International Comparisons of Educational Achievement: Cautions and Caveats

Michael J. Feuer
ETS Angoff Memorial Lecture
Washington
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In memory

William H. Angoff
1919 - 1993
This is Washington...

So people want to know the “take-away” message(s)

• **Comparisons matter** (and they should)
• Test scores are interesting (but incomplete)
• **Context is key** (to explain, if not to excuse)
• The sky is partly cloudy (but it’s not falling)
Rhetoric and reaction

“We are living in a world without borders.”

“To meet the realities of the 21st century ... we need students who are prepared to compete ... with students from all across the globe for the jobs of tomorrow.”

NGO, CCSSO, Achieve, 2008
Sound familiar?

“if an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war...”

A Nation at Risk, 1983
And from an even earlier time...

“America today is No. 1 in the world.”
Which evoked a slightly skeptical response…

“The White House is ... unofficially elated over America’s top finish in the 1971 Earth standing...

... The U.S. has dominated the world scene in this century, though it still trails the Roman and British Empires and the Mongol Hordes in total wins…”

- Garrison Keillor, October 2, 1971.
But seriously, folks...

- Logic of ICR
- Context, history, choices
- Toward an enriched policy research agenda
  - From malaise to [audacious] hope?
Which comes first?

-or-

Education or the economy?
Education → the economy

Education

Reform

student performance

Economic standing
Education ← the economy

SO WE NEED FIRST TO FIX POVERTY...

INEQUALITY AND POVERTY CAUSE...

student performance
Perception…

Scientists tell Congress: we are…
“in a stall” – 40%
“in decline” – 60%

And a high tech association confirms:
“The US is in decline”

Source: Rising Above the Gathering Storm, NAS, 2007
And data...

US:
• 40% of Global R&D spending.
• Faster growth than EU and Japan
• 35% total scientific publications
  • 49% of total citations
  • 63% of most highly cited

RAND, 2008

“The United States continues to lead the world in science and technology...”
A surprisingly cheery (?) thought

“… the average American worker is nearly 10 times more productive than the average Chinese worker, a gap that will close but not go away in our lifetimes…”

-David Brooks, NYT, 2010 (based on RAND study)
Economists have known this...

Total Productivity Growth Rates, Selected Countries, 1986-2004

[Bar chart showing average annual change in labor output per hour for Canada, France, Israel, Sweden, Taiwan, UK, and USA.]

Source: Lach, Shil, Trajtenberg, 2008
And rumors of the end of manufacturing may be a bit exaggerated...

Manufacturing labor productivity decreased in 2009 in 12 of the 19 economies compared by the Bureau of Labor Statistics. The United States had the largest productivity increase...
## Why history matters

### A century of productivity growth…

<table>
<thead>
<tr>
<th></th>
<th>1870</th>
<th>1900</th>
<th>1929-38</th>
<th>1950</th>
<th>1970</th>
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<tbody>
<tr>
<td>Canada</td>
<td>2.2</td>
<td>2.7</td>
<td>0</td>
<td>3.1</td>
<td>1.8</td>
</tr>
<tr>
<td>Finland</td>
<td>1.3</td>
<td>2.4</td>
<td>1.9</td>
<td>4</td>
<td>2.6</td>
</tr>
<tr>
<td>France</td>
<td>2.3</td>
<td>1.8</td>
<td>2.8</td>
<td>4.4</td>
<td>4.1</td>
</tr>
<tr>
<td>Germany</td>
<td>1.5</td>
<td>1.4</td>
<td>2.3</td>
<td>6.6</td>
<td>4.5</td>
</tr>
<tr>
<td>UK</td>
<td>1.6</td>
<td>0.9</td>
<td>0.9</td>
<td>2.2</td>
<td>2.8</td>
</tr>
<tr>
<td>USA</td>
<td>2.3</td>
<td>2</td>
<td>0.7</td>
<td>2.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Superior to US</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

**Superior to US***

*among 16
Did the public know?

In the 1970s it sure **seemed** like the sky was falling…but

"There [was] absolutely no evidence of a long-term slowdown in the sectors of the economy that are most progressive in terms of productivity growth"

-Baumol et al

Remember: why productivity growth is so important…
Is it possible we are asking the wrong question?

Hypothesis:
Rapid productivity growth abroad is better for America than is slow productivity growth abroad …

or: convergence is good
Rhetoric and data: are we “slipping?”

College Enrollment: Recent Trends

Source: NCES, 2009
Access: Hispanic Americans

College Participation

Source: Pew Hispanic Center tabulations of 2000 Census and 2008 American Community Survey
Getting the data right: definitions matter

Where do we rank on college completions?

But accounting for transfers... we are comparable to France (7-year rate), modestly below Sweden and the Netherlands (6, 7), modestly below Iceland and Norway (9, 10).

Let’s all take a deep breath...

“Degree completion rates in the US are … lower than those in many other countries. But that has been the case for at least half a century, ever since we as a nation decided to give many more people a chance at higher education…”

- Art Hauptman, Nov. 2009
By the way...

We were never # 1 in math either, and there hasn’t been a sharp decline …

-Brookings (Tom Loveless), 2011

TIMSS Math, 8th grade, 1995 – 2007
FWIW alert: here’s a ranking we might like!

“…reports of the death of US higher education appear to have been greatly exaggerated…”

“measure by measure: the US is the best of the best…”

-- The Times (London), September 2010
“If there is a crisis in American schooling it is … the crisis inherent in balancing [a] tremendous variety of demands Americans have made on their schools and colleges – of crafting curricula that take account of the needs of a modern society at the same time that they make provision for the extraordinary diversity of America’s young people…”

-- Lawrence Cremin, 1990
The “human capital century”*

* Goldin and Katz (a must-read)

Source: Barro-Lee, 2010
The high school picture, in the US...

And elsewhere...

Sources: for 1955-56 data, author’s estimates based on Figure 1.7, Goldin and Katz (2008); for 2008, OECD (2010).
Quantity and quality: the leaning tower of ...

Literacy
US avg: 500
Diff from OECD: 0
# OECD better: 6
# OECD worse: 13
# all better: 9
# all worse: 39

Math
US avg: 487
OECD avg: 496
#OECD better: 17
# OECD worse: 5
# all better: 23
# all worse: 29

Science
US avg: 502
Diff from OECD: 0
# OECD better: 12
# OECD worse: 9
# all better: 18
# all worse: 33
## PISA trends

<table>
<thead>
<tr>
<th>Country</th>
<th>Average Math Score 2006</th>
<th>Average Math Score 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>527</td>
<td>527</td>
</tr>
<tr>
<td>Finland</td>
<td>548</td>
<td>541</td>
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<tr>
<td>France</td>
<td>496</td>
<td>497</td>
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<tr>
<td>Germany</td>
<td>504</td>
<td>513</td>
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<tr>
<td>Israel</td>
<td>442</td>
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<tr>
<td>Korea</td>
<td>547</td>
<td>546</td>
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<tr>
<td>UK</td>
<td>495</td>
<td>492</td>
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<tr>
<td>US</td>
<td>474</td>
<td>487</td>
</tr>
<tr>
<td>Shanghai</td>
<td></td>
<td>600</td>
</tr>
<tr>
<td>Selected avg</td>
<td></td>
<td>504</td>
</tr>
<tr>
<td>Int'l avg</td>
<td></td>
<td>494</td>
</tr>
</tbody>
</table>

### Graph Details
- **Y-axis:** Average Math Score
- **X-axis:** Countries (Canada, Finland, France, Germany, Israel, Korea, UK, US, Shanghai)
PISA shock

“The findings of the OECD Programme … are alarming. A country with the economic and political significance of Germany belongs at the top of the league and cannot be satisfied with an education system performing at the OECD average level – never mind below it.”

-Federal Minister for Education and Research, Germany, 2000
And the after-shock

Changes in Mean Scores on PISA, 2000-2009, Males

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th>Math</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>2.14%</td>
<td>4.42%</td>
<td>6.95%</td>
</tr>
<tr>
<td>US</td>
<td>-0.41%</td>
<td>0.00%</td>
<td>2.41%</td>
</tr>
<tr>
<td>OECD</td>
<td>-2.06%</td>
<td>-1.59%</td>
<td>-0.80%</td>
</tr>
</tbody>
</table>
But what about the economy?


BLUE: difference in mean math score (males)
RED: difference in output per hour worked

Research alert: lagged model needed…
And anyway, is that all we care about?

The purpose of education is ... also meant to shape character... instill ... love of learning, the ability for independent study, self-confidence, risk-taking, imagination, creativity, leadership, respect and consideration for others, openness, inner contentment, familiarity with culture, skepticism, self-discipline...

--Moshe Justman, et al, 2010

“Every parent wants their [sic] children to go to the best possible university. That is what is driving our test-driven culture...all this energy spent on raising test scores... [is] not nurturing creativity or any other aspect of human nature...”

- Lee Ju Ho, Minister of Education, Korea, 2011
**Thinking beyond our “means”**

The higher the GINI, the more inequality…

**GINI Coefficient, Selected Years**

- **Red arrows**: bad
- **Green arrows**: good

Source: Luxembourg Income Study

Blue bars: 1970’s and 80’s
Purple bars: 2004, 2005
Rich data, poor people

Poverty, Selected Countries, 2004

Source: Luxembourg Income Study
Children in need: a global problem
Rhetoric alert: to explain is not to excuse...

... the performance of non-poor students ... declines as the proportion of their classmates below the poverty line increases...

And...

"...school poverty depresses scores of all students ..."

Preponderance of evidence: poverty and test scores

Average Scale Scores, 8th grade math, by percent students economically disadvantaged

TIMSS, 2007
Demography is not destiny

Percent difference between mean scores of students whose mothers' birthplace is country of test and students whose mothers' birthplace is elsewhere.

US does better than many other countries in narrowing the gap…
A wild idea?

Is America’s extraordinary economy in some ways a result of our commitment to inclusion, access, individual thinking, problem-solving, and extra-curriculars.. at the possible expense of high academic achievement (as measured by tests of cognitive skills)?

-A research challenge:
-do we have the data and methods to study this implied causal hypothesis?
Rhetoric alert: from despair to...

“[Aspi] rational” exuberance...?

Nation at Risk: was it the WHOLE nation?
National Goals: A typo?
NCLB: 2014
YCLB: The Atlantic
Race to the TOP: 2014
Where is Yogi Berra when we really need him?

Anxiety (and aspiration) for our future…
-- and we tend to forget the past

BUT--

Too much *nostalgia* about the past…
-- and we tend to become *complacent* about the future
Finding a balance: past successes and looking ahead

RAND:

the United States continues to lead the world in science and technology...

BUT

U.S. leadership in science and technology must not be taken for granted.
A caution about reform

Goldin and Katz:
“no other nation would come close to putting as large a fraction of its youth through secondary school...

[and] decentralization was a virtue at all levels ...”
It’s really about variance as much as about means...

Murnane and Levy (1996): “…

the new competitiveness did not benefit everyone. This is the real danger of low worker skills: economic growth can proceed while leaving large numbers of workers behind…”

[another must-read]
A modest proposal

- Trends and snapshots
  - The long view
- Attribution vs. correlation
  - Context and explanation
- Errors of measurement
  - Start with definitions
- Urgency vs. realism
  - Despair and exuberance
- From evidence to policy
  - Getting the right data doesn’t guarantee we get the data right...
From malaise to hope

“... the great transformation [of US schools, 1890-1950]... was due to deliberate, widespread educational efforts... we have a historical model of how to do this well...”

-Jeff Mirel, *Patriotic Pluralism*, 2010 (another must-read)