14.03 Microeconomic Theory & Public Policy Fall 2022

Lecture 7. Income Effects, Substitution Effects, and Labor Supply

David Autor (Prof), MIT Economics and NBER
Jonathan Cohen (TA), MIT Economics

Income Effects, Substitution Effects, and Labor Supply

Income and substitution effects in labor supply

- We typically think of demand functions as describing **goods** demand
- The same reasoning applies to labor **supply**
- And it's pretty cool how it works
- (We'll return to demand for goods in the next lecture—in particular, Giffen goods)

First principles: Labor vs. leisure

A consumer has to decide whether to work, how much to work

First principles: Labor vs. leisure

A consumer has to decide whether to work, how much to work

- She has only 24 hours a day
- She can divide these hours among work and leisure

First principles: Labor vs. leisure

A consumer has to decide whether to work, how much to work

- She has only 24 hours a day
- She can divide these hours among work and leisure
- Consider the role of income and substitution effects
  1. Holding constant income, how does an increase in the hourly wage affect labor supply?
  2. Holding constant the hourly wage, how does an increase in income affect labor supply?
  3. What is the effect of an increase in hourly earnings on labor supply?

A worker `buys' leisure by working less. Leisure is a normal good.

If the worker's hourly wage rises:

(1) What is sign of the **substitution effect** on hours worked? (+/-)
(2) What is sign of the **income effect** on hours worked? (+/-)

Note: (+) means more hours; (-) means fewer hours

A Substitution effect +; Income effect +

B Substitution effect -; Income effect +

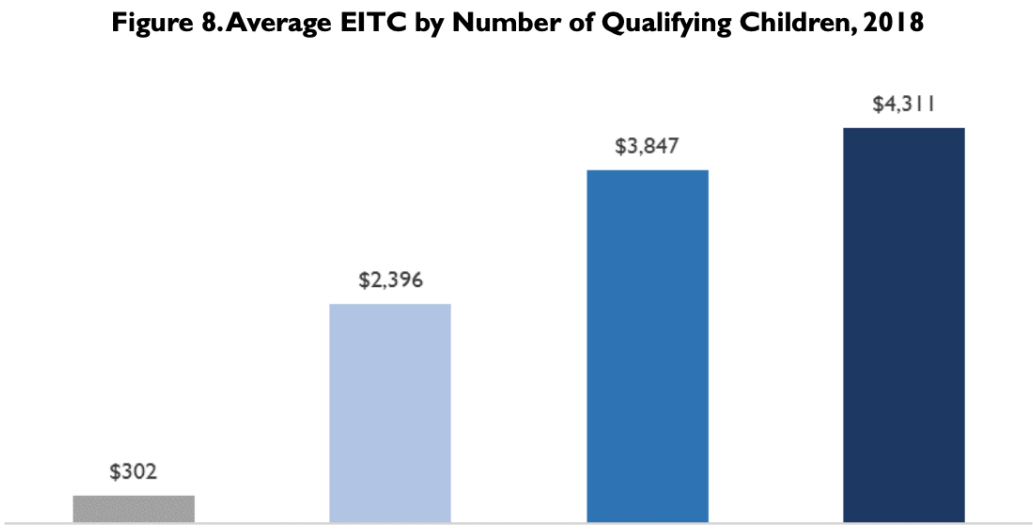
C Substitution effect+; Income effect -

D Substitution effect-; income effect -

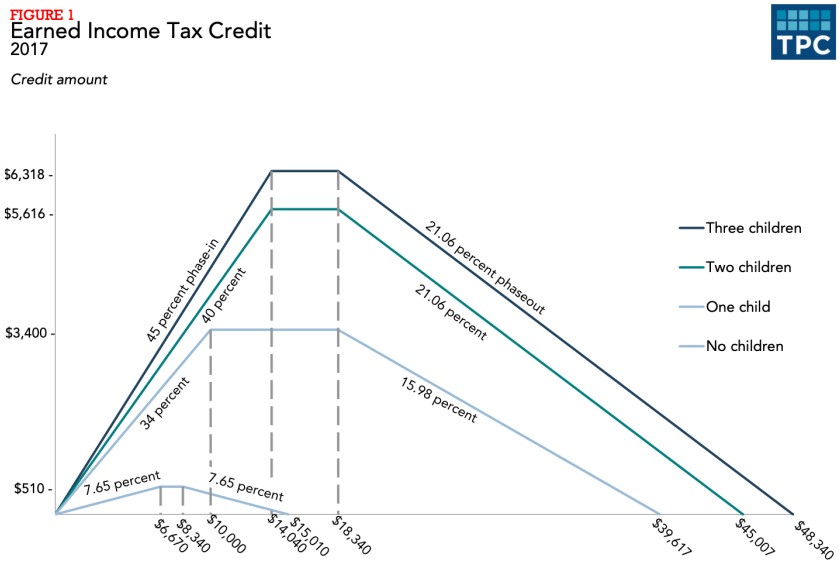
Context: the Earned Income Tax Credit (EITC)

- The EITC is a federal income subsidy for low wage workers
- In 2019 (pre-pandemic)
  - 26.7 million households received the federal EITC
  - Federal expenditures were $64.5 billion
  - Average benefit per household was $2,416

Average EITC benefit paid in 2018 by number of children



Federal EITC benefits schedule in 2017: Visual



Federal EITC benefits schedule in 2019: Table

TABLE 1

2019 Earned Income Tax Credit Parameters (Filing status single[a])

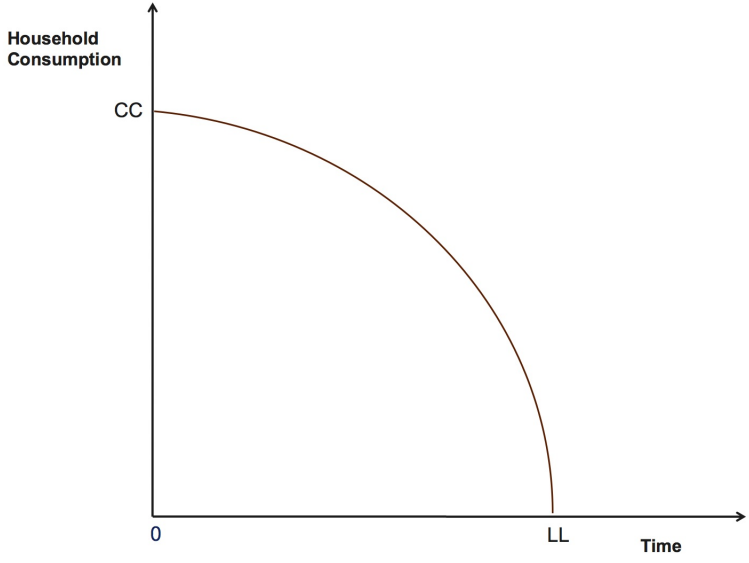
	Phase-in rate	Phase-in ends	Maximum credit amount	Phase-out begins	Phase-out rate	Phase-out ends
Childless	7.65%	$6,920	$529	$8,650	7.65%	$15,570
1 Child	34%	$10,370	$3,526	$19,030	15.98%	$41,094
2 Children	40%	$14,570	$5,828	$19,030	21.06%	$46,703
>2 Children	45%	$14,570	$6,557	$19,030	21.06%	$50,162

[a]Note: Unmarried filers who claim children for the purposes of the EITC usually file as heads of household; the parameters for each family size are the same as for single filers.

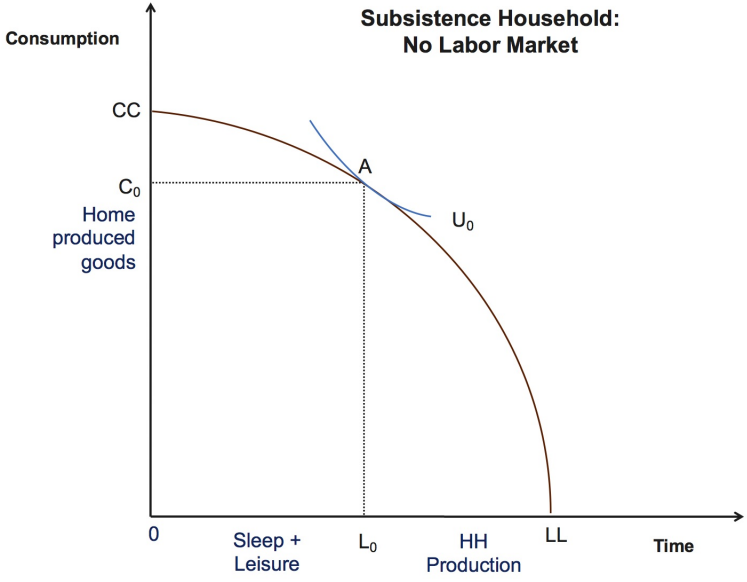
How Should EITC Affect Household Labor Supply and Leisure?

Income and Substitution Effects

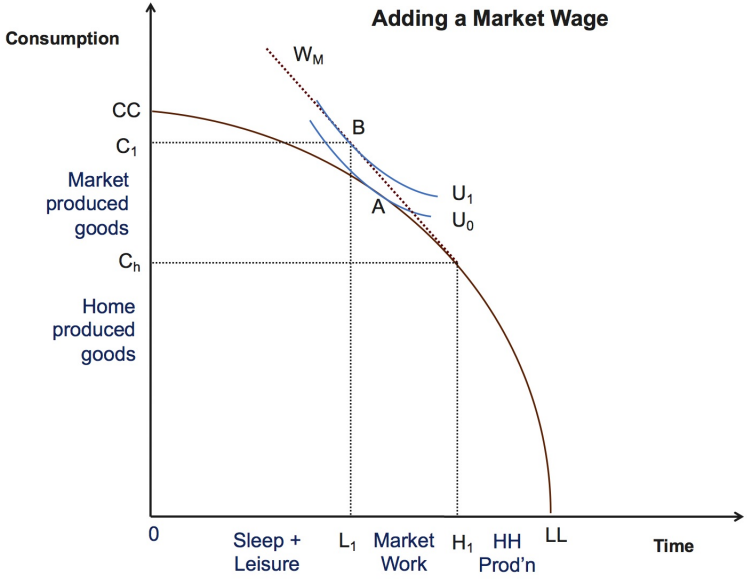
Household PPF in consumption vs. leisure space



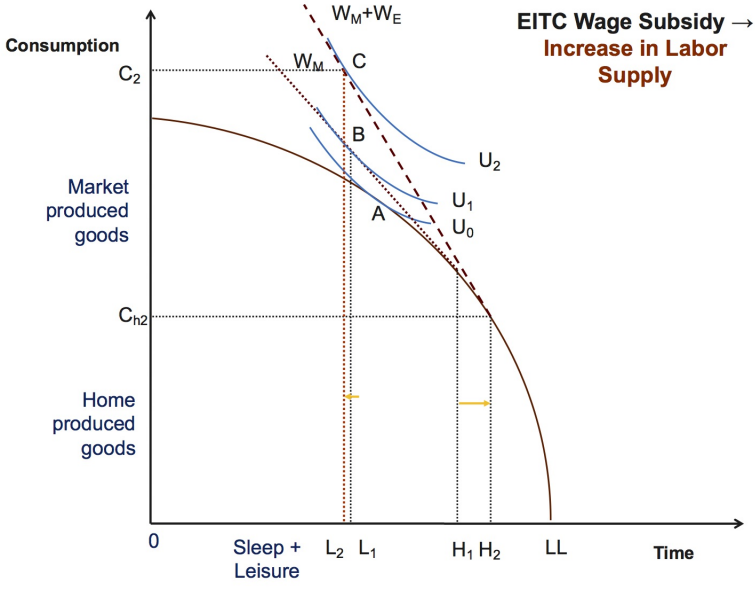
Household PPF in consumption vs. leisure space



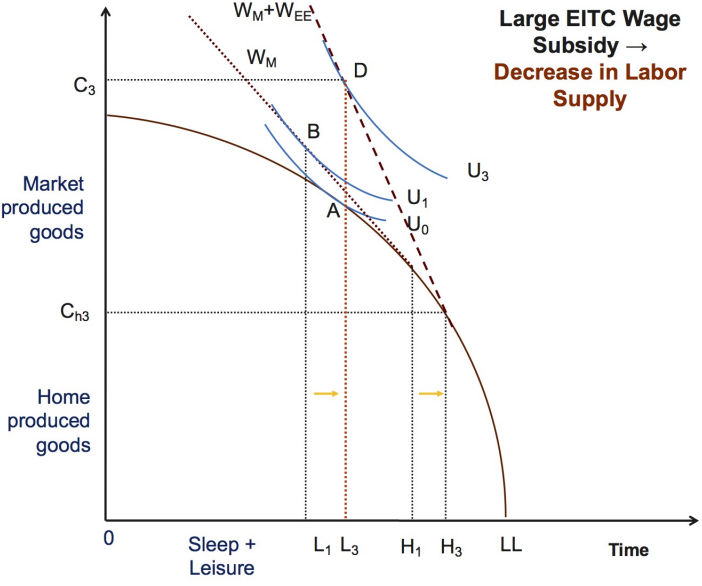
Household PPF in consumption vs. leisure space



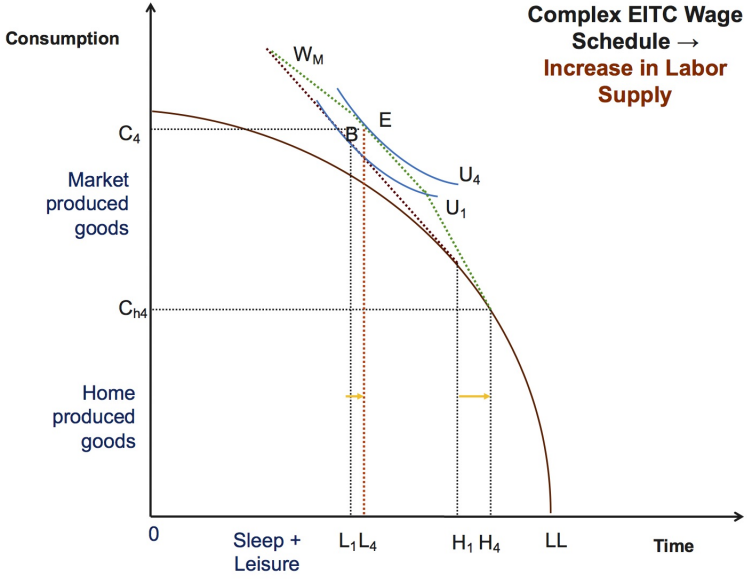
Household PPF in consumption vs. leisure space



Household PPF in consumption vs. leisure space



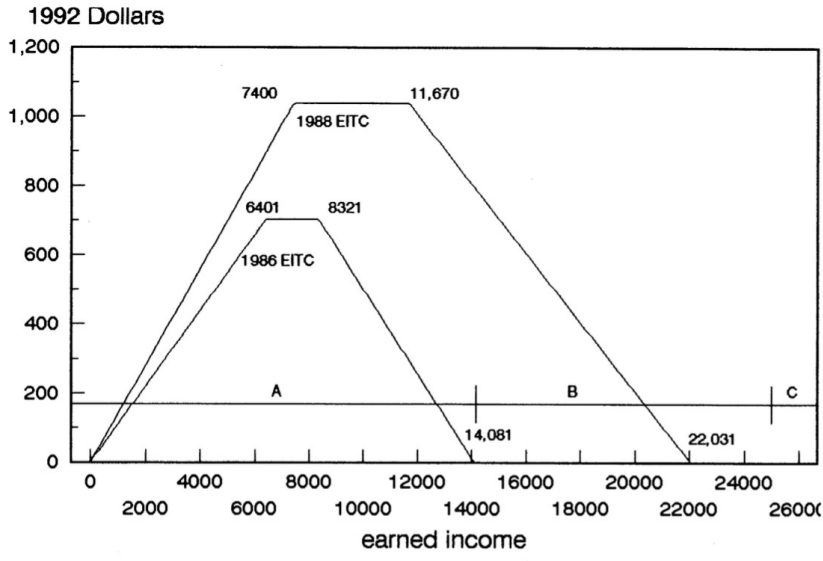
Household PPF in consumption vs. leisure space



Labor Supply Response to the Earned Income Tax Credit: Evidence from the Tax Reform Act of 1986

Eissa and Leibman, 1996

Comparison of EITC schedule in 1986 and 1988



Summary statistics: Unmarried women, Ages 16 – 44

Variable	Without children	With children			
			Education		
		All	Less than high school	High school	Beyond high school
Age	26.78	31.17	28.67	30.88	33.97
	(7.02)	(7.07)	(7.39)	(6.79)	(6.21)
Education	13.44	12.05	9.33	12.00	14.63
	(2.33)	(2.28)	(1.81)	(0.00)	(1.54)
Nonwhite	0.15	0.37	0.43	0.37	0.33
	(0.36)	(0.48)	(0.49)	(0.48)	(0.47)
Preschool children	0.00	0.48	0.61	0.48	0.36
	(0.00)	(0.50)	(0.49)	(0.50)	(0.48)
Filing unit size	1.00	2.74	3.03	2.66	2.60
	(0.00)	(0.96)	(1.17)	(0.88)	(0.81)
Earned income	15,119	11,262	4109	10,678	18,856
	(13,799)	(12,498)	(7844)	(10,679)	(14,497)
Earnings conditional on working	15,880	15,188	8414	13,758	20,589
	(13,708)	(12,289)	(9475)	(10,225)	(13,920)
Labor force participation	0.952	0.742	0.488	0.776	0.916
	(0.214)	(0.438)	(0.500)	(0.417)	(0.278)

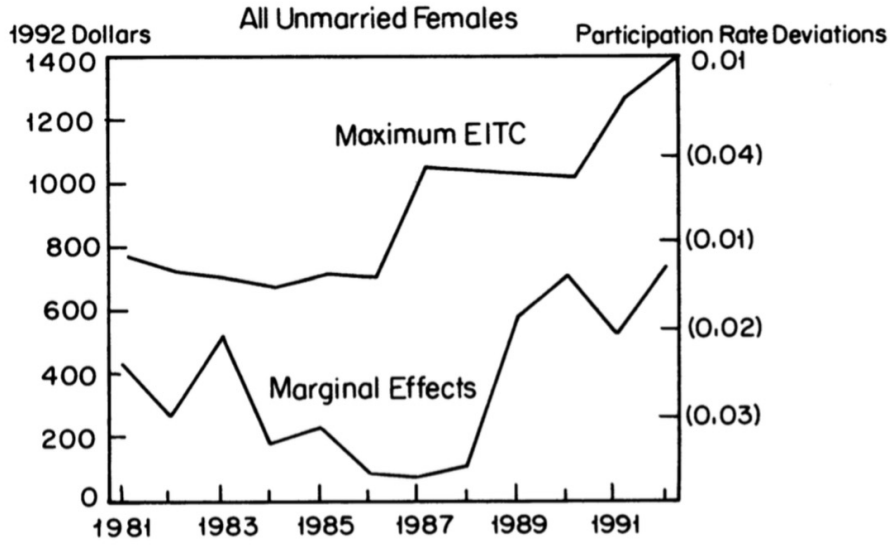
Diff-in-diff estimates: Labor force participation

TABLE II

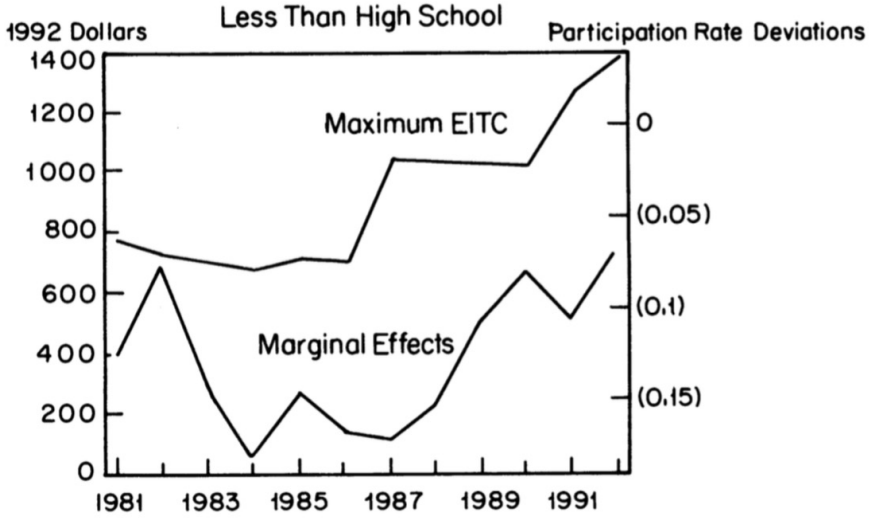
LABOR FORCE PARTICIPATION RATES OF UNMARRIED WOMEN

	Pre-TRA86 (1)	Post-TRA86 (2)	Difference (3)	Difference-in-differences (4)
A. *Treatment group:*				
With children	0.729 (0.004)	0.753 (0.004)	0.024 (0.006)	
[20,810]				
Control group:				
Without children	0.952 (0.001)	0.952 (0.001)	0.000 (0.002)	*0.024 (0.006)*
[46,287]				
B. *Treatment group:*				
Less than high school, with children	0.479 (0.010)	0.497 (0.010)	0.018 (0.014)	
[5396]				
Control group 1:				
Less than high school, without children	0.784 (0.010)	0.761 (0.009)	−0.023 (0.013)	*0.041 (0.019)*
[3958]				
Control group 2:				
Beyond high school, with children	0.911 (0.005)	0.920 (0.005)	0.009 (0.007)	*0.009 (0.015)*
[5712]				
C. *Treatment group:*				
High school, with children	0.764 (0.006)	0.787 (0.006)	0.023 (0.008)	
[9702]				
Control group 1:				
High school, without children	0.945 (0.002)	0.943 (0.003)	−0.002 (0.004)	*0.025 (0.009)*
[16,527]				
Control group 2:				
Beyond high school, with children	0.911 (0.005)	0.920 (0.005)	0.009 (0.007)	*0.014 (0.011)*
[5712]				

Max EITC and LFP of unmarried women w/ v w/o children



Max EITC and LFP of unmarried <HS women w/ v w/o children



Did EITC reduce hours worked? Unmarried women w/ v. w/o children

Dependent variable:	Annual hours	Annual hours	Annual hours	Annual hours
Variables	All single women with hours > 0 (1)	Less than high school with hours > 0 (2)	All single women (3)	Less than high school (4)
Kids (γ_0)	−83.03 (47.82)	−249.44 (132.61)	−186.48 (46.65)	−327.07 (110.24)
Post86 (γ_1)	−29.95 (23.61)	63.27 (78.03)	−45.33 (25.20)	−56.27 (69.26)
Kids × Post86 (γ_2)	*25.22 (15.18)*	*2.98 (46.04)*	*37.37 (15.31)*	*83.83 (39.42)*
Observations	59,474	5700	67,097	9354