The International Efficiency of American Education: The Bad and the Not-So-Bad News

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There is ample evidence to suggest that American schools perform worse than schools in many other countries. The U.S. ranks toward the bottom of the industrialized nations on international tests of academic achievement in science and mathematics. Not only may American schools perform worse but they may do so at the same time as they use more resources than other schools systems. In essence, American schools may not only be poor in quality but less efficient. This paper will explore some of the evidence on education efficiency. It will suggest that in many ways the assumption is correct, American schools are less efficient. It will suggest that the reason for the inefficiency of American schools is the difference in the 'demand to learn' between American and other school children. But the paper will also explore evidence that suggests that American schools are not less efficient and in one new way of looking at the problem, this paper will argue that American schools are more efficient than the schools in the Republic of Korea, one of the world's leading school systems. The paper will conclude with some advice on the proper role which international comparisons may play in the design of domestic education policy.

Background

Bad news about American education is a tradition. Often the news emerges from national commissions (Higher Education for Democracy, 1947; Committee on Education Beyond High School, 1956; Task Force on Education, 1960; Nation at Risk, 1983; The Future of Higher Education, 2006; State Scholars Initiative, 2008; Wolk, 2009). In many instances the bad news includes statements that American schools have declined in quality or have been bested by school systems in other countries. International tests of academic achievement have been used to suggest that American school children do not learn as much as do children in many other school systems, including the school systems of America's most important trading partners (Lemke, Sen, Pahlke, Partelow, Miller, Kastberg and Jocelyn, 2004; Baldi, Jin, Skemer, Green, Herget, 2007; Herget, 2007; Heyneman and Lee, 2012).

Sometimes, the school systems which attain first place in the ranking of achievement become a subject of headline news. This was the case for instance of the scores of Shanghai on PISA 2009 (New York Times, 2010). Attention has turned not only to the rankings of other countries on achievement tests, but on the comparative efficiency of one system versus another in those rankings (New York Times, 2007). [1]

Efficiency: The Bad News

The bad news is not new. Two decades ago the U.S. spent more money on education yet performed worse on tests of 8th grade mathematics (Table one). Table one displays the results of the international test designed by the Educational Testing Service (ETS) used in 1991 prior to PISA. Norway, for instance, spent $1,111 for each adult citizen in the population. Forty-six percent of the Norwegian students performed over the international median in 8th grade mathematics. This would imply that it would cost an additional $ US 24/adult citizen for an additional one percent of the students to achieve over the international mathematics median. The U.S. spent $ US 1040/adult citizen and 45% of the American students performed over the

Originally published as "The International Efficiency of American Education: The Bad and the Not-so-Bad News," (2013) pp. 279-302 in Heinz-Dieter Meyer and Aaron Benavot (eds.) *Pisa, Power and Policy: The Emergence of Global Educational Governance* Oxford (UK): Oxford Studies in Comparative Education Symposium Books. Appears with permission in *Current Issues in Comparative Education 16(1)*: 74-89.

international median. To get an additional percent over the international median, the U.S. would need to spend an additional $23/ citizen.

In other countries, however, the cost would be less. In Singapore and Japan it would only cost $US 7 to have an additional one percent of their students perform over international median; in Korea, Hong Kong, the Czech Republic, and Thailand it would only cost $US 4. Arguably the most efficient education systems in 1991 were located in Latvia, Lithuania and Romania, where only $US 2 or $US 3 would be required to have an additional one percent of their students over the international median. And the least efficient school system was that of Kuwait which would require $US 287 for an additional percentage of its students to perform over the international median.

Table 1. International Education Efficiency (1991).

Country	Public expenditure on education/capita (A) in dollars	Proportion of students over the international median in 8th grade mathematics (B) as a percentage	Ratio A/B
Norway	1111	46	24
United States	1040	45	23
Kuwait	848	3	287
Singapore	724	94	7
United Kingdom	649	48	14
Japan	602	83	7
Israel	584	56	10
Republic of Korea	362	82	4
Hong Kong	309	80	4
Czech Republic	297	70	4
Hungary	272	60	4
Thailand	206	54	4
Iran	183	9	20
Latvia	147	40	3
Lithuania	71	34	2
Romania	55	36	2

Sources: Second International Assessment of Educational Progress IAEP II, Math and Science in 20 Countries ETS 1991; and Heyneman, 2004.

Using PISA results from 2009, it appears that the U.S. has not improved on its level of education efficiency by comparison to other countries (Table 2).[2] If one takes the total PISA test score (reading, mathematics and science taken together), the U.S. ranks eighth out of 17 countries. However, if one incorporates education spending, the U.S. ranking drops from 8th to 16th, next to last. The countries with the highest efficiency ranking included Russia, Poland, the Czech Republic, and Hungary.

Table 3 illustrates monetary efficiency in a slightly different way. As one can see the U.S. is among the countries which had the highest secondary student expenditures but is positioned lower than many other countries in terms of PISA mathematics performance.

Table 4 illustrates this same issue using cumulative spending for ages 6 – 15 rather than spending on secondary school students alone. In this case the U.S. is the highest spending country in the sample and yet in middle of the sample in terms of total PISA test score performance.

Efficiency can be calculated in many ways, achievement on the basis of pupil expenditure is one. Another is achievement in conjunction with school time. Table 5 illustrates this principle. American schools devote almost 19 hours/week to core subjects, equivalent to Latvia and

Poland and far more than Sweden, Finland, Belgium and Switzerland. Yet Finland, Switzerland and Australia devote less time to core subject but have higher PISA achievement scores.

Table 2. Student performance in PISA 2009 and cumulative education spending per student

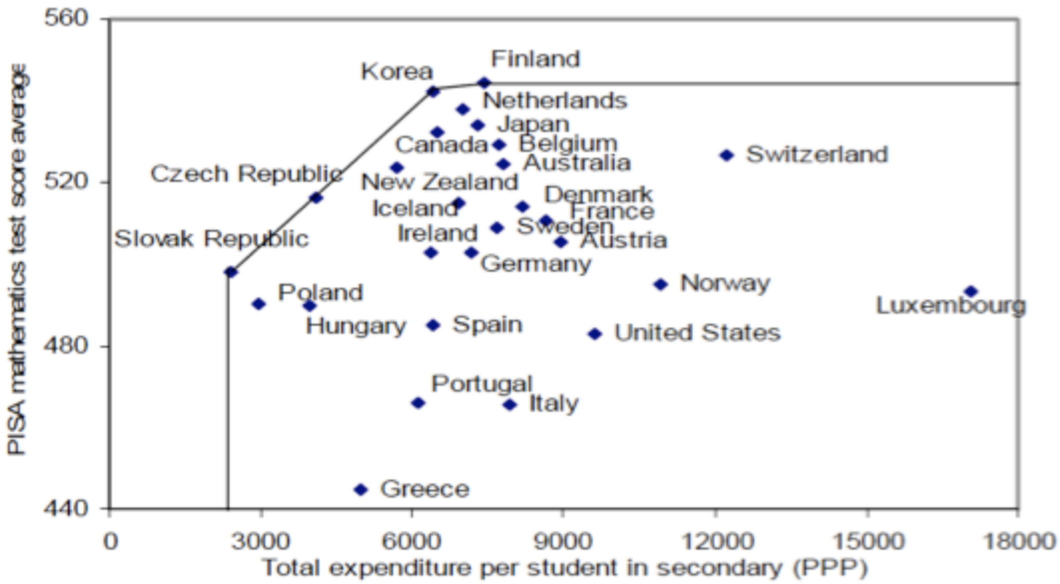
Country	Total test score	Score ranking	Spending (US$)	Ratio of scores to expenditures	Ratio ranking	Average expenditure for one score point
Finland	1,631	1	71,385	0.023	7	43.77
Australia	1,589	2	72,386	0.022	8	45.55
Switzerland	1,552	3	104,352	0.015	14	67.23
Belgium	1,528	4	80,145	0.019	10	52.45
Poland	1,503	5	39,964	0.037	2	26.59
Norway	1,501	5	101,265	0.015	14	67.47
Denmark	1,497	7	87,642	0.017	12	58.55
United States	1,496	8	105,752	0.014	16	70.69
Sweden	1,486	9	82,753	0.017	12	55.69
Czech Republic	1,471	10	44,761	0.033	3	30.42
Portugal	1,469	11	56,803	0.026	6	38.67
Hungary	1,464	12	44,342	0.033	3	30.29
Germany	1,461	13	63,296	0.023	7	43.32
Latvia	1,460	14	.	.	.	.
Italy	1,458	15	77,310	0.019	10	53.02
Greece	1,419	16	48,422	0.029	5	34.12
Russia Federation	1,405	17	17,499	0.080	1	12.45
OECD average	1,500		69,135	0.021		46.09

Source: OECD (2010, 2011)
Note:
1. *Total test score is the sum of three core subjects, reading, mathematical and scientific literacy.*
2. *Rankings are based on sample countries this paper examines only.*
3. *Cumulative education spending is in equivalent US dollars converted using PPPs.*
4. *"Ratio of scores to expenditure", i.e., test scores achieved when $1 is spent and "Average expenditure for one score point" is an average expenditure to get one test score point. Both of them are calculated by the author.*

Efficiency can also be calculated in terms of an output indicator, such as the rate at which enrolled students actually graduate. Table 6 illustrates the connection between secondary school graduation rate and total expenditures per secondary school student. The U.S. spends more than any other country with the exception of Switzerland, yet the rate of secondary school graduation is lower than any other country save Spain and New Zealand. The sum of this evidence would suggest that by many different measures the U.S. is less efficient than other countries and that the record of inefficiency is consistent over at least two decades.

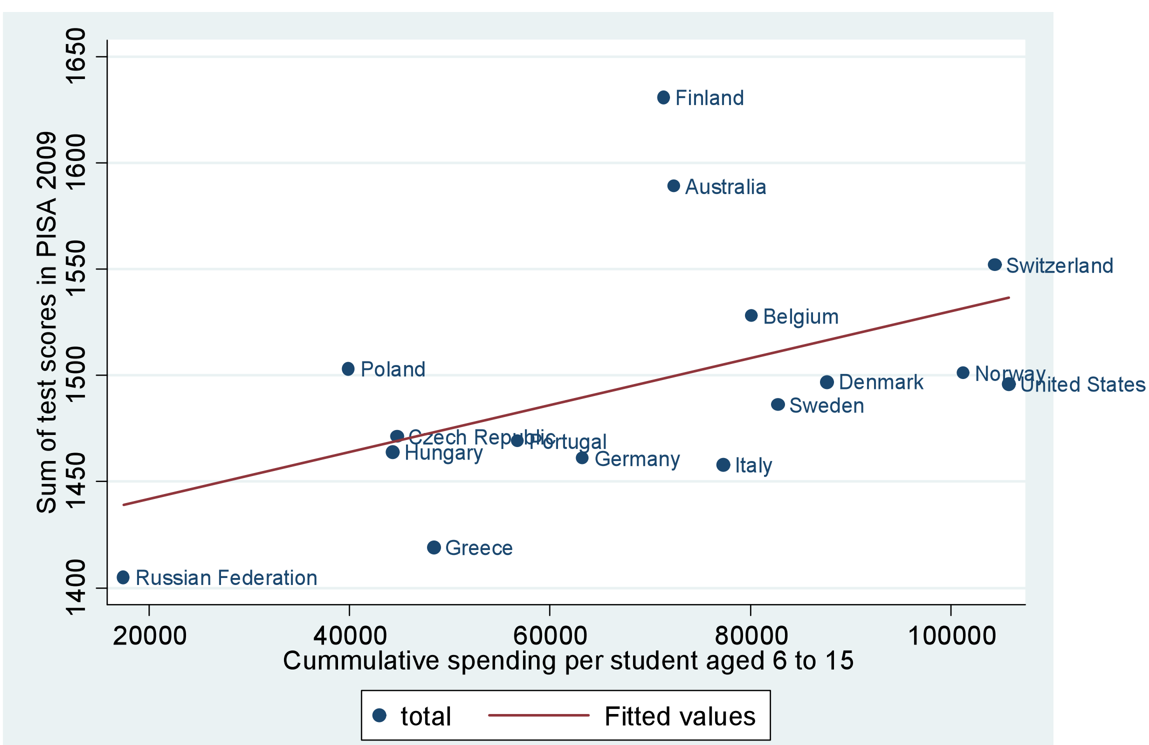
There are many hypotheses as to why American schools are less efficient than those of many other countries. One hypothesis is that American school children express a lower 'demand to learn' than do school children in countries with high efficiency in their school systems (Heyneman, 1999). This is sometimes noted as whether 100 percent of the children want to come to school each day and to try hard each day. In essence the 'demand to learn' is a culturally-shaped attitude or disposition that places the value of education higher or lower on a scale of socially desirable activities. There is, moreover, a gap in the 'demand to learn' between children of different backgrounds in the United States whereas in high efficiency school systems there is less of a gap between children of different backgrounds. This suggests that the barrier to student achievement in American schools is not poverty or race but the lack of the demand to learn and the difference in the demand to learn from one social group to another (Heyneman, 2005). This also suggests that better teacher training, a different curriculum or a longer school day will not have the intended effect until the demand to learn is generally augmented and until a high demand to learn is characteristic of all social groups.

Table 3. Secondary education spending and average PISA mathematics scores



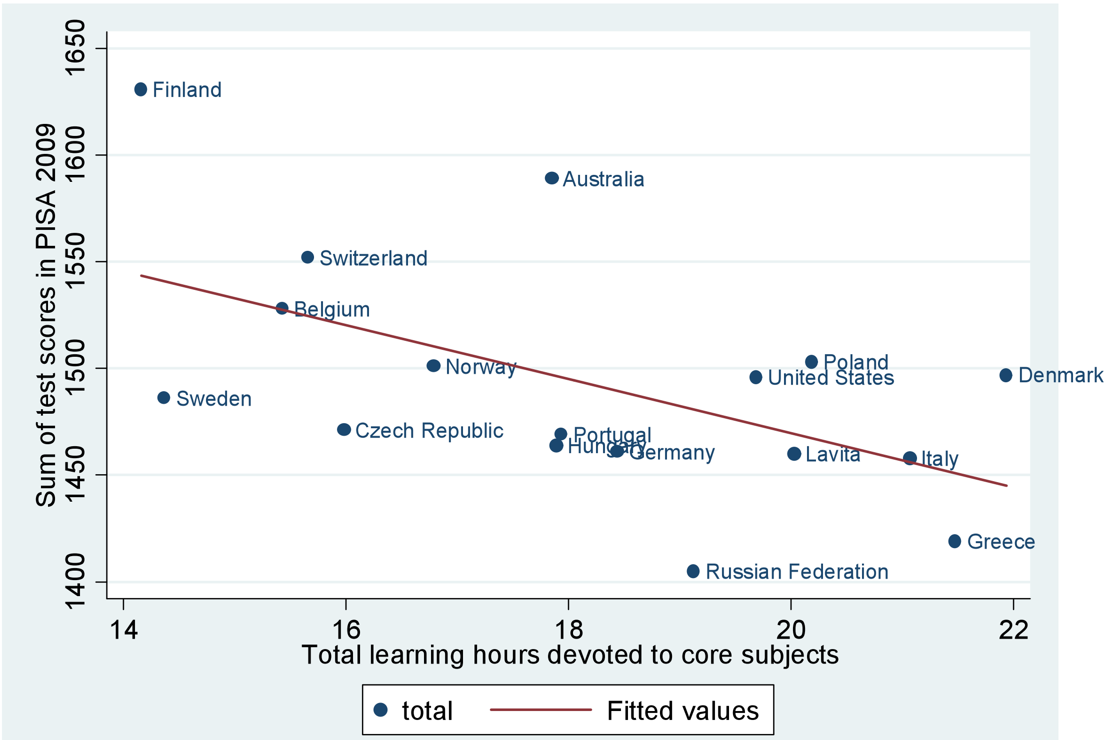
Sources: OECD Education at Glance 2006, www.oecd.org/edu/eag2006; OECD PISA. IMF staff calculations. The line connects countries with the highest observed efficiency and depicts the best practice frontier unadjusted for estimation bias (Verhoeven et al., 2007)

Table 4. Relationship between student achievement in PISA 2009 and cumulative spending



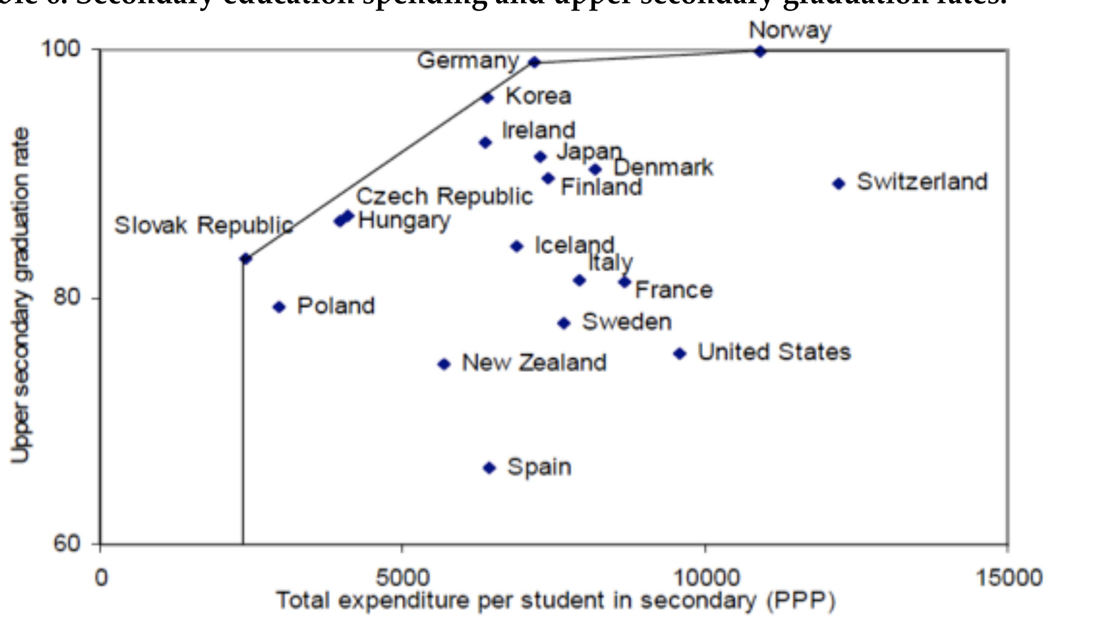
Source: OECD (2010, 2011)

Table 5. Relationship between student achievement in PISA 2009 and total hours devoted to core subjects



Source: OECD (2010, 2011)

Table 6. Secondary education spending and upper secondary graduation rates.



Source: OECD Education at a Glance 2006, www.oecd.org/edu/eag2006; OECD PISA and IMF staff calculations. The line connects countries with the highest observed efficiency and depicts the best practice frontier unadjusted for estimation bias (Verhoeven et al., 2007).

Table 7. Student achievement in PISA 2000 and scores from the Civic Education Study (CIVED) 1999 (rankings in parentheses).

Country	Reading literacy	Mathematical literacy	Scientific literacy	Total test score	Civic knowledge
Finland	546 (1)	536 (4)	538 (3)	1620 (3)	109.3 (2)
Australia	528 (4)	533 (5)	528 (7)	1589 (6)	101.7 (11)
Sweden	516 (9)	516 (15)	512 (10)	1544 (10)	99.1 (18)
Belgium	507 (10)	520 (9)	496 (17)	1523 (11)	94.7 (22)
Norway	505 (13)	499 (17)	500 (13)	1504 (15)	102.9 (9)
United States	504 (15)	493 (19)	499 (14)	1496 (17)	106.5 (6)
Denmark	497 (16)	514 (12)	481 (22)	1492 (18)	100.4 (14)
Switzerland	494 (17)	529 (14)	496 (17)	1519 (13)	98.3 (19)
Czech Republic	492 (19)	498 (18)	511 (11)	1501 (16)	102.6 (10)
Italy	487 (20)	457 (26)	478 (23)	1422 (24)	105.4 (7)
Germany	474 (21)	490 (20)	487 (20)	1451 (21)	99.8 (15)
Hungary	480 (23)	488 (21)	296 (15)	1464 (20)	101.6 (12)
Poland	479 (24)	470 (24)	483 (21)	1432 (23)	110.6 (1)
Greece	474 (25)	447 (28)	461 (25)	1382 (27)	107.9 (4)
Portugal	470 (26)	470 (24)	459 (28)	1399 (26)	96.2 (21)
Russia Federation	462 (27)	478 (22)	460 (26)	1400 (25)	99.6 (16)
Latvia	458 (28)	462 (25)	460 (27)	1380 (28)	91.5 (26)
OECD average	500	500	500	1500	100

Source: OECD (2001) and Schulz and Sibberns (2004)
Note:

1. *Numbers in parentheses are rankings among all participating countries in PISA and CIVED respectively.*
2. *Average of civic knowledge is international average, not OECD.*

Efficiency: the not-so-bad news

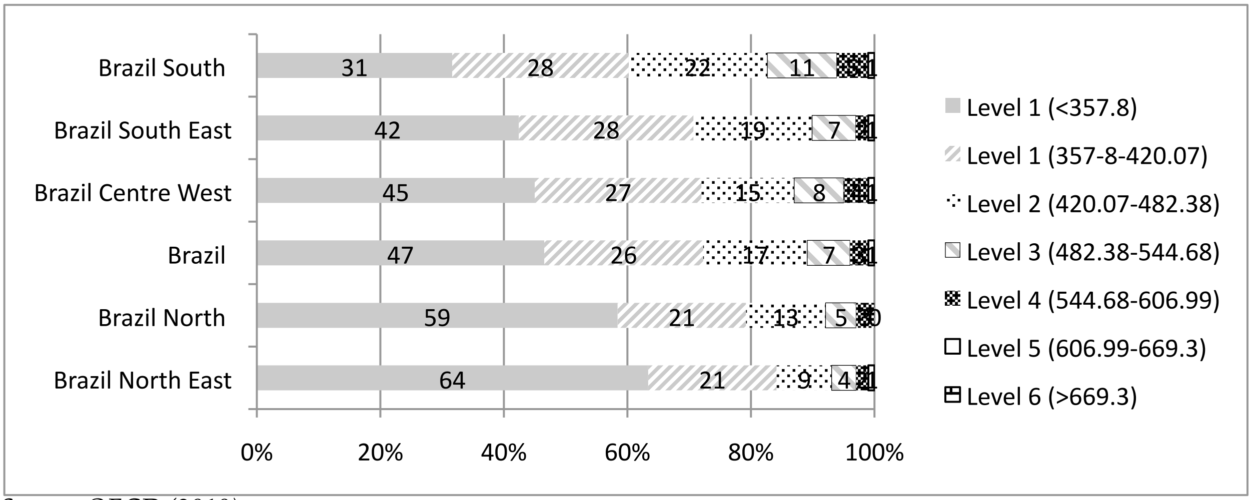
Achievement in subjects other than math and science. Most discussions of achievement concentrate on math and science; some on reading. But the purpose of public schooling and the reason nations invest in public schooling are broader than skills, jobs and productivity. They include the degree to which schools are able to influence citizenship behavior. On this dimension, American schools may do rather well. Table 7 illustrates the differences in international ranking using different achievement measures on PISA 2000 and CIVED 1999. The U.S. was ranked 15th out of 28 countries in reading literacy, 19th in mathematical literacy, and 14th in scientific literacy. However the U.S. was ranked 6th in the field of Civics Education. This could be rather important. Nations which struggle for social cohesion are nations which also struggle economically (Heyneman, 2000). Civil tension reduces trust and a reduction in trust reduces internal cooperation and trade (Heyneman, 2002/3). One reason why the U.S. economy continues to perform in spite of the low ranking in science and mathematics performance may be associated with the rather good job of the American schools in influencing citizenship.

Internal variation in performance.

The U.S. is typical of all large and diverse nations in that academic performance is significantly divergent from on region to another. Table 8 illustrates this divergence in Brazil. 16% of the students achieved the top levels of mathematics achievement in the south and only 7 % in the North east. Table 9 illustrates this divergence in the Russian Federation. The Russian average for PISA 2009 was 475; but this varied from Yakutia at 419 to Moscow at 546. Tables 10 and 11 illustrate this principle in the US and compares the scores of various states in Mathematics (Table 10) and Science (Table 11) against the scores of various nations. On both measures the top performing 'nations' in the world --- Singapore, Hong Kong and Taipei, also includes

Minnesota and Massachusetts. This suggests that parts of the U.S. school system is as competitive as the best in the world.

Table 8. Percentage of students by mathematics proficiency level in regions of Brazil



Source: OECD (2010).

Table 12 illustrates this principle in all the American states. This table shows the state proficiency in mathematics and a comparison of the nations with the same or similar proficiency levels. For instance, Vermont had a proficiency level similar to Australia, Denmark, Estonia, France and Germany. On the other hand, Tennessee, my own state had proficiency levels comparable to Croatia, Greece, Israel, Russia and Turkey. The most inefficient school system in the U.S., according to this criteria is the District of Columbia. Washington DC level of proficiency was the equivalent to that of Mexico, Thailand, and Kazakhstan.

Time devoted to studying using private tutors.
Most studies of education efficiency include time on task within the classroom, hours in the school day, scheduled school days/year. These are important indicators of effort, but are increasingly inadequate. Their inadequacy is particularly relevant when considering comparisons with countries in South and East Asia.

The typical student in Asia attends several types of schools simultaneously. They attend government run public schools from which the data pertaining to time on task usually derive. But they also attend 'cram schools' on a regular basis. These cram schools are referred to as 'shadow education'. In Japan the cram schools are called Juku; in Korea they are called 'Hogwans'. In general these schools are not managed according to modern styles of teaching but the opposite; they are there to reinforce rules, principles, formulae, and information. They are cram schools in the literal sense. In Korea for instance, 88% of the elementary students and 61% of the students in general high schools receive private tutoring in cram schools (Kim, 2010, p. 302). A Korean family which earns between $US 6,000 and 7,000/month typically allocates 6.3% ($US 440/high school student/month) on private tutoring (Korean Statistical Information Service, 2011). The financial burden on households, the stress on children, the implications for social inequality have long been recognized and have been subject to considerable research (Lee and Jang, 2010, Heyneman, 2010). In India, approximately 72% of the older primary school students and 52% of the secondary school students receive private tutoring (Ngai and Chung, 2010). Although it is difficult to research effectively, the portion of students in China who receive private tutoring in math was 28.8% and in English, 29.3% (Zhang, 2011). Other estimates have been made for South America (Mattos, 2007), Europe (Ireson, 2004, Bray, 2011) and the U.S. (Mattos, 2007). Private tutoring is so common that economists have begun to estimate its fiscal impact. By one estimate for instance, private tutoring in South Korea increased from 0.34% of GDP in 1977 to 2.3% of GDP in 2003, an amount equivalent to 50% of the public expenditure on education (Kim, 2007). The Korean Education Development Institute reports that 84% of the

Table 9. Results by Region in Russia (PISA 2009)

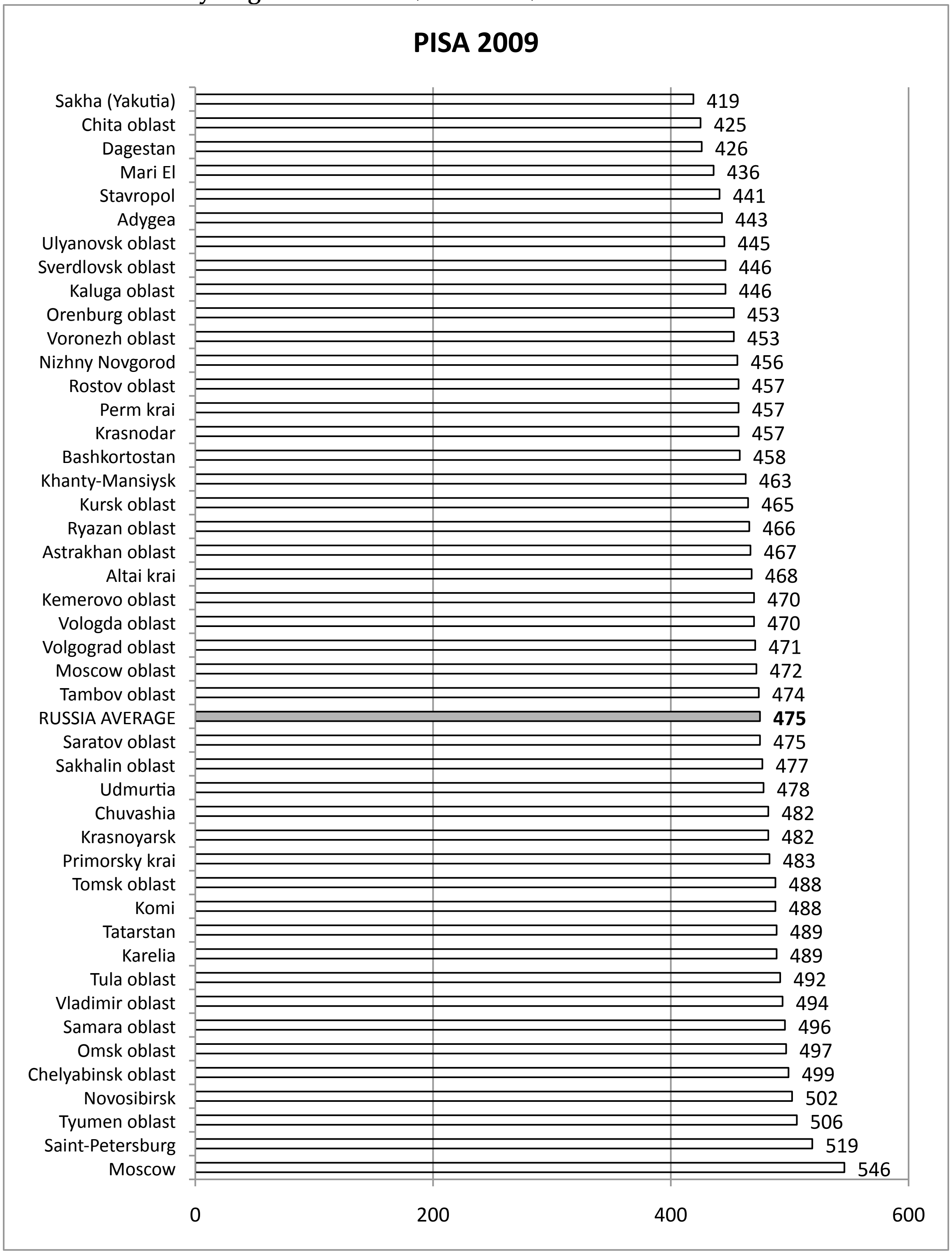


Table 10. Mathematics results by country and U.S. State (TIMSS 2007)

Scale score	Grade 4	Grade 8
	Hong Kong-Ch. (607)	
600	Singapore (599)	Ch. Taipei (598), Rep. of Korea (597) Singapore (593)
590		
580	Ch. Taipei (576) **MA-USA (572)**	Hong Kong-Ch. (572)
570	Japan (568)	Japan (570)
560	**MN-USA(554)**	
550	Kazakhstan (549) Russian Fed. (544) England-UK (541)	**MA-USA (547)**
540	Latvia (537) Netherlands (535)	**MN-USA (532)**
530	Lithuania (530), **USA (529)** Germany (525) Denmark (523)	Quebec-Ca. (528)
520	Quebec-Ca. (519) Australia (516) Ontario-Ca. (512)	Ontario-Ca., Hungary (517) England-UK (513), Russian Fed. (512)
510	Hungary (510), Italy (507) Br. Columbia-Ca., Alberta-Ca., Austria (505) Sweden (503), Slovenia (502)	Br. Columbia-Ca. (509), **USA (508)** Lithuania (506), Czech Rep. (504) Slovenia (501)
500	Armenia, **TIMSS Scale Avg. (500)** Slovak Rep. (496) Scotland-UK (494), New Zealand (492)	**TIMSS Scale Avg. (500)**, Armenia (499) Basque Country-Sp. (499), Australia (496) Sweden (491)
490	Czech Rep. (486)	Malta (488), Scotland-UK (487) Serbia (486)
480	Norway (473)	Italy (480) Malaysia (474)
470	Ukraine (469), Dubai-UAE(444), Georgia (438), Islamic Rep. of Iran (402), Algeria (378), Colombia (355), Morocco (341), El Salvador (330), Tunisia (327), Kuwait (316), Qatar (296), Yemen (224)	Norway (469), Cyprus (465), Bulgaria (464), Israel (463), Ukraine (462), Romania, Dubai-UAE (461), Bosnia and Herzegovina (456), Lebanon (449), Thailand (441), Turkey (432), Jordan (427), Tunisia (420), Georgia (410), Islamic Rep. of Iran (403), Bahrain (398), Indonesia (397), Syrian Arab Rep. (395), Egypt (391), Algeria (387), Morocco (381), Colombia (380), Oman (372), Palestinian Nat'l Auth. (367), Botswana (364), Kuwait (354), El Salvador (340), Saudi Arabia (329), Ghana (309), Qatar (307)

☐ = *Above the international average*
☐ = *Not measurably different from the international average*
☐ = *Below the international average*

NOTE: Countries are listed by estimated average scores. Figure is not a scaled representation of countries' scores. International/OECD average scores and U.S. scores are presented in bold font. While the formulation and construction of assessment scales are the same across the TIMSS, PIRLS, and PISA, the content represented by the scale scores is not the same across different ages within a subject domain.

Source: http://nces.ed.gov/surveys/international/reports/2011-mrs.asp# mathematics

Table 11. Science results by country and U.S. State (TIMSS 2007)

Scale score	Grade 4	Grade 8
600		
590	Singapore (587)	
580	**MA-USA (571)**	
570		Singapore (567) Ch. Taipei (561)
560	Ch. Taipei (557) Hong Kong-Ch. (554) **MN-USA (551)**	**MA-USA (556)** Japan (554), Rep. of Korea (553)
550	Japan (548) Russian Fed. (546), Alberta-Ca. (543) Latvia, England-UK (542)	England-UK (542)
540	**USA (539)**, Br. Columbia-Ca. (537) Hungary, Ontario-Ca. (536), Italy (535) Kazakhstan (533)	Hungary, Czech Rep. (539) **MN-USA (539)**, Slovenia (538)
530	Germany (528), Australia (527) Slovak Rep., Austria (526), Sweden (525) Netherlands (523)	Hong Kong-Ch., Russian Fed. (530) Ontario-Ca., Br. Columbia-Ca. (526)
520	Slovenia (518), Denmark, Quebec-Ca. (517) Czech Rep. (515), Lithuania (514)	**USA (520)**, Lithuania (519) Australia (515) Sweden (511)
510	New Zealand (504)	Quebec-Ca. (507)
500	Scotland-UK, **TIMSS Scale Avg. (500)**	**TIMSS Scale Avg. (500)** Basque Country-Sp. (498) Scotland-UK (496), Italy (495)
490	Armenia (484)	Dubai-UAE (489), Armenia (488) Norway (487), Ukraine (485) Jordan (482)
480	Norway (477) Ukraine (474)	Malaysia, Thailand (471)
470 and below	Dubai-UAE (460), Islamic Rep. of Iran (436), Georgia (418), Colombia (400), El Salvador (390), Algeria (354), Kuwait (348), Tunisia (318), Morocco (297), Qatar (294), Yemen (197)	Serbia, Bulgaria (470), Israel (468), Bahrain (467), Bosnia and Herz. (466), Romania (462), Islamic Rep. of Iran (459), Malta (457), Turkey (454), Syrian Arab Rep., Cyprus (452), Tunisia (445), Indonesia (427), Oman (423), Georgia (421), Kuwait (418), Columbia (417), Lebanon (414), Egypt, Algeria (408), Palestinian Nat'l Auth. (404), Saudia Arabia (403), Morocco (402), El Salvador (387), Botswana (355), Qatar (319), Ghana (303)

□ = *Above the international average*
□ = *Not measurably different from the international average*
□ = *Below the international average*
NOTE: Countries are listed by estimated average scores. Figure is not a scaled representation of countries' scores. International/OECD average scores and U.S. scores are presented in bold font. While the formulation and construction of assessment scales are the same across the TIMSS, PIRLS, and PISA, the content represented by the scale scores is not the same across different ages within a subject domain.
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parents in Korea state that private tutoring is a significant economic burden (KEDI, 2003). Some have commented that private tutoring relates South Korea, among other countries, to a low level of efficiency within the OECD member states (Grundlach and Wobmann, 2001; Kim, 2002). Others have commented on the distortions to higher education selection (Park, 1996), and the fact that memorization of material has a low impact on productivity (Paik, 2000).

Table 12. Percentage of students proficient in math by state and countries with similar proficiency levels

State	Percent proficient	Significantly outperformed by*	Countries with similar percentages of proficient students
1 Massachusetts	50.7	6	Canada • Japan • Netherlands • New Zealand • Switzerland
2 Minnesota	43.1	11	Australia • Belgium • France • Germany • Netherlands
3 Vermont	41.4	14	Australia • Denmark • Estonia • France • Germany
4 North Dakota	41.0	16	Denmark • Estonia • France • Iceland
5 New Jersey	40.4	14	Australia • Austria • Denmark • France • Germany
6 Kansas	40.2	16	Austria • Denmark • Estonia • France • Slovenia
7 South Dakota	39.1	16	Austria • Denmark • France • Hungary • Sweden
8 Pennsylvania	38.3	16	Austria • Denmark • France • Hungary • Sweden
9 New Hampshire	37.9	18	Austria • Denmark • France • Hungary • Sweden
10 Montana	37.6	18	Austria • France • Hungary • Poland • Sweden
11 Virginia	37.5	17	Czech Rep • France • Hungary • Poland • Sweden
12 Colorado	37.4	18	Czech Rep • France • Hungary • Poland • U.K.
13 Wisconsin	37.0	18	Czech Rep • France • Poland • Portugal • U.K.
14 Maryland	36.5	18	Czech Rep • France • Hungary • Poland • U.K.
15 Wyoming	36.0	18	Czech Rep • France • Poland • Portugal • U.K.
16 Washington	35.9	19	Czech Rep • France • Hungary • Poland • U.K.
17 Ohio	35.4	18	Czech Rep • France • Poland • Portugal • U.K.
18 Iowa	35.2	19	Czech Rep • France • Poland • Portugal • U.K.
19 Indiana	35.1	19	Czech Rep • France • Poland • Portugal • U.K.
20 Oregon	34.8	20	Czech Rep • Hungary • Poland • Portugal • U.K.
21 Connecticut	34.7	19	France • Poland • Portugal • Spain • U.K.
22 Texas	34.7	21	Czech Rep • Hungary • Poland • Portugal • U.K.
23 Nebraska	34.6	20	Czech Rep • Hungary • Poland • Portugal • U.K.
24 North Carolina	34.5	21	Czech Rep • Hungary • Poland • Portugal • U.K.
25 Maine	34.1	22	Czech Rep • Hungary • Poland • Portugal • U.K.
26 Idaho	34.1	22	Czech Rep • Hungary • Poland • Portugal • U.K.
27 Utah	32.4	26	Italy • Poland • Portugal • Spain • U.K.
28 Alaska	32.2	26	Italy • Poland • Portugal • Spain • U.K.
United States	**32.2**	**22**	**Italy** • Latvia • Poland • Spain • U.K.
29 South Carolina	31.9	26	Italy • Poland • Portugal • Spain • U.K.
30 Delaware	31.3	28	Hungary • Italy • Portugal • Spain • U.K.
31 Illinois	30.8	27	Czech Rep • Italy • Portugal • Spain • U.K.
32 New York	30.2	28	Hungary • Italy • Portugal • Spain • U.K.
33 Missouri	29.9	28	Hungary • Italy • Portugal • Spain • U.K.
34 Michigan	28.9	30	Ireland • Italy • Lithuania • Portugal • Spain
35 Rhode Island	27.7	34	Latvia • Lithuania
36 Florida	27.4	34	Greece • Latvia • Lithuania
37 Kentucky	27.3	34	Latvia • Lithuania
38 Arizona	26.3	34	Greece • Latvia • Lithuania
39 Georgia	24.7	35	Greece • Latvia • Russia
40 Arkansas	24.4	35	Croatia • Greece • Israel • Latvia • Russia
41 California	23.9	36	Greece • Russia
42 Tennessee	23.1	36	Croatia • Greece • Israel • Russia • Turkey
43 Nevada	23.0	36	Croatia • Greece • Israel • Russia
44 Oklahoma	21.3	36	Croatia • Greece • Israel • Russia • Turkey

45 Hawaii	21.2	38	Croatia • Israel • Russia • Turkey
46 Louisiana	19.0	39	Bulgaria • Croatia • Israel • Serbia • Turkey
47 West Virginia	18.5	41	Bulgaria • Turkey
48 Alabama	18.2	39	Bulgaria • Croatia • Israel • Serbia • Turkey
49 New Mexico	17.4	41	Bulgaria • Serbia • Turkey
50 Mississippi	13.6	43	Bulgaria • Trinidad and Tobago • Uruguay
51 District of Columbia	8.0	48	Kazakhstan • Mexico • Thailand

Source: Peterson et al. (2011)
** Number of countries whose percent proficient was statistically significantly higher*
Note: List of countries performing at a level that cannot be distinguished statistically are limited to those 5 with the largest population.

We were interested in the degree to which private tutoring might affect Korea's PISA efficiency. The PISA questionnaire asked students about time/week spent in private tutoring. We have added this time to the amount of time in formal school and have compared Korea to the U.S.

Table 13 illustrates this comparison in the learning time devoted to studying math in both the U.S. and Korea. Korean students report spending 86% more time studying math out of school than American students (2.1 hours/ week as opposed to 0.3 hours/week). While the ratio of time in formal schooling to PISA score is very close between the two countires (3.54 vs. 3.78), when one adds the time spent studying mathematics outside of formal schooling the differences are pronounced. The ratio of time/ Pisa score is 2.46 for Korean vs. 3.27 for American students. In essence, the American school system is one third more efficient that the Korean school system.

Table 13. Mathematical literacy and time studying math

	Math	In-school Instructional time for math (hours per week)	Instructional weeks in years	Total hours	Ratio of score to time
Korea	552	4.1	35.6	145.9	3.78
United States	472	3.7	36	133.2	3.54
	Math	Out-of-school instruction time for math (hours per week)	In-school + out of school instructions	Total hours	Ratio of score to time
Korea	552	2.1	6.3	224.3	2.46
United States	472	0.3	4.0	144	3.27

Source: PISA (2004) Learning for Tomorrow's World . Table 5.14.
Note: Math scores are from PISA 2003. Out-of-school activities include working with a tutor and attending out-of-school classes.

Table 14 continues this same illustration using the total time studying across all subjects not only studying on mathematics. The total time Korean students spend studying is about one third more than in the U.S.. The level of their PISA scores is indeed higher, but the ratio of time/ PISA score is considerably different. The ratio for Korea is 0.44, and for the U.S. 0.57. By this account, that is by comparison to the total time spent studying in private tutoring as well as in school, the American system is about 30% more efficient than the Korean system.

Table 14. Mathematical literacy and total time studying

	Math	In-school Instructional time for all subjects (hours per week)	Instructional weeks in years	Total hours	Ratio of score to time
Korea	552	30.3	35.6	1078.7	0.51
United States	472	22.2	36	799.2	0.59
	Math	Out-of-school instruction time for all subjects (hours per week)	In-school + out of school instructions	Total hours	Ratio of score to time
Korea	552	5.1	35.4	**1260.4**	0.44
United States	472	0.7	22.9	**824.4**	0.57

Source: PISA (2004) Learning for Tomorrow's World . Table 5.14.
Note: Math scores are from PISA 2003. Out-of-school activities include working with a tutor and attending out-of-school classes.

Implications
For twenty years a common refrain about American education is that it is inferior to the public school systems in Asia (Stevenson and Stigler, 1992; Stigler and Hiebert, 1999). The problem is that it has ignored the fact that the typical youth in Asia receives only a portion of his achievement from the public school system and that test scores in particular are influenced by the quality and intensity of the cram schools. But the refrain of inferiority to school systems in Asia is not only inaccurate scientifically but is pernicious in another way. It ignores the fact that the image of school systems in Japan, Korea and parts of China, by local citizens, is that of low quality, not high quality. Instead of crowing about international superiority on international tests of academic achievement, local authorities, parents, the academic community adamantly condemn the quality of their systems.

Typical adolescence in Asia involves cramming scientific and mathematical facts. Studying is treated as a full time profession in which students are asked to study 80 – 100 hours/week at home, in school, with tutors and in cram schools. The process has generated problems of depression, suicide, bullying and personality disorder (Kong, 2011; Lee and Larsen, 2000, Stankov, 2010). High exposure to private tutoring is associated with lower confidence and a dislike of academic work (Kong, 2011). Choi suggests that there "is a negative influence of shadow education on the way of learning and creativity among high school students," (Choi, date?). Yun suggests that in Korea "overheated shadow education drops the interests of learners and therefore decreases learners self learning ability" (Yun, 2006 p. 198). Yang agrees and points out that "as stress from shadow education increases academic motivation decreases. And as the burden on time and mentality among factors of stress from shadow education increases, internal satisfaction decreases … and problem behavior increases." Yang 2011,p. 2). An article in Yonhapnews reports on a study in which students depend on what and how to learn in cram schools or private tutors and cannot plan their own study in detail. They accept learning contents meaninglessly and passively and become other-person-led learners without explicit learning goals (Yonhapnews, 2007)

Even for those who successfully pass their examinations and enter a university, depression and meaninglessness continue. Unlike the U.S., Britain or Canada, scores on university selection examinations in Asia not only determine which university they are allowed to enter, but which program of study. The result is detrimental to their higher education experience. Cho points out that

> Most of the (students) are dissatisfied with their universities or departments since they have not chosen them according to their desires but according to their scores… the years of preparing for the examination under extreme tension and stress also make the winners extremely passive and dull. Many of them have difficulties adjusting to university life… Courses in liberal arts and social sciences that require analytical and critical thinking confuse and frustrate them endlessly. They are particularly annoyed by questions which do not have definite answers (Cho, 1995, p. 155).

As Tucker (2011, 2012) has explained, performance among Asian school children stems from a culturally narrow concentration on simplistic indicators of math and science as indicators of success. So damaging has this process become that the publics are searching for a way to escape and often look to the U.S. as having a more balanced way to raise children and adolescents. They are probably right. While Asians look longingly at the educational and personal effects of a typical American adolescence, Americans are rarely aware of the negative effects on personality development of an adolescence narrowly devoted to math and science scores. Were Americans more aware of these effects they might look with less jealousy at the success of Asia PISA scores.

While it is true that many American school systems are in desperate need of repair, it is also true that some school systems in the U.S are superb. Furthermore many Americans emerge from the process of adolescence with deep labor market experience, a sense of autonomy and personal independence which the typical youth in Asian countries do not have.

Summary.

In comparing ourselves with other countries, we must keep in mind that the indicators of our envy – high scores in math and science -- were not acquired in a vacuum, but rather through a different culture with many faults obvious to local populations but not to outsiders. American schools systems are not uniformly poor or inefficient. American students tend to perform better on some types of tests than others; some American states perform well on all tests; and in terms of time spent studying school systems in the U.S. may be considerably more efficient. Americans need to be more careful to not import the 'terror' of a shadow education adolescence typical of Asia. Americans need to be more circumspect when criticizing their own education policies as if the deficits were so uniform and the virtues so insignificant.

Notes

[1] Efficiency of a school system is defined here in a straightforward way, as output (e.g. test scores) per unit of input (e.g. per pupil expenditure). While such indicators do not tell the whole story of the quality of a nation's school system, they can highlight discrepancies and problems in need of attention.

[2] Data and tables have drawn on unpublished papers from three graduate students: Bommi Lee 2012 "Efficiency and effectiveness in education across countries: what should be measured?"; Yunkuyung Min 2012 "States' Variation in international students' assessment: Case of the U. S. and Brazil," and Jeongwoo Lee 2012 "An Attempt to reinterpret student learning outcomes: a cross-national comparison".

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References

Baldi, S., Jin, Y., Skemer, M., Green, P.J., and Herget, D. 2007 *Highlights from PISA 2006 Performance of U.S. 15 year-olds in Science and Mathematics Literacy in an International Context.* Washington D.C.: U.S. National Center for Education Statistics, Department of Education.

Bray, M., 2011 The Challenge of shadow education: Private Tutoring and its implications for policy makers in the European Union Brussels: European Commission.

Cho, Hae-Jong 1995 "Children in the examination war in South Korea: A cultural analysis," pp. 141- 168 in Stevens, S. (Ed.) *Children and the Politics of Culture*. Princeton: Princeton University Press.

Choi, Jaesung 2012. "Unequal access to shadow education and its impacts on academic outcomes: evidence from Korea," Paper presented at Spring 2012 meeting of ISA RC 28 "Economic transformation and social stratification in comparative perspectives", Hong Kong, May 10-13, 2012.

Commission on the Future of Higher Education (the Spellings Commission) 2006 *A Test of Leadership: Charting the Future of U.S. Higher* Education Washington D.C.: U.S. Department of Education.

Commission on Higher Education 1947 *Higher Education for American Democracy* (The Truman Report) Washington D.C.: U. SW. Government Printing Office.

Committee on Education Beyond High School 1956 First Interim Report to the President (The Eisenhower Report). Washington D.C.: U.S. Department of Health, Education and Welfare.

Heyneman, S.P. 1999 "American Education: A View from the Outside," *International Journal of Leadership in Education* Vol. 2 No. 1 pp. 31-4.

…………………………2000 From the Party/State to Multi-Ethnic Democracy: Education and Social Cohesion in the Europe and Central Asia Region," *Educational Evaluation and Policy Analysis*, " vol. 21 No. 4 (Summer, 2000), pp. 173 – 191.

………………………. 2002/3 "Defining the Influence of Education on Social Cohesion," *International Journal of Educational Policy, Research and Practice* 3 # 4 (Winter), pp. 73 – 97

…………………2004 "International Education Quality," *Economics of Education Review*, Vol. 23 pp. 441 – 52.

………………… 2005 "Student Background and Student Achievement: What is the right Question?" *American Journal of Education* Vol. 112 No. 1 (November), pp. 1-9

…………………2010 Private tutoring and social cohesion," *Peabody Journal of Education* Vol. 86 No. 2 183-88.

Heyneman, S.P. and Lee, B. (2012) "Impact of International Studies of Academic Achievement on Policy and Research," 2012 in Leslie Ann Rutkowski, Matthias von Davier, and David Rutkowski (Eds.) *Handbook of International Large Scale Assessment: Background, Technical Issues, and Methods of Data Analysis.* London: Chapman and Hall Publishers (forthcoming).

Ireson, J. 2004 "Private Tutoring: How prevalent and effective is it?" *London Review of Education* Vol. 2 No. 2 pp. 183-88

Kim, Ji-Ha, 2007 The Determinants of Demand for Private Tutoring," Unpublished manuscript prepared for Professors Henry Levin and Mun Tsang, Columbia Teachers College (July).

Kim K.K. 2010 'Educational Quality' in Lee, C.J., Kim, S.Y., and Adams, J. (eds.) Sixty Years of Korean Education Seoul: Seoul National University Press, pp. 285-325

Kim, J.S. and Jin. Y.J. 2010 "The effects of shadow education experiences and parents' achievement pressures on the learning attitudes of children," *Bumogyoyoukyongu* (Parents Education Study). 7(2): 5-22. (in Korean).

Kong,J.S. 2011 *The effects of partents-children dysfunctional communication and academic stress on adolescents' suicide ideation, focusing on the mediating effects of depression and gender differences*, Masters Thesis, Graduate School of Social Welfare, Yonsei University (in Korean).

Korean Statistical Information Service 2011 "*Spending on shadow education by school level and type/month, 2007-2011*," Seoul: Korea Education Development Institute.
Lee C.J. and Jang, H.M. 2010 "The History of policy responses to shadow education in Korea: Implications for the next cycle of policy responses," in Lee, C.J., Kim, S.Y., Adams, D. (eds.) *Sixty Years of Korean Education* Seoul: Seoul National University Press, pp. 512-545.
Lee, C.J. and Larson, R. 2000 The Korean 'Examination Hell': Long Hours of studying, distress, and depression," *Journal of Youth and Adolescence* Vol. 29 No. 2 pp. 249-71.
Lemke, M., Sen, A., Pahlke, E. Partelow, L., Miller, D., Williams, T., Kastberg, D and Jocelyn, L 2004 International Outcomes of Learning Mathematics Literacy and Problem-Solving: PISA 2003 Results from the U.S. Perspective Washington D.C.: U.S. National Center for Education Statistics, Department of Education
Mattos, L.O.N. 2007 "Explicadores do Rio de Janeiro: Encontros e desencontros em trajectorias professionais singulars," *Revista Brasileira de Estudos Pedagogicos* Vol. 88 No. 218 pp. 140-56.
National Commission on Excellence 1983 *A Nation At Risk: the imperative for education reform. Report to the Secretary of Education (*May): Washington D.C.: U.S. Department of Health Education and Welfare.
New York Times 2009 "Overpaying for educational underachievement". http://economix.blogs.nytimes.com/2009/04/22/overpaying-for-educational-underachievement/
New York Times 2010 " Shanghai placed the first. Focus on China, not the U.S.," http://www.nytimes.com/2010/12/07/education/07education.html?_r=1&pagewanted=all
Ngai A. and Cheung, S. 2010 'Students' participation in private tuition,' Youth Poll Series No. 188 Hong Kong: Hong Kong Federation of Youth Groups.
Stankov, I 2010 "Unforgiving Confucian culture: A breeding ground for high academic achievement, test anxiety, and self doubt?" *Learning and Individual Differences* Vol. 20 no. 6 pp. 555-63.
State Scholars Initiative 2008 *No Longer At Risk: a nation in peril* Boulder (Colorado): Western Interstate Commission for Higher Education
Stevenson, Harold W. and Stigler, James 1992 *The Learning Gap: Why our schools are failing and what we can learn from Japanese and Chinese education*. New York: Summit Books.
Stigler, James and Hiebert, James 1999 *The Teaching Gap: Best ideas from the world's teachers for improving education in the classroom.* New York: Free Press.
Task Force on Education Makes Its Report (The Kennedy Report) *The Saturday Review* January 21, 1961 p. 94
Tucker, M. 2011 *Strong Performers and Successful Reformers in Education*. Paris: Organization for Economic Cooperation and Development.
………………. 2012 *Surpassing Shanghai: An Agenda for American Education Built on the World's Leading Systems*. Cambridge: Harvard Education Press.
Wolk, Ronald A. 2009 "Why we are still at risk" *Education Week* April 29th
Yang, E.Y. 2011 *The effects of shadow education stress on middle school students' academic motivation and behavior problems,* Graduate School of Education, Chonnam National University Masters' Thesis (in Korean)
Yonhapnews 2007 "*Hangukyuigyoyukryuk, edaerojoeunga?* (Is current Korean education okay?)"http://app.yonhapnews.co.kr/YNA/Basic/article/Press/YIBW_showPress.aspx?contents_id=RPR20070517010800353 (in Korean).
Yun, Young-Ran 2006 Motivation, interest and self-learning ability. *Inha Gyoyukyongu* (Inha Education Study). No. 12, pp. 181-98. (in Korean)
Zhang Y. 2011 "The determinants of national college entrance exam performance in China – With an analysis of private tutoring," PhD Dissertation Columbia University.