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ABSTRACT

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Removing secondary-school fees can influence not only enrolment, but also young people's subsequent education and labour-market pathways. This paper examines differences in education enrolment level, participation in paid work, or inactivity around the introduction of Ghana's Free Senior High School (SHS) policy. Using four waves of the Ghana Socioeconomic Panel Survey, we compare the states recorded at consecutive interviews for young people aged 12–17 at baseline, distinguishing cohorts by their expected exposure to the reform.

The clearest differences occur among respondents initially enrolled below SHS. Compared with cohorts with no expected exposure, fully exposed cohorts have a 15.0 percentage-point higher adjusted probability of being in SHS at follow-up and a 10.6 percentage-point lower probability of remaining observed enrolled below SHS level. Differences in paid work are close to zero, while patterns among respondents initially in SHS or inactivity vary across destinations.

Using a countrywide household panel to examine multiple follow-up states, the analysis extends evidence from geographically concentrated experimental studies of secondary-school subsidies to young people's pathways around the introduction of Ghana's nationwide Free SHS policy. The findings suggest that expanded access to SHS was associated with meaningful changes in young people's subsequent educational pathways, rather than corresponding shifts into or out of paid work.

JEL Classification:

H52, I21, I25, I28, O12 055

Keywords:

Free secondary education; youth transitions; educational progression; school-to-work transitions; Ghana; Sub-Saharan Africa

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1 Introduction

Over the past two decades, many low- and middle-income countries have expanded access to primary education. As primary enrolment has approached universality in many settings, policy attention has increasingly shifted towards progression beyond basic education and the quality of learning. This evolution is reflected in the move from the Millennium Development Goal 2, which focused on universal primary completion, to Sustainable Development Goal 4, which encompasses equitable access to quality primary and secondary education. Yet progression into upper secondary schooling remains limited in much of Sub-Saharan Africa because of financial constraints, opportunity costs and institutional barriers (Gruijters et al., 2024). The transition from junior secondary to upper secondary schooling therefore remains a critical bottleneck in the education pipeline.

Recognising this bottleneck, governments in certain countries have introduced scholarships, fee reductions, and/or universal secondary-education policies (Gruijters et al., 2024). These reforms seek to reduce financial barriers at a stage of schooling where direct costs and opportunity costs are substantially higher than at primary level.

Reducing the cost of secondary education can affect more than the decision to enrol. By extending time in school, it may change progression into post-secondary education, delay entry into work or alter the risk of inactivity. These possibilities matter particularly in settings where school progression is often delayed and labour-market opportunities are limited. Yet much of the evidence on secondary-school expansion concentrates on enrolment and attainment, with less evidence on how free education policies may affect the ways young people navigate several competing education and labour-market states.

Existing research shows that reducing secondary-school costs can increase participation and attainment, including evidence from scholarship programmes in Ghana and fee-reduction policies elsewhere in Africa (Blimpo et al., 2019; Duflo et al., 2021; Gruijters et al., 2024). Experimental studies provide credible estimates for the populations and locations they cover. Studying nationwide reforms can show whether similar patterns are evident across a broader population and how education expansion is associated with young people's subsequent education and labour-market pathways.

Ghana provides an important setting for such an analysis. Introduced in September 2017, Free Senior High School (Free SHS) removed tuition and a wide range of other direct costs in public senior high schools. It also removed the previous Basic Education Certificate Examination (BECE) performance cut-off for SHS placement, reducing an academic barrier alongside the financial constraints on progression (Casely-Hayford et al., 2025). The scale of the reform and the sharp expansion in access raise a broader development question: how

did young people's education, work and inactivity patterns change across cohorts reaching secondary-school age before and after the introduction of Free SHS?

We address this question using four waves of the Ghana Socioeconomic Panel Survey (GSPS), spanning 2009/10 to 2022/23. We compare cohorts with different expected exposure to Free SHS and restrict each baseline sample to young people aged 12–17. At consecutive interviews, respondents are classified into pre-SHS schooling, SHS, post-secondary education and training (PSET), paid work or not (NEET – Not in Education, Employment of Training). We use multinomial models to relate respondents' initial state to the distribution of states observed at follow-up, allowing the exposure-group differences to vary across starting points.

The clearest and most precisely estimated differences occur among respondents initially enrolled below SHS. Partially and fully exposed cohorts are more likely to be observed in SHS at follow-up and less likely to remain below SHS than cohorts with no expected exposure, while adjusted differences in paid work are small. The main pattern is therefore one of greater educational progression rather than a corresponding shift between education and paid work. Among respondents initially in SHS, exposed groups are also more likely to be observed in PSET at follow-up, suggesting that differences may extend beyond entry into SHS to subsequent educational progression, although these estimates come from small and differently composed origin groups. For respondents starting in NEET, differences vary across destinations and provide no evidence of a similarly clear exposure gradient.

This paper complements experimental evidence on the effects of reducing secondary-school costs by examining young people's pathways around the introduction of Ghana's nationwide Free SHS policy. Existing studies show that reducing schooling costs can increase secondary enrolment and attainment and can have longer-run consequences for tertiary education, labour-market outcomes and other dimensions of young people's lives (Blimpo et al., 2019; Duflo et al., 2021, 2025; Gruijters et al., 2024). Much of this evidence, however, comes from targeted interventions or particular study populations. Using a countrywide longitudinal survey, we compare the subsequent education, paid-work and inactivity states of young people with different expected exposure to Free SHS, conditional on where they were positioned before the reform. This allows us to examine whether the higher SHS participation associated with exposure is accompanied primarily by fewer young people remaining at lower schooling levels, differences in entry into work or inactivity, or differences in subsequent progression to post-secondary education. We further examine whether these patterns differ by sex and prior academic preparation, providing evidence on the distributional and compositional dimensions of secondary-school expansion.

The remainder of the paper is structured as follows. Section 2 describes the institutional context, Section 3 reviews the related literature, and Section 4 describes the data, sample

and descriptive evidence. Section 5 outlines the empirical strategy, Section 6 presents the results and robustness checks, and Section 7 concludes.

2 Institutional Context: Ghana's Education System and the Free SHS Reform

2.1 Structure of the Ghanaian Education System

The education system in Ghana is structured into three cycles, namely: basic compulsory education, secondary education and post-secondary education or tertiary. The basic education system is further divided into two years of kindergarten (introduced in 2007 for children aged 4 to 6 years), 6 years of primary education (children aged 6 to 11 years) and 3 years of junior high school (JHS) (children aged 12 to 15 years). Basic education is intended to provide foundational literacy, numeracy, and problem-solving skills.

Upon completing junior high school, students take the Basic Education Certificate Examination (BECE), which is used in the placement process for entry into senior high school (SHS) (Ministry of Education, 2018). Students entering SHS follow a conventional three-year curriculum and write the West African Senior School Certificate Examination (WASSCE) on completion. WASSCE performance is the principal basis for direct entry into universities and many other tertiary programmes, including Colleges of Education and nursing and health-training programmes. Ghana's post-secondary education system also includes technical and vocational pathways, some of which can be entered without completing SHS or obtaining the WASSCE. The vocational education stream offers two main options: enrolling in SHS and selecting vocational programmes, or attending a Technical and Vocational Institute (TVI). For students seeking to continue within the conventional formal secondary education system, performance in the BECE was an important constraint on progression, and students who did not obtain the required results were substantially less likely to continue to SHS or formal TVET programmes.

The transition from JHS into SHS has historically been characterised by substantial attrition. Although Ghana achieved large expansions in primary school access following earlier reforms, progression into secondary education has remained more limited attributed to financial constraints, academic selection, and uneven access to secondary schools (Duflo et al., 2021; Gruijters et al., 2024). As a result, the transition into SHS represents a critical bottleneck in the education pipeline and a key point at which inequalities in educational progression emerge.

2.2 Education Financing and the Evolution of Free Education Policies

Since the 1990s, Ghana has implemented a series of policies aimed at expanding access to education by reducing direct schooling costs. The Free Compulsory Universal Basic Education (FCUBE) programme, introduced in 1996, sought to provide universal access to the first nine years of schooling (Ekundayo, 2018). The policy reduced tuition-related costs and covered examination fees, textbooks, and some instructional materials. However, households continued to face a range of indirect and supplementary schooling costs, limiting the extent to which financial barriers were fully removed (Akyeampong, 2009).

To strengthen FCUBE, the government introduced the Capitation Grant Scheme in 2004–2005, which provided direct funding to schools and prohibited additional levies on parents (Adamu-Issah et al., 2007; Ekundayo, 2018). The policy was intended to eliminate remaining financial barriers to enrolment at the primary and junior secondary levels. In 2007, compulsory free education was further extended to include kindergarten.

Despite these earlier reforms, substantial barriers to secondary education remained. Prior to 2017, households were responsible for a wide range of SHS-related expenses, including tuition, boarding fees, examination fees, textbooks, uniforms, and other school charges (Duflo et al., 2021; Casely-Hayford et al., 2025). These costs were substantial relative to household incomes, particularly for poorer households and for students required to attend boarding schools located far from home (Duflo et al., 2021).

In the 2015/16 academic year, the government introduced the Progressively Free Senior High School (PFSHS) policy, which absorbed selected school fees for day students attending public SHSs (Ministry of Finance, 2014). The policy reduced, but did not eliminate, the direct costs of attending SHS. Despite this intervention, a substantial share of students who qualified and were placed in SHS did not enrol, suggesting that important financial and other barriers to the transition to secondary education remained (Ministry of Education, 2018).

In September 2017, the government introduced the universal Free SHS policy. Under the reform, the government assumed responsibility for virtually all direct SHS costs in public schools, including tuition, boarding fees, textbooks, examination fees, meals, utilities, and other school charges (Dwomoh et al., 2022; Casely-Hayford et al., 2025). At the time of implementation, the fees abolished amounted to approximately GHS 1,297 annually for day students and GHS 2,006 for boarding students (Casely-Hayford et al., 2025).

Importantly, Free SHS did not abolish the BECE. Rather, it removed the previous BECE performance cut-off for SHS placement, allowing JHS completers to be considered for place-

ment regardless of their examination aggregate (Casely-Hayford et al., 2025).[1] The reform therefore reduced both financial barriers and an important academic restriction on progression. In the academic year, the share of placed students who enrolled increased from 74.3% in 2016/2017, to 85.4% (Ministry of Education, 2018).

The scale of the reform was substantial. Government expenditure on education increased sharply following implementation, rising from GHS 9.08 billion in 2016 to GHS 10.5 billion in 2017, with further increases in subsequent years (Armah, 2021). The policy is among the most comprehensive free secondary education programmes implemented in Sub-Saharan Africa (Gruijters et al., 2024; Casely-Hayford et al., 2025).

The introduction of Free SHS in Ghana therefore provides an important setting within which to examine the association between reductions in financial and institutional barriers and progression through the education system and transitions into adulthood. While previous studies have largely focused on enrolment effects, the broader implications for educational progression, labour market entry, and post-school transitions remain less well understood.

3 Literature Review

This paper contributes to three strands of the literature: (i) education expansion and free secondary schooling policies, (ii) transitions through the education pipeline and into the labour market, and (iii) selection and heterogeneous effects in access to education.

3.1 Education Expansion and Free Secondary Schooling

A large body of research has examined policies aimed at expanding access to education, including school construction and the removal of school fees. Such policies can increase enrolment and attainment, although fee abolition is also found to affect school quality and shift demand between public and private schools (Duflo, 2001; Bold et al., 2015). Much of this literature has focused on primary education.

More recent work has examined secondary education, where costs are substantially higher and access remains more constrained. Evidence from The Gambia, Kenya, Uganda, South Africa and Ghana generally indicates that reducing secondary-school fees can increase enrolment or attainment, but effects vary with baseline access, remaining non-fee costs and school-capacity constraints (Blimpo et al., 2019; Brudevold-Newman, 2021; Omoeva and Gale, 2016; Branson and Lam, 2017; Duflo et al., 2025; Gruijters et al., 2024). Recent

[1] BECE results continued to matter for allocation across schools and programmes, particularly where preferred schools were oversubscribed. The change concerned eligibility for placement rather than elimination of the examination or of academic ranking within the placement process.

district-level evidence from Ghana also associates Free SHS with increased completion, particularly among girls (Stenzel et al., 2024).

While this literature provides important evidence on the expansion of educational access, much of it has focused on enrolment and attainment. An important exception is the experimental evidence from Ghana, which follows recipients of targeted secondary-school scholarships into tertiary education and the labour market (Duflo et al., 2025). That evidence identifies the causal effects of removing financial barriers for rural young people who had qualified for SHS but could not afford to enrol. The nationwide introduction of Free SHS provides a complementary setting in which to examine education and labour-market pathways across a broader population and among young people starting at different points in the education system.

In addition, education reforms can alter not only financial barriers to schooling, but also institutional barriers governing progression between schooling stages. In Ghana, Free SHS retained the BECE but removed the previous examination-performance cut-off for SHS placement (Casely-Hayford et al., 2025). The reform therefore potentially changed the academic composition of students able to progress to SHS as well as reducing financial constraints on enrolment. These two margins make it particularly important to examine whether patterns around the reform differ according to prior academic preparation.

This paper contributes to this literature by comparing later education and labour-market states conditional on where respondents were positioned in the youth transition pathway around the introduction of Free SHS. In doing so, it provides evidence from the nationwide policy on whether differences in SHS participation are accompanied by differences in remaining at lower schooling levels, participation in paid work or inactivity, and subsequent progression into post-secondary education and training.

3.2 Transitions Through the Education Pipeline and into Work

A second strand of literature examines transitions from schooling into adulthood in low- and middle-income countries. This literature emphasises that young people face multiple potential pathways after leaving school, including continued education, labour-market entry, unemployment, or inactivity (Filmer and Fox, 2014). These pathways are often non-linear and characterised by periods of instability and repeated movement between states.

Longitudinal research illustrates the value of studying these dynamics as transitions rather than isolated outcomes: young people can move repeatedly between education, employment and inactivity, while their earlier states shape later opportunities (Branson et al., 2019; Atta-Ankomah et al., 2024). Educational progression and labour-market entry are

therefore connected processes rather than independent outcomes.

This perspective is particularly important in contexts where schooling expansion may delay labour-market entry, alter persistence within the education system, or change progression into post-secondary education and training. Policies that expand access to secondary schooling may therefore have consequences extending beyond enrolment itself, with differences potentially emerging across several subsequent education and labour-market states.

We build on this framework by comparing the competing states observed at follow-up conditional on whether respondents begin in pre-SHS, SHS or NEET. This permits exposure-group comparisons from several origin states while recognising that movements between interviews are unobserved.

3.3 Selection, Composition, and Heterogeneous Effects

A third strand of literature examines how financial constraints shape selection into education and the composition of students who progress through the schooling system. In developing-country settings, borrowing constraints and direct schooling costs can slow educational progression or prevent eligible students from continuing, leading to selective participation at higher levels (Jacoby, 1994; Blimpo et al., 2019; Duflo et al., 2025).

Policies that reduce schooling costs may therefore expand access at the margin and change the composition of students progressing through the education system. In Ghana, secondary-school scholarships substantially increased secondary completion among students who had qualified for SHS but were unable to enrol because of financial constraints (Duflo et al., 2021). More generally, who is induced to progress may depend on the constraints being relaxed: evidence from Kenya shows that reductions in fees combined with expanded school capacity particularly increased secondary progression in areas with initially low transition rates, while highlighting the potential for expansion to alter the ability composition of secondary-school students (Brudevold-Newman, 2021). These responses may also differ by gender. Fee reductions targeted at girls substantially increased female secondary-school participation in The Gambia (Blimpo et al., 2019), while recent evidence from Ghana finds that Free SHS increased secondary-school completion among girls, particularly in districts with high policy uptake (Stenzel et al., 2024).

The Ghanaian Free SHS reform makes these compositional questions particularly relevant because it relaxed both financial and academic constraints on progression to SHS. The students whose progression changed around the reform may therefore differ from those affected by interventions that relax financial constraints among students who have already qualified for secondary school. Examining heterogeneity by prior academic preparation can

help establish whether differences in SHS participation are concentrated among academically stronger students or extend to those with weaker prior preparation.

This paper contributes to this literature in two ways. First, we examine how patterns around the introduction of Free SHS differ by prior academic performance using baseline maths assessments. This allows us to assess whether higher SHS enrolment probabilities are concentrated among academically stronger students or also occur among students with weaker prior preparation. Second, we examine gender heterogeneity, allowing us to assess whether exposure-group differences are associated with changes in gender gaps across education, paid work and inactivity states.

4 Data

4.1 Ghana Socioeconomic Panel Survey (GSPS)

This paper uses data from four waves of the Ghana Socioeconomic Panel Survey (Osei et al., 2022, GSPS), conducted in 2009/10, 2014/15, 2018/19, and 2022/23. The GSPS was nationally representative at baseline and collects detailed information on educational enrolment and attainment, labour-market activity, household characteristics and socioeconomic status, as well as cognitive and academic test scores.

The longitudinal structure of the GSPS is particularly useful for this analysis. Original sample members are followed across waves, including when they move and form split-off households, allowing us to observe their education and labour-market states at consecutive interviews. At the same time, the composition of the sample changes across waves. The survey attempted to follow all original respondents who remained within a study community and half of those who moved outside it. Furthermore, new household members enter the sample through residence with an existing respondent and are subsequently followed thereafter. This attrition and the addition of new household members mean that the national representativeness of the original baseline sample does not carry straightforwardly into later waves.

This creates a challenge for weighting the pooled analytical sample. The prepared data contain Wave 1 cross-sectional weights for all Wave 1–2 model observations and for 96% and 92% of Wave 2–3 and Wave 3–4 observations, respectively.[2] These weights reflect the original Wave 1 sampling design; compatible later-wave panel weights and suitable weights

[2]The high coverage of Wave 1 weights partly reflects attrition among individuals entering the GSPS after Wave 1. Because the analytical sample requires observation in consecutive waves, later entrants aged 12–17 at the origin wave are disproportionately excluded if they are not retained at follow-up.

for later entrants are not available. Applying the Wave 1 weights to the pooled sample would therefore exclude some later entrants without restoring representativeness in the later waves.

For this reason, the main analysis is unweighted. We assess the sensitivity of the results in two ways. First, we re-estimate the models using the Wave 1 design weights for observations for which these are available. Second, we construct pair-specific inverse-probability-of-retention weights to account for observable differences in the probability of being retained to the subsequent wave. These are model-based attrition weights rather than survey weights and therefore do not restore national representativeness but account for non-random attrition based on observable baseline characteristics.

4.2 Panel Structure and Baseline–Follow-up States

The panel structure of the GSPS allows us to compare each respondent's state at two consecutive survey occasions. We define transition pairs between adjacent survey rounds (2009/10–2014/15, 2014/15–2018/19, and 2018/19–2022/23). Importantly, however we do not observe respondents continuously between those dates. Therefore, throughout the paper, a "transition" denotes the ordered pair of states observed at baseline and follow-up. It need not be a direct movement: respondents may enter, leave or revisit other states during the interval.

This feature allows us to relate an initial state to several competing states at follow-up, including:

- pre-SHS at baseline and SHS at follow-up,
- SHS at baseline and PSET at follow-up,
- schooling at baseline and employment or inactivity at follow-up,
- inactivity at baseline and education or work at follow-up.

These endpoint comparisons contain more longitudinal information than a single cross-section, but they do not identify first entry, uninterrupted persistence, the duration of a state or the sequence of events between interviews. We accordingly interpret them as differences in the distribution of follow-up states conditional on baseline state.

4.3 Sample Construction

Our analysis focuses on young people around the usual age of progression into senior high school (SHS) around the introduction of Free SHS in September 2017. The objective is to compare baseline–follow-up state distributions across cohorts with different expected exposure to the reform.

Our classification of expected exposure to Free SHS is based on the age at which young people would normally reach SHS under Ghana's education system. Children are expected to enter primary school at age six, complete six years of primary school and then three years of JHS. With uninterrupted progression, they should therefore reach SHS at about age 15. Actual progression is often slower because of delayed entry or repetition. We consequently treat age 15 as an expected point of entry rather than an exact rule and allow an additional year of latitude when interpreting exposure near the boundary.

Expected exposure is defined from attained age on 30 September 2017[3]. Respondents under age 15 are classified as having full expected exposure because their expected SHS entry falls after implementation; those aged 12–14 in 2017 are the members of this group already closest to expected SHS entry. Younger respondents in this category can enter the analysis when they reach the baseline-age range in later waves. Respondents aged 15–19 are classified as having partial expected exposure. Some, particularly those near the lower boundary or progressing with delay, could have entered SHS with the first Free SHS cohort, while others could already have been enrolled and covered by the progressively free subsidies introduced from 2015 rather than the new universal programme. Respondents aged 20 or older are classified as having no expected exposure because they are assumed to have passed through the usual SHS-age period before the reform and not to return to SHS.

The precise thresholds necessarily involve some judgement, given delayed progression and the absence of continuous grade histories, but are anchored in the expected age of progression through Ghana's schooling system. They do not correspond to an administrative eligibility rule: individuals can progress earlier or later than expected, and the GSPS does not establish whether each respondent enrolled in SHS or received a particular subsidy. The categories should therefore be read as no, partial and full *expected* exposure rather than observed policy receipt.

[3]Age on 30 September 2017 is calculated from harmonised reported birth year month variables with imputations based on age when information is unavailable.

Table 1: Age profile and expected exposure by birth year and survey wave

Birth year	2009/10	2014/15	Age at 30 Sep. 2017	2017/18	2022/23	Expected exposure
1992	17	22	24–25	25	30	No expected exposure
1993	16	21	23–24	24	29	No expected exposure
1994	15	20	22–23	23	28	No expected exposure
1995	14	19	21–22	22	27	No expected exposure
1996	13	18	20–21	21	26	No expected exposure
1997	12	17	19–20	20	25	No / partial expected exposure (birth-month boundary)
1998	11	16	18–19	19	24	Partial expected exposure
1999	10	15	17–18	18	23	Partial expected exposure
2000	9	14	16–17	17	22	Partial expected exposure
2001	8	13	15–16	16	21	Partial expected exposure
2002	7	12	14–15	15	20	Partial / full expected exposure (birth-month boundary)
2003	6	11	13–14	14	19	Full expected exposure
2004	5	10	12–13	13	18	Full expected exposure
2005	4	9	11–12	12	17	Full expected exposure
2006	3	8	10–11	11	16	Full expected exposure

Notes: Entries in the survey-wave columns show approximate age using the first calendar year in each wave label. Age on 30 September 2017 is shown as a range within each birth year because classification also uses birth month. September birthdays are treated as having occurred by that date. No expected exposure denotes age 20 or older, partial expected exposure denotes ages 15–19, and full expected exposure denotes under age 15. When birth month is missing, age is approximated from birth year and the observation is flagged in the analysis data. Shaded cells identify approximate ages 12–17 in Waves 1–3, the waves used as transition baselines. Expected exposure does not measure observed receipt of Free SHS support.

Table 1 shows how birth cohorts map onto approximate ages at each survey wave and, in turn, into our expected-exposure categories. The shaded cells indicate the birth-year–wave combinations in which respondents fall within the 12–17 baseline age range used in the analysis.

Because the survey waves span the introduction of Free SHS, the exposure groups available for comparison differ across wave pairs. In Wave 1–2, the relevant cohorts are predominantly classified as having no or partial expected exposure to Free SHS. By Wave 3–4, the comparison is instead largely between partially and fully exposed cohorts. Wave 2–3 falls between these periods: all three exposure categories are present, but only five observations in the principal baseline states are classified as fully exposed. The partial-exposure group is therefore observed on both sides of the reform and provides some continuity across the wave-pair comparisons.

It is important to be clear about what these comparisons capture. We are not observing the same young people first without and then with access to Free SHS. Rather, we compare

cohorts observed at similar ages but at different points in time, when their expected exposure to the policy differed. The panel dimension is used to observe where each young person is at one interview and where they are at the next. As a result, differences between the no- and fully exposed groups cannot be separated from other differences between cohorts and survey periods. Some respondents contribute observations to more than one consecutive wave pair, so standard errors are clustered at the individual level. However, relatively few respondents contribute observations across multiple relevant periods, providing insufficient within-person variation in policy exposure to support an individual fixed-effects approach.

The main analysis uses observations beginning in pre-SHS, SHS or NEET. Paid work is excluded as a baseline state because there are only 20 otherwise eligible baseline observations, which is insufficient for stable estimation. The multinomial model nevertheless retains paid work as a possible follow-up state. The gender and baseline-academic-performance analyses focus on respondents in pre-SHS schooling at baseline, the group closest to the SHS margin and large enough to support heterogeneity analysis.

4.4 Outcome Variables and Summary Statistics

At each wave, respondents are classified into one of five mutually exclusive states: enrolled in pre-SHS, SHS or post-secondary education and training (PSET), in paid work, or not enrolled and not employed (NEET). Current enrolment takes precedence over labour-market status,[4] and paid work refers to wage employment. Among those not enrolled, household or unpaid work, unemployment and labour-force inactivity are classified as NEET under the available coding.

For each consecutive pair of interviews, we relate the respondent's baseline state to the state observed at follow-up. The outcomes are therefore SHS, pre-SHS, PSET, paid work and NEET at the subsequent interview, conditional on the respondent's baseline state. Although tables use shorthand such as "transition into SHS", this does not imply that we observe the timing or sequence of movements between interviews.

The preferred specifications additionally include three district characteristics: the BECE pass rate, water coverage and the proportion of births attended by a skilled professional. These measures come from Ghana's District League Table reports and proxy for differences in educational performance, infrastructure and local health provision that may be correlated with cohort composition and follow-up states. The report year closest to the baseline wave of each transition is assigned to the respondent's baseline district. Water coverage is unavailable for the earlier period, so the 2018 district value is carried back to those transitions.

[4] Only 8 respondents are both enrolled and in paid work.

Table 2: Summary statistics by expected exposure

	Full sample	No exposure	Partial exposure	Full exposure
Demographics and household characteristics				
Age at baseline	14.311	14.794	14.565	13.392
Months between baseline and follow-up	51.236	52.353	50.995	50.194
Female	0.447	0.452	0.441	0.448
Household size	5.944	6.163	5.743	5.941
Household expenditure	2002.958	2692.649	1773.541	1464.050
Education expenditure	214.303	198.619	239.541	218.210
Mother's education				
Below primary/no education	0.531	0.585	0.512	0.492
Primary	0.149	0.131	0.163	0.151
JSS/middle school	0.275	0.247	0.277	0.306
SHS or higher	0.044	0.034	0.046	0.051
Father's education				
Below primary/no education	0.398	0.435	0.389	0.366
Primary	0.113	0.099	0.121	0.122
JSS/middle school	0.357	0.343	0.365	0.366
SHS or higher	0.121	0.101	0.121	0.144
Baseline state and test scores				
Pre-SHS	0.722	0.682	0.669	0.841
SHS	0.067	0.079	0.094	0.018
NEET	0.210	0.239	0.237	0.141
Maths score	4.902	5.044	4.752	4.949
English score	5.391	5.241	5.274	5.709
Raven score	6.165	6.195	5.738	6.502
District characteristics				
BECE pass rate	73.700	77.098	72.822	70.977
Water coverage	64.921	61.956	67.086	65.641
Skilled birth attendance	57.461	57.399	57.035	58.082
Follow-up outcome				
Enrolled in SHS at follow-up	0.226	0.156	0.217	0.321
Observations	4,217	1,456	1,563	1,198

Notes: Statistics are calculated at the baseline of each transition for respondents aged 12–17. Expected exposure is defined using attained age on 30 September 2017: no expected exposure denotes age 20 or older, partial expected exposure denotes ages 15–19, and full expected exposure denotes under age 15. The categories do not measure observed receipt of Free SHS support. Household expenditure is in 2021 values. District measures correspond to the District League Table information closest to the transition baseline wave.

Table 2 presents summary statistics for the analysis sample. It contains 4,218 baseline observations across the three transition pairs: 1,461 with no expected exposure, 1,562 with partial expected exposure and 1,195 with full expected exposure.

Baseline characteristics are similar across expected exposure groups. There are however some noticable differences. Respondents with full expected exposure are younger on average, have lower mean household expenditure and are more often in pre-SHS at baseline. Their district BECE pass rate is also lower on average. Household size, parental education and test scores are more similar, although differences remain on some measures. The analysis adjusts for these observed compositional differences, but the estimates remain associational rather than causal.

The age restriction ensures that every observation lies in the same 12–17 range, but the mean baseline age declines from 14.7 in the no-exposure group to 13.4 in the full-exposure group. The preferred models therefore control flexibly for baseline state and linearly for harmonised baseline age. Fully exposed cohorts are more likely to be in pre-SHS at baseline, whereas SHS and NEET baseline observations are less common in that group.

The time between consecutive interviews varies across respondents and wave pairs, which matters because longer intervals provide more opportunity to enter, complete or leave a particular state. The average interval is 52.4 months in the no-exposure group, 51.1 months in the partial-exposure group and 50.1 months in the full-exposure group. Within the final regression sample, intervals range from 47–67 months for Wave 1–2, 37–56 months for Wave 2–3 and 46–57 months for Wave 3–4, reflecting differences in survey timing and respondent-specific interview dates. We therefore control for the number of calendar months between interviews in all specifications. This makes the follow-up states more comparable across respondents, although we still do not observe when movements between states occurred.

The table also provides initial descriptive evidence of higher secondary-school participation among exposed cohorts. The share enrolled in SHS at follow-up rises from 15.5% among observations with no expected exposure to 29.8% among those with full expected exposure. The multivariate analysis below assesses whether this difference persists after accounting for baseline state, harmonised age, elapsed interview time, sex and district characteristics.

4.5 Descriptive Enrolment and Baseline–Follow-up Patterns

Figure 1 provides a first descriptive view of how enrolment varies by age across the four survey waves. It includes all respondents aged 6–24 observed in each wave and is therefore deliberately broader than the sample used in the main analysis. Panel A shows enrolment at any level, while Panel B focuses specifically on SHS enrolment.

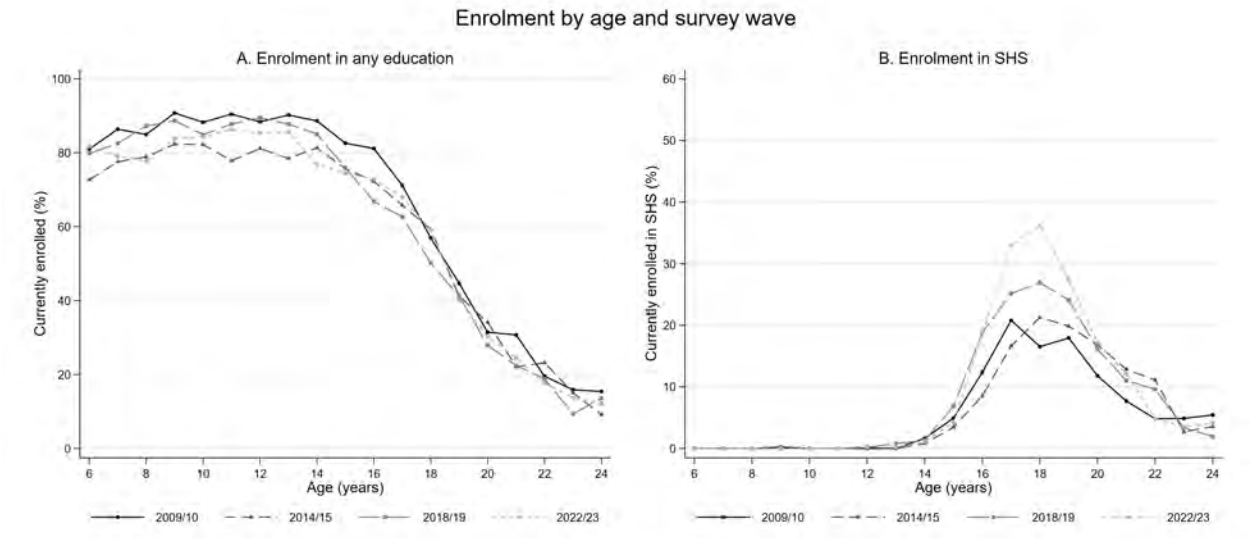

Figure 1: Enrolment by age and survey wave

Notes: Panel A reports enrolment at any level and Panel B reports SHS enrolment. Both panels use all GSPS respondents aged 6–24 observed in the relevant survey wave; they are not restricted to the transition-analysis sample.

As expected, enrolment at any level is high at younger ages and declines through the late teenage and early adult years. The more relevant pattern for this paper is the change in SHS enrolment. At ages 15–18, SHS enrolment is fairly similar in Waves 1 and 2, somewhat higher in Wave 3, and substantially higher in Wave 4. The increase is therefore concentrated in the survey waves spanning and following the introduction of Free SHS. These comparisons are descriptive: the survey waves also capture changes over calendar time and cannot on their own establish that the differences in enrolment are due to the policy.

The cross-sectional age profiles provide useful context, but do not show where young people observed at one point in the education pipeline are found several years later. Table 3 uses the longitudinal dimension of the GSPS to show baseline and follow-up states across consecutive interviews, separately by expected-exposure group.

The clearest descriptive differences are among respondents who start in pre-SHS. The proportion observed in SHS at follow-up increases steadily across the exposure groups, from 19.6% among those with no expected exposure to 28.9% among the partially exposed and 34.5% among the fully exposed. Paid work at follow-up moves in the opposite direction, falling from 6.3% in the no-exposure group to 1.9% in the fully exposed group. There is less evidence of a simple exposure gradient in remaining in pre-SHS: the corresponding proportions are 28.9%, 23.3% and 31.9%. Taken together, the unadjusted distributions

Table 3: Transitions between baseline and follow-up states by expected exposure

Baseline state	Pre-SHS	SHS	PSET	Paid work	NEET
No expected exposure					
Pre-SHS	0.287	0.196	0.008	0.063	0.445
SHS	0.000	0.036	0.098	0.259	0.607
NEET	0.108	0.073	0.008	0.081	0.731
Partial expected exposure					
Pre-SHS	0.234	0.288	0.002	0.055	0.422
SHS	0.000	0.028	0.292	0.174	0.507
NEET	0.157	0.075	0.017	0.055	0.696
Full expected exposure					
Pre-SHS	0.317	0.346	0.006	0.018	0.312
SHS	0.000	0.167	0.167	0.167	0.500
NEET	0.134	0.124	0.043	0.075	0.624

Notes: Cells are row proportions. Expected-exposure cohorts are defined by attained age on 30 September 2017, not observed policy receipt. Baseline age is harmonised with birth cohort and interview timing. The sample is restricted to respondents aged 12–17 at the transition baseline and excludes paid work as a baseline state.

suggest that the most consistent difference across exposure groups is in reaching SHS, rather than a uniform shift across all possible follow-up states.

There are also differences among respondents who start in SHS. The proportion observed in PSET at follow-up is 9.9% in the no-exposure group, 28.8% in the partial-exposure group and 16.7% in the full-exposure group. These comparisons should be treated cautiously, however, because the SHS origin group is smaller, particularly among the fully exposed. Among respondents who start in NEET, differences are spread across several follow-up destinations and do not show a similarly clear pattern across exposure groups.

These descriptive comparisons establish the main patterns in the data, but they do not account for differences in the characteristics of the exposure groups or for other changes across survey periods. We therefore turn next to the adjusted endpoint probabilities and assess how far the exposure-group differences remain once these factors are taken into account.

5 Empirical Strategy

5.1 Conceptual Framework

We model the competing follow-up states conditional on a discrete baseline state. Let S_{it} denote the state of individual i at the baseline interview t, where states include pre-SHS

schooling, SHS, PSET, and NEET. The distribution of $S_{i,t+1}$ is state-dependent, but the model does not observe the path taken between t and $t+1$.

The endpoint comparison most closely connected to the policy is between pre-SHS at baseline and SHS at follow-up, where SHS costs and the former BECE placement cut-off were relevant. Lower barriers could increase the probability of remaining enrolled i.e.later being observed in SHS, and reduce the proportion still observed in pre-SHS. Differences may also appear further along the pipeline, including the follow-up distribution across PSET, paid, or NEET.

5.2 Baseline–Follow-up State Model

We estimate a multinomial logit model. For destination j relative to the NEET base category,

$$\log\left[\frac{Pr(S_{i,t+1}=j)}{Pr(S_{i,t+1}=NEET)}\right] = \alpha_j + \beta_j Exposure_i + \gamma_j S_{i,t} + \delta_j(Exposure_i \times S_{i,t}) + X'_{i,t}\theta_j.$$

Here $Exposure_i$ distinguishes no, partial and full expected exposure and does not vary across an individual's transition observations. The vector $X_{i,t}$ contains baseline age and sex, the number of months between interviews, and baseline district-level BECE pass rates, water coverage and the share of births attended by a skilled health professional. The elapsed-month control accounts for unequal observation horizons across and within transition pairs. Standard errors are clustered by individual to account for respondents contributing more than one observation.

The exposure-by-baseline-state interactions allow estimated differences across exposure groups to vary with individuals' initial position in the education pipeline. Expected exposure is tied to cohort and survey period, and the model cannot therefore eliminate secular cohort differences or national period shocks.

Following estimation, we use the `margins` command to calculate predicted follow-up-state probabilities and pairwise differences across exposure groups within each baseline state.

5.3 Policy-Relevant Margins

The multinomial framework estimates multiple destination probabilities simultaneously. In addition, we focus on three broad sets of margins.

First, we examine the probability of being in SHS at follow-up among respondents observed in pre-SHS at baseline:

$$Pr(SHS_{i,t+1} = 1 \mid PreSHS_{i,t} = 1)$$

This margin is closely related to the central policy objective of expanding access to secondary schooling /[5].

Second, we examine whether expected exposure is associated with being observed in pre-SHS at both endpoints:

$$Pr(PreSHS_{i,t+1} = 1 \mid PreSHS_{i,t} = 1)$$

This is particularly relevant given the simultaneous removal of the previous BECE performance cut-off for SHS placement. It is labelled persistence for brevity, but could include schooling interruptions between interviews.

Third, among those enrolled in SHS at baseline, we examine the competing destinations PSET, paid work and NEET:

$$Pr(S_{i,t+1} = j \mid S_{i,t} = SHS), \qquad j \in \{PSET,\ PaidWork,\ NEET\}.$$

These margins show whether exposure-group differences extend beyond the pre-SHS margin into later observed education and labour-market states.

5.4 Heterogeneity by Gender

To examine whether follow-up-state patterns differ by sex, we estimate binary logit models for key destinations among respondents initially enrolled in pre-SHS schooling:

$$\begin{aligned}\text{logit}\left[Pr(Y_{i,t+1} = 1 \mid S_{i,t} = PreSHS)\right] = \alpha + \beta Exposure_i + \gamma Female_i \\ + \delta(Exposure_i \times Female_i) + X'_{i,t}\theta.\end{aligned}$$

where $Y_{i,t+1}$ represents a specific follow-up state including SHS, pre-SHS, paid work or NEET.

We report average predicted probabilities by sex and exposure group and calculate female-minus-male differences within each exposure category. This directly shows whether adjusted gender gaps narrow or widen across exposure groups. Gender analyses from other baseline states are treated as exploratory because their cell sizes and precision are more limited.

[5]It is not necessarily a measure of first SHS entry however because an SHS spell beginning and ending between interviews would not be observed.

5.5 Academic Selection and Composition Effects

We next examine whether the composition of students progressing into SHS differs across exposure groups and baseline academic performance.

For this analysis, we restrict the sample to individuals initially enrolled in pre-SHS schooling and estimate separate transition models by baseline maths-performance. We interact exposure status with a continuous baseline maths scores and a tercile measure. We construct the maths score terciles from the pooled distribution of valid baseline maths scores in this pre-SHS analysis sample.

Formally, the probability of being observed in SHS at follow-up is modelled as:

$$\begin{aligned}\text{logit}\left[Pr(SHS_{i,t+1}=1 \mid S_{i,t}=PreSHS)\right] = \alpha + \beta Exposure_i + \gamma TestScore_{i,t} \\ + \delta(Exposure_i \times TestScore_{i,t}) + X'_{i,t}\theta.\end{aligned}$$

where $TestScore_{i,t}$ denotes baseline maths performance either as a continuous measure or in terciles.

The score distribution differs somewhat across waves and therefore the pooled cut-points can partly reflect wave composition. We therefore interpret the tercile analysis alongside the continuous-score specification, which does not depend on discrete cut-points. Cell-size and precision diagnostics indicated that a three-way exposure-by-score-by-sex interaction would be too demanding of the available sample, so it is not estimated.

5.6 Initial Conditions and Attrition

Two issues arise in the estimation of transition models using panel data: initial conditions and potentially non-random attrition.

First, individuals observed in a given baseline state may differ systematically across cohorts. Exposure-group contrasts could therefore reflect this change in the composition of origin states as well as changes around the policy.

To go some way towards addressing this, the specification conditions explicitly on baseline state and allows exposure-group differences to vary across origin states. The sample is also restricted to ages 12–17 at baseline, providing overlap in age and schooling stage. The preferred model controls for district education, water and health measures. These steps improve cohort comparability but cannot provide an experimental counterfactual.

Second, next-wave non-response is substantial and differs across transition pairs (and hence expected exposure group): 49.0% between Waves 1 and 2, 29.3% between Waves 2 and

3, and 24.4% between Waves 3 and 4. Appendix Tables 6–9 compare baseline characteristics of respondents observed and not observed at the next wave. Differences are most evident in the first two transitions and include age, sex, household resources, parental education and selected district characteristics; Wave 3–4 differences are generally smaller, although baseline state and parental education remain relevant.

To assess the implications of this non-random attrition, we estimate transition-pair-specific retention models using baseline age, sex, household characteristics, parental education and district characteristics, including baseline district employment. The predicted retention probabilities from these models are used to construct inverse-probability weights [6] and used to check the robustness of the findings. Appendix Tables 11 and 12 provide the outputs of those models.

6 Results

6.1 Main Follow-up-State Differences across Free SHS Exposure Groups

Table 4 presents our first set of adjusted results: predicted probabilities of each follow-up state from the district-controlled multinomial logit model, separately by baseline state and expected-exposure group. The model additionally controls for baseline age, sex and the number of months between interviews. Full multinomial logit coefficients are reported in Appendix Table 10.

The clearest differences are among respondents enrolled below SHS at baseline. Compared with those with no expected exposure, partially exposed respondents have a 9.2 percentage-point higher adjusted probability of being in SHS at follow-up, rising to 15.0 percentage points among the fully exposed. These higher SHS probabilities are accompanied by 8.8 and 10.6 percentage-point lower probabilities of still being observed below SHS. In contrast, there is little evidence of a corresponding difference in paid work: the adjusted contrasts are 0.3 and -0.7 percentage points and are imprecisely estimated. Differences in NEET are also less pronounced. The partial-exposure contrast is close to zero, while full expected exposure is associated with a 4.7 percentage-point lower probability of NEET, significant at the 10% level.

The main pattern for this group is therefore a difference in where young people are positioned within the education system, rather than a shift between education and paid work. This is consistent with evidence that reducing the cost of secondary schooling can

[6] The weights are trimmed at the first and 99th percentiles and normalised within transition pair.

Table 4: Predicted transition probabilities by expected exposure

Baseline state	No exposure	Partial exposure	Full exposure	Δ Partial	Δ Full
Transition into Pre-SHS					
Pre-SHS	0.319	0.231	0.214	-0.088***	-0.106***
SHS	0.000	0.000	0.000	0.000	0.000
NEET	0.186	0.218	0.103	0.032	-0.083***
Transition into SHS					
Pre-SHS	0.197	0.290	0.347	0.092***	0.150***
SHS	0.086	0.051	0.196	-0.035	0.111
NEET	0.080	0.075	0.119	-0.005	0.039
Transition into PSET					
Pre-SHS	0.007	0.002	0.017	-0.005*	0.010
SHS	0.045	0.166	0.198	0.121***	0.153*
NEET	0.005	0.013	0.081	0.008	0.076***
Transition into Paid work					
Pre-SHS	0.049	0.052	0.042	0.003	-0.007
SHS	0.145	0.125	0.148	-0.020	0.003
NEET	0.041	0.048	0.103	0.007	0.062**
Transition into NEET					
Pre-SHS	0.427	0.425	0.380	-0.002	-0.047*
SHS	0.725	0.659	0.458	-0.066	-0.267**
NEET	0.688	0.645	0.594	-0.043	-0.094*

Notes: Probabilities are average predictions. Expected exposure is defined using attained age on 30 September 2017: no expected exposure denotes age 20 or older, partial expected exposure denotes ages 15–19, and full expected exposure denotes under age 15. These categories do not measure observed receipt of policy support. Models adjust for harmonised baseline age, months between baseline and follow-up, sex, district BECE pass rate, water coverage, and skilled birth attendance. Standard errors are clustered by individual. The final columns compare partial and full expected exposure with no expected exposure. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

increase secondary participation and attainment (Blimpo et al., 2019; Duflo et al., 2021, 2025; Gruijters et al., 2024), but helps clarify the margin on which the differences appear in the GSPS. Young people with greater expected exposure are more likely to have reached SHS several years later and less likely still to be observed at a lower level of schooling, without an offsetting difference in paid work.

This pattern is particularly relevant in the Ghanaian setting because Free SHS changed more than the direct cost of attending secondary school. The reform also removed the previous BECE performance threshold for SHS placement, widening the group able to progress to SHS. The lower probability of remaining below SHS is therefore consistent with greater progression among cohorts reaching secondary-school age after these financial and academic barriers were relaxed. We cannot determine from the endpoint data whether individuals progressed directly or continuously to SHS, or separate these changes from other differences across cohorts and periods. Nonetheless, the results suggest that an important margin of change around the reform was progression within education rather than movement out of paid work.

The results for respondents already enrolled in SHS at baseline point to a possible extension of this pattern further along the education pipeline. Their predicted probability of being in PSET at follow-up rises from 4.5% among those with no expected exposure to 16.6% among the partially exposed and 19.8% among the fully exposed, corresponding to differences of 12.1 and 15.3 percentage points. Paid-work probabilities, by contrast, are very similar across the three groups at 14.5%, 12.5% and 14.8%. The higher PSET probabilities are consistent with exposed SHS cohorts being more likely to progress into post-secondary education, a pattern that also echoes experimental evidence from Ghana showing that secondary-school scholarships increased subsequent tertiary participation among women (Duflo et al., 2025). The comparison here is much less precise, however: only 6.4% of the descriptive sample begins in SHS, and only 1.9% of the full-exposure group does so. The SHS-origin groups also differ in their composition, so these estimates provide suggestive rather than strong evidence of greater post-secondary progression.

There is no similarly clear pattern among respondents who begin in NEET. The predicted probability of remaining in NEET falls from 68.8% among those with no expected exposure to 64.5% among the partially exposed and 59.4% among the fully exposed. The 9.4 percentage-point difference for the fully exposed is significant at the 10% level. However, the differences are spread across several destinations: full expected exposure is associated with a lower probability of pre-SHS and higher probabilities of both PSET and paid work, while SHS probabilities differ little. Rather than pointing to a common pathway out of NEET, these results indicate a more varied set of follow-up states.

Taken together, the results are strongest for young people who begin below SHS. Greater expected exposure to Free SHS is associated with a higher probability of subsequently being in SHS and a lower probability of remaining below SHS, while paid-work probabilities are essentially unchanged. There is also some evidence of higher PSET participation among those already in SHS, although the smaller and differently composed samples make this result less certain. The broad pattern—stronger differences in education states than in paid work—is consistent with experimental evidence from Ghana showing substantial educational effects of secondary-school subsidies alongside labour-market effects that emerge more slowly and unevenly (Duflo et al., 2025). Our results extend that perspective to cohorts observed around the nationwide Free SHS reform, but remain descriptive of differences across exposure groups rather than estimates of the causal effect of the policy.

6.2 Heterogeneity by Gender

We examine gender heterogeneity among respondents initially enrolled below SHS, where the main exposure-group differences are concentrated and the sample is large enough to estimate sex-specific follow-up probabilities with reasonable precision.

Looking across the different follow-up states in Table 5 shows an important gender difference that is not apparent from SHS participation alone. Among respondents with no expected exposure, females and males have similar adjusted probabilities of being in SHS at follow-up. Females are, however, 8.5 percentage points less likely to remain observed in pre-SHS and 9.9 percentage points more likely to be NEET. The similarity in SHS probabilities therefore masks a different distribution across the other follow-up states, with young women substantially more likely than young men to be observed in NEET. As elsewhere, these are differences between states observed at consecutive interviews and do not imply a direct movement from pre-SHS into NEET.

The pattern looks different among respondents with full expected exposure. The gender gaps (see Figure 2 in both pre-SHS and NEET are close to zero and imprecisely estimated, while the probability of being in SHS is substantially higher than in the no-exposure group for both sexes—by 14.4 percentage points for males and 19.1 percentage points for females. The pre-SHS and NEET gender differences evident among those with no expected exposure are therefore not evident among the fully exposed.

These patterns are consistent with earlier evidence that reducing secondary-school costs can be particularly important for girls (Blimpo et al., 2019; Stenzel et al., 2024). They also relate closely to experimental evidence from Ghana. Duflo et al. (2021) find similarly large effects of secondary-school scholarships on SHS completion for males and females, but

Table 5: Gender heterogeneity by expected exposure

Sex	No exposure	Partial exposure	Full exposure	Δ Partial	Δ Full
Transition into Pre-SHS					
Male	0.390	0.277	0.246	-0.112***	-0.143***
Female	0.305	0.235	0.226	-0.070**	-0.078***
Transition into SHS					
Male	0.197	0.295	0.341	0.098***	0.144***
Female	0.193	0.283	0.384	0.090***	0.191***
Transition into PSET					
Male	0.006	0.004	0.004	-0.002	-0.002
Female	0.004	—	0.023	—	0.019
Transition into Paid work					
Male	0.046	0.055	0.058	0.009	0.011
Female	0.033	0.031	0.009	-0.002	-0.024**
Transition into NEET					
Male	0.364	0.377	0.369	0.013	0.005
Female	0.463	0.451	0.366	-0.012	-0.097***

Notes: Probabilities are average predictions. Expected exposure is defined using attained age on 30 September 2017: no expected exposure denotes age 20 or older, partial expected exposure denotes ages 15–19, and full expected exposure denotes under age 15. These categories do not measure observed receipt of policy support. Models adjust for harmonised baseline age, months between baseline and follow-up, sex, district BECE pass rate, water coverage, and skilled birth attendance. Standard errors are clustered by individual. The final columns compare partial and full expected exposure with no expected exposure. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

substantially different subsequent pathways: the increase in tertiary participation was concentrated among women and ultimately eliminated the gender gap in tertiary attendance in their study sample. Our results point to a related possibility at an earlier point in the education pathway. Greater expected exposure to Free SHS is associated with smaller gender differences across some of the subsequent education and inactivity states we observe. However, the female-minus-male SHS differences within exposure groups are imprecisely estimated, and comparisons across exposure groups also capture cohort and period differences. The results therefore suggest a narrowing of some gender differences in subsequent states rather than establishing that Free SHS caused these gaps to close.

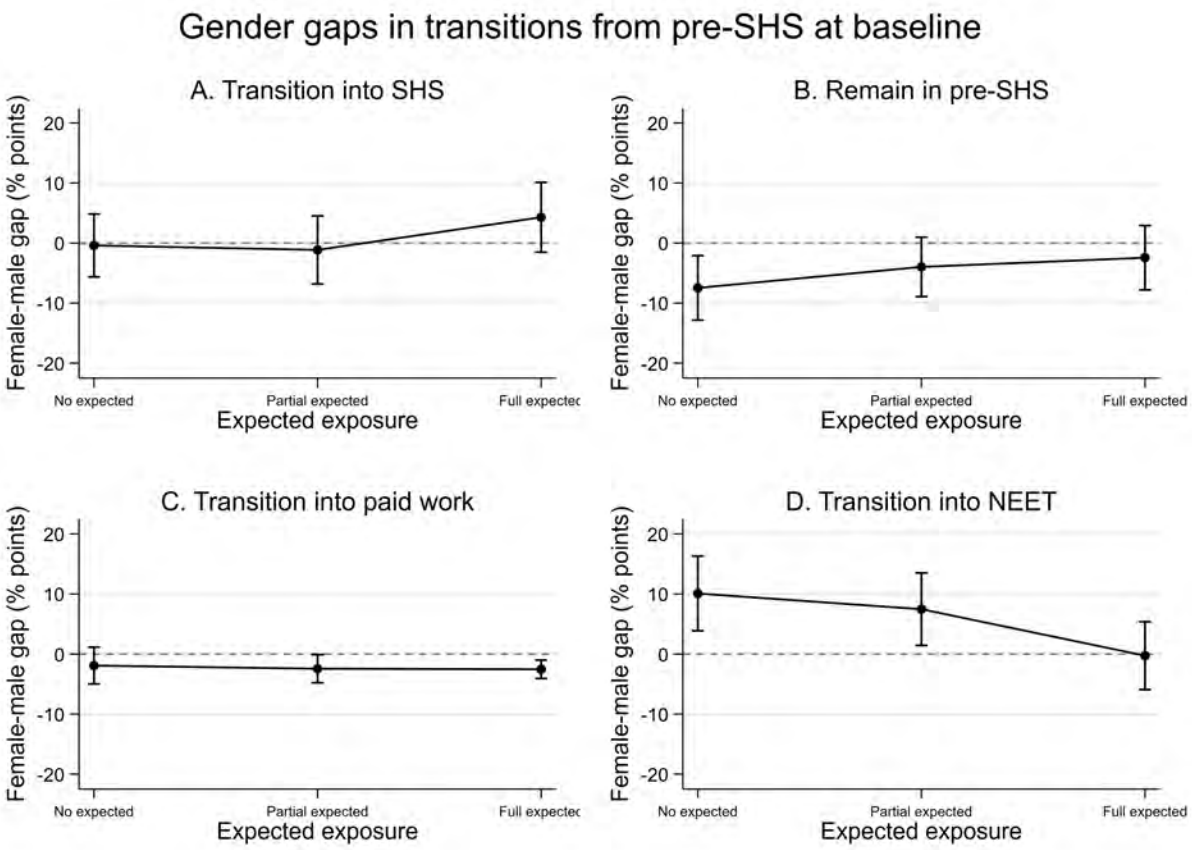

Figure 2: Gender gaps in transitions from pre-SHS at baseline

Notes: Points report female-minus-male differences in average predicted follow-up-state probabilities, in percentage points, within each exposure group. A transition denotes the pair of observed baseline and follow-up states; intervening states are not observed. Bars are 95% confidence intervals. Models adjust for harmonised baseline age, months between baseline and follow-up interviews and the three district characteristics; standard errors are clustered by individual.

We also examined gender differences among respondents starting in SHS and NEET.

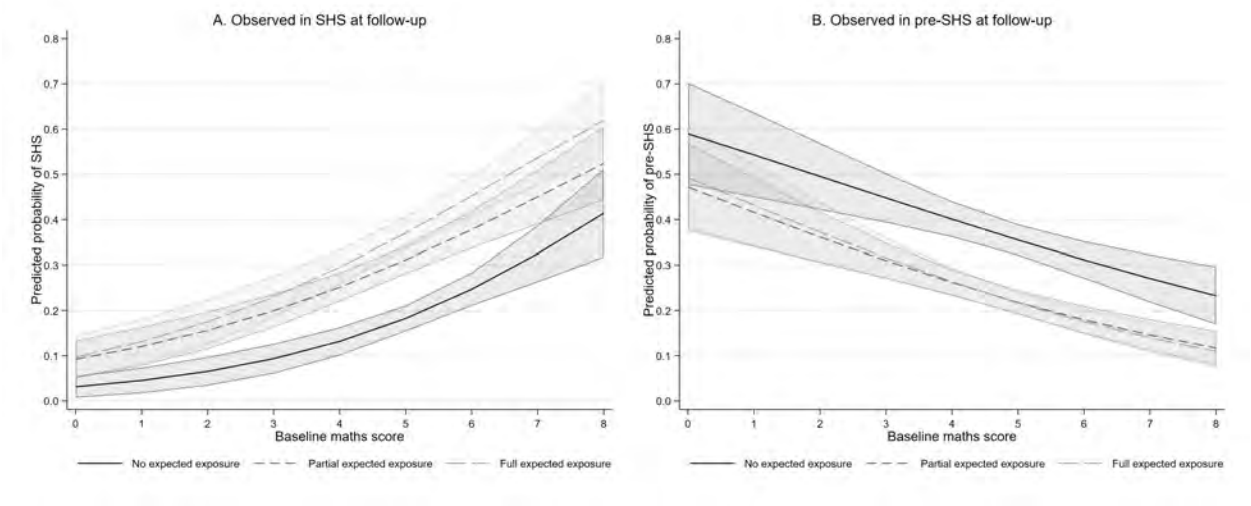

Figure 3: Follow-up education states by baseline maths score

Notes: Lines report average predicted probabilities by expected-exposure group over the continuous baseline maths score; shaded areas are 95% confidence intervals. Models adjust for harmonised baseline age, months between baseline and follow-up interviews, sex and the three district characteristics; standard errors are clustered by individual. Scores are pooled across waves and are not formally harmonised across survey rounds.

Estimates for the SHS-origin group are too imprecise to support substantive conclusions and are not reported. Among those starting in NEET, several gender differences appear in the no- and partial-exposure groups, but there is no consistent pattern across exposure groups. We therefore report these estimates in Appendix Figure 4 as exploratory evidence.

6.3 Heterogeneity by Prior Academic Performance

The academic-performance results help clarify which students appear to be associated with the expansion in SHS participation. Panel A of Figure 3 shows a pronounced academic gradient: before considering exposure-group differences, respondents with higher baseline maths scores are substantially more likely to be observed in SHS at follow-up. Yet higher predicted SHS probabilities under greater expected exposure are visible across much of the baseline-score range. Panel B shows the corresponding probabilities of remaining observed in pre-SHS, which are generally lower under greater expected exposure. Viewed together, the panels reinforce that the principal exposure-group contrast lies between positions within the education pipeline across a broad range of prior performance. The pattern does not suggest an expansion limited to academically strong students who were already most likely to progress, but neither is it well described as an increase confined to the weakest-performing

students.

This distinction matters for interpreting Free SHS relative to earlier evidence on secondary-school subsidies. Experimental scholarship evidence from Ghana identifies the effects of relaxing financial constraints among students who had already qualified for secondary school (Duflo et al., 2021, 2025). Free SHS potentially shifted a broader margin: it removed substantial direct costs while also relaxing the previous BECE performance threshold for placement. The maths-score patterns are consistent with the resulting expansion reaching students across a broader range of prior academic preparation, extending evidence on access and selection from Ghana and elsewhere (Blimpo et al., 2019; Brudevold-Newman, 2021). They therefore provide suggestive evidence of compositional change in SHS participation, although the data cannot isolate the contribution of the fee and placement components or establish how the academic distribution of actual Free SHS entrants changed.

The tercile estimates reported in Appendix Table 15 support the same broad interpretation: follow-up SHS probabilities are higher under full expected exposure in low-, middle- and high-scoring groups, with the largest absolute contrast among middle scorers. Because the score distributions differ across waves and the assessments have not been formally harmonised across rounds, these patterns should be read as suggestive exposure-group differences rather than causal changes in ability composition.

6.4 Robustness Checks

We conduct three robustness checks to assess the sensitivity of the main exposure-group differences to sample retention, contemporaneous local labour-market conditions and time-invariant differences across districts. First, we examine whether differential retention across survey waves affects the results. Appendix Table 11 compares predicted probabilities and exposure-group contrasts from three versions of the main multinomial logit model: the unweighted specification used in the main analysis, a specification using the inverse-probability-of-retention weights described in the data section, and a specification combining the Wave 1 design weights with the retention adjustment. The first two models use the same analytical sample, while the third is restricted to respondents for whom Wave 1 design weights are available.

The main education results are very similar when we adjust for differential retention. Among respondents starting in pre-SHS, the full-versus-no-exposure difference in the probability of being in SHS at follow-up declines only slightly, from 15.0 to 14.5 percentage points, while the corresponding pre-SHS difference changes from -10.6 to -9.6 percentage points. When the Wave 1 design weights are also applied, the SHS difference increases to

17.1 percentage points. The paid-work difference remains close to zero in the unweighted and retention-weighted models, but increases to −3.4 percentage points and becomes statistically significant in the design- and retention-weighted specification. The NEET difference remains similar in magnitude but is no longer statistically significant in this specification.

Appendix Table 12 additionally reports linear probability estimates for the same key destinations. Overall, the weighting exercises leave the central education pattern largely unchanged: greater expected exposure remains associated with a higher probability of being observed in SHS and a lower probability of remaining below SHS. The results for paid work and NEET are somewhat more sensitive to the choice of weights. These checks suggest that observable differences in retention do not account for the main education results, although inverse-probability weighting cannot address selection on unobserved characteristics and the Wave 1 design weights do not restore national representativeness to the later-wave sample.

Second, Wave 4 coincides with the post-COVID period and is the follow-up wave for the fully exposed group. The full-exposure contrasts could therefore partly capture differences in local labour-market conditions in the post-COVID period rather than differences associated with Free SHS exposure. To assess this possibility, we add measures of the district share of working-age adults in employment at baseline and follow-up. Baseline conditions use the 2010 Population and Housing Census; follow-up conditions use the 2010 measure for Waves 2 and 3 and the 2021 Census measure for Wave 4. Appendix Table 13 shows that, among respondents starting in pre-SHS, the full-versus-no-exposure SHS contrast declines from 15.0 to 9.6 percentage points but remains statistically significant. The pre-SHS contrast declines from −10.5 to −9.3 percentage points, while the paid-work contrast remains small. Local employment controls therefore attenuate the education contrasts but do not remove them.

Third, exposure groups may differ across districts in ways that are not fully captured by the district characteristics included in the preferred specification. We therefore examine whether the principal pre-SHS results remain when comparisons are made within baseline districts. We therefore estimate linear probability models for follow-up pre-SHS, SHS, paid work and NEET, with baseline-district fixed effects, on the common-support sample. Of 182 districts, 162 contain at least two exposure categories and 118 contain all three; 97.3% of analysis observations are in districts with exposure overlap. Appendix Table 14 shows that adding district fixed effects leaves the central pre-SHS and SHS contrasts substantively intact. Paid-work estimates remain small and imprecise.

Across the three exercises, the strongest and most consistent findings are higher probabilities of being in SHS and lower probabilities of being in pre-SHS at follow-up among partially and fully exposed cohorts starting in pre-SHS. The paid-work differences are small, while NEET differences remain generally imprecise. None of these checks removes national

cohort and period confounding or reveals the intervening pathway.

7 Conclusion

The expansion of fee-free secondary education across Sub-Saharan Africa has understandably focused attention on whether removing fees enables more young people to enter and complete secondary school. But as secondary participation expands, the question increasingly extends beyond access itself. Young people who remain in education for longer may progress further through the education system, enter the labour market later, or avoid periods of inactivity. Understanding these subsequent states is important for assessing what a large expansion in secondary schooling means for young people's pathways into adulthood.

This paper has examined these questions around the introduction of Ghana's Free SHS policy. The clearest differences are among young people who were enrolled below SHS when first observed. Compared with cohorts with no expected exposure to the reform, those with greater expected exposure are substantially more likely to be observed in SHS several years later and less likely still to be enrolled below SHS. By contrast, their probability of being in paid work changes very little. The pattern therefore suggests that the expansion associated with Free SHS is visible primarily in progression within the education system, rather than in a simple movement away from work and into schooling.

Looking across the prior academic-performance distribution provides some indication of who is included in this expansion. The higher probability of reaching SHS is not concentrated only among respondents with stronger baseline maths performance, nor only among those with weaker preparation. Instead, it appears across much of the performance distribution. This is particularly relevant in the Ghanaian context because Free SHS changed both the financial and academic margins of progression. In addition to removing direct schooling costs, the reform removed the previous BECE performance threshold for SHS placement. The cohorts progressing under Free SHS could therefore include young people who would previously have been constrained by the cost of SHS as well as those who would not have met the earlier placement threshold.

The gender results provide a further indication that changes in access may be reflected differently across subsequent states. Among cohorts with no expected exposure, females and males have similar probabilities of being observed in SHS at follow-up, but females are substantially more likely to be NEET and less likely to remain below SHS. These differences are much smaller among the fully exposed, alongside substantially higher SHS participation for both males and females. This pattern is interesting in light of experimental evidence from Ghana. Secondary-school scholarships increased SHS completion substantially for both sexes,

but their longer-run consequences differed: gains in tertiary participation were concentrated among women (Duflo et al., 2021, 2025). Our estimates cannot establish that Free SHS narrowed gender gaps, but they similarly point to the value of looking beyond secondary enrolment alone when considering how expanded access may affect young women and men.

The results for young people who begin further along the education pathway are less precisely estimated, but are also suggestive. Among those already in SHS, greater expected exposure is associated with a higher probability of subsequently being observed in PSET, while paid-work probabilities differ little across exposure groups. The smaller and differently composed SHS-origin samples limit how much weight can be placed on these estimates. Nevertheless, considered alongside the stronger results for those starting below SHS, they raise the possibility that the consequences of secondary-school expansion continue to unfold as larger cohorts reach the end of SHS and seek to progress further. Evidence from the Ghana scholarship experiment, where some educational and labour-market consequences emerged only after long periods of follow-up, provides good reason to continue following these cohorts as they age (Duflo et al., 2021, 2025).

There are important limits to what can be concluded from the comparisons in this paper. Expected exposure is assigned on the basis of cohort and survey timing rather than observed receipt of Free SHS, and cohorts with different expected exposure are observed in different periods. The GSPS interviews are also several years apart, so we observe where respondents are at baseline and follow-up rather than the sequence of movements between these points. Later-wave attrition further means that the analytical sample should not be treated as nationally representative at each wave. The robustness checks show that the main education results remain when we adjust for observable differences in retention, local employment conditions and time-invariant district differences. They cannot, however, separate the introduction of Free SHS from other cohort and period changes. The estimates are therefore best understood as evidence on how young people's subsequent states differed across cohorts with different expected exposure to the reform, rather than as causal effects of Free SHS.

These findings nevertheless have implications for how secondary-school expansion is considered. Removing financial and institutional barriers to SHS changes the number and potentially the composition of young people progressing through the education system. As access becomes less of the binding constraint, attention necessarily moves further along the education pipeline. Whether students progress through SHS, whether they are able to move into post-secondary education and training, and what opportunities await them when they eventually enter the labour market become increasingly important. The success of fee-free secondary education will therefore depend not only on bringing more young people into secondary school, but on whether the education system and labour market can accommodate

the larger and more diverse cohorts that expanded access makes possible.

Acknowledgements

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A Attrition diagnostics

Table 6: Wave-on-wave non-response among age-eligible baseline respondents

Transition pair	Baseline eligible	Retained	Not observed	Rate
Wave 1–Wave 2	2739	1397	1342	49.0%
Wave 2–Wave 3	2078	1466	612	29.5%
Wave 3–Wave 4	2651	1997	654	24.7%

Notes: The risk set contains respondents observed and aged 12–17 at the baseline of each transition and includes all baseline states, including paid work. It is therefore broader than the main analytical sample reported in Table 2, which excludes paid work as a baseline state. Retained respondents are observed in the immediately following wave. Not observed denotes absence from that wave and need not represent permanent panel attrition. Results are unweighted because panel weights and weights for later entrants are unavailable.

Table 7: Baseline characteristics by next-wave observation: Wave 1–Wave 2

Characteristic	Retained	Not observed	Difference	Std. difference
Baseline age	14.302	14.563	0.261***	0.151
Months between baseline and follow-up	52.376	.	.	.
Female	0.462	0.489	0.026	0.053
Household size	6.255	5.998	-0.257**	-0.093
Real household expenditure	2788.077	3042.431	254.354**	0.080
Real education expenditure	188.403	202.771	14.369	0.051
Baseline: pre-SHS	0.714	0.694	-0.020	-0.045
Baseline: SHS	0.056	0.066	0.010	0.041
Baseline: PSET	0.000	0.001	0.001	0.055
Baseline: paid work	0.002	0.001	-0.001	-0.037
Baseline: NEET	0.227	0.238	0.011	0.025
Mother: below primary	0.602	0.551	-0.052***	-0.105
Mother: primary	0.124	0.138	0.015	0.044
Mother: JSS/middle	0.238	0.254	0.016	0.037
Mother: SHS or higher	0.034	0.054	0.020**	0.096
Father: below primary	0.451	0.382	-0.069***	-0.141
Father: primary	0.093	0.091	-0.002	-0.006
Father: JSS/middle	0.335	0.403	0.068***	0.142
Father: SHS or higher	0.098	0.112	0.014	0.045
Baseline maths score	4.987	5.011	0.024	0.015
Baseline English score	5.167	5.150	-0.017	-0.008
Baseline Raven score	6.116	5.966	-0.150	-0.055
District BECE pass rate	77.928	75.726	-2.202***	-0.180
District water coverage	61.241	62.157	0.916	0.052
District skilled birth attendance	56.507	55.989	-0.518	-0.020
Baseline district employment share	0.697	0.695	-0.002	-0.041

Notes: Characteristics are measured at the baseline of the transition. Difference is the mean for respondents not observed at follow-up minus the retained mean. Standardised differences use the pooled within-group standard deviation. Sample sizes can vary across characteristics because of item non-response. Robust standard errors are used for significance tests. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Baseline characteristics by next-wave observation: Wave 2–Wave 3

Characteristic	Retained	Not observed	Difference	Std. difference
Baseline age	14.283	14.521	0.238***	0.139
Months between baseline and follow-up	51.206	.	.	.
Female	0.428	0.536	0.108***	0.218
Household size	5.806	5.858	0.052	0.020
Real household expenditure	1879.456	1842.554	-36.902	-0.021
Baseline: pre-SHS	0.707	0.676	-0.030	-0.066
Baseline: SHS	0.052	0.044	-0.008	-0.036
Baseline: PSET	0.000	0.000	0.000	.
Baseline: paid work	0.003	0.008	0.005	0.063
Baseline: NEET	0.238	0.271	0.034	0.077
Mother: below primary	0.534	0.601	0.067***	0.135
Mother: primary	0.165	0.120	-0.045***	-0.129
Mother: JSS/middle	0.258	0.225	-0.034	-0.078
Mother: SHS or higher	0.042	0.050	0.007	0.036
Father: below primary	0.411	0.446	0.035	0.070
Father: primary	0.122	0.119	-0.003	-0.010
Father: JSS/middle	0.343	0.302	-0.041*	-0.088
Father: SHS or higher	0.119	0.126	0.007	0.022
Baseline maths score	4.584	4.458	-0.127	-0.072
Baseline English score	4.979	4.915	-0.064	-0.029
Baseline Raven score	5.524	5.289	-0.236	-0.088
District BECE pass rate	72.788	72.978	0.190	0.013
District water coverage	68.065	67.347	-0.719	-0.043
District skilled birth attendance	56.779	55.749	-1.029	-0.042
Baseline district employment share	0.701	0.708	0.008**	0.110

Notes: Characteristics are measured at the baseline of the transition. Difference is the mean for respondents not observed at follow-up minus the retained mean. Standardised differences use the pooled within-group standard deviation. Sample sizes can vary across characteristics because of item non-response. Robust standard errors are used for significance tests. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Baseline characteristics by next-wave observation: Wave 3–Wave 4

Characteristic	Retained	Not observed	Difference	Std. difference
Baseline age	14.275	14.515	0.240***	0.140
Months between baseline and follow-up	50.338	.	.	.
Female	0.453	0.480	0.027	0.055
Household size	5.705	5.505	-0.200*	-0.079
Real household expenditure	1429.379	1427.389	-1.990	-0.002
Real education expenditure	226.385	226.473	0.089	0.000
Baseline: pre-SHS	0.719	0.640	-0.079***	-0.170
Baseline: SHS	0.079	0.070	-0.008	-0.031
Baseline: PSET	0.000	0.000	0.000	.
Baseline: paid work	0.008	0.011	0.003	0.033
Baseline: NEET	0.195	0.279	0.084***	0.198
Mother: below primary	0.498	0.566	0.068***	0.136
Mother: primary	0.161	0.147	-0.014	-0.040
Mother: JSS/middle	0.290	0.230	-0.060***	-0.137
Mother: SHS or higher	0.050	0.054	0.004	0.018
Father: below primary	0.382	0.475	0.094***	0.190
Father: primary	0.117	0.099	-0.018	-0.058
Father: JSS/middle	0.361	0.293	-0.068***	-0.145
Father: SHS or higher	0.138	0.128	-0.010	-0.030
Baseline maths score	5.003	4.811	-0.191**	-0.122
Baseline English score	5.753	5.606	-0.146	-0.082
Baseline Raven score	6.460	6.142	-0.317**	-0.127
District BECE pass rate	70.920	69.829	-1.091	-0.060
District water coverage	65.687	65.842	0.155	0.009
District skilled birth attendance	58.339	57.485	-0.854	-0.038
Baseline district employment share	0.701	0.702	0.000	0.003

Notes: Characteristics are measured at the baseline of the transition. Difference is the mean for respondents not observed at follow-up minus the retained mean. Standardised differences use the pooled within-group standard deviation. Sample sizes can vary across characteristics because of item non-response. Robust standard errors are used for significance tests. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B Full multinomial estimates

Table 10: District-controlled multinomial logit estimates

	(1)				
	RECODE of w_status_t1				
	pre_SHS	SHS	PSET	Paid_work	NEET
No expected exposure	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
Partial expected exposure	-0.393***	0.376***	-1.101	0.089	0.000
	(0.127)	(0.121)	(0.792)	(0.228)	(.)
Full expected exposure	-0.369***	0.671***	0.998	-0.013	0.000
	(0.130)	(0.129)	(0.632)	(0.316)	(.)
pre-SHS	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
SHS	-14.010***	-1.495***	1.628***	0.833***	0.000
	(0.185)	(0.530)	(0.507)	(0.308)	(.)
NEET	-1.206***	-1.435***	-0.732	-0.565**	0.000
	(0.217)	(0.236)	(0.671)	(0.266)	(.)
No expected exposure × pre-SHS	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
No expected exposure × SHS	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
No expected exposure × NEET	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
Partial expected exposure × pre-SHS	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
Partial expected exposure × SHS	-12.637***	-0.824	2.591***	-0.075	0.000
	(0.229)	(0.738)	(0.899)	(0.423)	(.)
Partial expected exposure × NEET	0.645**	-0.368	2.113**	0.128	0.000
	(0.280)	(0.321)	(1.074)	(0.394)	(.)
Full expected exposure × pre-SHS	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
Full expected exposure × SHS	-1.983***	0.605	1.046	0.575	0.000
	(0.425)	(0.791)	(0.856)	(0.768)	(.)
Full expected exposure × NEET	-0.234	-0.170	2.078**	1.213**	0.000
	(0.333)	(0.341)	(0.871)	(0.474)	(.)
Age at baseline	-0.665***	-0.160***	0.480***	0.294***	0.000
	(0.035)	(0.030)	(0.128)	(0.057)	(.)
Months between baseline and follow-up	-0.110***	-0.063***	0.096**	0.145***	0.000
	(0.017)	(0.018)	(0.046)	(0.022)	(.)
Male	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
Female	-0.318***	-0.042	-0.115	-0.533***	0.000
	(0.091)	(0.086)	(0.252)	(0.153)	(.)
District BECE pass rate	-0.006**	0.012***	0.015**	0.015***	0.000
	(0.003)	(0.003)	(0.008)	(0.005)	(.)
District water coverage	-0.000	-0.000	0.003	-0.002	0.000
	(0.003)	(0.002)	(0.007)	(0.004)	(.)
District skilled birth attendance	-0.004**	0.001	0.004	0.003	0.000
	(0.002)	(0.002)	(0.005)	(0.003)	(.)
Constant	15.439***	3.880***	-17.935***	-15.167***	0.000
	(1.112)	(1.101)	(3.379)	(1.757)	(.)
Observations	4061				
Pseudo R-squared	0.158				

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C Robustness checks

Table 11: Multinomial predicted-probability contrasts under alternative weighting specifications

		Unweighted		Retention weighted		Wave 1 + retention weighted	
Destination	Baseline state	Partial vs no exposure	Full vs no exposure	Partial vs no exposure	Full vs no exposure	Partial vs no exposure	Full vs no exposure
Transition into Pre-SHS							
	Pre-SHS	−0.088***	−0.106***	−0.078***	−0.096***	−0.079***	−0.093***
		(0.019)	(0.019)	(0.019)	(0.019)	(0.021)	(0.021)
	SHS	0.000	0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	NEET	0.032	−0.083***	0.029	−0.082**	−0.006	−0.085**
		(0.033)	(0.032)	(0.034)	(0.032)	(0.040)	(0.043)
Transition into SHS							
	Pre-SHS	0.092***	0.150***	0.086***	0.145***	0.095***	0.171***
		(0.019)	(0.022)	(0.020)	(0.023)	(0.026)	(0.030)
	SHS	−0.035	0.111	−0.027	0.113	−0.033	−0.012
		(0.046)	(0.090)	(0.045)	(0.088)	(0.044)	(0.063)
	NEET	−0.005	0.039	−0.002	0.040	0.026	0.058
		(0.021)	(0.029)	(0.022)	(0.029)	(0.032)	(0.040)
Transition into PSET							
	Pre-SHS	−0.005*	0.010	−0.004	0.009	−0.004	0.003
		(0.003)	(0.008)	(0.003)	(0.008)	(0.006)	(0.009)
	SHS	0.121***	0.153*	0.117***	0.142*	0.093**	0.120
		(0.033)	(0.082)	(0.032)	(0.082)	(0.042)	(0.101)
	NEET	0.008	0.076***	0.007	0.072**	0.006	0.067*
		(0.006)	(0.029)	(0.006)	(0.029)	(0.010)	(0.039)
Transition into Paid work							
	Pre-SHS	0.003	−0.007	0.001	−0.006	−0.004	−0.034***
		(0.010)	(0.012)	(0.010)	(0.012)	(0.013)	(0.012)
	SHS	−0.020	0.003	−0.030	0.005	−0.023	0.034
		(0.040)	(0.084)	(0.040)	(0.084)	(0.054)	(0.139)
	NEET	0.007	0.062**	0.005	0.061**	−0.017	0.013
		(0.014)	(0.029)	(0.013)	(0.028)	(0.019)	(0.029)
Transition into NEET							
	Pre-SHS	−0.002	−0.047*	−0.005	−0.052**	−0.008	−0.046
		(0.022)	(0.024)	(0.023)	(0.025)	(0.028)	(0.031)
	SHS	−0.066	−0.267**	−0.060	−0.260**	−0.038	−0.142
		(0.063)	(0.115)	(0.062)	(0.117)	(0.075)	(0.147)
	NEET	−0.043	−0.094*	−0.040	−0.091*	−0.008	−0.053
		(0.038)	(0.050)	(0.038)	(0.050)	(0.046)	(0.063)
Observations		4,061		4,061		3,514	

Notes: Entries are contrasts in average predicted probabilities from the multinomial logit models; no expected exposure is the reference category. Expected exposure is defined using attained age on 30 September 2017. The models include interactions between expected exposure and baseline state, harmonised baseline age, months between interviews, sex and district characteristics. Paid work is excluded as a baseline state. The retention-weighted model uses transition-pair-specific inverse-probability weights. The final specification multiplies the Wave 1 household weight by the inverse-probability-of-retention weight and is restricted to observations with a positive, non-missing Wave 1 household weight. Standard errors are clustered by individual. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 12: Linear probability estimates under alternative weighting specifications

Destination	Exposure contrast	Unweighted	Retention weighted	Wave 1 weighted	Wave 1 + retention weighted
Pre-SHS	Partial vs no exposure	−0.091***	−0.081***	−0.094***	−0.083***
		(0.020)	(0.020)	(0.022)	(0.022)
	Full vs no exposure	−0.126***	−0.116***	−0.127***	−0.119***
		(0.022)	(0.022)	(0.025)	(0.026)
SHS	Partial vs no exposure	0.097***	0.091***	0.110***	0.101***
		(0.020)	(0.021)	(0.026)	(0.027)
	Full vs no exposure	0.167***	0.163***	0.197***	0.191***
		(0.022)	(0.023)	(0.029)	(0.030)
Paid work	Partial vs no exposure	−0.003	−0.006	−0.004	−0.006
		(0.010)	(0.010)	(0.013)	(0.013)
	Full vs no exposure	−0.003	−0.005	−0.017	−0.018*
		(0.009)	(0.009)	(0.011)	(0.010)
NEET	Partial vs no exposure	0.002	−0.001	−0.008	−0.008
		(0.022)	(0.023)	(0.027)	(0.028)
	Full vs no exposure	−0.042*	−0.045*	−0.055*	−0.055*
		(0.024)	(0.024)	(0.030)	(0.031)
Observations		2,944	2,944	2,534	2,534

Notes: Linear probability estimates among respondents in pre-SHS at baseline. No expected exposure is the reference category. The retention-weighted specification uses transition-pair-specific inverse-probability-of-retention weights. The Wave 1-weighted specification uses the Wave 1 household weight. The final specification multiplies the Wave 1 household weight by the inverse-probability-of-retention weight. The Wave 1-weighted columns are restricted to observations with a positive, non-missing Wave 1 household weight. All specifications control for harmonised baseline age, months between interviews, sex and the three district characteristics. Clustered standard errors are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 13: Predicted-probability contrasts with local employment conditions

Destination	Exposure contrast	District controls	+ Employment conditions
Pre-SHS	Partial vs no exposure	−0.087***	−0.085***
		(0.019)	(0.019)
	Full vs no exposure	−0.105***	−0.093***
		(0.019)	(0.023)
SHS	Partial vs no exposure	0.093***	0.081***
		(0.020)	(0.020)
	Full vs no exposure	0.150***	0.096***
		(0.022)	(0.026)
PSET	Partial vs no exposure	−0.005*	−0.007*
		(0.003)	(0.003)
	Full vs no exposure	0.010	0.004
		(0.008)	(0.007)
Paid work	Partial vs no exposure	0.003	−0.000
		(0.010)	(0.010)
	Full vs no exposure	−0.007	−0.013
		(0.012)	(0.012)
NEET	Partial vs no exposure	−0.003	0.011
		(0.022)	(0.022)
	Full vs no exposure	−0.048**	0.006
		(0.024)	(0.029)

Notes: Entries are average predicted-probability contrasts among respondents in pre-SHS at baseline. Expected exposure is defined using attained age on 30 September 2017: no expected exposure denotes age 20 or older, partial expected exposure denotes ages 15–19, and full expected exposure denotes under age 15. The categories do not measure observed policy receipt. Both specifications control for harmonised baseline age, months between interviews, sex and the three district characteristics. The second additionally controls for baseline-district employment in the 2010 Census and employment in the follow-up district using the period-appropriate census. Clustered standard errors are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 14: Linear probability estimates with baseline-district fixed effects

Destination	Exposure contrast	Employment controls	+ District fixed effects
Pre-SHS	Partial vs no exposure	-0.089^{***}	-0.076^{***}
		(0.020)	(0.026)
	Full vs no exposure	-0.125^{***}	-0.104^{***}
		(0.027)	(0.034)
SHS	Partial vs no exposure	0.084^{***}	0.095^{***}
		(0.021)	(0.026)
	Full vs no exposure	0.120^{***}	0.125^{***}
		(0.028)	(0.036)
Paid work	Partial vs no exposure	−0.003	0.007
		(0.010)	(0.013)
	Full vs no exposure	0.000	−0.001
		(0.010)	(0.016)
NEET	Partial vs no exposure	0.013	−0.027
		(0.023)	(0.030)
	Full vs no exposure	0.007	−0.028
		(0.030)	(0.040)
Observations		2,938	2,938

Notes: Linear probability estimates among respondents in pre-SHS at baseline. No expected exposure is the reference category. The comparison specification includes harmonised baseline age, months between interviews, sex, the three district characteristics, baseline-district employment and follow-up employment conditions. The fixed-effect specification absorbs baseline district. Clustered standard errors are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

D Exploratory gender gaps from a NEET baseline

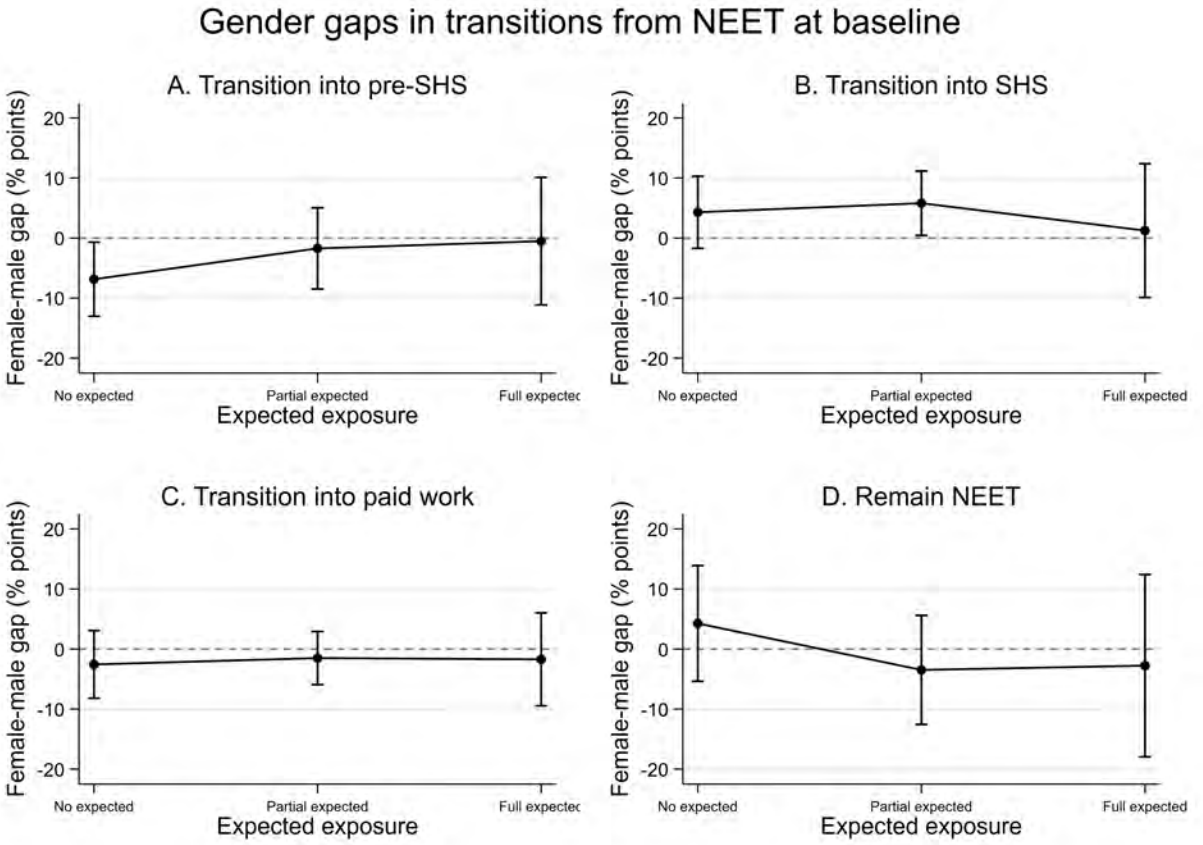

Figure 4: Gender gaps in transitions from NEET at baseline

Notes: Points report female-minus-male differences in average predicted follow-up-state probabilities, in percentage points, within each expected-exposure level. A transition denotes the pair of observed baseline and follow-up states; intervening states are not observed. Expected exposure is defined using attained age on 30 September 2017. Bars are 95% confidence intervals. Models adjust for harmonised baseline age, months between baseline and follow-up interviews and the three district characteristics, with standard errors clustered by individual. The estimates are exploratory.

E Maths-score tercile estimates

Table 15: Transitions from pre-SHS by maths score and expected exposure

Maths score group	No exposure	Partial exposure	Full exposure	Δ Partial	Δ Full
Transition into SHS					
Low score	0.104	0.203	0.238	0.099***	0.134***
Middle score	0.212	0.363	0.442	0.151***	0.231***
High score	0.341	0.398	0.492	0.058	0.151**
Transition into Pre-SHS					
Low score	0.433	0.322	0.301	-0.112***	-0.133***
Middle score	0.340	0.186	0.192	-0.154***	-0.148***
High score	0.253	0.141	0.150	-0.112**	-0.103**
Transition into Paid work					
Low score	0.031	0.015	0.031	-0.015	0.000
Middle score	0.053	0.046	0.027	-0.006	-0.025
High score	0.023	0.099	0.075	0.076***	0.051*
Transition into NEET					
Low score	0.438	0.461	0.415	0.023	-0.023
Middle score	0.388	0.405	0.344	0.017	-0.044
High score	0.351	0.333	0.300	-0.017	-0.051

Notes: Probabilities are average predictions. Expected exposure is defined using attained age on 30 September 2017: no expected exposure denotes age 20 or older, partial expected exposure denotes ages 15–19, and full expected exposure denotes under age 15. These categories do not measure observed receipt of policy support. Models adjust for harmonised baseline age, months between baseline and follow-up, sex, district BECE pass rate, water coverage, and skilled birth attendance. Standard errors are clustered by individual. The final columns compare partial and full expected exposure with no expected exposure. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

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Data

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