Request that you should not refuse

- PLEASE SWITCH OFF AND PUT AWAY YOUR CELL PHONES
- LAPTOPS OK IF WORK IS ACADEMIC
- REMOVE BAGS AND OTHER MATERIALS THAT CAN CAUSE DISTRACTION
- STOP HAVING SIDE CONVERSATIONS
- PARTICIPATE IN CLASS

Class 11

Creating a literature

Supply of Labor: Lagrangian Set up, Reservation Wage, Leisure Demand Function, Labor Supply Function & Labor Elasticity

Returns to Education

- **Read for Wednesday's Class (Class 12)**

Work on selecting a Literature for final project

Look at Vive Le Revolution

For upcoming Weekend

Vive Le Revolution & Bertrand and Mullianathan Paper

- RULES FOR LITERAUTRE
- Microeconomics Topics
- Theoretically Rigorous
- Empirically uses identification strategies such as FE, IV, DID, RD etc.
- Main article: Cannot be a survey article or a paper discussed in this or any other classes
- Main Article: Written in last 10-15 years in a ranked economic journal
- Submit on May 17th Wed 2017 in class

EXAMPLE

Student Name:_____

Main Article: Network Effects and Welfare Cultures" By: Marianne Bertrand, Erzo F.P. Wittmer, Sendhil Mullianathan *The Quarterly Journal of Economics*, August 2000

Auxiliary Article 1) "Participation in Heterogeneous Communities" By: Alberto Alesina and Eliana Ferrara, Quarterly Journal of Economics, Oxford University Press, 2000

Auxiliary Article 2) "Networks in the Modern Economy: Mexican Migrants in the U.S. Labor Market" By: Kaivan Munshi, Quarterly Journal of Economics, Oxford University Press, 2003

Auxiliary Article 3) "The Role of Information and Social Interactions in Retirement Plan Decisions: Evidence from a Randomized Experiment" By: Esther Duflo and Emmanuel Saez, Quarterly Journal of Economics, Oxford University Press, 2003

Parametric Reservation Wage, Interior Solution (Equilibrium)

$$U = U(l,c) = l^{\alpha} \times c^{\beta}$$

$$MU_l = \frac{\partial U(l,c)}{\partial l} = \alpha l^{\alpha-1} c^{\beta}$$

$$MU_c = \frac{\partial U(l,c)}{\partial c} = \beta l^{\alpha} c^{\beta-1}$$

$$|Slope| = |MRS| = \frac{MU_l}{MU_c} = \frac{\alpha c}{\beta l}$$

$$c = \frac{wT + V}{p} + \frac{-w}{p} l$$

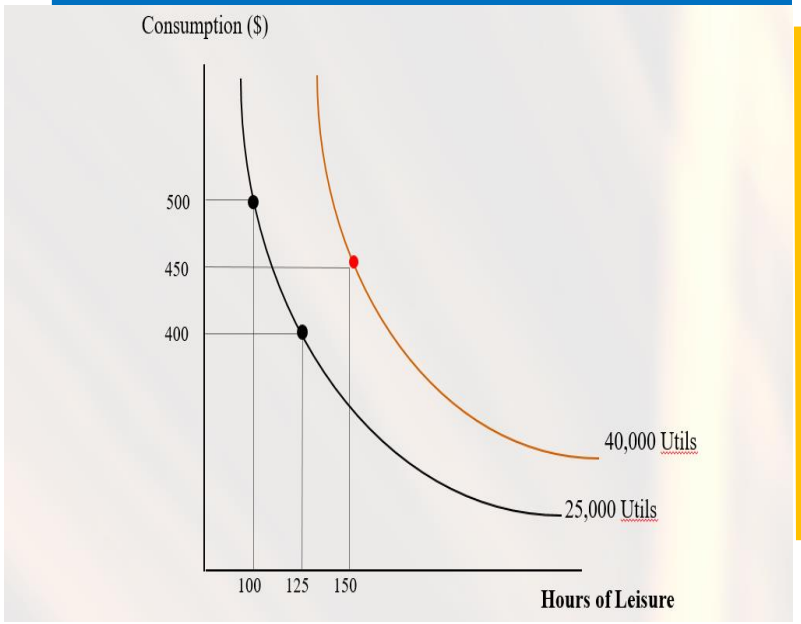
All Play No Work

$$VI\big|_{l=T} = \frac{V}{p}$$

All Work No Play

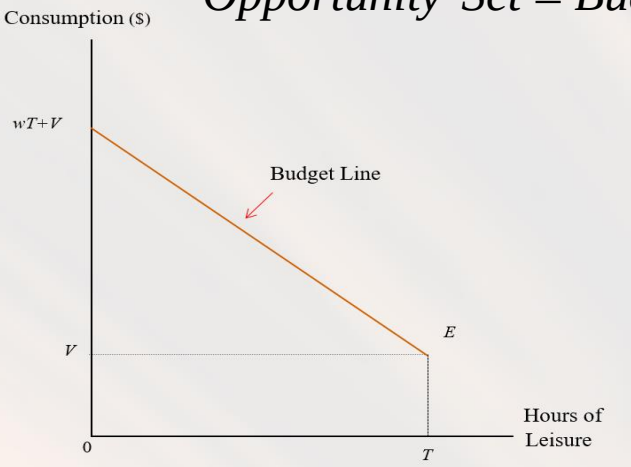
$$VI_{l=0} = \frac{wT + V}{p}$$

$$|Slope| = |\text{Re}\, al\ \ Wage| = \frac{w}{p}$$



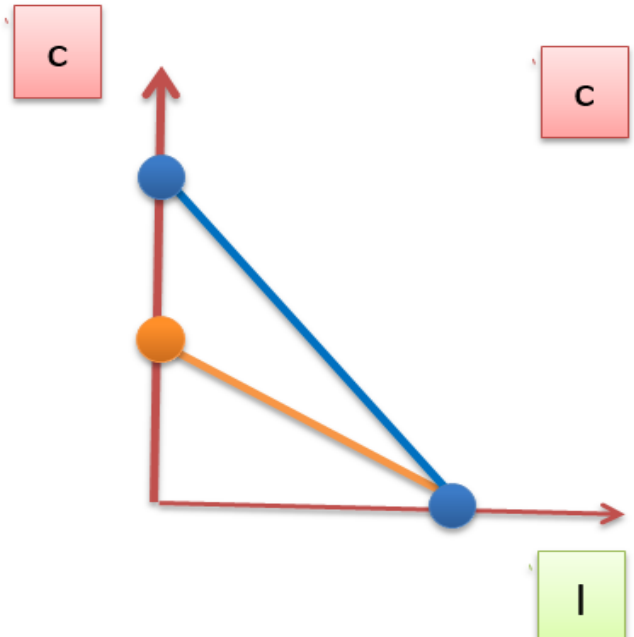
Graphing the Budget Constraint

Opportunity Set = Budget Set

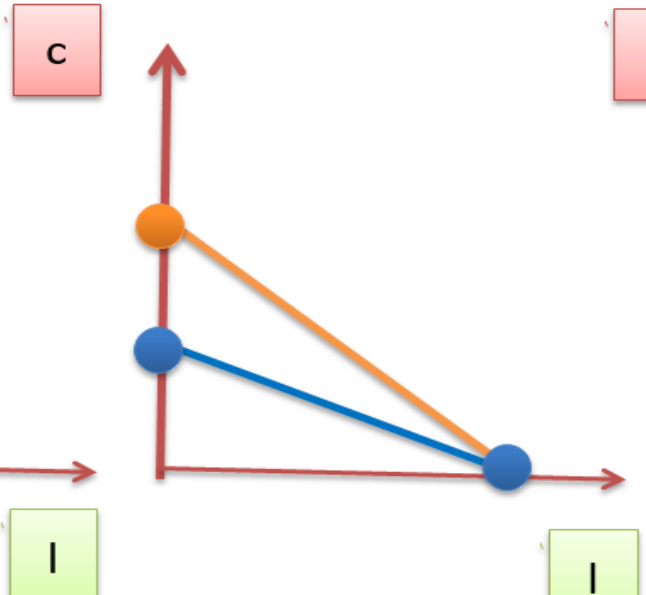


	Baseline/ Benchmark	Case 1 (increase in w)	Case 2 (Decrease in w)	Case3 (Increase in V)
w	20	40	10	20
p	1	1	1	1
V	0	0	0	100
T	110	110	110	110
$\left\|\text{Re}\,al\ Wage\right\|$	20	40	10	20

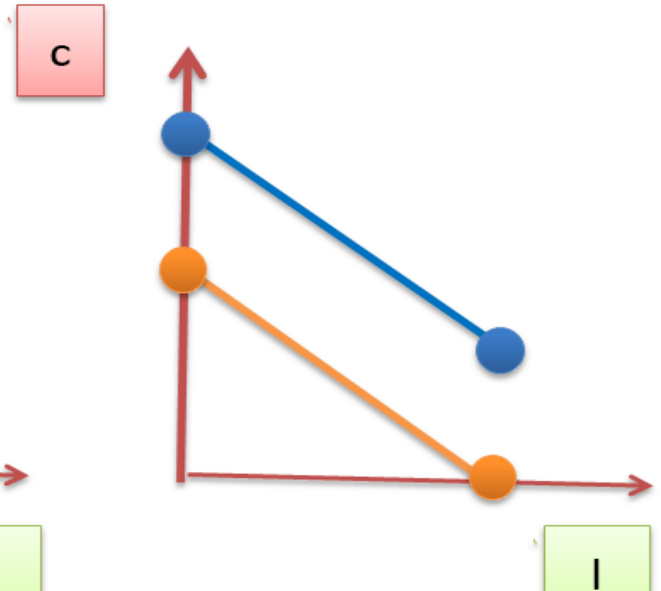
Benchmark & Case 1



Benchmark & Case 2



Benchmark & Case 3



$$RW = |MRS|_{l=T,c=V}$$

Parametric Reservation Wage, Interior Solution (Equilibrium)

$$RW = \frac{\alpha c}{\beta l}\Big|_{l=T,c=\frac{V}{p}}$$

$$RW = \frac{\alpha V}{\beta p T}$$

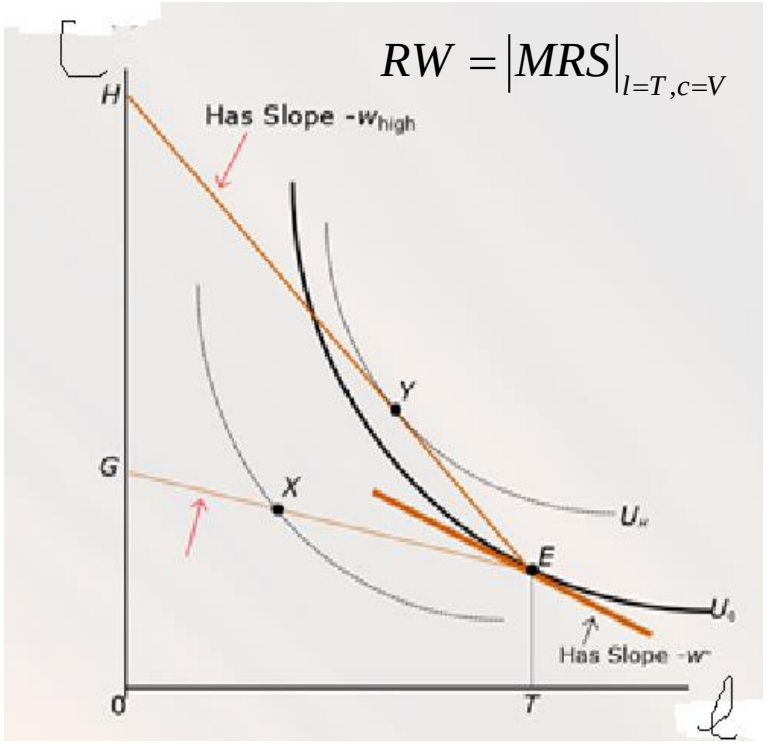
$$If \;\; RW < w \;\; Then \;\; h^* > 0$$

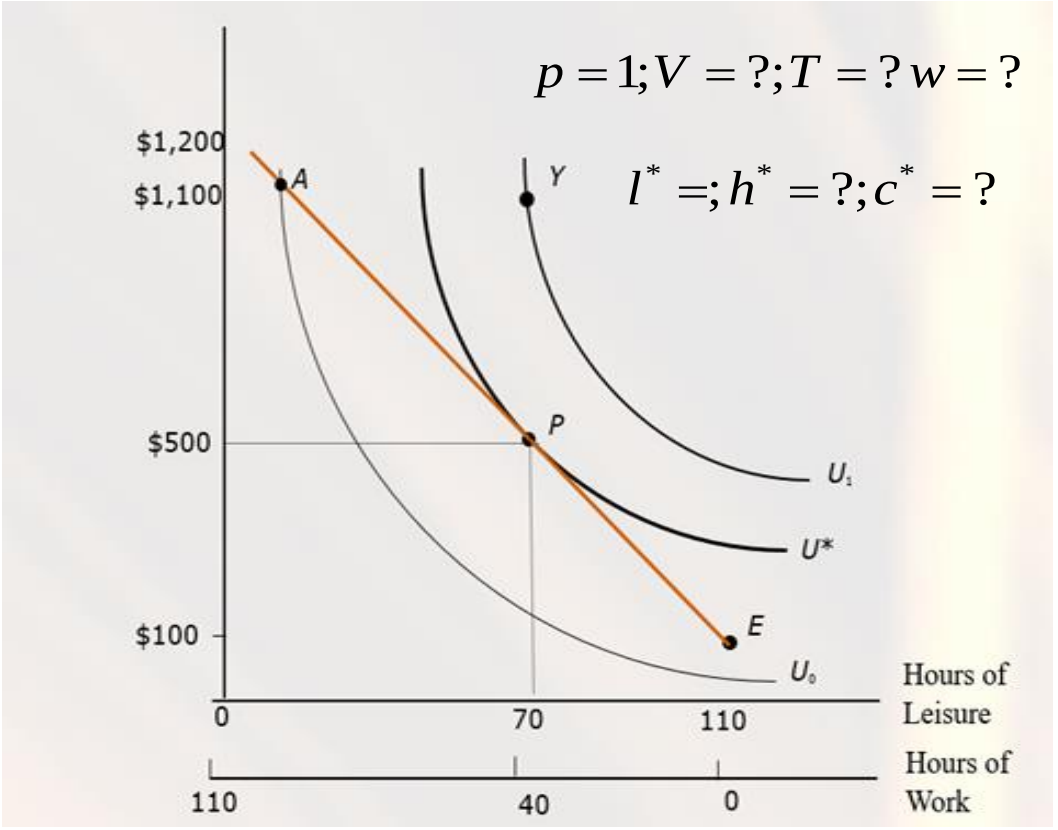
$$|MRS| = |Real \;\; Wage|$$

$$\frac{\alpha c}{\beta l} = \frac{w}{p}$$

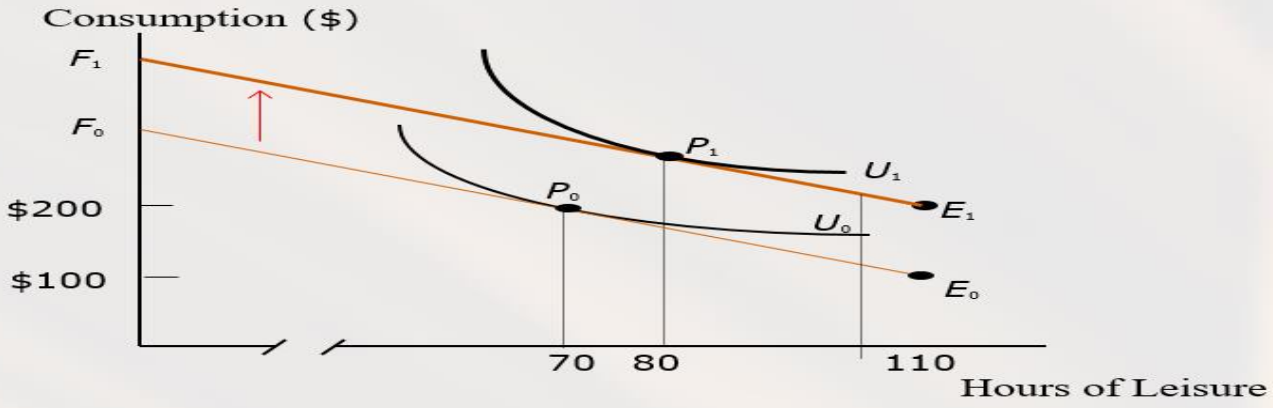
$$Or, c^* = \frac{\beta w}{\alpha p} l^* \ldots (1)$$

$$c^* = \frac{(wT + V)}{p} - \frac{w}{p} l^* \ldots (2)$$

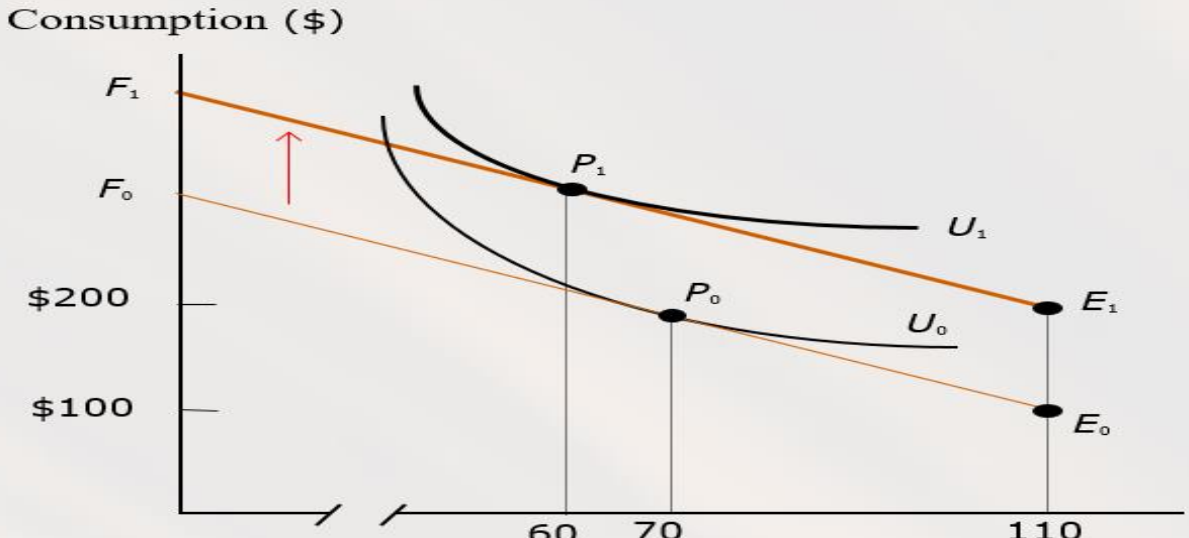


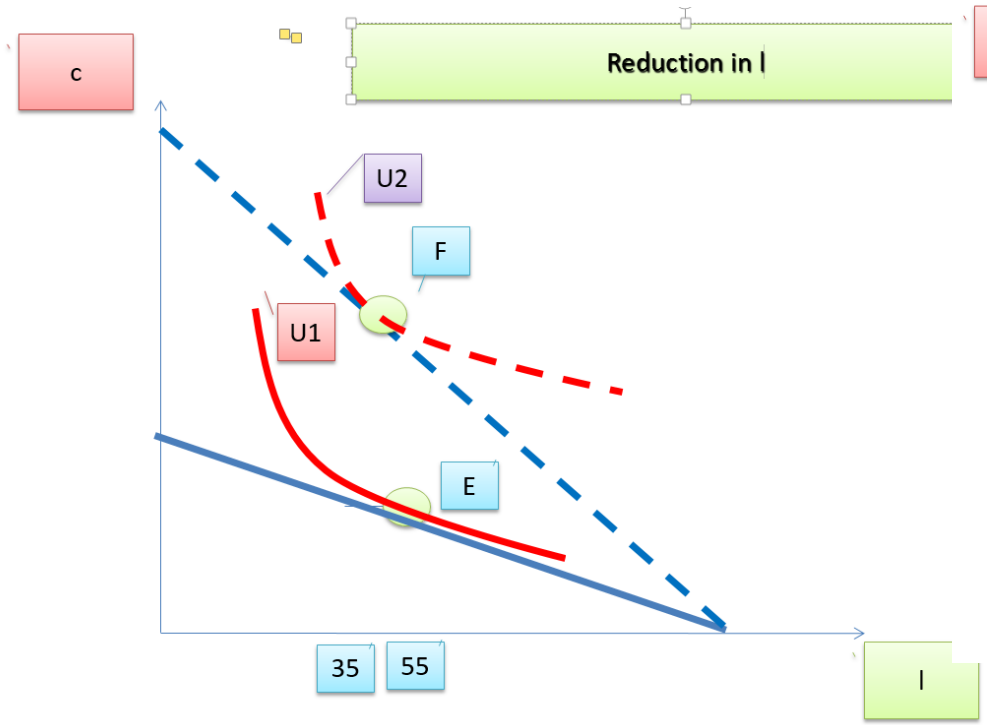


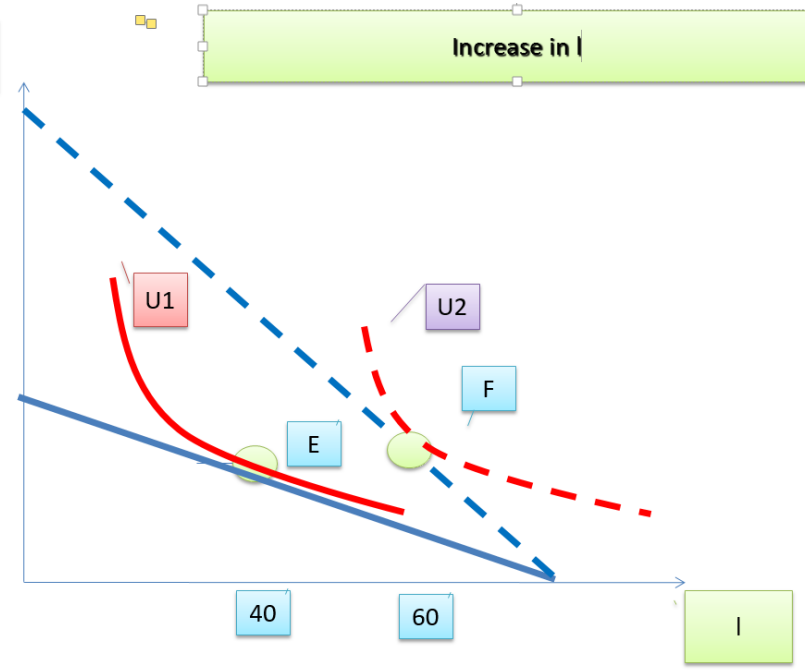
The Effect of a Change in Nonlabor Income on Hours of Work



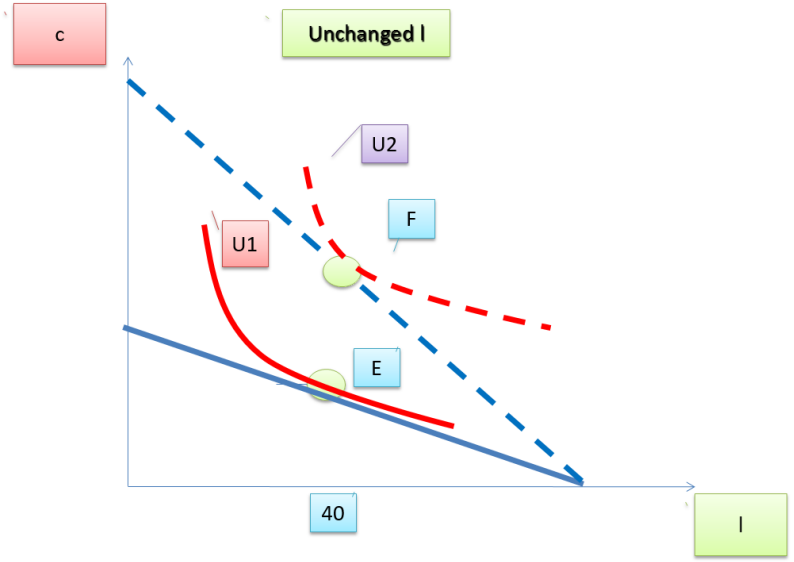
The Effect of a Change in Nonlabor Income on Hours of Work







Draw Corresponding Labor Supply Functions in Class



Substitution Effect (SE) & Income Effect (IE)

Substitution Effect From a wage change

$w\uparrow \rightarrow l\downarrow \rightarrow h\uparrow$: *Leisure More Expensive*

$w\downarrow \rightarrow l\uparrow \rightarrow h\downarrow$: *Leisure Less Expensive*

Income Effect From a wage change

$w\uparrow \rightarrow l\uparrow \rightarrow h\downarrow$: *Leisure Normal Good*

$w\downarrow \rightarrow l\downarrow \rightarrow h\uparrow$: *Leisure Normal Good*

Clash of SE and IE

$w\uparrow$ *Leisure Normal Good*

Substitution Effect $>$ *Income Effect* $:\rightarrow l\downarrow \rightarrow h\uparrow$

Substitution Effect $=$ *Income Effect* $:\rightarrow l$ *unchanged* $\rightarrow h$ *unchanged*

Substitution Effect $<$ *Income Effect* $:\rightarrow l\uparrow \rightarrow h\downarrow$

$w\downarrow$ *Leisure Normal Good*

Substitution Effect $>$ *Income Effect* $:\rightarrow l\uparrow \rightarrow h\downarrow$

Substitution Effect $=$ *Income Effect* $:\rightarrow l$ *unchanged* $\rightarrow h$ *unchang*

Substitution Effect $<$ *Income Effect* $:\rightarrow l\downarrow \rightarrow h\uparrow$

$$T = h + l$$
$$pc = wh + V$$

$$U = l^{\alpha} c^{\beta}$$

$$\frac{\partial U}{\partial l} = \alpha l^{(\alpha-1)} c^{\beta} = MU_l$$

$$\frac{\partial U}{\partial c} = \beta l^{\alpha} c^{(\beta-1)} = MU_c$$

$$\Gamma = U + \lambda[w(T-l) + V - pc]$$

$$\frac{\partial \Gamma}{\partial l} = MU_l - \lambda w = 0....(1) \rightarrow pMU_l = \lambda w$$

$$\frac{\partial \Gamma}{\partial c} = MU_c - \lambda p = 0....(2) \rightarrow MU_c = \lambda p$$

$$\rightarrow \frac{\alpha c^*}{\beta l^*} = \frac{w}{p} \quad .....(4)$$

$$\frac{\partial \Gamma}{\partial \lambda} = 0 \Rightarrow w(T - l^*) + V - pc^* = 0.....(3)$$

l* will give Leisure Demand Function. Using 3 and 4

$$pc^* = w(T - l^*) + V$$

$$c^* = \frac{\beta w}{\alpha p} l^*$$

$$p\frac{\beta w}{\alpha p} l^* = w(T - l^*) + V = wT + V - wl^*$$

$$l^* = \frac{(wT + V)}{w\left(1 + \frac{\beta}{\alpha}\right)} = \frac{T}{\left(1 + \frac{\beta}{\alpha}\right)} + \frac{V}{w\left(1 + \frac{\beta}{\alpha}\right)}$$

$$l^* = \frac{(wT+V)}{w\left(1+\frac{\beta}{\alpha}\right)} = \frac{T}{\left(1+\frac{\beta}{\alpha}\right)} + \frac{V}{w\left(1+\frac{\beta}{\alpha}\right)}$$

$$c^* = \frac{\beta w}{\alpha p}\left[\left(\frac{T}{1+\frac{\beta}{\alpha}}\right) + \frac{V}{w\left(1+\frac{\beta}{\alpha}\right)}\right]$$

$$U^* = l^{*\alpha} c^{*\beta}$$

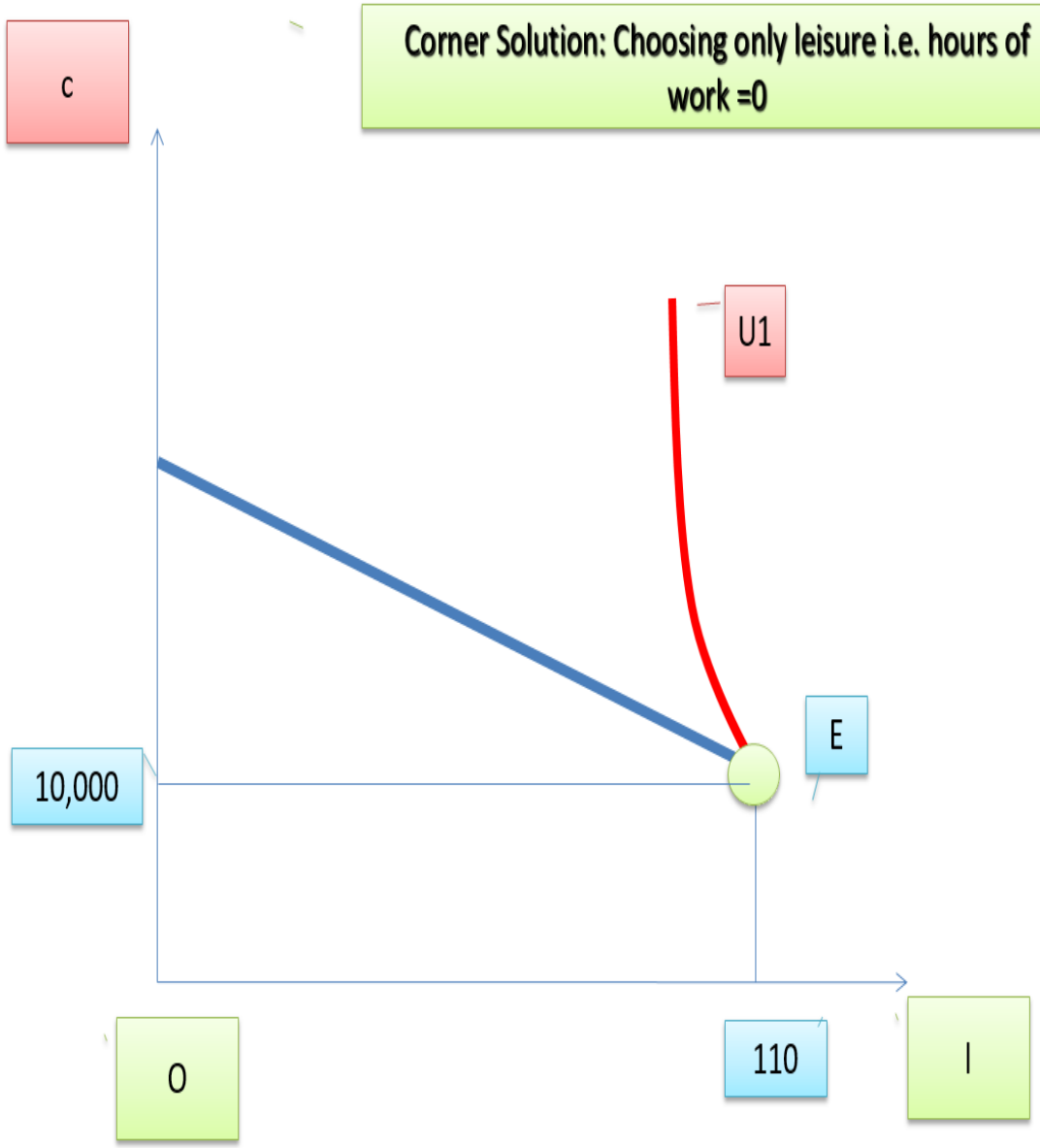
h* = T-l* will give Labor Supply Function.

$$h^* = T - l^* = T - \frac{(wT+V)}{w\left(1+\frac{\beta}{\alpha}\right)} = T - \frac{T}{\left(1+\frac{\beta}{\alpha}\right)} - \frac{V}{w\left(1+\frac{\beta}{\alpha}\right)}$$

$$\frac{\partial h^*}{\partial w} = \frac{V}{w^2\left(1+\frac{\beta}{\alpha}\right)} > 0$$

$$\varepsilon^S = \frac{w}{h^*}\frac{\partial h^*}{\partial w} = \frac{w}{h^*} \times \frac{V}{w^2\left(1+\frac{\beta}{\alpha}\right)} > 0$$

Graphical and Parametric : Corner Solution: Little More Detail



$$w \leq RW$$

OR

$$|MRS| > |Real \quad Wage|$$

$$Or, \frac{MU_l}{w} > \frac{MU_c}{p}$$

All Play No Work

$$l^* = T.....(3)$$

$$h^* = T - l^* = 0..(4)$$

$$c^* = V.....(5)$$

$$U^* = (l^*)^{\alpha} \times (c^*)^{\beta}$$

$$U^* = T^{\alpha} V^{\beta}....(6)$$

Interior solutions with Different Preference Parameters

$$l^* = \frac{(wT+V)}{(1+\frac{\beta}{\alpha})w} \text{.....(3)}$$

$$h^* = T - l^* = T - \frac{(wT+V)}{(1+\frac{\beta}{\alpha})w}$$

$$h^* = T - \frac{T}{(1+\frac{\beta}{\alpha})} - \frac{V}{(1+\frac{\beta}{\alpha})w} \text{..(4)}$$

$$c^* = \frac{(wT+V)}{p} - \frac{w}{p}l^* \text{.....(5)}$$

$$U^* = (l^*)^{\alpha} \times (c^*)^{\beta} \text{....(6)}$$

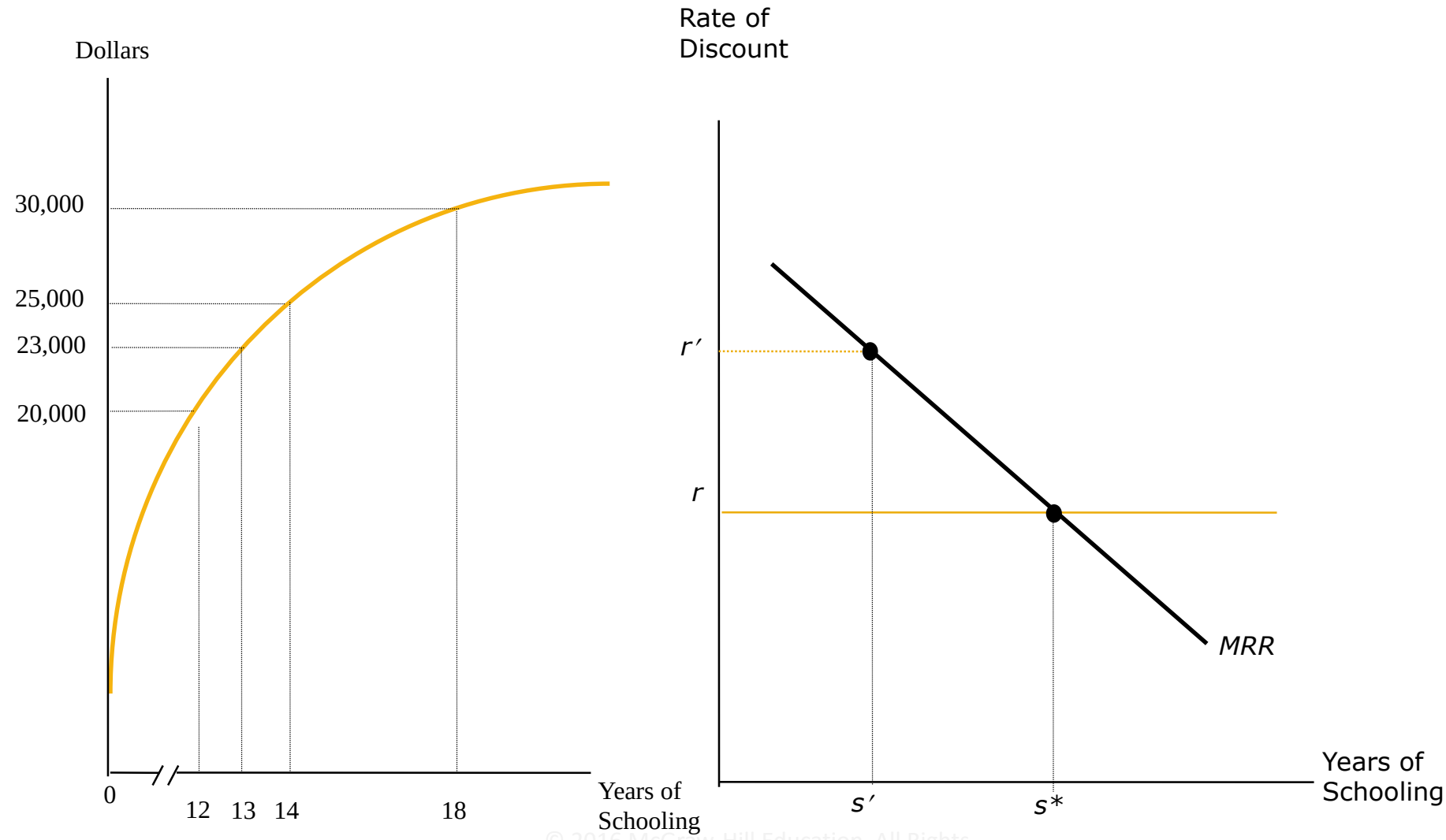
	Baseline	Case 1	Case 2	Case3
Alpha	0.5	0.5	0.5	0.5
Beta	0.5	0.5	0.5	0.5
w	20	40	10	20
p	1	1	1	1
V	0	0	0	100
T	110	110	110	110
l*	?	?	?	?
h*	?	?	?	?
c*	?	?	?	?
U*	?	?	?	?

	Baseline	Case 1	Case 2	Case3
Alpha	0.5	0.5	0.5	0.5
Beta	1	1	1	1
w	20	40	10	20
p	1	1	1	1
V	0	0	0	100
T	110	110	110	110
l*	?	?	?	?
h*	?	?	?	?
c*	?	?	?	?
U*	?	?	?	?

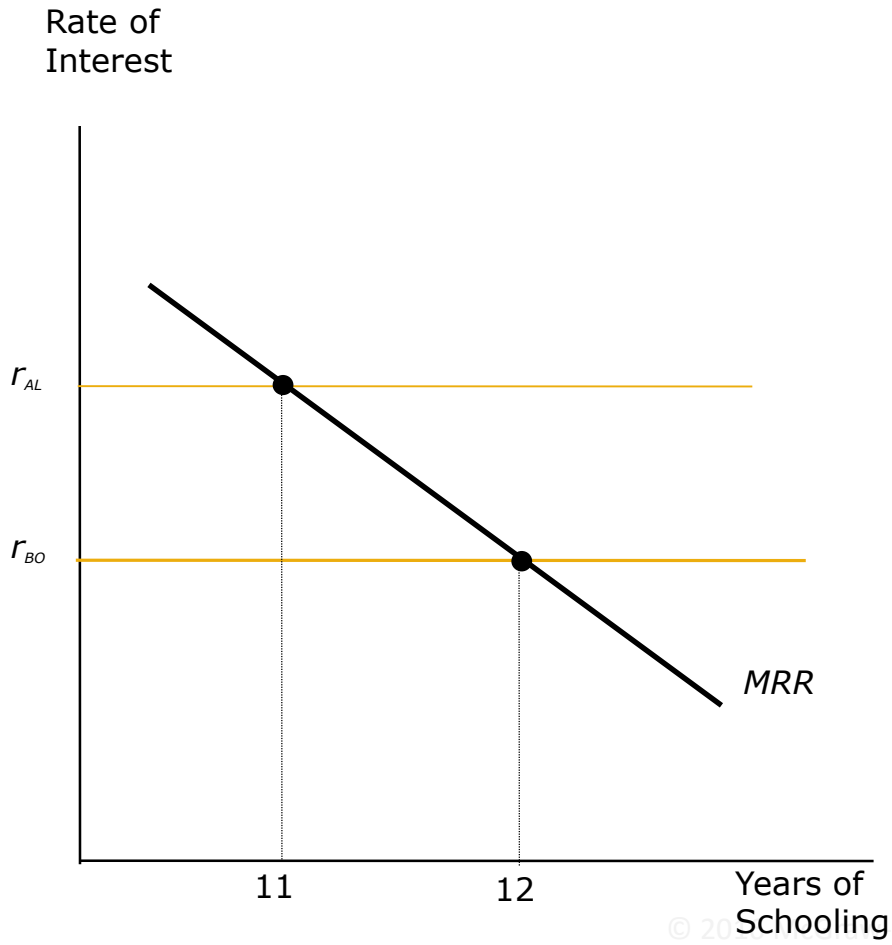
Policy Question: Returns to Education: Human Capital/ Signaling

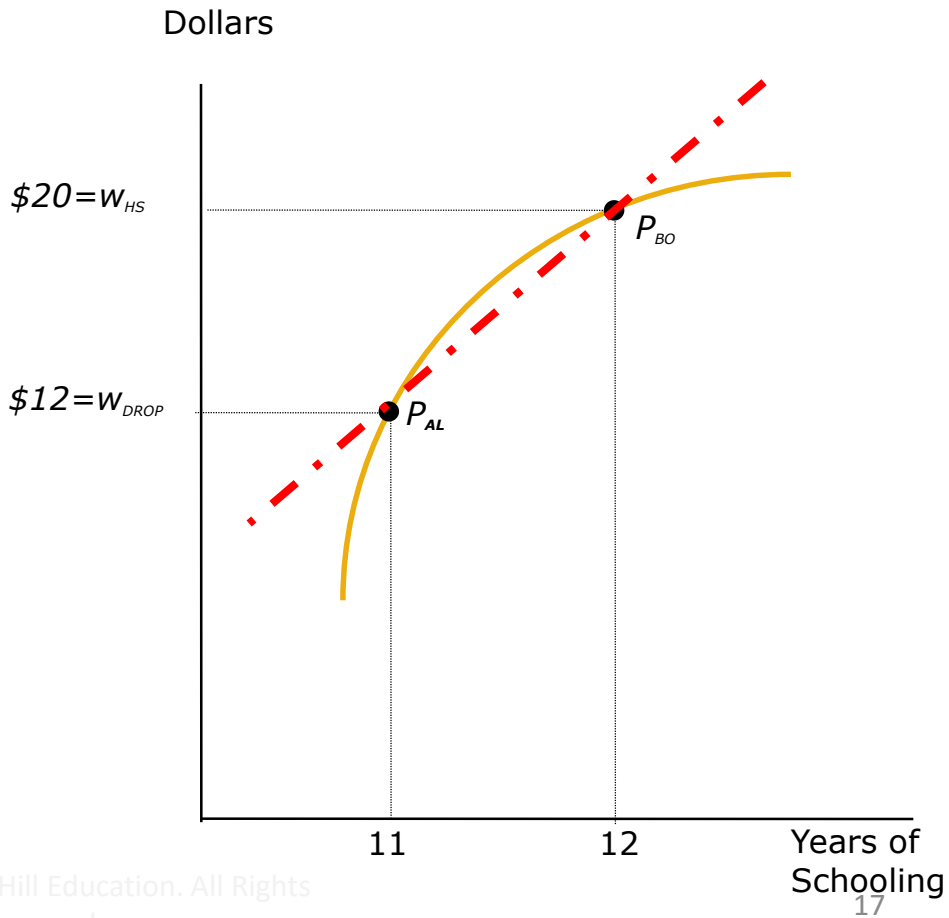
If your years of schooling increases by 1 unit how much does your per hour wage increase?

Schooling Model: The Wage-Schooling Locus & it's slope [Marginal Rate of Return (MRR)]

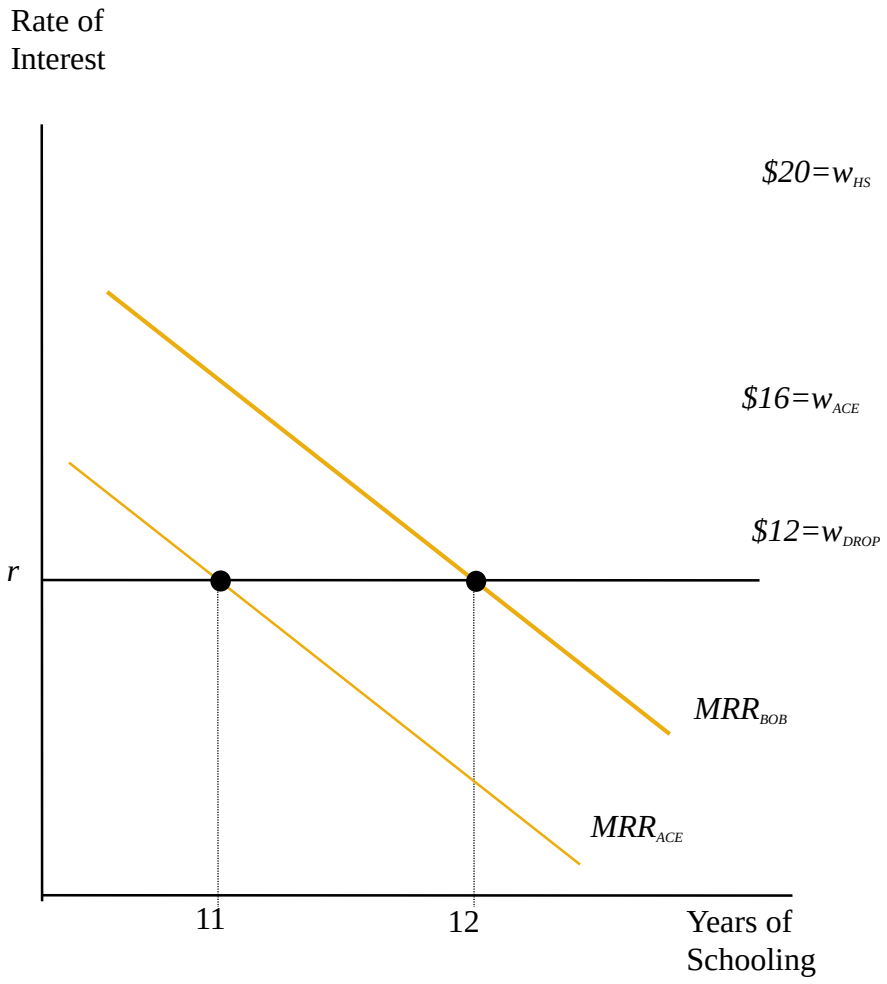


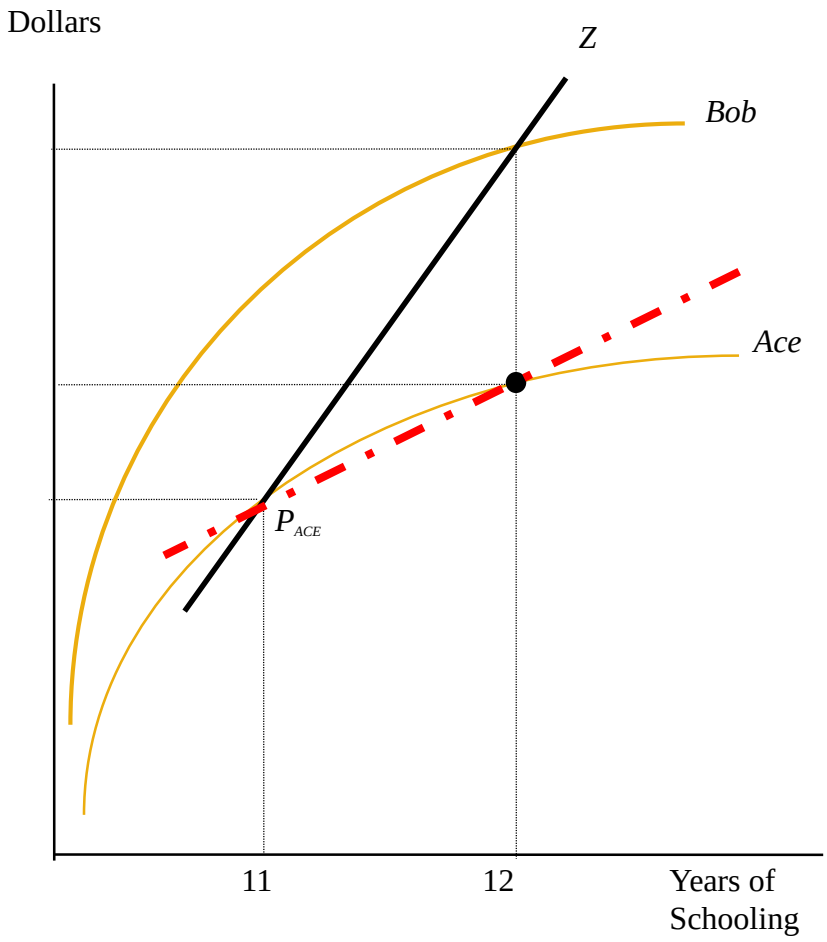
Schooling and Earnings When Workers Have Different Rates of Discount (what do discount rates depend on?)





Schooling and Earnings When Workers Have Different Abilities (what is ability?)





Consequences of Ability Bias

- The extent to which unobserved ability differences exist affects estimates on returns to schooling, since the ability difference may be the true source of the wage differential.
- Suppose high school grads earn $15,000 more than high school dropouts. Should government fund programs for high school completion? Appears that program may “pay for itself”(erroneous perception)

Today's Paper: Vive la Re´volution

Table 1
Descriptive Statistics

Variable	Mean	Standard Deviation
Cohort dummy:		
1946	.128	.33
1947	.140	.35
1948	.145	.35
1949	.148	.35
1950	.145	.35
1951	.145	.35
1952	.148	.35
Education dummy:		
Less than *baccalauréat*	.718	.45
Baccalauréat only	.096	.29
University diploma (*bac* + 2)	.074	.26
University degree	.111	.31
Years of higher education	1.440	2.47
Wage (log)	9.170	.49
Middle-class family background	.246	.43
N	26,371	26,371

SOURCE.—Labor Force Survey 1990, 1993, 1996, and 1999.
NOTE.—Sample is male wage earners born between 1946 and 1952.

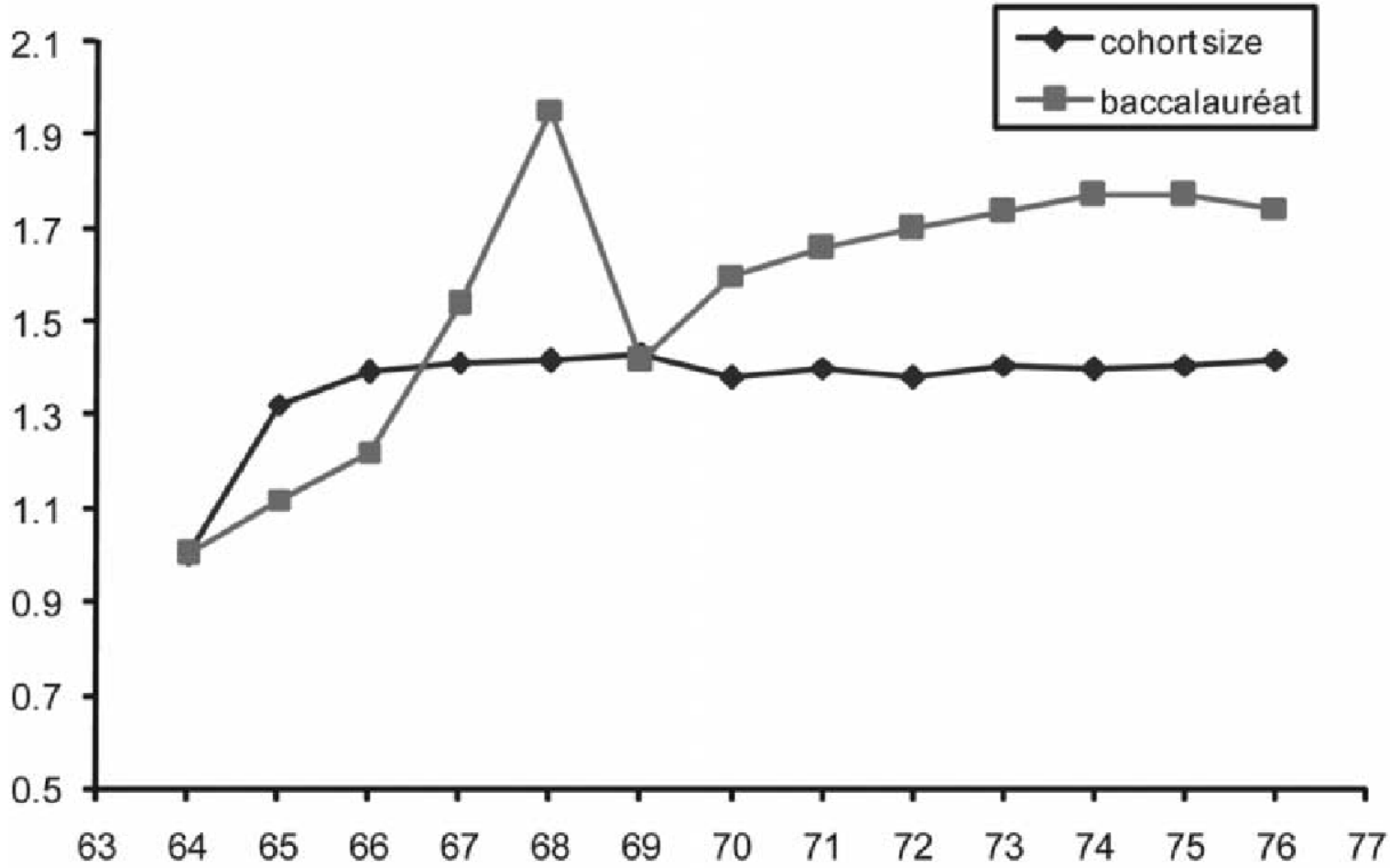


FIG. 1.—Trends in the number of *bacheliers* and in cohort size. The size of the cohort for year t corresponds to the number of persons born at $t - 19$ (19 is the median age of candidates). The two series are normalized to one in 1945. Source: French Ministry of Education (number of *bacheliers*) and the French Statistical Office (cohort size).

Table 2
Distribution of Education across Male Workers, by Year of Birth (%)

		Greater than *Baccalauréat*		
	Baccalauréat Only (1)	All (2)	Diploma (*Bac* + 2) (3)	Degree+ (> *Bac* + 2) (4)
1946	9.9 (.4)	17.4 (.6)	6.3 (.3)	11.0 (.5)
1947	9.0 (.4)	18.8 (.6)	7.1 (.4)	11.8 (.5)
1948	9.1 (.4)	19.0 (.6)	6.9 (.4)	12.1 (.5)
1949	9.8 (.4)	20.3 (.6)	8.6 (.4)	11.6 (.5)
1950	9.8 (.4)	18.4 (.6)	8.0 (.4)	10.4 (.5)
1951	9.8 (.4)	17.9 (.6)	7.5 (.4)	10.4 (.5)
1952	9.8 (.4)	17.8 (.6)	7.3 (.4)	10.4 (.5)

SOURCE.—Labor Force Survey 1990, 1993, 1996, and 1999.
NOTE.—Sample is male wage earners. Standard deviation is in parentheses.

IV 1: Birth Cohorts

- 1949 birth cohorts were the treatment cohorts
- In 1968 the affected cohort should be 19 years old (repeating class in secondary education system is pretty common)
- In our analysis we choose 1946 and 1952 as comparison cohorts as they are less likely to be affected by the relaxation of examination standards in 1968

Table 4
Impact of Birth Cohort on the Education and Labor Market Outcomes of Male Workers

	Baccalauréat Only (1)	At Least University Diploma (*Bac* + 2 or More) (2)	At Least University Degree (*Bac* + 3) (3)	Years of Higher Education (4)	Log Wage (5)	*Cadre* (Upper-White-Collar Occupation) (6)
1947	−.009 (.006)	.014 (.008)	.008 (.006)	.060 (.050)	.006 (.010)	.001 (.008)
1948	.007 (.006)	.015 (.008)	.012 (.006)	.080 (.050)	.031 (.010)	.008 (.008)
1949	−.001 (.006)	.027 (.008)	.009 (.006)	.150 (.050)	.021 (.010)	.016 (.008)
1950	−.001 (.006)	.008 (.008)	−.002 (.006)	.030 (.050)	.005 (.010)	.000 (.008)
1951	−.005 (.006)	.002 (.008)	−.001 (.006)	.010 (.050)	.003 (.010)	.003 (.008)
Trend	−.000 (.001)	.001 (.008)	−.001 (.001)	.005 (.010)	.010 (.002)	−.005 (.001)
Age	−.000 (.001)	.001 (.008)	.000 (.001)	.004 (.005)	.023 (.001)	.003 (.001)
N	26,370	26,370	26,370	26,370	26,370	26,370

SOURCE.—Labor Force Survey 1990, 1993, 1996, and 1999.

NOTE.—Sample is male wage earners born between 1946 and 1952. Coefficients for the worker's cohort dummy are relative to the comparison cohorts of 1946 and 1952. Standard deviation is in parentheses.