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# OVEREDUCATION IN TRINIDAD AND TOBAGO'S LABOUR MARKET: A QUANTILE REGRESSION APPROACH.

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## Abstract

This study examines the impact that over-education has on the earnings of private and public sector workers in Trinidad and Tobago. Using individual person's data from the Continuous Sample Survey of the Population (CSSP) for the period 1991-2015, the returns of over-educated workers is estimated using a simple Quantile Regression approach. The labour force comprises of a large amount of over-educated workers who hold secondary and university level qualifications. The returns of workers employed in high-income jobs seems to be falling throughout the entire 1991-2015 period, while that of low and middle-income workers improved during 2004-2009 but declined thereafter the 2010-2015 as Trinidad and Tobago entered an economic recession. In addition, even though the wage returns of over-educated men, improves over the wage distribution, those in low and high-income jobs degenerated consistently throughout the 1991-2015 period. When compared to that of women, the opposite is true as their returns tends to worsen across much of the wage distribution. With any improvement being observed during 1991-2009 by low-income women.

**Keywords:** Human Capital, Educational Mismatch, Returns to Over-education, Quantile Regression.

**JEL Classification:** C21, I21, I26

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## 1. Introduction

The most exploited means of enhancing the human stock of capital within many economies across the world, can be found within the economic development plans where the focus is on the investment in Higher Education and Training. Often, the move towards such development begins with easing access into university level institutions. In the case of Trinidad and Tobago, such easing has been led by both the Dollar-for-Dollar (DfD) and Government Assistance for Expenditure (GATE) initiatives. The admittance through such programmes, when aided by the progression of information technology may have created not only an immense supply of highly educated workers, but also created the right conditions for the educational mismatch phenomenon to thrive. It is therefore, necessary to examine how the persistence of educational mismatch, in particular that of over education may have influenced the wage returns of Trinidad and Tobago's Private and Public Sector workers throughout the 1991-2015 period.

In the literature, Educational Mismatch falls under the body of knowledge on Occupational Mismatch, which according to Flisi et al. (2017, 2), refers to "the discrepancy between workers skills and competencies, with those required by the job." It is often the result of divergences created through global economic changes resulting from changes in technology, innovation, and opportunities for higher education. Where such changes either negative, or positive, tends to amplify the circumstances required to enter the labour market. For this reason, the problem of educational mismatch is worsened further if the occupation held, and the qualification acquired by the worker is either not suitable, or compatible.

As educational provisions become more accessible in Spain, Sweden, and China, their respective labour markets have failed to not only create jobs which are suited for their highly educated workers, but to also do so at an appropriate pace to match the rate at which these graduates are leaving their universities and seceondary schools, to enter the labour force (Aberg 2003; Bai 2006; Dimian 2014). As a result, over-educated Swedish workers often compete for the same job opportunities, as their undereducated colleagues. Such a rivalry is likely to result in the absorption of over-educated workers into jobs, which require low educational requirements. This lack of suitable jobs may leads to the displacement of over-educated workers, but also create a higher rates of unemployment among the overeducated population.

In high-income countries like Australia, the biographical features of their graduate population such as thir age, gender, marital stauts, field of study, as well as their business cycle fluctuations are all noted to have influenced the intensity of over-education (Chevalier 2003; Carroll and Tani 2013). While younger workers in the United Kingdom (UK) are more prone to becoming

over-educated, than older workers, as they lack working experience, and sufficient on the job skills (Chevalier 2003). As a result, young over-educated workers in the UK tend to suffer a greater pay penalty than older workers who are properly matched with their jobs.

Bearing the impact that educational mismatch has on the earnings capacity of workers around the world, it is essential to regulate the intensity to which such a problem exists within Trinidad and Tobago's labour market. This study then, contributes to the study of over education in five ways. To the best knowledge of the author, this is the first study which quantifies the intensity of over education in Trinidad and Tobago for the period 1991-2015. Second, it traces the presence of over education by qualification, training field, and industry of employment. Together these two contributions is crucial as the concept of over education is often difficult to quantify. In addition to, examining the presence of over education by industry and field of study, gives an indication as to how specific industries are manage the supply of mismatched workers, and if they are meeting their industry demands. This enables policy makers to determine if the presence, and intensity of over education is becoming a impediment to economic growth, and development.

Third, this study illustrates how the wage returns of over educated workers evolved over the period 1991-2015, and across the entire wage distribution divided into four cohorts, i.e., 1991-1997, 1998-2003, 2004-2009, and 2010-2015. This adds to the body of literature which uses quantile regression to examine the returns of over educated workers across the entire wage distribution, as most studies that looks at the returns at the mean. Doing so, captures the returns of different income groups located at different points along the wage distribution, which are likely to vary according to their level of education, level of skill and job characteristics.

Fourth, this is the first study to calculate and analyse the price elasticity of the Government Assistance for Tuition Expenses (GATE) and the Higher Education Loan Programme (HELP), across the 2004/2005 to 2013/2014 fiscal years. This part of the study develops the understanding of how the demand for higher educational funding is likely to change in the future, amid the 2009-2015 economic recession. The data on the price elasticity can assist policy makers in predicting the impact that changes in the cost of tuition may have on the expenditure of higher educational programmes.

Furthermore, I acknowlege three previous studies done by Chiswick and Miller (2005), Street (2016), and Alleyne (2009) which although not focused on the Trinidad and Tobago population directly, it provided some interesting insights. In the case of the latter two studies, Chiswick and Miller (2005), while examining the wage returns of mismatched immigrants living in the United States (US), also indirectly looked at those derived by Caribbean immigrants. In doing so, they estimated, that 24.01% of Caribbean immigrants living in the US in 2000, were over-educated. The

partial effects of education on earnings when estimated, revealed that over-educated Caribbean immigrants benefitted from a 3.9% improvement in their returns (Chiswick and Miller 2005). While, Alleyne (2009) found that the intensity of over-education amongst Caribbean-US immigrants in 2000, was 11.77% (living in the US more than 5 years) and 13.19% (living in the US less than five years). The intensity of over-educated Trinidad and Tobago immigrants was 8.65%

The third study done by Streete (2016), examines the impact that higher educational funding initiatives such as the GATE programme, may have on the labour market prospects of the graduates Trinidad and Tobago. Using a mixed methods and purposive sampling approach, Streete (2016) finds that 90.1% of graduates considered themselves to be over-educated. This deduction was influenced by the frequency of creation of job opportunities, and the inability of the graduates to match their skills, with what is demanded by the labour market.

The fifth sub-contributions of study, builds upon these findings of Chiswick and Miller (2005), Streete (2016) and Alleyne (2009), first by quantifying over education for both nationals and non-nationals of Trinidad and Tobago, rather than looking at Trinidad and Tobagonian immigrants living in the United States (US). Unlike Streete (2016) who used a mixed method approach to arrive at his conclusion, this study is grounded on applied econometric techniques to examine the intensification of over-education at both the university level, and the post-secondary level. In light of the implementation of the GATE programme, it is important to do so, because the growth of over-educated university workers, is likely to change the labour market preference of employers throughout the private and public sector enterprises.

That being said, to quantify the presence of over education, the Realized Matches (RM) measure used by Flisi et al. (2014, 2017), Herrera-Idárraga, López-Bazo, and Motellón (2015) and Ortiz and Ñopo (2015) is also applied to this study. Following this, to examine the returns of workers, the Quantile Regression (QR) technique is used to estimate the returns to overeducation, by creating a family of simple quantile regression functions to capture the wage changes of all workers scattered across the wage distribution. In doing so, one can take into account both their labour market characteristics such as their industry of employment and occupational grouping, as well as their biological and educational characteristics such as their qualifications, training, working experience, marital status, and gender (Koenker and Hallock 2001).

By using these techniques, this study finds that, first the labour force appears to be comprised of a large amount of over-educated workers. Second, the intensity over-education while increasing across the study's time frame, is comprised of workers who are educated at the secondary and university level. Third, the wage returns of over-educated workers employed in high-end jobs, i.e., at

the upper tail (q95) of the wage distribution, have persistently declined during 1991-2015. Fourth, all other over-educated workers employed in either low, or middle-income jobs benefitted from an improvement in their wage returns during 2004-2009, before falling during 2010-2015. In addition, even though the wage returns of over-educated men, improves over the wage distribution, those in low and high-income jobs degenerated consistently throughout the 1991-2015 period. When compared to that of women, the opposite is true as their returns tends to worsen across much of the wage distribution. With any improvement being observed during 1991-2009 by low-income women.

Section 2, of this paper offers a brief synopsis of the historical and present funding mechanisms used for higher education in Trinidad and Tobago. This is then followed by section 3, which provides a brief explanation of the measures of educational mismatch. An examination of the data selected descriptive statistics, and the persistence of over-education in Trinidad and Tobago are all briefly examined in sections 4. The intended econometric methodology being used is outlined in section 5. The subsequent findings and its analysis is presented with final concluding thoughts in sections 6-7.

## **2. Sources of Higher Education Student Funding in Trinidad and Tobago**

The journey towards creating a fully funded higher education system in Trinidad and Tobago is one which incorporates several funding mechanisms. Beginning with the Students Advisory Services (SAS), and the Division of Student Services and Development (DSSD) departments at the University of the West Indies (UWI) St. Augustine campus, both undergraduate and postgraduate students can get help to cover the cost of their tuition by accessing financial provisions through the Emergency and Hardship Loans, Open University Scholarships and Bursaries, as well as the Adopt a Student and UWI's Development Endowment Fund. At the postgraduate level, funding is provided based on the students academic performance, and relevance of their research through scholarship such as the UWI Post Graduate Scholarship, the De La Rue Scholarship, the Eric Williams, Elsa Goveia scholarship, and the Sol Caribbean scholarship.

The funding of university education is also governed by several legislative acts such as The Students Cess Act of 1989, which seeks to generate funding for tertiary led programmes, through the provision of loans and the imposition of a tax. The tax, which is based on the First Schedule, is made payable by university students who are pursuing undergraduate degrees, and professional law programmes offered by the Hugh Wooding Law School, UWI, the Institute of International Relations and the Norman Manley Law School (Trinidad and Tobago 1989). However, the tax does not include the recipients of National Scholarships, or postgraduate programmes.

The Student Revolving Loan Fund (SRLF) Act of 1973, also provides funding for registered university students but does not include those studying in areas of Law and Humanities at local institutions (Trinidad and Tobago 1973). Under this act, both undergraduate and postgraduate students can access loans up to TT\$100,000.00 for a period of 5 years (Trinidad and Tobago. House of Representatives 2006). The University Student Guarantee Loan Fund (USGLF) Act of 1994, like the SRLF, offers registered full-time undergraduate and postgraduate students access to loans from commercial lending agencies to pay their tuition (Trinidad and Tobago 1994). In the years subsequent to the implementation of the act, several amendments were made to enable students who paid 10% of their tuition fees, to access funding for up to 40% of their tuition fees in the form of loans from lending agencies.

The USGLF and the SRLF funds were merged in 2006 to form the Higher Education Loan Programme (HELP) to enable students studying at both local and regional universities and or tertiary level institutions, to access low interest rate loans valued up to TT\$25,000 or TT\$75,000 per academic year for 3 years (Trinidad and Tobago. MOE 2017a). Following this, within 6 months of completing their course of study, the student is expected to become gainfully employed within either a private, or public sector entity before repaying the loan (Trinidad and Tobago. MOE 2017b). In addition, grants are also offered through the Financial Assistance Studies Programme (FASP) which was implemented in 2002. This one-time grant is valued at TT\$100,000 to cater for the needs of underprivileged students enrolled in either post-secondary, or undergraduate programmes in traditional, and non-traditional fields of training (Trinidad and Tobago. MOE 2017c).

With the provision of universal secondary education in 2000, it is likely that more students may have entered into an advanced level of secondary education as a entry requirement for entry into university level institutions. Thus leading to a possible upsurge in the demand for university-level programmed offered by both private and public educational institutions (Trinidad and Tobago. House of Representatives 2001). In order to facilitate this influx of students at university level, the the Dollar-for-Dollar (DfD) programme was implemented in 2001. Under this programme, 50% of students tuition expenses is borne by the government, and the other 50% by the student. In 2004, this programme was replaced by the Government Assistance for Tuition Expenses (GATE) programme, due to the inability of students to pay their share of tuition, the limited array of courses covered by the DfD programme, and the exclusion of private tertiary level institutions.

Under the GATE initiative, the government covers up to 50% of tuition expenses for students who are capable of partially paying their tuition, and up to 100% of tuition expenses for underprivileged students who are unable to do so. The provision of such funding is guided by the

execution of a means test, which determines the suitability of the student for such funding. Regardless of the outcome of the means test, the GATE programme was further modified in 2006 to provide full, i.e., 100% and partial, i.e., 50% of funding for students enrolled in undergraduate and postgraduate programmes. By the end 2015, funding was restricted due to the poor academic performance of students at the undergraduate level.

### **3. Popular Measures of Educational Misalignment in the Literature**

The literature on educational mismatch highlights three methods used to quantify and categorize workers as being either correctly matched, or over/under-educated. These are the Job Analyst (JA), Realized Matches (RM), and the Self-Assessment (SA) measures (Kiker, Santos, and De Oliveira 1997; Kupets 2016; Salinas-Jiménez, Artés, and Salinas-Jiménez 2016; Flisi et al. 2017). For purposes of this study, the Modal approach of the RM measure will be used because of the cost and time constraints associated with implementing the JA, and SA measures.

Briefly, the RM measure determines if workers are either over/under-educated, or matched by comparing the educational requirements of their specific occupation, with their actual level of education. This is done under the assumption that one education level is likely to be appropriate for each occupational grouping, even though some occupations require different levels of education depending on its complexity. To prevent the over-sorting of occupations, which in turn reduces the validity and reliability of that particular occupation, the RM measure uses a 2 or 3 digit occupational classification in its computation.

To establish the presence of an educational mismatch, the standard deviation, and the mean of the required educational level within each occupational grouping is calculated. Using the results, workers are then classified as matched, i.e., their own education level is appropriate for that which is required by their specific occupation, if their own education level falls within the one standard deviation range around the mean education level required by their occupation. By the same token, workers are classified as over/under-educated if their education level is greater/less as one standard deviation above/below the mean for their specific occupation.

The subjective use of the one standard deviation range around the mean, as a defining point in determining if workers are educationally mismatched, is often met with disapproval, because the RM measure is sensitive to the presence of outliers, and changes in the business cycle. In such a situation, these changes may give the wrong impression of the adequacy of educational qualifications by specific occupations within the labour market, and may lead to the approximation of smaller education mismatch estimates (Bauer 2002). To address this issue, Kiker, Santos, and De Oliveira (1997) used the modal value of the required level of education within each occupation to determine



if workers are educationally mismatched. Workers are now classified as correctly matched if their own level of education falls within a one standard deviation range around the modal education level of workers in the occupation. In a similar manner as above, the worker whose own education level is more than/less than one standard deviation above/below the modal education level of workers in the same occupation is considered to be either over or under-educated.

The RM measure is often the preferred technique of classifying educational mismatch because it can be easily calculated from any dataset, and does not require the use of a specially designed questionnaire. The measure is however, prone to cohort effects because workers tend enter the labour force at different points in time. For this reason, the quality of educational qualifications obtained, the educational requirements of occupations, the exposure to technology, and employment opportunities of all workers tend to differ over time (Flisi et al. 2014, 2017). To account for this difference, the required years of education for each cohort of workers can be varied with their year of birth or the year that the data was collected. In the case of this study, the time frame was broken down into 4 cohorts reflecting the years of data collection, i.e., 1991-1997, 1998-2003, 2004-2009, and 2010-2015.

Apart from the RM measure, the JA measure focuses on the most favourable educational requirements needed by workers to become employed in a specific occupation (Carroll and Tani 2013; Mavromaras and Sloane 2015; Moore and Rosenbloom 2016). The job analyst uses biographical data, and job requirement information, together with job and education description systems, to determine if a worker is educationally mismatched (Murillo et al. 2012). Given the comprehensive nature of the JA method, it is considered superior, because of its objectivity, and use of job definitions. However, the measure is rarely used because of its high implementation costs, the quick rate at which the data collected becomes obsolete, resulting from changes in the business cycle, technology, and job requirements (Hartog 2000; Kiersztyn 2013; Grunau 2016).

The SA measure, unlike the RM and JA measures, takes into account the views of workers regarding the job-education match of their current occupation (Filiztekin 2011; Ortiz and Ñopo 2015; Salinas-Jiménez, Artés, and Salinas-Jiménez 2016; Flisi et al. 2017). In order to do this, either a Direct Self-Assessment (DSA), or an Indirect Self-Assessment (ISA) of workers is undertaken to determine the extent to which educational mismatch is present. The information is collected by means of a questionnaire on a variety of employment-related topics such as the process of recruitment, performance standards, the necessity of higher education, and the ability to undertake tasks with their current education level.

By comparing the information gathered from the questionnaire, with their own level of education, workers are then categorized as either over/undereducated or matched. There are many advantages associated with the SA measure, such as the ease at which the information gathered can be observed, it is job specificness, relevance and up-to-dateness (Hartog 2000; Flisi et al. 2014; Grunau 2016). However, the subjective nature of the SA measure makes it more prone to measurement errors resulting from bias created during the data collection process. This can, unfortunately, lead to the over/under-stating of workers categorized as either over/under-educated, or matched.

## **4. Data and Descriptive Statistics**

### **4.1 Data**

The primary source of data used in this paper are the records of information on Individual Persons living in Trinidad and Tobago, gathered by the Continuous Sample Survey of Population (CSSP), i.e., a rotational survey carried out on a quarterly basis every year. Using the survey statistics for the period 1991-2015, the impact that over education may have on the earnings of workers is examined. The sample data from this dataset is restricted to allow for the creation of one main sample and three subsamples. The main sample is restricted to include, both male and female workers ages 15-65, who are employed on a full-time basis, i.e., working 33 hours and more per week, within Public sector entities, i.e., representing Central or Local Government Institutions and Private sector bodies, i.e., representing Private Business Enterprises.

The first sub-sample includes all the features of the main sample, with the exception that it only includes private sector employees. This sample is included as a robust check, because the majority of Trinidad and Tobago's labour force is employed within the private sector. For this reason, the business environment within which wages are determined is expected to be more competitive than the public sector, as their wages are offered on a contractual basis regardless of changes in either the business environment, or domestic economy. The second and third sub-samples are restricted based on the workers' gender. This resulted in a separate male and female sub-samples. These samples were used to take into account the difference in the labour market decisions made by men and women, as the decision to actively take part in the labour market has a tendency to vary by ones gender and is as a result likely to be reflected in ones earnings capacity.

Contained within each of the samples outlined above, is a variety of variables defined in Table 1 below. Of the variables presented, the most crucial is that which quantifies overeducation and deflates the hourly wage rate. In the case of the former, the variable used to reflect the workers years of schooling is constructed by using the workers highest level of non-vocational educational attained

by examination. The classification of the workers' years of schooling based on the time spent at different educational institutions is guided by both the International Standard Classification of Education (ISCE) and the structure of Trinidad and Tobago's education system as outlined by the United Nations Educational, Scientific and Cultural Organization (UNESCO).

To quantify the presence of overeducation, the Realized Matches (RM) measure of educational mismatch discussed in the previous section is used. As a quick reminder, the RM measure uses, two variables representing the workers years of schooling and a 3 digit classification of their occupational categories. Based on this calculation, three dummy variables were generated to reflect each category of educational mismatch. In order to take into account the cohort effects, to which this measure is prone, this study varies the time frame, i.e., year in which the data is collected. This led to the creation of 4 cohorts of years, i.e., 1991-1997, 1998-2003, 2004-2009, and 2010-2015.

The earnings variable used in this study is the natural logarithm value of the real wage rate. To generate this value, the workers' gross monthly income is calculated on an annual and weekly basis. Given that the variable representing the number of hours worked in the past week was categorical nature, the average actual hours worked was used to derive the actual hours worked per week. In order to do this, the median hours worked is calculated using the upper and lower class hourly thresholds, then multiplied by the frequency of the hours worked during the past week, which gives the cumulative hours worked. By dividing the total cumulative hours worked by the total frequency of hours worked, the average actual hours worked per week is derived. Following this, the hourly wage rate is deflated using an annual deflation series from 1991-2015 which incorporates the Consumer Price Index (CPI), then logged.

In addition, the workers potential working experience was then calculated using the formulae, i.e., potential working experience=age-years of schooling-6. Several dummy variables which reflect the workers marital status, gender, ethnic group, county divisions, occupation and industry categories was also taken into account. The last group in the four latter variables played the role of the reference category. These variables are controlled for because they are likely to influence the wage returns of workers and correlated with the over and under-education variables.

**Table 1: Variables definition**

Variables	Definition
Marital Status	Dummy variable takes the value of 1 if married and 0 otherwise.
Gender	Dummy variable takes the value of 1 if male and 0 if female.
Ethnicity	Separate dummy variables each taking the value of 1 if the worker is of African, Indian, Chinese, Syrian/Lebanese, White, Mixed and Other ethnic decent and 0 otherwise.
Working Experience	Potential work experience = age-years of schooling-5

Years of Schooling	Constructed using the Highest level of Non-vocational educational attainment attained by persons and guided by both the International Standard Classification of Education (ISCE) and the Structure of the education system defined by UNESCO (2006) for Trinidad and Tobago.
Primary Schooling	Dummy variable takes the value of 1 if worker completed less than 9 years of schooling, and 0 otherwise.
Secondary Schooling	Dummy variable takes the value of 1 if the worker completed more than 10 years of schooling, and 0 otherwise.
University Schooling	Dummy variable takes the value of 1 if the worker completed more than 14 years of schooling, and 0 otherwise.
Educational Mismatch	Separate dummy variables each taking the value of 1 if the worker is either under, over and has the required education, and 0 otherwise.
Real Hourly Wage Rate	Natural logarithm of real hourly wage rate.
County Divisions	Separate dummy variables each taking the value of 1 if the worker lives in the areas of Caroni, Nariva-Mayaro; Saint Andrew, Saint David and Tobago; Saint George, Saint Patrick, Victoria and 0 otherwise.
Occupation	Separate dummy variables each taking the value of 1 if the workers occupation falls in the Defence force; Legislators, Senior Officials and Managers; Professionals; Technicians and Associate Professionals; Clerks; Service workers and Shop sale workers; Agricultural, Forestry and Fishery workers; Craft and Related workers; Plant and Machine Operators and Assemblers; Elementary Occupations, and 0 otherwise.
Industry	Separate dummy variables each taking the value of 1 if employed within Agriculture, Hunting, Forestry and Fishing; Mining and Quarrying; Manufacturing; Electricity, Gas and Water; Construction; Wholesale and Retail Trade, Restaurants and Hotels; Transport Storage and Communication; Financing, Insurance and Real Estate activities, and 0 otherwise.
Parent Schooling	Parents Years of schooling.

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Source: Own Compilation

## 4.2. Descriptive Statistics

Table 2 highlights some the descriptive statistics for the sample of all workers employed on a full-time basis within private and public sector enterprises. A brief examination of the information emphasised a few important points for the period 1991-2015.

First, while the parents of workers have an average of 7 years of schooling, the workers themselves have an even greater average of 12 years of schooling. Second, while many workers appear to have been educated at the secondary level (59.9%), a small fraction of workers are educated at the primary (21.9%) and university levels (14.7%). Third, most workers tend to earn an average of TT\$23.65 per hour, and TT\$44, 000.76 annually.

Fourth, while most workers appear to be employed within craft and related (19.9%), service, shop, and sale (16.8%) and technicians and associate professional (17.2%) type occupations, the

least number of workers are employed within the military or defence force (1.1%) and agricultural, forestry, and fishery (0.3%) type professions.

Fifth and finally, the industrial composition of the labour force appears to show a similar trend as the occupational groupings above. Specifically, industries in the areas of community, social and personal services (37%), and construction (17.6%) industries, tend to hire the largest volume of workers, whereas the agriculture, hunting, forestry, and fishing (1.7%) and the electricity, gas, and water (0.3%), absorbed the least volume of workers for the 1991-2015 period.

**Table 2: Summary Statistics (1991-2015)**

<b>Private &amp; Public Sector Workers</b>		
<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>
Married	0.366	0.482
Worker Education & Training		
Years of Schooling	11.980	2.217
Primary Education	0.219	0.413
Secondary Education	0.599	0.490
University Education	0.147	0.354
Parent Education		
Parents' Years of Schooling	6.774	6.094
Earnings		
Annual wage	44,000.76	38016.25
Real Hourly wage	23.657	20.467
Occupational Category		
Defence Force	0.011	0.103
Legislators, Senior Officials & Managers	0.040	0.195
Professionals	0.052	0.222
Technicians & Associate Professionals	0.172	0.378
Clerks	0.154	0.361
Service Workers & Shop Sale workers	0.168	0.374
Agricultural, Forestry & Fishery workers	0.003	0.053
Craft & Related workers	0.199	0.400
Plant & Machine operators and Assemblers	0.062	0.241
Elementary Occupations	0.138	0.345
Industry (sector) of Employment		
Agriculture, Hunting, Forestry and Fishing	0.017	0.129
Mining and Quarrying	0.027	0.162
Manufacturing	0.113	0.317
Electricity, Gas and Water	0.003	0.055
The Construction Industry	0.176	0.381
Wholesale and Retail Trade, Restaurants & Hotels	0.144	0.351
Transport Storage & Communication	0.034	0.182
Financing, Insurance & Real Estate and Business Services Sector	0.115	0.319
Community Social & Personal services	0.370	0.483
Observations	125,247	

Note: Actual figure based on main sample of private and public sector workers.

Source: Own calculations.

### 4.3 Educational Misalignment in Trinidad and Tobago

Following the implementation of the RM measure, a summary of the educational mismatch statistics shown in Table 3 below, reveals that during the period 1991-2015, even though the education level of many public and private sector workers, i.e., 68.29% in Trinidad and Tobago were correctly matched with the requirements of their jobs, there were 13.14% of workers who are over educated.

Based on the sample used in this study, the presence of over-education seems to become more prominent, i.e., strengthening from 8.24%, to 20.03%, during 1991-1997 to 2010-2015. The growth in the number of matched workers from 66.45%, to 68.63%, implies that workers are becoming more aligned educationally with their chosen occupations during 1991-2009 period. However, this appears to be temporary as the composition of matched workers falls by a small margin to 67.15%, during 2010-2015.

The intensity of over-education amongst workers with secondary, and university level qualifications appears to be growing from 9.26%, to 13.73%, and from 22.46%, to 53.14% respectively, during the 1991-1997 to 2010-2015 periods. This is further supported by the ease at which workers are becoming matched with suitable jobs. In the case of workers with primary level qualifications, workers ability to become matched is improving, i.e., from 22% to 29% during the 1991-1997 to 2010-2015 periods. However, workers with secondary, and university level qualifications are becoming less matched, as reflected by their simultaneous fall, i.e., from 87% to 84%, and from 73% to 45%, respectively during the 1991-1997 and 2010-2015 periods.

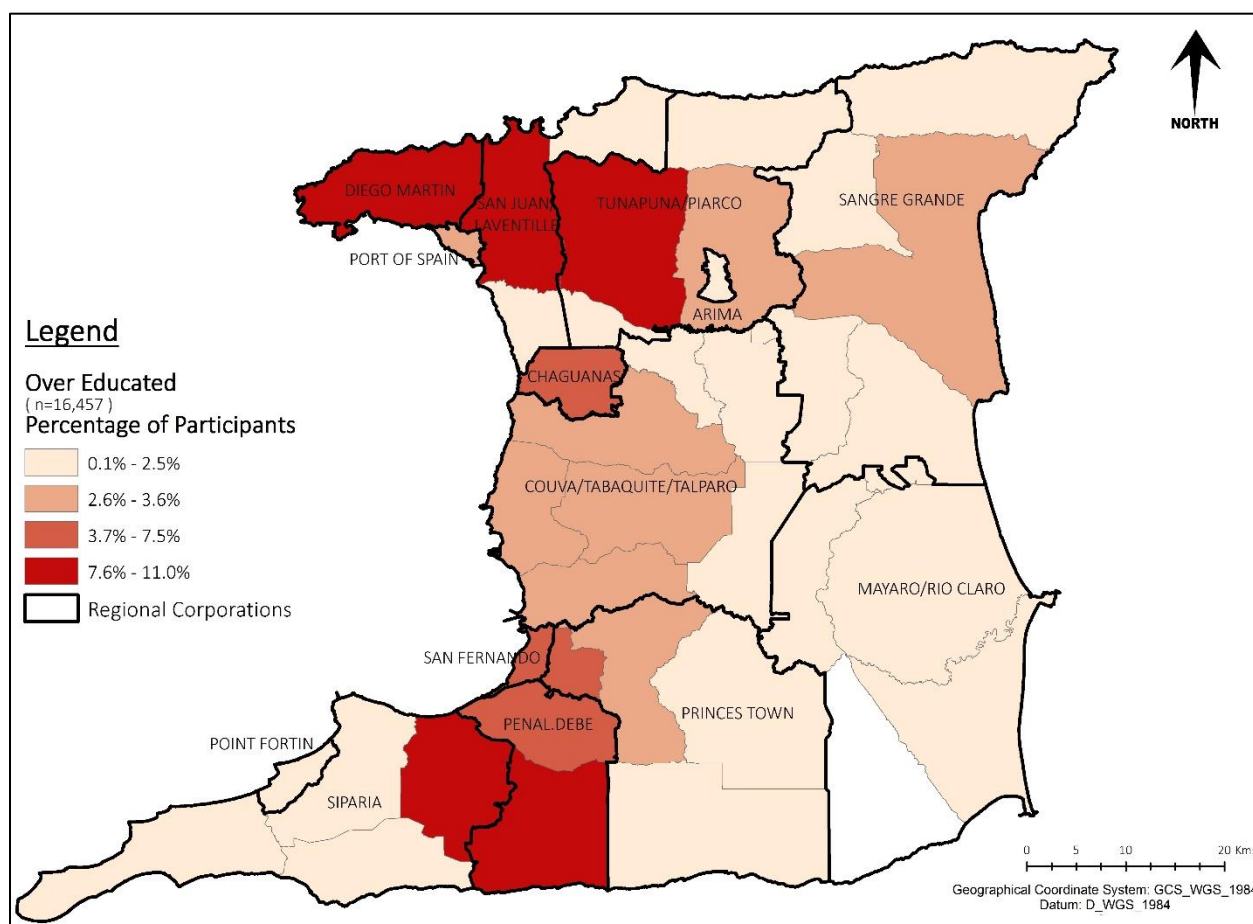
**Table 3: Educational Mismatch Statistics**

Education Level	Year Cohort	Correctly Matched	Over Educated
Primary	1991-1997	1,844 (22)	0 (0)
	1998-2003	1,922 (24)	0 (0)
	2004-2009	1,833 (26)	0 (0)
	2010-2015	1,188 (29)	0 (0)
Secondary	1991-1997	15,070 (87)	1,613 (9.269)
	1998-2003	18,320 (86)	2,443 (11.448)
	2004-2009	20,337 (84)	3,234 (13.351)
	2010-2015	13,923 (84)	2,266 (13.738)
University	1991-1997	2,678 (73)	819 (22.463)
	1998-2003	2,772 (70)	1,073 (27.261)
	2004-2009	2,979 (60)	1,881 (38.015)
	2010-2015	2,669 (45)	3,128 (53.143)
Total Observation	1991-1997	19,592 (66.452)	2,432 (8.249)
	1998-2003	23,014 (69.380)	3,516 (10.600)
	2004-2009	25,149 (69.632)	5,115 (14.162)
	2010-2015	17,780 (67.155)	5,394 (20.037)

Note: Actual figure based on main sample. The relevant percentage is shown in the parenthesis. *Source:* Own calculations.

The geographic distribution of the sample of over educated workers when mapped using ARCGIS, reveals some interesting findings as shown I figure 1 below. In that, most of the over educated workers appears to be concentrated in the districts of St. George East and South (Diego Martin, St. Anns, Tacarigua), Central (Chaguanas), Victoria North (Ortoire, Naparima), and St Patrick East (Siparia). It is possible that these areas may have the most over educated workers because the areas high population density, with workers earning an average of less than TT\$999, and between TT\$1, 000-TT\$8, 999 per month, while working an average of 33-40 hours weekly.

**Figure 1: The Intensity of Over Educated workers in Trinidad (1991-2015)**



Source: Own calculations

Note: Shows the concentration of all overeducated private and public sector workers.

## 5. Econometric Methodology

### 5.1 Quantile Regression

Frequently, within the human capital framework, the efficiency of workers depends not only on their individual attributes such as their age, and working experience, but also their own investment towards acquiring a better form of education. This investment is often crucial to a

firm's productive process because it may bring about higher earnings in the future (Becker 1964). Regardless of the investment made, the future earnings of workers may vary because of their individual level of capabilities, skills, and experience, as well as the quality and quantity of education attained. Even though, Becker (1964) explains that the general training a student receives at the primary and secondary level is applicable for all job types, it is specific training received at the technical/vocational and university level, which improves their productivity. Although one expects that the enhanced productivity is likely to be associated with this type of training, it is at this point where the student/worker can become over educated from having acquired either too much educational qualifications. It is expected that workers with specific training, workers are more likely to earn a higher wages, however, this may not always be the case as global economics changes, technological advancement, and fluctuations in the business cycle, may influence where and at what pace workers become active players within the labour market.

The primary means of defining the relationship between the earnings and the educational mismatch, is based on the estimation of a Modified Mincerian equation (Mincer 1974). The earnings equation is modified to take into account the workers years of over education. An Ordinary Least Squares (OLS) version of the earnings function is first used to estimate the average returns of overeducated workers. This equation is specified as:

$$\ln wage_i = \delta_0 + \delta_1^{over} M_i^{over} + \delta_2 X_i + w_i \quad (1)$$

where for the  $i^{th}$  worker,  $\ln wage$  is the log of the real hourly wage,  $\delta_0$  reflects the returns of having either no working experience, or education,  $\delta_1^{over}$  shows the rate of return with the years of over education,  $M^{over}$  corresponds to the years of over-education,  $X$  is a vector of control variables highlighted in section 4.1 above. and  $w$  is the error term.

The Quantile regression (QR) technique is also integrated into this study, because of the deficiencies embedded within the OLS (Koenker and Hallock 2001). These include the estimation only at the mean, which produces an average of the worker's wage, and is not likely to be representative of all job types in the entire labour market. The job type is taken to mean the different wages associated with different levels of jobs, such as low, middle and high-income jobs.

By using the QR method, the wage of all over educated workers are captured at varying points across the wage distribution. In this study, the wage distribution is separated into the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> and 95<sup>th</sup> quantiles, to allows for a more detailed examination of the impact that over education may have on the earnings of workers located at these specific points. As mentioned earlier, it is important to do so, because the impact that over education may have on the returns of workers may be different at each point. This difference is owed to variations in their the income, job type, job



opportunities, educational qualifications, the field of training, and working experience, all of which may in turn manipulate their position on the wage distribution. When estimating the OLS version, one misses this decisive factor, as the technique does not clearly reflect the effect that these differences may have on the wage returns of over educated workers. Given this argument the QR equation for this study is specified as;

$$\ln wage_i = X_i \delta_\tau + w_{\tau i}, \tau(\ln wage_i | X_i) = X_i \delta_\tau \quad (2)$$

where for the  $i$ th over educated worker,  $\ln wage_i$  is the log of the real hourly wage rate,  $X_i$  the vector of independent variables,  $\delta_\tau$  the unknown vector of parameters (constant),  $w$  is the error term,  $\tau$  the sample quantile, and  $\tau(\ln wage_i | X_i)$  the conditional quantile of the educated workers' hourly wage rate ( $\ln wage_i$ ) given  $X_i$ .

## 5.2 Instrumental Variables

Bearing in mind the theoretical constructs of both types of regressions presented above, for the purposes of this study, they will be estimated under the assumption that the workers years of over education is not correlated with the error terms shown. The author acknowledges that even with such an assumption, the workers years of over education may still be correlated with their earning. In such a case, the estimation may produce bias estimates, because of the presence of Omitted Variable Bias (OVB). The manifestation of OVB is quite common in the literature, as authors such as McGuinness and Byrne (2015), Korpi and Tahlin (2009) and Hartog (2000) have try to deal with the endogeneity of the misaligned variables, by including other variables which reflects the month that the highest degree is awarded to the worker, their place of residence during childhood, and their level of individual motivation and abilities.

In cases where the IV techniques have been applied, it led to the production of even higher coefficient estimates. Which implies that attenuation bias may be present, as over educated workers may be suffering from an even larger pay penalty after taking into account the presence of endogeneity. This is not surprising as Leuven and Oosterbeek (2011), and Pecoraro (2014), suggests that the IV technique is difficult to apply to mismatched variables, like overeducation. This is often due to the inability of authors to find credible instruments within their respective datasets. The structure of the mismatched education variables themselves, which is either ordinal or binary can produce weak instruments and can lead to the over-identification of the earnings function. In light of these issues, this paper will not address the problem of endogeneity, because the limited nature of the CSSP dataset prevents the creation of believable instruments for the over education variable.

## 6. Empirical Results and Analysis

### 6.1 Returns to Private and Public sector Over-Education in Trinidad and Tobago

To assess the wage returns of over-educated workers, both equations were estimated, and the z-test undertaken. The z-test was done to determine if the returns of workers employed within the private and public sector workers, was significantly different from workers employed in non-private and public sector entities.

If both groups of workers have the same variance, are normally distributed and independent of each other, the two-tailed p-values associated with this test for each cohort of over-educated workers was found to be higher than all conventional levels of alpha, i.e., 0.01, 0.05 and 0.10. This implies that there was no difference in the average wage of over-educated workers employed in the private and public sector with that of over-educated workers who are not employed in these sectors.

A summary of the estimation results presented in Table 4 and is illustrated by Figures 2-4 below. The OLS estimates were statistically significant at all conventional levels of alpha. The average returns of all workers for the period of 1991-1997 to 2010-2015, fell from 18% to 14.8%. This outcome is like that of Spain, whose workers average return also fell from 8.5% to, 5.55% during 1995-2006 (Murillo et al. 2012). This is not the overall conclusion, as over-educated workers in Turkey benefitted from a rise in their wage returns, from 7.32% to 54.9% during 1994-2002 (Filiztekin 2011).

Further examination into the impact that over-education has on the wage distribution across the quantiles, i.e., q95-q10 and q75-q25 for all Trinidad and Tobagonian workers, seems to be much larger between q95-q10 than q75-q25. The largest average returns during 1991-1997 appears to have the highest spread between quantiles, while the smaller average returns for 2010-2015 have the largest spread between the q75-q25. This divergence may be a sign that the average wage estimates produced by the OLS, masks the differences concerning the impact that over-education has on the wage returns of all workers across the wage distribution.

An examination of the QR estimates in Table 4, evades these issues. It reveals that the returns of all over educated workers had a similar rising trend across the wage distribution for all cohorts, i.e., specifically from 16.4% to 24.6% during 1991-1997, from 15.7% to 22.6% during 1998-2003, from 18.8% to 19.8% during 2004-2009, and from 14.3% to 18.6% during 2010-2015.

This movement is also supported by Figure 2, which shows higher returns at the upper tail (q95), and lower returns at the lower tail (q10) of the wage distribution regardless of year cohort. A similar pattern was also uncovered by (Budria 2011) for over educated Portuguese workers, whose

returns improved across the wage distribution from 2.3% to 4.8% (q10 to q90), with the highest returns being experienced at q90, during 1994-2001 and 2000-2002.

**Table 4: Summary Estimates of the Returns of Overeducated Workers.**

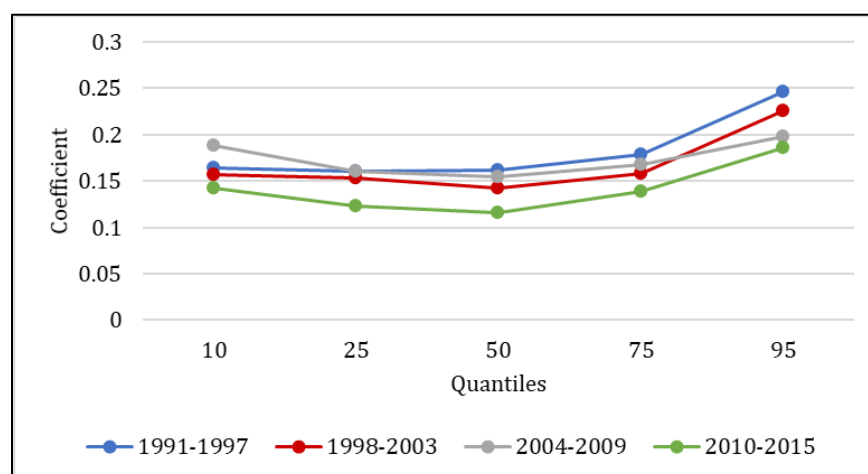
Year Cohort	OLS	q10	q25	q50	q75	q95	$\Delta q95-q10$	$\Delta q75-q25$	z-test
<b>Panel A: Private &amp; Public Sector Workers</b>									
<b>1991-1997</b>	0.180 ***	0.164 ***	0.161 ***	0.162 ***	0.179 ***	0.246 ***	0.082	0.018	0.082
	(0.010)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)			
<b>1998-2003</b>	0.164 ***	0.157 ***	0.153 ***	0.142 ***	0.158 ***	0.226 ***	0.069	0.005	0.106
	(0.008)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
<b>2004-2009</b>	0.172 ***	0.188 ***	0.161 ***	0.154 ***	0.168 ***	0.198 ***	0.010	0.007	0.142
	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)			
<b>2010-2015</b>	0.148 ***	0.143 ***	0.123 ***	0.116 ***	0.139 ***	0.186 ***	0.043	0.016	0.204
	(0.007)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)			
<b>Panel B: Private Sector Workers</b>									
<b>1991-1997</b>	0.272 ***	0.222 ***	0.263 ***	0.245 ***	0.268 ***	0.311 ***	0.089	0.005	0.067
	(0.015)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)			
<b>1998-2003</b>	0.259 ***	0.222 ***	0.239 ***	0.253 ***	0.270 ***	0.320 ***	0.098	0.031	0.078
	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)			
<b>2004-2009</b>	0.279 ***	0.272 ***	0.280 ***	0.274 ***	0.281 ***	0.331 ***	0.059	0.001	0.087
	(0.011)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)			
<b>2010-2015</b>	0.228 ***	0.183 ***	0.193 ***	0.215 ***	0.253 ***	0.307 ***	0.124	0.060	0.129
	(0.010)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)			

Note: \*\*\*The coefficient values are statistically significant at all conventional levels of alpha (0.01, 0.05, and 0.10). The robust standard errors are shown in parenthesis. The dependent variable is the logarithm of the real hourly wage rate, the presence of under and required educational matches are controlled.

Source: Own Calculations.

Notwithstanding the improvement in the returns, Figure 3 below illustrates that all over-educated workers employed in high-end jobs experienced a consistent fall in their wages from 24.6% to 18.6%, during the 1991-1997, to 2010-2015 cohorts. While the returns of over-educated workers employed in low and middle-income jobs generally, improved throughout the wage distribution during 2004-2009, before experiencing a similar decline in 2010-2015. These findings implies that even though the GATE programme created a highly educated workforce, in the end, the workers who really suffered from the overcrowding of job were those in low and middle-income jobs.

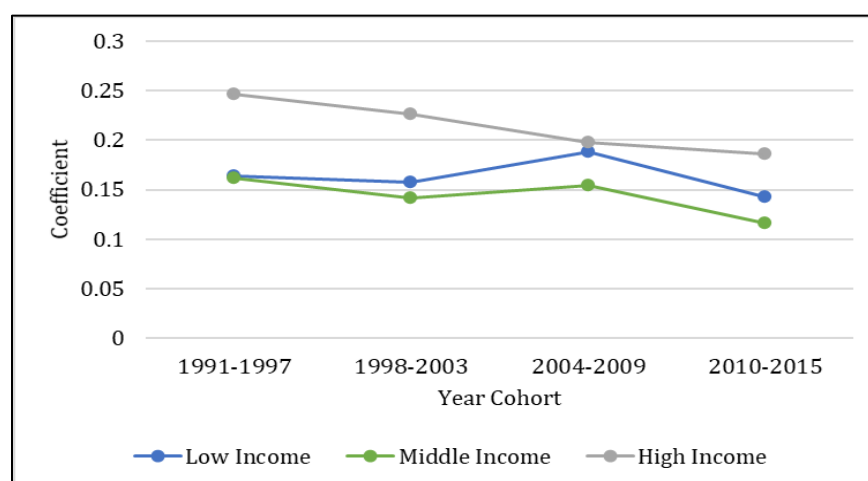
**Figure 2: The Returns of Overeducated Private and Public Sector workers.**



Source: Own Calculations

Note: For the sake of space and clarity in terms of the trend in the estimates, the confidence intervals were not included in this graph. However, graphs with the intervals can be requested from the author.

**Figure 3: The Returns of Overeducated workers in Low, Middle and High income Jobs.**



Source: Own Calculations

Note: For the sake of space and clarity in terms of the trend in the estimates, the confidence intervals were not included in this graph. However, graphs with the intervals can be requested from the author.

The significant improvement in the price of Trinidad and Tobago's, crude during the 1994-2008 economic boom, from US\$17. 2/bbl. to US\$99. 6/bbl. Implies that there was some growth in government revenue from TT\$7,549.90mn to TT\$57,821.40mn. As a result, educational institutions benefitted from higher funding of TT\$1804. 80mn. Despite the financial injection into the education system, it did not generate significant returns, as the education sector's growth as a percentage of RGDP fell from 3.5% to -3.9%, during the 1996-2008 period.

The sluggish growth of the Petroleum and Non-Petroleum sectors, from 7.8% and 7.2%, to -4% and 1.2%, during 1996-2015, implies that the labour force compositions of these sectors may

have been placed in a precarious position in terms of job creation and sustainability. It is possible that the deteriorating wage returns of overeducated workers may be a result of diminishing job opportunities at the sectoral level, as the growth of the sugar, agriculture, petroleum, and manufacturing industries all contracted during 1998-2003.

Regardless of the contraction, the sectors which appear to have generated the most job opportunities and absorbed the most over-educated workers during 1991-2015, were in the areas of community, social and personal services (growing from 38.40% to 44.80%), the wholesale and retail trade/ restaurants and hotels (growing from 8.55% to 9.36%), and construction (growing from 16.81% to 23.23%). Despite the integration of over educated workers the growth of the construction (from 5.3% to -3.7%), and personal services (from 2.7% to 0.7%), and minimal expansion of the wholesale and retail trade/ restaurants and hotels (from -12.8% to -7%) during continued to contract during 1996-2015. This sectoral contraction may have persisted because overeducated workers when not properly matched, may find that their educational qualifications become either inadequate, or obsolete for the tasks assigned to them by their current occupation.

The lack of accreditation of tertiary level programmes may have also influenced the quality of the qualification received, and the wage of the worker. In that, even though several of the tertiary level institutions accessing GATE funding are registered with the Accreditation Council of Trinidad and Tobago (ACTT), only 13 institutes have gained accreditation status (ACTT 2017). For this reason, it is possible that the certification provided by unregistered private and public tertiary institutions, may not be a true representation of the capability of the recipient. If the employer considers the quality of the workers qualifications during the hiring process, given the lack of accreditation of such tertiary institutions, then this may possibly contribute towards the lower returns experienced by over-educated workers during 2010-2015.

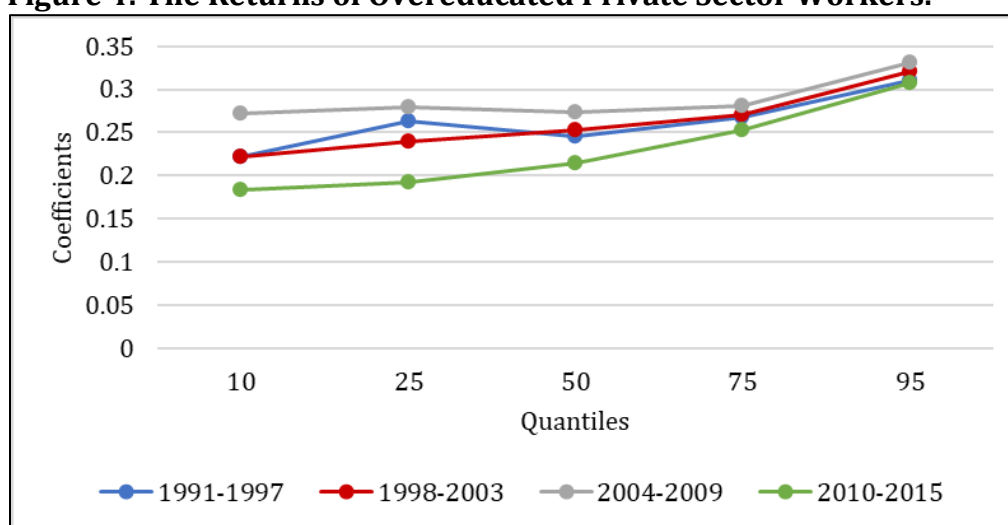
The relevance of the respective fields of training of over-educated workers to their current occupation may also be a contributing factor towards their declining returns in 2010-2015. Using the UWI, St. Augustine campus as a case in point, the average relevance of students' first degrees to their current job, from the faculties of medical sciences and social sciences declined from 3.75% to 3.53% and from 2.80% to 2.43% respectively, during 2010-2013 (COPIR 2014, 2015). This is likely to reflect the presence of an educational mismatch as some of the knowledge, and skills gained from such programmes may not be used by their current job. This is further supported by a decline in the average skill use of students graduating from the faculties of humanities and education (from 3.13% to 3.10%), medical science (from 3.65% to 3.50%) and social sciences (from 2.77% to 2.60%) during 2010 to 2013.

## 6.2 Robust Checks

To determine if the previous findings are robust, the returns of overeducated workers employed in the private sector workers is also estimated. A summary of the estimation results and the z-test is shown again in Table 4 above. A brief look at the summary results, shows that the z-test statistic shows that the average returns of over-educated private sector workers were not likely to be significantly different to that of over-educated public sector workers. The high value of the OLS, and QR estimates, implies that over-educated private sector workers do have a higher earnings capability, than that of over-educated public sector workers for the time frame under study. This difference may be due to the private sector's ability to better absorb and offer competitive wages to over-educated workers than that of public sector entities.

The average wage returns of private sector workers also show a similar pattern as Table 4, declining from 27.2% to 22.8%, throughout the 1991-1997 to 2010-2015 period. The divergence between the OLS estimates, and the change between the quantiles, indicates that the average returns may misrepresent the impact that over-education may have on the earnings of private sector workers. The wage returns of private sector workers shown by figure 4, also improves across the wage distribution, i.e., from q10 to q95 for all year cohorts, so that the most concentrated returns occur in the upper tail (q95), as opposed to the lower tail (q10) of the wage distribution. Unlike the trend observed in Figure 3, in Figure 5, the wage returns of private sector workers tend to rise during 1998-2003 to 2004-2009, before falling in 2010-2015. This may have possibly resulted from the implementation of the GATE and HELP programmes in 2004 and 2006.

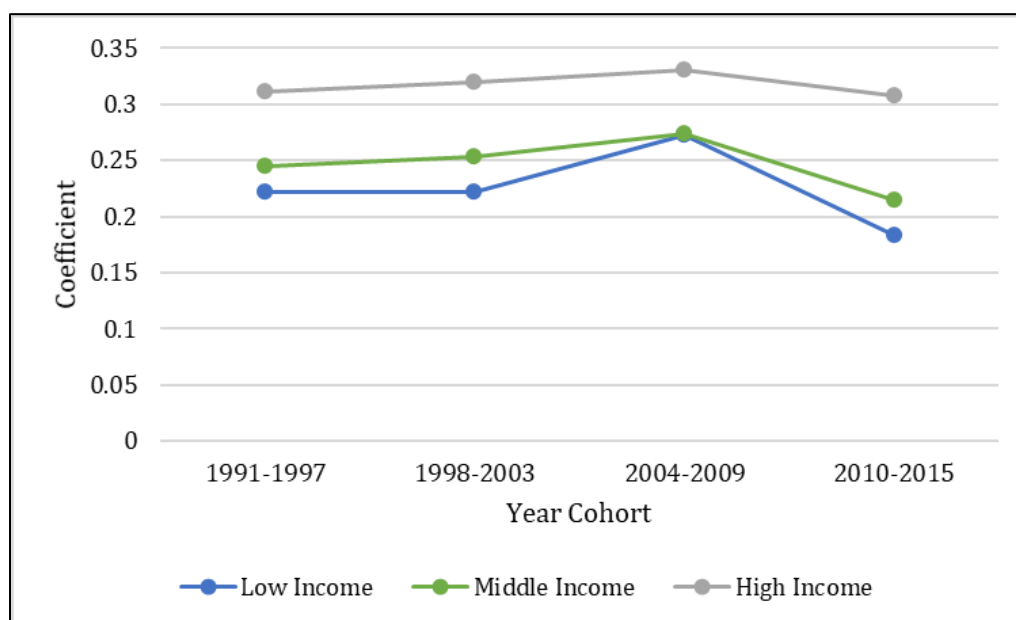
**Figure 4: The Returns of Overeducated Private Sector Workers.**



Source: Own Calculations

Note: For the sake of space and clarity in terms of the trend in the estimates, the confidence intervals were not included in this graph. However, graphs with the intervals can be requested from the author.

**Figure 5: The Returns of Overeducated workers in Low-, Middle- and High-income Private Sector Jobs.**



Source: Own Calculations

Note: For the sake of space and clarity in terms of the trend in the estimates, the confidence intervals were not included in this graph. However, graphs with the intervals can be requested from the author.

### 6.3 The Gender Dynamics of Over-Education

The wage returns of over-educated men and women working in both the private and public sector is examined and a summary of the results presented below in Table 5 below. In both cases, the z-test statistic point out that the average returns of over-educated men and women workers are not likely to be significantly different from each other. The average returns of over-educated women while higher than that of men, appears to be declining for both groups, from 16.9% to 9.8% for men, and from 25.5% to 22.7% for women, during 1991-2015.

A similar outcome is seen in the literature where, Kiker, Santos, and De Oliveira (1997) found that overeducated Portuguese women earned higher returns (5.6%), than men (4.4%) in 1991. This is not always the case as overeducated German, and Spanish men earn more than women (Bauer 2002, Murillo et al. 2013). These differences may be linked to both the structure of the labour force, and the demand for university and secondary level qualifications, as the intensity of over-education is more prominent for men educated at the secondary level, than for women.

In comparison in Trinidad and Tobago, even though the supply of over-educated men and women at the university level have increased from 4.40% to 12.67% and from 5.79% to 27.20%, respectively, during 1991-1997 to 2010-2015, it is exceptionally higher for women. This is supported

by the growth of over-educated women after the implementation of the GATE programme, which increased by 11.58%, when compared to 4.53% of men, during 2004-2009 to 2010-2015.

Apart from this, even though the wage returns of over-educated men, in Trinidad and Tobago tends to improve over the wage distribution, as reflected by Table 5 and figure 6 below. The returns of those men employed in low and high-income jobs degenerated consistently during 1991-2015.

When compared to the returns of over educated women, the opposite trend is observed, as their returns tends to worsen across much of the wage distribution as reflected by figure 7 below. The improvement in the returns of over educated women employed in low-income jobs is also observed during 1991-2009. However, women in high-income jobs, like that of over-educated men also deteriorated throughout the 1991-2015 period.

**Table 5: The returns of Overeducated Men and Women.**

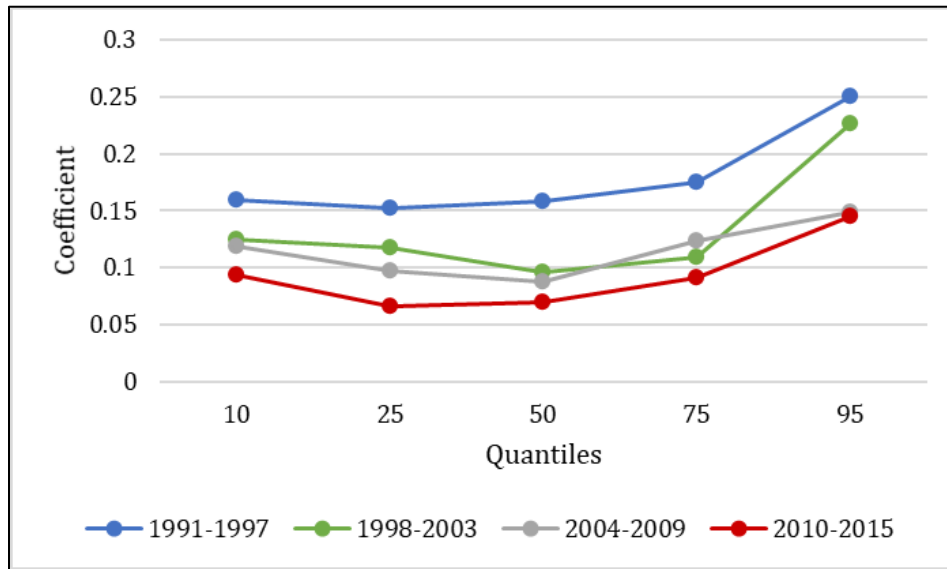
Year Cohort	OLS	q10	q25	q50	q75	q95	$\Delta q95-q10$	$\Delta q75-q25$	z-test
<b>Panel A: Men</b>									
<b>1991-1997</b>	0.169 *** (0.014)	0.159 *** (0.030)	0.152 *** (0.001)	0.158 *** (0.001)	0.175 *** (0.001)	0.250 *** (0.000)	0.091	0.023	0.076
<b>1998-2003</b>	0.122 *** (0.011)	0.125 *** (0.001)	0.118 *** (0.000)	0.096 *** (0.000)	0.109 *** (0.001)	0.227 *** (0.000)	0.102	-0.009	0.095
<b>2004-2009</b>	0.113 *** (0.009)	0.119 *** (0.002)	0.097 *** (0.000)	0.088 *** (0.000)	0.123 *** (0.000)	0.149 *** (0.001)	0.030	0.026	0.130
<b>2010-2015</b>	0.098 *** (0.010)	0.094 *** (0.000)	0.066 *** (0.000)	0.070 *** (0.000)	0.091 *** (0.000)	0.145 *** (0.001)	0.051	0.025	0.175
<b>Panel B: Women</b>									
<b>1991-1997</b>	0.255 *** (0.015)	0.302 *** (0.001)	0.281 *** (0.002)	0.228 *** (0.001)	0.222 *** (0.001)	0.275 *** (0.001)	-0.027	-0.059	0.088
<b>1998-2003</b>	0.256 *** (0.012)	0.335 *** (0.001)	0.292 *** (0.001)	0.216 *** (0.001)	0.210 *** (0.000)	0.269 *** (0.001)	-0.066	-0.082	0.119
<b>2004-2009</b>	0.266 *** (0.011)	0.357 *** (0.001)	0.285 *** (0.000)	0.243 *** (0.000)	0.206 *** (0.001)	0.265 *** (0.000)	-0.092	-0.079	0.147
<b>2010-2015</b>	0.227 *** (0.011)	0.252 *** (0.000)	0.251 *** (0.000)	0.208 *** (0.001)	0.187 *** (0.000)	0.230 *** (0.001)	-0.022	-0.064	0.232

Note: \*\*\*The coefficient values are statistically significant at all conventional levels of alpha (0.01, 0.05, and 0.10). The robust standard errors are shown in parenthesis. The dependent variable is the logarithm of the real hourly wage rate, the presence of under and required educational matches are controlled.

Source: Own calculations.



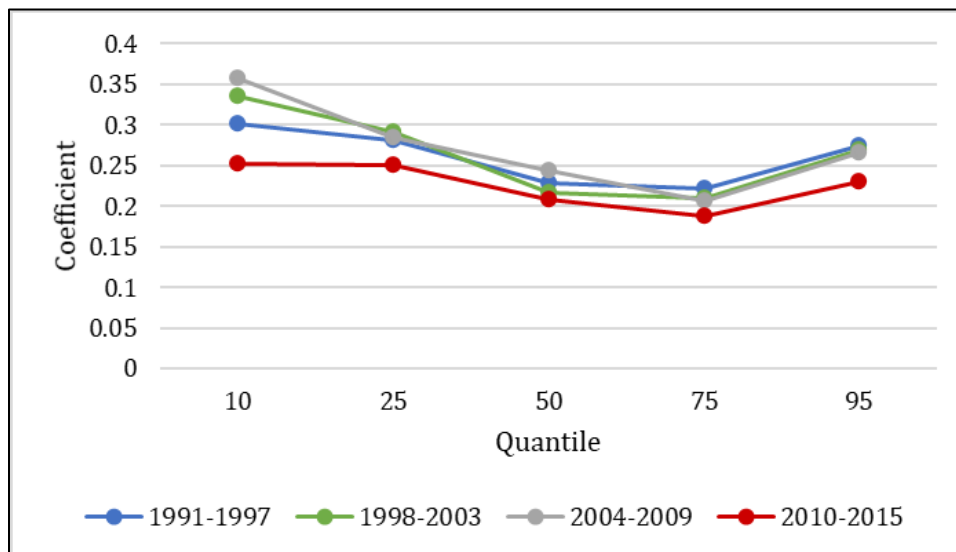
**Figure 6: The Returns of Overeducated Men.**



Source: Own Calculations

Note: For the sake of space and clarity in terms of the trend in the estimates, the confidence intervals were not included in this graph. However, graphs with the intervals can be requested from the author.

**Figure 7: The Returns of Overeducated Women.**



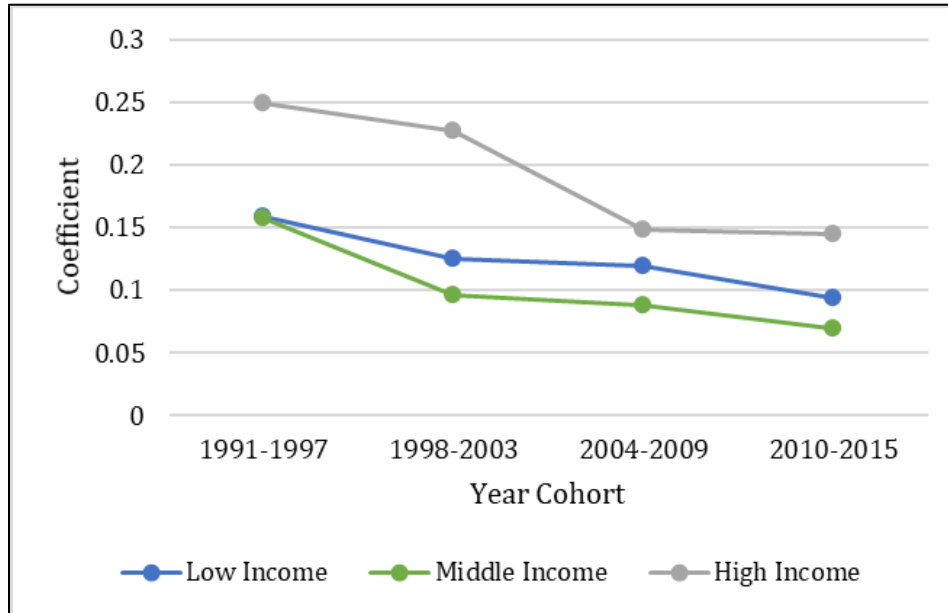
Source: Own Calculations

Note: For the sake of space and clarity in terms of the trend in the estimates, the confidence intervals were not included in this graph. However, graphs with the intervals can be requested from the author.

A closer examination of the returns shows that most over-educated men in low-, middle- and high-income jobs, tends to decline continuously from the beginning of 1991 to 2015 as reflected by figure 8 below. However in figure 9, the returns of over-educated women seems to decline from an earlier point in time as one move across the wage distribution. More specifically, the returns of

women begin to fall from 2010-2015 at q10, from 2004-2009 at q25, from 1998-2003 at q50, and from 1991-1997 for both q75 and q95.

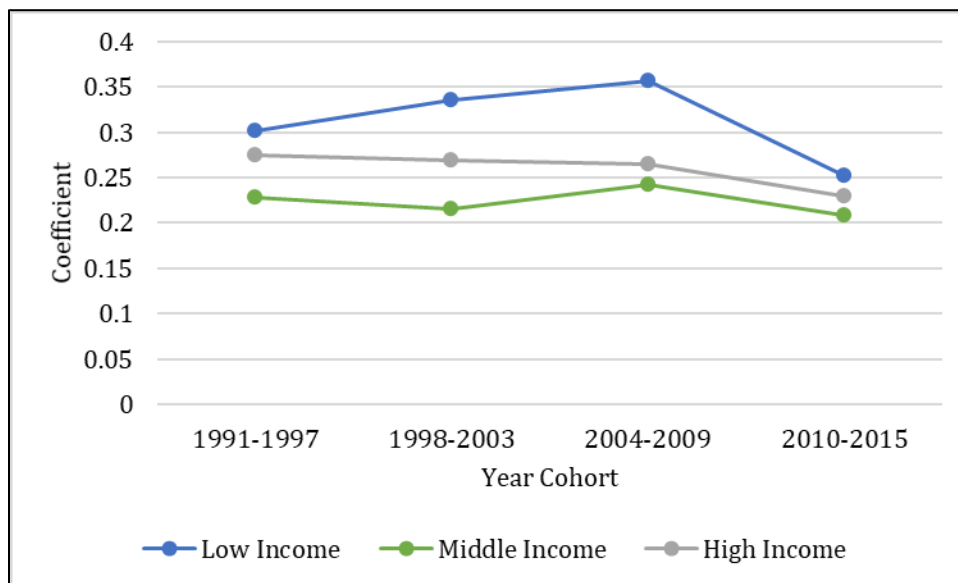
**Figure 8: The Returns of Overeducated Men in Low-, Middle- and High-income Jobs.**



Source: Own Calculations

Note: For the sake of space and clarity in terms of the trend in the estimates, the confidence intervals were not included in this graph. However, graphs with the intervals can be requested from the author.

**Figure 9: The Returns of Overeducated Women in Low-, Middle- and High-income Jobs.**



Source: Own Calculations

Note: For the sake of space and clarity in terms of the trend in the estimates, the confidence intervals were not included in this graph. However, graphs with the intervals can be requested from the author.

Bearing in mind the wage patterns exhibited by both over-educated men and women, based on the sample used in this study, the industries which absorbed the most over-educated men were in the areas of construction (from 29.12% to 43.72%) and community social and personal services (from 24.44% to 26.76%). However, most of these men are trained in fields of commercial, business management and public administration, engineering, trade and industrial craft, mathematics & computer science, and engineering. This disconnect between the field of training and the industrial area of employment may be a factor which contributed to the returns of over-educated men being driven down, as they may become displaced within the labour market.

In comparison, even though most over-educated women were absorbed by the financing, insurance & real estate; community, social and personal service industries, specific industries in the areas of mining & quarrying, construction, and community social and personal services have continued to hire more over-educated women. One reason may be the result of the wide range of fields in which women may have become qualified, as most are trained in the areas of teacher training, social and behavioural science: and commercial and business programme/management & public administration. For this reason, over-educated women employed in low-income jobs may experience higher returns because their field of expertise may not be as saturated as high-income jobs. Given that the returns of women employed in high-income jobs were already on the decline prior to the implementation of the GATE scheme, implies that these job categories were already saturated and became inundated as the 2009-2015 economic recession settled.

## **7. Conclusion**

Developing the human stock of capital in Trinidad and Tobago, is a major goal of government administrations. In order to provide better quality of workers, one of the first course of action is to encourage workers to undertake more educational and training. To do this, opportunities for persuing greater education is often generated by providing funding initiatives such as the DfD, GATE and the HELP programmes. By undertaking such initiatives, one creates a supply of highly educated workers, but also a population of over educated workers. The rate and intensity of which such a mismatch occurs can be further amplified during times of economic hardship as labour markets may unable to accommodate the influx of highly educated workers.

Bearing in mind that the purpose of implementing such funding mechanisms is to make the transition into higher education more effortlessness, it is important to examine how the presence of over education not only persists, but how it influences the returns of such workers over time. This paper contributes to the area of educational misalignment, primarily for the Caribbean region by being the first to quantify the existence of over education in Trinidad and Tobago for the period 1991-

2015. It takes the measurement of educational misalignment to another step further by not only quantifying its presence by education level, and qualification, but also by the workers field of training and industry of employment. The Realized Matches (RM) measure of educational mismatch, when used together with the Quantile Regression technique, finds that Trinidad and Tobago's labour force consists of a significant number of over-educated workers, who are educated at the secondary and university levels. It is also found that the earnings of over-educated workers employed in high-end jobs have declined throughout 1991-2015, while those in low and middle-income jobs benefitted from an improvement in their wage returns during 2004-2009, before it fell in 2010-2015. The diminishing returns experienced by over-educated workers during the 2009-2015 recession, may be linked to not only the surplus of highly educated workers shaped by the GATE programme, but also fading job opportunities between sectors, the deteriorating standard of education at the university level, and the growing irrelevance of qualifications with workers occupations. In addition, even though the wage returns of over-educated men, improves over the wage distribution, those in low and high-income jobs degenerated consistently throughout the 1991-2015 period. When compared to that of women, the opposite is true as their returns tends to worsen across much of the wage distribution. With any improvement being observed during 1991-2009 by low-income women.

Based on the findings of this paper, there are several factors which may influence the demand for highly educated workers. As discussed previously, these factors are inclusive of over-skilling, remuneration costs, redundancy of skills training, educational qualifications, job position, and age, all influence the rate at which over-educated workers are absorbed into private and public sector enterprises. Given the implications of these findings, it is possible to manage the growth of educational mismatch, and to secure a better wage in three ways.

The first recommendation, is to move away from a subsidized provision and commercialization of higher education, which focuses on quantity of university educated workers, to one which concentrates on the quality of university graduates produced. The second recommendation is to restructure the GATE programme in a way that the skills generated from the programme can be aligned to what is demanded by public and private sector enterprises. The third recommendation is to embed within the GATE programme, tools to develop other non-academic skills valued by employers in areas such as teamwork, communication, entrepreneurship, innovativeness, creativity, life skills, adaptability, interpersonal and problem-solving skills. By encouraging the growth of such areas, graduates would not only be employable, but also become the creators of future jobs.

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