Specific Skills and Education

Swiss Leading House Conference

Zurich

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Agenda

- Combine firm-based training with education and the economy
- Two topics – narrow to broad
  - Firm-specific skills – a different view
  - Specific skills are general → substitution between formal education and firm-specific on-the-job training

Specific Human Capital Story

- **Traditional View: Two kinds of human capital – general and specific**
- **A different view –**
  - Human capital is general
  - Firms' values are specific
- **Who needs a new view?**
  - Stories are too limited
  - Effects are too big
  - More implications

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Example

- Silicon Valley start-up
- Tax, economics, Java
- Loss of job causes loss in wages

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Implications

- Get all traditional implications
- New implications
  - Market thickness
  - Steeper profiles in idiosyncratic firms
  - Occupation eliminates tenure effects
  - Firms may pay for "general" training

Model

- Output at firm i:

$$y_i = \lambda_i A + (1-\lambda_i) B$$

Key here is weights are firm-specific

- Draw before period 2 firm j, where output is

$$y_j = \lambda_j A + (1-\lambda_j) B$$

Wage setting – Many possibilities

- Nash bargain: Wage in period 2 is

$$W_2 = \tfrac{1}{2} \{ [\lambda_1 A + (1-\lambda_1) B] + [\lambda_j A + (1-\lambda_j) B]$$

or

$$W_2 = B + \tfrac{1}{2} (\lambda_1 + \lambda_j)(A - B)$$

Stay or Go?

- Efficient bargaining implies stay if worth more at initial firm or, equivalently, if

  $(\lambda_1 - \lambda_j) (A - B) > 0$

- $\lambda \sim f(\lambda)$

- Opt to stay with probability $F(\lambda_1)$

- Exogenous separation probability q

Maximization for Worker

- Choose A and B to maximize lifetime wealth

$$y(\lambda_1) = \Pr(stay)E(W_{stay}) + \Pr(quit)E(W_{quit})$$
$$+ \Pr(layoff)E(W_{layoff}) - C(A,B))$$

- From f.o.c., investment is a weighted average of relevant skill-weights

- Depends on probability of
  - Staying - current firm better than alternatives
  - Quitting - current firm worse than best alternative
  - Layoff – current firm shuts down

Intuition

- **Certainty of continued employment**
  - Only wage at initial firm is relevant
    - Would invest exclusively in A or B, depending on λ
  - But hedge investment because wage at current firm depends on outside opportunities

- **If layoff is certain**
  - Only outside wage is relevant so invest based on market average λ

Wages: Stayers and Leavers

A general rule (almost any model) is

$$W_{Quit} > W_{Stay} > W_{layoff}$$

- Tenure effects in OLS wage equations = difference between wage of stayers and leavers
  - Positive if most leavers are layoffs
  - Negative if most leavers are quitters
  - Ability bias, but no evidence on education coefficients
  - Panel allows actual (conditional) tenure coefficients

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Implication: Idiosyncratic Firms

- ■ Investment is higher in idiosyncratic firms
- ■ Stayers have higher wages in idiosyncratic firms
- ■ New technologies pay
  - ■ High wages (steep profiles)
  - ■ If company closes, suffer large wage loss

Implication: Market Thickness

- Thicker market ➔ more idiosyncratic investment
    - Thicker markets imply smaller loss or greater gain on separation
    - Even though more specialized, the thick-market-effect dominates, implying smaller wage loss with involuntary separation

- Firm-specificity is endogenous: Less in thick markets
    - Definition depends on market thickness
    - Defined by large wage loss on involuntary turnover – smaller in thick markets
    - Defined by low turnover – higher in thick markets

- More wage loss in recessions – less likely to find good weights – measured as vacancy/unemployment falls

- Proxies: geography (density), occupation (common), mature industry

Implications: Quits, Layoffs, and Tenure

- As in traditional model or matching models, turnover declines with tenure
- Like traditional matching models, ratio of quits to layoffs declines with tenure
    - Early turnover is in large part voluntary
        - Young workers find better weights
    - Turnover in senior years only because exogenous shock
        - Old workers at firms that suit their past investments so leave only involuntarily (keep moving to most idiosyncratic firms over time)
    - Senior workers at more idiosyncratic firms than junior workers
- Wage changes
    - Since quits/layoffs higher among old than young, wage change among leavers higher for young than old

Results for Wage Growth

- PSID (2003 sample)

	d ln wage	std error
Young leavers	0.09	0.04
Old leavers	-0.03	0.05
Young stayers	0.16	0.02
Old stayers	0.08	0.02

- Young leavers have positive wage growth (voluntary); old leavers negative (involuntary)
- For both old and young, stayers do better than leavers, suggesting
  - Involuntary turnover dominates in both groups, or
  - Omitted ability effects

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Implications: Who Pays for General Training?

- Firm pays for training that looks general (Acemoglu and Pischke)
- All training is "general" in that has use elsewhere
- Worker suffers wage loss on move even though human capital is "general"

Skill Weights Conclusion

- Skill weights view gives same implications as old view
- Skill weights approach provides additional implications
- More sensible story and more general story
- Ties together investment, matching, turnover, wage changes
- Fits results in literature

Formal Education is a Substitute for "Specific" Training

- **If specific is actually general, then can be done in school rather than on-the-job**
- **Why not do it in school?**
  - Schools are bad
  - Too much heterogeneity in schools
    - Jobs are like specialized finishing schools
    - Division of labor
      - As society demands more education, more specialized schools substitute for jobs
- **Want to consider the first, given US heterogeneity in educational system**

Policy: No Child Left Behind

- Goal: To bring up the bottom so that firm doesn't have to do what is schools comparative advantage

- To defeat the "soft bigotry of low expectations"

History

- National Assessment of Educational Progress (exam given to 4th and 8th graders at state level since 1990)
- Gap between 25th and 75th percentile = 50 points (out of 500)
- Black/white gap averages 38 points
- Hispanic/white gap averages 28 points
- Gaps did not decline in years leading up to 2000

NCLB

- Took effect Jan, 2002
- Two features
  - Accountability
  - Choice as remedy

Accountability

- **Testing**
  - Grades 3-8
  - Reading and math
  - State chooses test, but all take NAEP for comparison
- **Reporting at school level by**
  - Poverty
  - Race and ethnicity
  - Disability and limited-English-proficiency
- **Target**
  - 100 percent proficiency by 2014
  - Must make adequate yearly progress

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Failing Schools

- Must develop improvement plan
- If continue to fail then
  - Students have school choice
  - Tutoring services
  - Replacement of school staff
- Idea is to provide incentives to those who can take action
- Three actors
  - School Staff
  - Parents
  - Students
- Emphasis of NCLB is on the first

Choice in Schools

- Milton Friedman (1955) argued competition would drive schools to meet demands of their consumers
- Empirical evidence
  - Hoxby shows that where competition (Catholic schools), public schools perform better
  - Hoxby; Borland and Howsen show threat of relocation within geographic region improves school quality
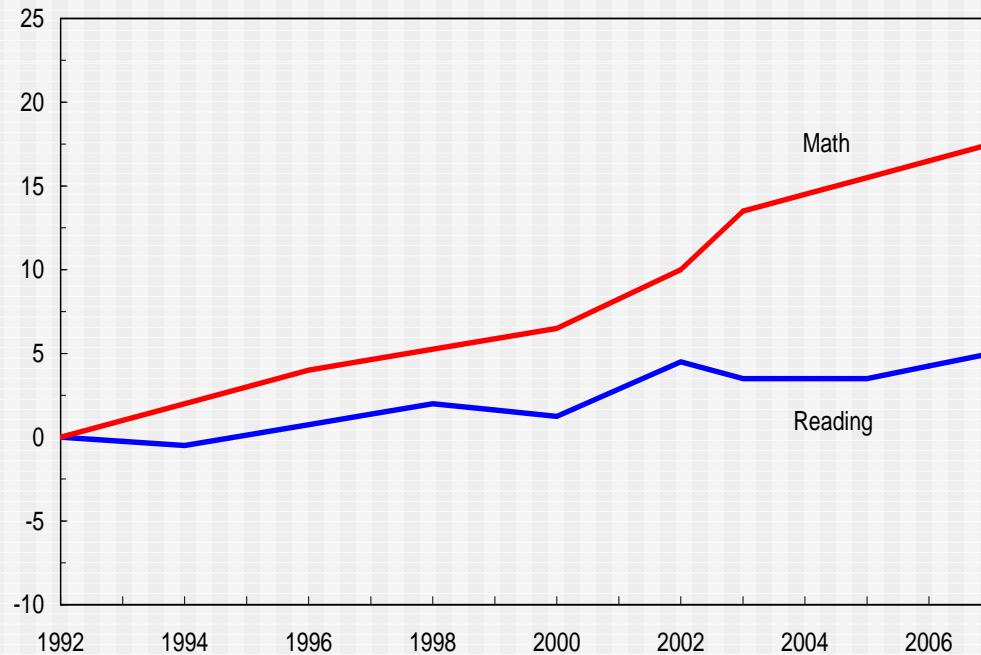
Results – No statistically significant change in NAEP trend

Yearly Changes in NAEP Test Scores

Period	Reading and Math
1992-2002	0.73
2002-2007	0.80
Entire Period	0.75

NAEP Scores in Reading and Math: 1992-2007

Change in Score Since 1992

Source: National Center for Education Statistics, NAEP 2007 Report

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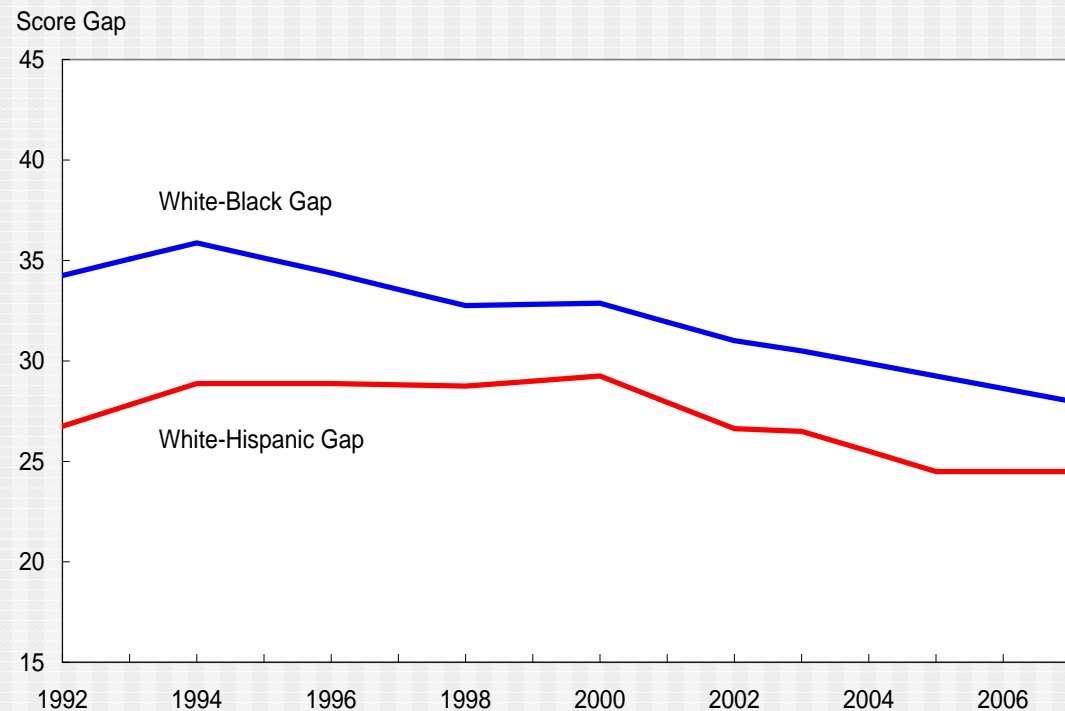# White-Black, White-Hispanic Gaps Closing More Quickly

Yearly Changes in White-Black Gap

Period	Reading and Math
1992-2002	-0.33
2002-2007	-0.60
Entire Period	-0.42

Yearly Changes in White-Hispanic Gap

Period	Reading and Math
1992-2002	-0.01
2002-2007	-0.43
Entire Period	-0.15

White-Black and White-Hispanic Gaps in NAEP Scores (Math and Reading)

Score Gap

Source: National Center for Education Statistics, NAEP 2007 Report

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Evidence

- **Suggests better improvement since NCLB**
- **Criticisms**
  - Timing – too fast?
  - Revert to trend?
  - Teaching to the Test?
    - QJE (2005) shows better to announce standards and teach to the test for high-cost learning environments
- **General conclusion**
  - Changed rhetoric and expectations
  - Some early evidence consistent with positive effects
  - More role for competition and choice

Conclusion

- Skill-weights view is different way to think about specific human capital
- Means that specific is general
- Suggests could be done in school
- Schools must be competent or firms will provide the training
- NCLB is attempt to make bottom schools competent