

# U.S. Results on PISA 2012\*

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On a three year cycle, the Organisation for Economic Cooperation and Development (OECD) assesses the performance of 15-year-olds in countries around the world. In 2012, 31 OECD countries and 34 other countries participated in the Programme for International of Student Assessment (PISA).<sup>1</sup> These tests cover mathematics, science, and reading and provide direct comparisons of skills.<sup>2</sup> This discussion focuses on math performance, which is the most important in terms of economic returns.

The attached tables provide a quick overview of the results.<sup>3</sup> The results are sobering. The U.S. is significantly below the OECD average for mathematics, significantly above the OECD average of low performers, and significantly below the OECD average of high performers. [See Table I.A] (In reading and science, the U.S. students do better in country rankings but are insignificantly different from the OECD average).

As seen in Figure 1.2.13, the math performance is not statistically different from Norway, Portugal, Italy, Spain, Russian Federation, Slovak Republic, Lithuania, Sweden, and Hungary. In simplest terms this is not the group of countries that we would like to be compared with. Note that this also puts us significantly behind a cluster of East Asian countries but also a number of European and even developing countries.

What is perhaps more disturbing still is that scores have been stagnant for the past decade. Since 2003, the assessments have been constructed to be directly comparable. Figure 1.2.15 provides estimates of the average annual gains in PISA math points since first measured. The United States made virtually no gains over the past decade. But a range of other countries made substantial gains. The most rapid gains were made in very low performing countries such as Qatar and Kazakhstan. Yet higher performing countries also made substantial gains – Israel, Singapore, Italy, and Poland. Poland is interesting because it has steadily improved over the past decade and now ranks 8<sup>th</sup> within the OECD (14<sup>th</sup> among all 65 participating countries). In simplest terms, other countries show that change is possible.

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<sup>1</sup> In reality, not all participants are countries. Shanghai participated but not other provinces of China. Hong Kong and Macao along with Chinese Taipei (Taiwan) also participated. Throughout all participants are described as countries for simplicity.

<sup>2</sup> The PISA sampling finds a random selection of 15-year-olds who are in school. The failure of some countries to have students in school at age 15 can bias scores, but this is not a significant problem for the developed countries in the OECD. It will affect some developing countries, who nevertheless continue to score below the U.S. Within the developed countries to which we would wish to be compared, many have higher high school graduation rates than the U.S. (Organisation for Economic Co-operation and Development, *Education at a glance 2013: OECD indicators*. Paris: Organisation for Economic Co-operation and Development, 2013).

<sup>3</sup> The tables are taken from Organisation for Economic Co-operation and Development. 2013. *PISA 2012 Results: What Students Know and Can Do – Student Performance in Mathematics, Reading and Science (Volume I)*. Paris: OECD. This and other publications can be found at: Organisation for Economic Co-operation and Development. 2013. *PISA 2012 Results: What Students Know and Can Do – Student Performance in Mathematics, Reading and Science (Volume I)*. Paris: OECD.

## Some interpretation: “These test scores really do not matter”

In response to these results, a number of commentators have tried to counsel ignoring the results or have tried to spin them to suit other purposes. This response comes in various forms, and unfortunately get an amount of media attention without much thoughtful response. The following highlights common versions of the arguments against international test results and provides an overview of the response to each.

### 1. *We have a very strong economy, so we are not being drawn down by the results.*

Indeed, *A Nation at Risk* gave the message of an economy in danger because of schools but we have had strong growth over the quarter century since those warnings. The answer is that we have the world’s best economic system and institutions, and this has protected us from the deficiencies of our schools. But it is likely that we will not be so sheltered in the future and will have to rely on our skills (human capital). Other countries have emulated many of the features of our economic institutions and are now putting that together with improved human capital – implying that we may no longer be the world’s leader in innovation in the future. Moreover, increasing U.S. debt and public sector balance issues imply increased taxes and larger government intrusion in the future – things that will weaken our economic institutions. Our analysis shows that long run growth is very closely related to the skills measured on these tests.<sup>4</sup> From historical experience, the differences in potential economic outcomes from improvements in skills comparable to those seen in other countries are many multiples of the total cost of the 2008 recession until now.

### 2. *The U.S. ranking is completely explained by poverty, and we should be fixing poverty and not our schools.*

Various (poor) analyses have suggested that, because the U.S. has higher poverty than other countries, our low U.S. scores can be explained by poor kids since children in poor families tend to have lower achievement. Indeed, in response to the PISA 2012 scores, the American Association of School Administrators (AASA), “The problem we find in American education isn’t that schools are ‘falling behind,’ it is that schools are ‘pulling apart.’ Poverty in America is the real issue behind today’s education gap, and it means students can experience different education trajectories because of where they live.”<sup>5</sup> This is the association of school superintendents, arguing that it is not

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<sup>4</sup> Hanushek, Eric A., and Ludger Woessmann. 2012. "Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation." *Journal of Economic Growth* 17, no. 4 (December): 267-321.

<sup>5</sup> AASA Statement on the Program for International Student Assessment (PISA), December 3, 2013. Accessed December 15, 2013, at <http://www.aasa.org/headlinecontent.aspx?id=31030>. See also Martin Carnoy and Richard Rothstein, What do international tests really show about U.S. student performance? Washington, DC: Economic Policy Institute (January 2013). For comments on the EPI study, see <http://hanushek.stanford.edu/publications/we-know-answer-what-question>.

the schools but poverty. Figure 1.2.22 shows clearly why this is wrong. If everything is fine except that the poor are dragging down the average, the United States would be turning out the same share of high-performing students as other countries. To the contrary, only 9 percent of U.S. students perform at the highest proficiency levels in math (levels 5 and 6), far behind the 20 to 30 percent performing at that level in countries such as Korea, Japan, Switzerland, and the Netherlands. Our neighbor to the north, Canada, turns out almost twice as many high-flyers as the United States. Moreover, if an income gap made America unique, you would expect the percentage of American students performing well below proficiency in math to be much higher than the percentage of low performer in countries with average test scores similar to the United States. That's not the case. We have the same average scores as the Slovak Republic, Lithuania, and Hungary (hardly a group we want to be compared with!), and like those countries' students, about a quarter of our students performed well below proficiency in math. In other words, the United States is no worse at educating our weakest students than are countries with scores similar to ours. The problems in American education are across the board, with every kind of student doing poorly when compared to students in other industrialized countries.

**3. *Other things such as grit, determination, etc. are much more important than cognitive skills.***

While these noncognitive skills may well be important, the empirical evidence on the economic outcomes related to them is thin. At the same time, we know that measured achievement has very high economic returns to individuals. In fact recent work on earnings of individuals and how they relate to achievement shows that the U.S. rewards high skills more than any of the 22 other countries surveyed by the OECD.<sup>6</sup> Moreover, there is no evidence that having higher skills detract from noncognitive development or skills. In fact there is some evidence that they go together. Interestingly, in confidence, U.S. students have always thought that they were above average in math skills and, most recently on PISA questionnaires, show above average self-efficacy in doing math problems – things that belie their performance.

**4. *We don't really need any more skilled workers because we already have enough unemployed or underemployed college graduates.***

At any time, there is always an amount of transitory unemployment as workers move across jobs and as some workers (even college graduates) find that their skills built up on "old technologies" are no longer needed. But over the long run, the nature of production adapts to the workforce it has. With a highly skilled workforce, technology tends to expand in ways that employ these skills. With a

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<sup>6</sup> This finding comes in recent unpublished analysis of the PIAAC data by Eric A. Hanushek, Guido Schwerdt, Simon Wiederhold, Ludger Woessmann, "Returns to Skills around the World: Evidence from PIACC." PIAAC is an OECD survey of adults age 25-65, and it showed the U.S. had the lowest achievement of all 23 countries except for Spain. PIAAC is the Programme for International Assessment of Adult Competencies.

lower level of skills, industry expands on dimensions that do not need as many skills – although these expansions are generally not at the forefront of technology and at least historically have not seen the same growth in wages that go to more skilled technologies. Moreover, as seen in Figure 1.2.22, the modest proportion of Level 5 and 6 students suggests that the future development of scientists and engineers in the U.S. is going to be constrained. Indeed, the demand for highly skilled workers educated abroad is very evident now in Silicon Valley.

## Some Conclusions

There are three important conclusions related to PISA 2012. First, the U.S. is not doing well, falling behind most of the countries that we would like to compete with. While this low ranking has been seen on prior international assessments, there are many reasons to believe that it will be very important for our future. Second, by historical patterns, improving our achievement – which identifies the human capital of our workforce in the future – has huge economic ramifications. Indeed getting to the level of Canada implies higher growth that would translate into 20 percent higher paychecks for the average worker over the entire 21<sup>st</sup> Century.<sup>7</sup> Not only does this relate to our current fiscal woes, but also it will say things about our future economic and international leadership. Third, other countries have shown that it is possible to improve. While it is not easy simply to copy what they might have done, it is clear that changing achievement can be done – even if it is difficult.

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<sup>7</sup> The economic arguments are found in Eric A Hanushek, Paul E. Peterson, and Ludger Woessmann, *Endangering Prosperity: A Global View of the American School* (Washington, D.C.: Brookings Institution Press, 2013).