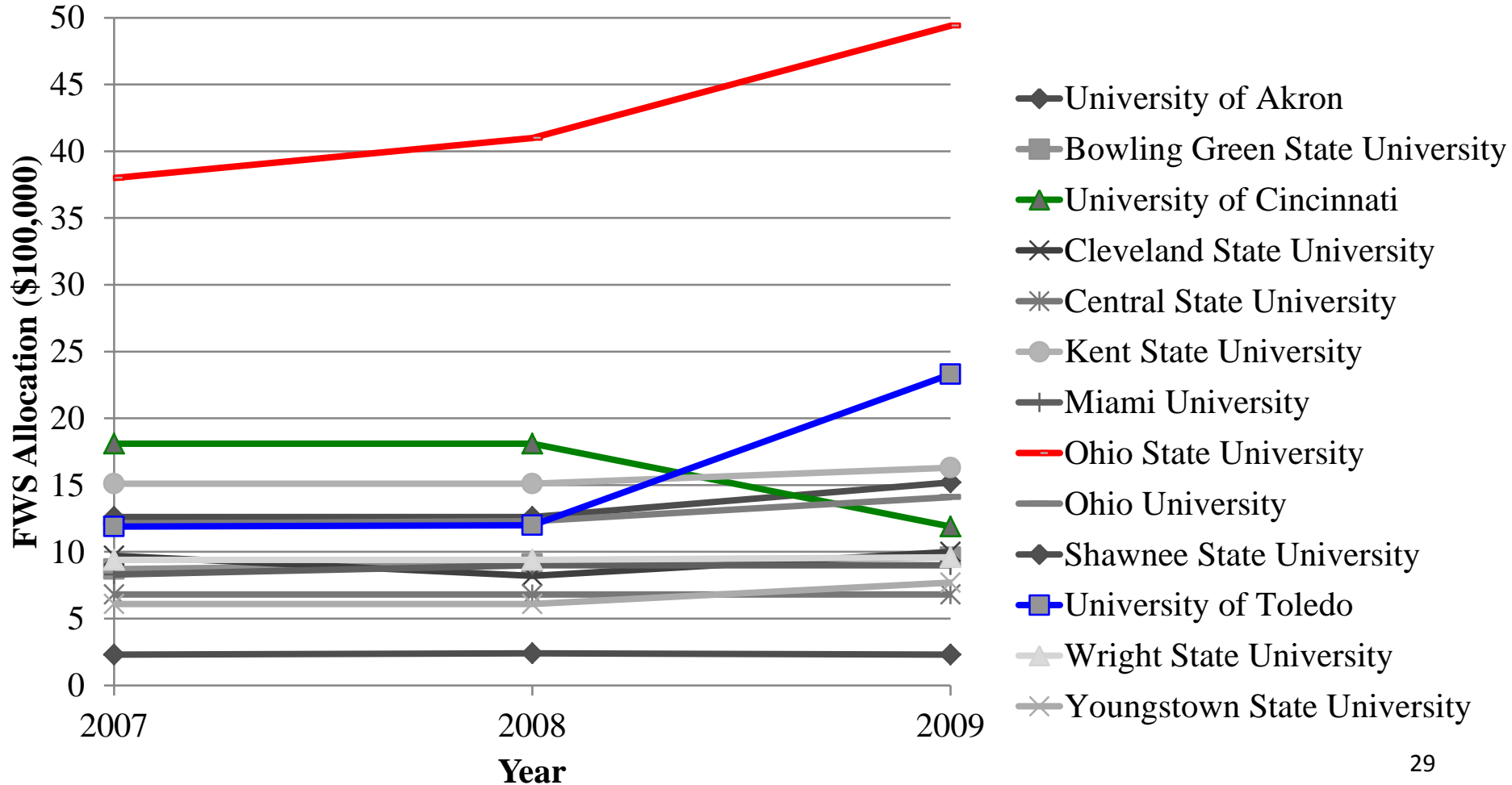
Results for Dependent vs. Independent Students

	First Semester GPA	Second Semester GPA	First Semester Credits Earned	First Year Cumulative Credits	Persisted to Sophomore Year
Dependent	1	2	3	4	5
WS Amount Received (\$100)	-0.0374** (0.0169)	-0.0477*** (0.0160)	-0.355*** (0.0854)	0.511 (0.782)	-0.0079 (0.0056)
Constant	2.870*** (0.0569)	2.848*** (0.0601)	14.12*** (0.377)	32.28*** (2.733)	0.580*** (0.0148)
Covariates	Y	Y	Y	Y	Y
Observations	57,967	57,967	57,967	57,967	57,967
Independent	6	7	8	9	10
WS Amount Received (\$100)	0.0045 (0.0183)	-0.0259 (0.0216)	0.150 (0.163)	1.874*** (0.283)	0.0103*** (0.0040)
Constant	2.722*** (0.0909)	2.624*** (0.0879)	10.94*** (0.485)	22.07*** (1.423)	0.332*** (0.0461)
Covariates	Y	Y	Y	Y	Y
Observations	3,607	3,607	3,607	3,607	3,607

Interpretation of Subgroup Analysis

- Differential rates of participation?
 - 6% of dependent students, \$182 average FWS earned
 - 5% of independent students, \$192 average FWS earned
- Different counterfactuals?
 - Financially independent students probably more likely to be working in general. FWS participation predicts larger increases in on *and* off campus work for older students in Scott-Clayton's (2011) sample.

FWS Allocations 2007-2009



Revised Instrumental Variables First Stage

- Excluding Ohio State, University of Cincinnati and University of Toledo does not change key relationship in the first stage

First Stage	Amount of Work Study Received
EFC X Award Per Pell Recipient	-0.0004* (0.0001)
EFC	0.111** (0.0418)
Award Per Pell Recipient	0.0034*** (0.0005)
Constant	-3.439*** (1.271)
Covariates	Y
Observations	46721
R-squared	0.125

Results excluding OSU, UC, and UT

	First Semester GPA	Second Semester GPA	First Semester Credits Earned	First Year Cumulative Credits	Persisted to Sophomore Year
Second Stage	1	2	3	4	5
WS Amount	-0.0191**	-0.0307***	-0.272***	.997**	-0.0057*
Received (\$100)	(0.0086)	(0.0135)	(0.0817)	(0.473)	(0.0056)
Constant	2.515*** (0.0849)	2.511*** (0.0745)	11.47*** (0.429)	23.84*** (1.562)	0.430*** (0.0307)
Covariates	Y	Y	Y	Y	Y
Observations	46,721	46,721	46,721	46,721	46,721

- Excluding these schools improves first stage estimates of FWS rec'd
- Small, negative effects on GPA and persistence as well as positive effects on first year credits earned
- All estimates statistically significant