The Market for "Rough Diamonds": Information, Finance and Wage Inequality

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Economics of Inequality

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Wage Inequality Facts

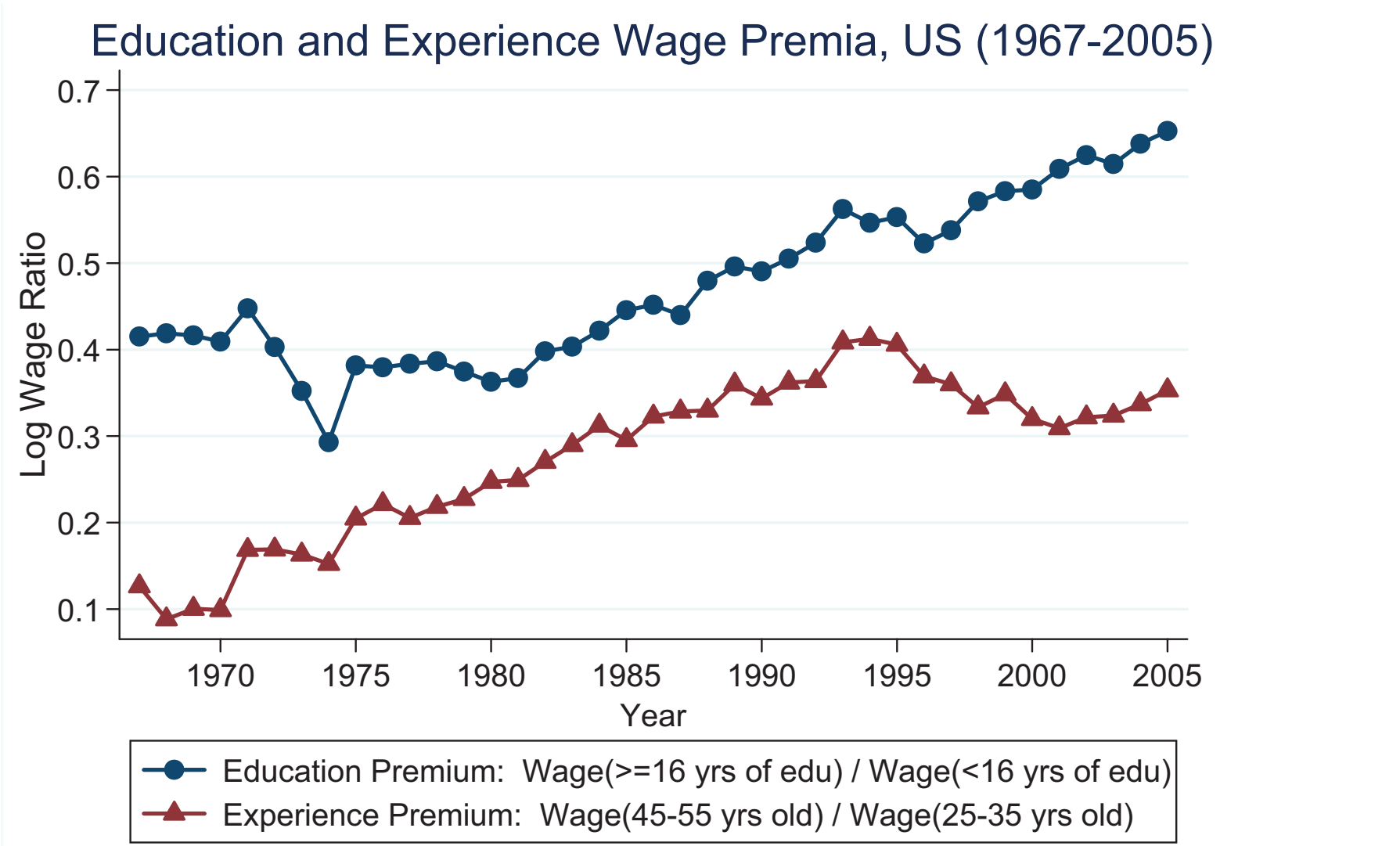
Fact 1: Since 1970's both the education and the experience premium increased sharply in the US, leading to higher wage inequality.

Fact 2: The education premium rises significantly for inexperienced workers and only moderately for the experienced ones.

Fact 3: The experience premium increases only for the less-educated workers, while it remains flat among the highly-educated ones.

$\Rightarrow$ **Existing studies cannot provide an explanation.**

Fact 1 - Experience Premium ↑ similarly to Education Premium



EducPrem ⇑ by 35%

ExperPrem ⇑ by 35%

Fact 2 - Education Premium ↑ mainly for Inexperienced

"Specifically, the rise in the college/high-school wage gap for men is most pronounced among young workers ..." Card and DiNardo (2002).

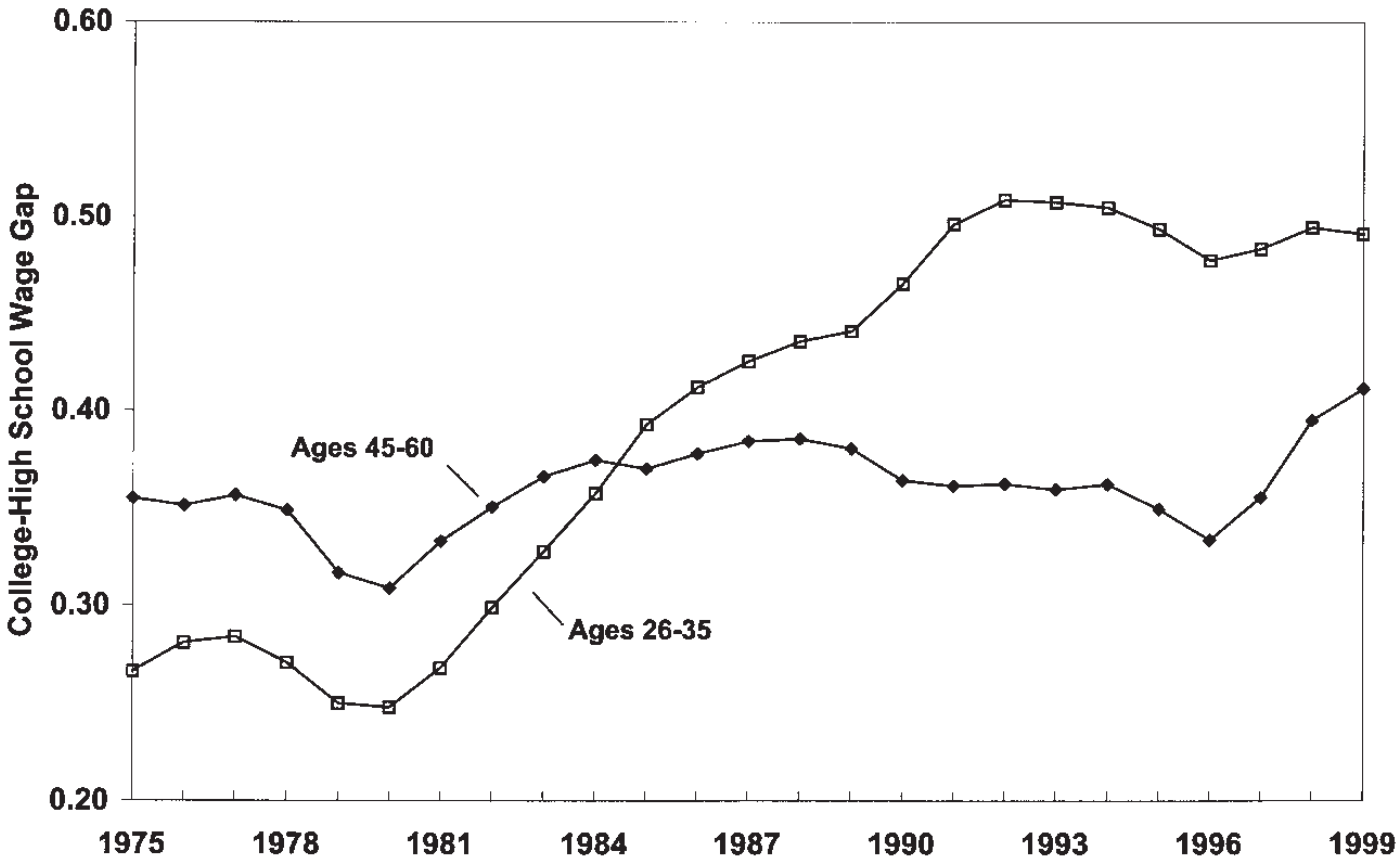
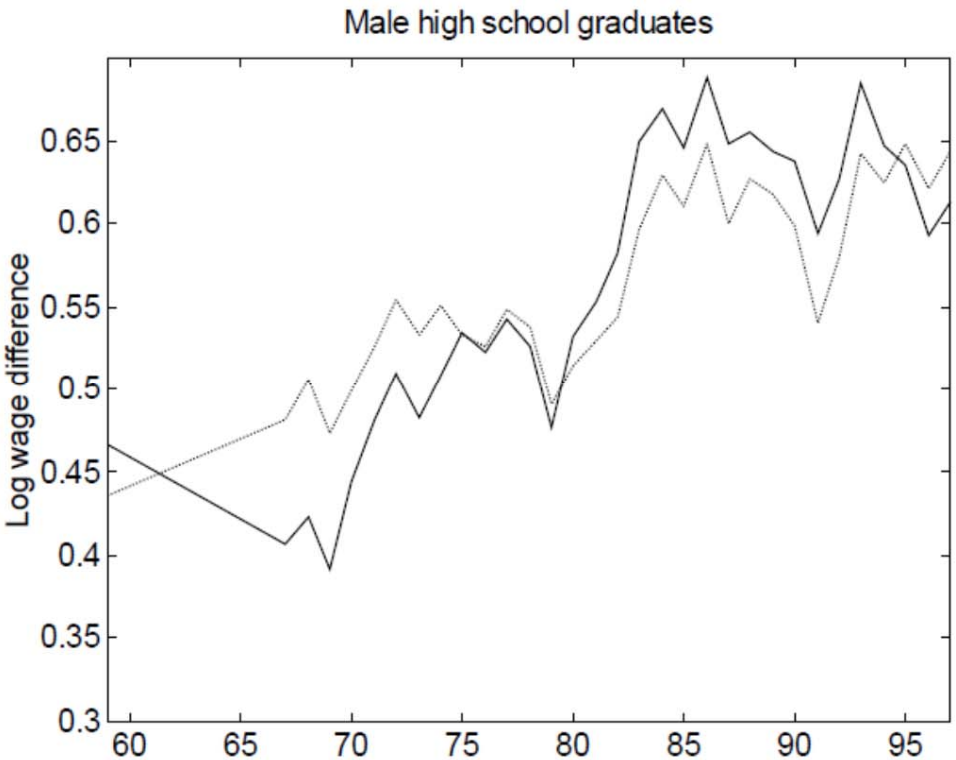
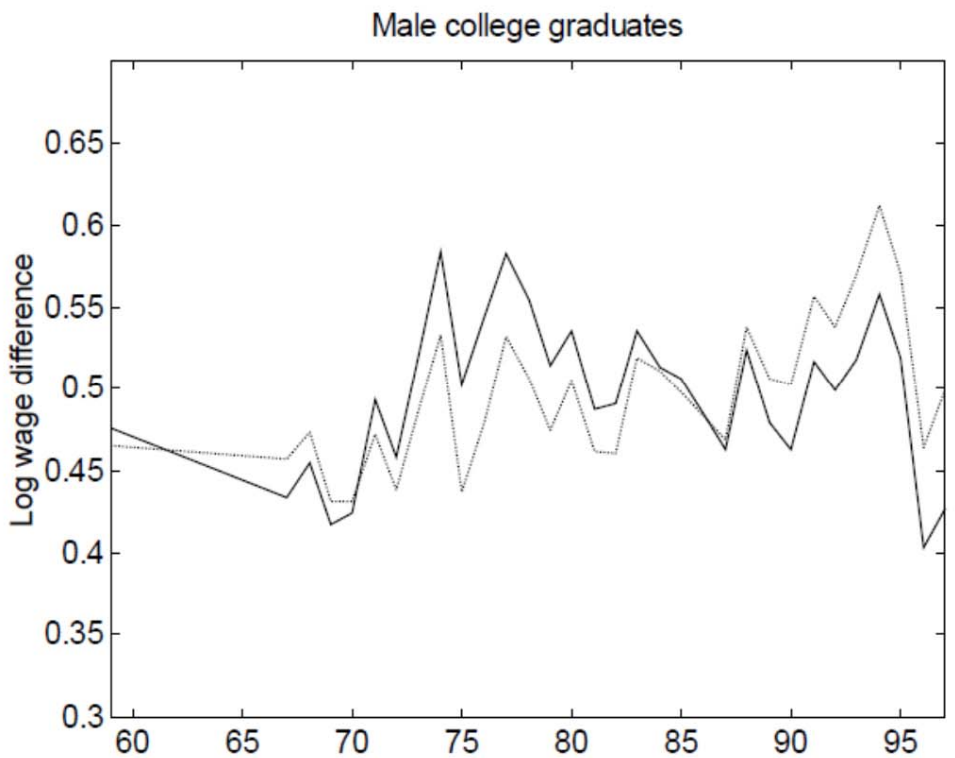


FIG. 7.—College–high school wage ratio for men by age group

Fact 3 - Experience Premium ↑ only for Low-Educated

"... one of the most important challenges ... is to explain the combination of the rise in the returns to labor market experience for the low-educated workers in the population and the flat, or declining, pattern of the experience premium for college graduates." Hornstein/Krusell/Violante (2005)





Source: Weinberg (2004).

Facts 1-3 in numbers

Panel A: Education Premium within Experience Group (March CPS, US)

	Dependent Variable: log(Education Premium): Wage(Educ>=16)/Wage(Educ<16)					
	Sample 1963-2008			Sample 1970-1997		
	All	Exper<10	Exper>=10	All	Exper<10	Exper>=10
	(1)	(2)	(3)	(4)	(5)	(6)
Year	0.0073***	0.0078***	0.0053***	0.0079***	0.0111***	0.0036***
	(0.0005)	(0.0006)	(0.0004)	(0.0008)	(0.0011)	(0.0007)
Adj R-squared	0.829	0.806	0.767	0.762	0.786	0.509
Observations	46	46	46	28	28	28

Panel B: Experience Premium within Education Group (March CPS, US)

	Dependent Variable: log(Experience Premium): Wage(Exp>=10)/Wage(Expc<10)					
	Sample 1963-2008			Sample 1970-1997		
	All	Educ<16	Educ>=16	All	Educ<16	Educ>=16
	(1)	(2)	(3)	(4)	(5)	(6)
Year	0.0054***	0.0048***	0.0022***	0.0055***	0.0072***	-0.0003
	(0.0004)	(0.0004)	(0.0005)	(0.0004)	(0.0006)	(0.0008)
Adj R-squared	0.838	0.727	0.275	0.854	0.838	-0.031
Observations	46	46	46	28	28	28

My Paper - Key Message

Fact 1: Since 1970's the experience premium increased similarly to the education premium in the US, leading to higher wage inequality.

Fact 2: The education premium increases sharply for inexperienced workers and only moderately for the experienced ones.

Fact 3: The experience premium increases only for the less-educated workers, while it remains flat among the highly-educated ones.

$\Rightarrow$ **Existing studies cannot provide an explanation.**

$\Rightarrow$ **I explain these facts in a unified framework.**

My Paper - The Mechanism

- **Key elements:**
  (i) Signaling, (ii) Credit Constraints, (iii) Private Employer Learning.

- **Signaling & Credit Constraints:** Firms cannot distinguish the low from the credit constrained high type. *Explains Education Premium*

- **Signaling, Credit Constraints & Private Employer Learning:**
  Now firms learn the type of their workers.
  Explains Experience Premium & the Within Group Inequality

- **Key papers:** (i) Signaling $\Rightarrow$ Spence (1973)
  (ii) Credit Constraints $\Rightarrow$ Galor & Zeira (1993)
  (iii) *Public* Employer Learning $\Rightarrow$ Jovanovic (1979)

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  (i) & (ii) $\Rightarrow$ Hendel et al. (2005) - *theory*

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  (i) & (iii) ⇒ Lange (2007) - *empirical*

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  (iii) *Private* Employer Learning $\Leftarrow$ *Kahn (2014)*

  (i), (ii) & (iii) $\Leftarrow$ **THIS PAPER**

Literature - Education, Experience and Wages

	Informational Return	**Non-Informational Return**
Education	Signaling	Human Capital
Experience	Employer Learning	Employee Learning (LBD)

- **Human Capital vs Signaling**:
  Becker (1964) vs Spence (1973); Bedard (2001); Lange (2007).
- **Employer Learning**:
  Jovanovic (1979); Farber and Gibbons (1996); Arcidiacono et al. (2010); Kahn (2014).
- **Skill (Education) Premium**:
  SBTC: Katz and Murphy (1992); Acemoglu (1998); Caselli (1999); Galor and Moav (2000).
- **Experience Premium**: Heckman et al. (1998); Aghion et al. (2002);
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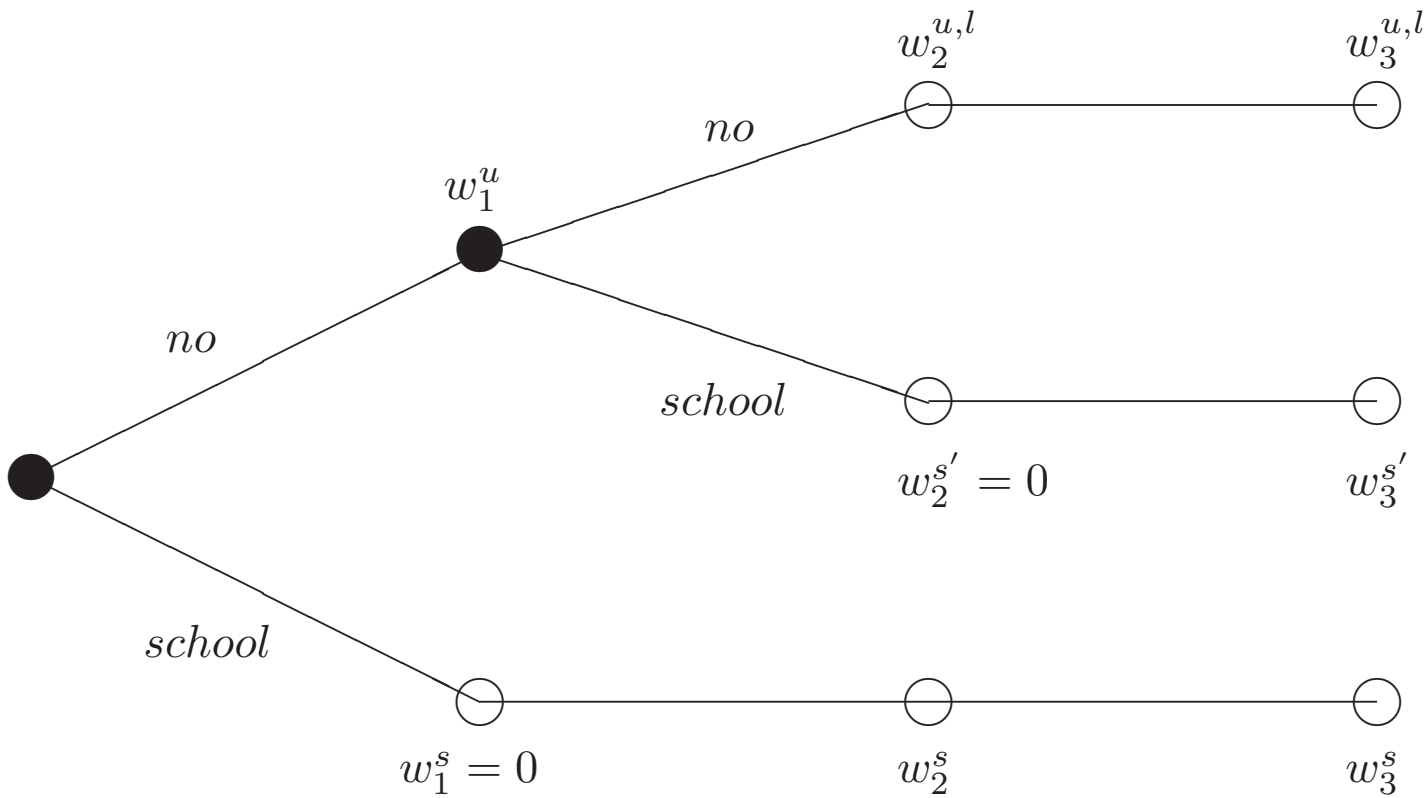
Outline

- Intro
- **Theory**
- **Evidence**
- Conclusions

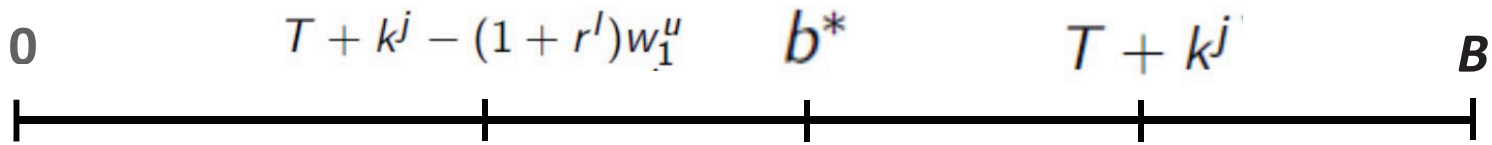
Setup - Elements I

- **Workers**: mass 1, live 3 periods, π high ability types ($q^h > q^l$), continuum of initial wealth, education choices, fixed tuition cost T & differentiated effort cost ($k^l > k^h \equiv 0$), max *earnings*.
- **Firms**: compete à la Bertrand over workers, $t = 1$ observe actions & set wages, $t = 2$ observe productivity, max *profits*.
- **Information**: asymmetric information in worker ability.
- **Finance**: credit constraints $r^b > r^l$, self-funded vs borrowers.
- **Learning**: *private* employer learning, informational advantage of incumbent firms over potential competitors.

Elements II: Timing



Elements III: Lifetime Earnings



1. **Self-Funded Young Students:** $b^i \geq T + k^j$.
   $y^A = (1 + r^l)^2(b^i - T - k^j) + (1 + r^l)w_2^s + w_3^s$.

2. **Young Borrowers:** $b^i \in [b^*, T + k^j)$.
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3. **Self-funded Old Students:** $b^i \in [T + k^j - (1 + r^l)w_1^u, b^*)$.
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4. **Uneducated:** $b^i < T + k^j - (1 + r^l)w_1^u$
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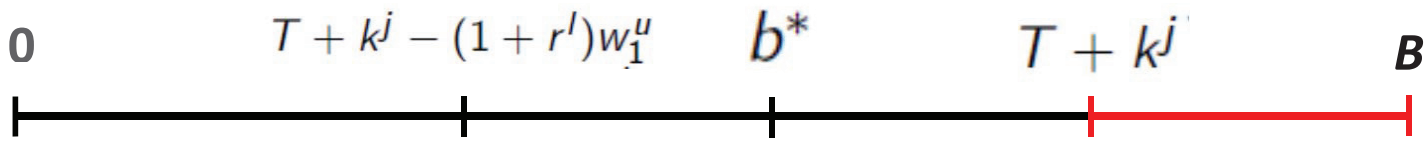

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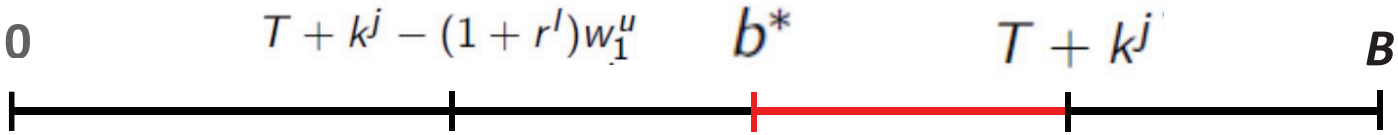

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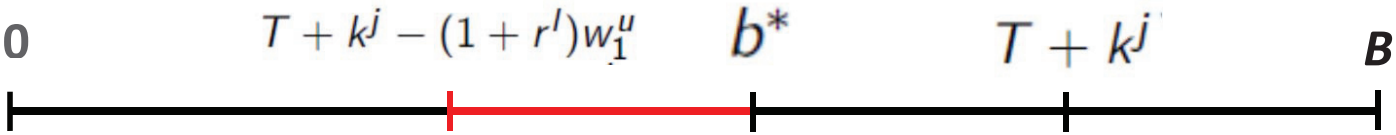

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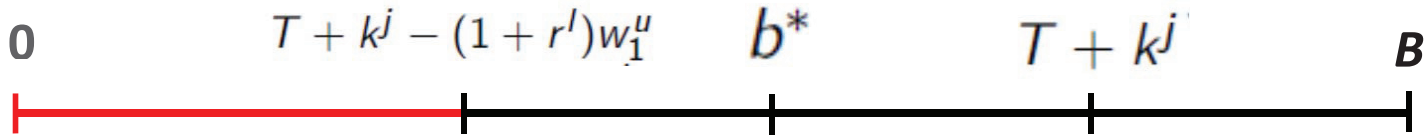

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Key Assumptions

Assumption 1

The effort cost for the low type k^l is high enough that even the richest low type prefers to remain uneducated.

Assumption 2

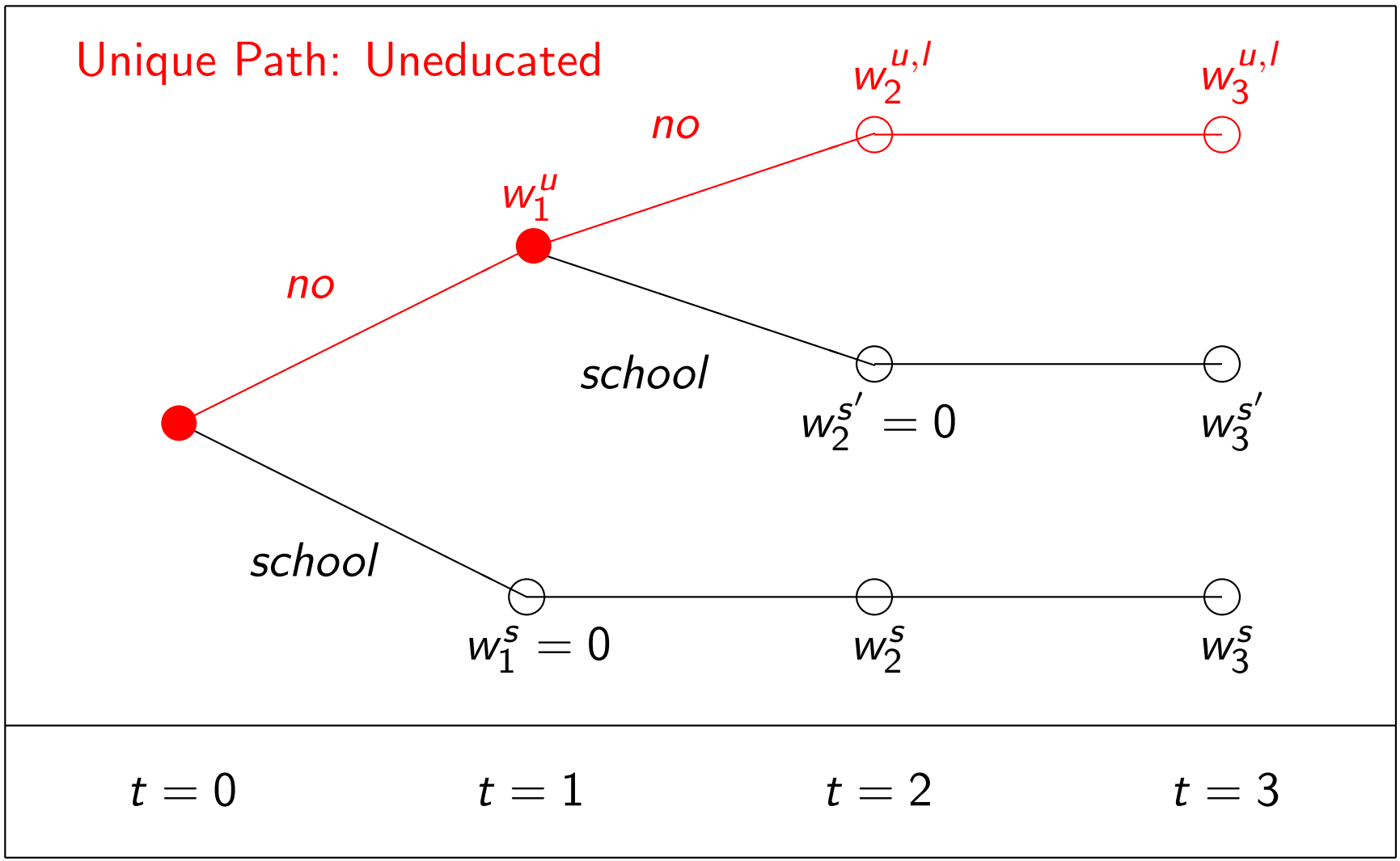
Credit constraints render education investments profitable only for the relatively rich high types.

Assumption 3

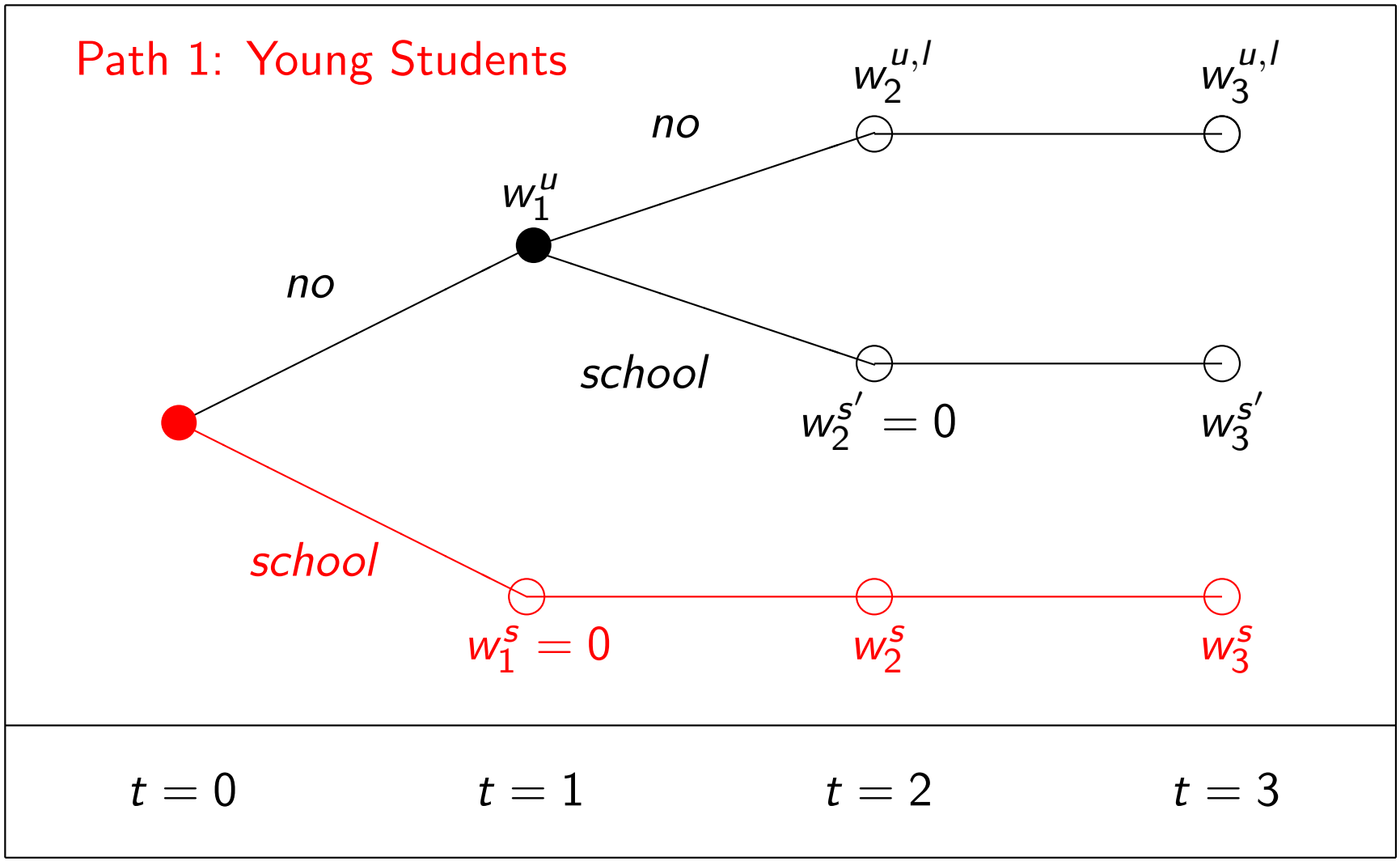
Old and uneducated high types prefer to separate themselves instead of pooling with the low types.

▸ Go to **Details**

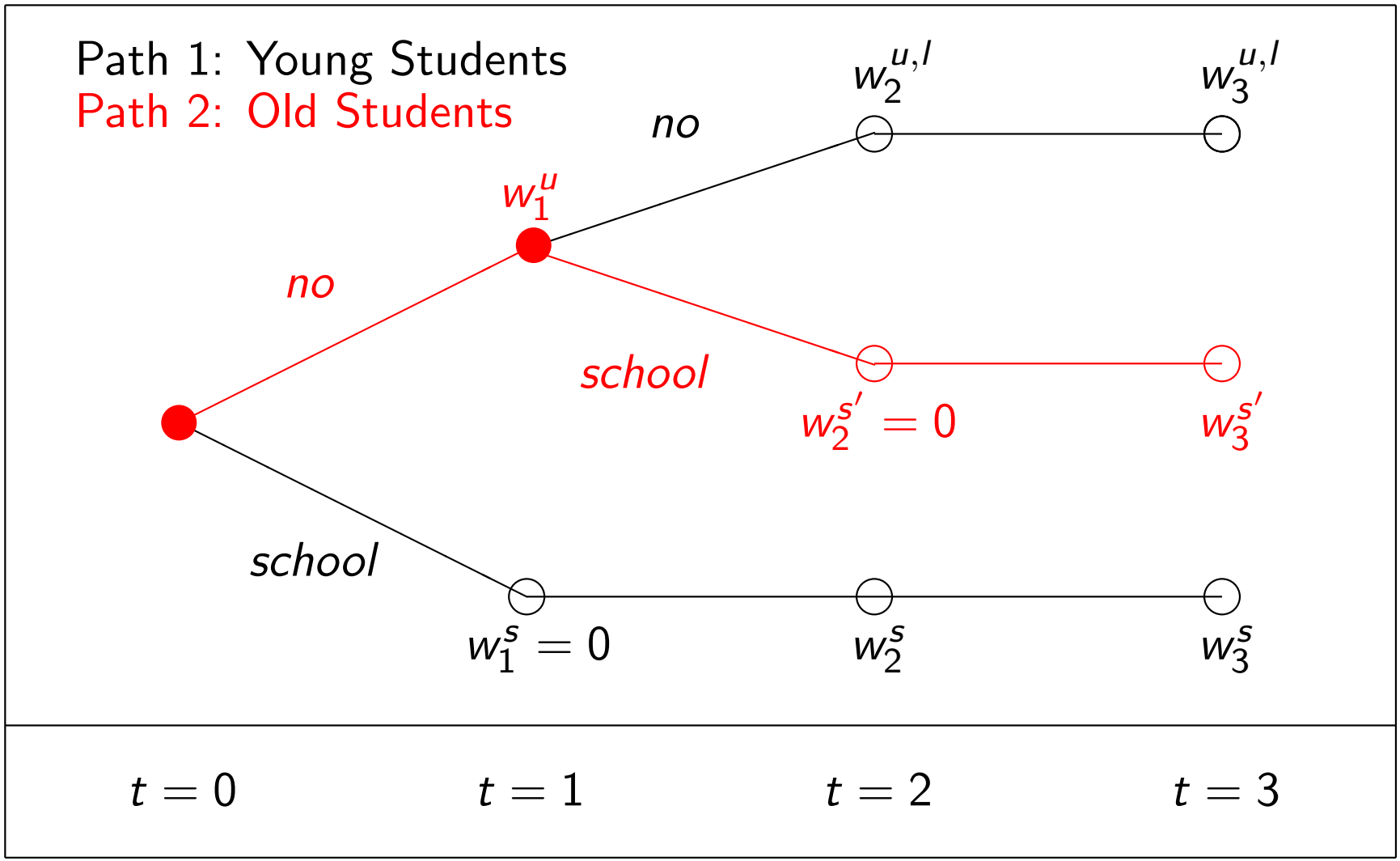
Group A: Low Types - All Remain Uneducated



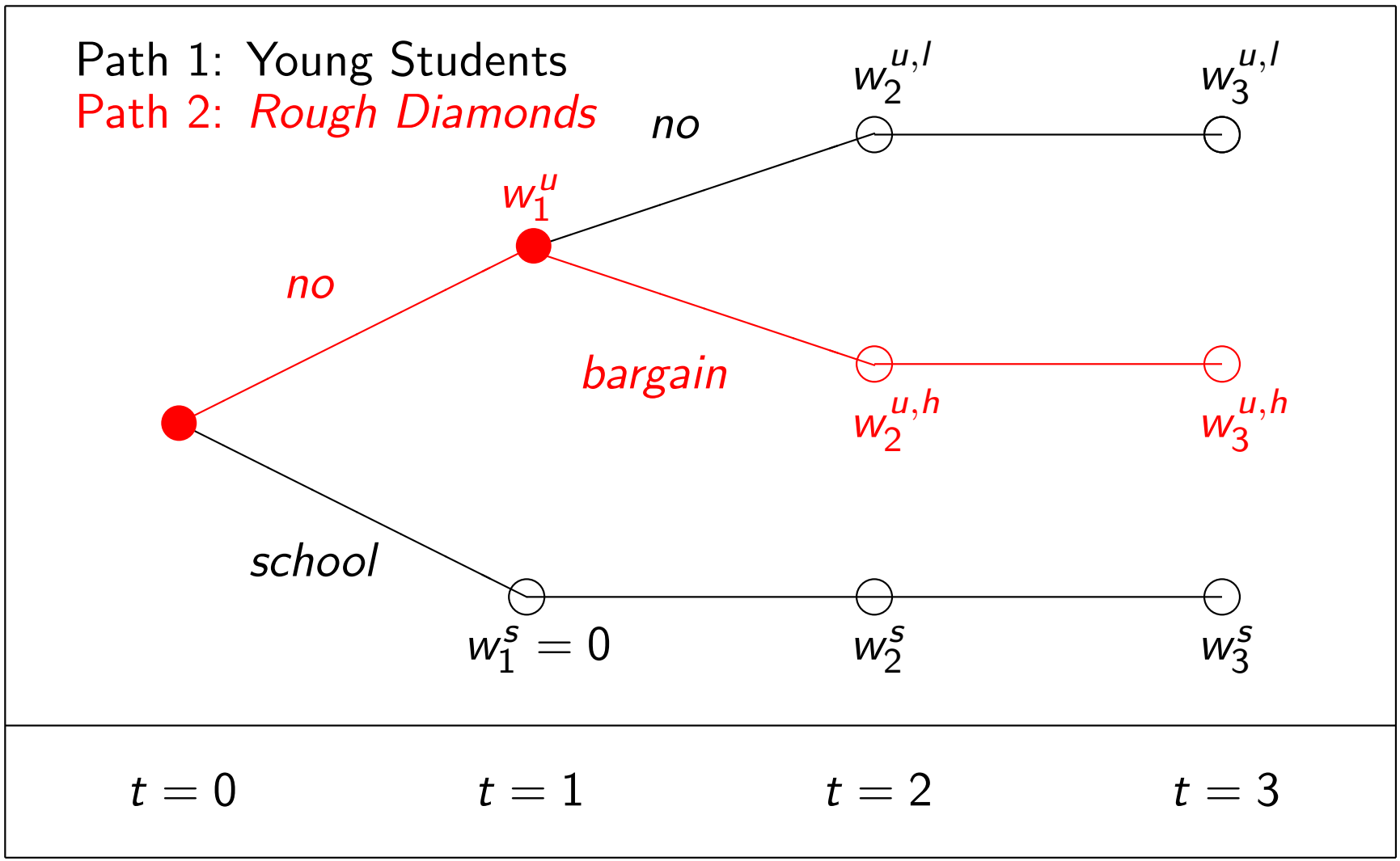
Group B: High Types - The Wealthy Go to School Young



Group B: High Types - Constrained Can Go To School Old (threat)



Group B: High Types - Negotiate a Better Contract



Firm's beliefs and Wages

- All educated workers are high types. So, $w_2^s = w_3^s = q^h$.
- Those who never go to school are low types.
  So, $w_2^{u,l} = w_3^{u,l} = q^l$.
- Uneducated high type bargainers get this wage:
  $w_2^{u,h} = w_3^{u,h} = [q^h - (1 + r^l)T]/(2 + r^l)$.
- We only have to determine the unskilled-inexperienced wage (pool of constrained high types and all low types): w_1^u.

Equilibrium I: The Equilibrium Concept

A Perfect Bayesian Signaling Equilibrium is defined as:

1. choices of education in period 1 based on ability and initial wealth: $A_1^*(q^j, b^i) \in \{school, not\}$, choices in period 2 based on ability and initial wealth $A_2^*(q^j, b^i) \in \{school, not\}$;
2. beliefs by firms about worker type in the first period of employment given their education level $B_1(j|A_1)$, $\forall$ $A_1\{school, not\}$ and $B_2(j|A_2)$, $\forall$ $A_2\{school, not\}$;
3. and equilibrium wages: $w_1^u, w_2^u, w_2^s, w_3^u, w_3^s$ and $w_3^{s'}$.

Such that:

1. workers maximize their lifetime earnings,
2. firms maximize their profits,
3. labor markets clear.

Equilibrium II: Supply & Demand for Unskilled Labor in period 1.

Supply

- The supply of unskilled labor is given by the following equation: $P(u|h) = P(b^i < b^*)$. When $w_1^u \Uparrow$, then $b^* \Uparrow$.
- AS2 re-written gives SUPPLY: $b^* = \frac{(1+r^b)^2 T+(1+r^l)w_1^u-(1+r^l)(w_2^s+T)}{(1+r^b)^2-(1+r^l)^2}$

Demand

- Expected productivity: $w_1^u = q^l \left(\frac{1-\pi}{1-\pi+\pi P(u|h)}\right) + q^h \left(\frac{\pi P(u|h)}{1-\pi+\pi P(u|h)}\right)$
- Solving for $P(u|h)$ gives DEMAND: $P(u|h) = \frac{1-\pi}{\pi}\left(\frac{w_1^u-q^l}{q^h-w_1^u}\right)$
- Demand curve for unskilled labor in period 1 is upward sloping.

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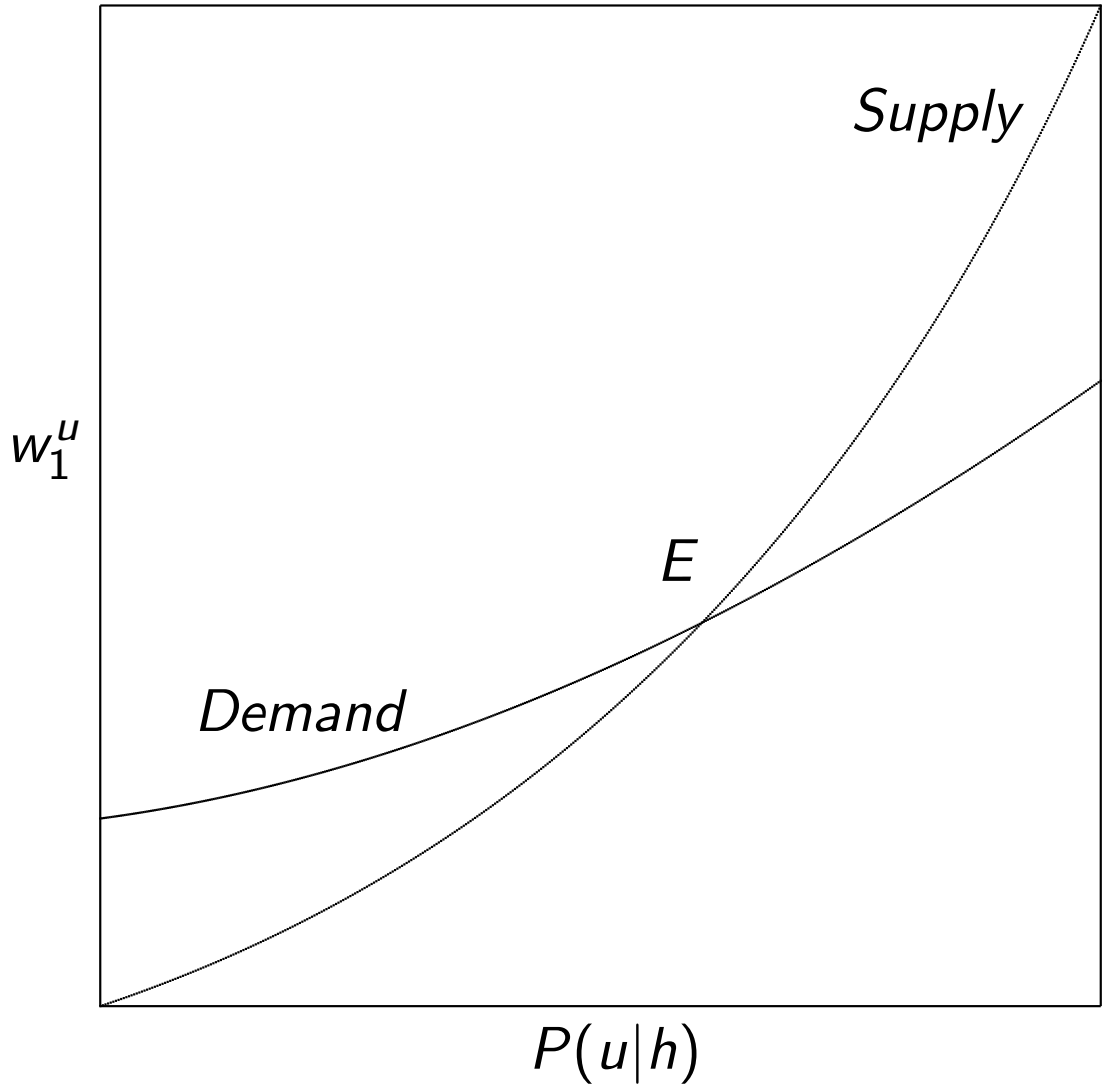
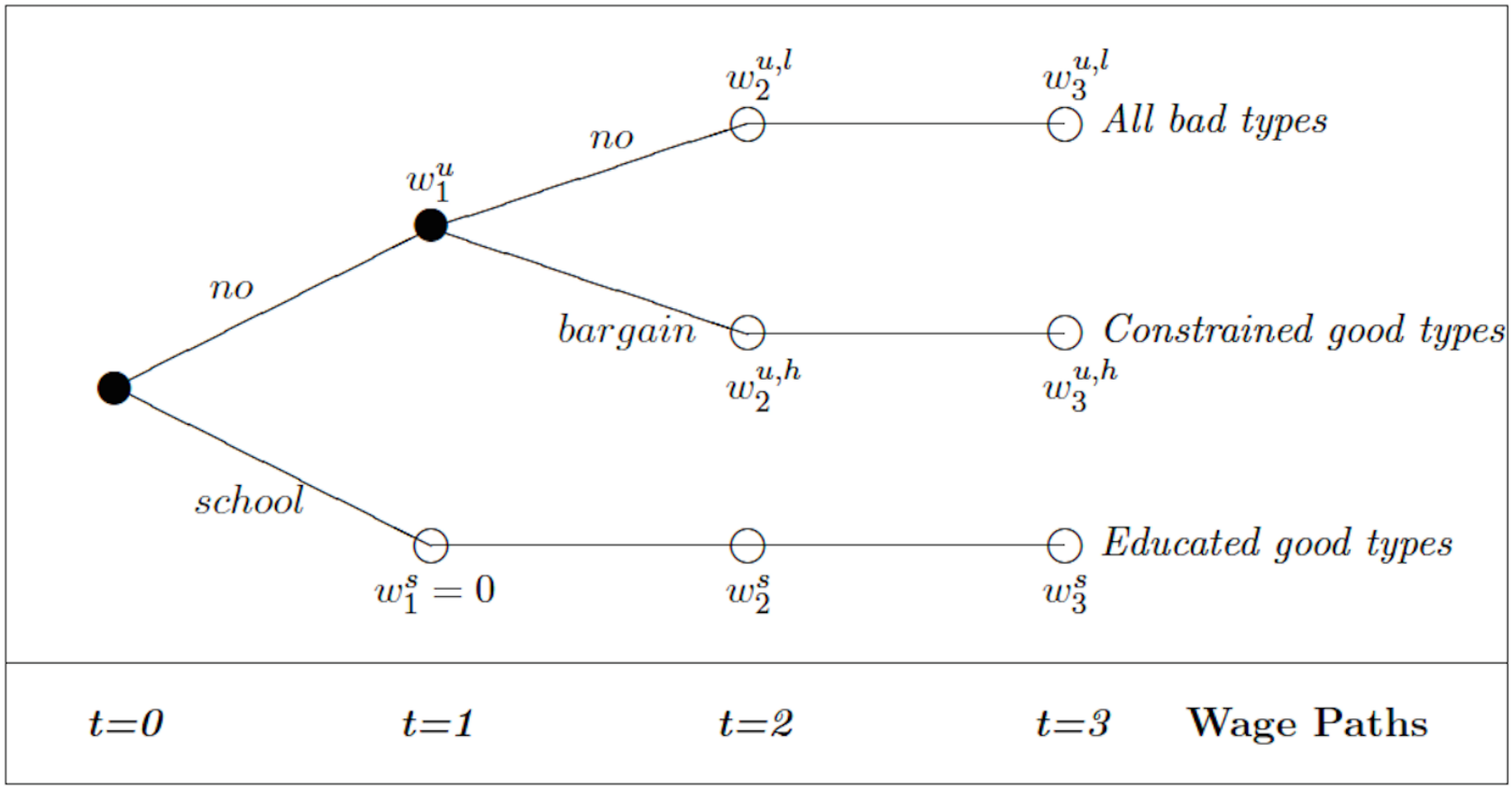


Proposition 1: Existence & Stability.

Let $P(\cdot)$ be continuously differentiable, then there exists at least one stable equilibrium.

▸ Go to **Proof**

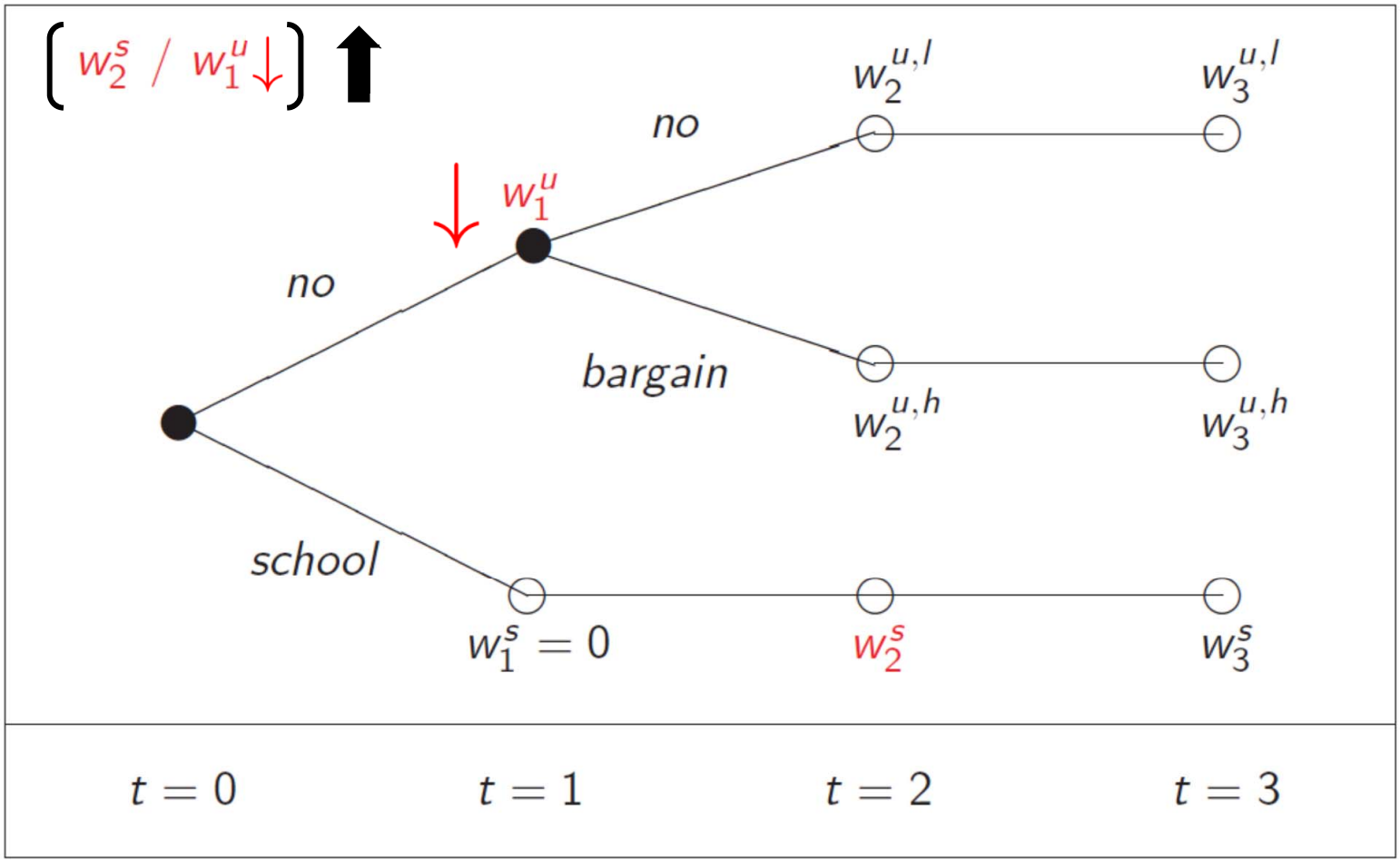
Equilibrium VI: The Labor Market in Equilibrium



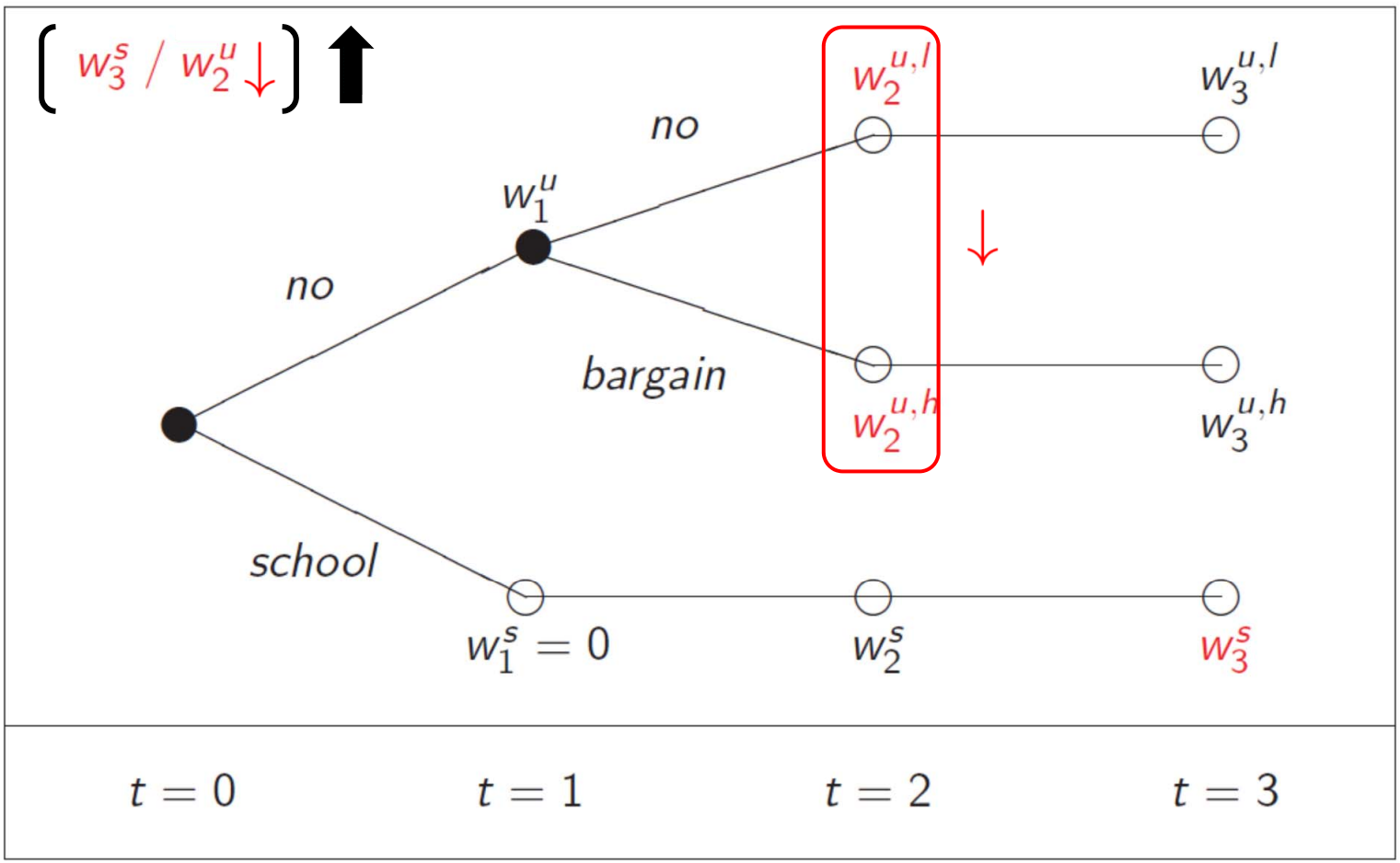
Comparative Statics

Credit Constraints have become less severe

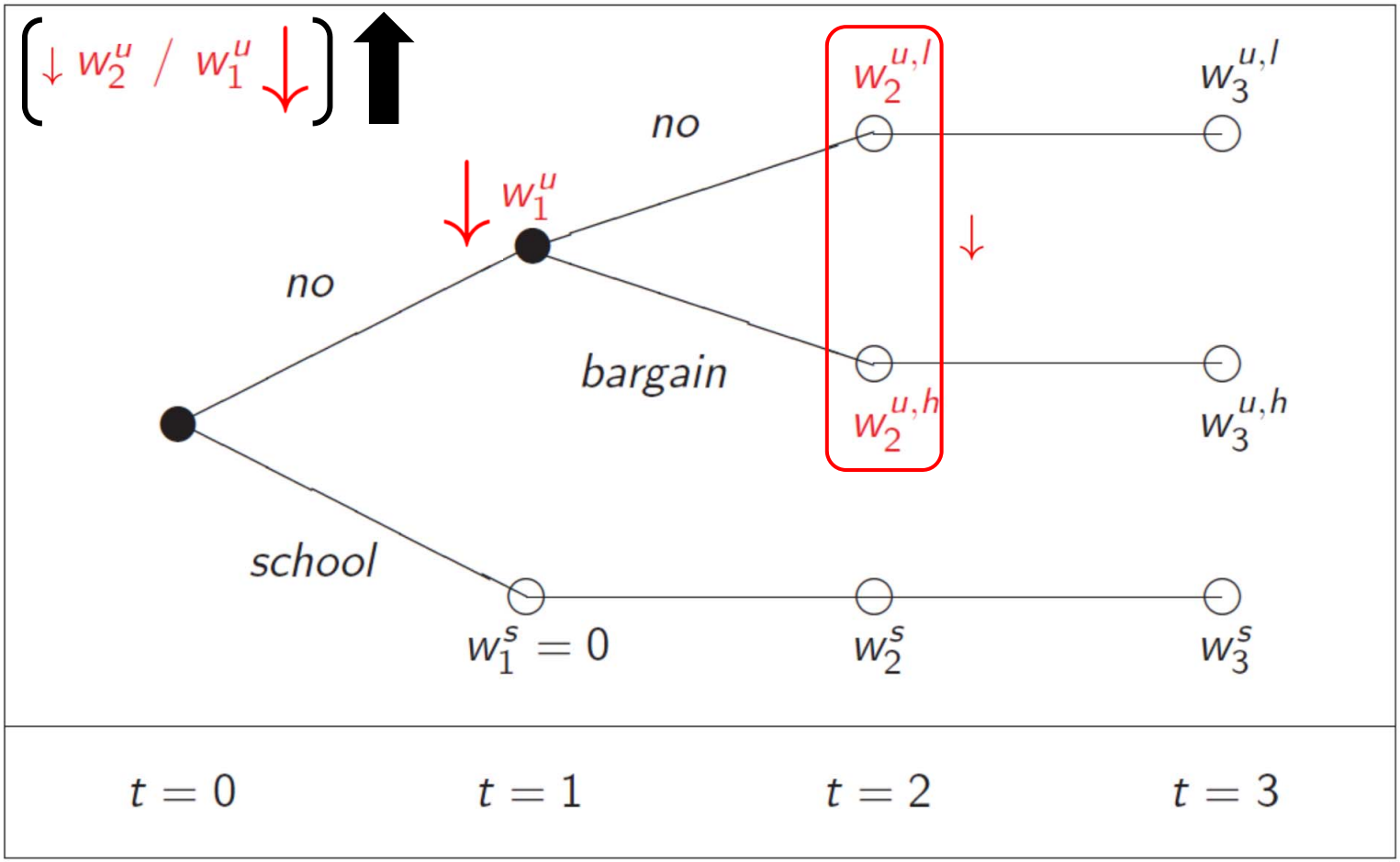
Education Premium for Inexperienced Workers



Education Premium for Experienced Workers



Experience Premium for Low-educated Workers



Experience Premium for Low-educated Workers: Proof

$$\frac{w_2^u \downarrow}{w_1^u \Downarrow}$$

$$\frac{N^H \downarrow {w_2}^{u,h} + N^L q^l / [N^H \downarrow + N^L]}{N^H \downarrow q^h + N^L q^l / [N^H \downarrow + N^L]}$$

$${w_2}^{u,h} < q^h$$

Comparative Statics I: Education Premium

Proposition 2: Education Premium

In any stable equilibrium, less severe credit constraints increase the education premium for both experienced and inexperienced workers. However, the increase is larger in magnitude for the latter.

▸ Go to **Proof**

▸ Go to **Graph**

Comparative Statics II: Experience Premium

Proposition 3: Experience Premium

In any stable equilibrium, less severe credit constraints increase the experience premium. The experience premium rises only for low-educated workers, while it remains constant for the highly-educated ones.

▸ Go to **Proof**

▸ Go to **Graph**

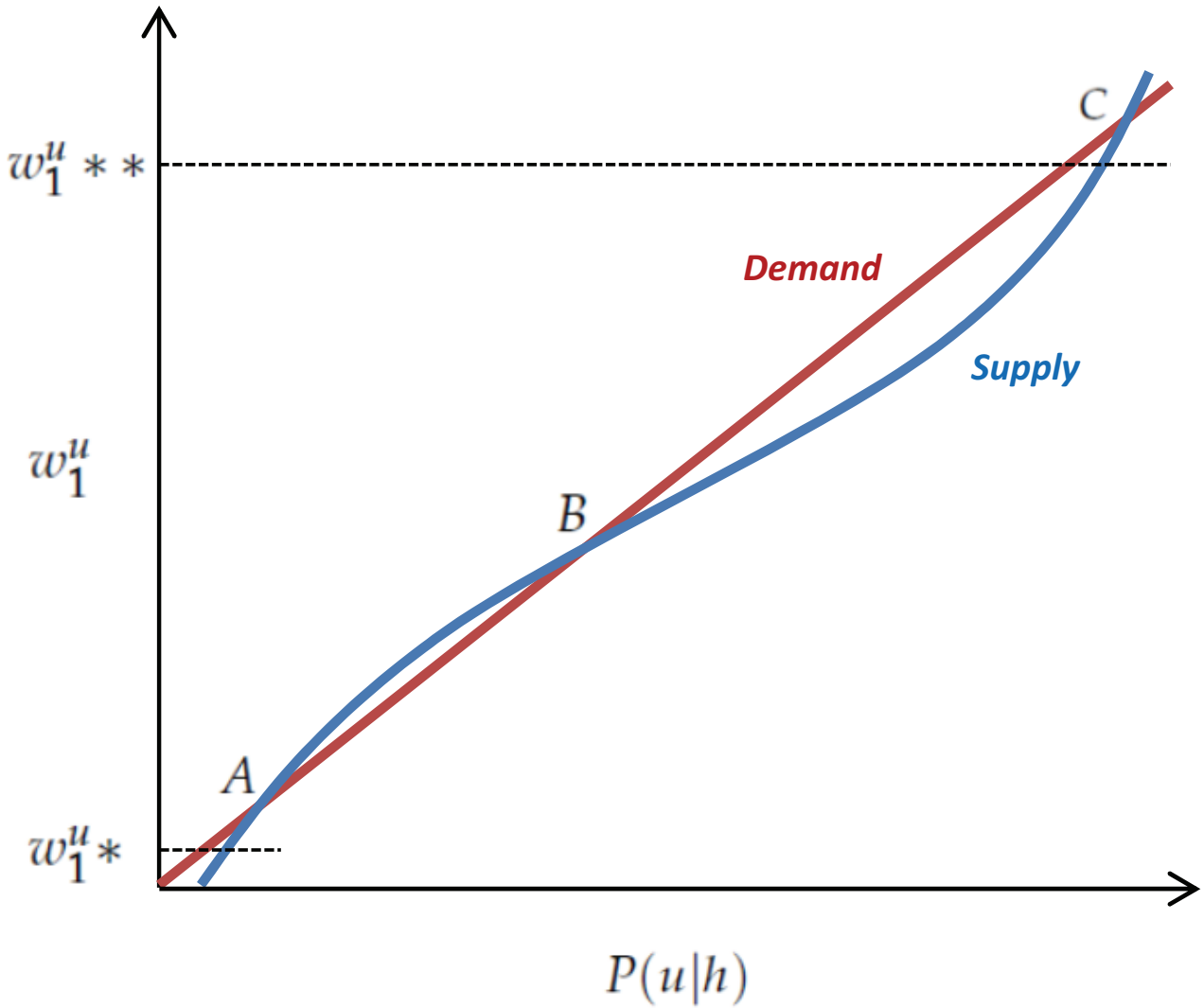
Robustness in Theory

- The model with 2 ability types is just a simplification. A more realistic version with a **continuum of ability types** does not change the results of propositions 2 and 3.

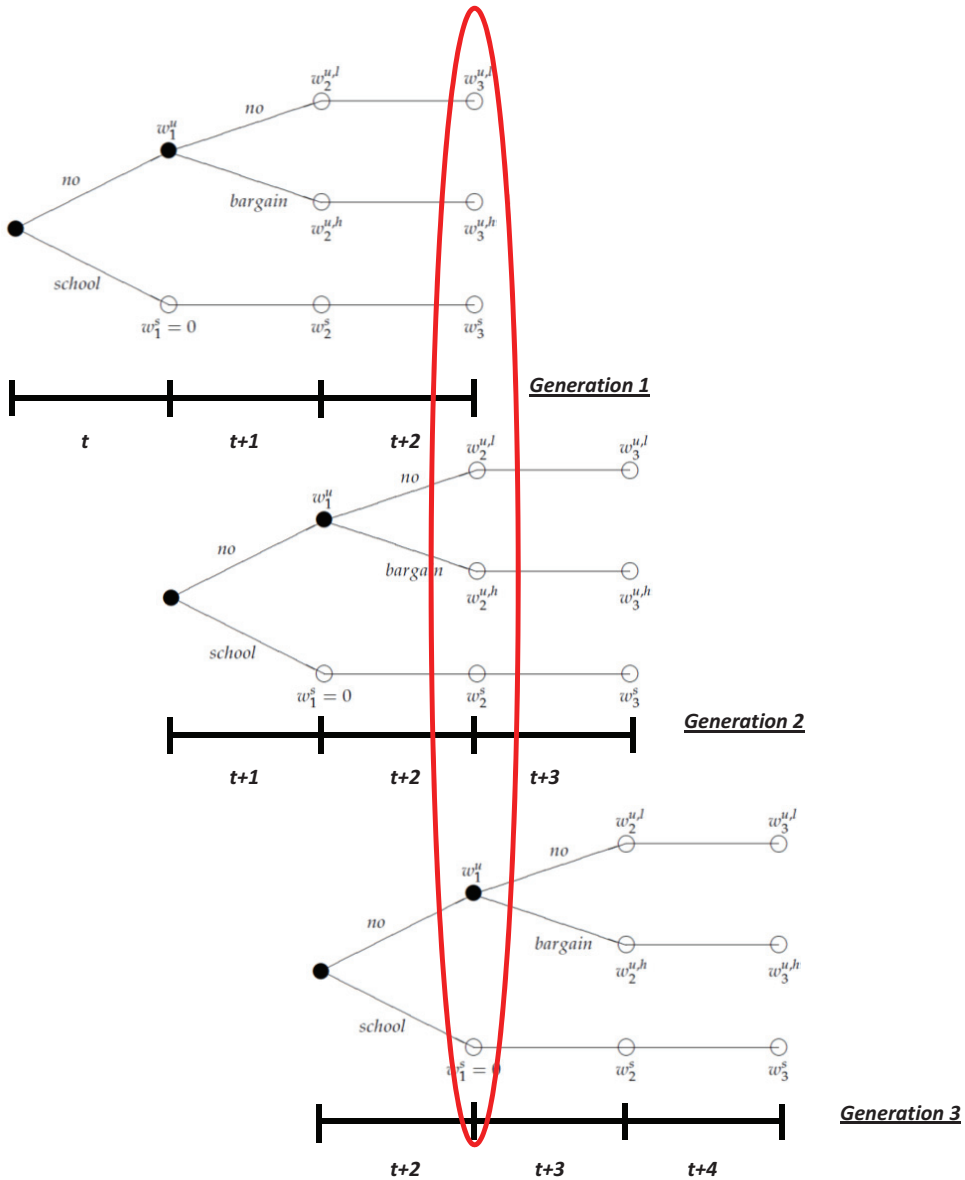
- Pure signaling model but adding **human capital** not only leaves the qualitative results of propositions 2 and 3 unaffected but also boosts the magnitude of the rise in the skill premium.

- The only return to experience is due to employer learning. However, augmenting this model with **employee learning** *(LBD)* leaves propositions 2 and 3 unaffected.

Multiple Equilibria, Selection and Minimum Wage Policy



A Dynamic three-period OLG Model



Outline

- Intro
- **Theory**
- **Evidence**
- Conclusion

The relaxation of Credit Constraints for Higher Education

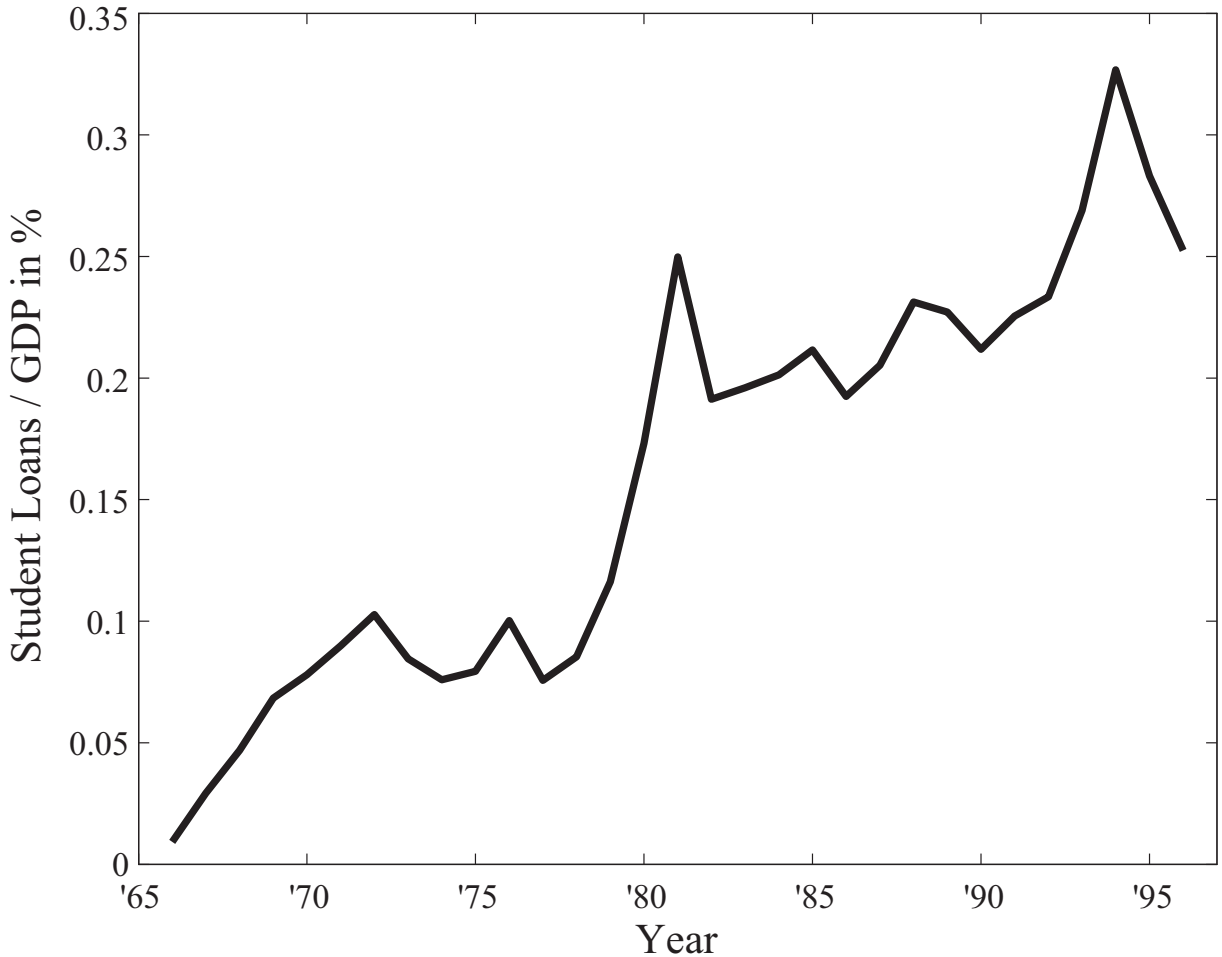
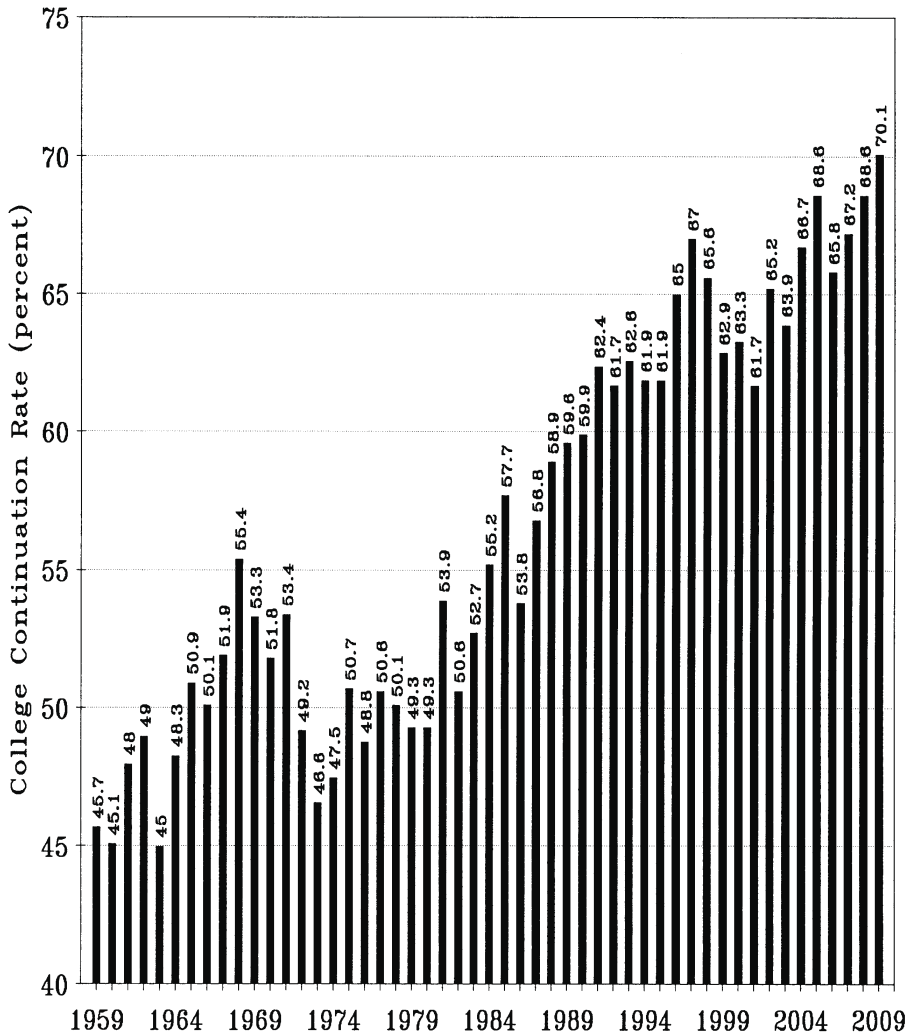
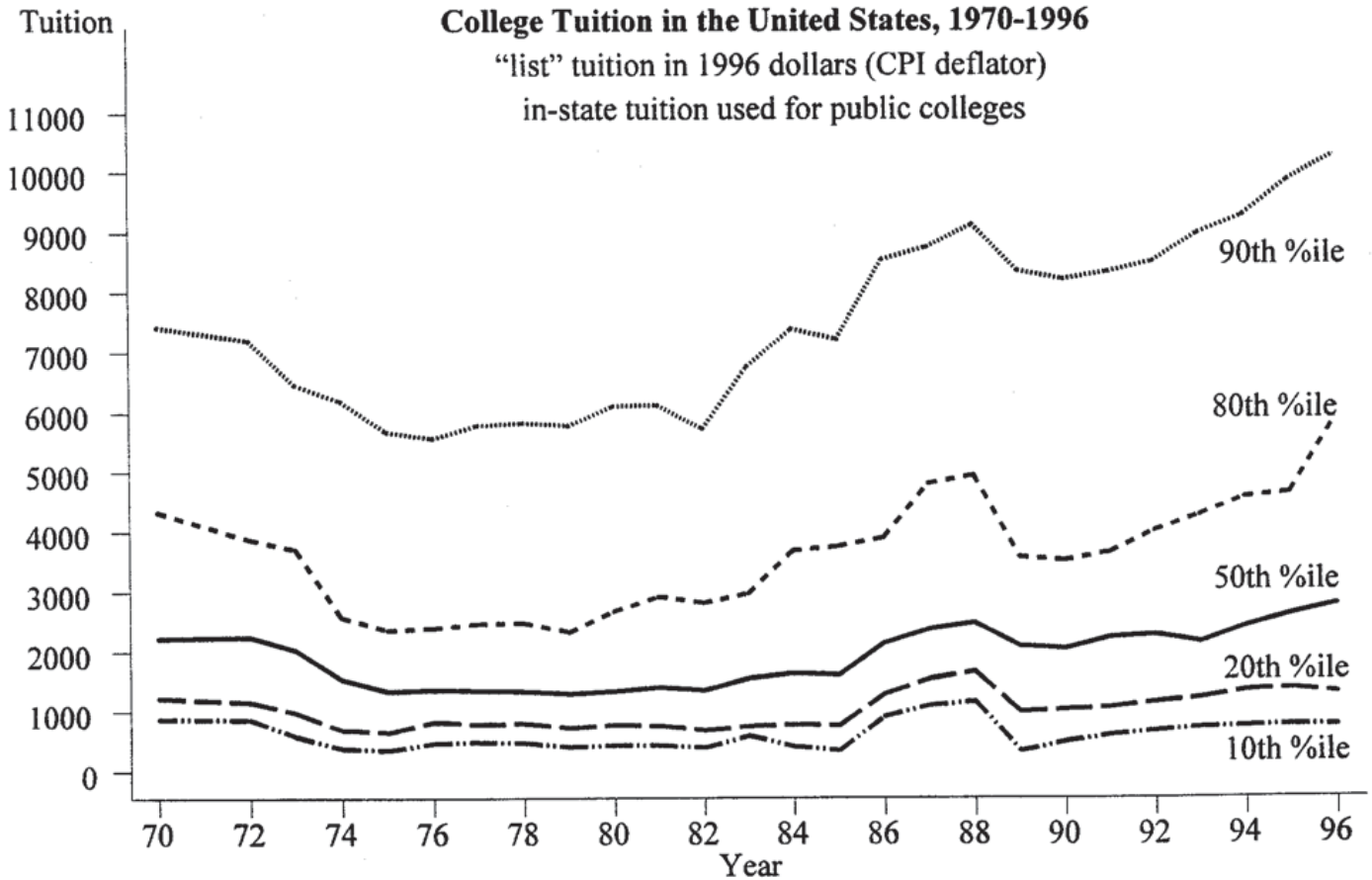


Fig. 5. Federal Family Education Loan volume as a percentage of GDP. Source: U.S. Department of Education and Council of Economic Advisors.

College Continuation Rates, US



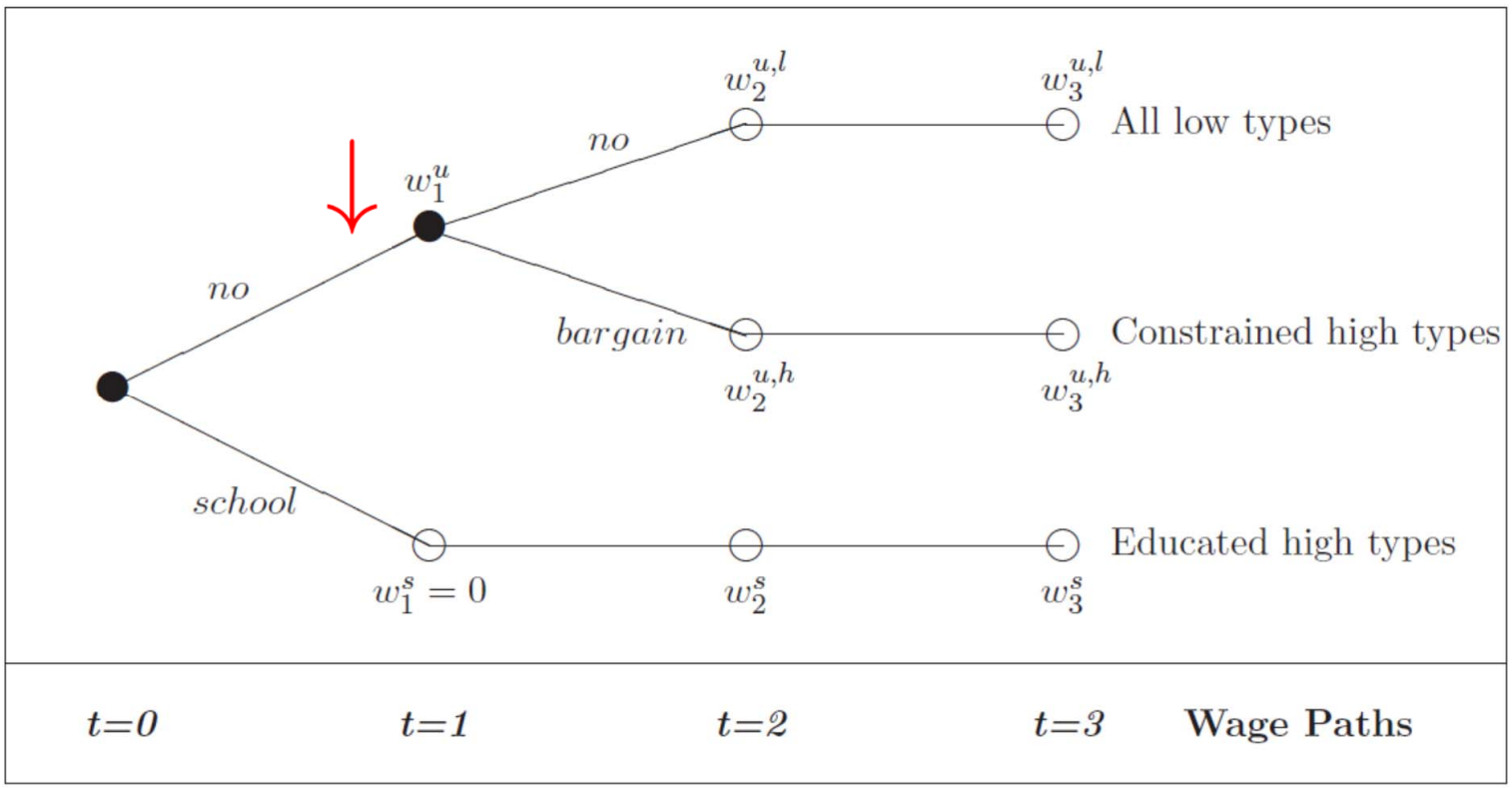
Tuition Fees in *Real Terms*, US



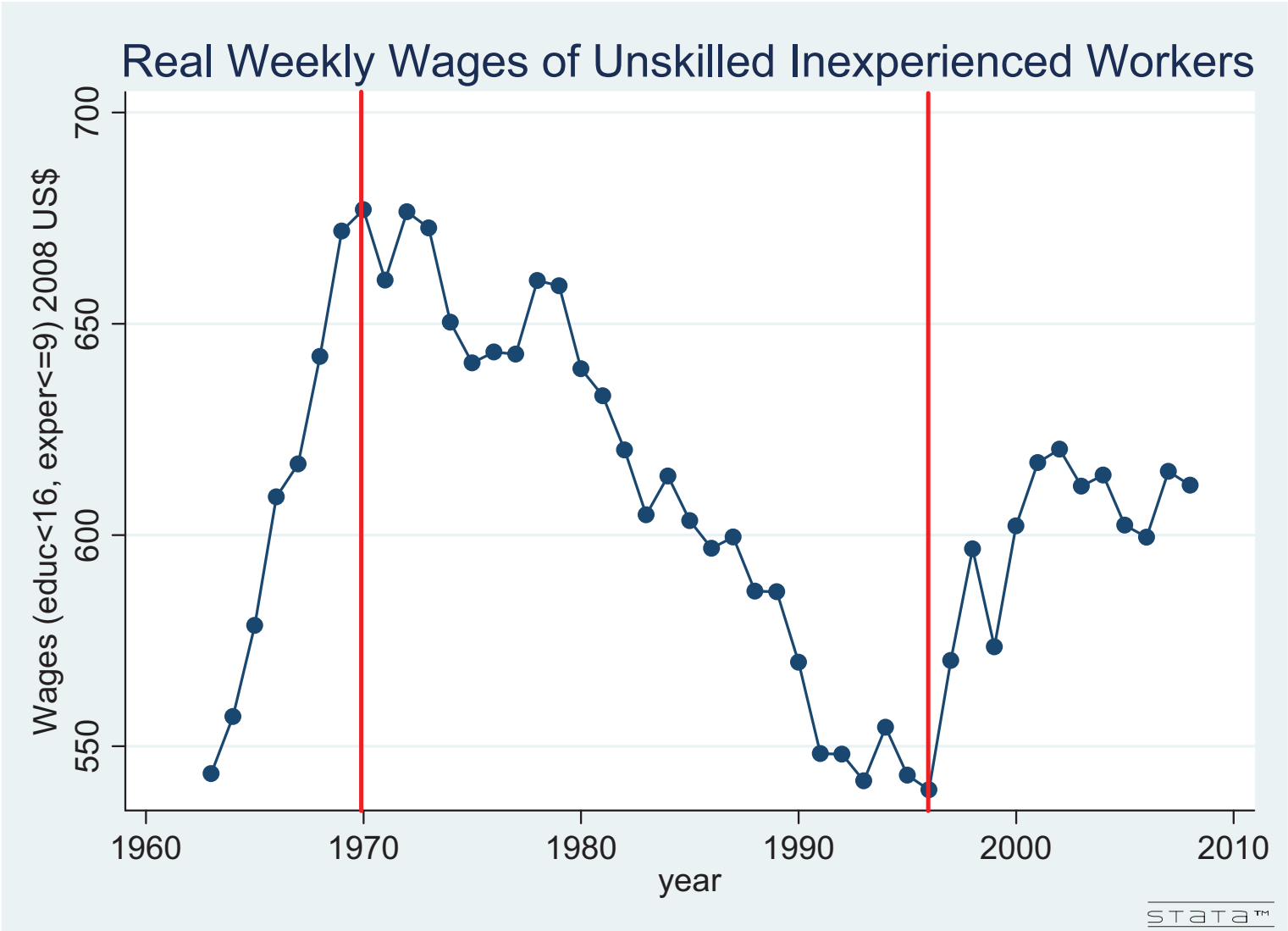
Source: Hoxby (2000), tuition fees in real terms 1970-1996, US

Theory - Falling Unskilled-Inexperienced Wages $w_1^u \downarrow$

Unskilled Inexperienced workers are **less able** due to a composition effect $\rightarrow$ real wages for unskilled inexperienced labor have fallen (in both my model and real data).

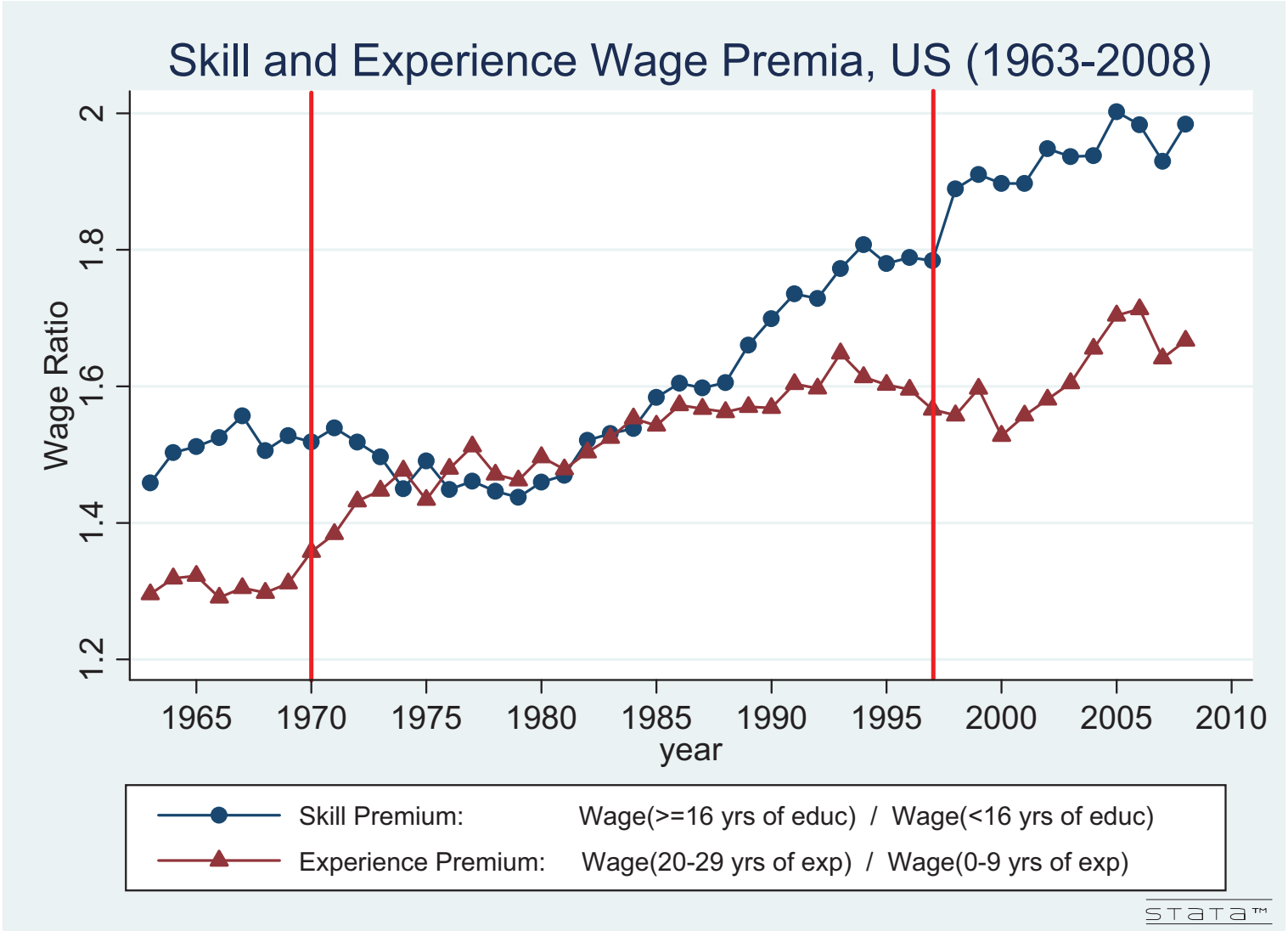


Data - Falling Unskilled-Inexperienced Wages $w_1^u \downarrow$ (1970-1997)



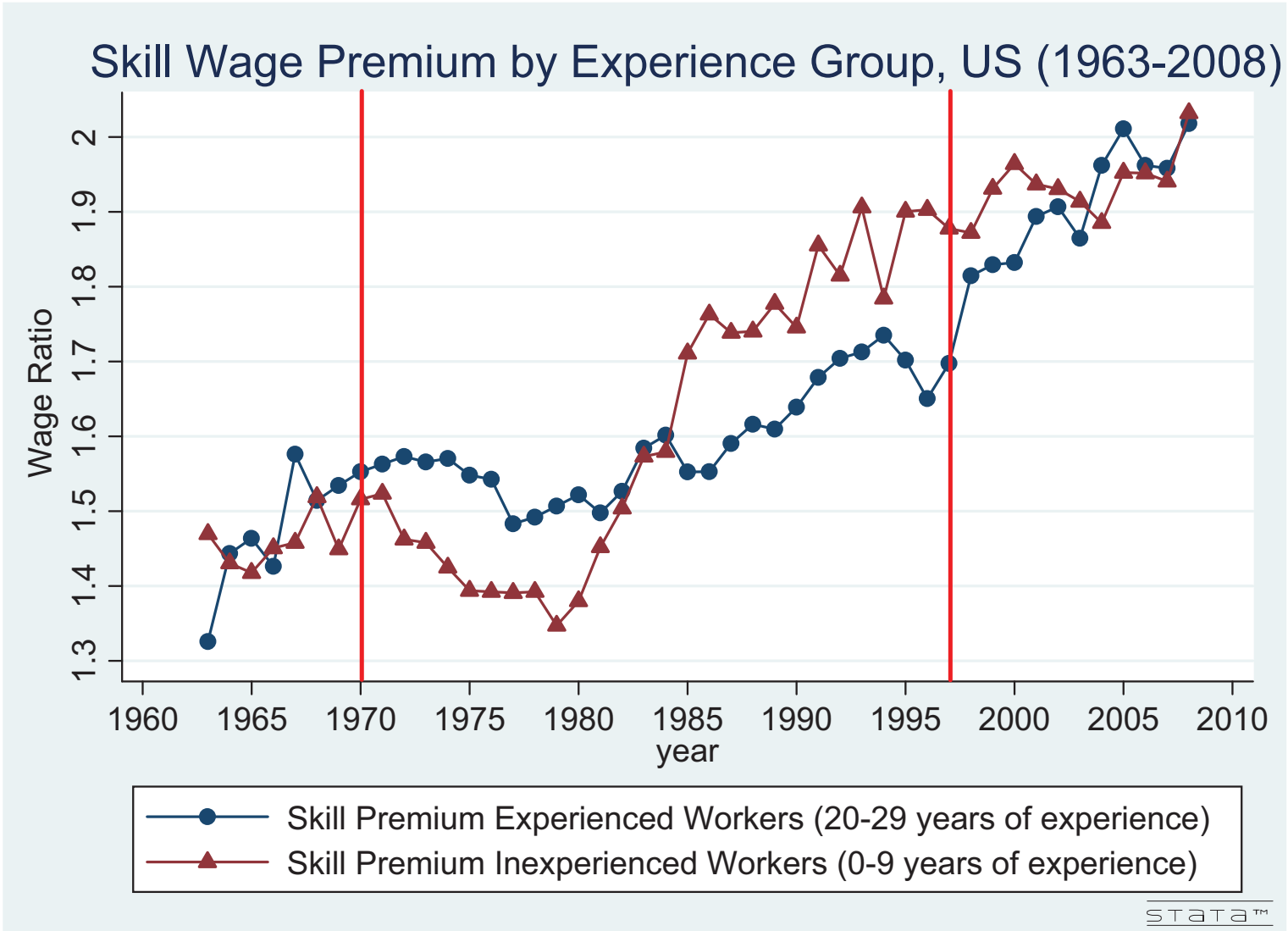
Source: March CPS (male weekly wages).

Rising Between Group Inequality (1970-1997)



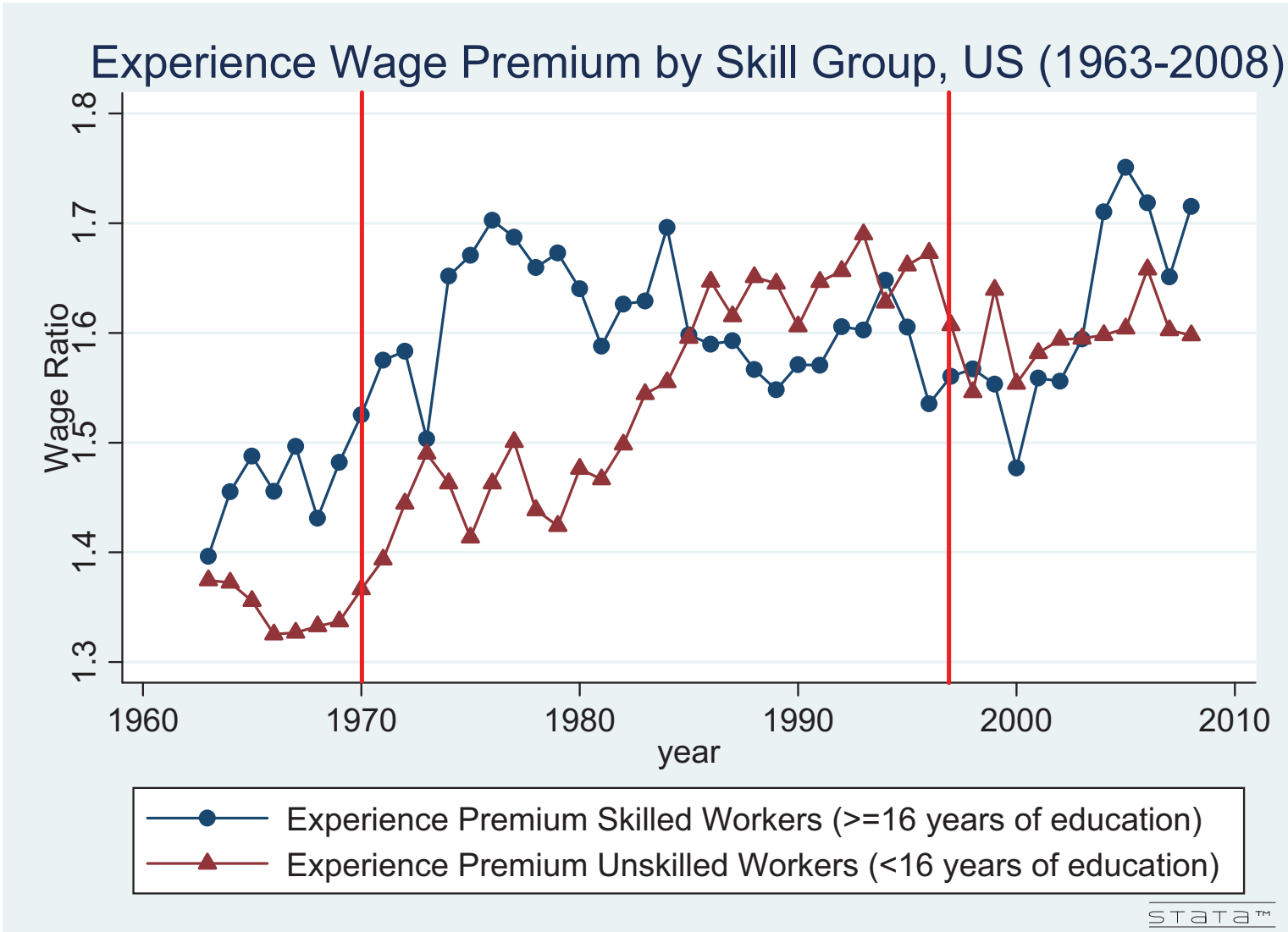
Source: March CPS (male weekly wages).

Rising Within Group Inequality (1970-1997)



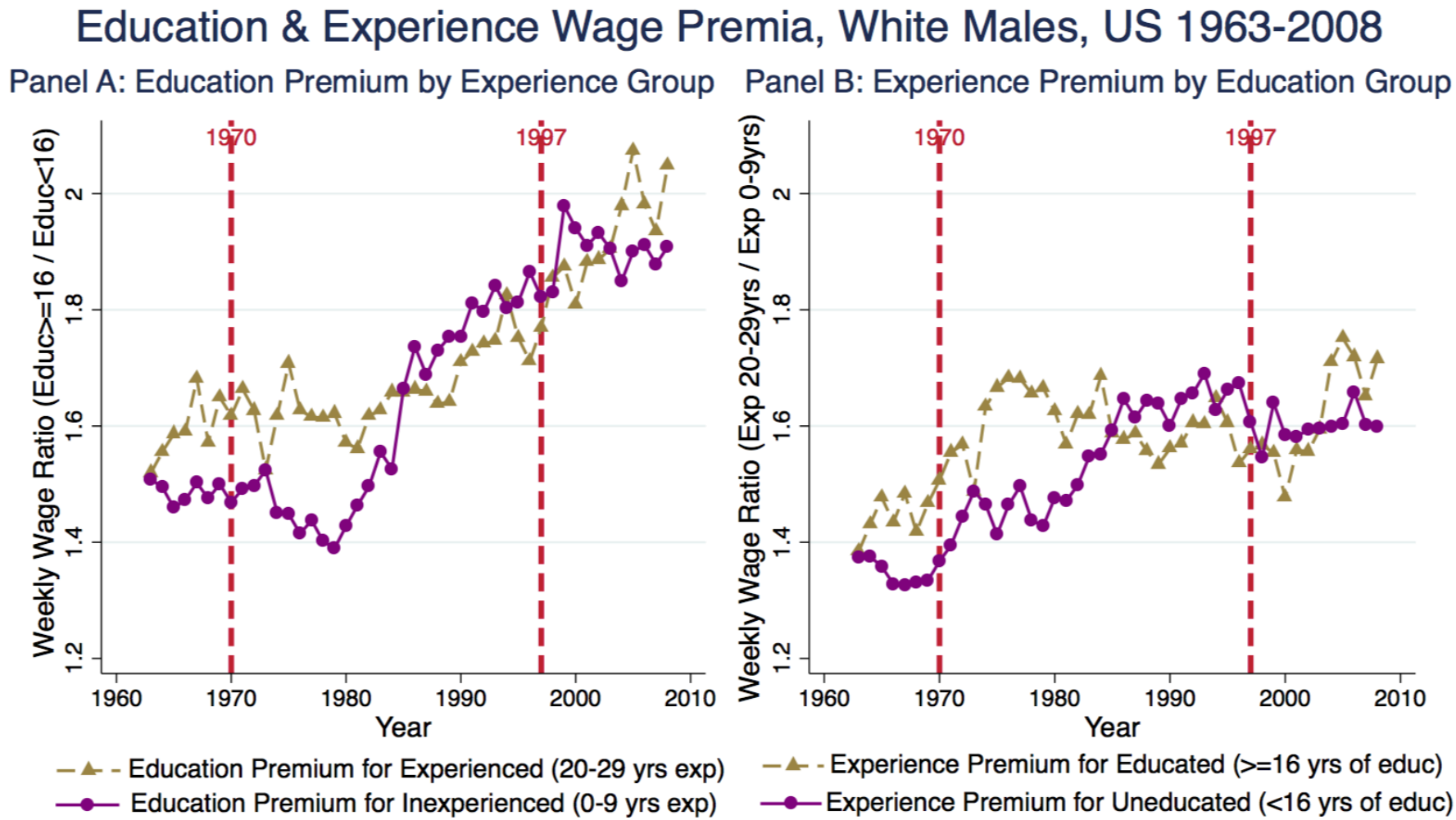
Source: March CPS (male weekly wages).

Rising Within Group Inequality (1970-1997)



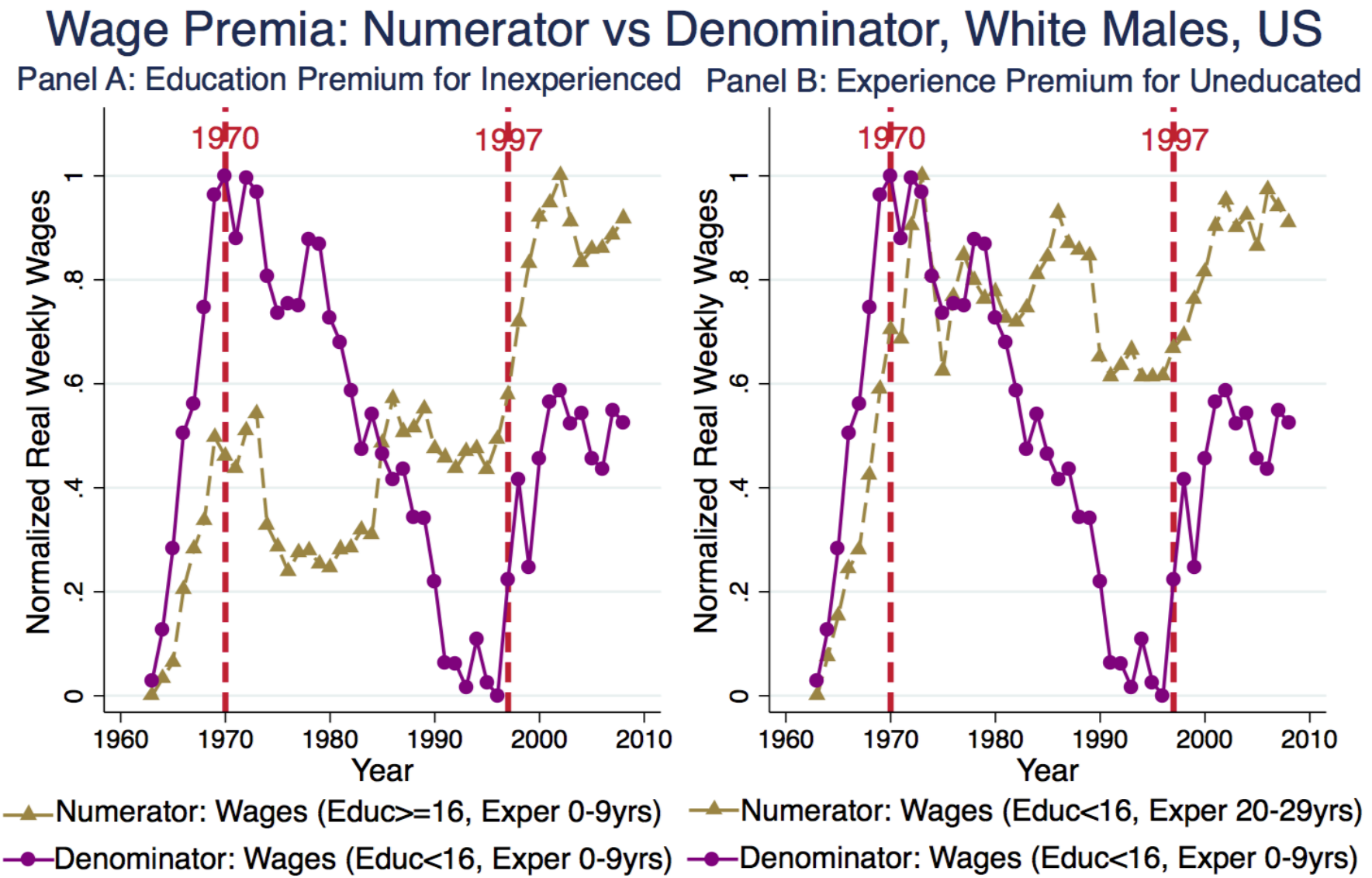
Source: March CPS (male weekly wages).

Rising Within Group Inequality (1970-1997)



Source: March CPS (male weekly wages).

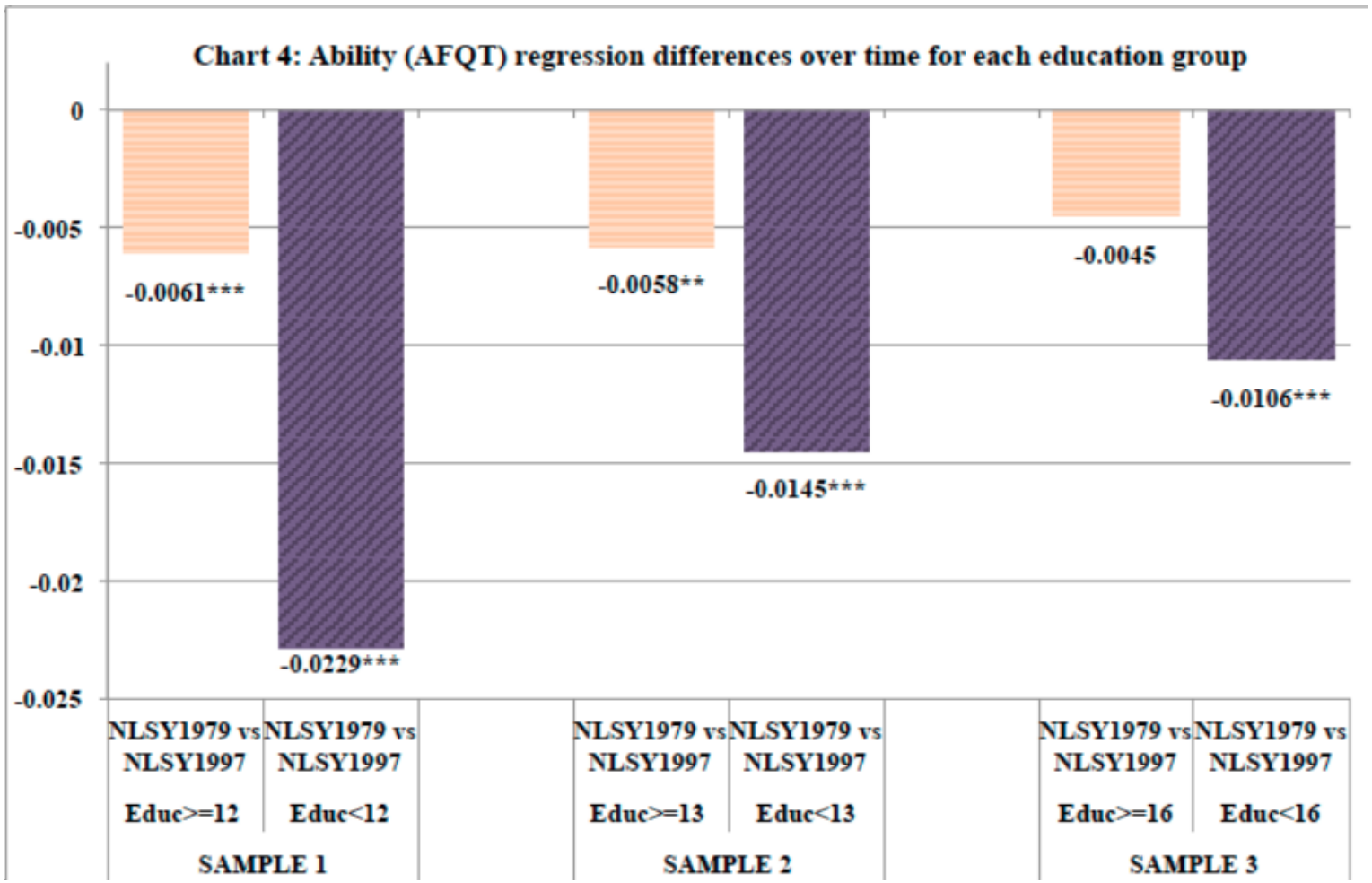
Falling Unskilled-**Inexperienced** Wages $w_1^u \downarrow$ (1970-1997)



Source: March CPS (white males, weekly wages).

NLSY 1979 & 1997: Ability (AFQT) falls for low-educated workers

$$EDUC = c + b1 * AFQT + b2 * FEMALE + b3 * HISP + b4 * BLACK + \mathbf{b6} * AFQT97 + b7 * FEM97 + b8 * HISP97 + b9 * BLACK97$$



How much of the rising skill premium explains the falling denominator?

Panel A: log Education Premium for Inexperienced Workers, US 1963-2008

Dependent Variable: log (WageEduc>=16 / WageEduc<16) for 0-9 years of experience

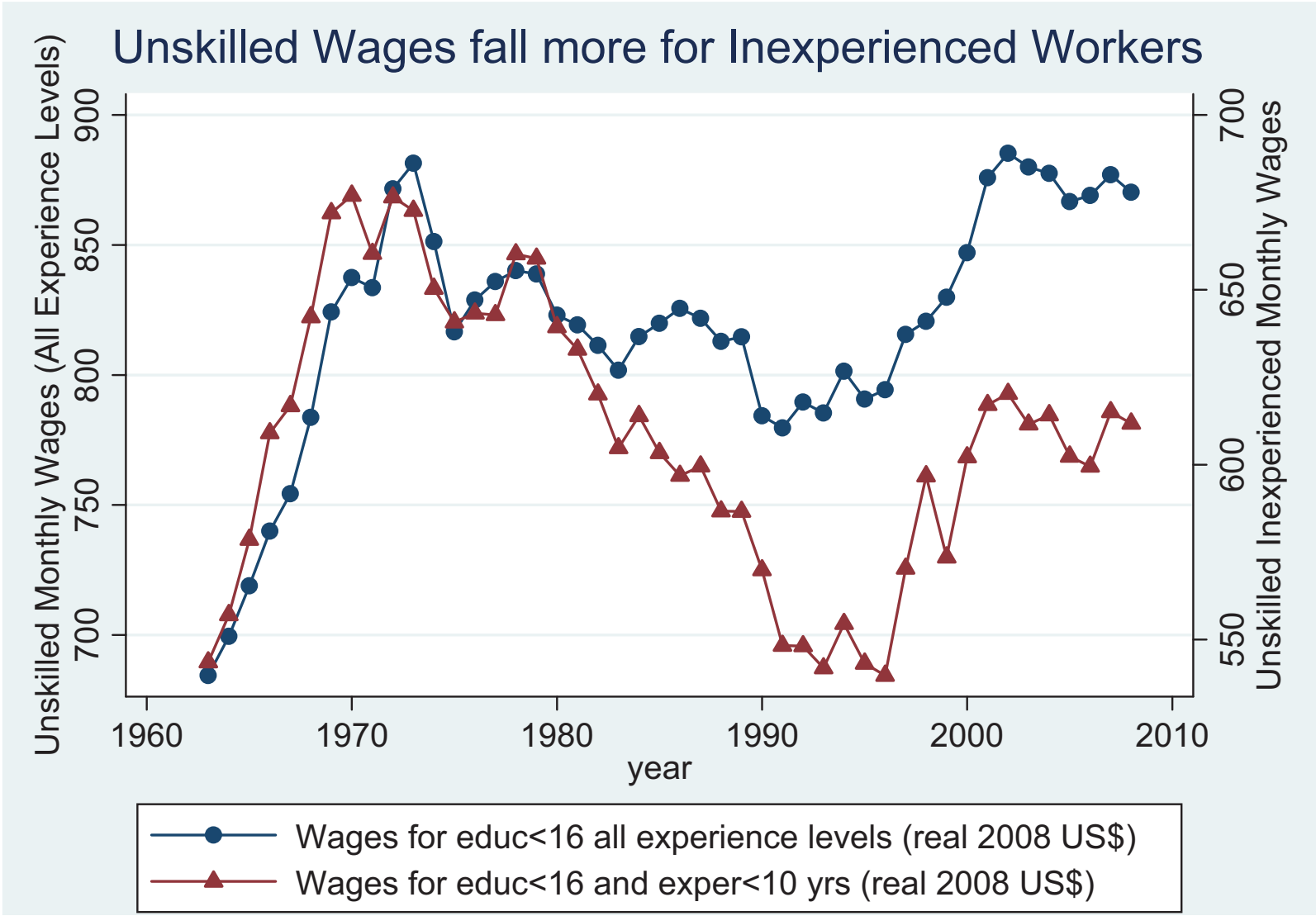
	Without Composition Adjustment			Composition-Adjusted Wage Premium		
	(1)	(2)	(3)	(4)	(5)	(6)
Year	0.0078***	0.0061***	0.0070***	0.0095***	0.0079***	0.0088***
	-0.0006	-0.001	-0.0005	-0.001	-0.0016	-0.0008
Nominator		0.2764*			0.1995	
		-0.145			-0.1521	
Denominator			-0.4933***			-0.5035***
			-0.1016			-0.0943
Composition				-0.1581**	-0.1216	-0.1705***
				-0.0775	-0.0818	-0.0606
Adj R-squared	0.806	0.817	0.872	0.819	0.822	0.889
N	46	46	46	46	46	46

Panel B: log Education Premium for Inexperienced Workers, US 1970-1997

Dependent Variable: log (WageEduc>=16 / WageEduc<16) for 0-9 years of experience

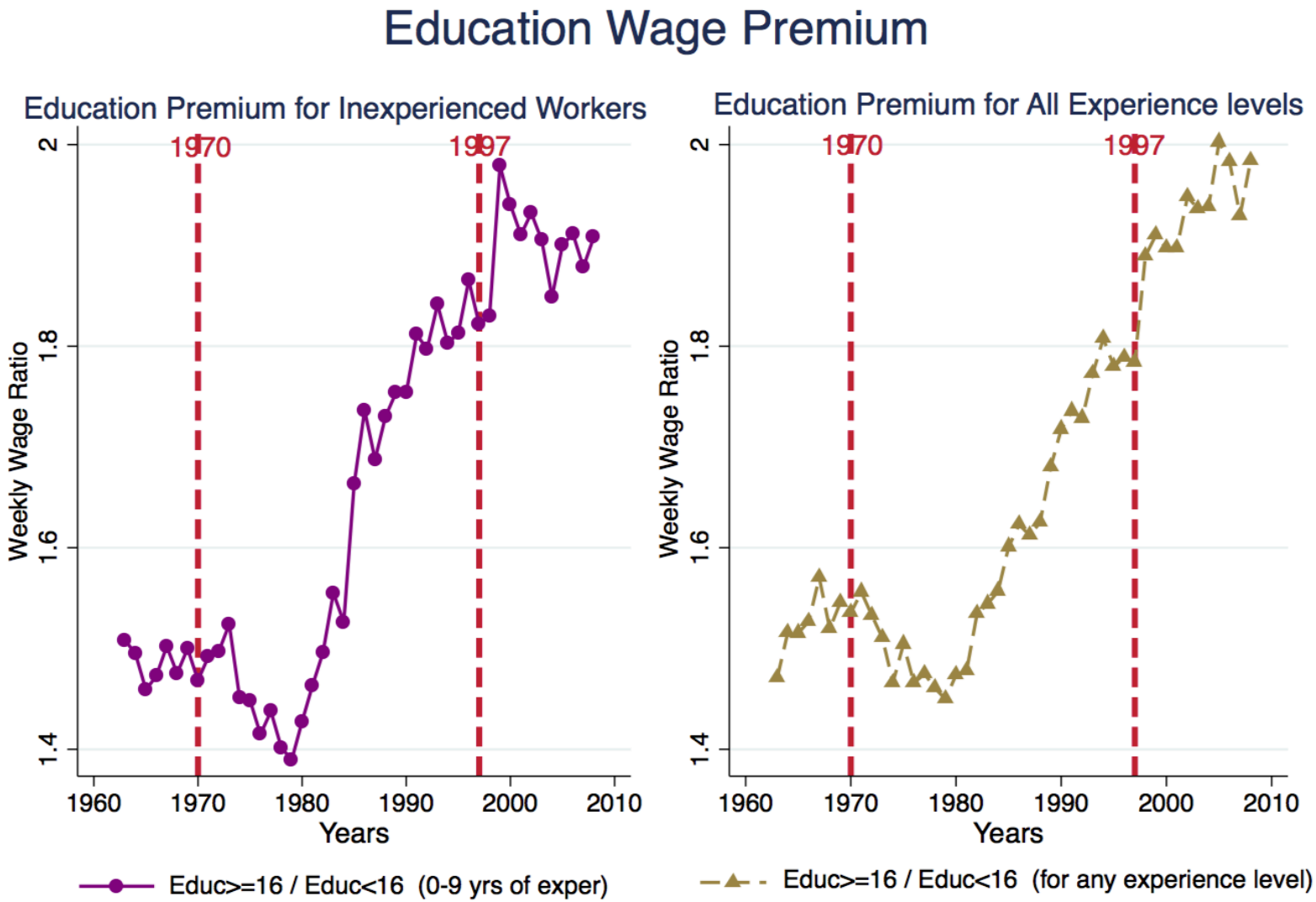
	Without Composition Adjustment			Composition-Adjusted Wage Premium		
	(1)	(2)	(3)	(4)	(5)	(6)
Year	0.0111***	0.0087***	0.0012	0.0128***	0.0073***	0.0029
	(0.0011)	(0.0006)	(0.0033)	(0.0023)	(0.0012)	(0.0033)
Nominator		1.0408***			1.0888***	
		(0.1093)			(0.1139)	
Denominator			-1.1358***			-1.2780***
			(0.3639)			(0.3566)
Composition				-0.1445	0.1054	-0.2532*
				(0.1644)	(0.0809)	(0.1388)
Adj R-squared	0.786	0.952	0.840	0.784	0.953	0.853
N	28	28	28	28	28	28

Relation to Hendel et al. (2005) - Educ not enough, **Exper needed**



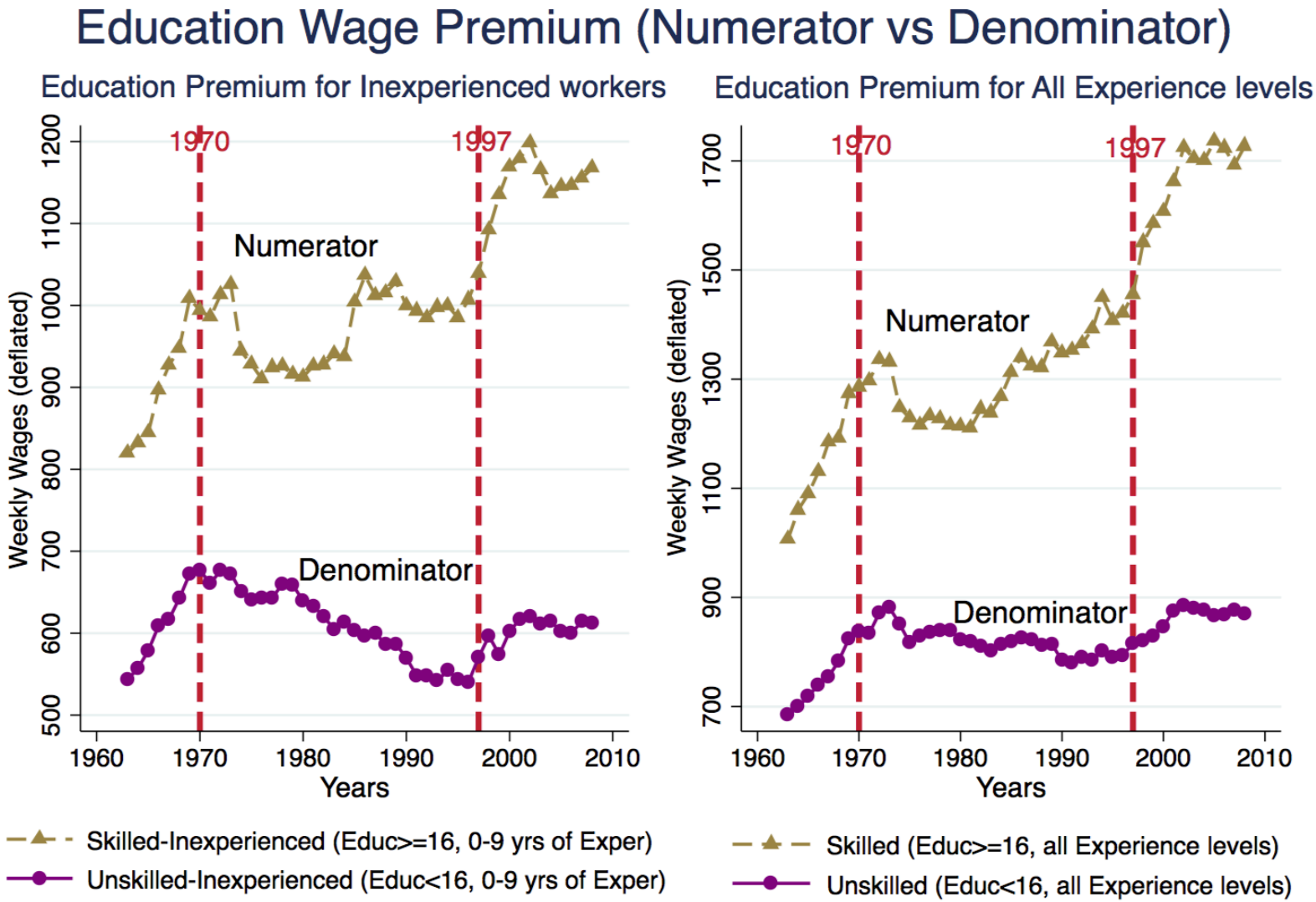
Source: March CPS (white males, weekly wages).

Relation to Hendel et al. (2005) - Educ not enough, **Exper needed**



Source: March CPS (white males, weekly wages).

Relation to Hendel et al. (2005) - Educ not enough, **Exper needed**



Source: March CPS (white males, weekly wages).

Conclusion

A model of job market "*signaling*", with "*private employer learning*" and "*credit constraints*" accounts for the following facts of wage inequality:

1. the rise in the **skill premium** despite the growing supply of skills;
2. the understudied aspect of rising wage inequality related to the increase in the **experience premium**;
3. the sharp growth of skill premium for **inexperienced** workers and its moderate expansion for the **experienced** ones;
4. the puzzling coexistence of rising experience premium for **unskilled** workers and its flat pattern for the **skilled** ones.

Policy Implication – Equality of Opportunity vs Equality of Outcome

Friedrich August Hayek

"There is all the difference in the world between treating people equally and attempting to make them equal." - *Individualism and Economic Order* (1948).

"Equality before the law and material equality are therefore not only different but are in conflict with each other; and we can achieve either one or the other, but not both at the same time." - *The Road to Serfdom* (1944).

John Maynard Keynes

"The political problem of mankind is to combine three things: economic efficiency, social justice and individual liberty." - *Essays in Persuasion* (1931).

"The outstanding faults of the economic society in which we live are its failure to provide for full employment and its arbitrary and inequitable distribution of wealth and incomes." - *The General Theory* (1936).

Thank you for your attention!

The Market for "Rough Diamonds": Information, Finance and Wage Inequality

Theodore Koutmeridis
University of St Andrews

Key Assumptions - Details

Assumption 1: the effort cost for the low type is high enough

$$k^l > \frac{(1+r^l)(w_2^s - w_2^{u,l}) + w_3^s - w_3^{u,l} - (1+r^l)^2(w_1^u + T)}{(1+r^l)^2}, \quad y^D > y^A.$$

Assumption 2: CMI render schooling profitable only for few

$$b^i \geq \frac{(1+r^b)^2 T + (1+r^l)w_1^u - (1+r^l)(w_2^s + T)}{(1+r^b)^2 - (1+r^l)^2} \equiv b^*, \quad T \leq (1+r^l)q^l.$$

Assumption 3: old high types prefer to separate from the low

$$T < \frac{w_3^s - w_3^{u,P} + (1+r^l)w_2^{u,P}}{1+r^l}, \quad y^C > y^D_{pooling}.$$

▸ Go Back

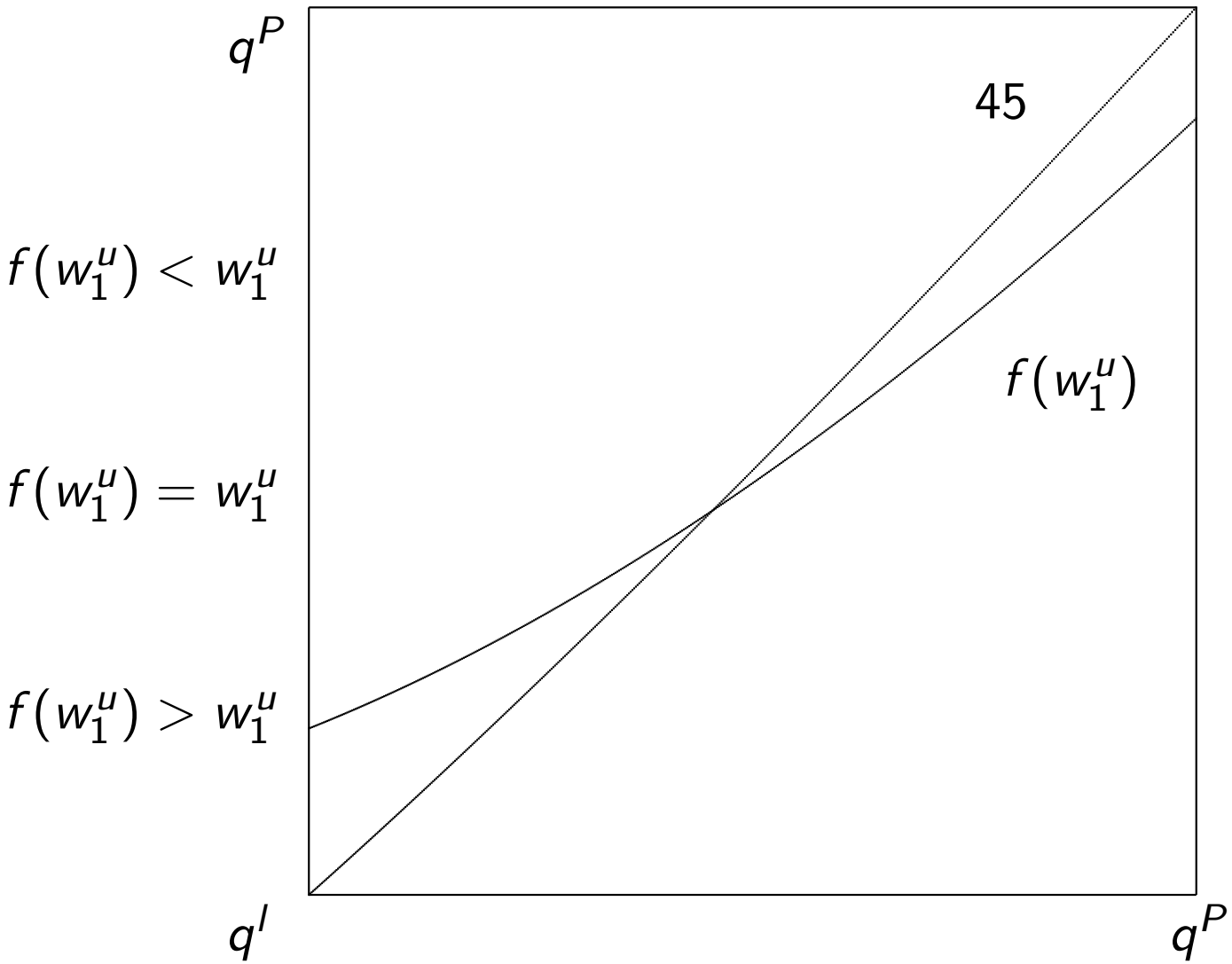
Equilibrium Unskilled Wage in period 1 w_1^u

- $f : [q^l, q^P] \to [q^l, q^P] : f(w_1^u) = \frac{(1-\pi)q^l + \pi q^h P(b^i < b^*(w_1^u; T, r^b))}{1-\pi+\pi P(b^i < b^*(w_1^u; T, r^b))}$.
- An equilibrium occurs when $f(w_1^u) = w_1^u$.
- For local tâtonnement stability, prices evolve according to $\partial w_1^u / \partial t = f(w_1^u) - w_1^u$

Proposition 1: Existence & Stability.

Let $P(\cdot)$ be a continuously differentiable function. Then, there exists at least one stable equilibrium.

Proof of Existence & Stability: Graph



Proof of Proposition 1: Existence & Stability I

For existence, I apply *Brouwer's Fixed Point Theorem*, for continuous functions from a nonempty, convex, compact set to itself. Function $f(\cdot)$ is indeed continuous, since $P(\cdot)$ is continuous. The function maps from the set $[q^I, q^P]$ to $[q^I, q^P]$ and the set is convex and compact, since the unskilled wage w_1^u can take any value within this set. So, from Brouwer's Fixed Point Theorem an equilibrium exists.

Proof of Proposition 1: Existence & Stability II

Now I prove stability. For locally tâtonnement stable equilibria, prices evolve according to $\partial w_1^u/\partial t = f(w_1^u) - w_1^u$. If I set the derivative of function $f(\cdot)$ with respect to w_1^u larger than zero, I find that $q^h > q^l$, which is always true and means that $f(\cdot)$ is increasing in w_1^u. This implies that when we are in an equilibrium, an increase in the wage must lead to $f(w_1^u) - w_1^u < 0$. Now let us take the maximum possible value for w_1^u, which is $q^P = q^l(1-\pi) + q^h\pi$ and occurs when $P(u|h) = 1$. Taking $f(w_1^u) - w_1^u < 0$ for this wage, leads to $q^h > q^l$, which is always true.

Proof of Proposition 1: Existence & Stability III

Accordingly, a decrease from the equilibrium wage leads to $f(w_1^u) - w_1^u > 0$. If instead we take the minimum possible value for w_1^u, which is q^l and occurs when $P(u|h) = 0$, again we conclude that $q^h > q^l$, which is always true. Since, for the lowest price $w_1^u = q^l$ we have $f(w_1^u) - w_1^u > 0$ and for the highest price $w_1^u = q^P$ we have $f(w_1^u) - w_1^u < 0$, for a value of w_1^u in the set (q^l, q^P) we must have $f(w_1^u) - w_1^u = 0$, which means that there generically exists at least one locally tâtonnement stable equilibrium. Notice that the result holds generically, since we cannot exclude the possibility that the function $f(\cdot)$ is tangent to the diagonal.

▸ Go back

Proof of Proposition 1

Recall that $b^* \uparrow \Rightarrow P(u|h) \uparrow \Rightarrow w_1^u \uparrow$. There are two skill premia. The first one is the skill premium within the group of inexperienced workers, which is denoted as w_2^s/w_1^u. From (15) we can see that in a stable equilibrium a fall in r^b decreases b^* and w_1^u. So the first skill premium $w_2^s/w_1^u = q^h/w_1^u$ increases. The second skill premium is within the group of experienced workers denoted as $w_3^s/\underline{w}_2^u$. Notice that $\underline{w}_2^u$ stands for the average wage of the uneducated worker regardless of whether he is a bargainer or not. This wage depends on the number of low types getting wage $w_2^{u,l} = q^l$ and the number of credit constrained high types getting $w_2^{u,h}$, which is higher than q^l. Observe also that a fall in r^b decreases the number of bargainers who get the higher wage $w_2^{u,h}$ and therefore it decreases the average wage of the uneducated worker with one year of experience $\underline{w}_2^u$. Given that w_3^s is constant an equal to q^h, the second skill premium increases as well, when credit frictions relax. ▸ Go back

Proof of Proposition 2 I

There are three experience premia one for the skilled and two for the unskilled workers. For the skilled workers it is $w_3^s/w_2^s = q^h/q^h = 1$. For the unskilled workers the one is computed by comparing their wages of the first and second period $\underline{w}_2^u/w_1^u$ and the other by comparing the wages of the second and third period $\underline{w}_3^u/\underline{w}_2^u = 1$. Notice that the only experience premium that is not constant is the one of the unskilled workers for the first period of their experience and equals $\underline{w}_2^u/w_1^u$. In a stable equilibrium, less severe credit frictions caused by a decline in r^b decrease b^* and w_1^u. However, less severe credit frictions decrease $\underline{w}_2^u$ as well, since fewer high types will be credit constrained and fewer agents in the uneducated pool will get the higher wage $w_2^{u,h}$. So both the nominator and the denominator decrease. Now we compare two experience premia. The one denotes the experience premium before the relaxation of credit frictions and the other after it.

Proposition 4 will hold if $ExpPremium_{before} < ExpPremium_{after}$. I suppose that this inequality does not hold and if I derive a contradiction, then proposition 4 holds.
$ExpPremium_{before} \geq ExpPremium_{after}$

$$\frac{w_2^u}{w_1^u} before \geq \frac{w_2^u}{w_1^u} after$$

$$\frac{\overline{N_2^H} w_2^{u,h} + N_2^L q^l / [\overline{N_2^H} + N_2^L]}{\overline{N_1^H} q^h + N_1^L q^l / [\overline{N_1^H} + N_1^L]} \geq \frac{\underline{N_2^H} w_2^{u,h} + N_2^L q^l / [\underline{N_2^H} + N_2 l]}{\underline{N_1^H} q^h + N_1^L q^l / [\underline{N_1^H} + N_1^L]}$$

Where N denotes the number of agents, the subscript denote the time-period and the superscript the type of the group. Observe that when the credit frictions are severe there are more credit constrained high types in the uneducated pool, which I denote will upper-bar $\overline{N_1^H}$, accordingly after the relaxation of credit constraints there are fewer, which I denote with lower-bar $\underline{N_1^H}$. I use the same notation for period two as well, when the subscript at N^H is 2.

Proof of Proposition 2 III

Notice that: $\underline{N_1^H} = \underline{N_2^H}$, also $\overline{N_1^H} = \overline{N_2^H}$ and $N_1^L = N_2^L$. So the above inequality becomes:
$\frac{\overline{N^H} w_2^{u,h} + N^L q^l}{\overline{N^H} q^h + N^L q^l} \geq \frac{\underline{N^H} w_2^{u,h} + N^L q^l}{\underline{N^H} q^h + N^L q^l}$ After some algebra this leads to $w_2^{u,h} \geq q^h$. But this inequality cannot hold, since it is always true that $w_2^{u,h} < q^h$. This gives us the desirable contradiction. That is why the experience premium always increases as credit frictions relax.

▸ Go back

Proof of Proposition 3 I

Proposition

In any stable equilibrium, when credit constraints relax more for women compared to men, the gender wage gap narrows for both experienced and inexperienced workers.

This is mainly a result of the change in the composition, as more women get the higher skilled wages ($w_2^s = w_3^s = q^h$), while there is no difference in the level of wages for men and women. Males and females get the same wage for all skill and experience groups both before and after the change in the credit markets. However, after the relaxation of credit constraints more women go to school. This means that the gap between the average wage of women and the average wage of men narrows. It is straight forward that the same holds when credit constraints relax for both men and women but for women they relax more. However, a formal proof might be useful.

Proof of Proposition 3 II

I prove the proposition for a particular case. I begin with the gender premium for inexperienced wages. Consider that before the relaxation of credit constraints we have $r_w^b > r_m^b > r^l$ and after we have $r_w^b = r_m^b = r^l$. This example keeps the generality of proving the proposition, as credit constraints relax for both genders but they relax more for women but it also simplifies the exposition. There is a mass 1 for each gender, some have school and high wages and some get the uneducated wage. I compare the ratio of the average wage for men over that of women, before and after the change. Notice that if the distribution of initial wealth and of ability for both men and women is the same, after the change the gender wage ratio would be 1, as average wages are equal for men and women. If the inequality below holds, then the proof is complete.

Proof of Proposition 3 III

$$\left[\frac{W^{men}_{inexp}}{W^{women}_{inexp}}\right]^{BEFORE} > \left[\frac{W^{men}_{inexp}}{W^{women}_{inexp}}\right]^{AFTER}$$

$$\frac{[N^{men}_{educ} q^h + (1 - N^{men}_{educ}) w^u_1]}{[N^{women}_{educ} q^h + (1 - N^{women}_{educ}) w^u_1]} > 1$$

...

$q^h > w^u_1$

Which is always true. So, when credit constraints relax more for women, the gender wage gap falls for inexperienced workers. In similar logic, it can be proved that the same holds for experienced workers. Notice that the assumption of *no discrimination in wages* simplifies the proof, as men and women get the same unskilled inexperienced wages w^u_1.

▸ Go **back**

My Data for US Wages and Finance

The data source is the March Current Population Survey, which is constructed in order to represent the US labor market. I use individual data for real weekly earnings from 1963 to 2008. My sample is comprised of males aged 16 to 64 that work full-time, full-year (FTFY), defined as 35-plus hours per week 40-plus weeks per year and who are not self employed. I also exclude those who have a real weekly wage below 67 US dollars (using PCE, base year 1982).

Why weekly earnings: Estimates of hours worked last year from the March CPS appear to be noisy, and moreover, data on usual weekly hours last year are not available prior to the 1976 March CPS.

Domestic credit provided by banking sector (% of GDP)
Long definition: Domestic credit provided by the banking sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available (including institutions that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other banking institutions are savings and mortgage loan institutions and building and loan associations. Source: International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates

2008: The average weekly wage for educ¡=12 was $586. The min was almost zero and the max $300,000. The median was $480, indicating large wage inequalities even within this group of less educated students.