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Sophie Gardiner and Marco Stampini[1]

Abstract - We analyze the relationship between education and employment in Suriname, using data from a 2007 IDB household survey (representative nationally and at the level of three macro areas: Urban Coast, Rural Coast and Interior). We find that education brings returns in terms of both likelihood of employment (particularly for women) and higher earnings. Completed primary, junior secondary, senior secondary and tertiary education increase the probability of employment by 12%, 19%, 86% and 84% respectively, relative to the base category of no-schooling or incomplete primary. In addition, senior secondary and tertiary education lead to 46% and 81% higher earnings, relative to peer individuals with junior secondary education or less. These returns to education are relatively high in the context of the Caribbean. Nonetheless, higher educational achievements are associated with a transition towards public sector jobs, suggesting that the private sector is scarcely dynamic, and unable to attract skilled workers.

1. Introduction

With the support of a loan from the Inter-American Development Bank (IDB), Suriname is planning the implementation of a unified Conditional Cash Transfer (CCT) program. Regular school attendance is one of the co-responsibilities to which payments will be linked. The underlying assumption is that higher school attendance will translate in greater human capital accumulation, breaking the intergenerational transmission of poverty. Children of poor households will be able to achieve better labor market outcomes, and will not need social assistance in the future. In order to calculate the social returns of the project, it is therefore fundamental to study how schooling affects the probability of finding a job, its characteristics and the associated earnings.

Over the last 15 years, several studies have been published on the returns to education in various countries (for a comprehensive review, see Colclough *et al.* 2010). These studies conclude that returns to higher education have been increasing, and returns to primary education decreasing across developing countries and particularly in Latin America. Manacorda *et al.* (2010) relate this trend to the demand for a more highly educated work force in Latin America. The Organization of Eastern Caribbean States finds that returns to education are increasing across the Caribbean region due to a shortage of skilled labor, a trend that may apply to Suriname as well (OECS 2005).

Our paper is the first to analyze the relationship between schooling and labor market outcomes in Suriname. We use data from a nationally representative household survey carried out by the IDB in July-November 2007. Data was originally collected for the elaboration of a proxy means test of poverty, to be used to determine eligibility for a government health card, and included modules on education, employment and income.

We find that education has a double return in terms of both likelihood of employment (particularly for women) and higher earnings. Completed primary, junior secondary, senior secondary and tertiary education increase the probability of employment by 12%, 19%, 86% and 84% respectively, relative to the base category of no-schooling or incomplete primary. In addition, senior secondary and tertiary education lead to 46% and 81% higher earnings, relative to peer individuals with junior secondary education or less.

The analysis also produces other policy relevant results. First, we find evidence of low educational achievements, with a strong regional gap. Only 33% of the adults in the sample have achieved junior secondary or higher education nationally, and the figure is as low as 12% in the Interior region. Second, the private sector appears to be scarcely dynamic, with low levels of formality and individuals with high education working predominantly in the public sector.

The remainder of the paper is organized as follows. Section 2 gives background information on the structure of the education system in Suriname. Section 3 describes the data and methodology used to estimate the returns to education. Sections 4 and 5 discuss educational achievements and provide a profile of the labor market. Section 6 discusses the relationship between education and labor market outcomes, and estimates the returns to schooling. Section 7 concludes.

2. Background

The education system in Suriname is administered by the Ministry of Education and Community Development (MOECD), and has changed very little from the pre-independence Dutch system. There are four levels of schooling: pre-primary for ages 4-5 years, followed by primary (grades 1-6), junior secondary (grades 7-10), and senior secondary (grades 11-13). There are 336 primary schools (323 of which include pre-primary), 112 junior secondary schools, and 30 senior secondary schools.

The country is divided in three regions: (i) Urban Coast (made of the capital city of Paramaribo); (ii) Rural Coast (made of the areas surrounding Paramaribo), and; (iii) Interior (Amazonian). 81 of the primary schools (77 of which include pre-primary), six of the junior secondary schools and no senior secondary schools are located in the Interior. In the whole country, there are only three higher vocational schools and one university. Nearly half of all primary and secondary schools

are private and operated by religious organizations nationally, while over 65% of the schools are private in the Interior (IDB 2011).

Suriname spends a relatively large share of its total public expenditure on education (20%), and has dramatically increased primary school enrollment rates (now at 90%). However, the enrollment rate in primary school remains low (71%) in the Interior. In addition, nearly one in five students repeats a grade in primary school, and one in ten drops out of grades 1-3. Students who repeat grades in primary school are less likely to complete secondary school.

Enrollment drops sharply after age 12, when schooling is no longer compulsory. Enrollment rates in junior and senior secondary school are as low as 49% and 21% nationally, and 17% and 0% in the Interior. Fees are high. About half of the students are tracked into "dead end" vocational secondary schools, student preparation is inadequate, and the curriculum and learning materials are outdated. Male students have lower secondary school enrollment and higher repetition rates than female students (IDB 2011).

The structural causes of the particularly low enrollment of students in the Interior include poor infrastructure, limited school oversight, long travel time, high prevalence of costly private schools, and high rates of migration, child labor, pregnancies and marriages. The regional gap is also due to the system's cultural bias towards those on the coast. All classes are taught in Dutch, despite the fact that the majority of students in the Interior are first exposed to the Dutch language when entering school. In addition, few teachers are local, and teachers working in the Interior are generally less qualified (IDB 2011).

3. Data and methodology

We use data from a nationally representative household survey conducted by the IDB in July-November 2007 to inform the elaboration of a proxy means test (PMT) of poverty (Bitran and Muñoz 2009). The sample was made of 1,445 households, and is representative both nationally and at the level of the three regions.

The questionnaire included twelve modules: (i) household roster; (ii) education; (iii) health; (iv) employment and income from work; (v) social assistance; (vi) health insurance; (vii) housing and assets; (viii) consumption and expenditures; (ix) agriculture, farming, hunting and fishing; (x) other sources of income; (xi) credits and loans; (xii) household perceptions. To analyze the returns to education, we focus mainly on education, employment and income variables.

To measure the returns to schooling, we estimate the following equation on the sample of working age individuals (15-64 years old):

$$(1) \qquad ln(w) = EDU\alpha + X\beta + WORK\varphi + \lambda\delta + u$$

where:

- $ln(w)$ is the natural logarithm of monthly earnings (in Surinamese dollars, from the respondent's main job);
- *EDU* is a vector of variables measuring education (four dummy variables for completed primary, completed junior secondary, completed senior secondary and completed tertiary, with less than completed primary as an omitted category);

- *X* is a vector of individual characteristics including:
    - gender (female);
    - age (25-39 years old, 40-54 years old, 55-64 years old, with 15-24 years old as an omitted category);
    - ethnicity (Maroon, Creole, Javanese, Mixed, Amerindian, Other, with Hindustani as an omitted category);
    - region of residence (Urban and Rural Coast, with Interior as an omitted category);
- *WORK* is a vector of work related variables including:
    - type of job (informal wage, self-employed (including employers and unpaid work in family business), with formal wage employment as an omitted category);
    - sector of activity (mining, industry, construction, transport, services, government and health, other, with agriculture as an omitted category);
    - number of hours worked per week (two dummy variables for 30-50 hours and more than 50 hours, with less than 30 as an omitted category);
- λ is the Inverse-Mills-Ratio included to correct the selection bias due to the fact that those whose earnings are reported differ from other individuals;
- α, β, φ, δ are the parameters to be estimated, and *u* is a random disturbance.

The Inverse-Mills-Ratio λ is estimated as a result of the following regression:

$$(2) \qquad Prob(empl) = EDU\eta + X\,\theta + Z\tau + \varepsilon$$

where:

- *empl* is a dummy variable equal to 1 if the individual is employed and has positive earnings;
- *EDU* and *X* are defined as in equation (1);
- *Z* is a vector of selection variables assumed to affect the likelihood to work but to be unrelated with weekly earnings once working; it includes two dummy variables for being married and for having children;
- η, θ, τ are the parameters to be estimated, and ε is a random disturbance.

Estimation of equations (1) and (2) is performed simultaneously using the Heckman command in the statistical software STATA.

The data has some limitations. For example, the questionnaire collects information on the main job over the last twelve months (rather than over the past week). Consequently, we cannot estimate the rates of labor market participation ((employed + unemployed) / population) and unemployment (unemployed / (employed + unemployed)). We can only measure the rate of employment (defined as the share of the working age population that worked for income during the twelve months prior to the interview).

The number of hours worked during the past week has several odd values. Consequently, we focus on monthly earnings instead of hourly earnings, and control for time worked through two dummy variables. Similarly, enrolment variables lead to estimated enrolment rates that are much higher than the official ones released by the Ministry of Education. In addition, enrollment appears to be higher for 14, 18, 20 and 23 year old males than for those a year younger. For females, the rate of enrollment drops sharply at age 11, and then rises consistently for ages 12-15. These trends are inconsistent with the enrollment patterns of other countries; therefore, we do not study school enrolment and focus on adults' labor market outcomes.

4. A profile of educational achievements

Educational achievements in Suriname are generally poor. One in four working age individuals has not completed primary education, and only one in ten has completed senior secondary or tertiary schooling.

While, remarkably, men and women have comparable levels of education, we find evidence of a large regional gap. In the Interior, over half of the working age population has not completed primary schooling, and only 12% has at least junior secondary education (against 37% in the Urban Coast region and 28% in the Rural Coast) (Table 1; Figure 1). As was discussed in the background section, access to education is more difficult in the Interior, which in turn has negative effects on employment and earnings.

The analysis by age groups highlights that, as expected, the younger generations are achieving higher levels of education. For example, prime age individuals (25-39 years old) record half incidence of cases of less than primary schooling relative to those 55-64 years old, and almost double incidence of senior secondary or tertiary education (Table 1).

Table 1 - Educational achievements of the working age population in Suriname

% with completed level of education, by:	Region			Gender	
	Urban Coast	Rural Coast	Interior	Males	Females
None	22.5	27.4	54.5	26.1	25.5
Primary	40.7	44.5	33.8	40.9	40.6
Junior Secondary	23.7	20.3	8.9	22.7	21.2
Senior Secondary	10.7	7.0	2.3	8.7	10.1
Tertiary	2.5	0.9	0.6	1.5	2.6
Share in the sample	77	15	8	48	52
% with completed level of education, by:	Age (years)				
	15-24	25-39	40-54	55-64	Total
None	18.1	24.1	30.3	50.1	25.8
Primary	49.3	38.2	36.4	30.0	40.7
Junior Secondary	21.5	24.7	22.2	11.9	22.0
Senior Secondary	10.8	10.0	8.5	4.7	9.4
Tertiary	0.4	3.1	2.7	3.3	2.1
Share in the sample	33	32	27	8	100

Source: Authors' elaborations based on PMT 2007 data.
Sample size: 3,198 15-64 years old individuals with non-missing education variables.

Figure 1 - Educational achievements of the working age population in Suriname, by region
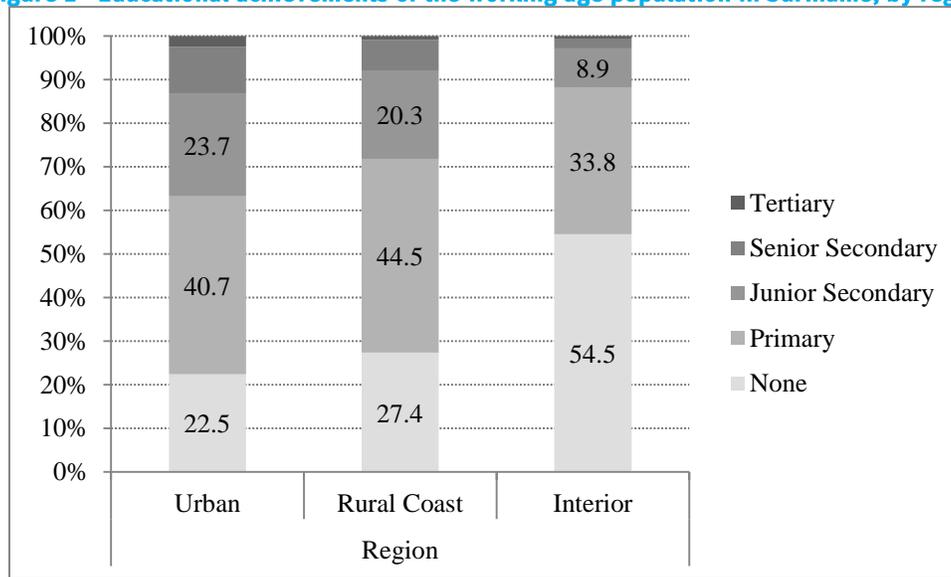
Source: Authors' elaborations based on PMT 2007 data.
Sample size: 3,198 15-64 years old individuals with non-missing education variables.

5. Labor market profile

Half of the working age population worked for income during the twelve months prior to the interview. The analysis highlights strong gender and regional gaps.

Overall, only 33% of women are employed, against 68% of men. When working, women are less likely than men to be self-employed, and more likely to be formal wage employees. This is reflected in lower percentages of employment in agriculture, construction and transports, and in higher probability of employment in other services and especially in the public administration (government and health) (Table 2).

The employment rate is much lower in the Interior than on the coast (39% against 52% in the Urban Coast region). In addition, the Interior's labor market is characterized by higher levels of informality (the sum of self-employment and informal wage employment), higher incidence of primary activities (agriculture and mining) and lower incidence of industry and private sector services, when compared to the Urban Coast region. Surprisingly, over one third of working individuals in the Interior are employed in the public administration (government and health, including: teachers, health workers, armed forces, police, firemen, administrative workers and others) (Table 2). The higher rate of informal work and lower rate of private sector employment may be an indication of fewer opportunities in the Interior region.

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Table 2 - Profile of Suriname's labor market

	Gender		Region			
	Males	Females	Urban Coast	Rural Coast	Interior	Total
% employed	68.0	33.4	51.6	47.4	38.9	50.0
Type of job (% of employed):						
Self-employed	17.0	8.8	13.8	15.7	16.0	14.2
Informal wage	22.0	18.6	20.1	21.2	28.9	20.9
Formal wage	60.9	72.6	66.1	63.1	55.1	65.0
Total	100	100	100	100	100	100
Sector (% of employed):						
Agriculture	12.4	5.7	6.7	24.5	18.7	10.0
Mining	2.6	0.2	1.1	4.4	4.3	1.8
Industry	2.2	1.4	2.1	1.9	0.0	1.9
Construction	9.1	0.2	6.3	6.6	0.8	6.0
Transport	6.2	0.6	4.2	3.0	7.0	4.2
Services (a)	44.1	48.8	49.8	29.6	31.3	45.7
Gov't and Health	17.3	41.2	25.2	24.6	34.6	25.7
Other	6.3	1.8	4.7	5.5	3.3	4.7
Total	100	100	100	100	100	100

Source: Authors' elaborations based on PMT 2007 data.
Sample size: for the percentage of employed, 3266 working age individuals; for type of job and sector, 1566 working age individuals with non-missing observations of the relevant variables. (a) Services include: electricity, gas, water, retail, hotels, restaurants, storage, communications, financial intermediaries or other services

6. Returns to education

Higher educational achievements are associated with substantial increases in the likelihood of employment. While only 46% of working age individuals with less than primary schooling work, the share grows to 74% for those with tertiary education (Table 3). The effect on the probability of employment is nearly linear, but only starts from completed junior secondary education (individuals with primary education have probability of employment similar to that associated with no degree). Interestingly, most of the trend is driven by women, for whom education increases the probability of employment by over 40 percentage points. On the contrary, males with no education, primary education, junior secondary and senior secondary education have nearly identical employment rates. Only tertiary education is associated with a significant increase in men's rate of employment (by 20 percentage points). We do not observe any contribution of education to closing the regional employment gap.

In addition to increasing the probability of employment, education also leads to substantially higher earnings. While the median worker with no degree earns SRD (Surinamese Dollars) 450 per month, those with completed senior secondary schooling earn SRD 800 monthly (Table 4). In contrast to what we observed for the probability of employment, education does not contribute to closing the gap in earnings across genders.

Table 3 – Probability of employment in Suriname

% employed, by:	Region			Gender		Total
	Urban Coast	Rural Coast	Interior	Males	Females	
None	49	48	32	69	25	46
Primary	45	43	43	64	27	45
Junior Secondary	58	48	45	71	42	56
Senior Secondary	60	62	97	71	52	61
Tertiary	75	76	52	89	66	74
Total	52	47	39	68	33	50

Source: Authors' elaborations based on PMT 2007 data.
Sample size: 3,198 15-64 years old individuals with non-missing education and employment variables.

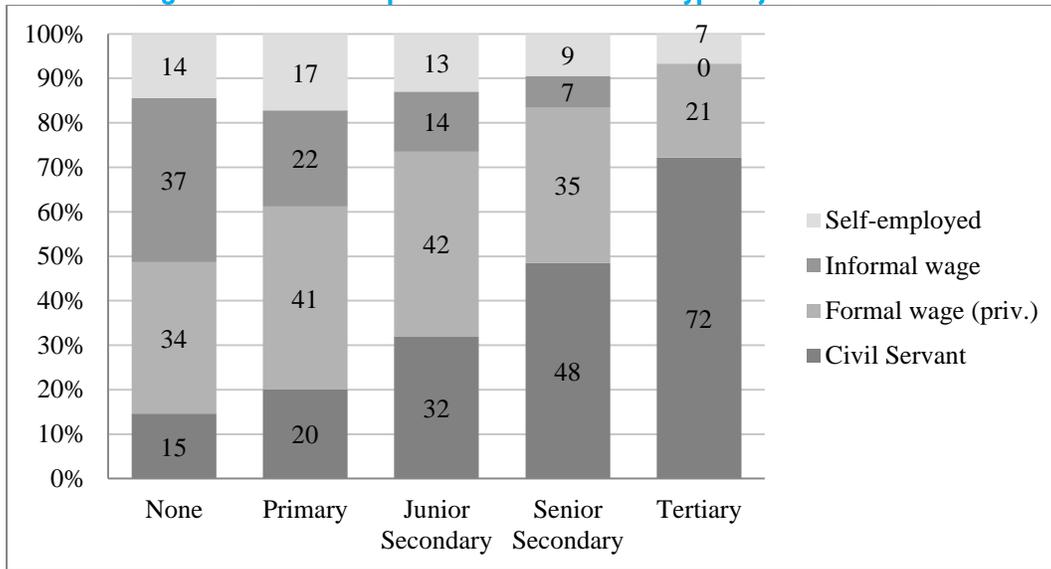**Table 4 – Median monthly earnings in Suriname**

Median monthly earnings (SRD), by:	Region			Gender		Total
	Urban Coast	Rural Coast	Interior	Males	Females	
None	450	500	400	500	400	450
Primary	500	500	500	599	427	500
Junior Secondary	600	558	600	600	500	600
Senior Secondary	800	800	950	800	848	800
Tertiary	950	900	989	1050	890	900
Total	580	500	500	600	500	545

Source: Authors' elaborations based on PMT 2007 data.
Sample size: 1,375 working age individuals with valid earning observations.

The returns to education in terms of earnings are at least in part explained by the transition to more formal types of jobs. Formal wage employment in both private and public sector accounts for 93% of total employment among individuals with tertiary education, against 49% for those with no degree (**Figure 2**). The trend is driven by the steep increase in public sector employment for both men and women, and by higher access to formal wage employment in the private sector for women only. Two gender differences are worth noting. First, formal employment in the public sector provides over 40% of jobs for women, against only 19% for men. Second, while 17% of men are self-employed with no difference across educational achievements, self-employment concerns only 9% of women and is relatively frequent only at low levels of schooling (not shown in the tables).

Figure 2 – Relationship between education and type of job in Suriname

	None	Primary	Junior Secondary	Senior Secondary	Tertiary
Self-employed	14	17	13	9	7
Informal wage	37	22	14	7	0
Formal wage (priv.)	34	41	42	35	21
Civil Servant	15	20	32	48	72

Source: Authors' elaborations based on PMT 2007 data.
Sample size: 1,551 15-64 years old individuals with non-missing information on level of education and type of job.

The multivariate analysis allows for the estimation of the returns to education while controlling for individual and job characteristics. We find that achieving senior secondary or higher education increases the likelihood of employment by over 80% relative to individuals with no degree, while the positive effect of primary and junior secondary schooling is in the 10-20% range (Table 5, right hand side panel). What is more, achieving senior secondary and tertiary education increases monthly earnings by 40% and 60% respectively, relative to individuals with no degree. Primary and junior secondary schooling have no significant effect on earnings (Table 5, left hand side panel). These returns are relatively high when compared to other Caribbean countries (reported in Table 6), although differences in data and methods hinder the comparability with other results reported in the literature.

The estimation of equation (1) produces several other interesting results. First, females are 60% less likely than males to be employed, although we find no evidence of a significant earning gender gap conditional on employment. Second, the Creole, the Javanese and the mixed ethnic groups are about 20% more likely to be employed than the Hindustani, while only the Amerindians experience an earning gap (by 16%) once employed. Third, residence in Urban Coast areas increases the likelihood of employment by 29% relative to the Interior, although we find no evidence of regional earning gaps. Fourth, informal wage employment is associated with 31% lower earnings relative to formal wage employment (while earnings from self-employment are not statistically different from formal wages). Finally, monthly earnings from working in mining, construction, transport, services, and government and health are significantly higher than agricultural incomes. In particular, mining is associated with a 109% earning premium.

Table 5 – Determinants of monthly earnings (Heckman regression)

Independent variables		Dep. Var. = ln(monthly earnings)			Dep. Var. = Employed (0/1)		
		Coef.	% change	Signif.	Coef.	% change	Signif.
Education	Primary	0.035	4%		0.111	12%	*
(Omit.: less than primary)	Junior secondary	0.078	8%		0.174	19%	**
	Senior secondary	0.382	46%	***	0.622	86%	***
	Tertiary	0.593	81%	***	0.608	84%	***
Gender	Female	0.050	5%		-0.922	-60%	***
Age	Age 25-39	-0.193	-18%	***	0.869	139%	***
(Omit.: age 15-24)	Age 40-54	-0.194	-18%	***	1.011	175%	***
	Age 55-64	0.227	26%	***	0.191	21%	*
Ethnicity	Maroon	-0.012	-1%		0.039	4%	
(Omit.: Hindustani)	Creole	0.035	4%		0.197	22%	**
	Javanese	-0.005	0%		0.153	17%	**
	Mixed	0.113	12%		0.175	19%	*
	Amerindian	-0.161	-15%	*	0.096	10%	
	Other	-0.049	-5%		-0.166	-15%	
Region	Urban Coast	0.011	1%		0.253	29%	***
(Omit.: Interior)	Rural Coast	-0.041	-4%		0.098	10%	
Type of employment	Informal	-0.365	-31%	***			
(Omit.: formal)	Self-employed	-0.043	-4%				
Sector	Mining	0.738	109%	***			
(Omit.: Agriculture)	Industry	0.167	18%				
	Construction	0.352	42%	***			
	Transport	0.333	40%	***			
	Services	0.093	10%	*			
	Gov. and health	0.278	32%	***			
	Other	0.064	7%				
Hours worked per week	30-50	0.191	21%	***			
(Omit.: less than 30)	50 and up	0.318	37%	***			
Family characteristics	Married				0.214	24%	***
	Have children				0.083	9%	
Constant		6.446		***	-0.887		***

Note: 3214 observations, 1886 censored and 1328 uncensored. Legend: * p<.1; ** p<.05; *** p<.01.

Table 6 - Returns to education in the Caribbean

% difference in wages, relative to primary education	Secondary	Post-Secondary	Tertiary
Barbados	17	35	72
Dominican Republic	72	146	210
Guyana	42	74	110
St. Lucia	34	165	223
Trinidad and Tobago	25	89	186

Source: OECS 2005

7. Conclusions

We make the first attempt in the literature to estimate the returns to education in Suriname, using household survey data collected by the IDB in 2007. We find that schooling increases both probability of employment and earnings. For example, an individual with completed senior secondary education is 86% more likely to work than a peer with no degree (less than primary), and earns 46% more once employed.

These returns are relatively high in the context of the Caribbean. However, the private sector seems to be unable to provide sufficient employment opportunities to highly educated individuals. These disproportionately end up in civil servant jobs, in the government and health sector.

This problem is not likely to receive significant attention as long as educational achievements of the working age population remain low. Our data shows that, nationally, only 12% of the population aged 15-64 years have completed senior secondary or higher education. In the Interior, this percentage is as low as 3%. However, the efforts of the Government of Suriname to increase enrolment have been fruitful, as evidenced by the increased schooling of the younger cohorts of workers. Over time, this will increase the supply of skilled workers at a pace that the demand from the public administration is unlikely to match. Efforts are therefore needed to increase the pool of employment opportunities for skilled individuals.

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