



## AN EXCEPTION TO THE GENDER GAP IN EDUCATION: THE MIDDLE EAST?

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**Introduction:** An interesting consequence of the Arab Spring is that it is compelling the West to re-evaluate its understanding of the Middle East. Stereotypes and misconceptions have abounded, but today the region can no longer be grossly dismissed as home only to extremists or the oil-rich. Instead, a more nuanced and accurate picture is emerging: one that is as full of contradictions as an image of any region would be. For a region not known for its equitable attitudes towards women, for instance, the Middle East offers up some surprising results for girls in school, results that are much better in some ways than the rest of the world.

**The Gender Gap in Mathematics:** A recent National Bureau of Economic Research (NBER) working paper by Roland Fryer and Steven Levitt, "An Empirical Analysis of the Gender Gap in Mathematics,"<sup>2</sup> finds evidence for a gender gap in elementary school level mathematics in the United States, a gender gap that they find, extending their analysis to international results, in elementary- and secondary-level students around the world – except the Middle East.

"Surprisingly, although these Middle Eastern countries have a high degree of gender

inequality, there is no gender gap in mathematics on average in these places,"<sup>3</sup> the authors write. What we will see in fact is that there is a reverse gender gap with girls outperforming boys in grade 4 results in the Middle East, a trend that continues into grade 8, though there are some distinct exceptions beginning to be noticeable by that grade, too.

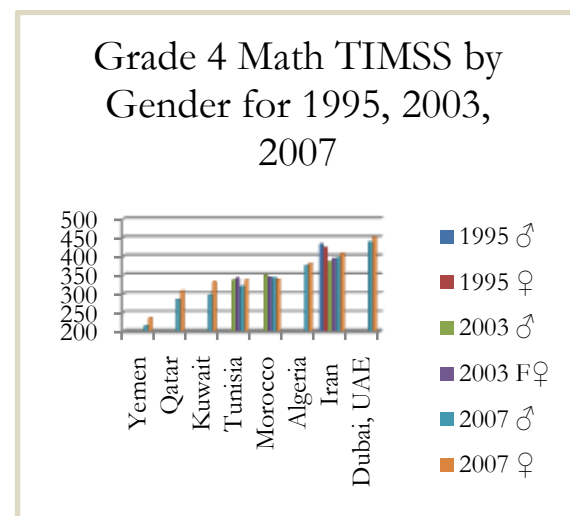


Figure 1

The study is based on data from the *Early Childhood Longitudinal Study Kindergarten Cohort (ECLS-K)*, a data set covering a sample of more than 20,000 children from approximately 1,000 US schools entering kindergarten in the fall of 1998, who were then subsequently re-interviewed in the spring of kindergarten, first grade, third grade, and fifth grade.

The study finds that on entering kindergarten, girls and boys are observationally equivalent in

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<sup>2</sup> See [www.NBER.org](http://www.NBER.org)

<sup>3</sup> Fryer and Levitt (2009), p. 7.

both math and reading. By the end of fifth grade, however, girls have fallen more than 0.2 standard deviations behind their male counterparts in math, a gap that is equivalent to roughly 2.5 months of schooling -- in comparison girls start .15 standard deviations ahead of boys in reading and retain that advantage. The study goes on to show that girls are losing ground in math in every region of the country, every racial group, all levels of the socio-economic distribution, every family structure, and in both public and private schools.

A range of explanations is put forward for the U.S. data, including less investment by girls in math, low parental expectations, and biased tests, but the authors find little support for any of these theories. Paradoxically, the evidence suggests that the gender math gap is notably large among children who attend private schools, have highly-educated mothers, and have mothers working in math-related occupations -- all factors that one would think would actually be in line with girls' success in math.

When Fryer and Levitt turn their attention to international results, probing data from PISA and TIMSS exams, what they find there confirms what they see in the US -- except in the Middle East. Referring to a paper by Guiso *et al.* (2008)<sup>4</sup> that uses the PISA exam for 15 year olds, the authors show that the results are largely consistent with the ECLS-K data for the US with boys outperforming girls in math in the majority of countries, while girls outperform boys in reading in every country of the sample. Guiso *et al.* shows however that the gender gap in math scores is strongly negatively correlated with various measures of gender equality such as the World Economic forum's Gender Gap Index.

For instance, TIMSS results from 2007 for grade 4 and grade 8 mathematics corroborate these findings. In Bahrain and Iran, which are among the worst in terms of gender equality, girls are easily outperforming boys on math, a phenomenon due to relatively strong

performance by girls rather than an unusually weak showing by boys; nor does it appear to be due to selection bias arising from a smaller, yet academically stronger, share of girls in school either.

One intriguing hypothesis the authors put forward to explain this has to do with same-sex classrooms. In most of the world, most classes are mixed-gender. In a handful of the Middle Eastern countries that participated in TIMSS (Bahrain, Iran, Jordan, Palestine, and Saudi Arabia), virtually all secondary schooling is gender-segregated, while in two other countries, Egypt and Syria, there is a mix of same and mixed-gender classrooms, but the majority are same-sex. As it is in these classrooms environments where girls outperform boys, this leads the authors to contend that: "Cross-country data are consistent with the hypothesis that mixed gender classrooms are a necessary component for gender inequality to translate into poor female math performance" (Fryer and Levitt, 2009, p.21).

In this connection, it would have been interesting to know whether mathematics scores taken from the ECLS-K dataset for girls and boys taught in same-sex classrooms in the US would have corroborated this hypothesis or not, but this was not the authors' primary research question. Much evidence exists demonstrating the improved performance of girls in mathematics in same-sex classrooms<sup>5</sup>, though a clear counter-example is mentioned in the study: that of Scandinavian countries, considered to be gender-equal societies, where the gender gap effectively disappears.

However, there is much room for argument here: not all primary schooling in the Arab world is segregated. Yet it is in primary school that students are first tested with the grade 4 TIMSS math exam and the gender gap is already apparent. In Tunisia where classes are not segregated, TIMSS results clearly demonstrate statistically significant differences favoring girls who score 337, on average 18

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<sup>4</sup> "Culture, Gender, and Math," Luigi Guiso, Ferdinando Monte, Paola Sapienza, and Luigi Zingales, *Science*, 320, No. 5880 (2008), 1164-1165.

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<sup>5</sup> see <http://www.singlesexschools.org/research-singlesexvscoed.htm>

points better than boys at 319 (TIMSS 2007 mathematics for Gr. 4). In Figure 1, we see the results by gender of those Middle Eastern Countries participating in the TIMSS Grade 4 mathematics. Girls outperform boys in all cases, but two: in Morocco where boys did better than girls in 2003 and 2007, and in Iran in 1995, where boys did better than girls (but where subsequently in the next two testing cycles the trend was reversed).

However, the trend is less apparent when we consider the grade 8 TIMSS mathematics results

in Figure 2 below. Of the many conservative societies with same-sex classrooms, all have girls outperforming boys, but in more secular cultures, many more exceptions show up: Morocco's results continue to show boys outperforming girls, as they did in grade 4 results, while Tunisia, whose results in grade 4 favored girls, has now done an about-face with boys outscoring girls. That said, other less conservative countries, like West Bank and Gaza (WBG), show girls dominating the scores.

Figure 2

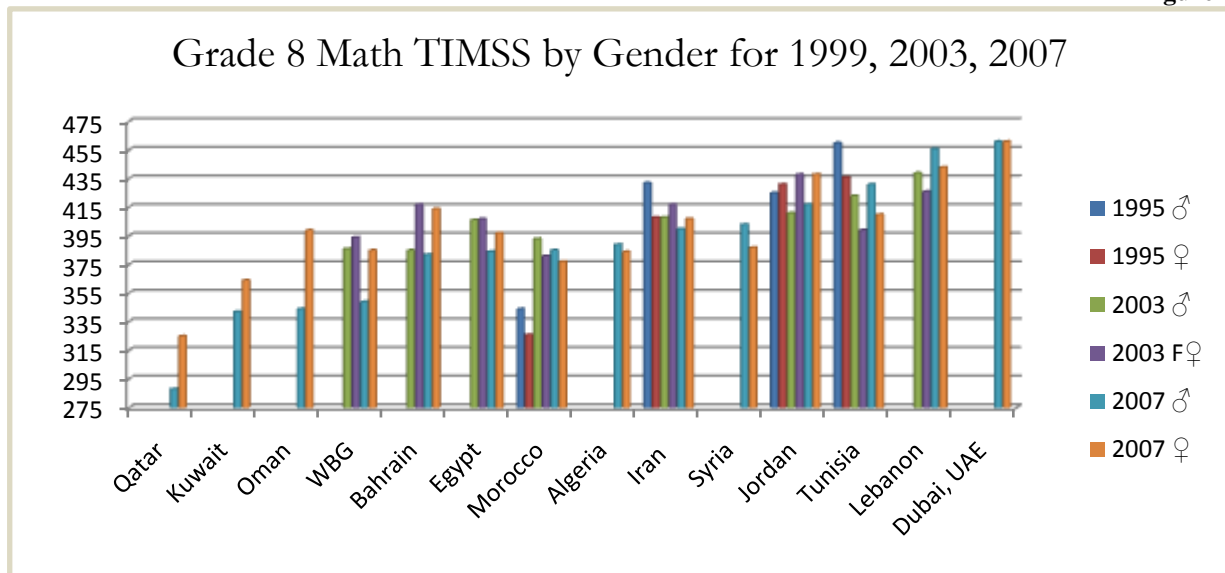


Table 1 Unemployment rates in MENA (%)

	Egypt 2006				Lebanon 2004				Morocco 2001			
	All	Male	Female	Gender gap	All	Male	Female	Gender gap	All	Male	Female	Gender gap
Primary	1.7	1.7	1.8	1.0	4.3	3.8	8.2	0.5	12.7	12.8	12.5	1.0
Sec. Gen.	4.0	3.3	8.9	0.4	4.7	3.8	7.9	0.5	35.1	29.2	47.3	0.6
Sec. Voc	15.4	7.1	36.8	0.2	8.2	7.1	10.9	0.7	27.0	22.8	34.2	0.7
Tertiary	16.6	10.5	29.1	0.4	5.5	3.9	7.8	0.5	39.8	40.2	38.3	1.1

A perfectly satisfying explanation for all these differing results remains elusive -- perhaps results from TIMSS 2011 will help. It is fascinating how social context and environment can frame academic performance. Unfortunately, it is still not clear what the root causes are or how to effectively structure incentives to systematically attenuate the gender gap. This is true in the US and also

particularly true of the Middle East where we observe what seems to be a reversal of the gender gap sometimes. Clearly much more research is needed.

In the meantime, one inescapable observation is that girls are now doing better now than boys in most subjects in the region, with the result that many more of them are going on to tertiary

education. According to UNESCO figures, in 19 countries of the region that were surveyed, the gross enrolment rate for women in tertiary education is increasing annually, and in 15 of those countries, the women's rate is now equal to or exceeds the men's rate.<sup>6</sup>

This is leading to its own set of complications. In the 2010 edition of *Women's Rights in the Middle East and North Africa*<sup>7</sup> one of the many findings deals with women's advances in education. Over the past 10 years, women in all MENA countries except Yemen have made gains in access to education, literacy, university enrollment, and the variety of subjects open to study. There has, as well, been an increase in the availability of vocational training schools and business colleges for female students.

But these advances are coming at a price: in the fields of mathematics and science, the report points out some glaring imbalances:

Although women are generally still encouraged to study in such traditionally female disciplines as education and medicine, in many countries women's numbers have increased in the fields of science and engineering. Particular progress has been visible in the Gulf States, where women are now joining new professions in substantial numbers and are increasingly going abroad on government scholarships. There has, however, been something of a backlash in a few MENA countries against women's involvement in non-traditional study areas. In Kuwait, women who want to study in certain traditionally male fields, such as engineering, must achieve a higher grade point average for admission than men. In Oman, women students often must postpone university study for one year, a limitation not applied to men.

Women's participation in the labor market is low by world standards but is slowly increasing. It was 22.6 % in 2000 rising to 24.8% in 2009 (in comparison the world average for

women was 52.1% and 52.7% for these same years).<sup>8</sup> As women's educational attainment in MENA countries has increased, more women have tried to move towards the job market. But there, not only are employment prospects dim, advancement prospects, when they are finally employed, are poor too. World Bank figures for unemployment suggest that educated women have the highest rates of unemployment in the region. As table 1 demonstrates, in three secular countries (hence those with lesser constraints placed on women), the unemployment rates of women with secondary and tertiary education is anywhere between one and five times as high as their male counterparts with comparable education. For instance, 29.1% of female university graduates in Egypt are unemployed, almost three times higher than their male counterparts. Yet once employed, women of the region also face significant and often insurmountable obstacles to their advancement.

Some have suggested that one cause of the Arab Spring uprisings was that the educated populace in Tunisia and Egypt were held down too long. As women in the region progress educationally, one wonders how long they might be held back too.

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<sup>6</sup><http://stats.uis.unesco.org/unesco/TableViewer/tableView.aspx>

<sup>7</sup> Found at <http://www.freedomhouse.org/template.cfm?page=163>

<sup>8</sup> ILO, *Trends econometric models*, October 2010