Policy Brief 12
12____December 2023
Research Programme
CROSSING BORDERS
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Vocational Training and Employment in Senegal

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Senegal faces a significant challenge in equipping its youth with the requisite human capital necessary to unlock its economic potential. This challenge is exacerbated by the nation's youthful demographic profile – in 2020, 62% of the populace was under 25 years old – alongside a substantial working-age cohort, constituting 55% of the total population (Dasgupta et al., 2022). Owing to declining fertility rates, the proportion of the working-age demographic is anticipated to continue its ascent, projected to reach 58% by 2030 and 61% by 2060 (Ritchie et al., 2023). Concurrently, since 2015, over 30% of young individuals aged 15-29 fall into the category of NEET (Not in Education, Employment, or Training), with a disproportionately adverse impact observed among young women (World Bank, 2022).

Senegal stands to capitalise on its substantial workforce to accelerate economic growth and alleviate poverty. However, realising this demographic dividend necessitates a more robust economic appraisal of this resource, entailing enhanced productivity and its increased contribution to national production. To achieve this objective, Senegal has pledged, among other initiatives, to enhance the management of the education system and bolster technical and vocational training (hereafter referred to as TVET). The Plan Sénégal Emergent (2018) outlines strategies such as directing 30% of youth transitioning from the fundamental cycle towards TVET and elevating the proportion of graduates from this cycle enrolled in TVET from 8% in 2017 to 11.8% by 2023.

To secure the requisite funding for TVET, the Senegalese government instituted the Professional and Technical Training Financing Fund (Fonds de Financement de la Formation Professionnelle et Technique), commonly referred to as 3FPT, in 2014. This fund operates in conjunction with the initiatives of the National Office of Vocational Training (Office National de Formation Professionnelle - ONFPT), established in 1986. Annually, approximately 41 billion CFA francs (equivalent to 62.5 million euros) are allocated to TVET efforts by the country. Additionally, development partners such as the African Development Bank (AfDB) and LuxDev contribute to TVET financing, providing an annual sum of 15 billion CFA francs (equivalent to 22.8 million euros) (MEFPAI 2021).

TVET programmes throughout the country exhibit significant variations in content, duration, target demographics,

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and management approaches (whether organised or subsidised by the state). The rate at which graduates or certified individuals from these institutions enter the labour market fluctuates based on factors such as their place of residence, the duration of their training, and the sector of activity (Diagne and Sika, 2023). However, our understanding of the impact of TVET on the integration of young people and women in Senegal is incomplete. Specifically, we lack a comparative evaluation between the observed integration rate of TVET graduates and the integration rate they would have achieved had they not undergone TVET – an intrinsically unobservable rate corresponding to an alternative or "counterfactual" scenario.

To maintain or increase investment in TVET, it is imperative to assess its impact as objectively as possible. A positive impact could bolster the promotion of TVET among young people; while conversely, a negative impact could prompt adjustments in the implementation of TVET policies. Existing literature suggests that the impact of TVET is generally varied (J-PAL 2023; Alfonsi et al. 2020; Alzúa et al. 2016; Crépon et Prémand 2021; Hardy et al. 2019; Hirshleifer et al. 2014). In the present Senegalese context, limited training capacity and potential mismatches with business needs may constrain the extent of such impact. This highlights the crucial need for a rigorous and continuous evaluation of TVET effectiveness to optimise its advantages and ensure alignment with the country's economic and social objectives.

Empirical Exploration

We adopt a quasi-experimental approach to examine the impact of TVET Programmes on employment in Senegal. The "Enquête Harmonisée sur les Conditions de Vie des Ménages" (EHCVM) collected in 2018-2019 serves as the sole available and relevant database for this analysis. This survey offers the advantage of national coverage, encompassing all 14 regions and 45 departments, which serve as decentralised administrative units responsible for social issues. Furthermore, it provides comprehensive data on individuals' engagement in the labour market, their income levels, access to essential services such as education and healthcare, and their participation in TVET programmes. Importantly, it is essential to acknowledge that this study retains an exploratory nature due to inherent data limitations, which we will elaborate upon subsequently.

We focus on individuals aged 15 to 45 who have not undergone formal education[1]. The data comprises 3,346 observations. Accordingly, we proceed to estimate an equation of the following form:

$$(1)\ E_{id} = \beta_0 + \beta_1.\Omega_{id} + \beta_2.X_{id} + D_d + \varepsilon_{id},$$

where the dependent variable, E_{id}, encompasses the following probabilities:

- The likelihood of holding a specialised job: E_{id}=1 if individual *i* in department *d* occupies an intellectual or scientific role, or an intermediate profession such

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[1] *We limit ourselves to this subpopulation due to data availability. The EHCVM records participation in TVET Programmes only for individuals who have not attended formal education.*

as administrative, commercial or health-related. E_{id}=0 if the job is non-specialised.

- The probability of holding a formal job: E_{id}=1 if individual *i* in department d receives a payslip or files a tax return. E_{id}=0, if the job is informal.

- The logarithm of monthly income: measured by the salary of a salaried individual or the earnings derived from the individual's professional activity.

The variable Ω_{id} indicates whether individual *i* has undertaken TVET. The vector X_{id} encompasses a range of individual characteristics including age, gender, marital status, and the presence of children. The variable D_d represents a departmental fixed effect, capturing all fixed characteristics, observable or not, at the departmental level. The error term ε_{id}, accounts for unobserved heterogeneity at the individual level. Table 1 presents the descriptive statistics of the sample.

	Observations	Mean	Std
Has a job	3,346	0.9848	0.1225
Has a spezialised job	3,346	0.0158	0.1249
Has a formal job	873	0.1100	0.3130
Monthly income (in CFA francs)	1,532	85,397	145,074
Participation in TVET	3,346	0.0529	0.2239
Participation in TVET broadly defined (TVET, literacy courses, language courses)	3,346	0.1010	0.3014
Access TVET and agricultural support centers	3,346	0.0643	0.2452
Age	3,346	30,298	8,813
Female	3,346	0.3201	0.4666
Living in a union	3,346	0.6342	0.4817
Has children	3,346	0.2430	0.4289

Table 1: Descriptive statistics of the sample

Source : EHCVM 2018-19

On average, individuals in our sample are 30 years old, predominantly male (approximately 68%), and in a union (63%). Nearly 25% of them have children. Among those who have not pursued formal education, a small percentage report participation in TVET (5% and 10% broadly defined) or access to TVET Programme institutions (6%), although almost all report employment. As expected, very few individuals have a formal job (11%) or a specialised job (1.5%). The average monthly income from employment (salary or earnings from professional activity) is approximately 85,000 CFA or nearly 130 euros.

Figure 1 below illustrates the results of estimating the previous equation using the Ordinary Least Squares (OLS) method. It reveals a positive and significant correlation between participation in TVET and employment, particularly for formal employment and income. Interestingly, when differentiating between women and men, the correlation appears stronger among women, especially for formal employment and income.

Among individuals who have never pursued formal education, a positive correlation is evident between participation in TVET Programmes and engagement in the labour market in Senegal. This correlation holds true for both women and men.

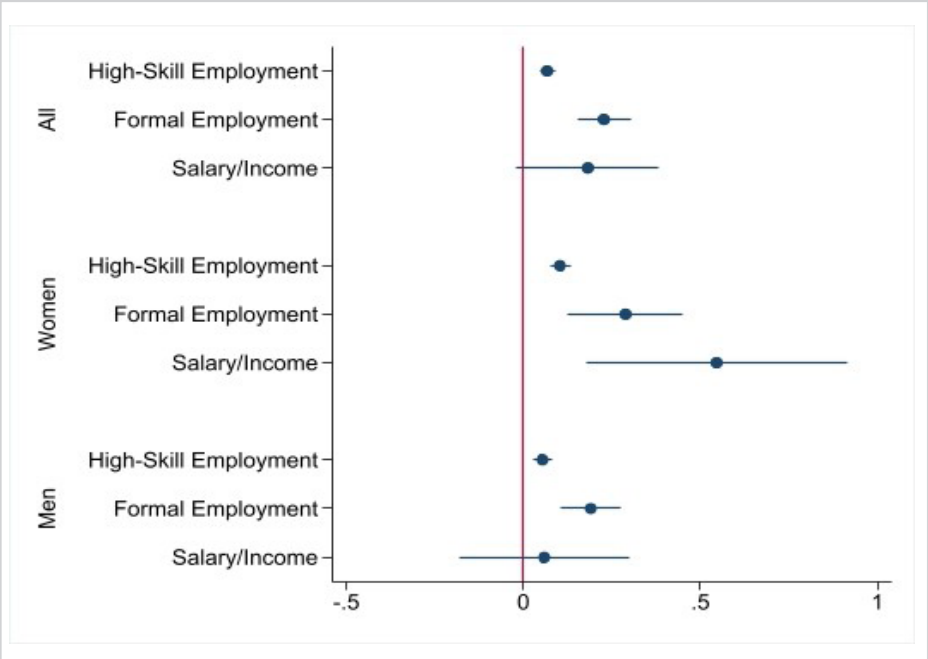

Figure 1: TVET and Employment Dynamics

Note : The bars on either side of the coefficient (the point) indicate the 95% confidence interval. When a bar crosses the red vertical line, the coefficient is not significantly different from zero.
Source : EHCVM 2018-19

Instrumental Variable Approach

We cannot interpret the positive correlation above as a direct causal relationship between TVET and employment. In effect, estimating the relationship between participation in vocational training and the probability of an individual accessing employment may be biased or erroneous due to unobservable factors, such as motivation or individual determination, which could influence both the decision to undergo TVET and the likelihood of finding employment. This highlights an issue of endogeneity that we must address in our estimation strategy.

To tackle the endogeneity issue, we adopt an Instrumental Variable (IV) approach. The proposed IV for participation in TVET is the individual's exposure to TVET supply. Ideally, we would measure this exposure by the distance between the supply and the interviewed individual's place of residence. In this scenario, the closer an individual is to a TVET centre, the higher their exposure to TVET. However, the EHCVM data does not provide geolocation information for training centres and individuals' places of residence. Instead, it indicates the presence or absence of a TVET centre or Agricultural Support Centre (known as *Centre d'Encadrement Agricole - CEA*) in the locality of residence[2]. Consequently, we consider that an individual is exposed to the TVET supply if such a centre exists in their locality.

Our identification hypothesis rests on the assumption that the presence of a TVET centre in a particular locality within the department is random[3], or the presence or absence of a TVET in the locality does not influence the selection of households' residences within a department.

The map (see *Figure 2*) shows the TVET and CEA available by department[4]. The Dakar, Fatick, Foundiougne, Koumpentoum and Nioro du Rip departments are the most well-endowed.

Figure 3 illustrates the results of the estimation using the IV approach. In contrast to the correlation analysis, this method does not corroborate that an individual's participation in TVET yields a positive and significant impact on employment variables, including for women.

However, the current data does not afford us the opportunity to move beyond this correlation to establish a causal link between participation in TVET Programmes and engagement in the labour market.

[2] *In Senegal, the Agricultural Supervision Centers provide training to farmers on agricultural techniques.*

[3] *As the geographical coordinates of the localities are not available, we are not currently able to carry out an analysis at a finer geographical level than at the departmental level.*

[4] *Only the TVET centers located within a Regional Directorate (DR) of the survey are included on the map.*

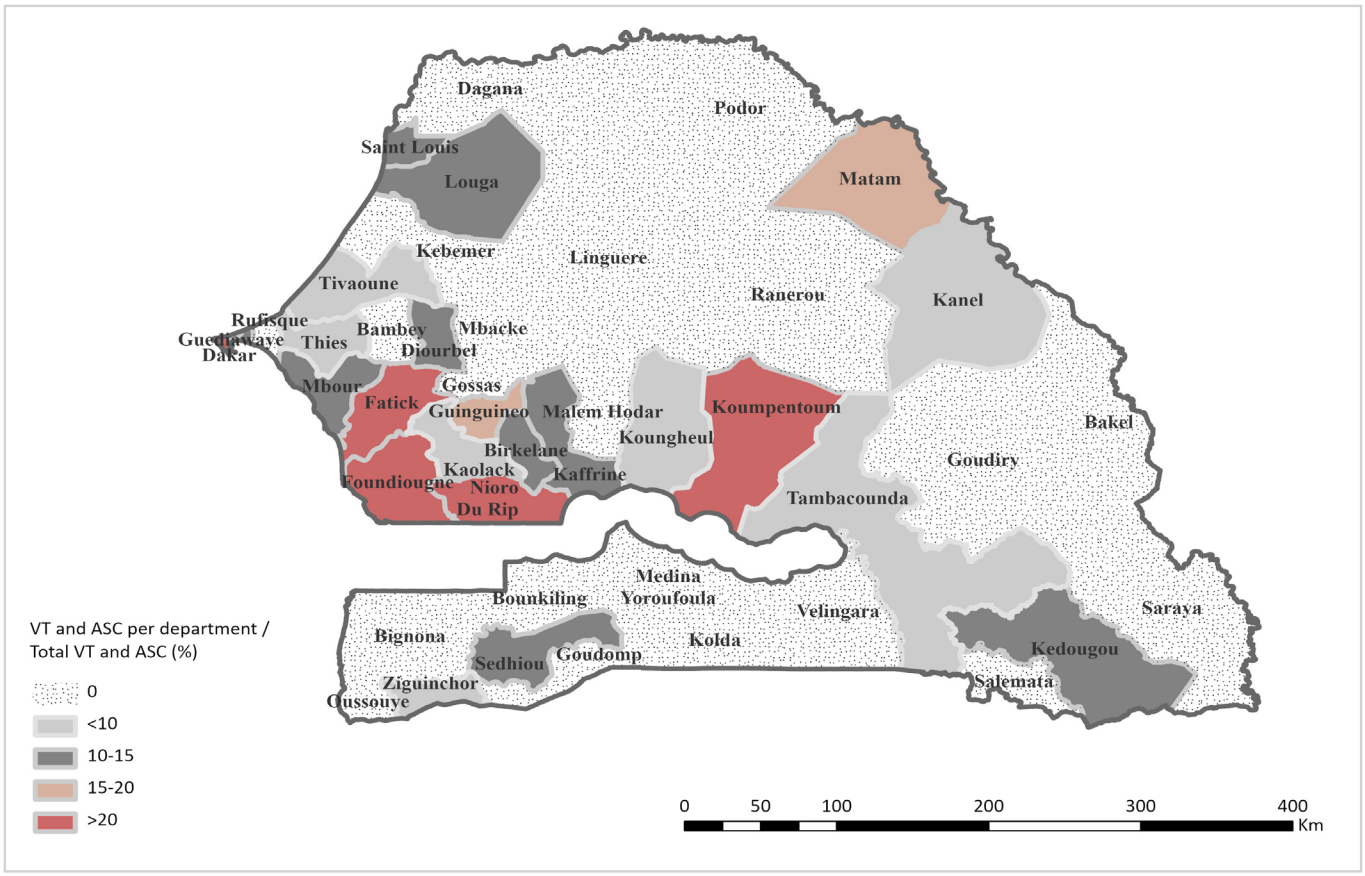

Figure 2: TVET Centers by department in Senegal
Source : EHCVM 2018-19

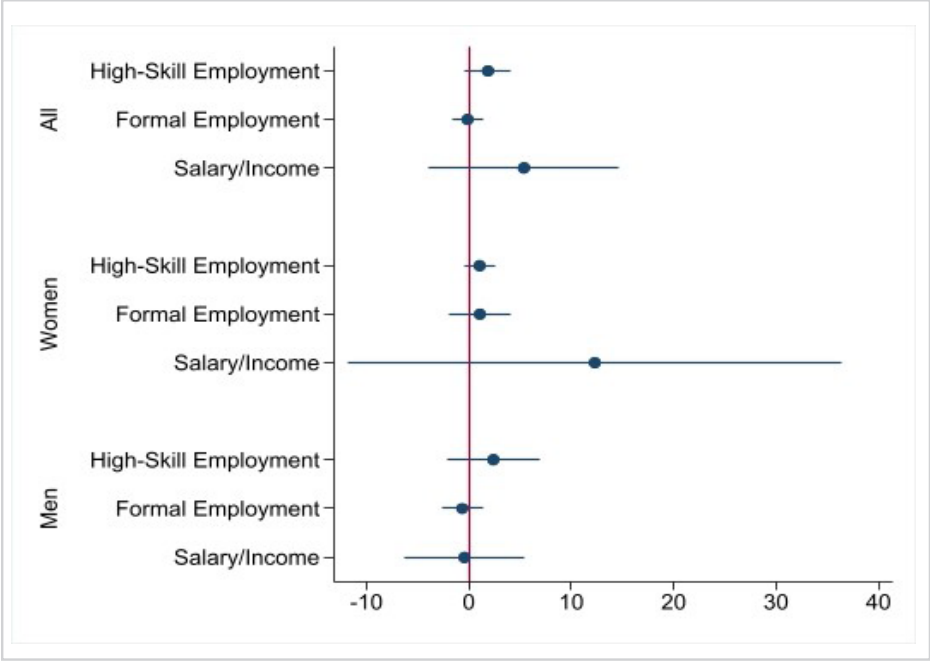

Figure 3 : The impact of TVET on employment dynamics using IV

Note: The bars on either side of the coefficient (the point) indicate the 95% confidence interval. When a bar crosses the red vertical line, the coefficient is not significantly different from zero.
Source : EHCVM 2018-19

Warning and Discussion

It is important to emphasise that the data exploitation for this IV strategy has notable limitations. The assumption that access to TVET Programmes significantly promotes participation in TVET is not always hold true. The data show a positive but not always significant correlation between these variables. Thus, we face a weak instrument problem, calling into question our IV strategy. Consequently, we cannot conclude on the existence of a causal link between TVET participation and employment dynamics. Several other factors contribute to the difficulty of making a statement on this causal link.

The first factor concerns the imprecision of the measurement of exposure to TVET Programmes. This imprecision is particularly significant for individuals living on the border of two localities, one with a TVET offer and the other without.

The second factor lies in the measurement of TVET participation. The EHCVM survey imprecisely measures participation in TVET. The measurement ignores the diversity in the types of vocational training (artisanship, formal and informal training, training with or without certification, post-initial training TVET, etc.). Moreover, it does not capture the entirety of the TVET offer, as we observe TVET participation only for women and young people who have never been to school. Finally, it does not allow for positioning TVET participation in the life cycle of the surveyed individuals, while this information is important for improving targeting in the guidance of young people.

The third factor concerns the lack of the full characterisation of TVET supply accessible to a young person residing in a given locality. If a young person undergoes TVET in a specific field, it is almost impossible to describe the alternative TVET supply to which the individual could have aspired. This lack of information limits the analysis of the constraints young people face when choosing which TVET to undertake.

Obtaining new data is necessary to achieve a comprehensive understanding of the impact of TVET Programmes, going beyond simple correlations and enabling the establishment of causal relations.

The solution to these two problems involves improving household survey and administrative data collection systems:

- *Enhance survey data*: - The questionnaires for surveys (EHCVM, employment survey, demographic and health survey, etc.) can be expanded to better measure exposure to TVET Programmes, participation rates of eligible and exposed populations in TVET, and to provide a more comprehensive account of the diversity of TVET.

  This can be accomplished by adding a dedicated module on vocational training in the questionnaires. Secondly, it is advisable to select

sample sizes relevant for this type of analysis in order to measure the impact of TVET at a disaggregated level (region or department). This requires collaboration with the National Agency of Statistics and Demography (ANSD) and institutions that provide technical or financial support for these surveys. Examples include the World Bank for EHCVM surveys, the World Bank and the International Labour Organisation for employment surveys, and USAID and UNICEF for demographic and health surveys.

- *Improve administrative data*: - Simultaneously, it is advisable to expand the coverage of administrative data by adding variables capturing the existence of TVET Programmes infrastructure, the types of training offered, and the frequency of data collection. This would help consolidate existing databases and create a comprehensive initial mapping of formal training infrastructures. This mapping can be associated with existing initiatives aiming to produce an employer-employee database[5].

[5] *A database covering the period 2015-2020 has been constructed by a team involving the National Agency of Statistics and Demography (ANSD), the General Directorate of Taxes and Domains (DGID), the Senegalese Retirement Benefits Institute (IPRES), the Social Security Fund (CSS), and the Directorate of Labor Statistics (DSTE), along with university researchers. This initiative deserves support to extend the temporal coverage.*

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