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Women and Minorities in Science, Technology, Engineering, and Mathematics (STEM): Evidence from Trinidad and Tobago

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Abstract

Using a quantitative research approach, this study aims at investigating the wage returns and the gender wage gap of Trinidad and Tobago's minority groups in Science, Technology, Engineering, and Mathematics (STEM) fields. To do this, data from the Continuous Sample Survey of Population (CSSP), for the period 1991–2015, is used to estimate a Mincerian earnings function via the quantile regression method, after which the standard Oaxaca–Blinder Decomposition method is employed to decompose the wage differentials. This analysis revealed that regardless of ethnic class (i.e. minority group [persons who are of mixed, white, Syrian/Lebanese, Chinese, and other heritage] or majority group [persons of an Indian and African heritage]), there are more men trained in STEM than women. While the average earnings of female minority workers in STEM are higher than that of male minority workers, the earnings of male majority workers are higher than that of female majority workers. The gender wage gap between minority workers in STEM appears to be much more prominent (9.8%) than that of majority workers (8.5%). This implies that the issue of gender inequality in STEM is more pronounced amongst minority workers in Trinidad and Tobago.

Keywords: gender, STEM, wage gap, Mincerian Earnings Functions, Blinder–Oaxaca Decomposition, gender inequality, quantitative study

Introduction

Building diversity in education has been a topic of interest in the education economics literature for decades, as early researchers such as Verdugo (1992), tackle challenging issues related to wage discrimination and earnings differentials of minority groups based on their ethnicity. As time progressed, many countries sought to develop their human capital base with easier access to higher education and training, but the lingering problems of discrimination, inequity, and lack of diversity began to resurface with a greater reprisal about minority groups. Countries focused on the development of their human resources, issues such as discrimination, inequity and lack of diversity, often arose with minority groups having less access to higher education and training opportunities. According to Wirth (1945 p. 347) a minority group is, "any group of people who, because of their physical or cultural characteristics, are singled out from the others in the society in which they live for differential and unequal treatment, and who therefore regard themselves as objects

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of collective discrimination." Minority workers refer to persons who belong to minority groups based on race or ethnicity while ethnic minority groups refer to a group of persons who based on their cultural or physical characteristics are treated unfairly leading them to experience discrimination. In this article ethnic class, refers to if the worker is considered to be in either the minority group (persons who are of Mixed, White, Syrian/Lebanese, Chinese, and Other heritage) or majority group (persons of an Indian and African heritage).

Bearing this in mind, many universities have tried to become more diversified through student enrolment, so that underrepresented students from various minority groups can enter academic programmes. However, as Anderson and Kim (2006) explain, even though many universities may be able to attract a more diverse group of students into the STEM field, the challenge remains to create a successful experience which allows these students to complete their respective programmes. Apart from these administrative issues, there are several factors which may influence the ability of persons from minority groups to have a successful academic and working experience in STEM fields. As noted by Dasgupta and Stout (2014, p. 21), some of these considerations include, "the feeling like a misfit in STEM classes, being vastly outnumbered by male peers, and lacking female role models make women avoid STEM majors or leave prematurely. In early to mid–adulthood, subtle gender bias in hiring and promotion, biased evaluation of scientific work, non–inclusive department climate, juggling work–family responsibilities, and difficulty returning after a family–related pause".

Focusing on the labour market aspect of these challenges, studies conducted in countries such as the United States (US), and the United Kingdom (UK) reveal that for both sexual and ethnic minority groups in STEM, a great deal of interpersonal marginalization and devaluation of persons exists, originating from the lack of inclusion and respectful communication with colleagues, which can indeed reduce the productivity of persons (Cech & Waidzunas, 2022). These problems may be linked to not only the ethnic background of the worker but also the characteristic features of the STEM labour market; for instance, the rate at which highly skilled STEM workers retire from their current positions may vary by sector (Smith & White, 2022).

Differences in the wage gap of minorities were attributable to their education, ability to speak English, and parents' education (Black et al., 2006). Much of the gender disparities in STEM are driven by students' peers and learning environment, as well as the education and employment background of their parents (Dasgupta & Stout, 2014). This outcome may also link to the leaky STEM pipeline, where the educational experiences of minority students play an integral role in their persistence within their field (Griffith, 2010). Kerr and Kerr (2013) explain that United States (US) immigrant workers in STEM take longer to make career adjustments due to the lack of job opportunities. British minorities fare no better, as the inequitable distribution of labour market opportunities reinforces the stereotype threat that they may encounter (Blackaby et al., 2002). If, however, ethnic minority immigrants are better educated, then they experience higher earnings (Dustmann & Theodoropoulos, 2010).

A study of this nature, which seeks to examine the wage returns and the gender wage gap of STEM minority groups from Trinidad and Tobago, expands the empirical literature on the topic for the Caribbean region. In this context, given that most of the literature on this topic focuses on the experiences of minority workers in the US and the UK, there remains a virtual absence of literature on the topic of minority workers in STEM for Trinidad and Tobago. There is no quantitative study which focuses exclusively on the education and labour economic outcome of ethnic minority groups in STEM for Trinidad and Tobago. This creates a significant research gap, as there are no studies in the literature which quantitatively examine the earnings, wage gap, and presence of discrimination experienced by this segment of STEM workers in Trinidad and Tobago.

This reality created the perfect conditions to use modern literature, data, and econometric techniques which are more relevant to the current labour market atmosphere to fill the gap identified. To do this, two research questions were proposed:

(1) How does the wage return of ethnic minority groups in STEM change over the period 1991–2015?

(2) Is there a gender wage gap amongst ethnic minority workers in STEM?

By answering these research questions, this study contributes to the literature in four ways, by: (1) examining the wage returns of ethnic minority workers in STEM fields over the entire wage distribution and across 24 years (1991–2015), (2) highlighting the gender wage gap that ethnic minorities in STEM may experience, (3) broadening the empirical and applied literature in the field of education economics which implements the Quantile Regression and Oaxaca–Blinder methodologies, and (4) developing and pioneering the empirical literature in education economics for Trinidad and Tobago which focuses on the ethnic groups in STEM.

Using data from the 1991–2015 Continuous Sample Survey of Population (CSSP), the Mincerian earnings function was estimated to observe the overall wage returns of STEM minority workers; while the Blinder–Oaxaca decomposition method was used to determine how their gender profile influences their wage gap. This study found that the wage returns of STEM minority workers have improved over wage distribution for the period 1991–2015, with the highest returns being experienced by those employed in high–income jobs, which refers to persons who are employed in high-paying positions that are associated with specialized skills and advanced education. On average, the earnings of female minority workers in STEM was found to be higher than that of male minority workers. The gender wage gap of minority workers in STEM fields appeared to be much larger than that of workers from the majority group implying that the issue of gender inequality in STEM is more prominent among minority workers.

Literature Review

The underrepresentation of minority groups in STEM fields is not a new problem, as the lack of inclusion of these groups continues to persist in higher education and the working environment. According to Atkins et al. (2020), the mentorship of students in STEM plays a crucial role in not only the diversity and retention of students in the field, but also their scientific identity, as mentors are often in key positions to offer greater development opportunities. This is especially important since underrepresented minorities such as African Americans, Latinx, and Native Americans, tend to integrate into the STEM community at a different pace than non–minority students (Estrada et al., 2018). One reason for this may be due to the unconventional approach to instruction in STEM fields by faculty, leading to the creation of "exclusive" classrooms where STEM minority groups are not traditionally represented (Dewsbury, 2020). One interesting example occurred in the US, where faculty members in the selection of post–doctoral candidates in STEM in the areas of physics, biology, and engineering exhibited greater levels of gender and racial bias, and racial microaggressions towards female and African American and Latinx students (Eaton et al., 2020; Kuleshov et al., 2021; Miles et al., 2020).

In the case of Latinx students, the recruitment, admission, program expansion, networking, and negotiations between students and faculty were important factors in the academic and cultural integration of these students in STEM (Bensimon et al., 2019). However, even though faculty members' role as institutional agents can make a difference in the development of STEM minority students, there are still some faculty who view the ability of STEM students as a fixed concept, thus leading to large racial achievement gaps (Canning et al., 2019). Such a view not only creates a barrier for underrepresented students, but also leads to greater negative experiences within the classroom thereby reducing their level of achievement and motivation. For this reason, the vulnerable population of women and minority students in STEM in countries such as Israel, Latin America, Malaysia, and the US, are more likely to perceive such environments as threatening, as there are more instances of stereotyping, control, biases or cultural norms, and discrimination further exacerbating the underrepresentation of minority groups in STEM at the secondary and university levels (Casad et al., 2019; Diamond & Kislev, 2020; Garcia–Holgado et al., 2019). The consequence of this type of environment is that minority students not only switch from their STEM field of interest, but may also drop out of college entirely (Riegle–Crumb et al., 2019).

In addition, demographics, math ability, and career development were also vital to the retention of United States (US) undergraduate students in STEM majors (Belser et al., 2018). Students who were enrolled in more STEM–focused career planning courses were of African American and Hispanic descent, and those who scored higher on the math component of the SAT exam, had a greater chance of being retained in STEM majors. Minority and first–generation college students with strong family, cultural, and social network connections to a particular STEM field were also influenced in their career pursuits (Dewsbury et al., 2019; Meador, 2018; Puccia et al., 2021).

Despite this, it was noted by Jelks and Crain (2020) that Non–Asian minority students in the US who completed their undergraduate degrees tended to leave the STEM field due to a lack of social capital and job opportunities. One could posit that this may be due to the creation of racially hostile work and education environments (McGee, 2020). When examined in greater detail for Hungarian, Slovak, and Romanian minority workers, it appeared that their inability to obtain better job opportunities was due to invisible biases, horizontal segregation, and the glass ceiling effect in the decision–making process throughout workers' career stages (Lendak–Kabok, 2020; Liu et al., 2019).

Data and Descriptive Statistics

Data

The dataset used in this paper was derived from the Continuous Sample Survey of Population (CSSP) for the period 1991–2015. This dataset collects information on a biannual basis covering a wide array of topics such as individual employment status; hours of work; duration of employment; industry of employment and occupational status; level of education/qualifications; and biographical and demographic information. The sample data used in this article comprised economically active persons (i.e., individuals aged 15–65) who were employed on a full–time basis (working more than 33 hours per week), within either public sector or private sector enterprises.

There are two important restrictions made to the sample used in this study:

1. it is limited according to the ethnic class of the worker. The ethnic composition of Trinidad and Tobago embraces a wide array of ethnicities; as a result, in the context of Trinidad and Tobago, the minority group comprised persons who are of Mixed, White, Syrian/Lebanese, Chinese, and Other descent, while the majority group comprised persons of Indian and African descent.
2. A STEM variable was designed to reflect those who are trained in the STEM fields (i.e., science; engineering and architecture; medicine and veterinary science; and mathematics and computer science.

A host of explanatory variables (inclusive of the workers' gender, potential experience, marital status, years of schooling, father's and mother's years of schooling, occupational grouping, the industry of employment, geographical location, educational mismatch, level of training and year of data collection, were also considered.

Descriptive Statistics

The summary statistics for a few of the main variables are shown in Table 1. For the period 1991–2015, Table 1 reveals that, on average, there was less tendency for workers in the ethnic minority group to be married. Those in the ethnic minority group appeared to benefit from higher hourly and annual earnings than those in the ethnic majority, even though the latter group had more working experience. Persons from the ethnic majority may be more predisposed to being undereducated, while those in the ethnic minority group are more likely to be overeducated, holding more years of schooling. On average, parents of workers in the ethnic minority group had higher levels of education than parents from the ethnic majority group. A brief examination of the gender profile for both samples (as reflected in Figure 1), reveals that more workers are falling into the ethnic majority group than the ethnic minority group. According to Figure 1 (Panel A), from 1991–2007 the ethnic majority appears to be growing; however, there were two dips in the sample growth, first in 2000, and again in 2004. As expected, there were more men than women in the ethnic majority. However, towards the beginning of the timeframe (1991–2008), while there is a large difference in the number of men and women, at the end of the period (2009–2015) this change begins to decrease in size.

In comparison, according to Figure 1 (Panel B), the number of workers in the ethnic minority is much smaller than that of the ethnic majority group, with a great deal more fluctuations in its sample growth throughout the period 1991–2015. The composition of men in the ethnic minority is much higher than that of women. However, the difference between genders is much smaller throughout the time frame, especially from 2005–2011.

Table 1

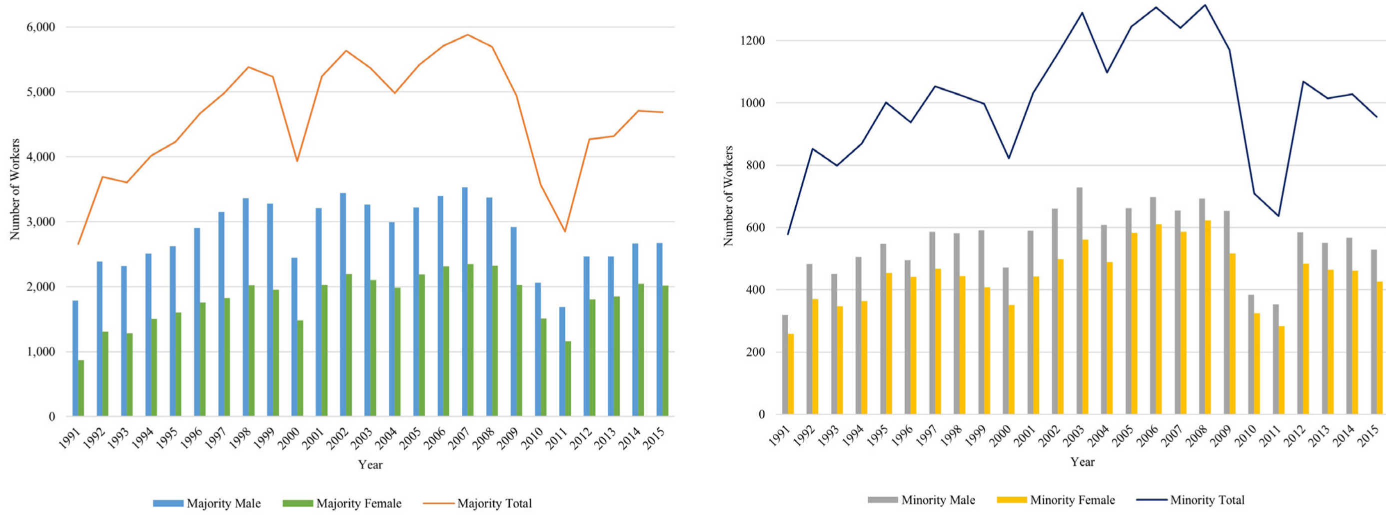
Summary Statistics of Minority and Majority Workers (1991–2015)

	Mean	
Variables	**Minority Workers**	**Majority Workers**
Married	0.34	0.39
Real hourly wage	TT$27.57	TT$24.58
Annual income	TT$51,257.59	TT$45,719.34
Undereducation	0.15	0.19
Overeducation	0.15	0.13
Years of schooling	12.38	11.95
Working experience	16.98	17.82
Fathers' years of schooling	0.20	0.19
Mothers' years of schooling	1.94	1.75
No. of Observations	25,201	115,653

Source: Author's compilation.

Figure 1

Gender Dynamic of Ethnic Minority & Majority Workers (1991-2015)



Source: Author's compilation

Econometric Specification

To support the answering of the previously outlined research questions, this study makes use of two frameworks pioneered by Becker (1975) which focus on the Human Capital aspect of education and training; as well as the work of Oaxaca (1973) and Blinder (1973), who focus on the male–female wage differentials. These studies serve as the conceptual framework of this research. Human capital refers to the knowledge and skills which persons accumulate throughout their lifetime through education and training, empowering them to become productive members of society, since labour can be sold as a commodity to earn an income (World Bank, 2022). For this reason, the most valuable capital is that which can be invested through education and training in the growth and development of an individual.

The framework which forms the basis of this study is drawn from the ideologies of Becker (1975) concerning the wage returns of specific training. In this study, the form of specific training is the education and instruction received in the fields of science, technology, engineering, and mathematics. According to Becker (1975, p. 26), such specific training in STEM is training that "does not affect the productivity of trainees that would be useful in other firms." As a result, the skills and abilities developed by such training in STEM may have limited transferability to other firms, as it may only enhance the productivity of those firms and industries which use such skills (Becker, 1993). Thus, specific training in STEM may not be useful in most firms, but only in those which produce either an explicit product or service.

Further to this, the provision of specific training in STEM fields is either borne by the worker, or by the employer. So if the employer covers the cost of training, then they would collect the returns in the form of larger profits resulting from higher productivity which would be achieved only when the return is at least as large as the cost (Becker, 1993). Bearing this in mind, this study implements a quantitative research methodology because it allows for the use of a large sample of minority workers to be extracted from the CSSP dataset, which in turn enhances the objectivity and accuracy of the findings made using statistical tests and analyses to show relationships among the data. To learn more about the wage returns of minority workers, the Ordinary Least Squares (OLS) version of the Mincerian wage equation put forward by Mincer (1974), is used to estimate the average returns of minority workers in STEM, which is specified as,

$$lnw_i=\beta_0+\beta_1\ STEM_1+\beta_2\ X_i+e_i \qquad (1)$$

where the i^{th} minority worker, ***lnw*** is the natural logarithmic of the real hourly wage; $STEM_1$ is the dummy variable reflecting the workers with qualifications in the STEM fields; X_i is the vector of control variables highlighted in the previous section, and e_i the error term.

Given that the OLS technique is sensitive to the presence of outliers, which can distort the results of the regression analysis, the Quantile Regression (QR) method is often implemented to estimate the returns of workers over entire wage distributions, to consider the workers' employment characteristics that may influence their position on the wage distribution scale. Bearing this in mind, the QR equation is specified as,

$$ln\ w_i=X_i\ \beta_\tau + e_{\tau i}\ ,\ \tau(lnw_1|X_i\ )=X_i\ \beta_\tau \qquad (2)$$

where the i^{th} minority worker, lnw_1 is the natural logarithmic of the real hourly wage rate; X_i is the vector of the set of independent variables; ***e*** is the error term; β_τ is the unknown vector of parameters (constant); τ is the sample quantile; $\tau(lnw_1|X_i\ )$ and is the conditional quantile *(τ)* of the ith minority workers' hourly wage rate *(lnw_1)*, given the vectors of independent variables *(X_i).*

In the second case, to examine the gender wage gap of minority workers in STEM fields, the Oaxaca–Blinder Decomposition method was implemented as the primary framework for this study as it is popularly used to explain inequality in earnings across groups of persons, either by their sex or race (Blinder, 1973; Oaxaca, 1973). Thus, the technique enables one to decompose inequality into contributory causes that indicate the differences in the mean predicted outcome between two groups of workers (Rahimi & Hashemi Nazari, 2021). This is especially important to the STEM field, as discrimination against different groups (i.e., minority workers), may influence the rate at which different genders can effectively integrate themselves within STEM occupations and industries (Oaxaca, 1973). As a result, labour force characteristics such as workers' sex and ethnicity, can create an unequal distribution of female workers to male workers in STEM occupations, resulting in a wage difference between both sexes employed in the same occupation.

To investigate the distinct facets of inequality that minority workers in STEM experience, regressions are used to explain the inequality of incomes for both men and women (Blinder, 1973). According to Blinder (1973), this can allow the gender wage gap to be decomposed into its explained and non–explained portions, as derived below. For the purposes of this study, consider the linear regression presented in Equation 3, which shows an unadjusted model of wage determination for the ith minority worker in STEM.

$$1nw_i= X_i\ \beta_i\ +e_i \qquad (3)$$

where, for the i^{th} worker, ln *w* is the natural logarithmic of the real hourly wage rate, X_i is a vector of individual characteristics, β_i is a vector of coefficients, and is the error term.

To investigate the gender differentials of minority workers in STEM, this equation is decomposed to estimate the wage distribution of both men and women individually. Thus, these wage equations are specified as,

$$lnw_i^{mSTEM} = X_i^{mSTEM}\ \beta_i^{mSTEM} + e_i^{mSTEM} \quad (4)$$

$$lnw_i^{wSTEM} = X_i^{wSTEM}\ \beta_i^{wSTEM} + e_i^{wSTEM} \quad (5)$$

where m represents male minority workers in STEM, and w represents female minority workers in STEM. The disparity between male and female minority STEM workers can be found by taking the mean wage difference between both groups, such that,

$$lnw_i^{mSTEM} – lnw_i^{wSTEM} = X_i^{mSTEM}\ \beta_i^{mSTEM} – X_i^{wSTEM}\ \beta_i^{wSTEM} + e_i \quad (6)$$

Bearing in mind that the difference between male and female STEM minority workers' mean wage is the result of differences in both individual characteristics and the vector coefficients, the general decomposition must now take into account both aspects. Thus, incorporating the vector of coefficients for male minority workers with the individual characteristics of female minority workers in STEM, the wage differential is partitioned into the observed gender wage gap and the unexplained gender wage gap. Thus, the reference group becomes,

$$lnw_i^{mSTEM} – lnw_i^{wSTEM} = \beta_i^{mSTEM}(X_i^{mSTEM} – X_i^{wSTEM}) + X_i^{wSTEM}\ (\beta_i^{mSTEM} – \beta_i^{wSTEM}) + e_i \quad (7)$$

where the first term on the right–hand side of Equation 7, is the observed gender gap i.e., the "explained" portion of the wage gap. It highlights the differential attributable to the different endowments or characteristics of male and female STEM workers. It also captures how the wage differential between male and female workers in STEM changes in response to the gap in characteristics. The second term on the right–hand side of Equation 7, is the "unexplained" portion of the wage gap. This term often reflects that aspect of the differential attributable to differing vector coefficients.

Analysis and Discussion

The Wage Structure of Ethnic Minorities in STEM

The wage returns of Trinidad and Tobago's minority workers employed in STEM fields were found by estimating Equations 1-3. These equations were assessed under the assumption that there was no correlation between the variable which represents the workers in STEM fields and the error term. The graphical illustration of the earnings of workers' wages across the wage distribution (reflected in Figures 2 and 3) are statistically significant at different p–values; where for this study, the p–values considered are when $p < 0.01$, $p<0.05$, and $p<0.1$. A brief examination of the returns reveals that during the period 1991–2015, STEM minority workers benefitted from average earnings of 0.5% and STEM majority workers benefitted from average earnings of 2.3%. In both instances, for the workers in the industry of employment, occupational grouping and gender had the largest, most significant impact on their earnings.

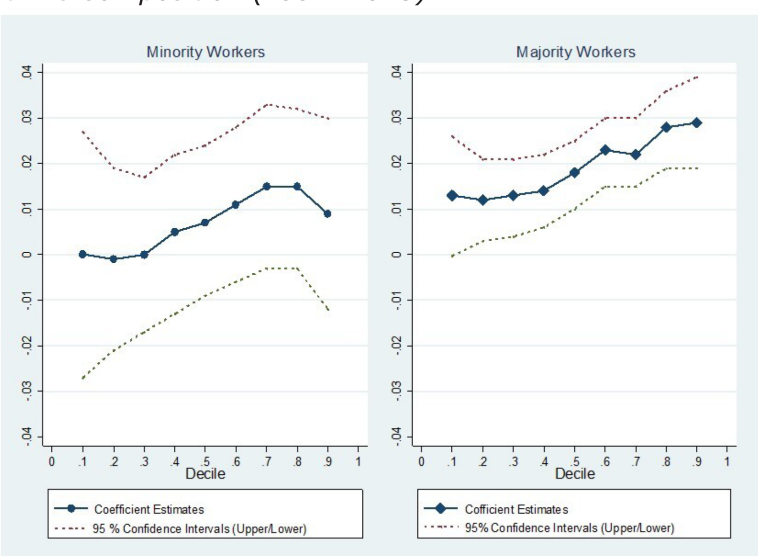
Given that the OLS estimation accounts for the average returns only and does not highlight changes across the wage distribution, the QR estimates are also included. When considered, the returns of STEM minority workers shown in Figure 2 were found to have improved across the distribution. They experienced their highest returns if employed in high–income jobs, and smaller returns if employed in low–income jobs.

The earnings of high–income minority workers in STEM appear to be driven by their gender, schooling, university educational qualifications, and occupational grouping. However, the returns of this group also declined by 40% from 1991–2015, perhaps due to the various factors which drive the profits of high–income businesses such as economic opportunities, labour market characteristics, and what each business values.

The returns of the STEM majority workers are also estimated as a check of robustness. The outcome shown in Figure 2 reveals that STEM majority workers earn more than STEM minority workers. A similar pattern emerges in earnings, as the returns for the STEM minority group appear to be rising across the wage distribution. A key difference develops as the returns of STEM majority workers employed in high–income jobs (unlike the minority group) improved steadily. Although driven by similar factors of occupation, industry of employment, and education, it is possible that such a difference in the earnings of high–income workers may be due to insufficient preparation for these types of roles, limited opportunities for professional development, and changes in industry demand for STEM skills.

Figure 2

Wage Returns of STEM Workers by Ethnic Composition (1991–2015)



Source: Author's compilation

The Gender Dynamic of STEM in the Workplace

Aside from the overall trend in the returns of each group of workers, it is also worth looking at the gender dynamic of their wages. Based on the results, the average earning of minority women in STEM (2.4%) is much higher than that of minority men (1.9%). An examination of these returns across the wage distribution shown in Figure 3 reveals that minority women in STEM earn more than minority men. However, the returns of minority men vary across the wage distribution (Figure 3, Panel A), with the highest returns at the 4th decile, and lowest at the 6th decile. In comparison, the earnings of minority women in STEM (Figure 3, Panel B) appeared to be a mostly positive trend across the wage distribution, but like minority men in STEM declined consistently from the 7th to the 9th deciles.

When the majority of workers in STEM is considered as a test of robustness, the average returns of the majority of women in STEM (4.9%) was again higher than that of men (3.5%). However, the returns of the majority of men in STEM were not only higher (Figure 3, Panel C) but appeared to be rising steadily across the wage distribution, while the returns of the majority of women, though small (Figure 3, Panel D), declined consistently across the wage distribution. Like minority workers, a similar descent in returns amongst high–income majority women in STEM was observed.

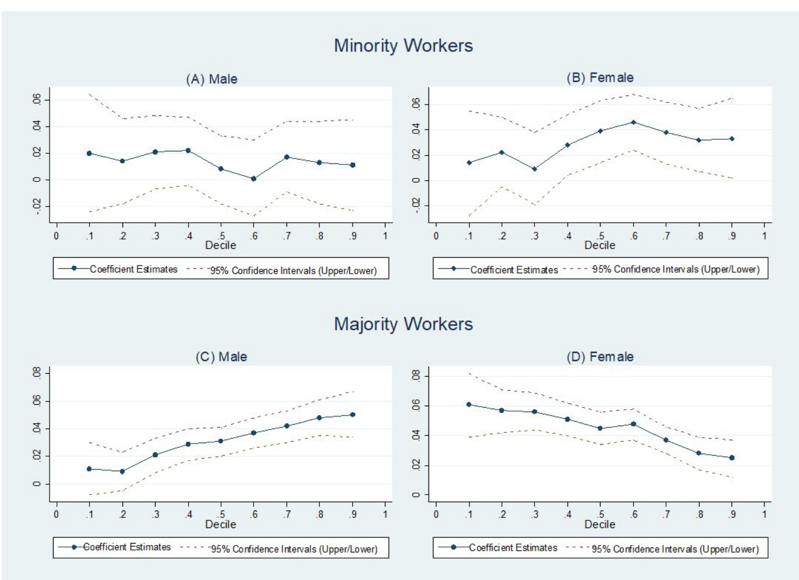
In general, the findings uncovered revealed that from 1991–2015, the earnings of minority men and women, and minority women in STEM were impacted the most by changes in the economy based on their labour market characteristics. This much was reflected most notably by the earnings of high–income men and women, which seemed to plummet consistently, while those in low–income jobs remained small. The reason for such an outcome can range across several issues greater demand for the development of middle–income

STEM jobs; possible reductions in the productivity of high-income and low–income STEM–related jobs (which may be linked to shorter hours worked); lower corporate profits; and less job growth in these areas.

The exception to these findings is that the earnings of the majority of men in STEM are not only higher than other workers under consideration, but appear to be improving across the wage distribution. Again, such a positive outcome may be strongly connected to the demands of the industry, such as the preference for men of either Indian or African ancestry from the majority group to hold positions in high/middle–income jobs in STEM fields. It is noted however, that while this outcome may be a reflection of the structure of Trinidad and Tobago's population, the result implies that there might not be as much diversity and inclusion at the senior level of STEM jobs. This is especially important, as the earnings of minority women in high–income STEM jobs, although higher than that of minority men, may continue to erode in the future.

Figure 3

Gender–Specific Returns of Ethnic Minority & Majority Workers in STEM (1991–2015)



Source: Author's compilation

The Gender Wage Gap of Minority Workers in STEM

To analyse the gender wage gap between minority and majority workers in STEM, the Blinder–Oaxaca decomposition method was implemented. This technique is frequently used to examine the labour market outcomes of different groups of workers using labour market characteristics, where the aim is to decompose the mean difference of the log wages in the regression models from a counterfactual perspective. By implementing this procedure, the wage differential is divided into two groups, where according to Jann (2008, p. 1),

> "the first part is "explained" by group differences in productivity characteristics such as education or work experience and a residual part that cannot be accounted for by such differences in wage determinants. This "unexplained" part is often used as a measure for discrimination, but it also subsumes the effects of group differences in unobserved predictors."

The outcome of such a decomposition in Table 2, shows that the mean predictions of the two groups and their differences were statistically significant at the 1%, 5%, and 10% levels of significance. An examination of this table reveals that the mean of the log wages of minority men in STEM is 3.076, which was significantly higher than the 2.979 produced for minority women. This produced a gender wage gap of 9.8%. In comparison, the average earnings of men (2.965) and women (2.880) in the majority group was much smaller than that of the minority group, which produced a smaller wage gap of 8.5% amongst the majority workers.

When decomposed, the gender wage gap produced three different statistics for the three different effects (i.e., the endowment effect, the coefficient effect, and the interaction effect). In the first instance, the endowment effect measured the average increase/decrease in wages of female workers if they had the same characteristics as male workers (such as their working experience, skills, abilities, etc.) Based on this information, if female minority workers had the same features as male minority workers, it was expected that their earnings would decline by 18.4%. In the case of female majority workers, the decline in their earnings was smaller (i.e., 22.7% for the 1991–2015 period).

In the second instance, the coefficient effect examined how much of the difference in wages was the result of how the characteristic features were treated. Such a difference in the treatment of workers' characteristics can be indicative of discrimination. So, in the case of minority workers, 17.1% of the average wage was a result of discrimination, while 19.6% of the average wage of majority workers was a result of discrimination the higher percentage being in the latter group.

In the third and final instance, the interaction effect (which measures the simultaneous effects of the difference in the endowment and the coefficient effects), revealed that from the female minority and majority workers' point of view, a positive effect of 11% and 11.7% respectively on the wages of both groups of women was experienced.

The outcome of the wage decomposition analysis shows that both groups of workers experience wage inequality, and that the gender wage gap for minority workers in STEM is much bigger than that of majority workers in STEM. There are many economic factors which may be linked to such a gender pay gap being felt more prominently by not only minority workers in STEM but all workers in general. These factors include women in STEM fields taking time away from employment to start their family and take care of dependent family members (which leads to limited working experience); the time demands of STEM jobs may be more stringent; and the employment demand for STEM jobs may vary by field of speciality. In addition to these disparities between men and women, in the case of minority workers, discriminatory practices, gender bias, gender stereotyping, and exclusion in the workplace, compounds the gender wage gap even further.

Table 2

Oaxaca Wage Decomposition of Workers in STEM (1991–2015)

Variables	*Minority Group*	*Majority Group*
Mean Lnwage		
Men (Group 1)	3.076 ***	2.965 ***
	(0.006)	(0.003)
Women (Group 2)	2.979 ***	2.880 ***
	(0.007)	(0.004)
Difference	0.098 ***	0.085 ***
	(0.009)	(0.004)
Decomposition		
Endowments	-0.184 ***	-0.227 ***
	(0.012)	(0.006)
Coefficients	0.171 ***	0.196 ***
	(0.007)	(0.003)
Interaction	0.110 ***	0.117 ***
	(0.010)	(0.005)

Source: Author's Calculations.
Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

To address these issues, several policy recommendations can be implemented to improve the situation. Some of these include the use of STEM enrichment programmes at the secondary and university level, and within the workplace to promote diversity, equity, and inclusion; the mentorship and professional development of early career students and workers to help build their scientific identity and competency in STEM as well as their intercultural competency; the creation of real–world STEM partnerships with industry leaders to provide formal and informal STEM opportunities; the creation of STEM support groups for minority students and workers who may be struggling to complete their programmes, or to integrate into the workplace, to foster greater peer–to–peer relationships.

Conclusion

The effect of race on the earnings of workers in the STEM field is related to the persistence of inequality in both the academic and working environment. Findings from this study indicate that not only are workers from the ethnic majority of Trinidad and Tobago's workforce impacted negatively by the existence of the gender wage gap in STEM, but so too are workers from the ethnic minority. Trinidad and Tobago's ethnic minority workers in STEM join many other minority workers and women from around the world in STEM who experience lower wages; fewer job opportunities; and fewer chances for professional development and promotion due to economic changes in the labour market. Hidden issues within the workplace such as gender bias, discrimination, and exclusion are also key factors. Based on these issues, this study puts forward policy recommendations that may contribute to reducing the gender wage gap experienced by minority and majority workers in STEM — effectively closing the gap in labour economics research on ethnic minorities in STEM for Trinidad and Tobago.

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