



Does Education Spending Matter? Long-term Effects on Child Outcome in Indonesia

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Abstract. Education-driven human resource development plays a vital role in fostering inclusive economic growth and ensuring the long-term well-being of communities, particularly in underdeveloped rural areas of developing countries. In Indonesia, decentralization, initiated in 2001, has granted local governments the responsibility to manage education, leading to 98% of the population completing primary education, and significant improvements in secondary school enrollment rates. Despite these achievements, many educated individuals struggle to secure decent employment, with a significant proportion still engaged in informal work with low wages and limited social security benefits. This raises concerns about whether public education spending has effectively enhanced long-term labor market outcomes for children in adulthood. This study investigates the relationship between government education spending per capita and labor market outcomes. To measure the extent of the influence of education policies in Indonesia during the decentralization period, this study uses government spending data on education functions allocated by each district/city in Indonesia during the period 2007-2018. Data on individual-level labor market outcomes are taken from the National Labor Force Survey (Sakernas) conducted in 2019-2023 by the Central Statistics Agency. the study expected to provide insights into the broader implications of public education policy on human capital development and labor market dynamics in Indonesia.

Keywords: Education Spending, Children, Labor Outcome, Sakernas

1 Introduction

Local governments commonly use education as a strategic approach to promote economic development in their respective regions. Government investment in education is recognized as a crucial tool in addressing significant economic challenges, including economic recessions, poverty, and unemployment (Haupt, 2012). Public funding for education at all levels is regarded as a potential investment to improve the quality of human resources in the regions. Fundamentally, enhancing human resources in terms of skills, knowledge, and individual capacities is often considered a key element in driving the economic progress of developing countries and improving their living standards. In this context, primary and secondary education plays a crucial role in human resource development. Governments often set explicit targets to expand public access to education. As a result, this effort can increase the number of potential workers and help meet the demand for skilled and semi-skilled labor across various economic sectors (Dissou et al., 2016).

Since 2001, local governments in Indonesia's regencies and cities have allocated a significant portion of their budgets to education. Figure 1a indicates that most regencies and cities allocate about 30-40% of their total budgets to education. Over the past two decades, educational achievements in Indonesia have shown notable progress. Access to education has improved significantly on average (see Figure 1b). A vast majority of Indonesians, approximately 98%, have completed elementary school. Furthermore, between 2001 and 2023, the net enrollment rates for junior and senior secondary schools have increased from 63% and 40% to 77% and 61%, respectively. Although the quality of government efforts in enhancing secondary education participation can still be questioned, it is undeniable that access to education and the number of educated individuals in Indonesia have seen a tangible increase.

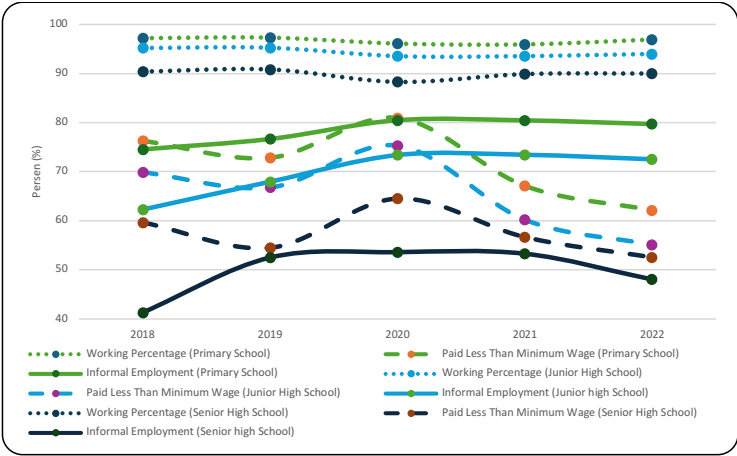


Figure 1. Employment Outcomes of Educated Workers in Indonesia

Source : National Labor Force Survey (Sakernas) 2018-2022

On the other hand, a primary concern in evaluating government performance lies in understanding how these educational achievements translate into improved societal welfare indicators. From the perspective of human capital accumulation theory, high-quality education enhances individual productivity, leading to better outcomes or returns. Thus, education plays a pivotal role in preparing individuals to enter the workforce and equipping them with skills for lifelong learning. However, after two decades of decentralization in Indonesia, educational achievements measured by individual outcomes in the labor market have not shown relatively favorable results. While school participation rates have risen, most educated individuals in Indonesia still face limited access to decent job opportunities upon completing their education. Government efforts to improve the quantity and quality of education appear insufficient to enhance societal welfare in the labor market. A significant portion of educated individuals who are employed remain in informal sectors, earning wages below the minimum standard. This issue raises an important question: is delegating the responsibility for managing education, particularly mandatory education, to local governments the right decision? Decentralization has been one of the most hotly debated policy issues. Proponents of decentralization argue that local stakeholders, who are less constrained by national bureaucracy and better understand the specific needs of their regions, are more capable of managing education than the central government. Consequently, it is suggested that decentralization reforms have the potential to provide higher-quality education and improve student outcomes. This study seeks to broadly examine how decentralization performance, reflected in the realization of education spending in various regions in Indonesia, relates to student outcomes in the labor market.

Fundamentally, several studies have explored the impact of education spending on various aspects of education, but there remain significant research gaps in certain areas. First, although many studies examine the impact of education spending on access to education and academic achievement, there is limited analysis of its effects on long-term individual outcomes in adulthood. Most existing studies focus on short-term impacts, such as increases in school participation rates or graduation rates, without considering how education spending influences the types of jobs individuals secure in adulthood or their overall quality of life. Research exploring the relationship between education spending and long-term labor market outcomes is scarce, particularly those linking educational achievements to the types of jobs individuals access after entering the workforce.

Second, in the context of fiscal decentralization, existing research largely focuses on the effectiveness of education spending allocation at the regional level without examining its impact on the labor market. While studies such as Lewis (2022) evaluate the distribution of education budgets across regions, they do not address how fiscal decentralization affects workforce quality and the types of jobs available in different

areas. This is a critical gap to explore, considering that fiscal decentralization has the potential to create disparities in workforce quality between regions, ultimately influencing the employment sectors accessible to education graduates.

Moreover, although education spending has been a central focus of many studies, analyses examining its impact during the era of fiscal decentralization remain very limited. Most existing research tends to focus on the general impact of education or on education policies at the central government level, without considering how decentralization influences budget distribution and education quality at the regional level. Fiscal decentralization provides local governments with greater autonomy in allocating education budgets, ideally aligning resources more closely with local needs. However, few studies explore how these policies affect long-term educational outcomes and their impacts on regional labor markets. Existing research, such as Lewis (2022), primarily assesses the distribution of education budgets between regions without linking these distributions to the quality of education produced or their impacts on labor market outcomes. This gap is critical to address, given the role of fiscal decentralization in shaping education policies that can significantly influence the quality of education and, ultimately, the job opportunities available to graduates in different regions.

Third, there is a methodological gap in previous research, which often relies on simple regression analysis to evaluate the relationship between education spending and labor market outcomes. This approach is limited in capturing the complexity of inter-variable relationships, especially in the context of fiscal decentralization, which involves various individual and regional-level factors. This study seeks to analyze the relationship between education spending and labor market outcomes at the individual level using a multilevel regression approach. Few studies have utilized multilevel regression, which is better suited to capture the hierarchical influences of individual-level variables, such as education and demographic characteristics, as well as regional-level variables, such as education spending and fiscal conditions.

The multilevel regression approach enables researchers to identify how factors operating at the individual and regional levels interact and simultaneously influence labor market outcomes. By modeling these relationships in greater detail, multilevel regression provides deeper insights into how variations in education spending, along with regional fiscal and demographic conditions, impact the quality and types of jobs accessible to individuals. Consequently, this approach offers a more accurate and comprehensive understanding of the dynamics between education spending and labor market outcomes in the context of fiscal decentralization.

This study aims to make a significant contribution to the existing literature by thoroughly examining the complex relationship between government spending on the education sector and labor market outcomes. The primary focus of the research is to answer the question of how government spending influences labor market outcomes. By exploring these aspects, the study is expected to provide valuable insights into the broader implications of education policies on human resource development and labor market dynamics.

2 Literature Review

Education spending has long been a central focus of public policy in various countries, recognizing the importance of education as a foundation for individual development and socioeconomic progress. As an investment in human resources, education spending is expected to enhance both the quality and accessibility of education, ultimately yielding positive outcomes for individuals. These outcomes encompass various aspects, including academic achievement, market-relevant skills, and participation in economic and social life. This subsection explores previous empirical studies related to the performance of education spending.

One seminal study by Duflo (2004) examined the medium-term consequences of increased human capital accumulation in developing countries. The study focused on the Indonesian government's education policy, which constructed over 61,000 elementary schools between 1974 and 1978. The findings revealed that a 10 percentage point increase in the proportion of elementary school graduates in the labor force resulted in a 4–7% increase in formal labor force participation.

Akresh et al. (2023) extended Duflo's work by evaluating the impact of education policies on the welfare of educated populations. Their findings showed that, in adulthood, men who experienced the impact of school construction during that period were more likely to work in the formal sector and in non-agricultural industries. Households where at least one parent benefited from school construction had higher living standards, more assets, and paid more taxes. Furthermore, the benefits extended to subsequent generations, with higher educational participation rates.

Galiani et al. (2008) analyzed the impact of school decentralization on educational quality in Argentina. Their research showed that decentralization had a positive effect on students' average test scores. However, the benefits of decentralization did not reach impoverished communities. While decentralization brought policies closer to local needs, enabling improved outcomes for some, impoverished populations often did not benefit optimally. This suggests that in contexts like Indonesia, with significant disparities in decentralization implementation, mechanisms for oversight and additional support in disadvantaged regions are crucial to ensure equitable benefits.

Jackson et al. (2015) found that a 10% annual increase in per-student spending led to a 0.27-year increase in average schooling duration, a 7.25% increase in wages, and a 3.67 percentage point reduction in education-related costs, alongside a decrease in adult poverty. Their study also indicated that the effects of education spending were significantly larger for children from low-income families. Similarly, Langørgen and Løkken (2023) found that school spending had a substantial and significant impact on boys' future incomes, particularly for children from low- and middle-income families, whereas the effects on girls were smaller and statistically insignificant. These findings are particularly relevant in the Indonesian context, where the government allocates 20% of the national budget to education, aiming to improve educational outcomes and societal well-being in the long term.

Lewis (2023) examined the impact of Indonesia's 20% education spending mandate on individual educational outcomes, measured by national exam scores and net enrollment rates. The findings indicated no significant effects on school participation or student exam scores. Lewis suggested that the mandate might have short-term benefits, such as improved literacy and numeracy skills, or long-term impacts related to employment, income, and poverty alleviation, as evidenced in other countries. This aligns with Leer (2016), who used a Difference-in-Difference approach to assess the impact of education decentralization on student outcomes and found no significant influence of education spending on academic performance.

In the labor market context, Chauvin (2018) analyzed the influence of education investment on regional labor market outcomes and potential spillover effects. Chauvin argued that education could enhance local productivity, but its potential benefits to local economies might be diluted if educated workers migrate for better opportunities or if skill supply growth exceeds demand. Using Brazil's FUNDEF program as a source of exogenous variation in local government education budgets, Chauvin found positive individual-level effects, including increased wages and educational attainment. However, these effects were often concentrated among individuals who migrated out of their education regions. At the regional level, increased education spending led to higher educational achievements, particularly in basic education, but the growth in educated workers worsened local labor market conditions due to insufficient demand.

The studies reviewed demonstrate that education investment significantly improves societal quality of life, with substantial potential in developing countries, including Indonesia. Increased access to education, whether through infrastructure development or larger budget allocations, promotes formal labor participation, household income growth, and intergenerational poverty reduction. Additionally, decentralization offers opportunities to tailor policies to local needs.

However, despite these positive impacts, education spending often falls short of its potential benefits. Increased budgets alone are insufficient to produce better educational outcomes without appropriate fund allocation strategies. Unequal distribution, weak oversight, and insufficient attention to learning quality reduce the effectiveness of education spending. Moreover, in some areas, increased education access does not always align with labor market demands, limiting its impact on unemployment reduction and overall welfare improvements.

3 Research Method

3.1 Data

This study utilizes secondary data from two main sources. Data on education expenditures at the regency/city level were obtained from the average government spending allocation for education functions in each regency/city in Indonesia during the 2007–2018 period. This data serves as the primary variable to measure the magnitude of expenditures allocated by local governments to the education sector in each region during that time. Education expenditures are calculated as the average expenditure per school-age population in each regency/city, based on the assumption that the allocation reflects the government's efforts to support education in the region.

Data on labor market outcomes at the individual level were sourced from the National Labor Force Survey (Survei Angkatan Kerja Nasional or Sakernas), conducted by Indonesia's Central Bureau of

Statistics (BPS) during the 2019–2023 period. This survey includes detailed information on individuals' employment status and characteristics, such as job type (formal or informal), employment sector, and skill level. The study specifically focuses on individuals born between 2000 and 2002, who were 6–7 years old in 2007, and therefore likely benefited fully from education expenditures during the 2007–2018 period. This cohort represents a suitable sample for assessing the long-term impact of education expenditures on labor market outcomes.

3.2 Empirical Strategy

This study adopts an empirical model that has been used in previous studies (Duflo, 2001; Akresh et al., 2023; Chauvin, 2024) to measure the impact of education spending on labor market outcomes. The research model is formulated as follows:

$$Y_{ijt} = \alpha + \beta_1 \text{Spending}_j + \beta_2 \text{Exp}_j + \beta_3 \text{Spending} * \text{Exp}_j + X_i \psi + \delta_t + \varepsilon_{ijt} \quad (1)$$

The dependent variable Y_{ijt} represents the labor market outcomes for individual i born in district/city j in year t . This variable is measured by five main indicators: (1) the probability of being employed, (2) the probability of working in the formal sector, (3) the probability of working in the informal sector, (4) the probability of working in the low-skill sector, and (5) the probability of working in the middle-class employment sector. The main independent variables in this model are *Spending* and *Exp*. *Spending* is the average government spending on education per school-age population in district/city j during the period 2007–2018, which describes the amount of education funding allocation in each region. *Exp*, or potential work experience, is calculated as the difference between the survey year and the individual's school graduation year, thus becoming an indicator of the length of an individual's participation in the labor market.

The interaction between *Spending* and *Exp*, denoted by *Spending* * *Exp*, is intended to capture the cumulative impact of education spending on an individual's career development, especially during the first five years after entering the labor market. In addition, this model also includes control variables in the form of a vector X_i which includes several individual characteristics, namely gender, non-formal education experience (such as training), location of residence (urban or rural), marital status, and employment sector. The presence of these control variables aims to reduce estimation bias by controlling for individual characteristics that may affect labor market outcomes. With a variable structure that includes various aspects, this model attempts to provide a comprehensive picture of the effect of education expenditure at the regional level on various aspects of labor market outcomes for individuals.

This study uses the Multilevel Modeling (MLM) estimation method to accommodate the hierarchical structure of the data used. This method considers that the data has two levels, namely individuals as the first level and districts/cities as the second level. MLM was chosen because it can capture variations between individuals within one district/city, as well as variations between different districts/cities. Thus, the resulting estimates will be more accurate compared to conventional linear regression. In the context of this study, MLM allows us to identify the effect of education expenditure at the district/city level on individual labor market outcomes while controlling for individual characteristics and taking into account data clustering at the district/city level. This model also allows for variation in coefficients across districts/cities, so we can see whether the impact of education spending on the labor market varies across regions. This approach will provide a comprehensive estimate of how government spending on education at the district/city level affects various aspects of the individual labor market, while identifying differences in impacts across different regions.

4 Results and Discussion

The regression results show that education spending has a negative and significant effect on a person's likelihood of working, with a coefficient of -0.058. This shows that individuals who come from areas with high education spending do not necessarily have better job prospects. On the other hand, the potential experience variable has a significant positive effect (0.113), which means that more experience increases a person's chances of working. Furthermore, the interaction between education spending and experience is not significant, indicating that work experience does not substantially change the impact of education on job opportunities.

In the formal sector, education spending has a significant negative effect with a coefficient of -0.088. This shows that high education spending does not guarantee that someone will be able to work in the formal sector. Those who come from areas with relatively high education spending actually have a lower chance of entering the formal sector. Furthermore, potential experience does not have a significant effect on the formal sector (-0.066), indicating that work experience alone is not enough to increase the chances of working in this sector without the support of relevant skills and education. The interaction between education and experience is also not significant, indicating that the impact of education on the formal sector does not change much with increasing experience.

The results of this study are in line with the findings of Chauvin (2018) who explained that the surplus of educated workers is often not absorbed by the formal labor market, forcing individuals to enter the informal sector. In addition, Chauvin also found that migration is often an alternative for educated workers to seek opportunities outside their educational area, which is relevant to the finding that higher education has not optimally increased formal employment opportunities in their place of origin. These results indicate that there is a potential mismatch between education investment and labor market needs, as explained by Glewwe and Kremer (2006) where increased education spending is often focused on educational inputs such as infrastructure, which do not always have a direct impact on improving work skills.

The findings of this study are in contrast to Duflo (2004), who found that the construction of elementary schools in Indonesia increased formal labor force participation by 4-7%. In this study, education spending did not show a significant positive impact on formal employment opportunities. The main difference between the two studies can be explained by the specific focus on the type of education spending. Duflo's study highlights education spending that is clearly allocated for school infrastructure development, which is a productive expenditure with a direct impact on increasing access to education. Meanwhile, this study uses total education spending, which includes various components such as personnel spending, goods spending, and capital spending.

In contrast, in the informal sector, education spending has a significant positive effect (+0.030) indicating that higher education spending actually increases a person's chances of working in the informal sector. This may be because, in some cases, individuals with higher education may not immediately find formal employment and end up choosing the informal sector as a temporary alternative. Potential experience has a much stronger effect in the informal sector (+0.182), indicating that work experience is very important in encouraging participation in this sector. More interestingly, the interaction between education spending and experience shows a significant negative effect (-0.011 to -0.052), indicating that with increasing experience, the positive impact of education spending on the informal sector decreases. In other words, in the long run, education and experience can help individuals exit the informal sector.

Table 1. Multilevel Logit Regression Estimates of Labor Market Outcomes

Variable	Dependent Variable				
	Dummy Bekerja	Dummy Formal Sector	Dummy Informal Sector	Dummy Low skill Job Sector	Dummy Middle Class Job
Ln Education Spending	-0.058*** (0.021)	-0.088*** (0.021)	0.030** (0.014)	0.032 (0.024)	-0.006 (0.008)
Potential Experience	0.113* (0.068)	-0.066 (0.064)	0.182*** (0.054)	0.120 (0.090)	-0.017 (0.031)
<i>The interaction between educational spending and potential experience</i>					
Spending * 2 years experience	-0.006 (0.005)	0.005 (0.005)	-0.011*** (0.004)	-0.009 (0.007)	0.002 (0.002)
Spending * 3 years experience	-0.011 (0.010)	0.013 (0.010)	-0.025*** (0.008)	-0.020 (0.013)	0.003 (0.005)
Spending * 4 years experience	-0.015 (0.015)	0.023 (0.014)	-0.039*** (0.012)	-0.029 (0.020)	0.004 (0.007)
Spending * 5 years experience	-0.023 (0.020)	0.029 (0.019)	-0.052*** (0.016)	-0.038 (0.027)	0.005 (0.009)
<i>Control Variables</i>					

Variable	Dependent Variable				
	Dummy Bekerja	Dummy Formal Sector	Dummy Informal Sector	Dummy Low skill Job Sector	Dummy Middle Class Job
Male	-0.081*** (0.006)	0.045*** (0.006)	0.035*** (0.005)	-0.013 (0.008)	0.011*** (0.003)
Training	0.063*** (0.008)	0.053*** (0.008)	0.009 (0.007)	-0.031*** (0.011)	0.018*** (0.004)
Live in City	0.021*** (0.007)	0.034*** (0.007)	-0.016*** (0.005)	0.018** (0.009)	0.004 (0.003)
Married	-0.068*** (0.009)	-0.108*** (0.008)	0.040*** (0.007)	-0.011 (0.012)	0.004 (0.004)
Industry Sector	-	0.360*** (0.025)	0.193*** (0.021)	0.193*** (0.026)	0.058*** (0.008)
Agriculture Sector	-	-0.102*** (0.009)	0.675*** (0.007)	-0.430*** (0.010)	-0.005 (0.004)
Constant	0.979*** (0.317)	1.432*** (0.320)	-0.463** (0.229)	0.241 (0.385)	0.102 (0.129)
Observations	25,759	25,759	25,759	13,318	9,534
Number of groups	99	99	99	99	99

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In addition, education spending does not show a significant effect (+0.032) effect on the probabilities of individuals entering the lower-skill job sector, indicating that increasing education spending does not directly affect a person's chances of working in this sector. Potential experience is also insignificant (+0.120), indicating that those with experience may not make this sector one of their job options. The interaction between education spending and experience also does not show significant results. large in this sector, education spending also does not show a significant effect (-0.006) on the probabilities of individuals entering the middle class job, indicating that increasing education spending does not have a direct impact on job opportunities in this sector. Potential experience is also insignificant (-0.017), indicating that work experience alone is not enough to increase participation in the middle-class job sector. The interaction between education spending and experience also does not show a significant impact, indicating that the combination of education and experience takes longer to affect job opportunities in this sector.

Several control variables also have significant effects on individual labor market outcomes. First, gender has a significant effect on several labor market outcomes. Men are less likely to be employed overall than women (-0.081), but they are more likely to work in the formal (+0.045) and informal (+0.035) sectors. In low-skilled jobs, gender does not show a significant effect, while in middle-class jobs, men have a slight advantage (+0.011), although the effect is relatively small. This indicates that the formal sector and middle-class jobs are still dominated by men, while women are more active in informal jobs and other sectors. Second, job training is shown to have a positive and significant impact on almost all labor market outcomes. Training increases a person's chances of being employed (+0.063) and significantly encourages participation in the formal sector (+0.053). However, training does not have a significant impact on the informal sector, indicating that jobs in this sector do not require many specialized skills. Training even has a negative effect on low-skill jobs (-0.031), indicating that individuals who receive training tend to avoid jobs in this sector. In contrast, training has a positive effect on middle-class jobs (+0.018), confirming that training provides greater opportunities for high-quality jobs.

Geographical factors, such as living in an urban area, also have a significant effect. Individuals living in an urban area are more likely to be employed in general (+0.021) and have a greater chance of working in the formal sector (+0.034). However, they are less likely to be involved in the informal sector (-0.016), which is often more prevalent in rural areas. Living in an urban area is also positively associated with the

chance of working in the low-skill sector (+0.018), although it is not significant for middle-class jobs (+0.004). These results suggest that urban areas offer more formal employment opportunities, but also include opportunities for low-skill jobs.

Marital status also has a variable effect on the labor market. Married individuals have lower odds of working overall (-0.068) and in the formal sector (-0.108). In contrast, they are more likely to work in the informal sector (+0.040), which may be due to the time flexibility offered by this sector. However, marital status does not significantly affect low-skilled jobs (-0.011) or middle-class jobs (+0.004). This result suggests that greater household responsibilities, especially for married individuals, may reduce their participation in the formal sector which requires a greater time commitment. The regression results also show significant differences between those working in the industrial sector and the agricultural sector in influencing labor market outcomes. Working in the industrial sector has a significant positive effect on the odds of working in the formal sector (+0.360), informal sector (+0.193), and low-skilled jobs (+0.193), reflecting the role of this sector as a cross-sector labor absorber with a dominance of formal organized employment. On the other hand, employment in the agricultural sector shows the opposite relationship, with a significant negative effect on the probability of employment in the formal sector (-0.102) and low-skilled jobs (-0.430). However, the agricultural sector has a very large positive effect on the probability of employment in the informal sector (+0.675), reflecting the dominance of informal employment in this sector, which is often based on small businesses or family workers. The effect of the agricultural sector on middle-class employment is insignificant (-0.005), while the effect of the industrial sector tends to be small but positive (+0.058). Overall, the industrial sector supports formality of employment and diversification of opportunities across sectors, while the agricultural sector remains the main base of informal employment, with limited contribution to higher-quality employment.

The regression analysis at this stage also explores in more depth how the benefits of education spending on labor market outcomes vary by individual characteristics and socio-economic context. By breaking down the analysis by specific categories—males only, urban dwellers, general high school graduates, and vocational school graduates—it is hoped that it will provide more focused insights into who benefits most from education investments. This approach allows for the identification of distinct patterns in the effects of education on employment opportunities in the formal, informal, low-skilled, and middle-class sectors, while also revealing the dynamics of the interaction between education, work experience, and individual context over the long run. The results of these estimations can be seen in detail in Table 5.2, which presents the regression coefficients and interaction terms for each category, providing a deeper understanding of the variation in the benefits of education across different groups in society.

First, the estimation results show that men receive lower benefits from education spending than women. The coefficient of the interaction term $\text{Ln Education Spending} \times \text{Male}$ shows significant negative results in almost all major sectors: labor force participation (-0.039), formal sector (-0.066), and middle-class jobs (-0.009). This suggests that men receive lower benefits from education spending than women in these sectors. The effect on the informal sector (+0.026**) suggests that there is a small benefit from education spending for men to work in this sector, although the contribution is relatively small. In the low-skilled jobs sector, the impact is insignificant (+0.011). Overall, these results indicate that men receive more limited benefits from education spending, with the largest negative impacts in the formal sector and labor force participation in general.

For individuals living in cities, the results of the interaction term $\text{Ln Education Spending} \times \text{Live in City}$ show a unique pattern. The coefficients are significantly negative on labor force participation (-0.066), formal sector (-0.079), and low-skill employment sector (-0.014), indicating that those living in cities receive lower benefits from education spending in these sectors. In the informal sector (+0.033), there is a significant positive impact, indicating that education provides opportunities for individuals in cities to enter the informal sector. The impact on middle-class employment is not significant (+0.005). These results indicate that individuals in cities tend to receive lower benefits from education spending in terms of access to formal and low-skill employment, but have greater opportunities in the informal sector.

Furthermore, the results of the interaction term $\text{Ln Education Spending} \times \text{General High School Graduates}$ indicate that this group receives very limited benefits from education spending. The coefficients are significantly negative for labor force participation (-0.003) and formal sector (-0.002), indicating that education spending does not significantly improve their opportunities in the labor market. The impacts on the informal sector (+0.001), low-skill jobs (+0.002), and the middle class (+0.000) are insignificant, further highlighting the limited benefits of education for general high school graduates. Overall, education provides only small additional benefits for this group, especially in the formal sector.

Table 2. Results of Multilevel Regression Estimation of Labor Market Outcomes Based on Individual Socio-Demographic Characteristics

VARIABLES	Male					Live in City					General High School Graduates					Vocational High School Graduates				
	Work	Formal Sector	Informal Sector	Low skill Job Sector	Middle Class Job	Work	Formal Sector	Informal Sector	Low skill Job Sector	Middle Class Job	Work	Formal Sector	Informal Sector	Low skill Job Sector	Middle Class Job	Work	Formal Sector	Informal Sector	Low skill Job Sector	Middle Class Job
Ln Education Spending	-0.038* (0.022)	-0.054** (0.022)	0.017 (0.015)	0.030 (0.025)	-0.002 (0.008)	-0.066*** (0.022)	-0.079*** (0.022)	0.014 (0.016)	0.012 (0.026)	-0.010 (0.009)	-0.050** (0.020)	-0.078*** (0.020)	0.029** (0.014)	0.029 (0.024)	-0.007 (0.008)	-0.046** (0.019)	-0.074*** (0.020)	0.029** (0.014)	0.029 (0.024)	-0.005 (0.008)
Ln Education Spending * Specific Group Variable	-0.039*** (0.013)	-0.066*** (0.012)	0.026** (0.010)	0.011 (0.018)	-0.009 (0.006)	0.006 (0.016)	-0.029* (0.015)	0.033*** (0.013)	0.057*** (0.021)	0.005 (0.007)	-0.003** (0.001)	-0.002* (0.001)	-0.001 (0.001)	0.002 (0.002)	0.000 (0.001)	0.014*** (0.002)	0.013*** (0.001)	0.001 (0.001)	-0.001 (0.002)	-0.000 (0.001)
Potential Experience	0.119* (0.068)	-0.058 (0.064)	0.180*** (0.054)	0.133 (0.090)	-0.013 (0.032)	0.083 (0.069)	-0.106 (0.065)	0.191*** (0.055)	0.175* (0.092)	-0.021 (0.032)	0.099 (0.068)	-0.074 (0.064)	0.175*** (0.054)	0.123 (0.090)	-0.016 (0.032)	0.131* (0.068)	-0.054 (0.064)	0.187*** (0.054)	0.118 (0.090)	-0.011 (0.032)
<i>The interaction between education spending, potential experience and specific control Variables</i>																				
Spending * 2 years experience	-0.045*** (0.014)	-0.062*** (0.013)	0.016 (0.011)	0.001 (0.019)	-0.007 (0.007)	-0.003 (0.005)	0.008 (0.005)	-0.011*** (0.004)	-0.014* (0.007)	0.001 (0.002)	-0.008 (0.005)	0.002 (0.004)	-0.010** (0.007)	-0.008 (0.002)	0.002 (0.002)	0.003 (0.005)	0.014*** (0.005)	-0.012*** (0.004)	-0.010 (0.007)	0.002 (0.002)
Spending * 3 years experience	-0.052*** (0.016)	-0.055*** (0.016)	0.002 (0.013)	-0.011 (0.022)	-0.006 (0.008)	-0.007 (0.010)	0.019* (0.010)	-0.026*** (0.008)	-0.028** (0.014)	0.003 (0.005)	-0.014 (0.010)	0.009 (0.008)	-0.024*** (0.008)	-0.020 (0.014)	0.003 (0.005)	-0.003 (0.010)	0.023** (0.010)	-0.026*** (0.008)	-0.021 (0.014)	0.002 (0.005)
Spending * 4 years experience	-0.058*** (0.020)	-0.047** (0.019)	-0.012 (0.016)	-0.025 (0.027)	-0.006 (0.010)	-0.009 (0.015)	0.031** (0.015)	-0.040*** (0.012)	-0.041** (0.020)	0.004 (0.007)	-0.016 (0.015)	0.022 (0.014)	-0.038*** (0.012)	-0.028 (0.020)	0.004 (0.007)	-0.008 (0.015)	0.033** (0.014)	-0.041*** (0.012)	-0.032 (0.020)	0.003 (0.007)
Spending * 5 years experience	-0.067*** (0.024)	-0.044* (0.023)	-0.024 (0.019)	-0.033 (0.033)	-0.005 (0.012)	-0.015 (0.020)	0.039** (0.020)	-0.055*** (0.019)	-0.053** (0.016)	0.006 (0.010)	-0.024 (0.020)	0.026 (0.016)	-0.051*** (0.016)	-0.037 (0.009)	0.005 (0.020)	0.016 (0.019)	0.038** (0.016)	-0.055*** (0.027)	-0.039 (0.009)	0.003 (0.009)
<i>Control Variables</i>																				
Male	-0.477*** (0.173)	-0.877*** (0.164)	0.396*** (0.138)	0.110 (0.213)	-0.104 (0.083)	0.081*** (0.006)	0.045*** (0.006)	0.035*** (0.005)	-0.013 (0.008)	0.011*** (0.003)	0.069*** (0.006)	0.034*** (0.005)	0.035*** (0.005)	-0.010 (0.008)	0.011*** (0.003)	0.072*** (0.006)	0.036*** (0.006)	0.036*** (0.005)	-0.011 (0.008)	0.011*** (0.003)
Training	0.062*** (0.008)	0.052*** (0.008)	0.009 (0.007)	0.018*** (0.011)	0.062*** (0.008)	0.022*** (0.007)	0.009 (0.011)	0.059*** (0.004)	0.049*** (0.008)	0.009 (0.007)	0.039*** (0.008)	0.049*** (0.007)	0.049*** (0.011)	-0.030*** (0.004)	0.018*** (0.008)	0.018*** (0.008)	0.021*** (0.008)	0.018* (0.007)	-0.025** (0.011)	0.017*** (0.004)
Live in City	0.021*** (0.007)	0.034*** (0.006)	-0.016*** (0.005)	0.018** (0.009)	0.004 (0.003)	-0.073 (0.213)	0.405** (0.204)	-0.454*** (0.167)	-0.730*** (0.280)	-0.080 (0.095)	0.023*** (0.007)	0.038*** (0.006)	-0.016*** (0.005)	0.018** (0.009)	0.004 (0.003)	0.016** (0.007)	0.030*** (0.006)	-0.015*** (0.005)	0.020** (0.009)	0.004 (0.003)
Married	-0.065*** (0.009)	-0.105*** (0.008)	0.040*** (0.007)	-0.010 (0.012)	0.004 (0.004)	-0.068*** (0.009)	-0.107*** (0.008)	0.040*** (0.007)	-0.012 (0.012)	0.004 (0.004)	-0.090*** (0.009)	-0.129*** (0.008)	0.040*** (0.007)	-0.007 (0.012)	0.004 (0.004)	-0.061*** (0.009)	-0.101*** (0.008)	0.040*** (0.007)	-0.013 (0.012)	0.004 (0.004)
Industry Sector	0.544*** (0.026)	0.342*** (0.025)	0.192*** (0.021)	0.193*** (0.026)	0.056*** (0.008)	0.556*** (0.026)	0.359*** (0.025)	0.197*** (0.021)	0.058*** (0.026)	0.350*** (0.008)	0.058*** (0.026)	0.350*** (0.025)	0.192*** (0.021)	0.194*** (0.026)	0.058*** (0.008)	0.560*** (0.026)	0.365*** (0.024)	0.193*** (0.021)	0.191*** (0.026)	0.057*** (0.008)
Agriculture Sector	0.569*** (0.009)	-0.105*** (0.009)	0.676*** (0.008)	-0.429*** (0.120)	-0.005 (0.156)	0.571*** (0.004)	-0.103*** (0.009)	0.676*** (0.009)	-0.428*** (0.100)	-0.005 (0.004)	0.564*** (0.009)	-0.109*** (0.009)	0.675*** (0.008)	-0.430*** (0.010)	-0.005 (0.004)	0.580*** (0.009)	-0.092*** (0.009)	0.674*** (0.008)	-0.433*** (0.010)	-0.005 (0.004)
Constant	1.243*** (0.329)	1.879*** (0.330)	-0.643*** (0.240)	0.120 (0.330)	0.156 (0.333)	1.118*** (0.333)	1.367*** (0.335)	-0.269 (0.243)	0.441 (0.405)	0.158 (0.137)	0.900*** (0.310)	1.335*** (0.229)	-0.443* (0.386)	0.256 (0.129)	0.102 (0.303)	0.754*** (0.303)	1.210*** (0.302)	-0.463** (0.230)	0.277 (0.387)	0.078 (0.129)
Observations	25,759	25,759	25,759	13,318	9,534	25,759	25,759	13,318	9,534	25,759	25,759	13,318	9,534	25,759	25,759	13,318	9,534	25,759	25,759	13,318
Number of groups	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

As for vocational high school graduates, they tend to benefit significantly more from education spending than other groups. The interaction term Ln Education Spending $\times$ Vocational High School Graduates shows significant positive impacts for labor force participation (+0.014), the formal sector (+0.013), and the middle-class employment sector (+0.011). In the low-skill sector, the impact is insignificant (-0.001), indicating that vocational education helps individuals move away from low-skill jobs. The effect on the informal sector is insignificant (+0.001), but education still provides larger benefits overall for formal and middle-class jobs. Hence, vocational graduates benefit the most from education spending in terms of access to high-quality jobs.

5 Conclusions

The findings of this study indicate that high levels of education spending do not significantly improve overall employment prospects. This points to a potential misalignment between educational outcomes and labor market demands, highlighting the need for a more targeted approach to educational investment. Despite increased public investment in education, many educated individuals still find themselves in informal employment. This underscores the presence of structural barriers in the labor market, such as a mismatch between the skills acquired through education and those required by the formal sector, as well as limited job opportunities in the formal sector.

Interestingly, graduates of vocational high schools appear to benefit more from education spending than their peers in general education programs. They show a higher probability of securing formal sector jobs and a reduced likelihood of entering the informal sector. This suggests that vocational education, which is often tailored to specific industry needs, may better equip students with the skills required for formal employment. However, the diminishing impact of education spending over time, particularly after five years of work experience, suggests that the initial advantages provided by education may wane unless skills are continuously updated to align with evolving labor market demands.

Future studies could delve deeper into the impact of education spending by disaggregating expenditures into specific categories, such as personnel costs (e.g., teacher salaries and training), capital expenditures (e.g., infrastructure and technology), and operational costs (e.g., learning materials). This disaggregation would allow researchers to assess which types of spending have the greatest impact on educational and labor market outcomes. Additionally, research could explore the role of regional variations in spending effectiveness, as well as the interplay between education spending and other factors such as economic development, industrial policy, and urban-rural disparities. Furthermore, longitudinal studies tracking individual career trajectories could provide insights into how education spending influences not just initial employment but long-term career advancement and income growth.

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Disclosure Statement

The authors report there are no competing interests to declare

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