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## **Occupational choice of skilled workers in the presence of a large development sector**

Evidence from Sierra Leone

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**Abstract:** Using data from Sierra Leone, I explore the role of cognitive ability in sorting across sectors and the importance of perceptions in the employment decision-making process. Crucial to the analysis is the introduction of the aid-industry/development sector as a ‘third sector’, which is shown to be attractive to skilled jobseekers. One of the key findings is that the largest share of skilled jobseekers opt for early-career employment working for a donor organisation, INGO, or NGO in the development sector. The results show that cognitive ability matters for occupational choice, as higher ability workers are more likely to choose the development sector over other sectors. Skilled graduates also sort by intrinsic motivations to some extent, but these motivations are secondary to jobseekers’ perceptions of various sectors. This result implies that ‘mission matching’ based on measured preferences may be inhibited in contexts where employment possibilities are limited.

**Key words:** development, employment, foreign aid, labour market, occupational choice, Sierra Leone, skilled workers

**JEL classification:** J22, J24, F35, C25

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## 1 Introduction

There has been an increasing push for skills enhancement in many developing countries (World Bank 2000, 2018), but little growth in employment opportunities to keep up with the increasing flow of graduates. The result has been unemployment and underemployment, with several implications for development. Returns to education may not be as high as previously estimated, though resources continue to be allocated to skills development; high levels of unemployment and underemployment imply underuse of human capital, which if used better could spur growth and development; and finally, at the micro level, happiness and wellbeing of skilled labour is diminished by low job satisfaction and motivation. At the policy level, development policy may need to focus more on production and private sector development in order to stimulate job creation and absorb graduates. In addition to economic development implications, the Government of Sierra Leone has identified the unemployment/underemployment of skilled youths as a potential security risk, as these youths may be easily incentivized to engage in unrest. It is therefore important to study the skilled workforce in low-income countries (LICs) and how this segment of the workforce makes decisions in the context of the opportunities available.

Much of the labour economics literature on skilled workers in developing countries has focused on questions related to aggregate supply of and demand for high-skilled labour, and on overall wage determination in the market for skilled workers. In contrast, research on the underlying drivers of the labour supply decisions of high-skilled individuals in these environments is relatively scarce. This paper is concerned with deepening our understanding of how the interplay between preferences of individual jobseekers, their specific characteristics (such as education or measured abilities), and their beliefs about the characteristics of jobs in various sectors determines eventual occupational choice. Important to the analysis is the introduction of the development sector as an option for skilled labour when choosing employment.

Preferences, in this context, entails characteristics such as intrinsic financial and prosocial motivations, attitudes toward risk and uncertainty, and desires for social status. If preferences are important to occupational choice, there is ‘mission matching’. Mission matching predicts that workers and sectors match on the basis of a given mission, such as philanthropy, profit maximization, or social efficiency (Besley and Ghatak 2005).

Situated primarily within the job-sorting/occupational choice literature, this paper addresses three specific questions in an LIC context:

- i. Do skilled jobseekers sort on the basis of cognitive ability at the sector level?
- ii. Do skilled workers sort on the basis of measured preferences (risk, time preferences, prosociality, financial motivation, desire for status) as predicted in the ‘mission matching’ literature?
- iii. Do perceptions matter for occupational choice?

In order to explore these ideas, a combination of survey and experimental methods from behavioural economics was used to study the occupational choice and job search behaviour of university graduates in Sierra Leone, positioning this within the opportunities available in the market. Sierra Leone was selected as an appropriate case study, as its labour market is typical of that of many low-income/lower-middle income countries that have high levels of informality, especially those emerging from a period of prolonged economic or political crisis.

The paper adds to the body of existing literature in a number of ways: first, by testing matching models on skilled workers—an under-studied population in the labour markets of developing countries; second, by introducing cognitive ability into the matching model framework; third, by introducing a measure of perceptions/beliefs into the standard occupational choice model. Alongside these three contributions, the development sector is positioned as a third sector and a viable sector choice in itself, which is another novel approach of the paper.

A key finding of the paper is the significance of cognitive ability in sector choice. Higher ability workers are more likely to choose the development sector over the public sector. This finding speaks to policy and should encourage development organizations to reflect on their impact on the dynamics of the labour market in the countries in which they operate; and the public sector to reflect on its competitiveness as an employer. The results also show that skilled graduates sort by measured preferences to some extent, but these motivations are secondary to jobseekers' perceptions of benefits across various sectors and the opportunities available in the various sectors. This result implies that 'mission matching' based on measured preferences may be inhibited in contexts where employment possibilities are limited.

The rest of this paper is structured as follows. Section 2 provides context by giving an overview of the labour market and the development sector in Sierra Leone. Section 3 presents an overview of key theories and empirical findings which have influenced the discourse to date, and from which the research questions were born. Section 4 discusses the methodological approach to answering these questions (both with respect to data collection and empirical methods). Section 5 presents the Multinomial Probit regression model of occupational choice and discusses the findings. Section 6 concludes.

## **2 The Sierra Leonean context**

Sierra Leone is a small West African country, with a population of just over 7 million. The capital, Freetown, was established as a trading post for the United Kingdom; later, Freetown (and Sierra Leone more generally) became a destination for resettling former slaves from the Americas. Sierra Leone gained independence from the UK in 1961, and became a republic a decade later, in 1971. The 1970s and 1980s saw significant economic deterioration, a decline in living standards, and calls for constitutional reform. Failure to reform left the country susceptible to civil war, which broke out in 1991 and ended in 2002. The war devastated institutions, infrastructure, the economy, and lives.

More recently, the country was once again set back developmentally as the combination of the Ebola crisis and declining global commodity prices led to a contraction in the economy. Overall growth declined from 20.7 per cent (5.5 per cent excluding iron ore) pre-Ebola/commodity price crash to -21.1 per cent in 2015 (1.4 per cent excluding iron ore) (IMF 2016). Growth recovered to 4.3 per cent in 2016 (3.3 per cent excluding the iron ore sector).<sup>1</sup> Despite the existence of natural resources and their contribution to growth, the economy remains largely dependent on agriculture; and the majority of the labour force is employed in this sector.

Frölich and Haile (2011) note that labour markets in developing countries have large informal sectors, many small-scale production units, limited social protection coverage, large uninsured risks, seasonality in jobs, and workers holding multiple jobs. Sierra Leone is typical of this. There

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<sup>1</sup> The Government measures and reports GDP and growth including and excluding iron ore.

were 1.86 million employed in Sierra Leone in 2014, though the majority were employed in the informal sector (Statistics Sierra Leone 2015). There are an estimated 188,777 formal-sector jobs, spread over self-employment (64,154) and wage employment (124,623). Of formal employment, the government is the largest employer (39 per cent), followed by the formal self-employed (34 per cent), the wage-employed formal sector (17 per cent), and the development sector (10 per cent). Just over 50,000 jobs are held by those who have a post-secondary qualification or higher. Of these, 22 per cent are self-employed and 78 per cent are wage employed. Of these jobs, 7 per cent are in the agriculture and fisheries sector, 1 per cent in mining and extractives, 2 per cent in manufacturing, 3 per cent in construction, and 87 per cent in services.

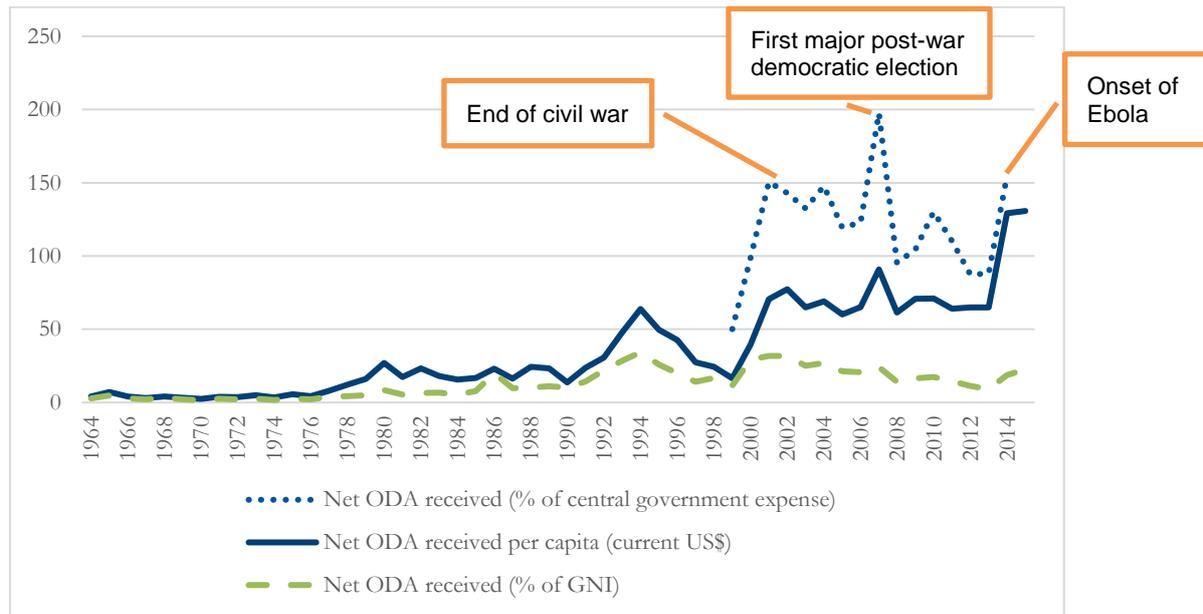
The government employs the largest share of skilled workers (44 per cent), followed by the private sector (30 per cent), and the development sector (10 per cent). From the data, the development sector employs a relatively small proportion of all skilled workers, but this masks the flow of jobs created and destroyed in the sector. Jobs in the development sector, though more unstable, are created more frequently with the launch of new projects that give way to vacancies. These jobs are largely short-term, in line with the life span of the associated project, and are routinely destroyed when the project comes to completion. Thus, the stock of development sector jobs at any one time may not reflect the large numbers of jobs created over time.

The role of development organizations in Sierra Leone has increased significantly in the past two decades, and now surpasses government spending, standing at around 23 per cent of GNI (Figure 1). At the end of the civil war, large amounts of aid flowed to Sierra Leone to assist in nation-rebuilding and recovery. Assistance was targeted primarily at infrastructure projects, government ministries, the justice sector, and social services. Kanyako (2016) argues that the government was unable to absorb such large inflows, which led to the development of the NGO sector. The NGO sector in turn helped foster accountability of government and democracy in the immediate post-war years. Estimates suggest that in the four years following the war, 26 per cent of total support to Sierra Leone was channelled through NGOs (Kanyako 2016: 27). NGOs are still a main (and well established) actor in the economic, political, and social landscape of Sierra Leone. Like the transition to a democratically elected government during the post-war period, the Ebola outbreak in 2014 led to a notable international response and large inflows of aid—up to 150 per cent of government spending in 2014 (Figure 1). Since then, the government, the donor community, and various NGOs have been working towards implementing the National Ebola Recovery Strategy 2015–2017.

Alongside this, there has been increasing focus on skills development at the highest level in Sierra Leone. Spending on tertiary education as a percentage of government expenditure nearly doubled between 2011 and 2014 (Figure 2), driving the overall increase in education spending. The quantity of graduates entering the labour market as a result has been increasing over the years (Awoko 2017).

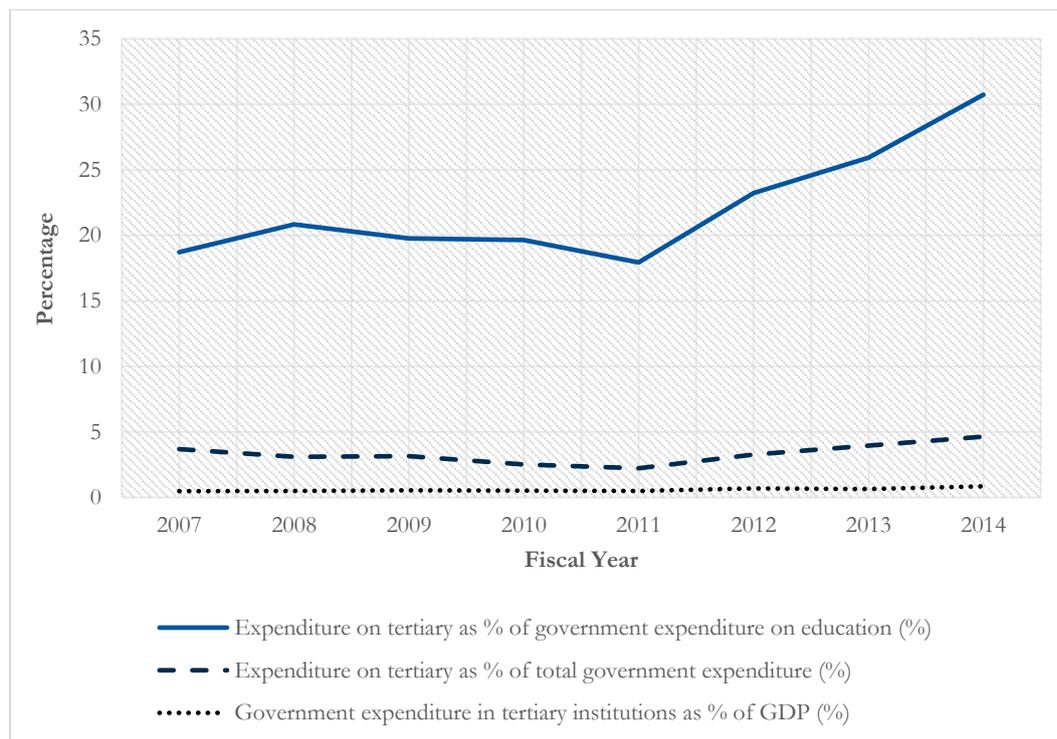
Sierra Leone therefore provides an apt case study, as the labour market is characteristic of other developing countries in that there is an expansion in the supply of skilled workers (at the university graduate level) and a large and persistent development sector.

Figure 1: ODA in Sierra Leone



Source: Author's construction from World Bank: World Development Indicators (<http://databank.worldbank.org/data/home.aspx>).

Figure 2: Government spending on tertiary education



Source: Author's construction from World Bank: World Development Indicators (<http://databank.worldbank.org/data/home.aspx>).

### 3 Literature review and contribution of the paper

The trade-off between labour and leisure has been the cornerstone of neo-classical labour supply models. Recent empirical work has attempted to study alternative labour supply models such as reference-dependent and income-targeting models (Andersen et al. 2014). Job sorting and matching models are relatively new themes in labour economics in developing countries. Past research into labour markets in developing countries primarily focused on labour market outcomes rather than drivers of worker behaviour. An extensive body of research addresses wage differentials and employment on the basis of formality, education, and productivity in developing countries (Falco et al. 2011; Kingdon et al. 2005; Nordman et al. 2011; Rankin et al. 2010; Satchi and Temple 2009; Teal 2011). Within this literature, the role of labour market institutions such as employment protection legislation, trade unions, and minimum wage legislation has also been addressed (Almeida and Aterido 2011; Bhorat et al. 2015; Freeman 2010; Kugler 2004). These studies, along with review papers by Berry (2008), Fields (2011), and Frölich and Haile (2011), provide a broad overview of labour market analysis in developing countries, within which this research sits. There are limitations with this body of research, however.

First, as Schler et al. (2009) argue, the perspective of the researched is absent from the discourse, as few studies have used survey methods to understand the beliefs held by labour market participants. Second, many of the above studies separated labour markets into formal and informal sectors, drawing on the seminal works of Lewis (1954) and Harris and Todaro (1970). Maloney (1998) showed that movement between the formal and informal sector was often fluid, and separation between the sectors was less rigid than initially conceptualized. And third, studies on returns to education have assumed that individuals are indeed able to find jobs and earn wages, as studies compare the wages of those employed who have different levels of education; but this assumption may not hold if labour markets fail to generate employment. Evidence put forward in Pritchett (2001), Kingdon et al. (2005), and Statistics Sierra Leone (2015) shows that growth in employment in Africa has not kept up with growth in school enrolment and entry into the labour market. In several African countries studied, growth in the labour force was at least four times as large (and even up to 29 times as large) as changes in wage employment (Fields 2011).

Taken together, incentives, opportunities, and choice become important to the debate. Understanding how people in developing countries are working, and why they have chosen a job is imperative, as this information is vital to labour policy. The rest of this literature review separates relevant past studies on the basis of two overarching themes: (i) mission matching and occupational choice, and (ii) risk preferences and occupational choice. I conclude by situating the present research in the existing literature.

#### 3.1 Mission matching and labour supply—prosocial and financial motives

Besley and Ghatak (2005) theorized that workers and sectors match on the basis of a given mission, such as philanthropy, profit maximization, or social efficiency. The experimental economics literature has built on this notion, hypothesizing that workers ‘match’ to a sector/occupation on the basis of prosocial or financial motives. Ashraf et al. (2014), Deserranno (2015), and Serra et al. (2011) studied health workers to determine whether those who opt into the sector are philanthropically/socially driven; and whether such ‘mission matching’ leads to organizational efficiency gains, as theorized by Fafchamps et al. (2006). Serra et al. (2011) showed that mission matching occurs as those with higher prosocial motivation are employed in the lower-paying non-profit sector; and Deserranno (2019) showed that individuals who are more profit-driven were more likely to apply for a higher paying job. In contrast, Ashraf et al. (2014) found that prosocial preferences were equal across groups exposed to different advertisements for the same job that

were intended to capture varying prosocial versus financial motivations. The theory predicts that higher prosociality is correlated with application to more ‘community-based’ jobs.

Ashraf et al. (2014) and Serra et al. (2011) implicitly assume a trade-off between financial and prosocial motivations, or a crowding-out effect, as posited in Bénabou and Tirole (2006). This assumption is not refuted by results from Deserranno (2019), but it is contested by Dal Bó et al. (2013), indicating that the literature is not conclusive. In Deserranno’s study, individuals in the high-pay treatment were 17 per cent more likely than the low-pay group to perceive the job as an income-earning role, rather than as a vehicle for improving health in the community (Deserranno 2019: 280). On the other hand, Dal Bó et al. (2013) analysed the recruitment drive for public-sector workers in Mexico and found that higher wages attracted higher quality candidates (proxied by higher reservation wage, IQ, and personality traits) and a more motivated (in terms of public sector motivation) candidate pool. This conflicting result is indicative that the results may be different across different groups and countries, e.g. lower skilled rural health workers in a low-income country (Deserranno 2019) versus higher skilled non-health workers in a middle-income country (Dal Bó et al. 2013: 1174).

The first aspect of matching relates to attracting the ‘right type’, as described above. The second aspect entails the efficiency of the match. Deserranno’s (2019) findings show that higher financial incentives increase the application pool and the likelihood of filling vacancies—consistent with Dal Bó et al. (2013)—but negatively affect retention and performance. Deserranno’s (2019) results can be explained by a costly crowding-out effect, as put forward in Bénabou and Tirole (2006). Another factor affecting Deserranno’s (2019) results is the design of the experiment. Characteristics of the applicant pool are likely to be affected by the treatment, as individuals with weaker prosocial preferences were more likely apply to the high-paying treatment; thus creating a crowding-out effect between financial motives and prosociality. Deserranno’s (2019) results contrast with Ashraf et al.’s (2014), which showed that rewarding career incentives (as a proxy for financial motives) did not negatively affect performance, but instead was associated with more effective health service delivery.

### **3.2 Risk preferences and occupational choice**

Empirical studies testing the ‘mission matching’ hypothesis have been silent on risk preferences in decision-making. The results may change if these are included. Falco (2014) explored risk preferences, and how these affect the choice between informal employment or queuing for a formal job/unemployment in Ghana. In Falco (2014), risk is modelled in two ways: (i) uncertainty in job search and (ii) uncertainty in income, conditional on being employed (Falco 2014). Risk preferences were elicited in 2007 and matched with 2004–2006 employment data. This may lead to a case of reverse causation. The author argues that risk preferences influence the choice of informal sector/queuing for the formal sector; however, it may be the case that being in a sector (between 2004 and 2006) could have influenced the risk preferences measured in 2007. Falco (2014: 105) argues that such endogeneity is unlikely to be the case by presenting the idea that ‘attitudes to risk are largely inheritable and therefore exogenous to labour market outcomes in adulthood’. Though this assumption had been used in previous studies, preference stability is still widely debated (Andersen et al. 2008; Chuang and Schechter 2015). Empirically, Falco (2014) uses a multinomial logit model (MNL) to show that risk-averse workers are more likely to queue for formal jobs (especially younger, more educated risk-averse workers). Risk-aversion decreases with the likelihood of informal employment.

### 3.3 Contribution to the literature

The papers reviewed above have all explored labour supply experimentally and contributed to the literature in various ways. From these papers we have learnt that financial incentives increase the application pool (Dal Bó et al. 2013; Deserranno 2019) and may improve performance (Ashraf et al. 2014) or crowd out more prosocial applicants (Deserranno 2019), who may opt for a philanthropic mission over financial gain (Serra et al. 2011). Other research on search and matching has demonstrated that employment and matching can be facilitated by reducing search costs, especially for disadvantaged groups (Abebe et al. 2016), and reducing information asymmetries (Abel et al. 2016; Bassi and Nansamba 2017; Carranza et al. 2017). However, employment might not be the objective in itself, but instead quality employment (Blattman and Dercon 2016). There remains great scope for further research in this area, which this paper aims to contribute to.

First, the present research brings together the literature on mission matching (financial versus prosociality) and utility preferences (risk-based matching) in one model and introduces the development sector as a viable occupational choice. Time preferences and desired social status are also added as explanatory variables. There may be a confounding effect of risk and time preferences in the context of employment. For example, a jobseeker who prefers a short-term contract may be a risk-taker, or myopic in the employment choice. Including both in the model can separate marginal effects. I also include a measure of cognitive ability in the model to determine if job-sorting across sectors is influenced by ability. It has already been established that job-sorting at the firm level is associated with level of education (Fafchamps et al. 2006). Another innovation is the introduction of the development sector as a third sector, or a choice in its own right. Given the size and continued presence of the development sector in many developing countries, it is expected that graduates will consider the development sector as a viable option when choosing employment.

Second, the research questions are applied to skilled workers, an under-researched group. Falco (2014) assumed free entry into the informal sector. This may not be true for highly skilled workers, who may see self-employment as an entrepreneurship opportunity requiring start-up capital, a potential barrier to entry. Similar arguments can be made about the studies by Andersen et al. (2014), Abebe et al. (2016), and Blattman and Dercon (2016), who all randomize over entry-level low-skilled workers.<sup>2</sup> These models may therefore not fit skilled workers. Arguably, low-skilled workers comprise the biggest share of the labour force in developing countries (2011), but this does preclude research on the labour supply decision of skilled workers. In fact, this area is increasingly relevant given the push to produce a 'skilled' labour force in many developing countries and higher levels of financial support for education by both donors and national governments associated with this cause (World Bank 2000). Given that the rate at which skilled labour enters the labour market out-paces the rate of job creation in many developing countries (Fields 2011; Pritchett 2001), it is vital to understand the occupational choices of skilled labour market entrants, as these may explain underemployment or the increasing size of the traditionally termed informal sector.

Third, this research seeks to introduce perceptions into the occupational choice discourse. Neo-classical models assume that agents are rational, and make utility-maximizing decisions with complete information. This paper will look beyond this assumption and consider individual beliefs and perceptions, which may be influenced by socio-economic status/information asymmetries, and may limit aspirations and choices made. Decision-making is driven by both incentives and

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<sup>2</sup> This is likely to be due to the nature of the methods.

biases in probability judgement or heuristics (Delavande et al. 2011; DellaVigna 2009). The role of beliefs will be introduced to determine whether/how these interact with intrinsic preferences and occupational choice. For instance, beliefs may taper motivations and/or determine occupational choice if choice is based on beliefs about the structure of the labour market rather than intrinsic attributes/preferences.

## 4 Methodology

### 4.1 Data collection methods

The target population of the survey was undergraduate university students who were in their final year of a degree programme, excluding those enrolled in medical institutions or teacher-training colleges. Given that the research aims to capture employment choice, perceptions and aspirations *ex ante*, minimal exposure to the labour market was warranted. Post-graduate students were excluded, as they often have years of experience in employment and enrol part-time for post-graduate studies. In contrast, the majority of undergraduates enrol directly from secondary school and the majority have less than a year's experience in the formal labour market.

Students enrolled at the College of Medicine and Allied Health Sciences (COMAHS) and various teacher-training colleges were excluded because the majority of employment for these skills is in the public sector (hospitals and government schools, respectively); hence, the study assumes that they have less 'choice' than undergraduate students in other disciplines (for instance, law, politics, economics, finance, engineering), who can in theory work across sectors. It may be the case that experienced health and education workers switch to the private sector or take up administrative or policy roles in the public or development sector, but this is often later in their careers, whereas the study focuses on employment immediately after leaving university.

Fourah Bay College (FBC) was selected as an appropriate study population from which the sample was drawn. FBC sits under the University of Sierra Leone (UoSL) and is the oldest and largest college in Sierra Leone. Of the 32 higher education institutions registered with the Tertiary Education Commission in 2011, there are only three universities,<sup>3</sup> and it was estimated that almost 20 per cent of all students in tertiary education and 30 per cent of university students were enrolled at FBC (World Bank 2013: 11–12). Importantly for this study, FBC provides population heterogeneity due to the variety of courses offered and the fact that it is located in the capital, Freetown. The student population of FBC is approximately 7,000, of which about 1,000 are final-year degree students.

Data collection took place between August and December 2017, at the main campus located at Mount Aureol, Freetown. A stratified quasi-random sampling method was used. The first step of the sampling process was to acquire a comprehensive list of all students enrolled in final year, which could be used as a sampling frame. Such a list was not available from the University Registrar, nor from department heads. The lack of centralized information systems in higher education institutions in Sierra Leone was highlighted as a shortcoming by the World Bank in its 2013 study (World Bank 2013: 25), and persists today. Both the University Registrar and various departments possessed only partial lists of registered students, as many students do not officially register because of the high registration fees. Students attend lectures and classes, and take

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<sup>3</sup> This estimate included two public and one private universities. Since then, two other universities have been established.

examinations all the same. At the end of final examinations, students then settle any outstanding fees in order to access their transcript and degree certificates. Taking the list of officially registered students would have resulted in a downward estimate of the FBC population and biased sampling, as the sample would have consisted of students that were financially better-off or on government scholarships.

Instead, final-year class representatives from each course were contacted and asked for an estimate of the number of students enrolled in their respective courses. Initial numbers for sampling were calculated on this basis. After a week of sampling, three random students who had been sampled from each course were contacted and asked how many students were enrolled in their course. If an estimate was significantly different, a fourth student was called and so forth. The average of these student estimates was used to proxy the population of final-year students at FBC, which totalled 1,060. This can be compared to the numbers graduated by the university in 2017, which was just over 1,000 according to local media reports (Awoko 2017).

Many experimental/quasi-experimental studies utilize advertisements as a sampling strategy for attracting participants. This is likely to result in opting-in bias (Slonim et al. 2013), which may lead to covariates being correlated with the outcome of interest. Given that the research measures latent traits such as financial motivation, risk and time preferences, and prosocial behaviour, advertising-based recruitment risked self-selection, which would likely have correlated with these variables. To minimize this, elements of random sampling were employed.

The population was stratified according to the four main faculties: Arts, Engineering, Pure and Applied Sciences, and Social Sciences. Subsequently, teaching schedules were obtained from the class representatives. The principal investigator and enumeration team (comprising four enumerators) then approached students either before or after their classes. Students often congregated in groups before and after classes, so an element of randomness was used in selecting students. A standard script was read to the student explaining the aims of the research, the duration of the survey, and the potential benefits of participating. The benefits included a monetary payout from the games and consideration for an internship (see discussion in Section 4.2). If a student declined, another student from the group was approached. A deliberate effort was made to ensure representation from each stratum. The pilot survey took place between 16–17 August, and the full survey between 19 and 31 August (excluding Sundays). This period covered the last teaching week of the term and first week of final examinations—one of the busiest periods on campus. For the week of the survey that coincided with the examination period, examination schedules were publicly available on notice boards across the university and, as before, enumerators targeted students on this basis.

A total of 392 students were surveyed out of the estimated FBC final-year population of 1,060, a sampling fraction of 37 per cent. Table 1 gives a summary of the sample characteristics. Despite this high sampling fraction, there were some constraints to data collection. The rainy season in 2017 was very harsh, leading to the tragic mudslide on 14 August 2017. The pilot was initially to begin on this date but was delayed out of respect. The survey period could not be extended past 31 August, as the majority of students were well into their examinations and daily response rates began to decline.

The survey comprised standard socio-demographic questions; questions on university and employment experience, perceptions of the labour market, desired job, and sector of employment; and five incentivized games.

Table 1: Summary of sample characteristics

Variables	Sample proportions	
	Yes	No
Female (No = male)	0.3469	0.6531
Lives in East Freetown	0.4031	0.5969
Originally from Freetown	0.4719	0.5281
Has children	0.3061	0.6939
Married	0.1122	0.8878
Has financial dependants	0.4694	0.5306
Ever employed	0.5944	0.4056
in the public sector	0.2806	0.3138
in the private sector	0.1888	0.4056
in the development sector	0.1582	0.4362
in self-employment	0.0255	0.5944
Has volunteer experience	0.6173	0.3827

Source: Primary survey data collected by author.

## 4.2 Experimental games and incentivized choice

Experimental games were used to elicit and measure latent traits related to risk and time preferences, prosociality, cognitive ability, and desire for social status. The first and second experimental games administered were multiple-price list (MPL) risk and time preference games adapted from Andreoni et al. (2015). They were used to measure participants' willingness to take risks with regard to employment earnings and their willingness to bring payments forward, respectively. For the risk-preference MPL the switching point where the respondent prefers the safe option over the lottery was used to calculate the Markowitz risk premium. This is the difference between the expected wealth (given the lottery) and the certainty equivalent or maximum willingness to pay to avoid the gamble (Vieider et al. 2015). Similarly, for the time preferences MPL, the switching point allows estimation of the discount factor.

The third game was a social value orientation game drawing on the work of Messick and McClintock (1968) and Schuyt et al. (2010) and was used to determine whether participants make decisions to maximize personal gains, collective gains, or relative gains (the difference between their outcome and that of others). The fourth game was the standard dictator game used in the economics literature and measured how much participants would give out of a sum of SLL100,000 (US\$13.33) to other students who were less advantaged. Finally, the fifth incentivized game was a series of 10 questions from Raven's Matrices, which was used to measure cognitive ability. Raven's Matrices were selected as a widely used measure of cognitive ability that does not require specific language, reading, or writing skills and is easy to administer (Raven 2003). These were piloted to ensure that respondents were able to answer the questions before the final survey.

The choice of games was determined by how well established the methods were and their simplicity, given that the games were embedded in the survey questionnaire. Dave et al. (2010) show that lack of understanding and limited mathematical knowledge can lead to inconsistent choices in risk games, causing noise in risk measurements. Simple measures like the MPL generate more stable estimates of risk over time. MPL also makes no assumptions on the functional form of utility and is easy to phrase over the employment domain. Similarly, Falk et al. (2016) argue that the MPL method allows a simple measurement of the discount rate, which is sufficient for this study. The method does not overcome the issue of how the perceived trustworthiness of the enumerator affects preference measures. The dictator game is tried and tested in the economics

discipline and the use of Raven's Matrices is commonplace in psychology. Raven's Matrices have also been used in labour market research in other African contexts (Abebe et al. 2016; Bassi and Nansamba 2017). All behavioural games were triangulated with hypothetical questions.

At the end of the survey, each participant was asked to roll a die, which determined the game the respondent would receive payment for. This incentivized truthful revelation for each game, while managing the cost of total payoffs. Actual payoff ranged from SLL15,000 to SLL50,000 (\$2 to \$6.67). Tossing the die to introduce randomness in payment did lead to an unforeseen limitation. A few Islamic students viewed this as gambling and therefore declined to participate. The incentivized games were fully funded by the International Growth Centre.

The MacArthur community ladder, a tool in psychosocial studies, was used to elicit subjective social status (Adler and Stewart 2007). Enumerators asked respondents to indicate where they stand in their society or community in their present state, and then where they thought they would be after five years, conditional on employment. The original MacArthur's ladder is unanchored and therefore purely based on subjectivity. The ladder used in this study was anchored by installing an occupation at the top and the bottom so that all respondents were given the same reference points between which to locate themselves.

In addition to preference elicitation, sector choice was incentivized and elicited through the creation of four internships. Respondents were told that they would be considered for only one sector and were therefore required to name one preferred sector among the public sector, private sector, development sector, or self-employment (by shadowing someone who had set up their own business). The tenure of each internship was 3 months, and interns were given a stipend of SLL600,000 (US\$79.80) per month. The internship stipend was fully funded by the International Growth Centre. At the time, interns under the nationally run Graduate Internship Programme (GIP) were given a stipend of SLL500,000 (US\$66.50), making the internship for this research attractive.

Subsequent to the survey, respondents were asked to submit CVs to the lead researcher. These were screened, and three CVs were sent to each employer for selection based on the employer's demands. The four interns were placed at Bollore (a large logistics company), Sierra Leone Grass Roots Agency (a small self-run NGO), Apex Bank (a government bank which oversees rural financial institutions), and the Centre for Coordination of Youth Activities (a large national NGO). Internships ran between November 2017 and April 2018, depending on employer's needs. The terms of reference entailed entry level administrative and operational tasks specific to the company and sector. In some instances, the interns travelled outside Freetown with the organization. Participants were made aware of potential rural travel at the time of submitting their CVs. In such cases, the organization covered the cost of travel, accommodation, and per diem. The two interns at Sierra Leone Grass Roots Agency and the Centre for the Coordination of Youth Activities were retained (on temporary contracts) by these organizations.

### **4.3 Theoretical framework underlying the empirical strategy**

The theoretical framework underlying the empirical model of occupational choice is a Random Utility Model (RUM), drawing on the seminal works by Daniel McFadden (1973) and Manski (1977) and more recent formulations in Cameron and Trivedi (2005).

In the model, the decision maker/agent is a student who performs a choice operation based on a decision rule. A finite population of decision makers,  $N$ , is assumed to exist. This finite population is given by the number of final-year undergraduate university students, excluding those enrolled in the medical or teacher-training colleges.

### *Utility and sector choice*

$U_i$  is a real-valued utility function of decision maker  $i$ . Decision maker  $i$  selects a sector for employment  $j$ , from the finite choice set  $C$ :  $j \in C$  such that  $U_{ij} \geq U_{ij'}$ , for all  $j' \in C$ . The choice set is defined across four sectors: the public sector, wage-employed private sector, wage-employed development sector, and self-employed. The public sector is as commonly defined, referring to institutions that are part of central government, line ministries, state-owned enterprises, parastatals, or any other state-owned and -operated agency. The wage-employed private sector covers organizations that are privately owned in the formal sector. The wage-employed development sector comprises organizations whose primary objective is promoting economic and social development in the local country (save for the public sector), through policy, advocacy, or implementation. This includes local NGOs, INGOs, and donor organizations. Another commonality across these three types of organization is external source of finances, as funding to NGOs, INGOs, and donor organizations derives from aid (either bilateral or multilateral ODA or private donations). And finally, self-employed refers to entrepreneurship. A distinction is not made between formal and informal self-employment.

Implicit in a sector-level analysis is the assumption that there are commonalities across jobs within each of the sectors, and differences between sectors to allow sensible groupings such that similar types of individuals are likely to sort across sectors and match on the basis of these sector characteristics. I argue that this is indeed the case given the different ‘missions’ across the sectors, the types of contracts offered, and the visible signs that communicate prestige. Both the public and development sectors are seen to have a duty to contribute to society, while private-sector institutions have a mandate to maximize profits. The majority of private- and public-sector jobs in Sierra Leone offer contracts in perpetuity (after an initial six-month probation), while employment in the development sector is often short-term and there is no contract in perpetuity. The development sector and public sector are associated with outward status symbols such as special licence plates, passports, and national and international travel (usually at higher career levels). These characteristics are associated with risk/time preferences, prosociality, and status and, I argue, are sector-specific. I acknowledge that there is heterogeneity within each sector in relation to company/organization size, day-to-day operations, and remuneration. The regression coefficients estimated for financial motivation are therefore likely to be noisy, as jobseekers with both low and high reservation wages may be attracted to the same sector given the spread of wages in a sector.

Finally, I assume that, *ex ante*, all skill types included in the study can find a job in any sector. One can imagine a mining company hiring administrative and support staff, an NGO seeking an engineer for a well-digging project, and government offices hiring a range of workers from lawyers to social workers. I do not assume that the sector chosen in this experiment is the sector that the respondent intends to continue working in for their entire career, but rather the sector they would like to start their career in. It can also be argued that the first job or internship has a meaningful impact on the trajectory of the first few years in the labour market due to the experience and connections that the intern gains.

### *Attributes and utility*

Let  $X$  and  $Y$  be attribute representations of individual  $i$  and sector  $j$ . Attributes include individual-level measures of risk preferences, time preferences, prosociality, financial motivations, desire for social status, and cognitive ability. Utility is defined as a function of the attributes of the decision maker and the sector.  $U_{ij} = w(x_i, y_j)$  for all  $j \in C$  and  $i \in N$ , where  $w$  is a real valued function. The jobseeker matches to a particular sector by comparing utility derived from different sectors.

There are elements of the attribute representation  $X$  and  $Y$  that can be observed, and those that are unobservable. The set-up does not mean that utility maximization is random, rather that individuals can be deterministic but randomness arises due to the unobservable component (Louviere et al. 2000). Assuming that utility is additively separable and that the observed and unobserved/random segments can be partitioned gives:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

Where  $V$  is well defined and the errors ( $\varepsilon$ ) are normally distributed random variables. RUMs usefully allow probabilities to be empirically modelled.

Equation (1) reduces to a multinomial choice model, where the probability of choosing a sector, conditional on attributes, can be estimated using an alternative-invariant Multinomial Logit or Multinomial Probit model. The model is alternative-invariant in this case, as the regressors vary by individual and not by alternative (Cameron and Trivedi 2015). Previous studies, like Falco (2014), have used Multinomial Logit models, but these suffer from the assumption of independence of irrelevant alternatives (Manski 1977). Decision makers are likely to consider options collectively rather than by pairwise comparisons.

#### *From RUM to probability*

There are  $C$  alternatives or sector choices. The dependent variable  $y$  is defined to take the value  $j$  if the  $j^{\text{th}}$  alternative is selected,  $j = 1, \dots, C$ . The probabilities associated with Multinomial Probit (MNP) models are complex given that the errors are not independent of each other. For the sake of illustration, I assume that there are three alternatives (the private, public, and development sector, say), in line with the notation used in Cameron and Trivedi (2005: 516–18); the probability that alternative  $j=1$  is chosen is given by:

$$\begin{aligned} P_j | x_i &= Pr(y = 1 | x_i) = P(U_{i1} > U_{i2} \text{ and } U_{i1} > U_{i3}) \\ &= P(V_{i1} + \varepsilon_{i1} > V_{i2} + \varepsilon_{i2} \text{ and } V_{i1} + \varepsilon_{i1} > V_{i3} + \varepsilon_{i3}) \\ &= P(V_{i1} - V_{i2} > \varepsilon_{i2} - \varepsilon_{i1} \text{ and } V_{i1} - V_{i3} > \varepsilon_{i3} - \varepsilon_{i1}) \\ &= P(V_{i1} - V_{i2} > \tilde{\varepsilon}_{21} \text{ and } V_{i1} - V_{i3} > \tilde{\varepsilon}_{31}) \\ &= \int_{-\infty}^{V_{i1} - V_{i2}} \int_{-\infty}^{V_{i1} - V_{i3}} f(\tilde{\varepsilon}_{21}, \tilde{\varepsilon}_{31}) d\tilde{\varepsilon}_{21} d\tilde{\varepsilon}_{31} \end{aligned} \quad (2)$$

Where  $f(\tilde{\varepsilon}_{21}, \tilde{\varepsilon}_{31})$  is a bivariate normal and the limits of the integral  $V_{i1} - V_{i2}$  and  $V_{i1} - V_{i3}$  depend on the regressors and the  $\beta$  parameters. For MNP models generally, errors are assumed to be drawn from a multivariate normal distribution with mean zero and identity variance-covariance matrix—an identifying assumption.

RUMs do not require knowledge of how the choice problem is generated, as the optimal decision can be determined without this (Manski 1977). The model assumes that exogenous forces produce a choice problem, and the decision maker selects among the available alternatives. Here, this can be interpreted as employers deciding what jobs to offer and when. This is driven by profit maximization in the case of private firms, budgets in the development and public sectors, company/government/donor objectives and hiring practices, etc; i.e. it is exogenous to the decision maker.

From the above, we can deduce that sector  $j$  is preferred to sector  $k$  if and only if the individual derives a higher level of utility/satisfaction from sector  $j$  than from sector  $k$ . The research will test if the probability of sector choice varies with elicited individual preferences/attributes related to risk (measured by the Markowitz risk premium), time preferences, prosocial behaviour (measured

by the share given), desired social status, financial motivation, and ability (measured by a composite Raven’s Matrices score using item response theory). Financial motivation, risk preferences, and prosocial behaviour were selected on the basis of the literature surveyed in Section 3. The remaining three attributes are new to this study and relevant to the research question stated at the beginning. Various socio-demographic factors are controlled for in the model.

## 5 Regression model and discussions of findings

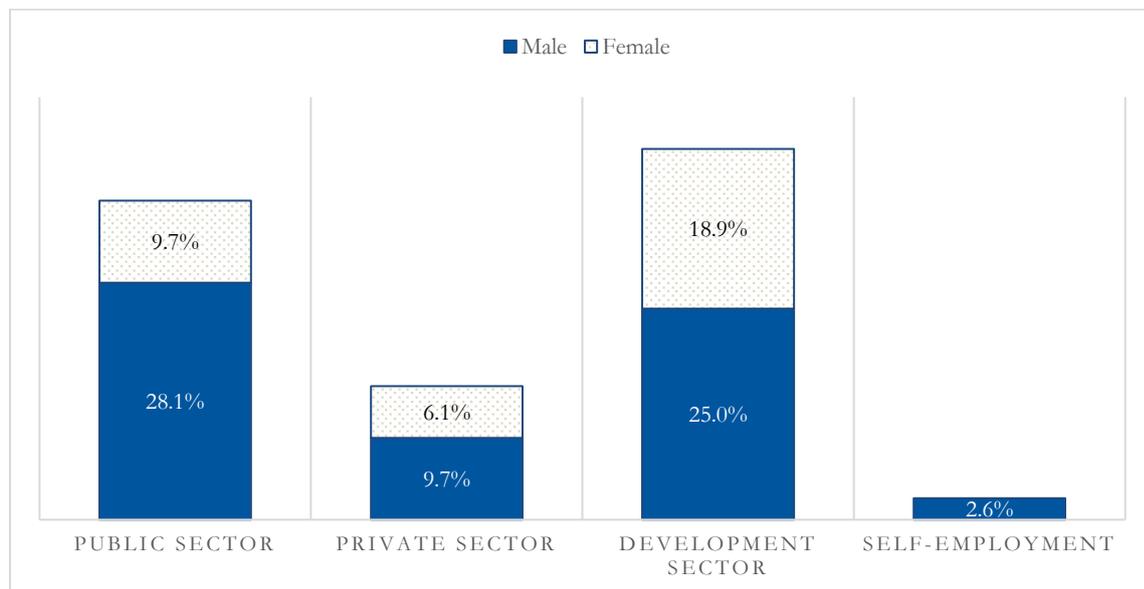
The model (based on the RUM presented in Section 4) estimates the probability of choosing a particular sector, conditional on the various individual traits described above. The probability of choosing sector  $j$ , conditional on attributes  $x_i$  (taking marginal effects) is given by:

$$P(y = j|x_i) = \beta_1 risk_i + \beta_2 time_i + \beta_3 prosocial_i + \beta_4 status_i + \beta_5 financial_i + \beta_6 ability_i + \gamma Z_i + \varepsilon_{ij} \quad (3)$$

$Z_i$  represents a vector of controls, including: sex, age, faculty enrolled in, if the respondent is originally from Freetown, current area of residence (West Freetown is richer than East Freetown), and parents’ education.

One of the key results is sector choice (Figure 3). Proportions estimated show that 43.9 per cent opted for the development sector, followed by 37.8 per cent for the public sector, 15.8 per cent for the private sector, and a mere 2.6 per cent for self-employment. Given that the majority of respondents opted for the development sector, this sector is established as an attractive choice in the employment decision, which is absent from previous literature. Other descriptive results are presented in Tables 2–7.

Figure 3: Sector choice of respondents



Source: Primary survey data collected by author.

Table 2: Summary statistics for key latent variable

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
res_wage_us	392	334.6599	291.4963	66.66666	2666.667
prosocial	392	0.237398	0.1414281	0	1
riskpremium	390	1.630769	0.7448724	-1	2
discountfactor	392	0.980021	0.0169871	0.9566856	1
status_change	392	2.752551	1.352271	0	9
raven_ability	392	-0.0015	0.7646224	-1.657177	1.933366

Source: Primary survey data collected by author.

Table 3: Correlation matrix of latent variables

	<b>Res_wage_us</b>	<b>Prosocial</b>	<b>Status_change</b>	<b>Present_bias</b>	<b>Risk_premium</b>	<b>Raven_ability</b>
Res_wage_us	1.0000					
Prosocial	0.0342	1.0000				
Status_change	0.0204	-0.0116	1.0000			
Present_bias	-0.0918	0.0317	-0.0678	1.0000		
Risk_premium	-0.2493	0.0596	-0.0011	-0.0145	1.0000	
Raven_ability	0.0856	0.0779	-0.0238	0.0018	-0.1464	1.0000

Source: Primary survey data collected by author.

Table 4: Key latent traits by chosen sector of employment

<b>VARIABLES</b>	<b>(1)</b> <b>Res_wage_us</b>	<b>(2)</b> <b>Prosocial</b>	<b>(3)</b> <b>Risk_premium</b>	<b>(4)</b> <b>Discount_factor</b>	<b>(5)</b> <b>Status_change</b>	<b>(6)</b> <b>Raven_ability</b>
Public sector	312.7 (22.05)	0.227 (0.0123)	1.693 (0.0574)	0.979 (0.00142)	2.608 (0.105)	-0.0986 (0.0666)
Private sector	437.2 (43.08)	0.214 (0.0178)	1.484 (0.104)	0.980 (0.00207)	2.742 (0.158)	0.0566 (0.0893)
Development sector	313.1 (22.04)	0.254 (0.0103)	1.650 (0.0563)	0.981 (0.00132)	2.894 (0.111)	0.0457 (0.0560)
Self-employed	364.0 (90.93)	0.227 (0.0354)	1.300 (0.318)	0.984 (0.00530)	2.600 (0.476)	0.252 (0.320)
Observations	390	390	390	390	390	390

Note: Standard deviation in parentheses.

Source: Primary survey data collected by author.

Table 5: Key latent traits by faculty enrolled in

<b>VARIABLES</b>	<b>(1)</b> <b>Res_wage_us</b>	<b>(2)</b> <b>Prosocial</b>	<b>(3)</b> <b>Risk_premium</b>	<b>(4)</b> <b>Discount_factor</b>	<b>(5)</b> <b>Status_change</b>	<b>(6)</b> <b>Raven_ability</b>
Arts	225.6 (14.67)	0.231 (0.0130)	1.801 (0.0518)	0.977 (0.00173)	2.864 (0.139)	-0.225 (0.0776)
Engineering	419.6 (37.11)	0.235 (0.0244)	1.556 (0.142)	0.976 (0.00290)	2.750 (0.234)	0.219 (0.144)
Pure/Applied sciences	442.8 (32.78)	0.222 (0.0186)	1.589 (0.0986)	0.982 (0.00189)	2.435 (0.127)	0.217 (0.0923)
Social sciences	341.0 (25.35)	0.245 (0.0105)	1.566 (0.0585)	0.982 (0.00124)	2.799 (0.102)	0.00587 (0.0523)
Observations	390	390	390	390	390	390

Note: Standard deviation in parentheses.

Source: Primary survey data collected by author.

Table 6: Comparison of mean values of key latent traits by chosen sector of employment (differences of mean presented)

	<b>Res_wage_us</b>	<b>Prosocial</b>	<b>Risk_premium</b>	<b>Discount_factor</b>	<b>Status_change</b>	<b>Raven_ability</b>
Public sector vs private sector	-124.5***	0.013	0.209*	-0.001	-0.134	-0.1552
Public sector vs development sector	-0.4	-0.027*	0.043	-0.002	-0.286*	-0.1443*
Public sector vs self-employment	-51.3	0	0.393	-0.005	0.008	-0.3506
Private sector vs development sector	124.1**	-0.04*	-0.166	-0.001	-0.152	0.0109
Private sector vs self-employment	73.2	-0.013	0.184	-0.004	0.142	-0.1954
Development sector vs self-employment	-50.9	0.027	0.35	-0.003	0.294	-0.2063
F-test for equality of group means	0.0238	0.1623	0.1375	0.6250	0.3108	0.2111

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Primary survey data collected by author.

Table 7: Comparison of mean values of key latent traits by faculty of enrolment (differences of mean presented)

	<b>Res_wage_us</b>	<b>Prosocial</b>	<b>Risk_premium</b>	<b>Discount_factor</b>	<b>Status_change</b>	<b>Raven_ability</b>
Arts vs engineering	-194***	-0.004	0.245*	0.001	0.114	-0.444***
Arts vs pure/applied science	-217.2***	0.009	0.212*	-0.005*	0.429*	-0.442***
Arts vs social sciences	-115.4***	-0.014	0.235***	-0.005**	0.065	-0.231**
Engineering vs pure/applied sciences	-23.2	0.013	-0.033	-0.006*	0.315	0.002
Engineering vs social sciences	78.6	-0.01	-0.01	-0.006*	-0.049	0.213
pure/applied science vs social science	101.8**	-0.023	0.023	0	-0.364*	0.211*
F-test for equality of group means	0.0000	0.7066	0.0605	0.0445	0.2363	0.0007

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Primary survey data collected by author.

Regression results are represented in Table 8. For the regression analysis, I restrict the sector choice to the public, private, and development sectors by excluding the respondents who opted for self-employment. This is done for three reasons. First, in Sierra Leone, the self-employed operate in both the private sector and the development sector. Therefore, self-employment is not strictly mutually exclusive. Second, comparing the differences between choosing the public, private, or development sector is useful analytically if we conceptualize the development sector as a third and competing sector. Third, only 10 out of the 392 respondents chose self-employment, so, computationally, excluding these respondents simplifies the maximization problem.

Table 8: Multinomial Probit regression results for sector choice. Choosing the development sector is the base outcome—MEM

VARIABLES	MNP regression estimates		Marginal effects (evaluated at the mean)—MEM		
	(1) Public_Sector	(2) Private_Sector	(1) Public_Sector	(2) Private_Sector	(3) Development_Sector
<b>Measured attributes</b>					
Cognitive ability	-0.253* (0.132)	-0.0779 (0.138)	-0.0665* (0.0341)	0.0053 (0.0194)	0.0612* (0.0357)
Reservation wage	-0.00007 (0.0004)	0.00054 (0.0004)	-0.00006 (0.0001)	0.00009 (0.00005)	-0.00003 (0.00012)
Prosociality	-0.858 (0.699)	-1.883** (0.811)	-0.1132 (0.1829)	-0.238** (0.118)	0.351* (0.191)
Desired status	-0.172** (0.0693)	-0.0665 (0.0806)	-0.0442** (0.0182)	0.0014 (0.0117)	0.0427** (0.0189)
Present bias	0.239 (0.228)	0.0722 (0.276)	0.0637 (0.0604)	-0.0056 (0.0386)	-0.0581 (0.0633)
Risk preference	0.0506 (0.141)	-0.0600 (0.154)	0.0185 (0.0362)	-0.0130 (0.0217)	-0.0055 (0.0384)
<b>Controls</b>					
Age	-0.525** (0.237)	0.0127*** (0.004)	-0.0017 (0.0097)	-0.0068 (0.0052)	0.008 (0.010)
Female	-0.511** (0.222)	0.044 (0.251)	-0.145*** (0.0544)	0.0422 (0.0381)	0.102* (0.059)
West_freetown	-0.0857 (0.1983)	-0.219 (0.230)	-0.0089 (0.0520)	-0.0290 (0.0335)	0.0379 (0.0541)
Origin_freetown	-0.195 (0.1996)	0.171 (0.228)	-0.0671 (0.0519)	0.0406 (0.0331)	0.0264 (0.0543)
Faculty_Engineering	0.0928 (0.3998)	1.36*** (0.388)	-0.0827 (0.0824)	0.283*** (0.0845)	-0.200** (0.0981)
Faculty_Pure/App Sci	0.427 (0.0314)	0.519 (0.352)	0.0844 (0.0801)	0.0508 (0.0497)	-0.135 (0.0827)
Faculty_Social Sci	0.576** (0.232)	0.422 (0.282)	0.135** (0.0578)	0.242 (0.0341)	-0.159** (0.0616)
Parents education <sup>4</sup> Constant	Yes 7.854** (3.50)	Yes 9.381*** (3.597)	Yes	Yes	Yes
Number of obs	380	380	380	380	380
F (44, 333)	2.27	2.27			
Prob > F	0.0000	0.0000			

Note: Standard errors in parentheses. Standard errors are calculated based on sample weights.

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

Source: Primary survey data collected by author.

For the multinomial models, the development sector is considered as the base category for interpreting estimates in columns 1 and 2 of Table 8 and Table 9. Stata automatically selects the

<sup>4</sup> Dummies are included for both mother's and father's level of education. These are not significant and therefore not presented in the table.

modal choice category as the base outcome for analysis. I keep this as the base category in order to interpret choosing the public and private sectors relative to the development sector. As I will discuss, using the development sector as the base outcome is useful to determine whether higher cognitive ability—the primary variable of interest—changes the probability of choosing the development sector relative to the other two sectors.

As seen in Table 8, jobseekers with higher cognitive ability are more likely to choose the development sector relative to the public sector. Of the measured attributes, the model produces significant results for prosociality, desired status, and cognitive ability. From columns 1 and 2 of Table 8, we see that respondents who are more prosocial are less likely to choose the private sector in preference to the development sector; and those who desire social status are more inclined towards the development sector in preference to the public sector. Gender and faculty of enrolment are also important predictors of occupational choice. Females are more likely to choose the development sector over the public sector. Relative to Arts students (the baseline faculty) engineers are more likely to choose the private sector over the development sector and social scientists the public sector over the development sector.

Estimates in columns 1 and 2 of Table 8 can be interpreted only on the basis of higher/lower probability of sector choice relative to the base sector. For instance, the negative sign on the ability coefficient suggests that as cognitive ability increases, the relative probability of choosing the public sector versus the development sector decreases. Columns 3, 4, and 5 give marginal effects at the mean (MEM), which estimates the change in the probability of choosing each sector conditional on the covariates in the model. The effects can be interpreted as the change in probability when there is an instantaneous change from the sample average for continuous variables, and a change from the base level for categorical variables.

If cognitive ability increases by 0.1 units above the average level, the probability of choosing the development sector increases by 0.61 per cent while the chance of choosing the public sector reduces by 0.67 per cent. Similarly, an instantaneous increase in desire for social status by 0.1 units increases the probability of choosing the development sector by 0.43 per cent, and reduces the chance of choosing the public sector by 0.44 per cent. Those with prosocial traits marginally above average (0.1 units higher) are less likely to choose the private sector (a change in probability of -2.38 per cent) but more likely to choose the development sector (a change in probability of 3.51 per cent). Females are 14.5 per cent less likely to choose the public sector and 10.2 per cent more likely to choose the development sector. The latter probability is only significant at the 10 per cent level. Finally, Engineers are 28.3 per cent more likely to choose the private sector and Social Scientists are 13.5 per cent more likely to opt for the public sector.

The results for cognitive ability indicate a type of internal brain drain from the public sector to the development sector at the time of sector choice, where higher ability workers are more inclined to work for development organizations. Evidence of a shift of workers from local organizations to development-oriented ones has been documented with respect to medical professionals (Bristol 2008). This study provides evidence that such an internal brain drain is not limited to nurses and doctors who opt for employment in the NGO sector instead of local private and public institutions, but applies to skilled workers more generally. This has likely implications for homegrown growth if local companies and the government are not able to access the required talent, or lose talent to development organizations. This finding speaks to policy and should encourage development organizations to reflect on their impact on the dynamics of the labour market in the countries in which they operate; and the public sector to reflect on its competitiveness as an employer. The appeal of the development sector is highest among those enrolled in the Arts faculty, while Engineers have a preference for the private sector and Social Scientists for the public sector. About 27 per cent of graduates belong to the Arts faculty.

With respect to mission matching, the appeal of the development sector to those with higher prosocial scores is expected, as the development sector is seen as ‘making a contribution to society’ and attracts more socially driven jobseekers. This is consistent with findings by Serra et al. (2011). The positive sign of the status coefficient is also expected, as the development sector is well respected in local communities. The negative coefficient of the status indicator with regard to the public sector may seem counterintuitive, as government jobs are highly sought-after in developing countries and often associated with long queues (Mazumdar and Mazaheri 2018). One possible explanation for this is the generally low opinion of the Government of Sierra Leone amid corruption allegations in the fight against Ebola (Awoko 2017).

Though the other results are not significant, the direction and size of the estimated coefficients are worth considering, nonetheless. There is a negative relationship between financial motivation and choosing the public and development sectors, while the sign is positive for the private sector—as found by Serra et al. (2011). As highlighted in Section 4.3.1, heterogeneity of jobs within each sector in relation to remuneration packages may lead to proving the null for the financial motivation coefficient. Risk-averse jobseekers are more (less) likely to choose the public sector (private sector) given the positive (negative) sign of the coefficient, which was also established in Falco (2014). The negative sign on the coefficient for the development sector indicates that risk-takers are attracted to the development sector, which is unsurprising given that the sector is characterized by uncertainty due to short-term contracts. Finally, those who are willing to wait for future gains are also more likely to choose the public sector and less likely to choose the development sector. Again, this makes sense intuitively, as public sector employment requires more waiting/queuing than development sector employment, which arises more frequently but is short-term.

There are also gender implications, given that females are less likely to choose employment in the public sector. At present, the public sector in Sierra Leone is male-dominated, and the results documented here show an opting-opt effect. This may be because women have less chance of progressing to senior roles and are more likely to be assigned more menial administrative tasks in the public sector.

As discussed above, though the signs are as expected on the basis of predictions from the mission matching literature, some of the measured preferences do not have significant coefficients. These results are robust to various specifications of the model, including hypothetical measures of risk and time preferences, categorical scales which measure risk and time preferences, interactions between time and risk preferences, and hypothetical questions which ask respondents about their willingness to give to a good cause. The results also remain unchanged when robust standard errors are included in the estimation.

The lack of significant results on these latent variables is in contrast to previous studies (discussed in Section 2), where significant results were found for risk preferences, prosocial behaviour, and financial motives. I argue that proving the null in this instance is useful and demonstrates that findings in middle-income and larger low-income countries are not necessarily transferable to low-income and least-developed countries. Falco’s (2014) study looked at Ghana, Ashraf et al. (2014) at Zambia, and Dal Bó et al. (2013) at Mexico, which are all middle-income countries. Deserranno’s (2019) study focused on Uganda and Serra et al. (2011) on Ethiopia, both of which are large low-income countries with populations around 41.5 million and 102.4 million, respectively (World Bank 2018). Sierra Leone is classified as low-income and has a small population, of just over 7 million (World Bank 2018). Arguably, population size and income matter for the labour market. Both these variables are likely to determine the size and structure of product markets and, by extension, the size and structure of factor markets like the labour market. I therefore posit that the

difference in results likely stems from the structure of the labour market and, importantly, the availability of employment opportunities, which may be a binding constraint.

Previous studies have also assumed that individuals can freely choose between the public and private sectors (Falco 2014) or between the for-profit and non-profit sectors (Serra et al. 2011) or can trade between options that are more financial or prosocial (Dal Bó et al. 2013; Deserranno 2019), either neglecting how the choice set is generated or, in the case of randomized control trials, creating the choice set. One of the main aims of this paper is to test occupational choice based on measured preferences in low-income contexts. I argue that in instances where economic and social factors influence the generation of the choice set (employment options in this case), agents are constrained and modify their behaviour accordingly. In other words, the least altruistic respondent may choose the development sector because perceived chances of employment are higher rather than because of their level of prosocial traits. Utility is therefore maximized probabilistically, and sector choices are based on possibilities, rather than preferences. It follows that the perception of the different sectors is a likely predictor of occupational choice.

I therefore modify the model above to include an individual-specific composite score, which measures the perceived attractiveness of the sector relative to other sectors. This score is based on individual perceptions of how each sector ranks in terms of salary, status, contribution to society, opportunities for training, career progression, and job stability. Respondents were asked to rank each sector in terms of these categories, and a composite ‘perception score’ for each sector was calculated using multiple correspondence analysis (MCA). Given that this is an individual-specific measure and not a sector-specific measure, the Multinomial Probit model can again be used.<sup>5</sup> As DellaVigna (2009) notes, decision-making is driven by both incentives and biases in probability judgement or heuristics. This composite score takes account of these heuristics by considering individual beliefs and perceptions.

The role of perceptions is introduced to determine whether these are associated with sector choice, and whether introducing perceptions into the model changes the significance of intrinsic traits as an explanation of sector choice. For instance, beliefs may taper motivations and/or determine occupational choice if this is made on the basis of beliefs about the structure of the labour market rather than intrinsic attributes/preferences. The updated model is presented in Table 9, where similar results are found for cognitive ability, status, and prosocial behaviour (columns 1 and 2) as in Table 8, but in Table 9 the coefficients are now more significant. In this model, an internal brain drain is again observed as higher (lower) ability jobseekers are more (less) likely to choose the development sector (public sector). Here, a 0.1 unit change in ability above average increases (decreases) the probability of choosing the development sector (public sector) by 0.76 per cent (0.79 per cent). This effect is larger than the results shown in Table 8 and significant at the 5 per cent rather than 10 per cent level.

As expected, the coefficients on the perception indices are significant. Columns 3 and 4 (of Table 9) show that opinions of the private sector do not influence the probability of choosing the public sector, and vice versa. However, a favourable opinion of the development sector reduces the probability of choosing the public and private sectors. As esteem of the development sector increases by 0.1 units, the likelihood of choosing the public sector and private sector reduces by 0.67 per cent and 0.45 per cent, respectively. Both results are significant at the 5 per cent level. The sign and significance of the coefficients for perception measures indicate a trade-off between

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<sup>5</sup> In the case of a sector-specific measure that varies across sectors but is the same for all individuals, the Alternative-Specific Multinomial Probit model is a better fit.

the public and development sectors, and private and development sectors; but not between the two traditional sectors, that is the public and private sectors.

Table 9: Multinomial Probit regression results for sector choice—including sector perception score

VARIABLES	MNP regression estimates		Marginal effects (evaluated at the mean)—MEM		
	(1) Public_Sector	(2) Private_Sector	(3) Public_Sector	(4) Private_Sector	(5) Development_Sector
<b>Measured attributes</b>					
Cognitive ability	-0.312** (0.133)	-0.111 (0.139)	-0.0789** (0.0335)	0.0031 (0.0198)	0.0758** (0.0357)
Reservation wage	-0.00009 (0.000430)	0.000499 (0.000399)	-0.00006 (0.00011)	0.00009 (0.00006)	-0.00003 (0.00011)
Prosociality	-1.264* (0.727)	-2.009** (0.832)	-0.2160 (0.1853)	-0.235* (0.1217)	0.451** (0.198)
Desired status	-0.185*** (0.0715)	-0.0421 (0.0837)	-0.0484** (0.0187)	0.0056 (0.0124)	0.0428** (0.0192)
Present bias	0.261 (0.241)	0.102 (0.284)	0.0664 (0.0633)	-0.0018 (0.0407)	-0.0646 (0.0663)
Risk preference	-0.00461 (0.147)	-0.0955 (0.155)	0.0051 (0.0374)	-0.0149 (0.0223)	0.0098 (0.0393)
<b>Perception measures</b>					
Pub sect perception	3.033*** (0.499)	0.678 (0.531)	0.794*** (0.1265)	-0.0945 (0.0768)	-0.6996*** (0.1334)
Priv sect perception	0.182* (0.107)	0.317** (0.136)	0.0292 (0.0275)	0.0383* (0.0198)	-0.0674** (0.0293)
Dev sect perception	-0.345*** (0.116)	-0.425*** (0.123)	-0.0672** (0.0288)	-0.0445** (0.0174)	0.1117*** (0.0317)
<b>Controls</b>					
Age	-0.827*** (0.241)	-0.943 (0.254)	-0.0192** (0.0096)	-0.0009* (0.005)	0.028*** (0.010)
Female	-0.316 (0.234)	0.046 (0.267)	-0.089 (0.057)	0.028 (0.040)	0.061 (0.063)
West_freetown	-0.518 (0.210)	-0.185 (0.240)	-0.002 (0.054)	-0.026 (0.037)	0.028 (0.056)
Origin_freetown	-0.284 (0.211)	0.059 (0.802)	-0.082 (0.054)	0.028 (0.034)	0.054 (0.057)
Faculty_Engineering	-0.173 (0.429)	1.18*** (0.390)	-0.127 (0.085)	0.256*** (0.080)	-0.129 (0.103)
Faculty_Pure/App Sci	0.0717 (0.338)	0.404 (0.371)	-0.004 (0.083)	0.056 (0.052)	-0.0512 (0.089)
Faculty_Social Sci	0.351 (0.248)	0.379 (0.300)	0.075 (0.225)	0.032 (0.052)	-0.107 (0.067)
Parent education Constant	Yes 13.00*** (3.562)	Yes 12.93*** (3.689)	Yes	Yes	Yes
Observations	380	380	380	380	380
F(50, 327)	3.60	3.60			
Prob > F	0.0000	0.0000			

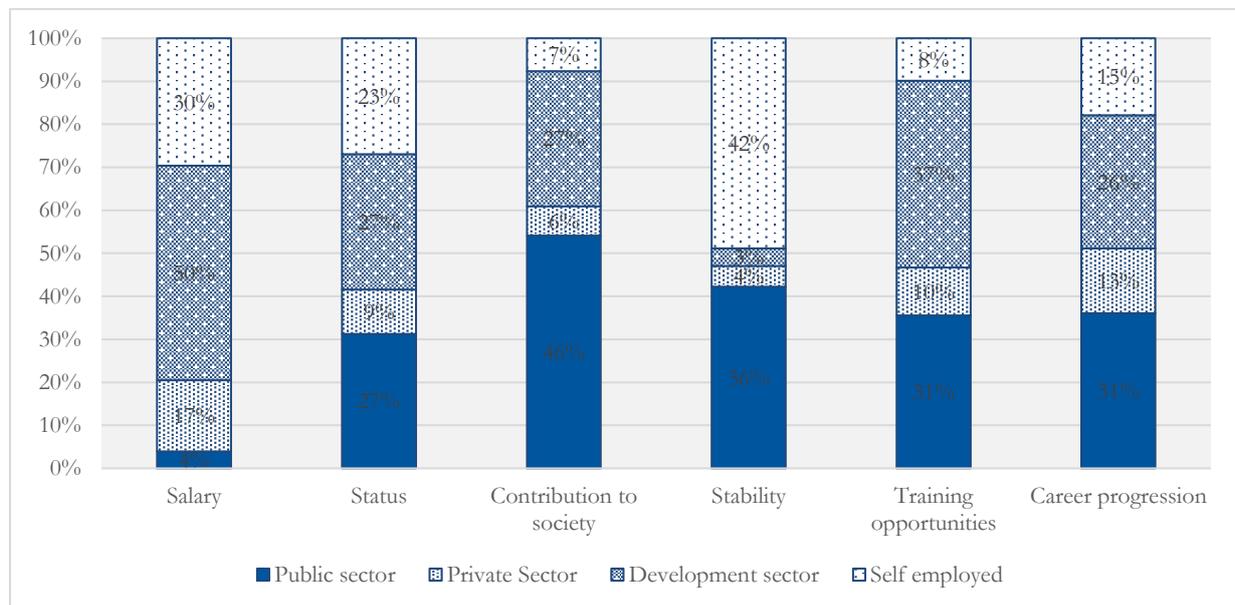
Note: Standard errors in parentheses. Standard errors are calculated based on sample weights. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Primary survey data collected by author.

The majority of respondents ranked the development sector as their first choice for salary, status (jointly with the public sector), and training opportunities (Figure 4). The development sector was ranked second for career progression, as many see the development sector as providing experience

and access to networks that will be beneficial to their career. Despite its being the preferred sector, respondents are fully aware of the instability of the development sector, as many contracts are short-term and contingent on project/programme funding. The fact that respondents were still willing to choose the development sector indicates that the rewards offered by the sector compensate for the riskiness associated with contract insecurity. Surprisingly, self-employment is seen as the second most stable sector, as respondents felt that they did not face the risk of contract termination if they work for themselves. This is a different interpretation of the risks of self-employment from that traditionally adopted in the literature, and again points to the importance of perception among respondents and how different meanings may be ascribed to terms. In addition to this, respondents cited that more information on vacancies was provided by organizations in the development sector, which led to an increased awareness of these jobs and feelings of increased chances of employment in the sector.

Figure 4: Breakdown of sector rankings by characteristic



Source: Primary survey data collected by author.

The interpretation above is based on marginal effects, evaluated at the mean (MEM). I interpret this as the effect on occupational choice for a ‘representative agent’ with the average of all continuous variables and the baseline values for the categorical variables. For comparison, the classical average marginal effects (AME) are given in Tables 10 and 11. AME take the average of a marginal change across all individual effects. Comparing Table 8 with Table 10 and Table 9 with Table 11 shows that the direction of the results is similar, with a marginal decline in some of the probability estimates when AME are calculated—in most cases a percentage point or less. I have opted for MEM interpretation, as a representative agent interpretation is more intuitive for representing the results of the study.

Table 10: Multinomial Probit regression results for sector choice. Choosing the development sector is the base outcome—AME

VARIABLES	MNP regression estimates		Average Marginal Effects (AME)		
	(1) Public_Sector	(2) Private_Sector	(1) Public_Sector	(2) Private_Sector	(3) Development_Sector
<b>Measured attributes</b>					
Cognitive ability	-0.253* (0.132)	-0.0779 (0.138)	-0.0587* (0.0300)	0.0063 (0.0203)	0.0525* (0.0312)
Reservation wage	-0.00007 (0.0004)	0.00054 (0.0004)	-0.00006 (0.0009)	0.00009 (0.00006)	-0.00004 (0.0001)
Prosociality	-0.858 (0.699)	-1.883** (0.811)	-0.0759 (0.1625)	-0.249** (0.123)	0.325* (0.168)
Desired status	-0.172** (0.0693)	-0.0665 (0.0806)	-0.0388** (0.0161)	0.002 (0.0122)	0.0368** (0.0165)
Present bias	0.239 (0.228)	0.0722 (0.276)	0.0562 (0.0536)	-0.0066 (0.041)	-0.0496 (0.0559)
Risk preference	0.0506 (0.141)	-0.0600 (0.154)	0.0175 (0.0322)	-0.0139 (0.0228)	-0.0036 (0.034)
<b>Controls</b>					
Age	-0.525** (0.237)	0.0127*** (0.004)	-0.0015 (0.0087)	-0.0091 (0.0064)	0.0106 (0.0092)
Female	-0.511** (0.222)	0.044 (0.251)	-0.134*** (0.0509)	0.0467 (0.0397)	0.0873 (0.054)
West_freetown	-0.0857 (0.1983)	-0.219 (0.230)	-0.005 (0.0463)	-0.0303 (0.0359)	0.0353 (0.048)
Origin_freetown	-0.195 (0.1996)	0.171 (0.228)	-0.0636 (0.0473)	0.0438 (0.0349)	0.0198 (0.0485)
Faculty_Engineering	0.0928 (0.3998)	1.36*** (0.388)	-0.0931 (0.0785)	0.285*** (0.0816)	-0.192** (0.0889)
Faculty_Pure/App Sci	0.427 (0.0314)	0.519 (0.352)	0.0716 (0.0733)	0.0541 (0.0533)	-0.126* (0.0756)
Faculty_Social Sci	0.576** (0.232)	0.422 (0.282)	0.119** (0.0528)	0.255 (0.0378)	-0.144** (0.0567)
Parents education <sup>6</sup>	Yes	Yes	Yes	Yes	Yes
Constant	7.854** (3.50)	9.381*** (3.597)			
Number of obs	380	380	380	380	380
F (44, 333)	2.27	2.27			
Prob > F	0.0000	0.0000			

Note: Standard errors in parentheses. Standard errors are calculated based on sample weights. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Primary survey data collected by author.

<sup>6</sup> Dummies are included for both mother's and father's level of education. These are not significant and therefore not presented in the table.

Table 11: Multinomial Probit regression results for sector choice—including sector perception score

VARIABLES	MNP regression estimates		Average Marginal Effects (AME)		
	(1) Public_Sector	(2) Private_Sector	(3) Public_Sector	(4) Private_Sector	(5) Development_Sector
<b>Measured attributes</b>					
Cognitive ability	-0.312** (0.133)	-0.111 (0.139)	-0.0607** (0.0261)	0.005 (0.0195)	0.0556** (0.027)
Reservation wage	-0.00009 (0.000430)	0.000499 (0.000399)	-0.00006 (0.00009)	0.00009 (0.00006)	-0.00003 (0.00011)
Prosociality	-1.264* (0.727)	-2.009** (0.832)	-0.1332 (0.1444)	-0.224* (0.117)	0.358** (0.149)
Desired status	-0.185*** (0.0715)	-0.0421 (0.0837)	-0.0378** (0.0146)	0.0068 (0.0122)	0.031** (0.0146)
Present bias	0.261 (0.241)	0.102 (0.284)	0.0506 (0.0491)	-0.0033 (0.0402)	-0.0473 (0.0502)
Risk preference	-0.00461 (0.147)	-0.0955 (0.155)	0.0059 (0.0293)	-0.0147 (0.0220)	0.0087 (0.0299)
<b>Perception measures</b>					
Pub sect perception	3.033*** (0.499)	0.678 (0.531)	0.620*** (0.088)	-0.1131 (0.0705)	-0.507*** (0.091)
Priv sect perception	0.182* (0.107)	0.317** (0.136)	0.0171 (0.0219)	0.0367* (0.0198)	-0.0538** (0.0223)
Dev sect perception	-0.345*** (0.116)	-0.425*** (0.123)	-0.0453** (0.0218)	-0.0418** (0.0164)	0.0872*** (0.0233)
<b>Controls</b>					
Age	-0.827*** (0.241)	-0.943 (0.254)	-0.0136* (0.0077)	-.0101* (0.006)	0.024*** (0.008)
Female	-0.316 (0.234)	0.046 (0.267)	-0.0736 (0.0467)	0.031 (0.039)	0.043 (0.049)
West_freetown	-0.518 (0.210)	-0.185 (0.240)	-0.002 (0.043)	-0.026 (0.036)	0.023 (0.043)
Origin_freetown	-0.284 (0.211)	0.059 (0.802)	-0.068 (0.043)	0.030 (0.034)	0.037 (0.044)
Faculty_Engineering	-0.173 (0.429)	1.18*** (0.390)	-0.131 (0.075)	0.245*** (0.073)	-0.114 (0.0823)
Faculty_Pure/App Sci	0.0717 (0.338)	0.404 (0.371)	-0.011 (0.067)	0.056 (0.053)	-0.0452 (0.071)
Faculty_Social Sci	0.351 (0.248)	0.379 (0.300)	0.053 (0.049)	0.031 (0.037)	-0.084 (0.053)
Parent education	Yes	Yes	Yes	Yes	Yes
Constant	13.00*** (3.562)	12.93*** (3.689)			
Observations	380	380	380	380	380
F(50, 327)	3.60	3.60			
Prob > F	0.0000	0.0000			

Note: Standard errors in parentheses. Standard errors are calculated based on sample weights and linearized.  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Primary survey data collected by author.

Finally, to verify the results above, I re-specify the model to include an enumerator dummy (Table 12) as another robustness test. Although all the enumerators were given a standard script to read to participants, it is not impossible that the enumerator administering the survey and preference elicitation games had an influence on the traits measured, as argued in Cilliers et al. (2015), as well as on the sector rankings. Controlling for enumerator effects mitigates any potential bias in the estimated coefficients. The results are robust to including these dummies.

Table 12: Multinomial Probit regression results for sector choice—including sector perception score and with/without enumerator effects

VARIABLES	MNP regression estimates		MNP regression estimates	
	(1) Public_Sector	(2) Private_Sector	(1) Public_Sector	(2) Private_Sector
<b>Measured attributes</b>				
Cognitive ability	-0.312** (0.133)	-0.111 (0.139)	-0.254* (0.138)	-0.0614 (0.145)
Reservation wage	-0.00009 (0.0004)	0.0005 (0.0004)	-0.00001 (0.0004)	0.0001 (0.0004)
Prosociality	-1.264* (0.727)	-2.009** (0.832)	-1.258* (0.727)	-2.466*** (0.911)
Desired status	-0.185*** (0.0715)	-0.0421 (0.0837)	-0.167** (0.0718)	-0.0043 (0.0953)
Present bias	0.261 (0.241)	0.102 (0.284)	0.252 (0.249)	0.231 (0.300)
Risk preference	-0.00461 (0.147)	-0.0955 (0.155)	0.0391 (0.149)	-0.0922 (0.159)
<b>Perception measures</b>				
Pub sect perception	3.033*** (0.499)	0.678 (0.531)	3.226*** (0.504)	0.473 (0.567)
Priv sect perception	0.182* (0.107)	0.317** (0.136)	0.170 (0.111)	0.400*** (0.153)
Dev sect perception	-0.345*** (0.116)	-0.425*** (0.123)	-0.358*** (0.116)	-0.477*** (0.133)
<b>Controls</b>				
Age	-0.827*** (0.241)	-0.943*** (0.254)	-0.842*** (0.244)	-0.946*** (0.265)
Female	-0.316 (0.234)	0.0462 (0.267)	-0.341 (0.237)	0.111 (0.279)
West_freetown	-0.0518 (0.210)	-0.185 (0.240)	-0.0560 (0.212)	-0.327 (0.244)
Origin_freetown	-0.284 (0.211)	0.059 (0.235)	-0.333 (0.216)	-0.0547 (0.240)
Faculty_Engineering	-0.173 (0.429)	1.18*** (0.390)	-0.165 (0.442)	0.851** (0.389)
Faculty_Pure/App Sci	0.0717 (0.338)	0.404 (0.371)	0.0473 (0.345)	0.0910 (0.377)
Faculty_Social Sci	0.351 (0.248)	0.379 (0.300)	0.397 (0.253)	0.206 (0.312)
Parent education	Yes	Yes	Yes	Yes
Enumerator effects	No	No	Yes	Yes
Constant	13.00*** (3.562)	12.93*** (3.689)	13.04*** (3.619)	13.82*** (3.851)
F	3.60	3.60	3.34	3.34
Prob > F	0.0000	0.0000	0.0000	0.0000
Observations	380	380	380	380

Note: Standard errors in parentheses. Standard errors are calculated based on sample weights. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Primary survey data collected by author.

## 6 Conclusions

This paper began by asking three research questions: (i) Do skilled jobseekers sort on the basis of cognitive ability at the sector level? (ii) Do skilled workers sort on the basis of measured preferences, as predicted in the ‘mission matching’ literature? and (iii) Do perceptions matter for occupational choice? The results show that cognitive ability is important to occupational choice at the sector level; some preferences matter when sorting across sectors, but perceptions are likely a better predictor of sector choice than measured preferences.

The evidence shows that individual financial, risk, and time preferences do not significantly factor into the decision-making process. Prosociality, status, and ability emerged as important factors. Overall these results force us to think more critically about the factors external to the decision maker that can drive the choice process. These factors interact with the job market and opportunities available to jobseekers. In particular, individual perceptions about sector traits and opportunities have a meaningful impact on employment choices. These perceptions are driven and formed by information provided by employers.

This study is unique in identifying and exploring the development sector as a choice in its own right, considering it endogenous to the labour market. The results show that the development sector is an attractive option and perceived favourably among university-educated young people. Importantly, favourable perceptions of the development sector reduce the probability of choosing the public and private sectors for early-career employment. A key reason for this is that more information on opportunities in the development sector is publicly available to jobseekers. If the results of this study are indicative of future trends, *ceteris paribus*, there may be further skills development geared at employment in the (desirable) development sector, and a movement of the highest skilled to development jobs. Both national governments and international actors need to be aware of and act on this, as such a sectoral shift and signs of an internal brain drain can have important consequences for long-term development, particularly home-grown development driven by the local public and private sectors.

I will conclude with some limitations of the study and suggestions for future research. FBC was the main study population and attempts have been made to generalize the findings using sampling weights. Despite this, given that perceptions have been shown to be of primary importance, we might expect different results if the sample was students in more rural areas who had never lived in Freetown, or internationally in countries that differ from Sierra Leone. Both these factors would cause people to have different beliefs and perceptions. Related to this, further research may wish to explore how perceptions of the labour market converge in a group. For instance, is there a 'leader' that introduces a new idea and disseminates this to generate 'group think', or do individuals update their beliefs by independently accessing information outside the group?

The study population of the research was clearly defined as skilled workers, an under-researched group in LIC contexts. That said, the results presented here may not be applicable to jobseekers of lower skill levels, who are likely to have different perceptions of self-worth in the labour market, to have different job opportunities available to them, and to search in different ways. Such workers, in essence, operate in a different market segmented by skills level.

Finally, this study did not explore gender differences in great detail. It was shown that females are less likely to choose the public sector, but this was not explored in great depth in the survey. This can be an area for future qualitative research in terms of fully exploring the gender dynamics of different employment choices.

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