

Jamaican Students Exam Performance in the 21st Century: Patterns and Puzzles

A Policy Brief of the Jamaica Education Transformation Commission, 2021
We REACH for Excellence

Orlando Patterson, Chair JETC

INTRODUCTION

- The exam performance of Jamaica's students are well below the nation's expectations & international standards. This policy brief examines their performance levels since 2002 in 7 major tests: the GSAT, GNAT, CSEC, CAPE, and the recent PEP exam, as well as the earlier Grade-4 Literacy & Numeracy tests. We also attempt to explain two puzzles that emerge from the analysis
- The analysis shows that, although the performance of students in 2018 remained unsatisfactory, there had, nonetheless, been marked improvements between 2004 and 2018, the last year of the GSAT exam. However, performance collapsed in 2019, the first year of the PEP. These results present two puzzles
- The first puzzle is to explain the improvement between 2004 and 2018. More specifically, to what extent did the substantial capacity building measures resulting from the 2004 Task Force explain these improvements? We show that the timing of the changes following the 2004 Task Force could not directly explain the improvement, but that there were an important indirect effects
- The second puzzle concerns the very poor results on the first PEP exams, taken in 2019. While the PEP is not strictly comparable to the previous GSAT and GNAT exams, the troubling results on the PEP point to what was problematic about the earlier exams. These problematic features of the earlier tests, and teachers' management of them, we argue, partly explain the improvement in scores following the 2004 Task Force report.

THE GRADE-4 LITERACY & NUMERACY EXAMS

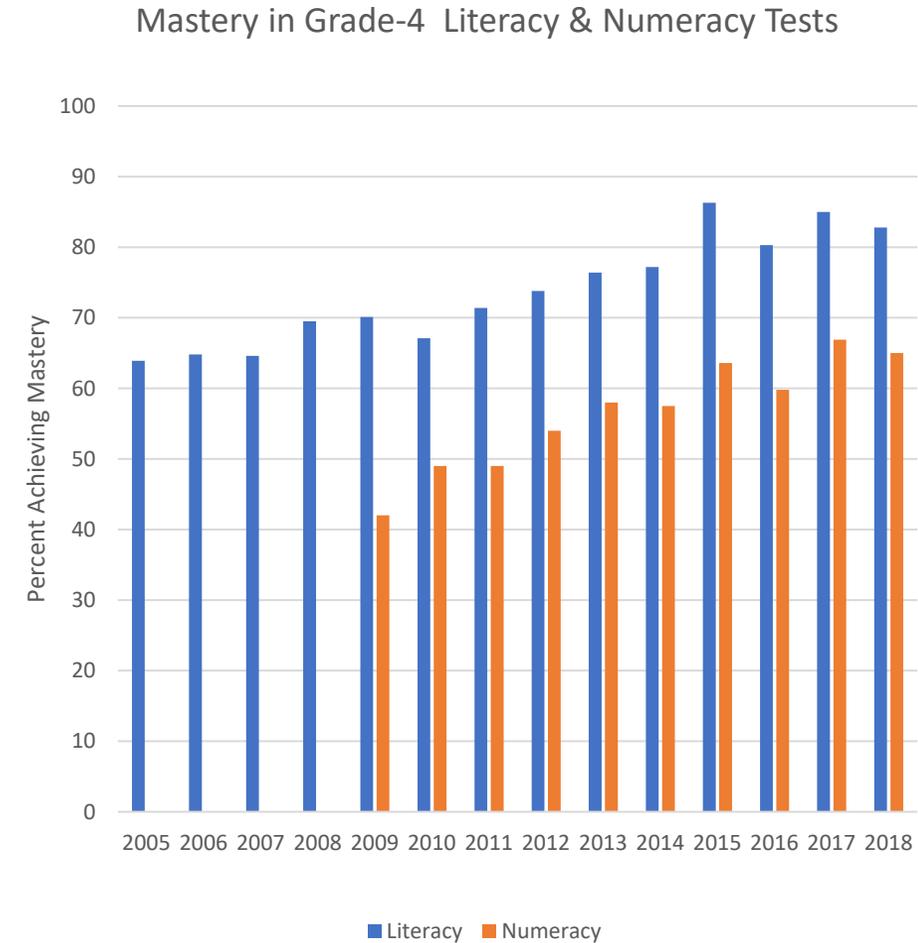
- First administered in 1998, The Tests are administered to children to determine their literacy and numeracy, at grade four, “in keeping with international requirements and standards.” MOEY
- For the numeracy segment, students are tested on number operation and representation; measurement and geometry, and algebra and statistics. MOEY
- The literacy component comprises word recognition; reading comprehension; and writing. MOEY
- The tests are diagnostic in nature and after completion students may be assigned a mastery level, almost mastery level, or non-mastery. MOEY



Orlando Scarlette practices his spelling with his mother Blossom Rhoden. He jumped 6 grades in 2 years to master the Grade 4 Literacy Test. [US AID]

Improved Performance on the Grade-Four Tests: 2005-2018

- Students performed well on these tests, with performance increasing over time
- A pass rate of over 85% was achieved in Literacy in 2015
- Math performance increased relative to language over time
- Which makes the poor performance in the exit primary exams all the more puzzling



Source: Various MOEY Publications

Mastery in Grade 4 Literacy Tests, by Gender, 2012-2018

- The gender gap begins from early. However, boys in this age-group have narrowed the gap in literacy from a 17-point to a 12-point difference over the 2012-2018 period

	2018	2017	2016	2015	2014	2013	2012
Female	17,157 (90.3%)	17,258 (91.1%)	16,445 (88.2%)	18,528 (92.5%)	17,598 (86.3%)	17,939 (85.2%)	17,968 (83.2%)
Male	14,582 (75.5%)	15,082 (79.0%)	13,358 (72.3%)	15,661 (79.9%)	14,190 (68.3%)	14,671 (67.9%)	14,574 (64.7%)

Based on: MOEY, Planning & Development Division, 2019. "2018 General Achievement in Numeracy (Grade Four Numeracy Test) Results by School."

Mastery in Grade 4 Numeracy Tests by Gender, 2014-2018

- The gender-gap has not narrowed in Mathematics. Nonetheless, there was a 10-point improvement among boys between 2014 & 2018

Year	National (%)	Male (%)	Female (%)
2014	57.5	50.2	65
2015	63.6	56.2	70.8
2016	59.8	53.1	66.5
2017	66.9	61.1	72.8
2018	65.6	58.9	72.5

Based on: MOEY, Planning & Development Division, 2019. "2018. General Achievement in Numeracy (Grade Four Numeracy Test) Results by School."

Mastery in Literacy in Private and Public Schools, 2012-2018

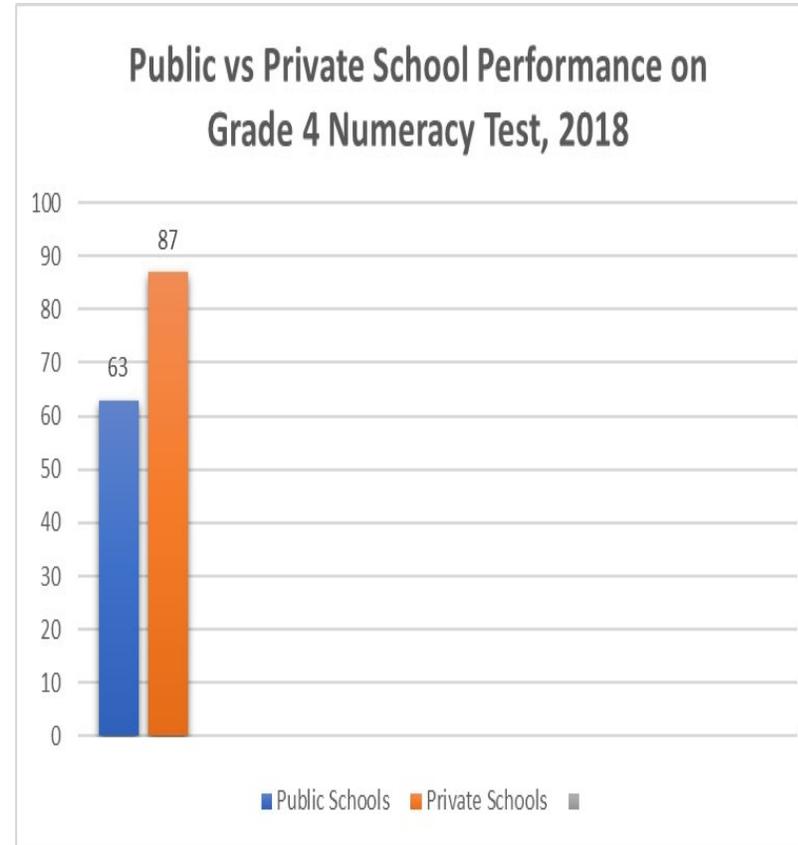
- The Inequalities in the education system are shown clearly in the different performances of Public and Private schools. There was, however, significant narrowing of the school-type gap between 2012 and 2018, from 22 to 15 points

Mastery	2018	2017	2016	2015	2014	2013	2012
National (%)	83	85	80	86	77	76	74
Public (%)	81	83	79	85	75	74	72
Private (%)	96	97	94	97	95	96	94

Source: MOEY 2019: “ 2018 Grade 4 Literacy Test by Schools”

Public vs Private Inequalities

- The Gap between public and private schools is much wider in Math: 24 points in 2018
- 758 Public Schools with a sitting population of 33,837 students sat the numeracy test in 2018
- 239 Private Schools with a sitting population of 4,5089 students sat the numeracy test that year



THE GSAT EXAMINATION

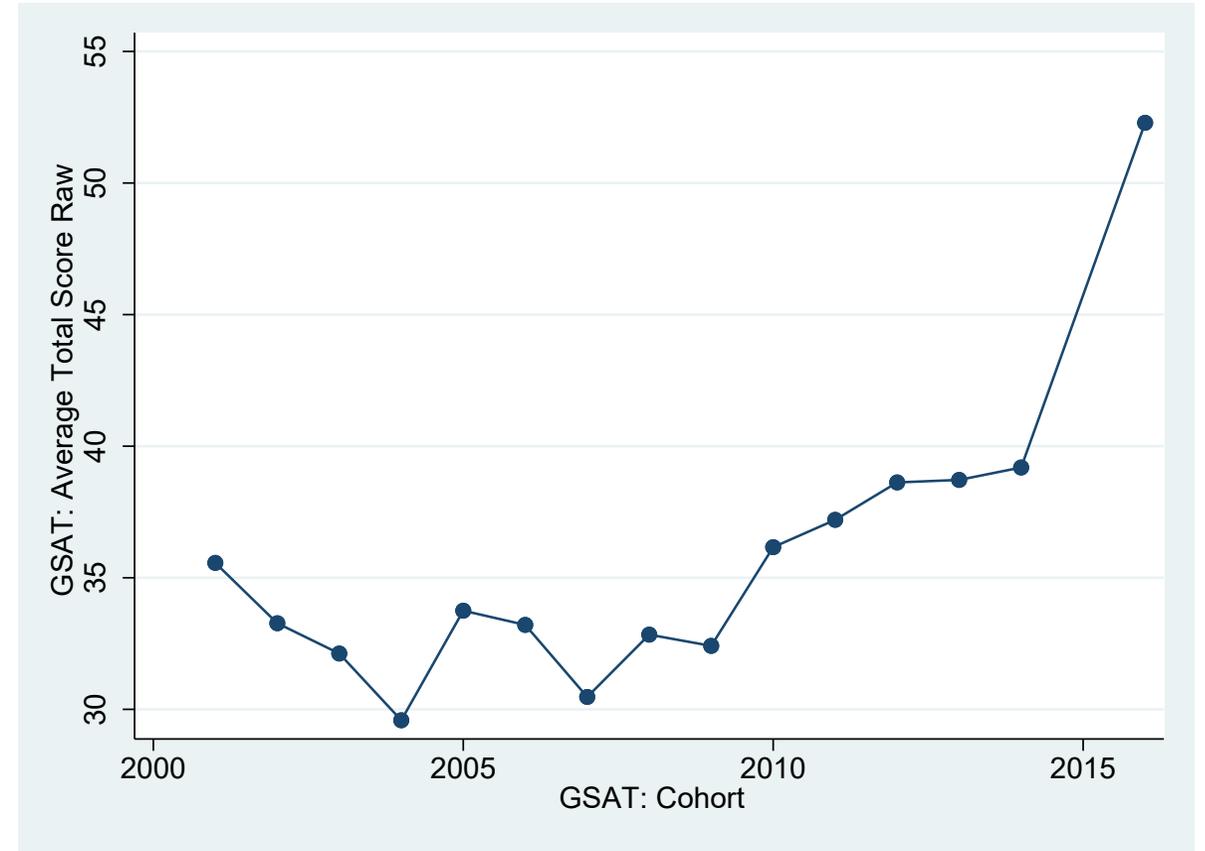
- GSAT replaced the UK's Common Entrance Exam in 1999
- Five subjects were examined: Math, Science, Language, Social Studies, and Composition
- Up to 2014 the score ranges were 80 for math/language/social studies, 60 for science, and 12 for composition
- However, in 2015-2016, all the score ranges, except composition, changed to 100
- To make the scores comparable we used weighted averages and transformed all to percentages
- GSAT was replaced by the PEP in academic year 2018-2019



Head Girl and Top Performing Student at St. Jude's Primary School, Jhonelle Knight. [JIS]

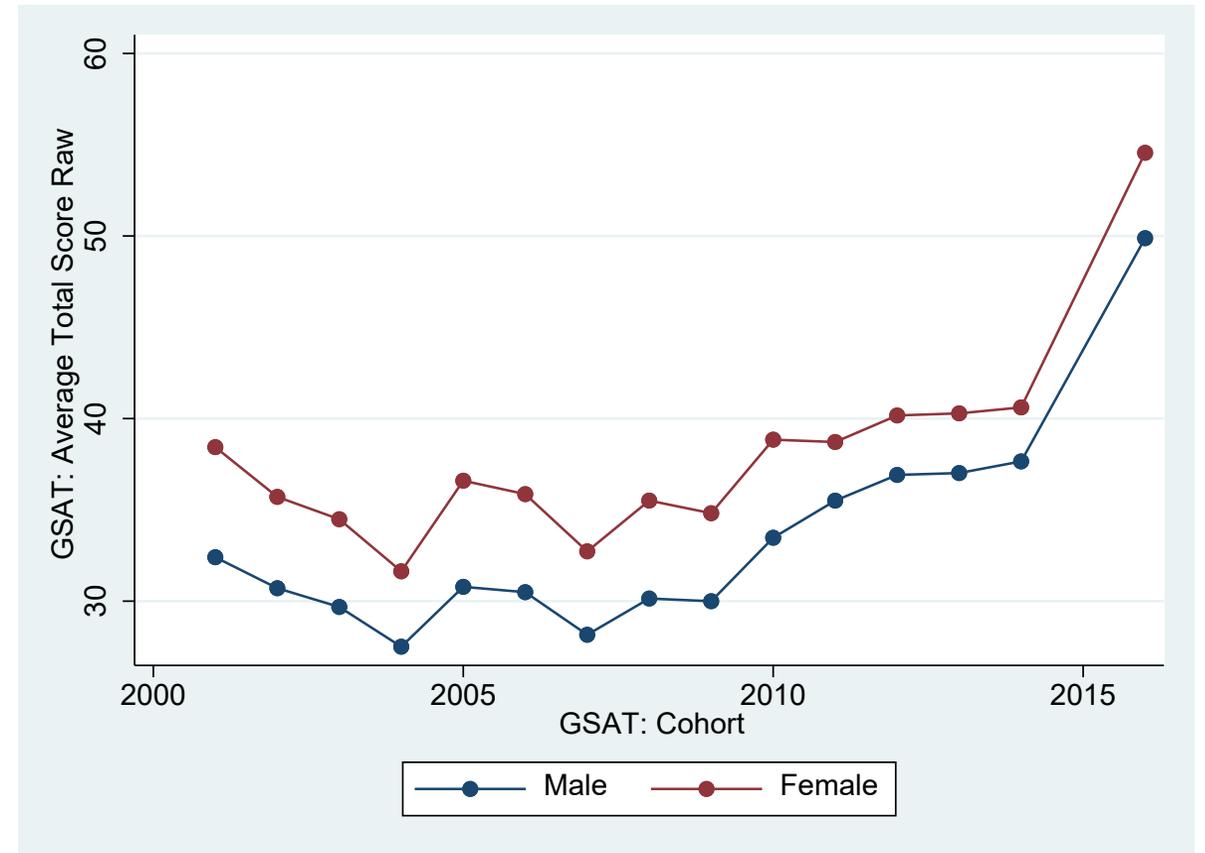
GSAT Mean Scores 2001-2018

- There was significant improvement in the scores between the very low point of 2004, when the mean was only 15, and 2015.
- After 2015 the scores leveled off and declined, shown on the later slides dealing with categories of performance

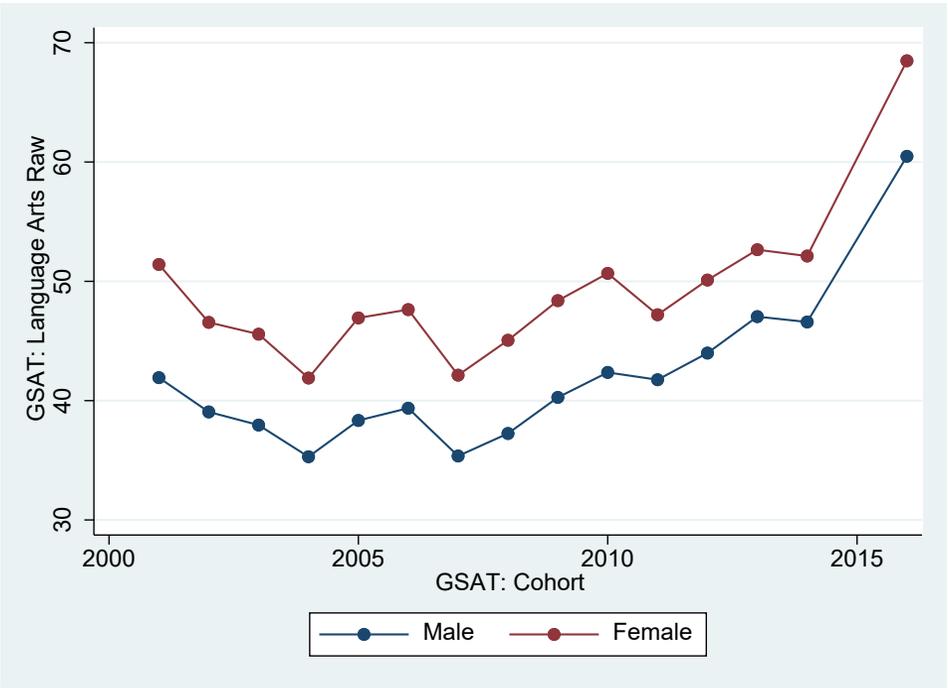
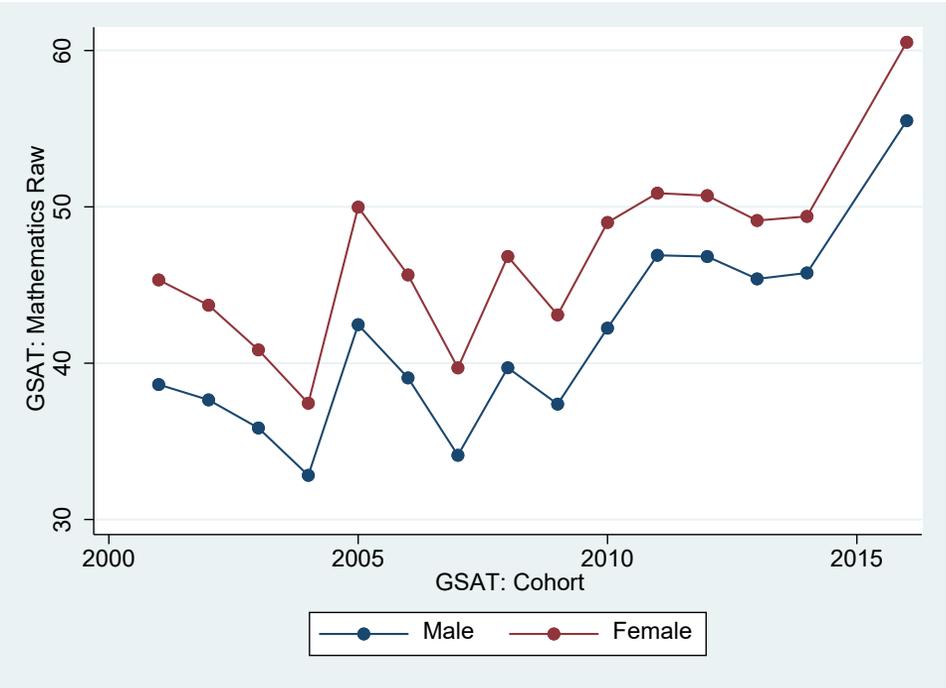


Total GSAT Mean Scores by Gender

- Girls outperformed boys throughout the history of the tests
- However, the gap narrowed over the years, reaching its smallest point in 2014
- The next slide shows that the gap holds in all subjects, though widest in Language



GSAT Scores by Subjects and Gender, 2002-2018





Proficiency Groups

Educators prefer to sort by performance groups rather than mean scores, especially where there is wide variation in scores, as in Jamaica

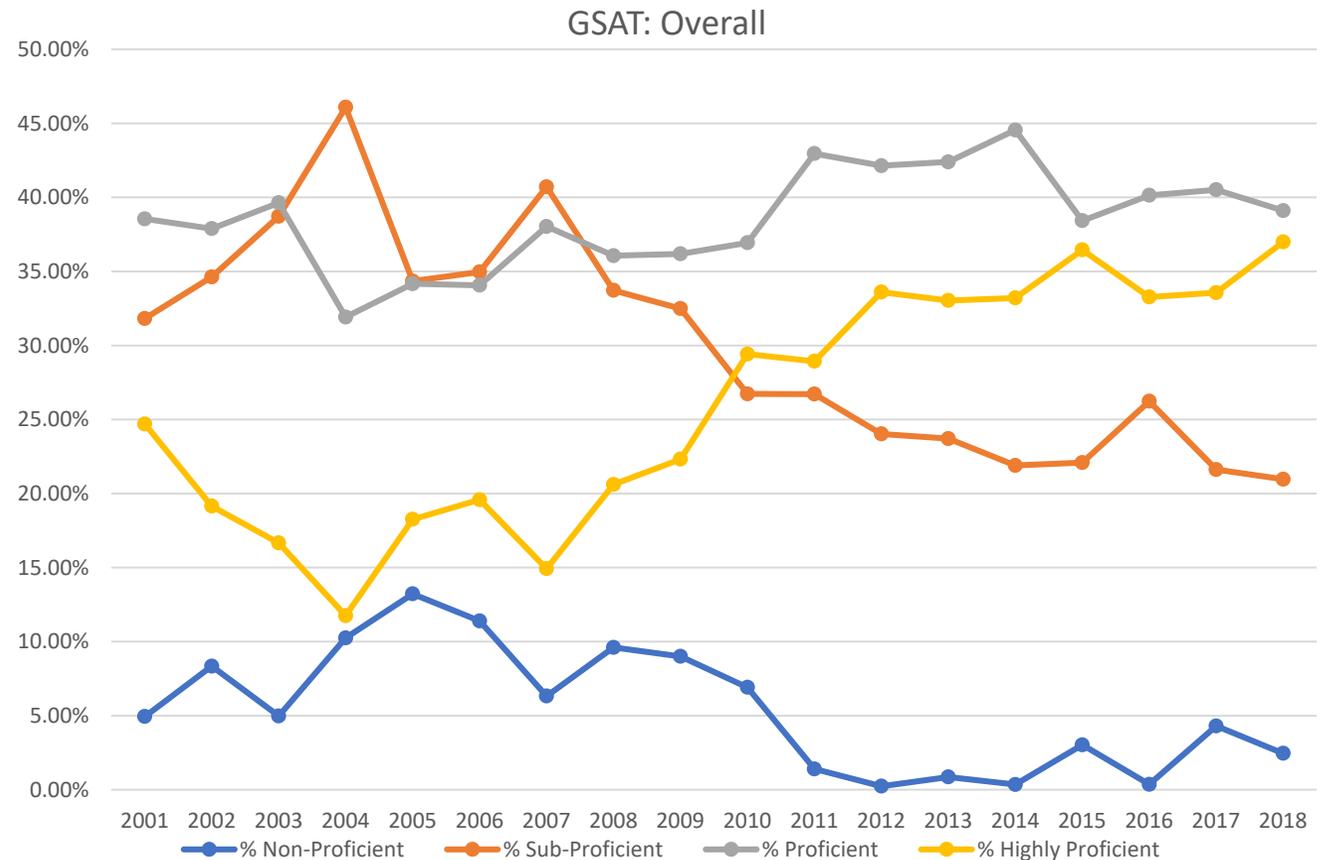
We sorted by 4 proficiency categories or performance groups:

- Non-Proficient for those passing under 25% of points
- Sub-Proficient for those between 25% and under 50% points
- Proficient, passing 50% to under 75% points
- Highly Proficient: Those passing 75-100 % points

The MOEY sometimes uses the term “Mastery” instead of “Proficiency.” We prefer the latter term, but use “Mastery,” when used by MOEY

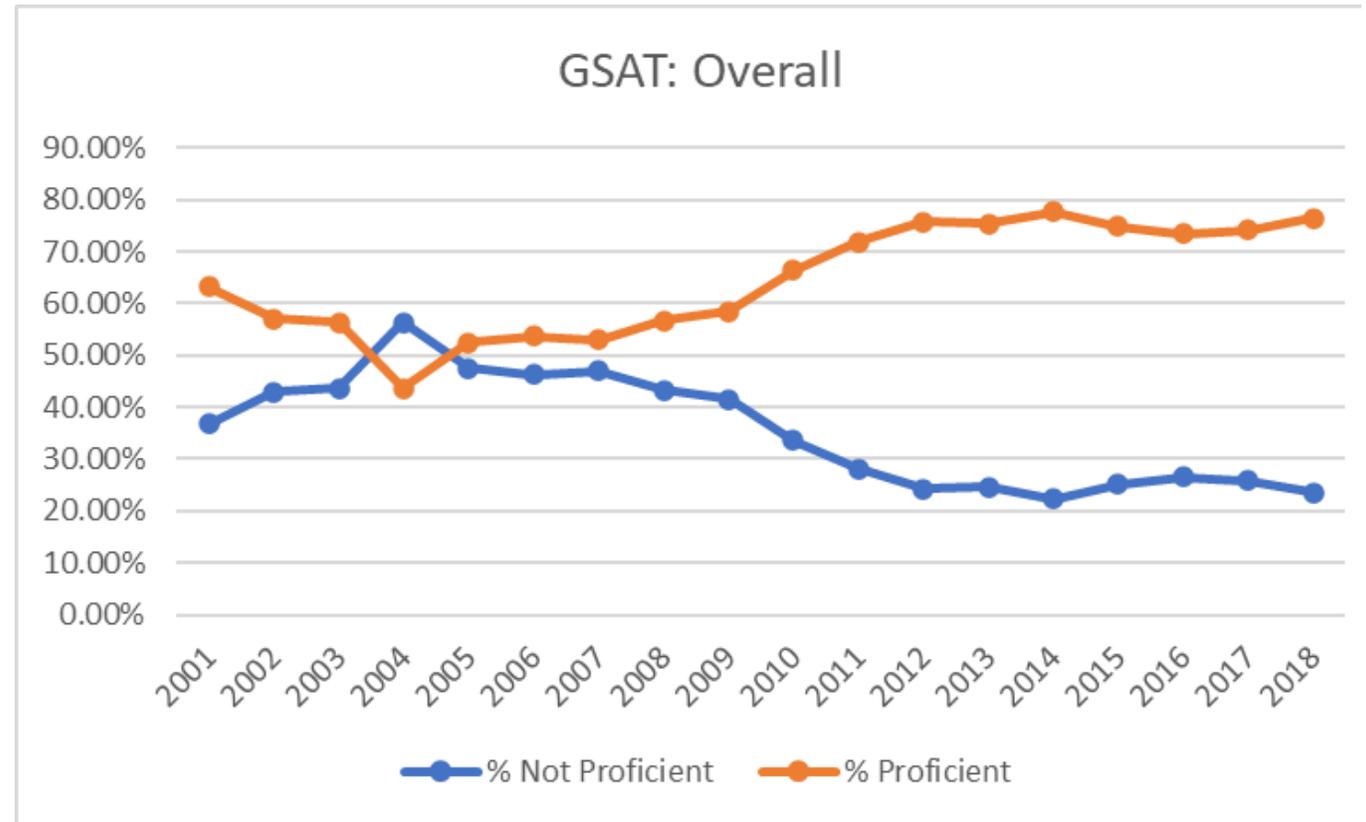
Percent GSAT Overall: 4 Categories of Proficiency

- This graph shows why proficiency categories are useful
- Note that the Proficient group remains at the same level between 2001 and 2018, while the Highly Proficient increased from 12% to 37%, which is good news
- The improvement would have come mainly from the Sub-Proficient and Proficient groups moving up
- Note that the Non-Proficient group remained mainly the same in 2001 and 2018



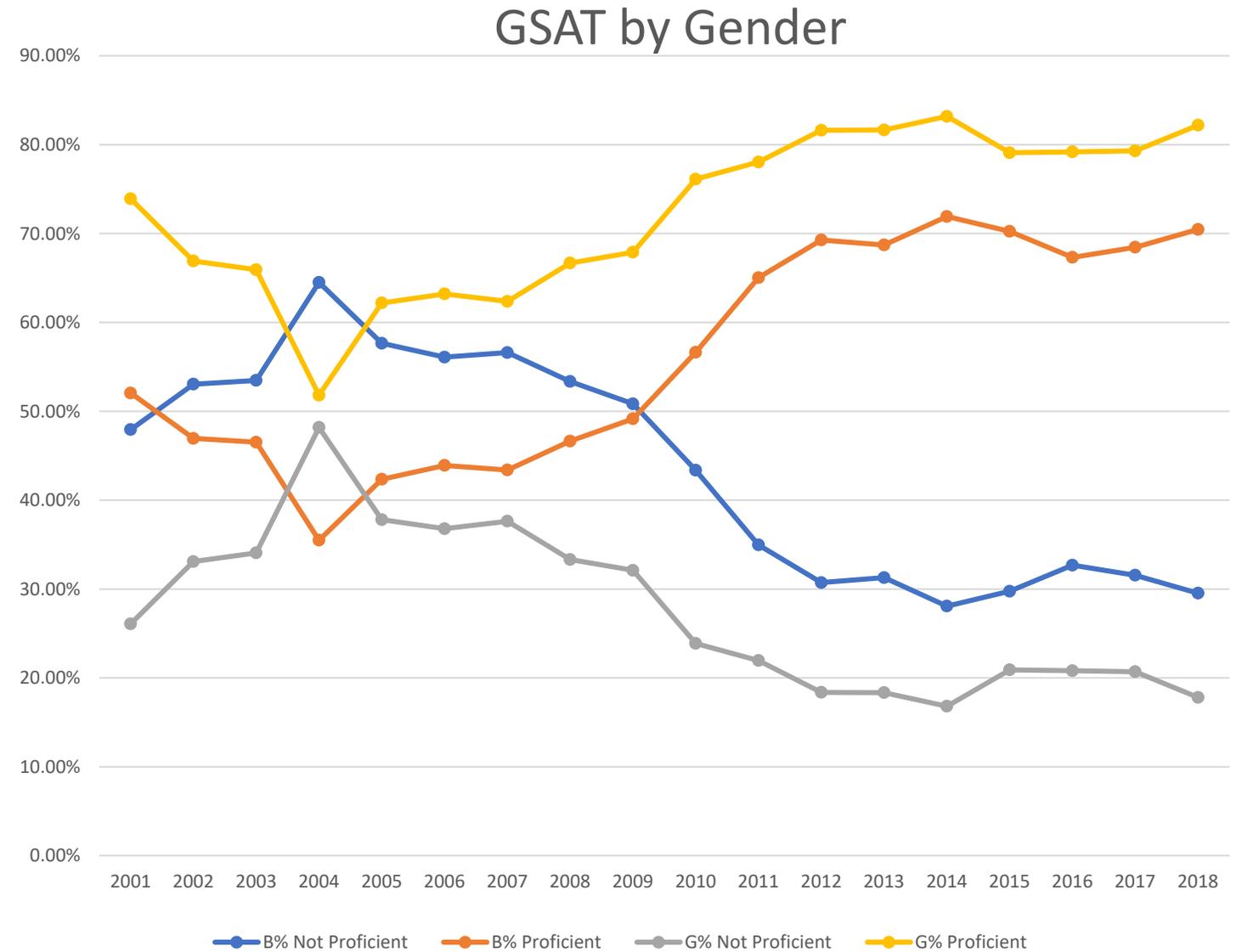
GSAT: Not Proficient vs Proficient or “Fail” and “Pass” Categories

- This graph collapses from 4 to 2 categories, which we may simplify as those who failed and those who passed the exams
- Educators, including those at MOEY, dislike the term, “fail,” which is not a bad habit, but should not be taken too far



The Gender Gap Narrowed Between 2001-2018

- This graph shows the decline in the gender gap over the years
- In 2004, at its widest, there was a 17-point gap
- In 2018, the last year of the GSAT exam, the gap was 12 points, a 30% narrowing



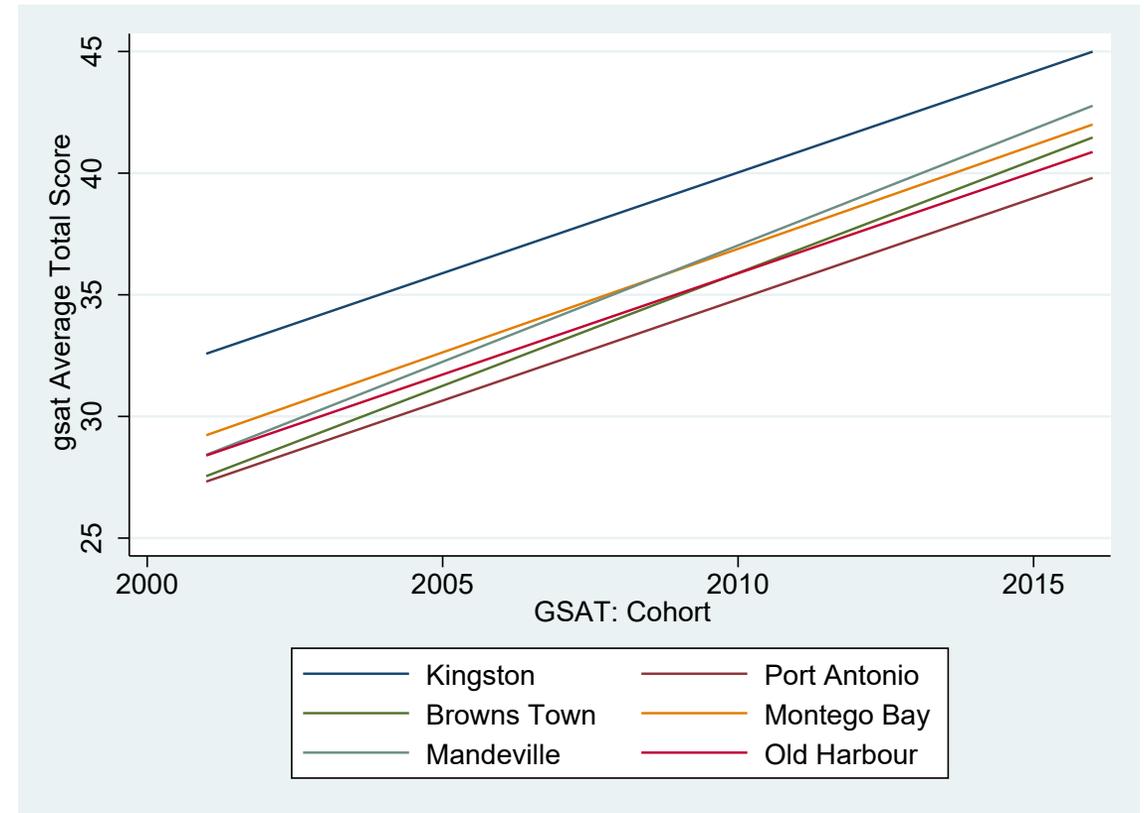
The improvement in mean scores occurred in all regions

However, the Kingston region showed the greatest improvement

The Mandeville region overtook Montego Bay from 2010

Port Antonio was the poorest performer throughout the period

GSAT Mean Total Score by Region



The GNAT Exams

Offered to students at the end of grade 9 at All Age and Primary, and Junior High Schools, for placement in Secondary schools

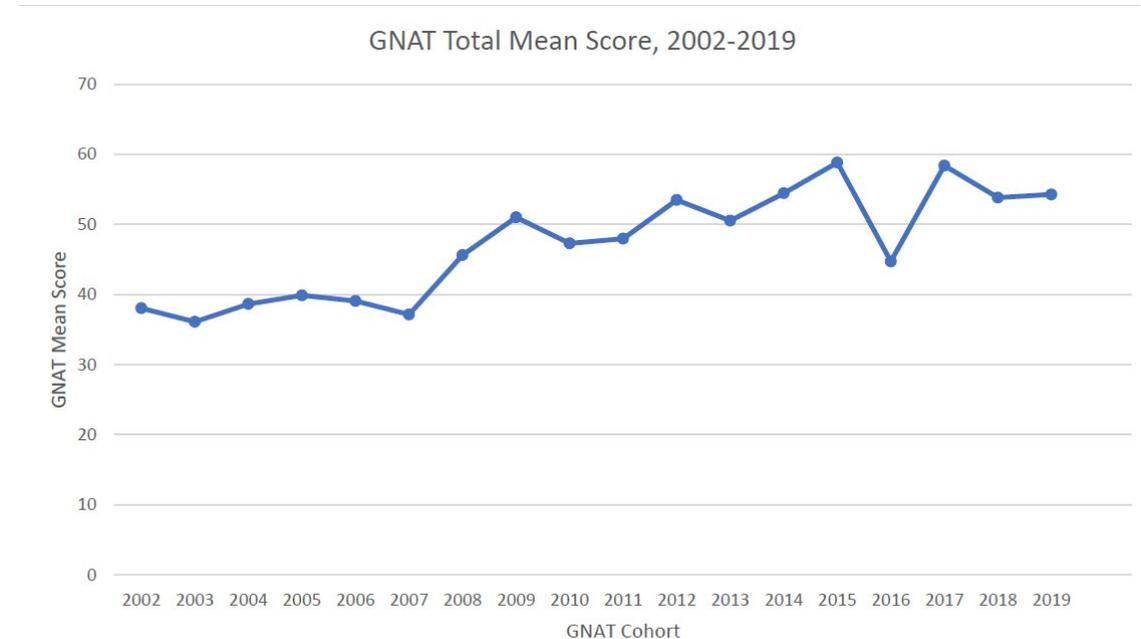


The Test was cancelled (NOT terminated) in 2021



GNAT Total Mean Scores, 2002-2019

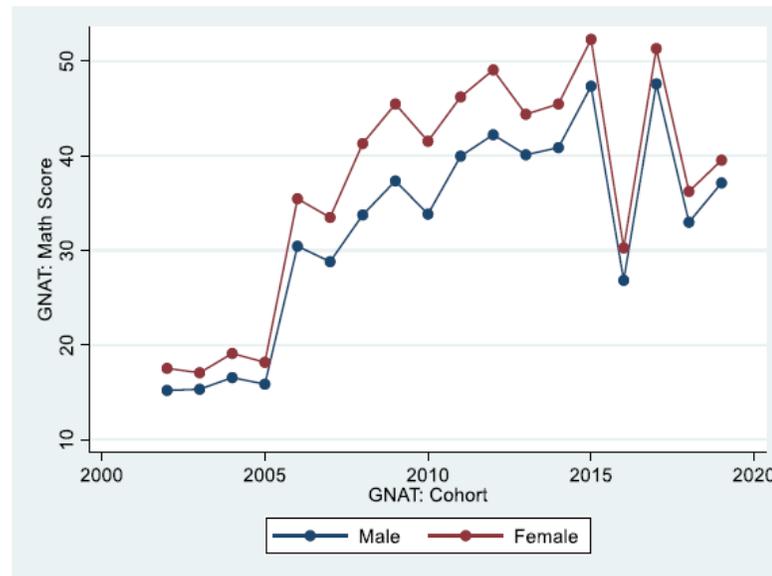
- Improvements in GNAT scores were less impressive than those for GSAT
- Recall that these testers were usually students attending the weaker non-traditional schools, often from less advantaged homes
- The mean score at its best was a bit under 60% in 2015, but declined to 55% in 2019



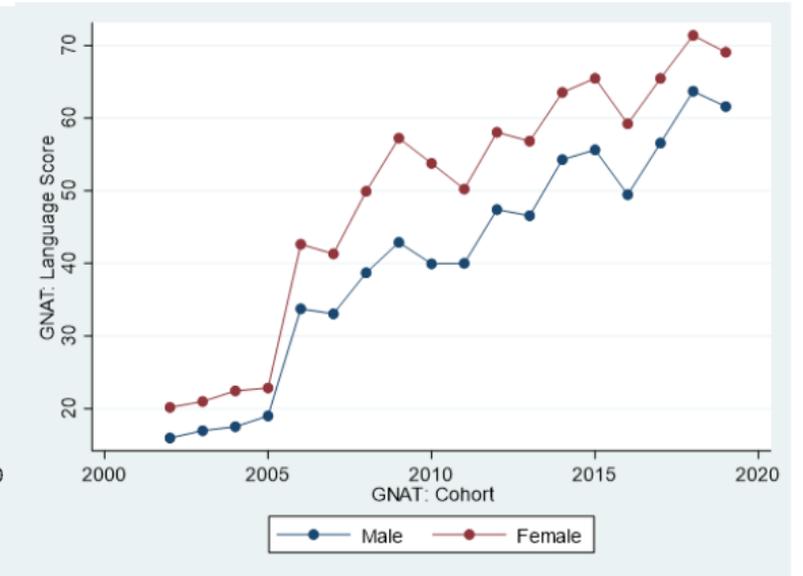
GNAT Math & Language Scores by Gender

- The GNAT Math score improved from abysmal to poor over the period, up from under 20 in 2002, but still under 40 for both genders
- The performance improvement in Language was much better
- The gender gap-- narrower than for GSAT--widened then narrowed, for both subjects

GNAT Math Score by Gender

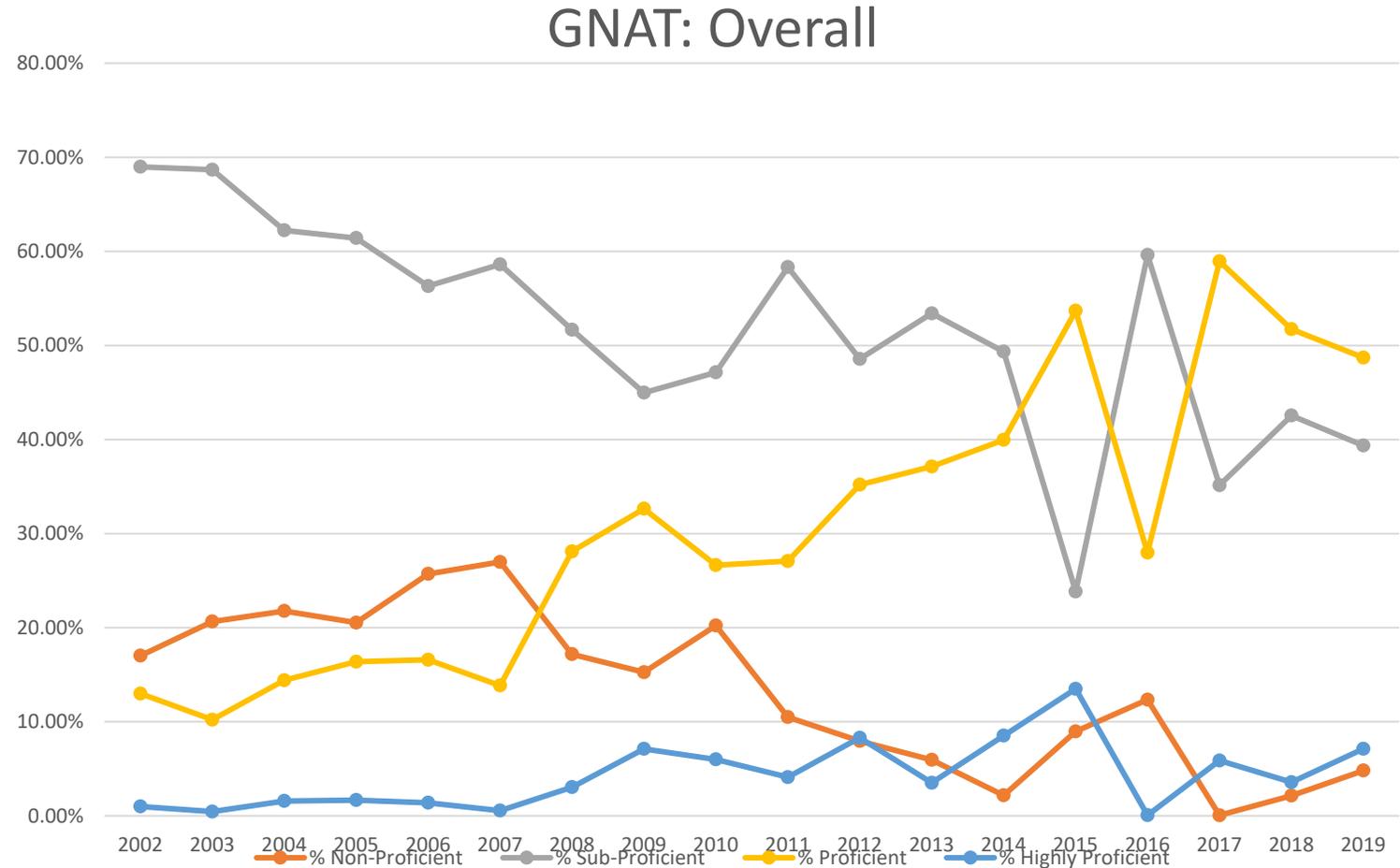


GNAT Language Score by Gender



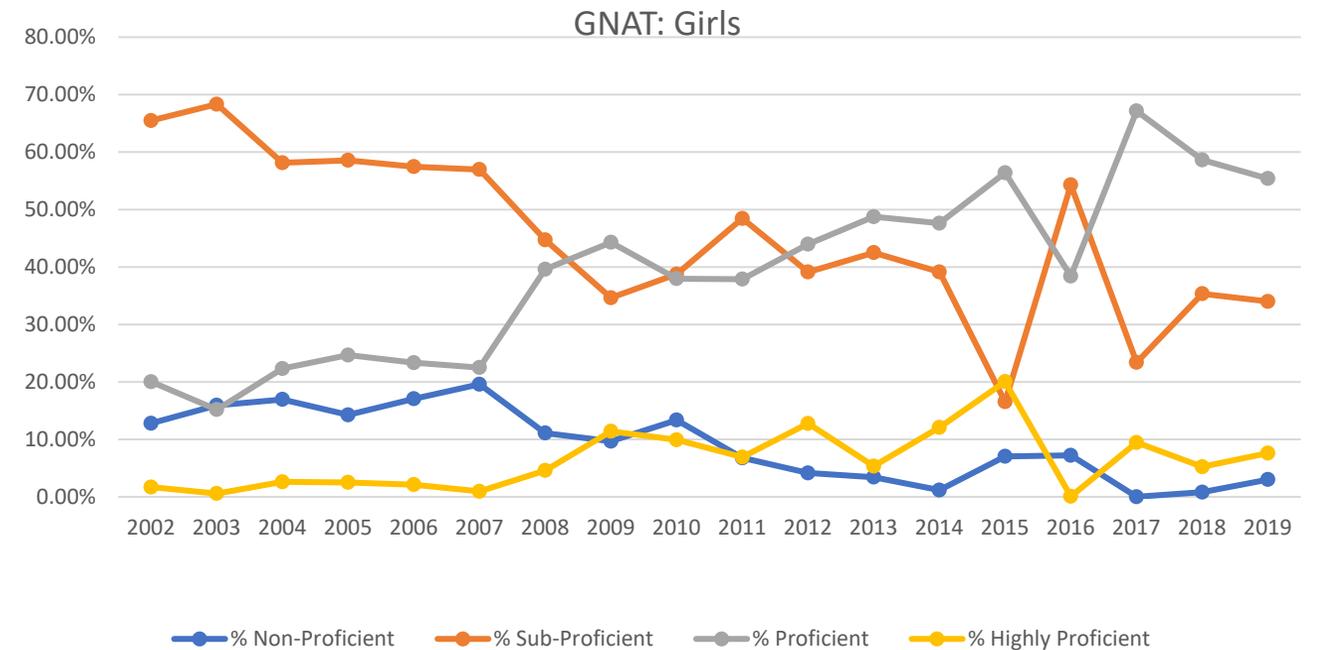
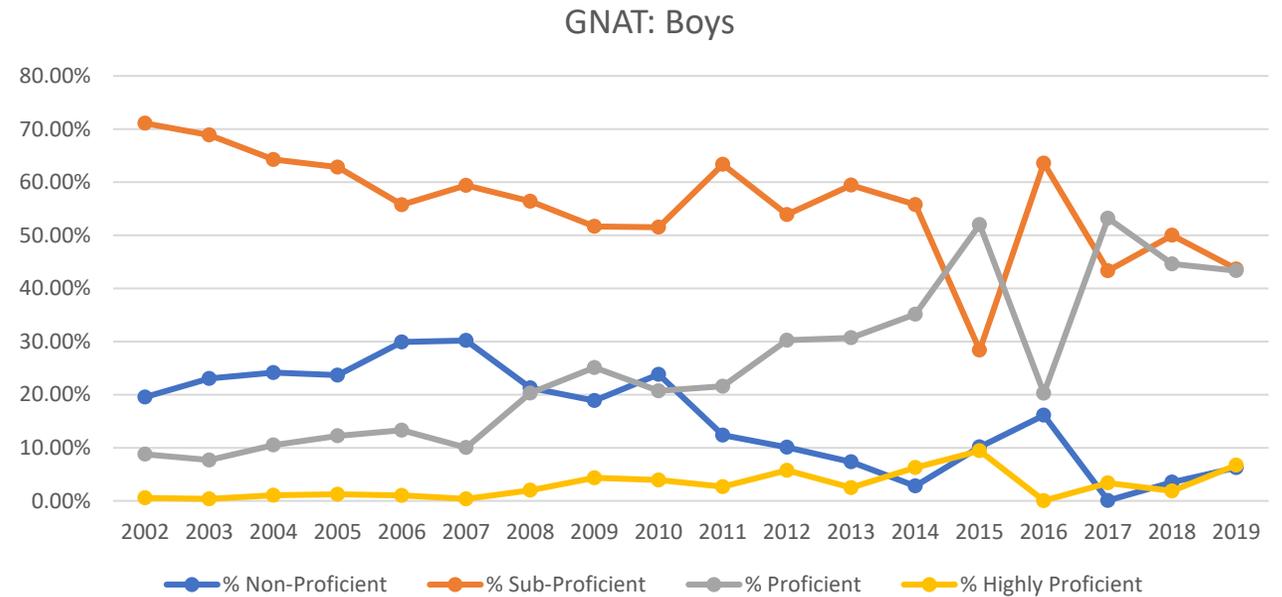
Percent GNAT Overall: Four Categories of Proficiency

- Unlike GSAT, improvement is mainly in the Proficient category, which moved from 13% to 49%
- The Highly Proficient group only moved from 1% to 7%



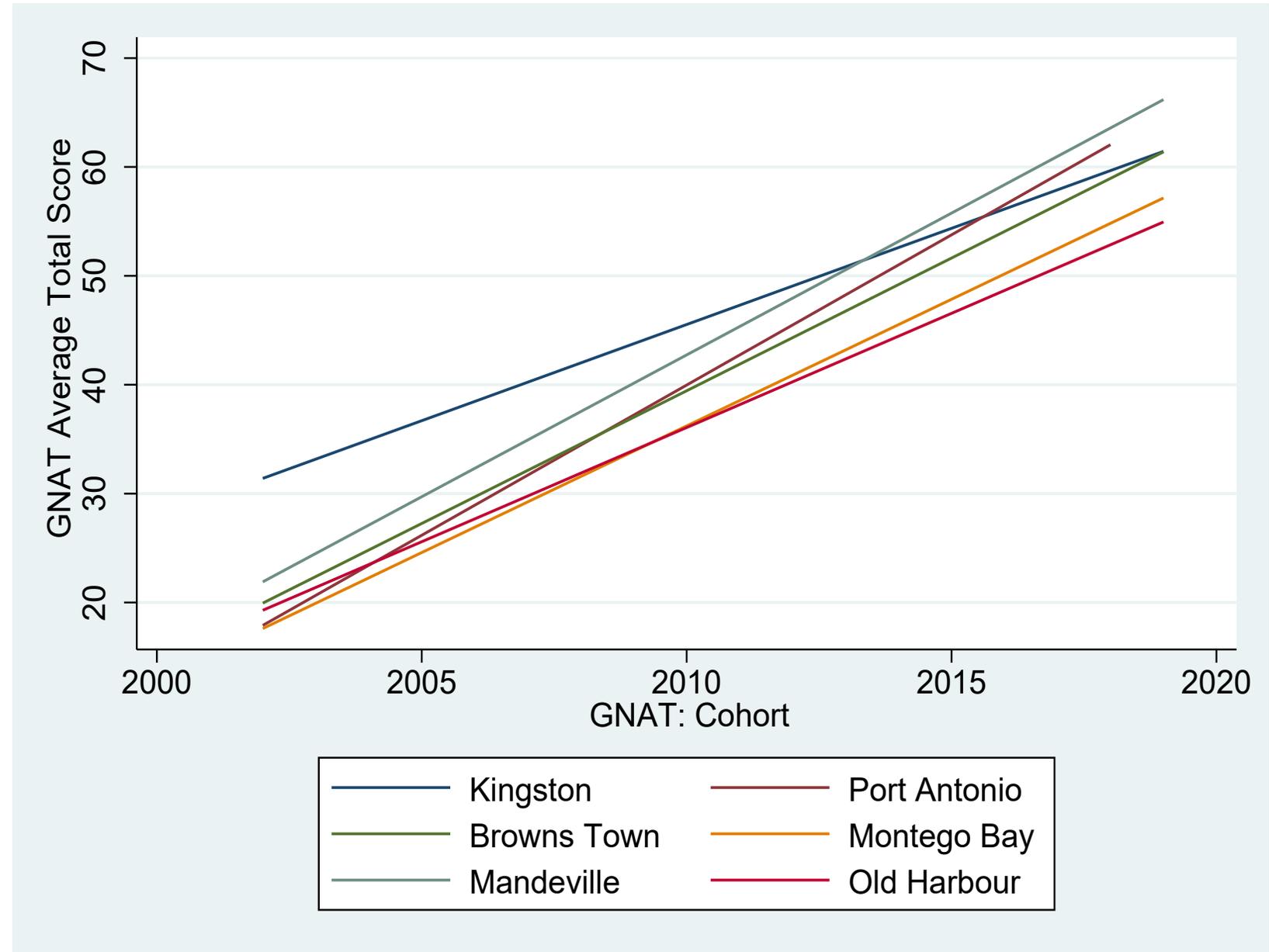
GNAT Proficiency Groups by Gender

- Although girls are outperforming boys, there is little gap between them in the Highly Proficient category



GNAT by Region

- Mandeville and, surprisingly, Old Harbour, students have out-performed those from Kingston in the GNAT, since 2014



THE PRIMARY EXIT PROFILE Exam



Minister of Education, the Hon. Fayval Williams, encouraging students before their PEP exam [JIS]

What the PEP Revealed

PEP was a new start in testing in Jamaica, a shift away from memorized learning to analytic and creative thinking

It revealed major deficiencies in the level and kind of learning achieved by students

In spite of improvements in exam performance over the previous 17 years, the PEP revealed extremely troubling levels of inadequacy in both literacy and numeracy

Primary Exit Profile (PEP) Performance in 2019

- 41 % PASSED IN MATHEMATICS
- 49% PASSED IN SCIENCE
- 55% PASSED IN LANGUAGE

SUBJECT	PERCENT BEGINNING	PERCENT DEVELOPING	PERCENT PROFICIENT	PERCENT HIGHLY PROFICIENT	PASS/FAIL RATIO
MATHS	7	52	35	6	41/59
SCIENCE	7	44	42	7	49/51
SOCIAL STUDIES	3	34	50	13	63/37
LANGUAGE ARTS	9	36	46	9	55/45

PEP Indicated that most students graduating from primary school *were barely literate*. The mean language score in the GSAT in 2018 was 65. While the 2 exams are not strictly comparable, the GSAT score did indicate at least acceptable levels of literacy. But PEP showed that:



READING: 33% CANNOT READ
OR CAN BARELY DO SO



WRITING: 56% CANNOT WRITE
OR BARELY



RESEARCH: 58 % CANNOT FIND
INFO ON A TOPIC OR BARELY

Is the Gender Problem Getting Worse?



UNICEF Jamaica

Failure Rate in 2019 PEP Exam, by Gender

MATHEMATICS: 66% MALES FAILING/
51% FEMALES

SCIENCE: 57% MALES FAILING/
44% FEMALES

LANGUAGE ARTS: 55% MALES FAILING /
35% FEMALES

SOCIAL STUDIES: 50% MALES FAILING/
37% FEMALES

THE CSEC EXAMS, 2002- 2018



[JIS]

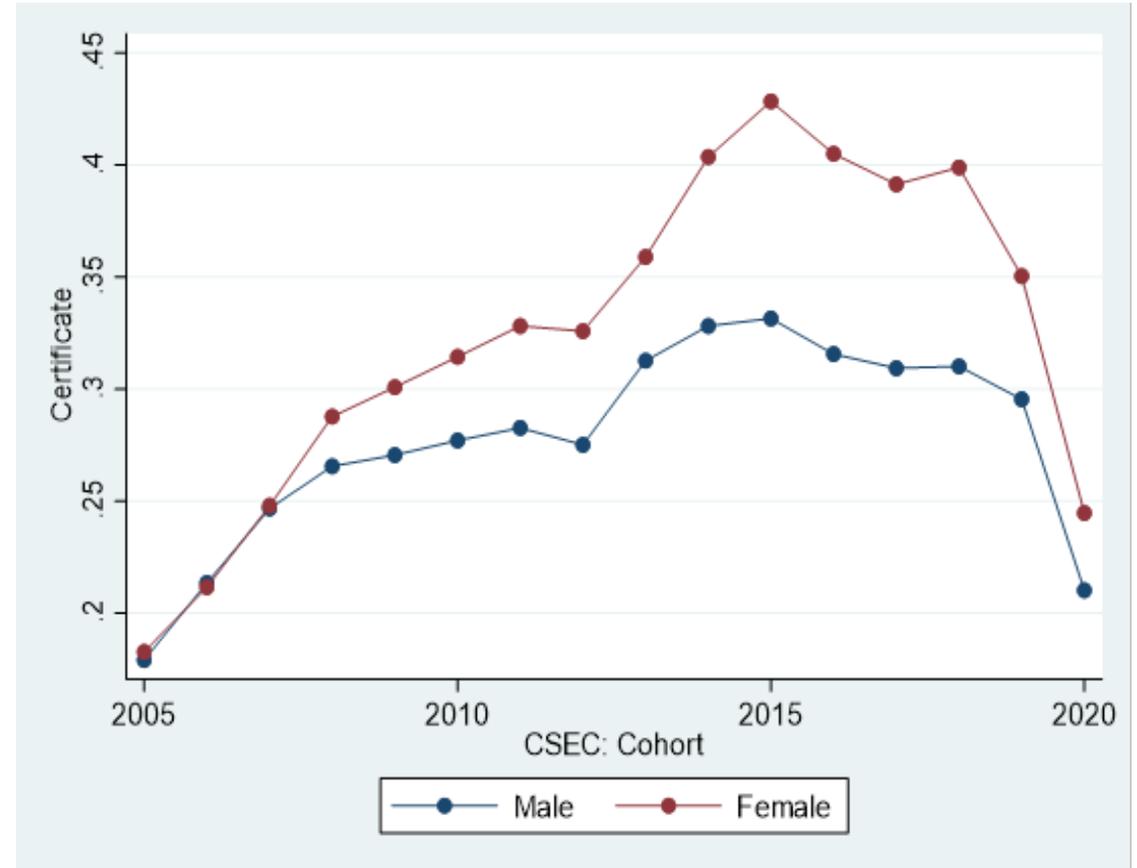
The CSEC Performance begins from an extremely low baseline of less than 10% in 2005 receiving certificates

Improvements have been substantial, but the rate never exceeded 43%, gained in 2015

However, after 2015 the rate plunged to under 30% in 2019

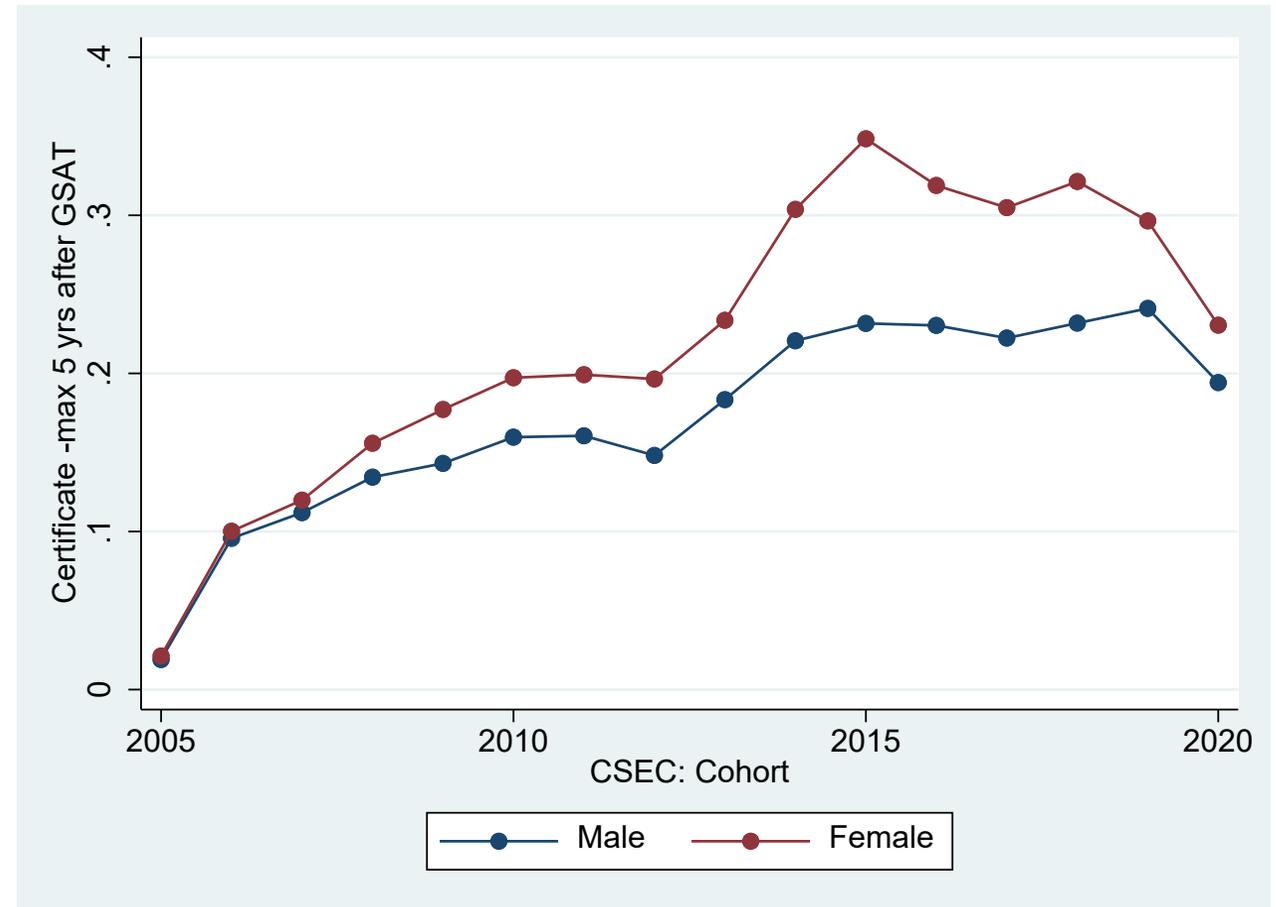
The gender gap grew from 2007 to 2015 when it reached 10 points, but has narrowed since to 5 points

CSEC Certificates Achieved, by Gender



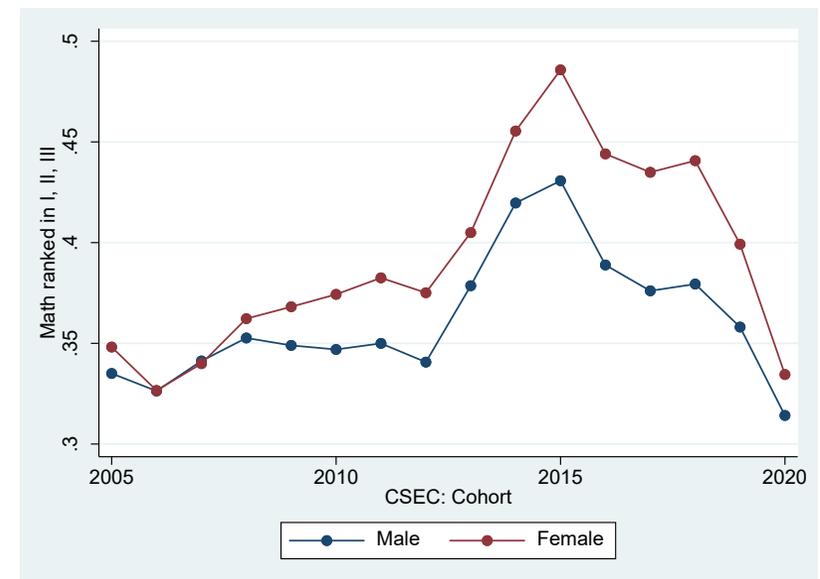
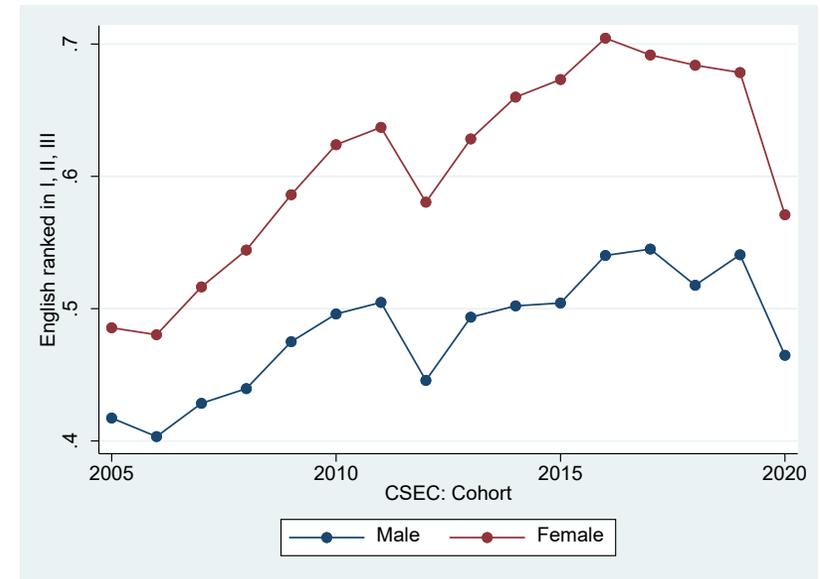
CSEC Taken Less than 5-Years after GSAT, by Gender

- Even worse is the Certificate rate within 5-years after taking the GSAT
- It was 2% in 2005, Improved to 35% among girls and 22% among boys in 2015
- Since 2015 the rate among girls declined, while that of boys improved slightly
- Leading to an overall decline, & a substantial narrowing of the gender gap



CSEC Math & English Ranked I,II,III

- Jamaica is the rare country where girls outperform boys in Math
- Both perform at under 50% in Math ranked I,II,III
- Performance in Language is much better, girls reaching 70% in 2015, when the gender gap was 15 points
- Since 2015 the overall rates have declined, and the gap narrowed



CSEC PERFORMANCE, 2019: A Closer Look

33,639 registered to sit exams:(18,627 Females, 15012 Males)---55%/44% ratio

32,617 actually sat exams: (18,202 females, 14, 415 males)--- 55/44% ratio

13, 861 passed 5 or more (with English & and or math) ---42.5% overall

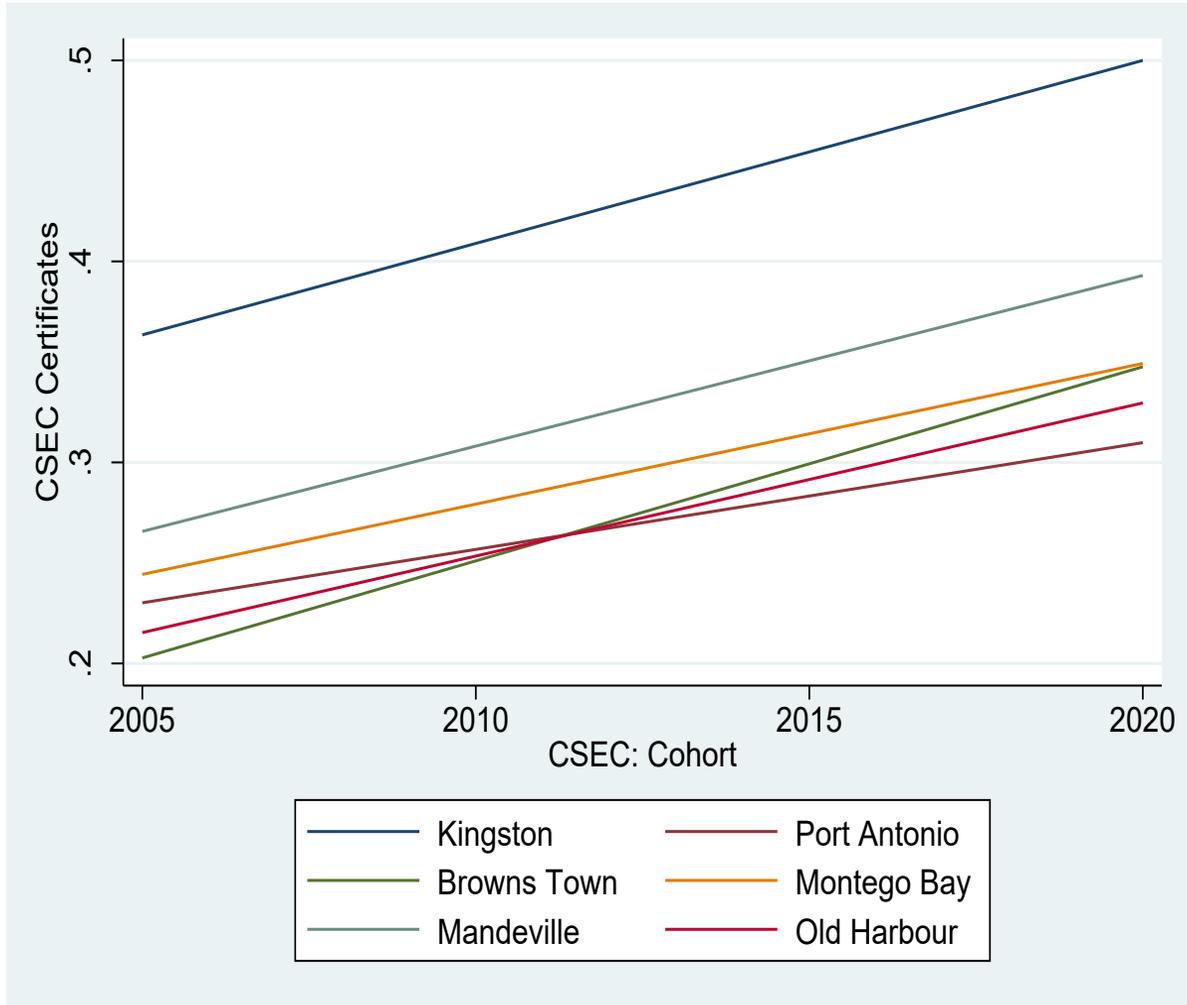
- 47% of Girls; 34% Boys

9,234 passed 5 or more (with English & Math)—28% overall

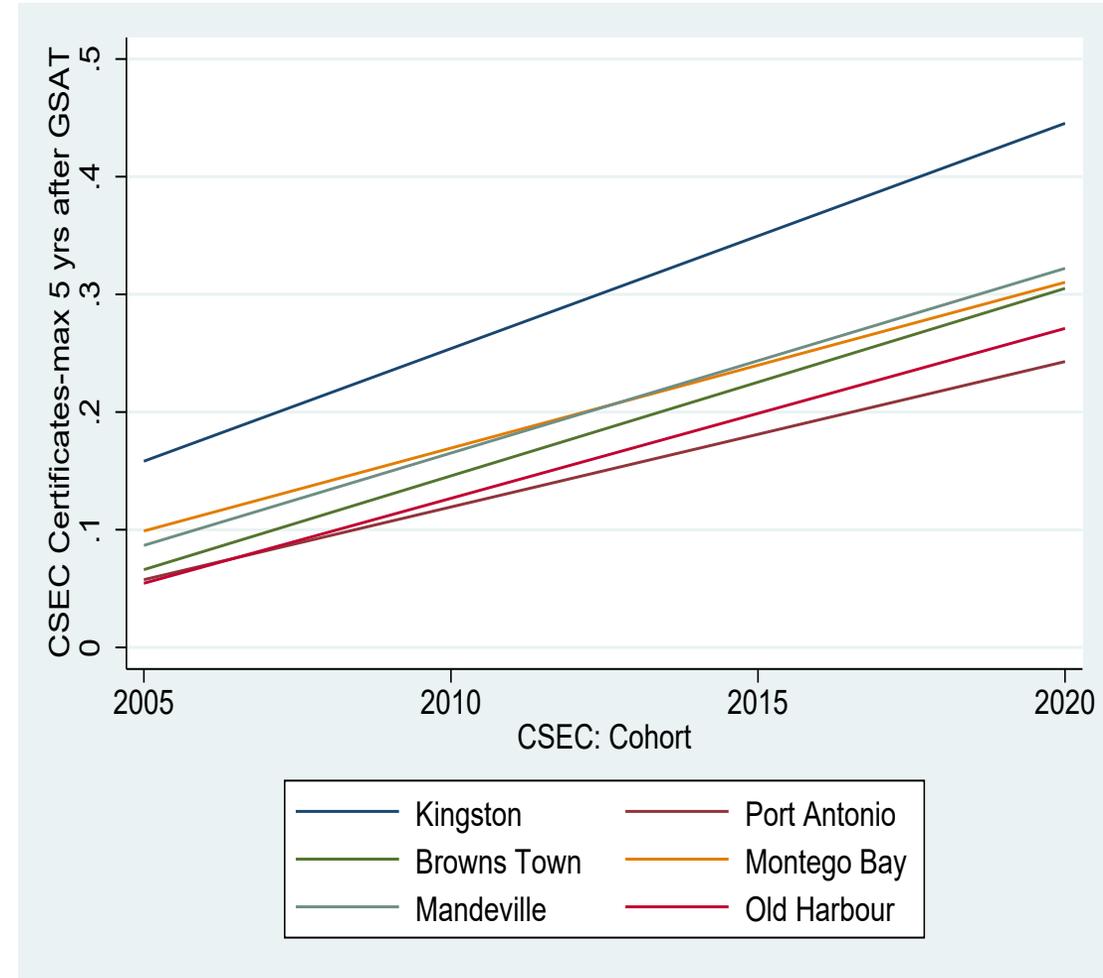
- 31% Girls; 23% Boys

Kingston substantially outperforms other regions in the CSEC Exams, Mandeville a Distant Second

CSEC Certificate by Region



CSEC Certificate Max 5-Years by Region



CAPE EXAM RESULTS



CARIBBEAN
EXAMINATIONS
COUNCIL

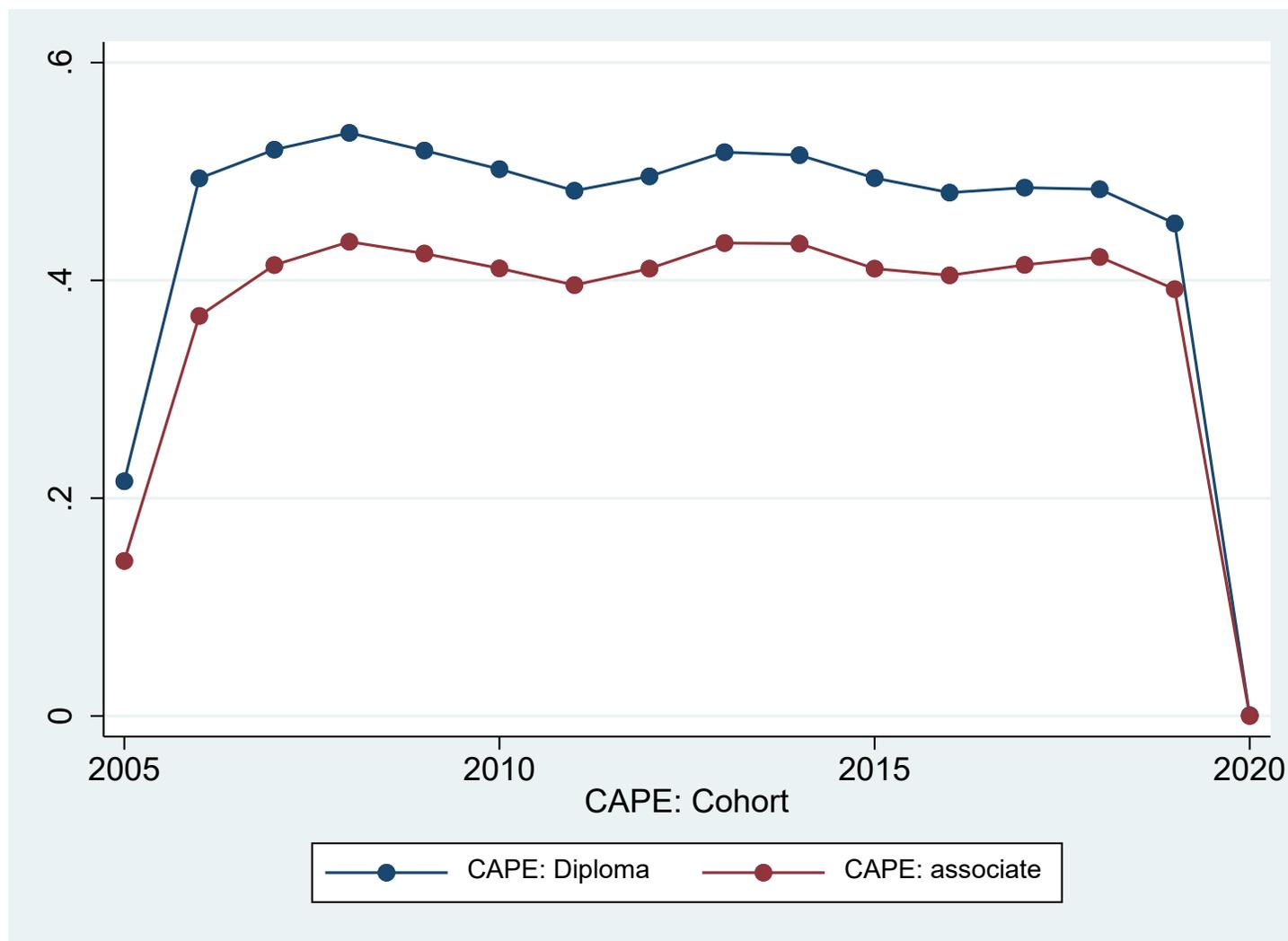
A Point to Remember about CAPE

- Note that the CAPE exam is recruiting a highly selected group of students, who must first have passed the CSEC exams



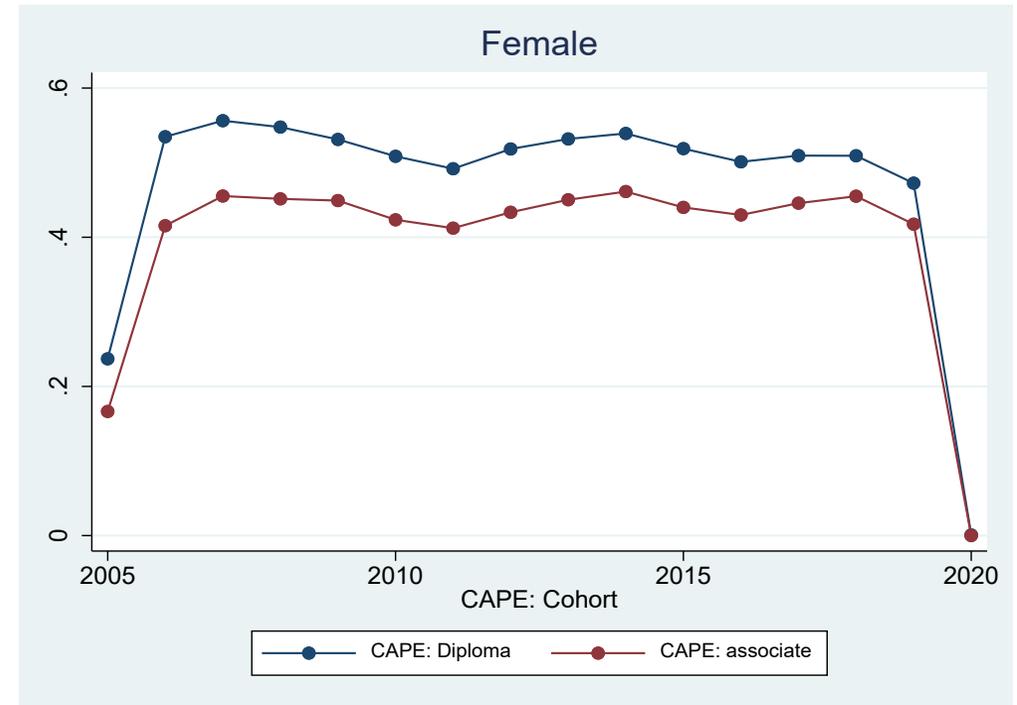
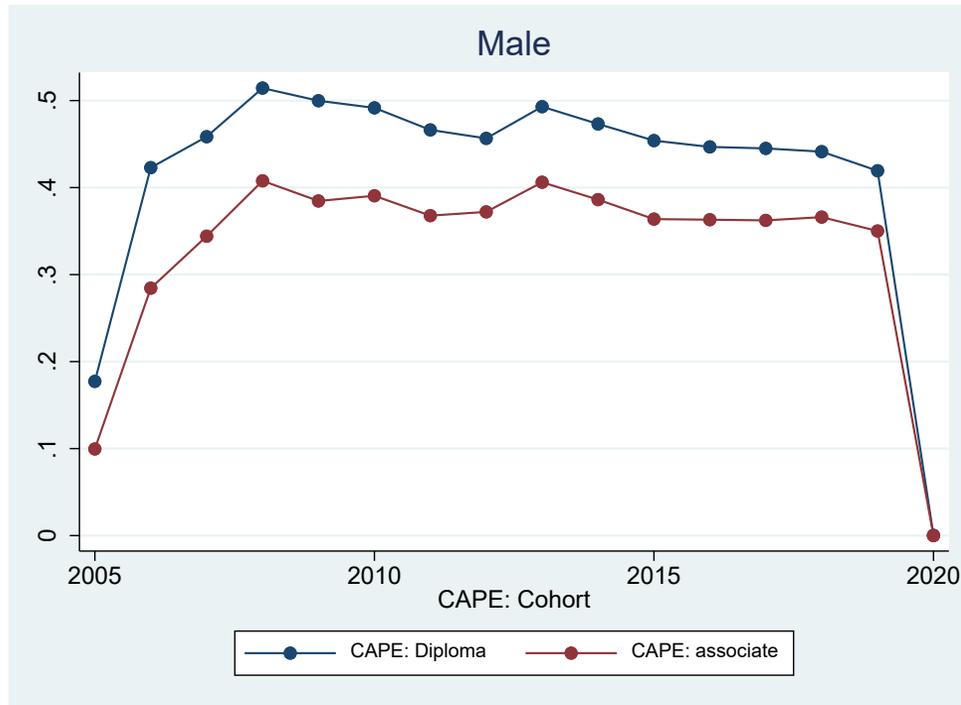
Declining CAPE Pass Rates in both Diploma & Certificate

- The Diploma pass rate has declined since 2008, and the Associate rate since 2013
- Both are now under 50%, the Diploma at 45%, the Associate at a bit under 40%



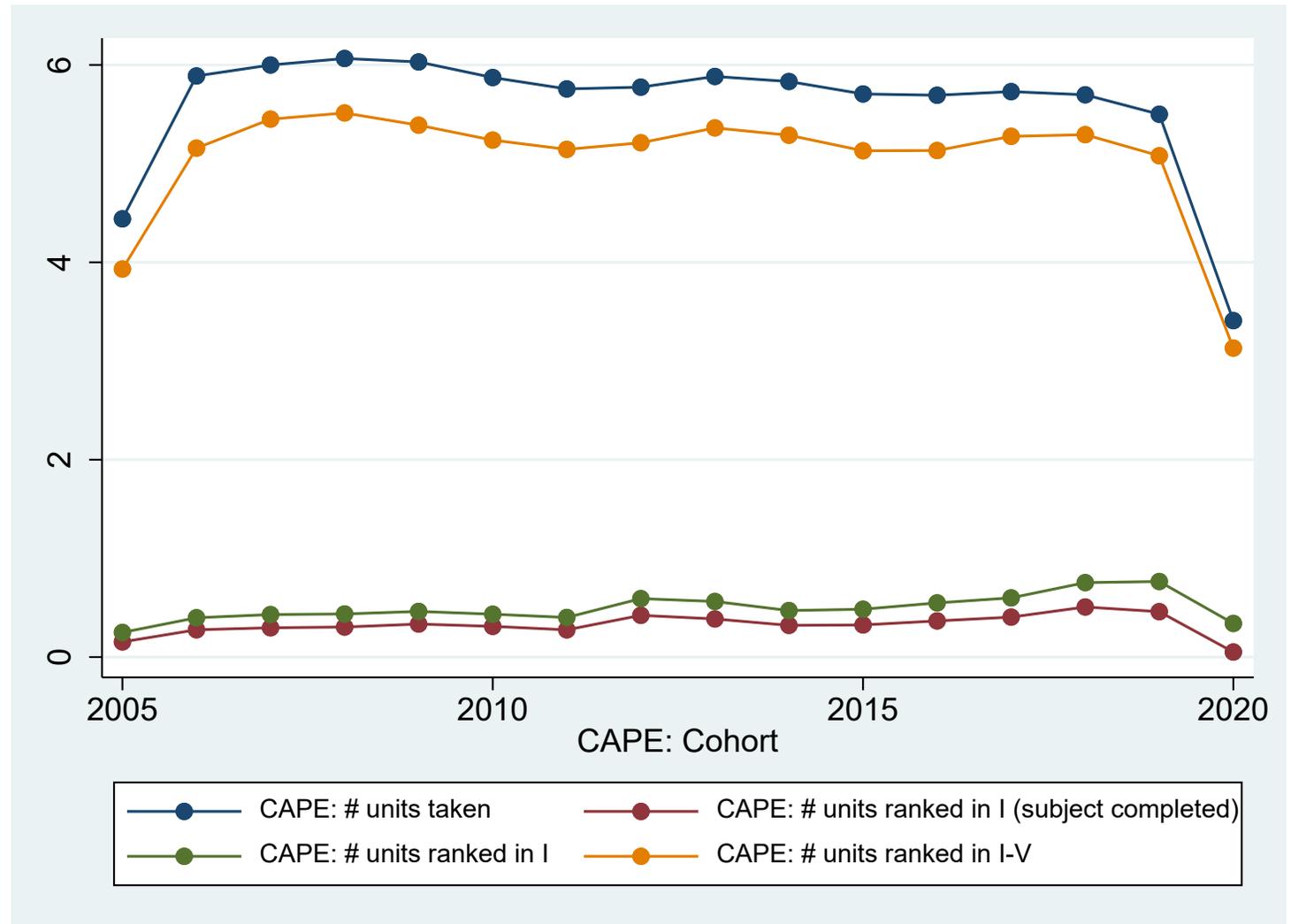
The Gender Gap has narrowed slightly, as both groups show a decline in performance to under 50%

CAPE Pass Rate & Certificate Type , by Gender



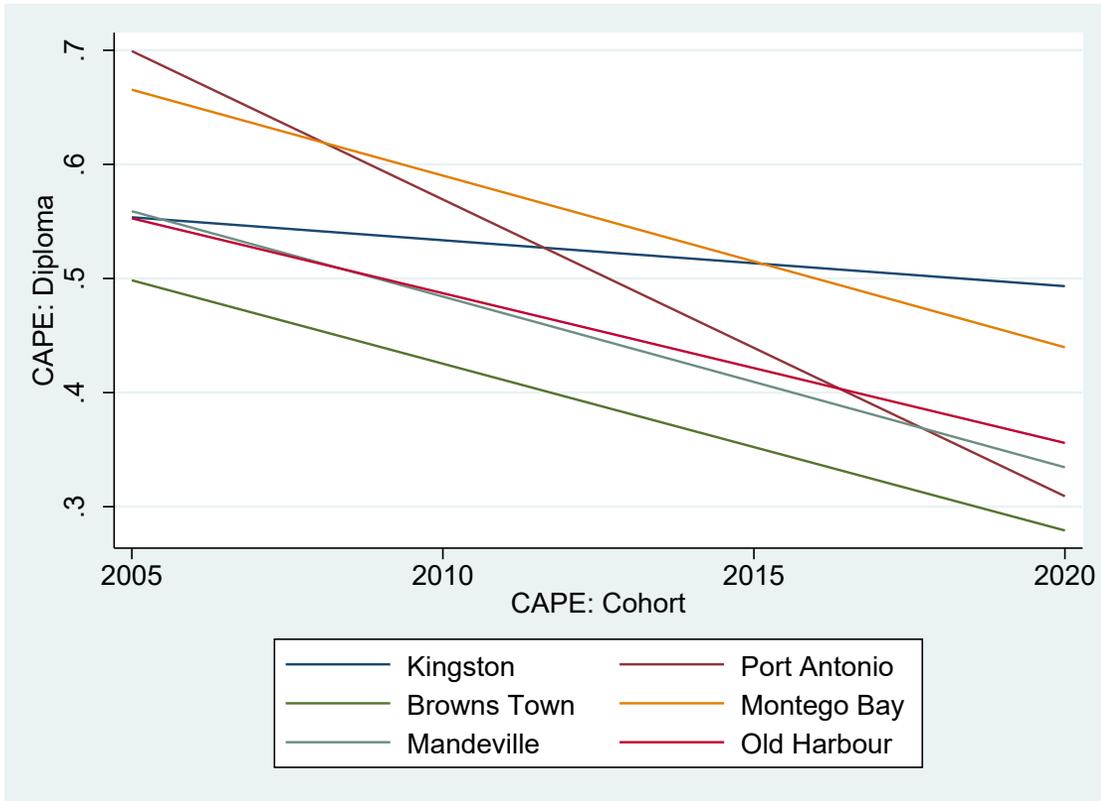
CAPE by # Units Taken, Rank & Completion

- The number of units taken has declined moderately
- Number of units ranked I has been low, close to zero
- Those ranked I in subjects completed even lower

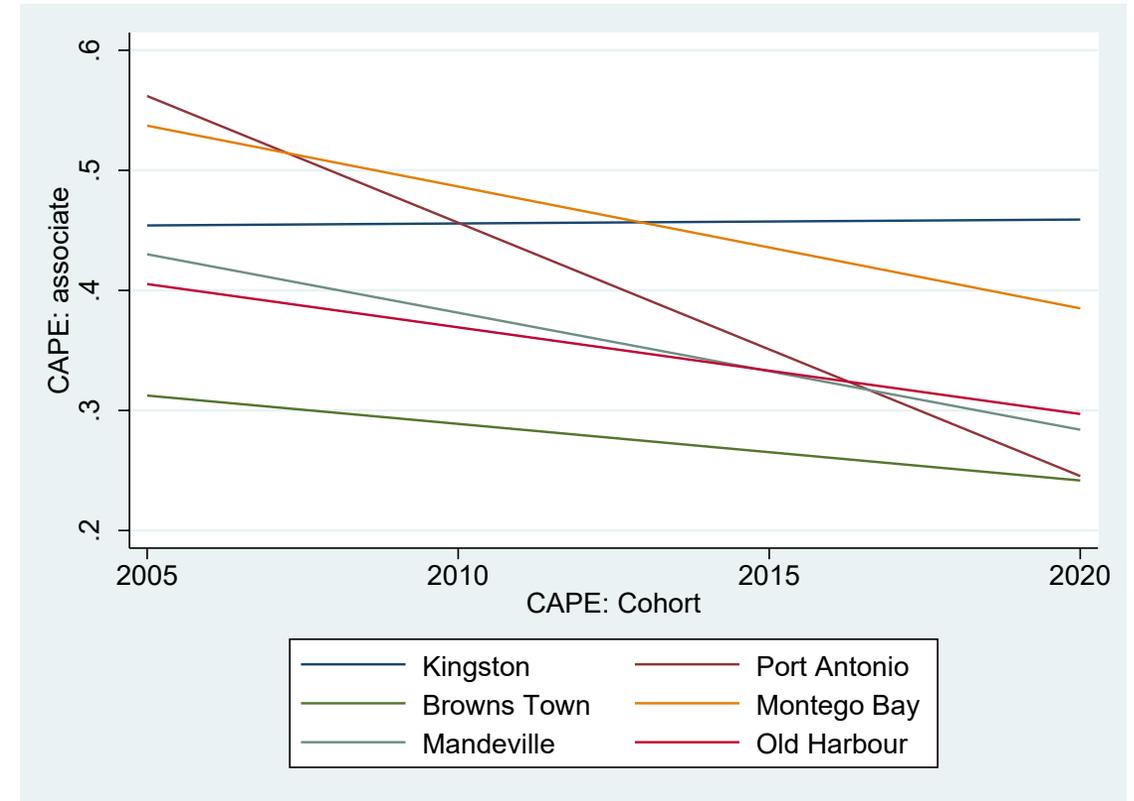


There has been a disappointing downward trend in the percent of Diplomas, as well as Associate Degrees awarded in all regions, but strikingly so in Port Antonio and Browns Town Regions

CAPE by % Diploma Passed by Region & Year



CAPE by % Associate Degree Passed by Region & Year



How Do We
Explain the
Apparent
Improvements
from 2004-
2018, then
collapse in the
2019 PEP
exams?

The PEP Results and latest CSEC decline show that Jamaica still has a major problem of poor student performance

Nonetheless, there were significant improvements in exam results among primary students from 2004-2018

Jamaica moved from extremely poor to moderately poor performance

What Explains the Improvements?

4 Hypotheses re Improvement Since 2004

1

1. The 2004 Task Force Reforms had a direct impact due to capacity building by the Education System Transformation Programme (ESTP)

2

2. Announcement or Signal effect

3

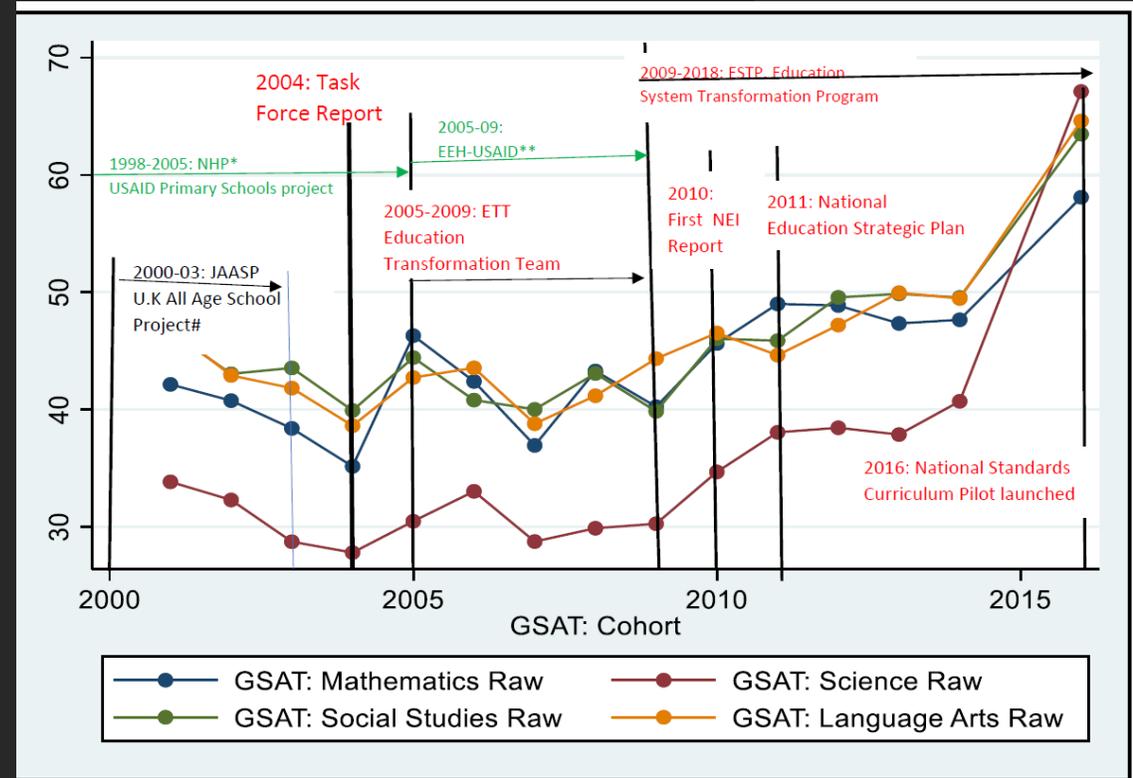
3. Teachers taught to the exams

4

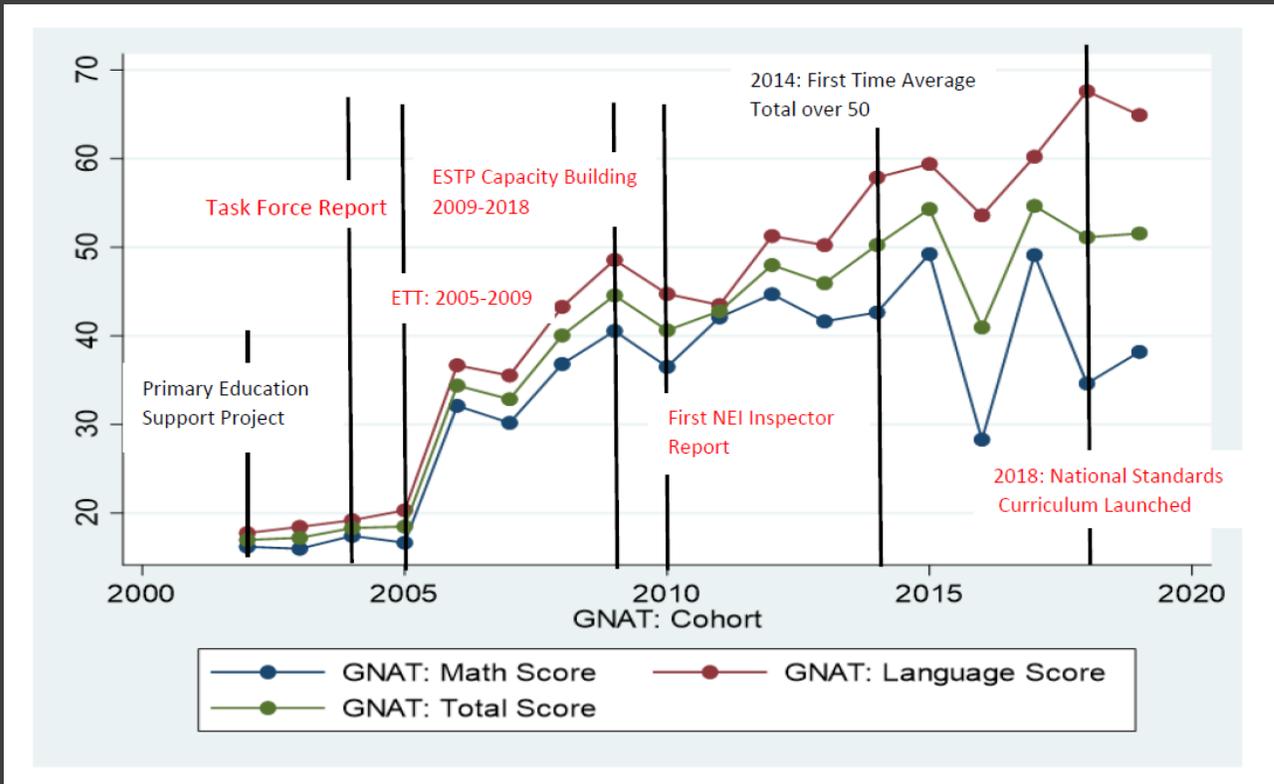
4. Demographic selection

ESTP Policy Interventions? The graph indicates otherwise

- There is no correlation between the interventions and exam scores
- Scores were declining before 2004, in spite of 2 major USAID interventions since 1998
- Scores started to increase the same year of the 2004 Task Force Report, before any classroom interventions
- They then declined until 2009 when the ESTP was established, then rose immediately, before any effects from ESTP were possible
- The NCEL was established in 2011, when scores began to level off
- The National Standards Curriculum went into effect in 2017-2018, after which the scores declined or leveled off (shown in the GNAT graph in the following slide)

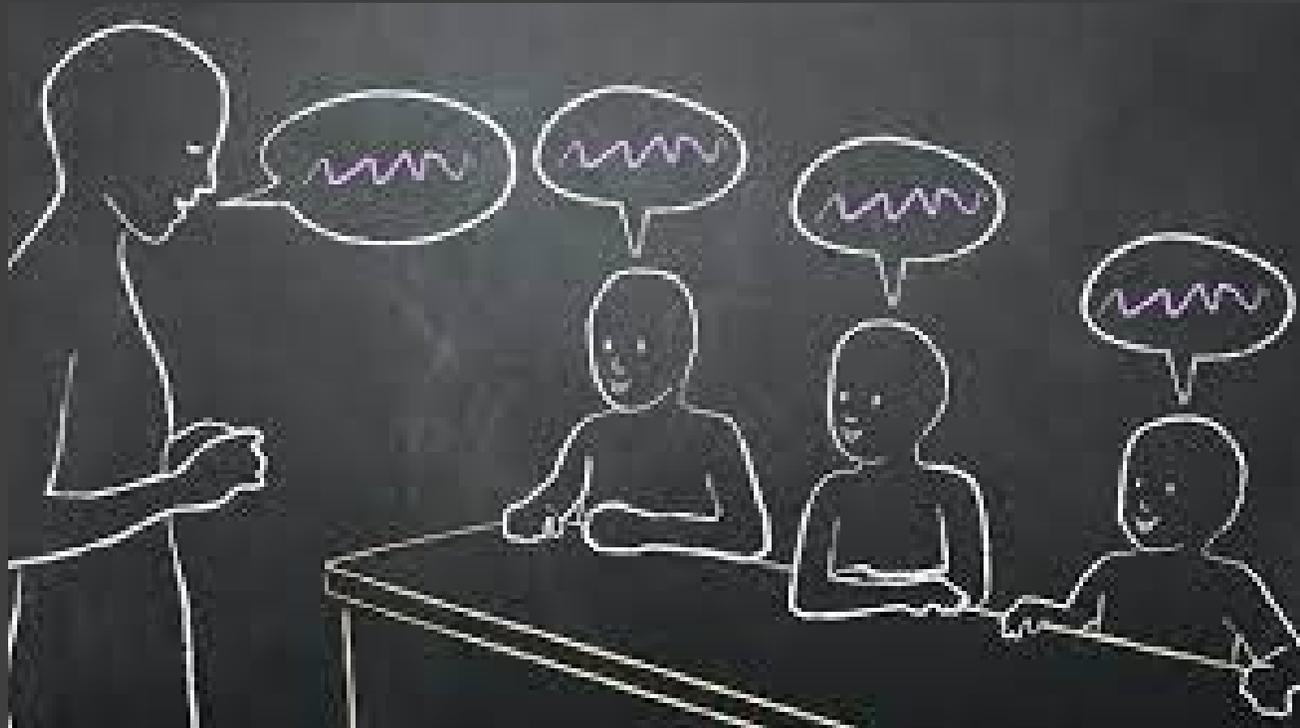


Announcement Effects?



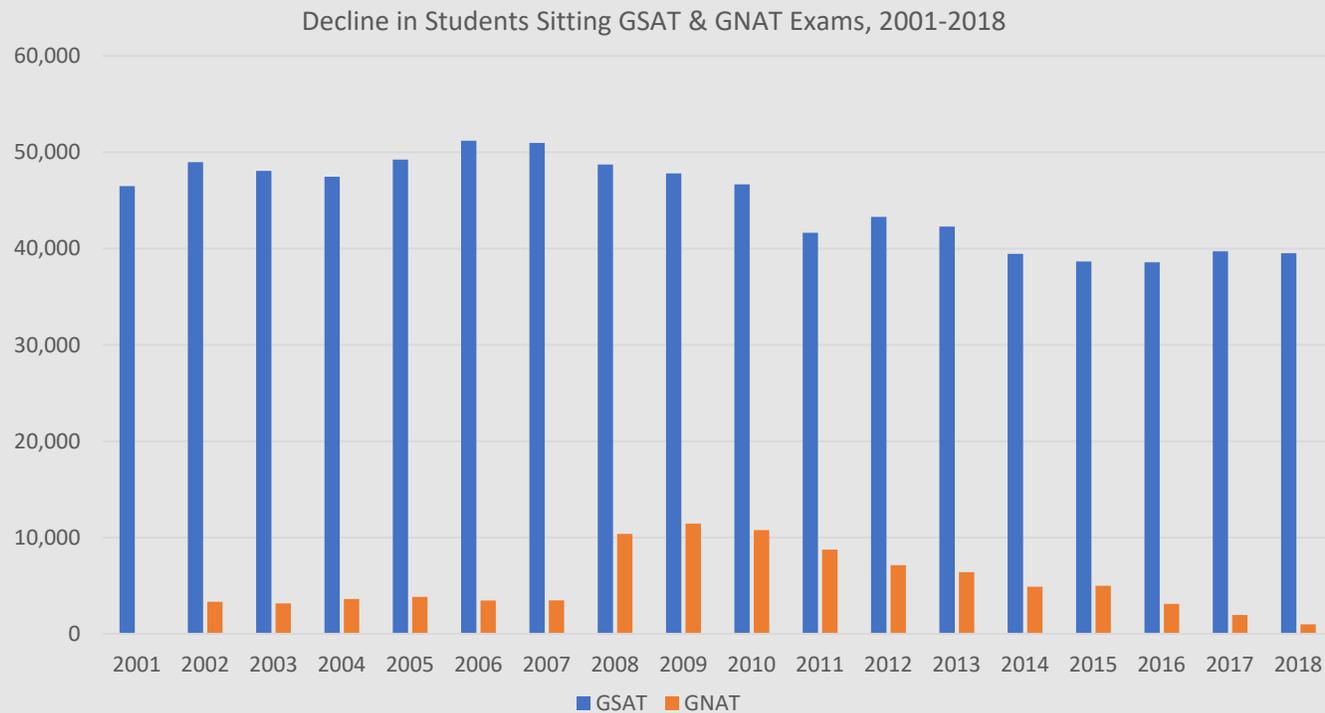
- An announcement effect is similar to what economists call signaling. The mere announcement or anticipation of a policy has immediate effects, such as changes in the stock market or business behavior following announcements by the U.S. FEDs
- The major education policy announcements, starting with the 2004 task force, may have had similar signaling effects
- Teachers and school principals suddenly felt under scrutiny in a system newly demanding accountability, and responded by immediately improving their performance
- This indicates that there was much room in the system for improvement, which previously functioned well below capacity

Teachers, under increased scrutiny, managed the results by rote teaching to the Exams



- This is quite likely. The previous exams had heavy emphases on rote teaching and learning, making it easy for teachers to manage performance by simply teaching to the exams
- This was one of the main reasons for scrapping the GSAT in favor of the PEP, which shifted the focus from teaching to learning and testing of analytic qualities
- It also explains why the PEP results were so poor, in spite of increasing performance in most of the previous years

Was there a Selection Effect in the Declining Numbers?

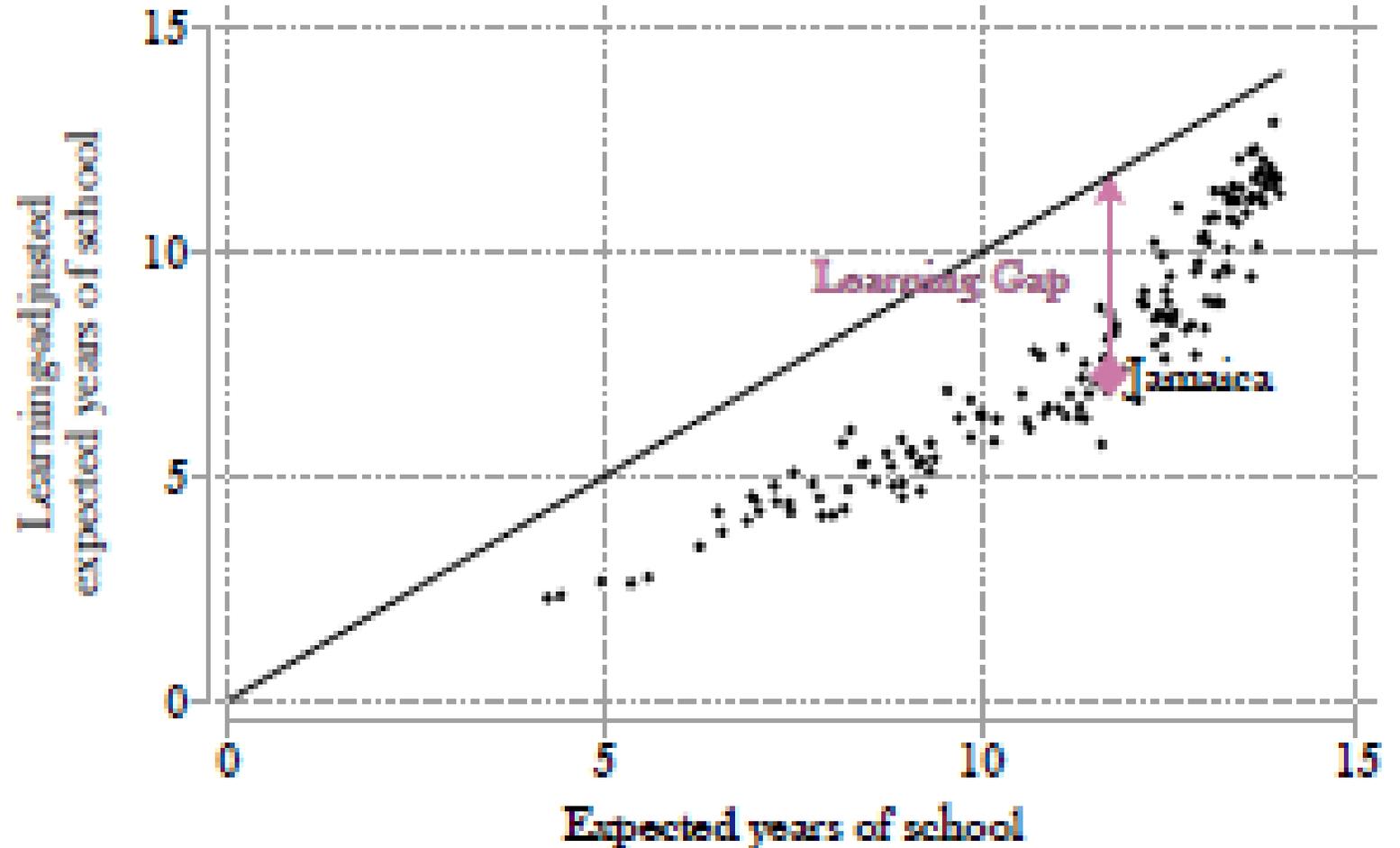


- There has been a substantial decline in the number of students taking the exams
 - GSAT: From 46,489 to 39,524
 - GNAT: From 3,325 to 982
- This is proportionately higher than the natural age-cohort declines in the school-age population
 - Students not prepared for the tests may have simply been absenting themselves, leading to a selection of better prepared students taking them
 - This was reinforced by the growing number of primary school students who have simply dropped out of school

The Failure Rate in PEP Supports the World Bank's Recent Verdict on Jamaica's Education

- That there is a learning crisis of high enrollment and poor performance
- That children in Jamaica can expect to complete 11.4 years of pre-primary, primary and secondary school by age 18.
- That, however, when years of schooling are adjusted for quality of learning, this is only equivalent to 7.1 years, a learning gap of 4.3 years

Figure 3. Learning Gap



Source: World Bank: *Human Capital Project, 2018 and 2019*

A large field of black umbrellas, with one bright yellow umbrella standing out prominently in the center. The umbrellas are arranged in a grid-like pattern, receding into the distance. The lighting is dramatic, with highlights on the edges of the umbrellas and deep shadows in the center of each one. The overall mood is one of conformity and individuality.

WE HAVE TO DO BETTER

Acknowledgment & References

- Our thanks to members of the Statistics Department of the MOEY for providing the original set of raw individual level data on the exam performance of all Jamaican students between 2002 and 2018. Special thanks to Ms. TerryAnn Thomas-Gayle, Manager, Student Assessment Unit of MOEY, for kindly agreeing to meet with the author and his assistant, along with the members of her department, in order to clarify some of the complexities in the data, and for providing us with additional data on the most recent GSAT and GNAT exam.
- Many thanks also to Ms. Trudy Deans, Senior Advisor to the Prime Minister of Jamaica, and Mr. Alok Jain, Consultant to the Prime Minister, for facilitating the administrative process of retrieving these data.
- The data used in this analysis were originally collected for the value-added modeling procedure, the results and interpretation of which are reported in the Unabridged version of the Commission's report and the Value-Added Policy Brief. Many thanks to Dr. Diether Beuermann Mendoza, Economist at the Inter-American Development Bank and his staff, for providing us with the data files which we re-analyzed for this policy brief.
- My research assistant , Mr. Ryan Dai, provided valuable support in the statistical re-analysis of these data
- Two doctoral dissertations provided some qualitative background information on the Grade 4 literacy tests:
 - Miller, Dawn E. E. 2017. *Consider the Children: Unintended Consequences of the Jamaican Primary Education Accountability System*. Unpublished doctoral dissertation, Harvard Graduate School of Education.
 - Lewis, Yewande Eleene ,*Literacy in elementary school in Jamaica: the case of the grade four literacy test*, Unpublished Ph.D Dis. University of Iowa, 2010