

“To what extent does the change to a Trump administration affect the academic quality of international undergraduate applicants to the United States?”

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Abstract

This paper aims to delve into the effects of the Trump administration of the mindset of international undergraduate students and determine whether the change in administration had an effect on the overall academic quality of international applicants to US undergraduate degrees. This paper collects data from international applicants at The University of North Carolina Asheville from 2013-2018. Using a Difference in Difference setting, the paper finds that the stricter immigration policies and uncertainty in the future labour market increases the quality of international applicants. More restrictions to the path of US labour market act as an additional screening mechanism so that only the high-quality international students apply. Besides academic quality, the paper also explores how intended majors of international students have changed. The estimation result shows that international students are more likely to choose STEM majors which the current immigration policies favour, indicating additional self-selection of international students.

1. Introduction

International students provide a broad range of benefits for the US economy and universities. However, immigration has become one of the most hotly debated topics across many countries, including the US. This has created a massive divide in opinions and shift in attitude towards international students and H-1B workers across the nation. More recently, COVID-19 exacerbated these differences when we experienced policy changes from the U.S. Immigrations and Customs Enforcement (ICE), targeting international students. For the purpose of this paper, international students are defined as “Non-citizen students applying for undergraduate positions at American Universities from outside the United States”.

The number of students applying for undergraduate positions is an important factor to consider because it helps us to understand the level of attraction that international students have for opportunities to study at US colleges. It is vital for colleges and important to the US economy that these numbers do not decrease too much, otherwise, there will be a strain on college funding. International students contributed \$45 billion to the U.S. economy in 2018 according to the U.S. Department of Commerce. International students usually pay higher tuition expenses than the average native student because they are considered “out of state”. As a result, many American universities are now reliant on these inflated revenue streams and have a real need to understand and counteract any influences on the number of international students applying to them.

International students are not only important to US colleges however. According to OpenDoors data, the top 3 majors for international students in the US (2016/17 & 2017/18) are Engineering, Business & Management and Math / Computer Science (Lu, 2019). Many of these students then continue their education in the US as, “foreign students accounted for 54% of master’s degrees and 44% of doctorate degrees issued in STEM fields in the United States in SY2016-2017” according to the U.S Congressional Research Service. This makes it incredibly important for the US to continue attracting international students for the sake of its international competitiveness in STEM fields and the needs of reliant industries such as US tech. Tracking the number of international enrollments at US colleges can help us draw connections between policy or administration changes and fluctuations in these

numbers. The data used for this study showed an average decrease in international applications of 1% after 2016. However, national enrollment during these years experienced much bigger negative growth. The country experienced a decline in new international enrollment of 3.3% from 2016-2017. This continued to decrease as shown in Figure 1.

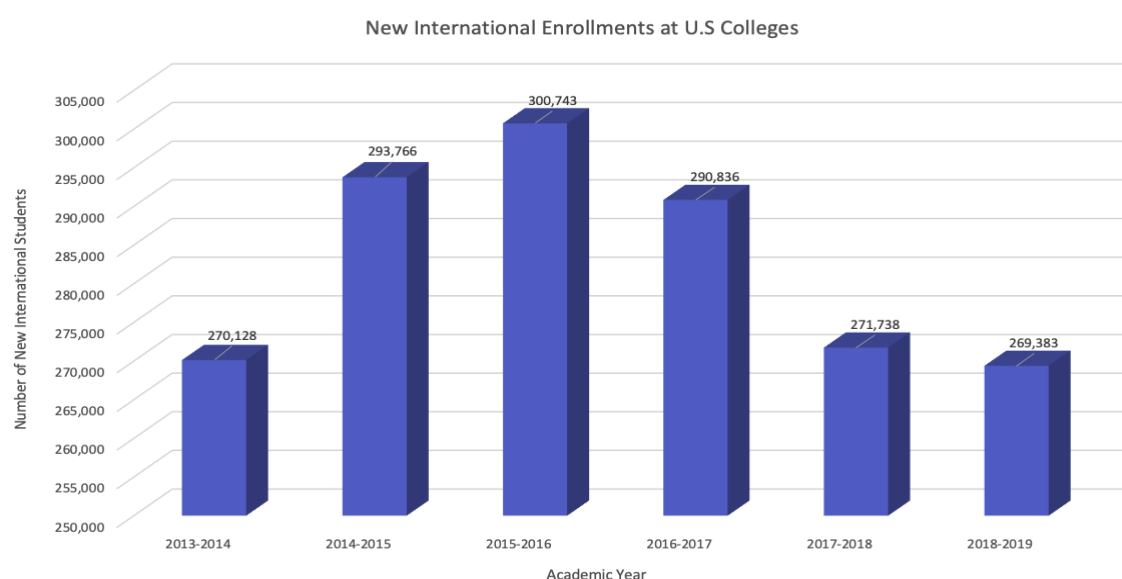


Figure 1. International Enrollments at U.S Colleges: Years 2013-2019. Data Source: Open Doors

Whilst this is only international Enrollment and not applications, it is important to note the continuous decrease and peak from 2015-2016. When explaining this drop, “Some U.S. college leaders have blamed White House rhetoric, visa delays and global tensions for discouraging overseas students.” (Perez)

International students are vital for the US economy as they offer unique perspectives to the management of companies and to any classroom settings. This paper will study the change in quality of these applicants, granted, they have decreased.

2. Literature Review

There has been much study done with regards to the impact that international workers have on the US economy. Some of these papers will be referenced in the following literature review. There is however, less study done that specifically targets international students and their fluctuating academic quality. The Kato, T., & Sparber, C. (2011) paper is a large part of the inspiration behind this study. The paper explores the effect of the quality of international undergraduate applicants after the decrease in the number of H-1B visa's was implemented in 2003. They found that with less incentive to come to America, because there is less likelihood that they will be allowed to stay there, the more talented applicants stopped applying to the US. However, the data also shows that lower-quality applicants continued to apply to the US regardless as they were not as focused on the H-1B visa afterwards. Kato & Sparber studied in depth, the benefits that international workers and students can bring to the US economy. This paper aims to build on that idea and investigates whether the country experienced any fluctuations in undergraduate applicant quality with the changes brought about by the Trump administration. These effects are important to the economy because the quality of students educated in the US will partly determine the quality of workers that they will become. By delving into the DATA concerning undergraduate international students. We specifically target years 2013-2018 in the hope that we will determine the effect of the Trump administration and their policies on the flow and quality of international students to US universities.

Matloff, Norman (2013) wrote a study in the Economic Policy Institute called “Are Foreign Students the ‘Best and Brightest’?”, that determines whether foreign graduate students offer superior skills or ability relative to their peer US graduates. It finds that this assertion is not supported by the data. In some measures, former foreign students have talent lesser than or equal to their American peers. Additionally, skilled-foreign-worker programs are causing internal brain drain in the United States. This is an important study as it highlights some of the difficulties that international workers and applicants can incur. With the data that this paper will produce, we will be able to determine whether higher or lower quality students are entering the US workforce and then continue to study its effect on internal brain drain.

Perez JR., Juan. (2019) studies the growth in international student enrolment under the Trump administration. From 2018-2019 there was a 1.7% increase in international student enrolment in US undergraduate degrees. However, the year before there was a 3.6% increase. Therefore, growth has slowed for the applications to undergraduate degrees in the US. We note that this is contrary to our OpenDoors data and table but still consider the research. This researches into a similar field in the sense that it is studying international undergraduates. This paper will add to that work by determining the quality of those applicants instead of the number. Additionally, a paper by E.Stirgus (2019) gives us another insight into international student enrolment during the 2018-2019 school year. Here, we see a decrease of about 20,000 applicants to 872,214, according to an annual report released by the U.S State Department and the Institute of International Education. Similarly to the last, this paper will take reference from those numbers whilst determining academic quality.

Whilst it is always important to study the numbers, we must also consider the changes in experience that international students are undergoing. Chi Nguyen, Maraki Kebede (2017) explores the implications of this political transition for immigrants' K-16 educational experiences during President Trump's administration. It revisits literature on school choice and the Deferred Action for Childhood Arrivals (DACA)—two policy areas where the most significant changes were expected to occur—as it pertains to immigrant students in the United States. Additionally, it identifies areas where there is limited scholarship, such as the unique educational experiences of various minority immigrant subgroups, the interplay between race and immigration status, and immigrant students in rural areas. Similarly, Bartram, B. (2018) explores “International Students in the era of Trump and Brexit: Implications, constructions and trends” (Bartram, 2018), examining the potentially unwelcome social and political effects of nationalism towards international students. It delves into the effects of Brexit as well as Trump's administration, giving us another interesting perspective to consider. Lastly in this category, R & C Rose-Redwood (2017) investigated international concerns over the anti-Muslim and immigration campaigns of the Trump administration. The international student community is currently living in a precarious world of insecurity in which international students are increasingly becoming the targets of violence and discrimination. This paper looks at how the Muslim travel ban affected international students and scholarships and how higher education institutions have responded to this threat. When trying to understand the deeper effects that the results of this paper will have on the US economy and society, we will take inspiration from these papers. This paper will add to the research by providing data on applicant's home countries and language distance from English. This way, we can determine whether any primarily Muslim countries have been affected.

Lastly, despite efforts by the Trump administration to bar Syrian refugees and citizens of seven Muslim-majority countries from entering the US, Indiana University found a way to overcome that obstacle. Reschke, M. (2017) studies the ways in which IU communicated with applicants abroad about how to address the situation before and after the order was issued. In fact, international applications rose a small % from 2016-2017. Days before the presidential election in November, international student applications were up 21% over the previous year in the University. Now, they're only up 6%.

3. DATA / Descriptive Statistics

The data used for this paper is exclusive and was provided by the University of North Carolina Asheville. Students names have been changed to randomly generated numbers in excel so as to avoid any privacy concerns. It contains 1089 data points of all international applicants and a similar number of native applicants from 2013-2018. Whilst it does not represent the experience of the nation, it is a reliable indicator of possible trends across the US. Any applicants that took the ACT instead of the SAT were standardised into SAT scores using a conversion provided by the American College Testing website. Additionally, any old SAT scores (from before 2016) were standardized to new SAT scores. Other variables that were not provided by the University of North Carolina Asheville were found using data from World Bank Open Data. These include GDP Growth, GDP per person and political stability. The language distance from English data was provided through Barry R. and Chiswick Paul W. Miller's paper (2004) on Linguistic Distance: A Quantitative Measure of the Distance Between English and Other Languages. This is a variable that is quantitatively measured through the difficulty that Americans have learning other languages.

Table 1: SAT scores of International and Native students before and during/after 2016.

	SAT 2013-2018	SAT Before 2016	SAT During/After 2016	STEM	STEM Before 2016	STEM After 2016
International	939.7283	857.8289	1040.121	46%	42%	50%
Native	1018.509	933.2234	1111.64	37%	37%	36%
International STEM	957.6238	864.3878	1045.481			
International Non-STEM	921.2874	856.55	1017.91			
Native STEM	1016.432	929.3814	1112.386			
Native Non- STEM	1025.293	940.6928	1114.177			

Here we can see the fluctuations in SAT scores and % of STEM undergraduates before and after 2016. It is clear from this table that the higher quality international applicants show a tendency to apply to STEM subjects as they receive an average SAT score of 36 points higher than non-STEM applicants. However, it is only in the international STEM section that we see an increase in SAT quality. Native STEM applicants score an average of 8.861 less. This suggests that the higher quality native applicants are not applying to STEM. International applicants may be more inclined to apply for STEM topics as they offer a 3-year Optional Practical Training (OPT). This gives them the opportunity to stay in the US for 3 years after they have finished their undergraduate degree. Non-STEM topics only offer 1-year OPT's. Other important trends in this table show that across the entire dataset, international students are 9% more likely to be applying as STEM undergraduates than native students. This is shown in the table below. We find that before 2016, 42% of applicants were STEM. From 2016 onwards, this figure rose to 50%. For native students, before and from 2016 onwards, the % of students applying as STEM undergraduates actually decreased by 1%, growing the difference between international STEM applicants and native STEM applicants from 5% to 14%.

Moreover, table 1 indicates that the average SAT score of native students is about 79 points higher than international students through 2013-2018. We might associate this to the fact that native students are generally more prepared for and familiar with the SAT than international students. Additionally, many international students do not speak English as their first language and so will typically score lower on the English section of the SAT. Despite these considerations, the SAT is still the best metric to use when trying to determine average academic quality and instead of looking at the scores themselves, we will instead look at their changes from 2013-2018.

The data shows that from 2016-2018, the average SAT score of international applicants applying to STEM subjects increased by 181 points. Hence, we experience a positive selection in this case. The economic story suggests that the higher quality undergraduate applicants are targeting STEM subjects more frequently as a result of the change in policies introduced by the Trump administration in an effort to stay in the US longer, or with the assumption that it will become increasingly difficult to stay there.

Having determined where the highest quality applicants are in each demographic, we now look to see which groups experienced the largest change in overall quality from before 2016 to during/after 2016.

Table 2. % increase or decrease in average SAT scores during/after 2016.

	2013-2015	2016-2018	% Δ
International	857.8289	1040.121	21.25%
Native	933.2234	1111.64	19.19%
International STEM	864.3878	1045.481	20.95%
Native STEM	929.3814	1112.386	19.69%
International non-STEM	856.55	1017.91	18.83%
Native non-STEM	940.6928	1114.177	18.44%

The results show that in all categories, SAT scores are expected to increase by an average of 19.72% during/after 2016. This is a significant difference overall. Particularly we note that international students improved the most, nearly 2% more than natives after 2016. The results of international applicants continue the trend and are higher than the native numbers in all three categories. This is significant because it indicates that the international

population was affected more positively than natives during this time period. Again, we see indicators of positive selection for the quality of international students applying to US undergraduate degrees.

After discovering some minor trends in the data regarding STEM studies between international and native applicants and overall changes in SAT scores, we will look at the distribution of these applicants to see if we learn anything more.

Table 3. % of applications from various parties.

	Observations	% of applications
Female	455	41.78
International	276	25.34
Female & international	120	11.01
1 st most frequent international country (CHINA)	55	5.05
2 nd most frequent international country (INDIA)	48	4.40
3 rd most frequent international country (GHANA)	32	2.93
4 th most frequent international country (PAKISTAN)	29	2.66
5 th most frequent international country (ETHIOPIA)	17	1.56

Table 3 shows the % of applications from Females, internationals and those countries where the greatest number of international applicants come from. We can see here that there are 16.44% less applications from females than males overall. The third row shows the % of applicants who were both female and international. Here, we see the trend continue where there are fewer international female applications than male. The most frequent international applications came from China, India, Ghana, Pakistan and Ethiopia respectively. In 2016, the USA received 350,755 students from China alone. China has the highest number of students abroad studying in the USA and India the second. These two distributions align with the national trend. However, the other three countries in Table 3 were not even in the top 15 for number of students studying in the US. Therefore, the number of applications from three countries do not follow national trends and are specific to UNC Asheville.

4. Empirical Methods

To identify the impact of the Trump administration on international applicants, this paper first estimates a group of difference in difference (DID) estimators given in the following regression question:

$$Y_{it} = \beta_0 + \beta_1 post_t + \beta_2 International_i + \beta_3 post_t \times International_i + X_{it}\delta + \varepsilon_{it}$$

Following the estimation strategy of Kato and Sparber (2016), the DID is intended to identify the impact of stricter immigration policy on international students. The tighter immigration policies following the new administration is the treatment in this setting. International applicants are the treated group while native applicants are the control group. To identify the causal impact, the parallel trend assumption is assumed to be true.

In this regression, i represents the individual. t stands for calendar year. β_1 estimates the effect on students that are both international and applying for undergraduate degrees during or after 2016. β_2 estimates the effect on international students who are defined as any applicant from outside the United States of America. The β_3 variable is of particular interest in this equation because if $\beta_3 > 0$, this represents positive selection. A negative value would indicate negative selection, I.E, the academic quality of applicants has decreased. This will be the main estimator of our story through the research. Additionally, the X_{it} variables include annual gdp growth rate, sex, political stability and language distance from English. These were important to control for because when dealing with international applications, it is often the case that events outside of the USA, such as a change in political stability in South Africa could change the changes or quality of applicants from SA to USA. Similarly, GDP growth plays a role in determining the quality of international applicants as a country offers their citizens more opportunities and income when it is thriving economically. Language distance from English is also particularly important to control for because it allows us to determine if there is a different in SAT quality based on how far or close to the English language international applicants are. As aforementioned, the SAT test is bias towards English speaking applicants and does not necessarily indicate academic quality but more so quality

through English specifically. The *international* variable is defined as: Non-citizen students applying for undergraduate positions at American Universities from outside the United States. The *post* variable is defined as applicants both native and international who have applied during / after 2016. The *post_international* variable is the interaction of international students who have applied after 2016. Female accounts for any applicants that have identified themselves as female on their application. STEM represents the portion of applicants who intend to major in STEM subjects. These include science, technology, engineering, and medicine. GDP growth is the growth rate of gross domestic product in applicant's home countries. Language distance is a quantitative measure of the applicant's native language to the English language. This is based on the difficulty that American's have learning the language. Political stability is a measure from the world bank that indexes political stability and lack of violence & terrorism in each country.

To control for omitted variable bias, a large selection of controls are present. These include: Political Stability, GDP growth of applicant's home country and native language distance from English.

Table 4. Regression on SAT scores

SAT SCORES	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6
Post	153.3452 (0.000)	153.8524 (0.000)	169.3500 (0.000)	177.0363 (0.000)	175.7101 (0.000)	176.9242 (0.000)
International	-160.6797 (0.000)	-162.1219 (0.000)	-164.9557 (0.000)	-193.3485 (0.000)	-202.9509 (0.000)	-201.4141 (0.000)
Post_International	132.8258 (0.000)	132.5657 (0.000)	115.4186 (0.000)	107.4047 (0.000)	107.3559 (0.000)	107.2793 (0.000)
Female	X	-7.220508 (0.627)	-9.470922 (0.534)	-10.3025 (0.496)	-9.804012 (0.518)	-9.769778 (0.520)
STEM	X	X	-1.353427 (0.929)	-1.457931 (0.924)	-1.173896 (0.930)	-9.919116 (0.948)
GDP Growth	X	X	X	16.58244 (0.000)	16.48812 (0.000)	17.23724 (0.000)
Language Distance	X	X	X	X	-0.01758784 (0.501)	-0.1854482 (0.481)
Political Stability	X	X	X	X	X	0.1678668 (0.750)

The trends shown through the 6 regressions indicate that SAT score increases through both parties ranging from 153.3452 to 177.0363. This is statistically significant. international applications are continuously expected to increase in overall quality but at a slower rate each year. This is continuously statistically significant too. The β_3 (*post_international*) variable is the one of particular interest because this shows us the positive selection story. We constantly see that after 2016, international applicants are expected to get higher scores on their SAT's and a higher increase in score than native students. Whilst natives receive an increase of the "POST" variable (i.e 176 in regression 6), international students would receive $176 + 107$ (*post + post_international*). Here, we see another indicator of positive selection in the international group. The overall trend is consistent and shows us that international students perform their best during/after 2016.

The female variable is not statistically significant but does represent a consistent trend of -7 to -10 points less on SAT scores. Similarly, the STEM variable suggests that STEM majors (both native and international combined) are likely to score anywhere from -1.17 to -1.45 points less on their SAT's. However, this is also not statistically significant. GDP Growth seems to be a strong indicator of academic success in the SAT for with each 1% increase in GDP, SAT scores will increase by about 16.77 points. Language distance from English is not statistically significant and has a very small effect on SAT scores with -0.175. Lastly, political stability will have a 0.167 point effect to SAT scores per 0.05 change in rating. We do not interpret the non-statistically significant variables any further.

This regression shows its robustness through extremely consistent trends throughout 6 different regressions. The changes in numbers were marginal, especially for the statistically significant variables. The primary 3 in focus are: *Post*, *international* and *post_international*. The control variables help to demonstrate the robustness of results through various regressions. We summarize the results by looking specifically at the last column (regression 6), my preferred specification: Applicants to the University of North Carolina Asheville have improved by a statistically significant average of 176 on their SAT scores through both native and international parties. International students are expected to have a lower score of 201 marks on their SAT's yet improve after 2016 by 107 points these are both also statistically significant. Female applicants received an average of 9.8 less points on

their SAT. However, this is not statistically significant. GDP Growth has a statistically significant effect on students SAT scores by increasing them by about 16.4 points per 1% increase in GDP. Political stability has a marginal positive effect on SAT scores but it is not statistically significant. The Political stability variable works on a spectrum from -2.25 to +2.25. Political stability has a linear relationship to SAT scores but is not statistically significant so we do not interpret this variable too much. Language distance from English provides a -.185 decrease in SAT score per .25 decrease in language distance from English score. This is rated from 1-3 in increments of .25 with 3 being the closest to English and 1 being the furthest away. Overall, throughout the results of these 6 regressions for SAT, we find a consistent trend of positive selection during/after 2016 meaning the quality of international undergraduates applying to US universities increased. In this case, quite substantially.

Next, we will run a similar regression with STEM major choice as the outcome variables:

$$Y_{it} = \beta_0 + \beta_1 post_t + \beta_2 International_i + \beta_3 post_t \times International_i + X_{it}\delta + \varepsilon_{it}$$

Table 5. Regression on STEM majors

STEM Majors	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
Post	0.0359932 (0.600)	0.0183445 (0.786)	0.0227129 (0.738)	0.0255975 (0.707)	0.0142263 (0.835)
International	0.0528897 (0.155)	0.012304 (0.741)	-0.0020436 (0.959)	0.0172586 (0.715)	-0.0099344 (0.843)
Post_International	0.0669355 (0.000)	0.0704714 (0.154)	0.0650392 (0.191)	0.0618171 (0.215)	0.0629594 (0.206)
Female	X	-0.182691 (0.000)	-0.1814801 (0.000)	-0.1817715 (0.000)	-0.1805526 (0.000)
GDP Growth	X	X	0.0096711 (0.158)	0.0097201 (0.157)	0.0050846 (0.493)
Language Distance	X	X	X	0.0003191 (0.493)	0.0003523 (0.449)
Political Stability	X	X	X	X	-0.0015175 (0.101)

The regression on STEM suggests that during/after 2016, students are 6-7% more likely to be applying to STEM topics. Whilst it is noted in this graph that we have very few statistically significant figures, the positive sign as supposed to negative does follow the theory that has been consistent throughout the rest of the paper. We see that international students applying to the University of North Carolina Asheville are more likely to apply to STEM subjects with the addition of the Trump administration. This is because under current immigration policy, STEM major graduates have a long OPT period of 3 years as opposed to one-year Non-STEM OPT. This allows STEM major graduates to work legally for 3 years before obtaining an H1B visa. The preferential treatment of STEM majors induce additional self-selection among international applicants. Additionally, these students are positively selected and receive higher average SAT results than prior natives and a higher increase in SAT results than their native peers in the same time bracket. The only statistically significant data we see in this table is that female applicants are about 18% less likely to apply to STEM topics.

5. Conclusion

The research indicates that international students are positively selected when applying to the United States after 2016. This is interesting because it shows a stark contrast to the results of the Kato & Sparber paper that studied the effects of H-1B visa regulations. We find in this study that all students are more likely to perform higher on their SAT's during the Trump administration. However, the change for international students is significantly higher than the change for native students. This may be due to increased pressure on international students to find ways into the US and also the increasing difficulty to stay in the US. We see the response to these changes through the increase in STEM subject applications from international students only. We note that the number of applications actually decreased during/after 2016 both for the University of North Carolina Asheville and nationally. It seems as though the lower-quality applicants are less inclined to apply to the United States as it costs

money and time and might not be worth it for lower SAT-scoring students. Higher-quality students however, may see the change in administration as an opportunity and may be more inclined to work in the United States due to Trump's lower-tax policies and efforts to keep the stock market running strong. These aspects would be particularly important to many of those who work in STEM. We considered that another alternative to explain an increase in average score of SAT from international students would be an increase in overall global political stability. However, The World Bank presents data on global political stability and lack of terrorism and finds that from 2013-2018 there was negative growth (political stability decreased globally).

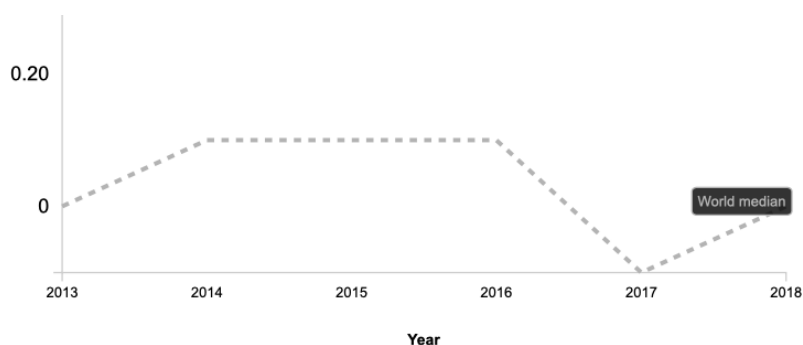


Figure 2. Political Stability And Absence Of Violence/Terrorism, Index: Years 2013-2018. Source: The World Bank

We must also entertain the possibility that our dataset accentuated these changes. In 2016 the SAT was changed in its structure and so grading may have become somewhat more lenient throughout those changes. Whilst the dataset used for this research has been standardized so that all the results before 2016 are marked as their would-be equivalent on the newer SAT, this process may not have been as clean as we originally thought. We consider that the SAT changes allowed more international students to perform well on the SAT. The two major changes to the SAT that are taken into consideration are (1. No guessing penalty), (2. Available to take on computer) and (3. The removal of an entire section *Critical Reading*). The fact that students do not receive a guessing penalty (or incorrect answer penalty) on their exam may have a large part to do with the general increase in SAT scores that we saw in 2016. Whilst the scores have been standardized in the dataset, the ways in which the SAT was taken was not controlled for. This most likely would have affected both populations the same amount. Secondly, the addition of a digital version of SAT tests would have made the test much more accessible to people around the world and also people with disabilities. Lastly, the removal of the Critical Reading section on the SAT would have helped international applicants immensely as they would have a much easier time preparing for the SAT. Native students who are generally more prepared for the SAT would continue in the same fashion whereas international students who do not have the same infrastructure to prepare would experience a larger marginal benefit. Additionally, with the removal of Critical Reading from the SAT, the math part becomes worth significantly more. As aforementioned, many international applicants are not fluent or native speakers of English and so rely on the Math part of the exam to increase their score. By removing an entire language-based part of the assessment, we would expect international students to would experience higher average scores.

The data presented in this paper shows a clear indication of positive selection during/after 2016 for the overall academic quality of international undergraduate applicants SAT scores to the University of North Carolina Asheville. The regressions show that international students' scores improve at a higher rate than native students before decreasing marginal gain from 2016-2018. The regression used in this paper has shown its robustness by providing similar results through a variety of regression equations. The data used in this paper is exclusive only to this study and the University of North Carolina Asheville.

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