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NO MAN LEFT BEHIND: EFFECTS OF EMIGRATION PROSPECTS ON EDUCATIONAL AND LABOUR OUTCOMES OF NON-MIGRANTS*

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The development impacts of emigration are largely determined by the education of those who stay behind. Departure of workers leads to a direct loss of human capital but opportunities for emigration also raise expected returns to education. I examine these effects by considering the introduction of education as a selection criterion to recruit Nepalese men in the British Army. This change raised educational investments by 1.15 years and increased the average education of men living in Nepal even after allowing for emigration. Despite not being selected in the British Army or emigrating elsewhere, these non-migrants benefited directly from additional schooling.

International migration is an increasingly popular employment option for individuals from developing countries. As of 2013, these migrants made up more than two-thirds of the global migrant population and their numbers in developed countries more than doubled between 1990 and 2013, from 40 to 83 million.[1] This is perhaps not surprising. Emigration brings sizable income gains for migrants and their household members (McKenzie *et al.*, 2010; Clemens, 2011; Gibson and McKenzie, 2011*b*). At the same time, the prospect of emigrating improves incentives to acquire human capital in source countries. When individual's investment decisions are based in part on the expected prospects of migration, such human capital acquisition can pay off even for those who are left behind. In this article, I use a quasi-experimental design to estimate the impact of emigration on human capital investment decisions, examine the change in educational levels of non-migrants and estimate the effect of this change on their labour outcomes.

The development impacts of emigration have been widely documented (Gibson *et al.*, 2013; Bryan *et al.*, 2014; Gibson and McKenzie, 2014). Education is an important way in which some of these impacts are realised (Docquier *et al.*, 2008; Yang, 2008; McKenzie and Rapoport, 2011). The early migration literature hypothesised that emigration leads to a loss of relatively more educated workers, prompting economists like Bhagwati and Hamada (1974) to propose a brain-drain tax to compensate for the loss incurred by developing countries. But brain drain does not necessarily deplete the

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[1] Based on United Nations (2013). Between 1990 and 2013, the number of migrants globally increased by 77 million. Migrants originating from developing countries accounted for more than two-thirds of this growth. Of the 136 million migrants residing in developed countries in 2013, 60% came from developing countries.

source country's stock of educated workers (Mountford, 1997; Vidal, 1998).[2] When education is required to migrate – due to skill-selective immigration policies implemented by developed countries – emigration prospects could raise expected returns to education. The development impact of migration therefore depends on the net change in education levels of those who are left behind. This net change is jointly determined by the mobility of educated workers and the increase in human capital of migrants and non-migrants alike.

I estimate these effects empirically by studying the decision of the British Government to shift towards a more selective education-based policy for recruiting Nepali nationals to work in the British Army. Nepal is one of the poorest countries in the world, with more than half of its population earning less than US$2 a day, and only a quarter of primary school graduates complete their secondary education (World Bank, 2012). In this regard, it presents an ideal case through which to identify net positive impacts of emigration on human capital in a developing country, as well as to estimate the direct benefits to non-migrants of such accumulation. While the latter relationship has been studied before (Fan and Stark, 2007; Gibson and McKenzie, 2011*a*; Docquier and Rapoport, 2012), this is the first article to provide experimental evidence of this relationship.

This experimental setting also provides an opportunity to study the effects of immigration policies that emphasise education. Canada, Australia and the UK – three of the top ten immigrant-receiving countries – have merit-based immigration policies, which place maximum weight on education. Germany, France and the US also use skill-based immigration quotas and a significant share of migrants enter these countries through such systems (Borjas, 1999; Marshall, 2011).[3] Such selective policies could differentially raise emigration prospects for skilled relative to unskilled workers; they could also alter the skill composition of the domestic workforce in source countries through selection and by incentivising skill acquisition. For example, Chand and Clemens (2008) document an increase in completion of tertiary education in Fiji to meet the criteria set by the Australian and New Zealand immigration point systems. I study a similar policy that raises investment incentives for a group of individuals in Nepal who seek to emigrate to work in the British Army. Such skill-based immigration polices can be an important catalyst for the growth of human capital in developing countries if enough people choose not to emigrate and instead accept employment in their home countries.

My findings suggest that the introduction of education as a criterion for selection for the British Army raised human capital investments within Nepal, with a significant increase in those completing secondary education. While the results are consistent with a change in actual returns to education induced by emigration prospects, the analysis also indicates that regional and household-specific conditions such as supply of schools and income constraints may have played an important role in determining individuals' educational responses. The recruitment numbers remained constant over this time but the shift towards selecting educated individuals led to an increase in

[2] Brain drain as well as skilled emigration, in the context of this article means the emigration of individuals who are more educated relative to the average.

[3] In Australia and Canada, 68% and 40% of new immigrants enter through merit-based points systems respectively. In the US, 10% of new immigrants enter through the skilled-migrant quota scheme.

educational levels of those who remained in Nepal. Despite not being selected to join the British Army or emigrating elsewhere, they benefited from additional schooling, as evidenced by improvements in job quality, including a shift to formal, salaried employment, as well as higher earnings in the domestic labour market.

So far, empirical evidence on the net brain gain hypothesis has been mixed. Macro studies by Beine *et al.* (2008) and Docquier *et al.* (2008) use different sets of instruments to address cross-country unobserved heterogeneity and find strong impacts on human capital investments across many countries; however, only a small number of countries experienced positive net effects on their human capital stock. Country-level analysis is unable to identify individual-level heterogeneities, which are important for analysing the channels through which incentive effects are realised. The empirical strategy of this article allows for a direct examination of the individual-level response to the change in an individual's skilled emigration prospects. The results are similar to those found by Batista *et al.* (2012) in Cape Verde and Chand and Clemens (2008) in Fiji. Unlike those studies, however, this study also considers the important welfare implications on non-migrants of human capital investments driven by emigration prospects.

Previous studies that measure the benefits of migration have mainly focused on estimating the effects on households with a migrant member (Yang, 2008; Gibson and McKenzie, 2011*b*; McKenzie and Rapoport, 2011). As a result, they did not capture the effects of emigration on non-migrant households, the numbers of which are likely to be large in developing countries because of strictly binding immigration quotas. Ignoring these households could severely underestimate the impacts from emigration. Mishra (2007) estimates a positive impact on local wages due to emigration. Individuals who try unsuccessfully to emigrate could also directly benefit from the human capital they accumulated initially for the purpose of migration. On the other hand, if foreign and domestic needs differ, the additional education obtained may not be useful in the domestic setting; the cost of brain waste from such distortions can be large and can even hinder economic growth in source counties (Maria and Stryszowski, 2009).

The rest of the article is structured as follows: Section 1 describes the background of the British Army recruitment in Nepal. Section 2 explains the empirical strategy and the data used for causal estimation. Section 3 presents the empirical results and Section 4 concludes.

1. Background

Nepal is a landlocked country surrounded by India to its south and China to its north. Its geographical position historically made it a melting pot for people and cultures from both sides of its border. The 1996 Nepal Living Standard Survey (NLSS) categorises the population into 15 ethnic groups. One of these, the Gurkha ethnic group, is comprised of 5 Mongol-Tibeto tribes – the Rai, Limbu, Gurung, Magar and Tamang, all of which settled in Nepal following the wave of migration from the north.

1.1. *British Brigade of Gurkha*

The British Brigade of Gurkhas is the unit of the British Army that is composed of Nepali soldiers. Following the Anglo-Gurkha war (1814–6), the British East India

Company and the Government of Nepal signed a treaty that transferred one-third of the territories previously held by Nepal to Great Britain and allowed the British to set up three Gurkha regiments in the British Indian Army. The early recruits of the British Gurkha Army included ethnic groups such as the Rajput, Thakuri, Chetri and Brahman, who migrated to Nepal from the south and were closely associated with the ethnic groups of India. In 1857, Indian soldiers serving in the British Indian Army led a mutiny against British rule in South Asia. Although the rebellion was swiftly contained in 1858, the British became wary of Indian nationals serving in their army. The British Gurkha Army stopped recruiting Nepali men who belonged to the ethnicities that originated in India. After 1857, the new Nepali recruits were mainly drawn from the five Monglo-Tibeto tribes who, unlike other ethnic groups in Nepal, had no cultural or historical ties with India because they had migrated to Nepal from the north (Farwell, 1984; Rathaur, 2001). The preference for such ethnic men is evident from a letter by the British Commanding Recruitment Officer in the early 1900s in which he writes: 'I first consider his caste. If he is of the right caste, though his physique is weak, I take him' (Banskota, 1994, p. 35).

This ethnicity bias in the recruitment of British Gurkha soldiers continues to exist even though the British government no longer uses ethnicity as a criterion for selection. According to the 2008 Nepal Labour Force Survey (NLFS), all current British Gurkha soldiers belong to one of the five Monglo-Tibeto tribes. Such bias could be due to a lack of recruitment information available to non-Gurkhas or because non-Gurkhas are marginalised in the recruitment process, which is conducted by ex-Gurkha servicemen who are themselves from the Gurkha ethnic group. Regardless of the reason for the bias, this British colonial tradition has evolved into a lucrative foreign employment opportunity for Nepali men of the Gurkha ethnic group.

The present value of the lifetime income from serving in the British Gurkha Army is estimated at around US$1.3 million, more than 50 times greater than the lifetime earnings of an average salaried employee in Nepal.[4] Given such large financial windfall, more than 25,000 individuals apply each year for only 300 available slots.[5] British Gurkha soldiers account for 40% of migrants to the UK from Gurkha communities, and remittances from Gurkha soldiers and pensions for ex-Gurkha soldiers were the country's largest source of foreign currency earnings until the recent development of other sources of migration. It should also be noted that joining the British Gurkha Army yields special cultural prestige among Gurkha families. Caplan (1995) points out that Gurkha ex-servicemen and their wives are known in their villages by their titles in the British Army. Hitchcock (1966) reports that many Gurkha villages are named after the title of their highest-ranking British Gurkha officer, such as the *Captain's village*.

The annual recruiting season spans about four months from early September to late December, and covers almost all the regions of Nepal. In the first stage, ex-Gurkha

[4] For detailed calculation of lifetime earnings, see Appendix Table A1. The difference between the lifetime earnings of a Gurkha soldier and those of a non-migrant in Nepal is similar to the gains in lifetime earnings from migration estimated by Gibson and McKenzie (2012) for workers from Ghana, Tonga and Papua New Guinea.

[5] Although the probability of success is small at one in every 83 applicants, the rate is comparable to other channels of emigration. For example, in the US Diversity Visa Lottery for applicants from developing countries, Clemens (2011) estimates that there were 272 emigration applicants per slot in 2010.

servicemen, or *Galla Wallahs*, go from village to village looking for raw talent. Galla Wallahs use their personal discretion to select a few potential recruits to advance the next round based on their physical attributes. The second stage is conducted by British Army Officers at the British Gurkha Recruitment Camp in Pokhara, and involves more comprehensive physical exercises along with a full medical checkup, a series of interviews, and written mathematics and English examinations. Recruitment officers also verify applicants' ages and education records. Successful applicants are then flown to the Infantry Training Centre in Catterick, England, where they undergo three months of military and cultural training. After that, they join The Royal Gurkha Rifles based at Shorncliffe Army Camp in Kent, The Queen's Gurkha Engineers based at Invicta Park Barracks in Maidstone, or The Queen's Own Gurkha Logistic Regiment based at Aldershot Garrison in Hampshire, all of which are located in England. Gurkha soldiers remain citizens of Nepal throughout their careers abroad in the British Army and are entitled to benefits and promotions in rank similar to British natives.

1.2. *A Change in Selection Criteria*

Although education is an important aspect of the British Gurkha Army recruitment process today, prior to 1993, no formal education was required for joining; the selection criteria were solely limited to physical examinations. Starting in 1993, recruits were required to have completed at least eight years of education and written tests in mathematics and English became part of the selection process. In 1997, the minimum education requirement was increased to 10 years.[6] This set of changes was instigated by a larger restructuring of the British Army in the early 1990s. In order to evaluate the role of its army in the post-cold war era, the UK Ministry of Defence conducted a series of defence reviews termed *Option for Change*, which concluded that 'strong defence requires military capability of fighting in a high-technology warfare; the aim is smaller forces, better equipped, and properly trained'. (Alexandreou *et al.*, 2000, p. 3) This led to reduced defence spending and an 18% reduction in service manpower in the British Army. This reduction was accompanied by an emphasis on a flexible and modernised force, which was achieved by incorporating new technologies and by improving education and training of soldiers. The shift towards more educated soldiers was in line with that of the US Army, which also saw its recruits with a high school diploma increase by 30% in the late 1980s (Department of Defense, 2008).

2. Identification Strategy

Economic models suggest that this change in selection criteria for the British Gurkha Army should increase expected returns to education among Gurkha men, especially given the large gains in wages for successful recruits, and, therefore, induce individuals to

[6] The estimated treatment effect on the younger eligible cohort should be interpreted as their response to the changes in both 1993 and 1997. In comparison to the first change in 1993, the later change is likely to have a smaller impact because, even before 1997, completing 10 years of education increased the likelihood of success in the British Gurkha recruitment due to necessity of doing well on written exams required from 1993. This meant that the changes in both 1993 and 1997 not only induced applicants to complete the minimum thresholds of education but also to continue with completing higher levels education.

invest more in human capital. Because the change was plausibly exogenous to socio-economic conditions in Nepal, the empirical strategy of comparing the education outcome of individuals who were affected to those who were not affected by this change gives an unbiased estimate of its effect on individuals' schooling decisions. It also allows me to examine its impact on the net human capital stock of the country and the domestic labour market outcomes of those who were not selected or chose to stay behind.

The individuals' exposure is jointly determined by their sex, ethnicity and age. First, the British Brigade of Gurkha, in contrast to the other regiments of the British Army, is exclusively made up of men; therefore, women were not affected. Second, considering that most British Gurkha soldiers since 1857 have been Gurkha ethnic men, non-Gurkha men were also not affected. Third, because recruits must be between 17 1/2 and 21 years old, men who were 22 or older in 1993 were not affected by the change. These older men are referred to as the *ineligible* cohort and the younger ones are referred to as the *eligible* cohort. Among the eligible cohort, individuals aged 6 to 12 were more likely to be enrolled in primary school in 1993 and to have enough years to change their educational trajectory in line with the new selection rule. They are also affected by the change in 1997. In contrast, older individuals aged 13 to 21 are mostly unaffected by the later change and their ability to respond successfully to the introduction of the educational requirement is constrained by the years of education they have already completed by its 1993 introduction. For example, Gurkha men aged 20 would only be able to respond if they already had at least 7 years of education in 1993. Because the data on education completed by 1993 is not available, the older eligible cohort includes some men who were affected by the change in 1993 and others who were not.

The effect on human capital is identified via difference-in-difference estimation, comparing male education between eligible and ineligible cohorts, within Gurkha and non-Gurkha ethnic groups. The difference in education between the two cohorts in the Gurkha ethnic group could be correlated with the age-varying unobserved variables. Subtracting from this cohort the cohort difference in education for non-Gurkha ethnic men would net out all age-varying characteristics as well as age-invariant ethnic characteristics that could directly affect education. The identification assumption is that in the absence of this change in selection criteria, the evolution of education outcomes of men between the two cohorts would not have systematically differed across Gurkha and non-Gurkha ethnic groups. Additionally, the difference-in-difference estimate of female education serves as a false experiment to test this identification assumption.

The above identification strategy can be expressed using the following regression framework:

$$Y_{ikml} = c + \alpha_{1kl} + \beta_{1m} + \gamma(T_{ik} \times G_{im}) + \sum_j (P_{ij} \times \boldsymbol{R}_m) \times \delta_j + \epsilon, \tag{1}$$

where Y_{ikml} is the education outcome for individual i of age k and ethnicity m, born in ward l; α_{1kl} is an age-ward dummy for each age k and ward l; β_{1m} is an ethnicity dummy for each m; G_{im} is a dummy indicating whether individual belongs to the Gurkha ethnic group; T_{ik} is a dummy indicating whether the individual belongs to the eligible cohort; P_{ij} is a dummy indicating whether individual is age j for $j \in \{age\ cohorts\}$; and $\boldsymbol{R_m}$ is a vector of ethnicity-specific variables.

The identification strategy can also be generalised to examine the impact for each birth-year cohort in the following regression framework:

$$Y_{iklm} = c + \alpha_{1kl} + \beta_{1m} + \sum_{x}(P_{ix} \times G_{im}) \times \gamma_x + \sum_{j}(P_{ij} \times \boldsymbol{R}_m) \times \delta_j + \epsilon. \quad (2)$$

Each γ_x can be interpreted as the effect of the selection criteria change on Gurkha men of age x. Since men who were 22 and older were not affected, the coefficients γ_x should be 0 for $x \geq 22$. Additionally, the coefficients γ_x should increase as x decreases for $x < 22$.

The difference-in-difference strategy nets out any potential positive or negative externalities generated by the educational response, as long as such externalities affect both Gurkha and non-Gurkha ethnic groups equally.[7] Furthermore, since the information regarding individuals' decisions to apply for the British Gurkha Army is not available, the estimate should be interpreted as the average treatment effect from the rule change on all eligible Gurkha men, regardless of their future intention to apply or not to apply for the British Gurkha Army.

The same strategy can be applied to estimate the effect on domestic human capital stock and local labour market outcomes by restricting the sample of Gurkha and non-Gurkha men to those who stay in Nepal. The identification strategy requires that the change had no effect on labour outcomes of eligible Gurkha non-migrants other than to increase their educational attainment. Potential sample selection based on education could bias the estimate if the change affected domestic returns to education differentially across Gurkha and non-Gurkha ethnic groups, leading to differential skilled emigration. Since labour markets in Nepal are not segregated along ethnic lines, men from both ethnic groups are likely to experience similar labour market changes following an increase in the supply of educated Gurkha men. In fact, any general equilibrium effects on labour outcomes would be netted out by the difference-in-difference estimate so long as those effects are common across the two ethnic groups.[8]

The data for the main empirical analysis come from the 2001 Nepal Census. It collected information on age, ethnicity, education and limited labour outcomes for all members of each household in the nationally representative sample, including members who were living abroad.[9] The census data are supplemented with the 1996 NLSS, which is a household survey that collected information on access to school facilities. More precise individual labour data are obtained from the 2008 NLFS, including information on sector of employment, underemployment, and earnings for a nationally representative

[7] One example of a negative externality is a potential decline in the quality of education, which could negatively affect schooling. There is no evidence that quality of schooling decreased following the change in selection criteria, mainly because the supply of schools increased with the increase in demand. Between 1997 and 2003, the number of secondary school teachers and the number of secondary enrolment increased by 41% and 42% respectively (National Planning Commission, 2007). As a result, the student–teacher ratio, an important indicator of school quality, remained constant at 21.5 during this period.

[8] The size of the general equilibrium effects could be large because the Gurkha ethnic group comprises almost 20% of the population. Its size depends on the relationship between human capital choice and returns to education, elasticity of demand for educated labour and ethnic segregation in the labour market.

[9] The sample of households is drawn from the complete household count conducted in the first phase of the census in 2001. If the entire household moved before 2001, then the information for those individuals is not available. From each ward, one of eight housing units were selected, and complete enumeration was done in six districts and 52 wards of the country. The sample comprises 20% of the population.

Table 1

Descriptive Statistics

	Whole sample	Gurkha	Non-Gurkha
Panel (a): individual level means (2001 Census)			
Total sample	1,389,705	245,148	1,144,557
Percentage of sample	—	17.6	82.4
Literacy rate (%)	55.2	53.2	55.6
Male (%)	69.5	66.9	70.0
Female (%)	41.3	41.0	41.4
Years of education	4.07	3.28	4.24
Male	5.34	4.24	5.57
Female	2.84	2.42	2.94
Born in urban area (%)	31.3	18.2	34.1
Panel (b): individual level means (2008 Labour Force Survey)			
Total sample	10,946	1,779	9,167
Percentage of sample	—	16.3	83.7
Employment (%)	81.9	82.0	81.9
Underemployment (%)	5.8	5.7	5.8
Non-agriculture employee (%)	55.2	46.0	57.0
Wage employee (%)	35.6	33.5	36.0
Government employee (%)	6.2	4.5	6.5
Permanent employee (%)	9.2	7.8	9.5
Monthly earnings (in US$)	20.37	17.76	20.88
Panel (c): household level means (1996 Living Standard Survey)			
Total sample	3,373	541	2,832
Percentage of sample	—	16.1	83.9
Household size	5.59	5.27	5.65
Access to school (in hours)	0.38	0.54	0.35
Access to paved road (in hours)	9.41	14.64	8.41
Poverty rate (%)	33.5	37.5	32.7

non-migrant sample.[10] Panels (*a*), (*b*), and (*c*) of Table 1 present summary statistics for 1,389,705 individuals aged 6 to 44 in 1993 from the 2001 Census; 10,946 men aged 6 to 28 in 1993 from the 2008 NLFS; and 3,373 households from the 1996 NLSS, respectively. Each panel provides the averages for important socio-economic characteristics for the entire sample as well as separately for the Gurkha and non-Gurkha ethnic groups. The average education for the Gurkha ethnic group is 3.28 years, which is slightly lower than the non-Gurkha average of 4.24; also, 18% of Gurkhas were born in urban cities compared to 34% of non-Gurkhas. About 18% of Gurkha and non-Gurkha men are unemployed and 5.8% are underemployed; individuals from both groups earn about US $20 a month, with Gurkhas earning slightly less. In all three surveys, the Gurkha ethnic group comprises about 16% of the sample.

3. Results

3.1. *Difference-in-difference*

Table 2 compares the educational attainment as of the 2001 Census of Gurkha and non-Gurkha men who were not affected by the change (aged 22–28 in 1993) to these

[10] Individuals living abroad for six months or more were excluded from the survey.

Table 2

Mean Education by Cohort and Ethnicity

	Years of education completed		
	Gurkha	Non-Gurkha	Difference
Panel (a): experiment 1			
Male aged 6–12 in 1993	5.74	6.26	−0.53
	(0.018)	(0.009)	(0.022)
Male aged 22–28 in 1993	3.64	5.34	−1.71
	(0.031)	(0.016)	(0.039)
Difference	2.10	0.92	1.18
	(0.034)	(0.017)	(0.042)
Panel (b): experiment 2			
Male aged 13–21 in 1993	5.20	6.61	−1.41
	(0.026)	(0.013)	(0.031)
Male aged 22–28 in 1993	3.64	5.34	−1.71
	(0.031)	(0.016)	(0.039)
Difference	1.56	1.27	0.29
	(0.041)	(0.020)	(0.049)

Notes. The Table reports the average years of education completed as of 2001 for men of different cohorts and ethnic groups. The standard errors are reported in parentheses.

who were affected, either those in the cohort aged 6 to 12 or those in the cohort aged 13 to 21.[11] In both ethnic groups, average years of completed education increased over time but it increased more for members of the Gurkha ethnic group. The difference-in-difference estimation shows that Gurkha men in the younger eligible cohort (aged 6–12) completed an average of 1.18 more years of education. This is significantly different from zero at the 1% level. Gurkha men in the older eligible cohort (aged 13–21) also raised their education by 0.29 years, which is less compared to the younger eligible cohort due to the reasons discussed earlier.

Potential age-varying characteristics correlated with ethnicity and education could confound the causal interpretation of these results. Gurkha ethnic groups are concentrated in the northern central region and north east corner of Nepal and Gurkha men are slightly more likely to be born in rural areas. If these regions are changing differentially over time, such confounding factors could bias the difference-in-difference estimates. I control for factors that might differentially affect Gurkha and non-Gurkha ethnic groups by estimating the coefficient γ in (1) and include in the regression the interactions of age dummies and ward dummies, for all ages and wards, as controls. A ward is the smallest administrative unit, which also acts as a political institution to facilitate the planning, programming and implementation of development programmes and projects.[12] Therefore, Gurkha and non-Gurkha men living in the same ward are likely to experience the same socio-economic changes, such as improvement in access to schools and increases in educational returns unrelated to changes in the selection criteria

[11] The census sample includes individuals living in Nepal as well as individuals living abroad so long as their household is located inside Nepal.

[12] Ward in this context refers to a village (VDC) in rural areas and a municipality in urban areas. In 2001, there were 3,972 wards in 75 districts.

for the British Gurkha Army.[13] The additional specification includes the interactions of age dummies and ethnicity-level average distance-time to the nearest school, calculated from the 1996 NLSS. Including such interactions in the regression controls for a potential correlation with government policies that might have targeted underperforming ethnicities at the time of the selection criteria change.

The estimates presented in panels (*a*) and (*b*) of Table 3 are statistically significant at the 1% level and are robust to different sets of controls. More importantly, none of the estimates decrease in magnitude compared to the simple difference-in-difference of means from Table 2, even after allowing for ward-specific differential trends and ethnicity-specific age-varying characteristics. This suggests that the estimates are not likely to be biased by such age-varying socio-economic factors; therefore, the change in the selection criteria induced Gurkha men from the younger eligible cohort to raise their education by 1.15 years and the older eligible cohort by 0.40 years.

Table 3

Impact on Education of Gurkha Men and Women

	Observations	(1)	(2)
Panel (a): experiment 1			
Eligible cohort: Males aged 6–12	325,876	1.16***	1.15***
Ineligible cohort: Males aged 22–28		(0.309)	(0.278)
Panel (b): experiment 2			
Eligible cohort: Males aged 13–21	300,327	0.43***	0.40***
Ineligible cohort: Males aged 22–28		(0.098)	(0.101)
Panel (c) control experiment 1			
Eligible cohort: Males aged 22–28	214,315	0.03	0.01
Ineligible cohort: Males aged 29–35		(0.174)	(0.202)
Panel (d): control experiment 2			
Eligible cohort: Females aged 6–12	333,055	0.29	0.06
Ineligible cohort: Females aged 22–28		(0.282)	(0.336)
Control variables:			
Age dummies		Yes	Yes
Ethnicity dummies		Yes	Yes
Age dummies × ward dummies†		Yes	Yes
Age dummies × rural birth dummy		Yes	Yes
Age dummies × access to school‡		No	Yes

Notes. *Significance at 10% level; **Significance at 5% level; ***Significance at 1% level. The standard errors are reported in parentheses and are adjusted for within-ethnicity correlation. This Table reports the estimates of γ in (1). The dependent variable is the years of education completed as of 2001. †*Ward* is the smallest administrative unit in Nepal and in 2001 there were 3,972 wards. ‡*Access to school* is ethnicity-level average distance-time to school in 1996.

[13] While this strategy controls for differential changes in domestic environment within Nepal, international factors could also affect Gurkha and non-Gurkha ethnic groups' educational outcomes differentially. For example, relaxation of international capital flow laws could increase remittance from Gurkha soldiers, which could improve their household members' access to and quality of education at home. Although I do not have information on whether any of the household members is serving in the British Gurkha Army, I exclude all individuals who had at least one household member living abroad around 1993 and estimate the effect on this new sub-sample. The results do not change, suggesting that the estimates are unlikely to be biased by international factors.

The identification relies on the assumption that in the absence of the rule change, the difference in educational outcomes between the eligible and ineligible cohorts would not have systematically differed across Gurkha and non-Gurkha ethnic groups. To test this parallel trend assumption, I conduct some control experiments. Table 2, panel (*c*) compares the educational attainment of the ineligible cohort aged 22 to 28 with another ineligible cohort aged 29 to 35 across Gurkha and non-Gurkha men. The estimate of coefficient γ in column 2 is 0.01 and not statistically different from zero at the conventional levels.[14] Panel (*d*) compares education outcomes for females aged 6 to 12 with females aged 22 to 28, in Gurkha and non-Gurkha ethnic groups. While women are not eligible for the British Gurkha Army, education of Gurkha females might still be affected due to intra-household resource allocations or intra-ethnicity spillovers; nonetheless, the estimates on Gurkha women of the younger eligible cohort is 0.06 and not statistically different from zero. Lastly, if the results are driven by the response to the change in selection criteria, the estimated effects should decrease with age for Gurkha men in the eligible cohort and be zero for all ineligible birth-year cohorts. I test this hypothesis by estimating γ_xs in (2) for $6 \leq x \leq 35$, where each γ_xs represents the effect on Gurkha men aged x. The control group comprises men aged 36 and 37. The estimates of γ_xs are plotted in Figure 1. γ_xs fluctuate around zero, are

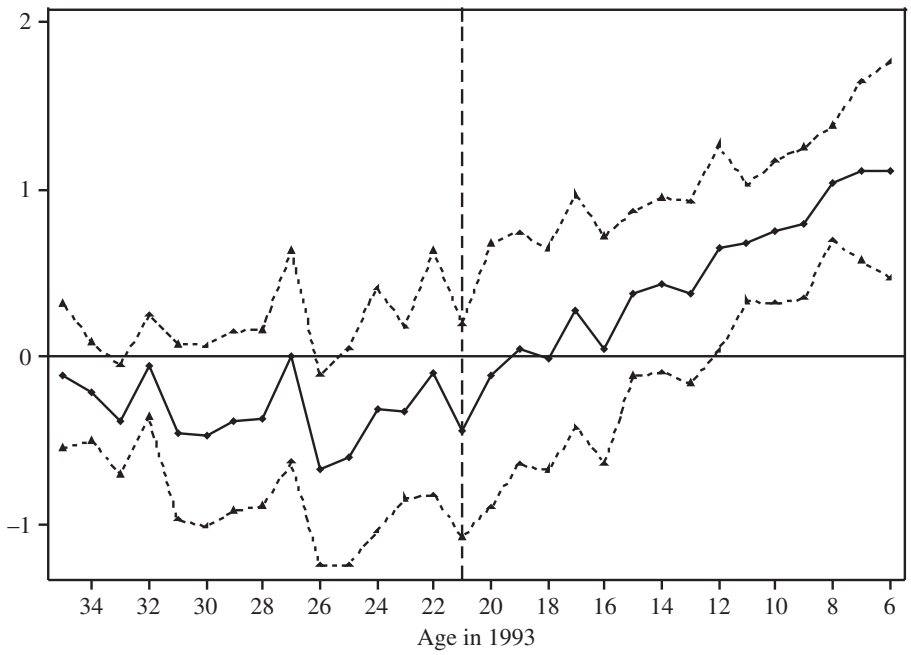

Fig. 1. *Impact on Education of Gurkha Men*
Note. The Figure plots $\gamma_x s$ in (2) with 95% confidence interval for $6 \leq x \leq 35$.

[14] I also compare the ineligible cohort aged 22 to 28 with another ineligible cohort aged 38 to 44, so that the age difference between the oldest in the first ineligible cohort and the youngest in the second ineligible cohort is nine years. This control experiment with nine missing birth-cohorts is consistent with the experiment in panel (*a*) of Tables 2 and 3. Using these cohorts for the control experiment does not change the results. The estimates are still statistically insignificant at the conventional levels.

statistically insignificant for all $x \geq 22$, and increase as age decreases for $x \leq 21$, providing further support for the internal validity of the empirical strategy.

3.2. *Synthetic Control*

In the empirical estimation above, the non-Gurkha ethnic group may not be a valid comparison for the Gurkha ethnic group. Prior to the change in selection criteria, Gurkha men, on average, attended school for fewer years than did non-Gurkhas; therefore Gurkha men catching up with non-Gurkhas' education could compound these estimates. To exclude this possibility, I use a data-driven procedure developed by Abadie and Gardeazabal (2003) to construct a different comparison group. The new counterfactual – the synthetic Gurkha ethnic group – is the convex combination of all non-Gurkha ethnicities that most closely resemble the Gurkha ethnic group based on the education of age ineligible men. For each non-Gurkha ethnicity, I calculate the average number of years of education for each birth cohort and then assign ethnicity-weights to minimise the difference between the educational attainment of Gurkha and synthetic Gurkha ethnic groups across ineligible cohorts.[15]

Figure 2 depicts the years of education completed for Gurkha and synthetic Gurkha ethnic groups across birth cohorts aged 6 to 44. Education of the synthetic Gurkha ethnic group closely matches that of the Gurkha ethnic group for ineligible cohorts aged 22 to 44, suggesting that the eligible cohort of synthetic Gurkha ethnic group provides a close approximation of the eligible cohort of the Gurkha ethnic group in the absence of the rule change. The difference in education between the Gurkha and synthetic Gurkha ethnic groups for cohorts aged 6 to 21 could be interpreted as the effect of introducing education as a criterion in the British Gurkha Army recruitment process. Education of Gurkha and synthetic Gurkha ethnic groups diverges considerably for eligible cohorts. The average difference in education among eligible cohorts is 0.71 years, which is four times larger than the difference among ineligible cohorts, and it decreases with age. Therefore, the estimate from this synthetic method is consistent with the results from the difference-in-difference strategy.[16]

3.3. *Extensive and Intensive Margins*

The change induced eligible Gurkha men to enrol in school and to complete at least the minimum required education for the British Army selection. Table 4 presents the effects at these two margins, by estimating the coefficient γ in (1) for the younger

[15] I calculate the ethnicity-weights from this minimisation problem: choose $\boldsymbol{W}$ to minimise $(\boldsymbol{X}_G - \boldsymbol{X}_N\boldsymbol{W})(\boldsymbol{X}_G - \boldsymbol{X}_N\boldsymbol{W})$, where $\boldsymbol{W} = \{(w_1, \ldots w_J)' \text{ subject to } w_1 + \cdots + w_J = 1, w_J \geq 0\}$. $\boldsymbol{X}_G$ is a $(k \times 1)$ vector of average years of education at each age ineligible birth cohort for the Gurkha ethnic group, where $21 \leq k \leq 44$. X_N is a $(k \times J)$ matrix with average years of education for k ineligible birth cohorts and J non-Gurkha ethnicities. Appendix Table A2 displays the weights of each non-Gurkha ethnicity in the synthetic Gurkha ethnic group.

[16] To exclude the possibility that this result could have been obtained by chance, I iteratively apply the synthetic control method to all the non-Gurkha ethnicities and examine whether assigning treatment at random produces results of similar magnitude (Bertrand *et al.*, 2004). Compared to 10 placebo tests of non-Gurkha ethnicities, the difference in education is largest for Gurkha ethnic group.

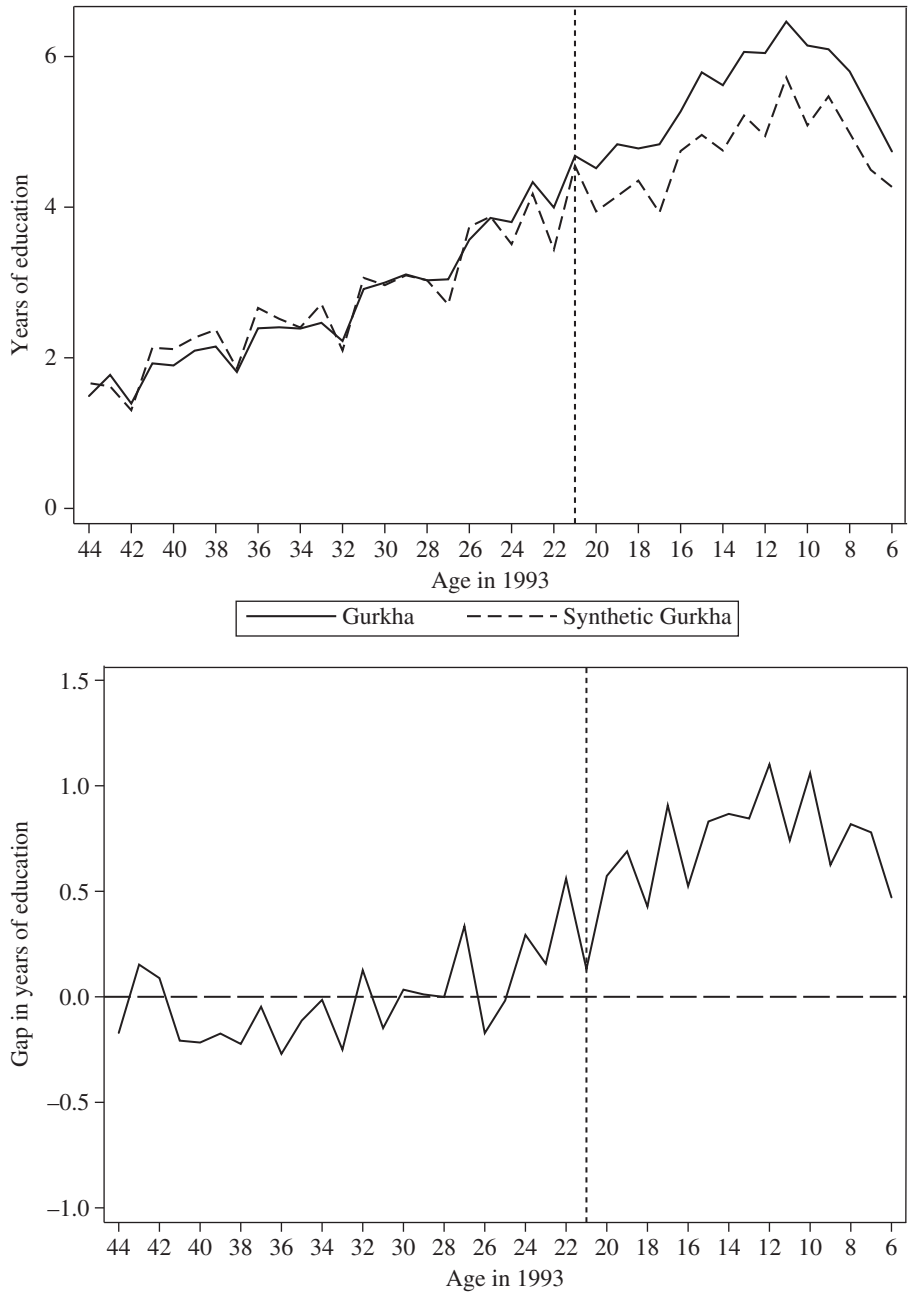

Fig. 2. *Comparison Between Gurkha and Synthetic Gurkha*

Notes. The graphs plot the average years of education completed as of 2001 and the difference at each birth cohort for Gurkha and synthetic Gurkha ethnic groups.

eligible cohort, where the dependent variables are dummies indicating years of education completed greater than zero and education equal to or greater than 10 years. The results suggest that the proportion of young eligible Gurkha men with at

Table 4

Impact on Education of Eligible Gurkha Men

	Observations	(1)	(2)
Panel (a): young eligible cohort (males aged 6–12)			
Dummy indicating education > 0	325,876	0.091***	0.092***
		(0.0292)	(0.0300)
Dummy indicating education ≥ 10	325,876	0.096***	0.095***
		(0.0290)	(0.0262)
Panel (b): old eligible cohort (males aged 13 to 21)			
Dummy indicating education ≥ 8	300,327	0.030**	0.025*
		(0.0111)	(0.0116)
Dummy indicating education ≥ 10	300,327	0.015	0.008
		(0.0102)	(0.0118)
Control variables			
Age dummies		Yes	Yes
Ethnicity dummies		Yes	Yes
Age dummies × ward dummies		Yes	Yes
Age dummies × rural birth dummy		Yes	Yes
Age dummies × access to school		No	Yes

Notes. *Significance at 10% level; **Significance at 5% level; ***Significance at 1% level. This Table reports the estimates of γ in (1) with a dummy-dependent variable indicating years of education completed ≥ s. The standard errors are reported in parentheses and are adjusted for within-ethnicity correlation.

least 1 year of education increased by 9.2 percentage points and the proportion with at least 10 years of education increased by 9.5 percentage points. Both estimates are statistically significant at the 1% level, indicating that the human capital response was positive at the two margins that should have been affected by the change.

At the intensive margin, the change should negatively affect education closer to but less than 10 years because the cost of increasing education to meet the minimum requirement for the British Army selection is lowest at these levels. I estimate the impact at different education levels by estimating the difference in difference in the distribution of education between young eligible and ineligible cohorts across Gurkha and non-Gurkha men who have at least one year of schooling. Figure 3 depicts the estimates of γ^ss from (1), with a dummy-dependent variable indicating the level of education completed exactly equal to s, for each $s = 2$ to 15. The share of those who completed exactly 8 and 9 years of education declined by 2.8 and 3.0 percentage points respectively, and the estimates are statistically different from zero at the 5% level. In contrast, the share of young Gurkha men with just a high school degree (12 years of education) increased by 3.7 percentage points and a college degree by 6.2 percentage points (statistically significant at the 1% and 5% levels, respectively). The positive impact on education beyond the minimum requirement of 10 years of schooling may have resulted from the improved likelihood of success in the selection process, especially with the introduction of English and mathematics examinations. Alternatively, some of the eligible Gurkha men who completed 10 years of schooling to meet the new selection criteria could have chosen to continue with their education for other reasons. Angrist and Imbens (1995) find similar positive spillover effects in the

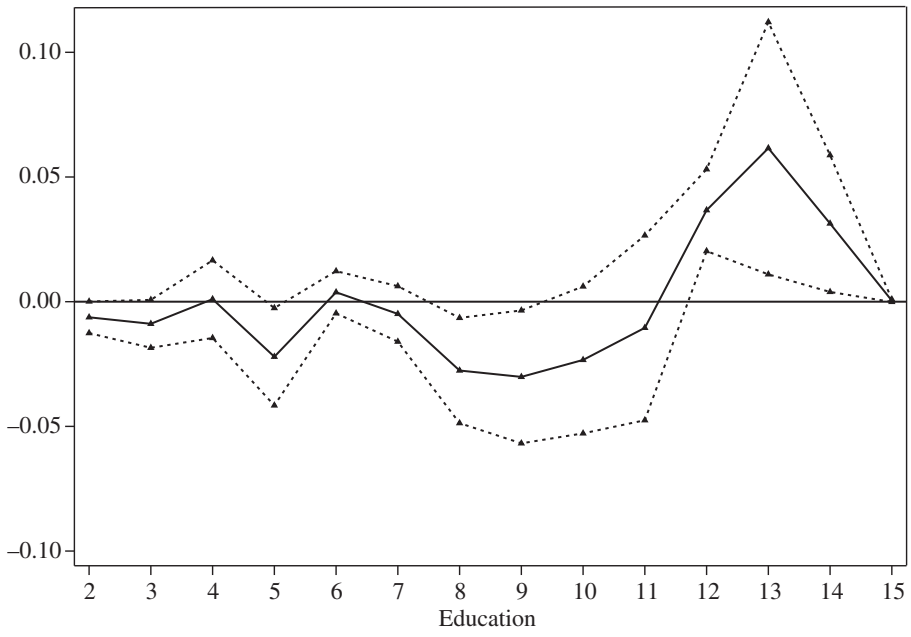

Fig. 3. *Difference-in-difference in Education PDF*
Notes. The Figure plots γ^ss in (1) with 95% confidence interval. For each $s = 2$ to 15, the dependent variable is a dummy indicating the years of education completed equal to s.

US, where compulsory attendance laws induced a fraction of the sample to complete some college as a consequence of constraining them to complete high school.

Table 4 also estimates the effect on older eligible cohorts of the 8-year minimum requirement for selection, which is the education criterion to which most of them were subjected. While the share of those with at least 8 years of education increased by 2.5 percentage points, there is no impact on completing 10 years of schooling. The former estimate is statistically significant at the 10% level. Moreover, the impact on the education distribution among the older eligible cohort varies by age. Among Gurkha men aged 20, the cost of increasing education to meet the minimum requirement is lowest for individuals with at least 7 years of education in 1993; among Gurkha men aged 19, individuals who already had completed 6 years of education in 1993 experienced the largest incentive to respond to the change in selection criteria. While information on education completed in 1993 is not available, one would expect that the fraction of Gurkha men aged 19 who dropped out with exactly 6 years of education would decrease or stay constant. Table 5 presents the impact on different cohorts at their respective margins by estimating γ^ss from (1), with dummy-dependent variables indicating the level of education completed equal to s. The share of Gurkha men aged 19 with 6 years of education declined by 1.6 percentage points, aged 18 with 5 years of education by 1.4 percentage points, aged 17 with 4 years by 1.2 percentage points, and aged 15 with 2 years by 1.1 percentage points. The estimates are statistically different from zero at the 10% level and, more importantly, none of the estimates are positively significant. All of these results are consistent with the change in educational

Table 5

Impact on Education of Old Eligible Gurkha Men

	Dummy indicating years of education = s						
	$s = 1$ (1)	$s = 2$ (2)	$s = 3$ (3)	$s = 4$ (4)	$s = 5$ (5)	$s = 6$ (6)	$s = 7$ (7)
Gurkha × age 14	0.001						
	(0.0022)						
Gurkha × age 15		−0.011**					
		(0.0043)					
Gurkha × age 16			−0.006				
			(0.0053)				
Gurkha × age 17				−0.012**			
				(0.0053)			
Gurkha × age 18					−0.014**		
					(0.0063)		
Gurkha × age 19						−0.016*	
						(0.0077)	
Gurkha × age 20							0.011
							(0.0069)
Observations	92,188	85,315	86,142	90,634	83,698	82,239	86,483

Notes. This Table reports the estimates of γ in (1). For each $s = 1$ to 7, the eligible cohort includes men of birth year cohort for which s is the minimum education they should have completed in 1993 in order to respond to the change successfully. For example, for $s = 1$, the eligible cohort includes men aged 14 and, for $s = 5$, the eligible cohort comprises of men aged 18. The ineligible cohort in all the regressions are men aged 22 to 28. The controls include age dummies, ethnicity dummies, age dummies × ward dummies, age dummies × rural birth dummy, and age dummies × ethnicity-specific school access. The standard errors are reported in parentheses and are adjusted for within-ethnicity correlation. *Significance at 10% level; **Significance at 5% level; ***Significance at 1% level.

investment induced by Gurkha men responding to the introduction of education in the selection criteria for British Gurkha Army recruitment.

The positive impact on human capital investment indicates that the British Gurkha Army constitutes an attractive foreign labour market opportunity for Gurkha men. Given that 80% of Gurkha men who aged out of the recruitment process before 1993 had less than 10 years of education, the addition of an educational requirement increased the share of Gurkha men who completed 10 years of schooling by 58.74%. The lifetime domestic earnings for a median Gurkha man who has completed at least 10 years of education is US$8,300 greater than his counterpart who has never enrolled in school.[17] Then the change in selection criteria increased this lifetime earnings gap between educated and uneducated Gurkhas by another US$16,000.[18] In comparison, the price of receiving additional 10 years of schooling is the shadow wage of the child plus any direct costs of attending school, such as tuition and transportation, and is estimated to be around US$3,800.[19] The expected benefits exceed the costs as long as the probability of joining the British Gurkha Army is not less than 0.0028, one in every 351 applicants, suggesting a strong investment incentive for Gurkha men. Moreover, the demand elasticity of education of 0.3 is within the range estimated by Kochar (2004) in rural India.[20]

3.4. *Heterogeneous Response*

In developing countries, socio-economic factors such as household labour constraints and access to schools and credit, could constrain individuals from raising their level of education. The size of the incentive effect could be negatively affected if these factors are binding for some households before or after the change. Columns 1 and 2 in Table 6 estimate the impacts differentially across districts with and without adequate supply of schools at the time of the change.[21] While the effects on young eligible cohorts between the two types of districts are not statistically different, the impact on the older eligible cohort living in districts with limited teacher supplies is significantly lower. Education of older eligible Gurkha men from districts with better access to schools increased by 0.49 years and this is statistically significant at the

[17] Based on the 2008 NLFS, a median Gurkha male with at least 10 years of education is expected to earn about US$1,086 annually by working in the local labour market, whereas, his counterpart who has no formal education is expected to each about US$713 annually. The present value of their lifetime earnings is calculated using a discount factor of 0.99 for an employment duration of 25 years, the same parameters used to calculate the lifetime earnings of a Gurkha soldier.

[18] US$16,000 is the expected lifetime earnings from the British Gurkha Army for each Gurkha man who is eligible to apply, which is calculated as: lifetime earnings × probability of being recruited. Therefore, the change in selection criteria increased the lifetime earnings gap between educated and uneducated Gurkhas by 193%.

[19] The direct cost is based on tuition and transportation fees for private schools in Nepal (Sangeeta, 2009). The opportunity cost of education is calculated based on the median earnings of under-16 males from the 2008 NLFS.

[20] Kochar (2004) finds that a 10% increase in returns to education in urban areas increased male middle school completion rate in rural areas of India by 2.9% to 5.9%.

[21] The district-level supply to schools is defined as the total number of secondary-level teachers per square kilometres in 1994 based on the National Planning Commission (2007). For a median district, the number of teachers per square kilometres is 0.169.

Table 6

Impact on Education of Eligible Gurkha Men (Differential Effect)

	Supply of school[†]		Household enterprise[‡]		Household asset[§]		Access to recruitment[¶]	
	Districts ≤ Median (1)	Districts > Median (2)	Agri production (3)	No agri production (4)	Owns TV (5)	Does not own TV (6)	Gurkha districts (7)	Non-Gurkha districts (8)
Panel (a)								
Young eligible cohort	0.98***	1.21***	0.82***	1.36***	1.46***	0.80***	1.24***	0.65**
(males aged 6–12)	(0.227)	(0.322)	(0.224)	(0.372)	(0.363)	(0.212)	(0.286)	(0.289)
p-value of *F*-test	0.274		0.064		0.022		0.006	
Observations	114,510	211,366	195,178	130,698	86,851	239,025	216,498	109,378
Panel (b)								
Old eligible cohort	0.16	0.49***	0.16	0.61***	0.74***	0.124	0.45***	0.21
(males aged 13–21)	(0.110)	(0.108)	(0.145)	(0.145)	(0.152)	(0.142)	(0.107)	(0.133)
p-value of F-test	0.005		0.034		0.010		0.152	
Observations	103,687	196,640	164,664	135,663	85,137	215,190	200,047	100,280

Notes. This Table reports the estimates of γ in (1). The dependent variable is the years of education completed as of 2001. The ineligible cohort includes men aged 22 to 28. The controls include age dummies, ethnicity dummies, age dummies × ward dummies, age dummies × rural birth dummy, and age dummies × ethnicity-specific school access. [†]Supply of school: Districts are divided based on the total number of secondary-level school teachers per km^2 in 1994. For a median district, there are 0.169 teachers per km^2. [‡]Household enterprise: Household is cultivating its own land or raising livestock in 2001. [§]Household asset Household owns a television set in 2001. [¶]Access to recruitment: Out of 75 districts, 53 districts have at least one village (ward) with more than half its population in 2001 from Gurkha ethnic group. They are labeled Gurkha districts and the remaining 22 districts are non-Gurkha districts. The standard errors are reported in parentheses and are adjusted for within-ethnicity correlation. *10% Significance; **5% Significance; ***1% Significance.

1% level. On the other hand, Gurkha men from the older eligible cohort with poor access did not raise their education levels. The estimated effects on the two types of populations are statistically different at the 1% level. The supply constraints are more likely to be binding for older relative to younger eligible cohorts because the supply of schools, both private and public, might have slowly improved over time in response to the higher demand. Between 1994 and 2003, the number of secondary teachers per square kilometre doubled in both Gurkha and non-Gurkha dominated districts, suggesting such a supply-side response (National Planning Commission, 2007).

In columns 3 and 4, I estimate the impact on individuals living in agricultural *versus* that on non-agricultural households; in columns 5 and 6 I estimate across household wealth using ownership of television set as a proxy. Based on the 2004 NLSS, more than 20% of school absenteeism was caused by the high financial cost of education and 10% due to labour constraints in household work. For both young and old eligible cohorts, the estimated impacts of the selection criteria change are smaller in magnitude and statistically different for individuals living in households that are directly involved in agricultural production compared to non-agricultural households. In households that own a television set, Gurkha men in the younger eligible cohort raised their education level by 1.46 years; their counterparts living in households without a television set only raised their education by 0.80 years. The F-test suggests that these estimates are statistically different at the 5% level. Household's agricultural and wealth status is measured in 2001 and, therefore, could be directly affected by the change. While both results should be interpreted with caution, the two stratified results could be potentially informative in documenting the role of household labour and credit constraints in reducing investment responses to skilled emigration.

Table 6 also estimates the impact of the change in selection criteria separately across districts with and without any Gurkha majority villages. One of the main differences between the two types of districts is the intensity of British Gurkha Army recruitment. As discussed in Section 1, the first stage of recruitment involves Galla Wallahs visiting villages around the country to conduct day-long selection camps, which are more likely to be held in Gurkha dominated regions. Gurkha men living in villages that are visited by Galla Wallahs should experience a greater increase in their returns to education in contrast to those living in other regions who would have to bear additional costs to apply. Such costs include not only travel expenses but also the knowledge about the exact dates in each village, which are often neither scheduled nor announced in advance. The difference in recruitment intensity can be used to examine whether the increased investment in education by Gurkha men is driven by changes in their actual returns to education. The results from columns 7 and 8 suggest that education increased by 0.65 and 0.21 years for younger and older eligible cohorts in non-Gurkha dominated districts respectively, while it increased by 1.24 and 0.45 years respectively, for the two cohorts in Gurkha dominated districts. The magnitude of the effects is almost double among Gurkha men with easier access to recruitment camps. For the younger eligible cohort, the estimates from Gurkha and non-Gurkha dominated districts are statistically different at the 1% level.

3.5. *Brain Drain Versus Brain Gain*

The human capital stock of Gurkha men who remain behind in Nepal is determined by the size of the incentive effect and the recruitment rate of the British Gurkha Army. Following the change in the selection criteria, the fraction of young eligible Gurkha men with at least 10 years of education increased from 16.17% to 25.66%, while only 1.2% of them would go on to join the British Gurkha Army. If British Gurkha Army recruitment is the only skilled emigration opportunity available, the proportion of educated Gurkha men remaining in Nepal is predicted to be 25.43%, which is an increase of 9.26 percentage points over the proportion of educated Gurkha non-migrants before the change.[22] The net change in their domestic human capital stock is likely to be positive as long as the probability of joining the British Gurkha Army is less than 0.44.

I examine the actual net change in domestic human capital stock of eligible Gurkha men by estimating coefficient γ in (1) and restricting the sample to include only individuals who were living in Nepal in 2001. This includes men who never emigrated and emigrants who returned before 2001. The results in Table 7 suggest that education among younger and older eligible Gurkha men living in Nepal increased by 1.19 and 0.41 years respectively. Both estimates are statistically significant at the 1% level. The

Table 7

Impact on Education of Eligible Gurkha Men (Non-migrants

	Observations	(1)	(2)
Panel (a): young eligible cohort (males aged 6–12)			
Years of education completed	320,592	1.20***	1.19***
		(0.310)	(0.277)
Dummy indicating education ≥ 10	320,592	0.099***	0.098***
		(0.0289)	(0.0258)
Dummy indicating education ≥ high school	320,592	0.103**	0.102***
		(0.0375)	(0.0339)
Dummy indicating education ≥ college degree	320,592	0.070**	0.072**
		(0.0291)	(0.0285)
Panel (b): old eligible cohort (males aged 13–21)			
Years of education completed	293,946	0.43***	0.41***
		(0.102)	(0.105)
Dummy indicating education ≥ 8	293,946	0.030**	0.025*
		(0.0118)	(0.0121)
Control variables:			
Age dummies		Yes	Yes
Ethnicity dummies		Yes	Yes
Age dummies × ward dummies		Yes	Yes
Age dummies × rural birth dummy		Yes	Yes
Age dummies × access to school		No	Yes

Notes. This Table reports the estimates of γ in (1). The sample is restricted to individuals who are living in Nepal in 2001. The standard errors are reported in parentheses and are adjusted for within-ethnicity correlation. *10% Significance; **5% Significance; ***1% Significance.

[22] The proportion of educated Gurkha men remaining in Nepal $H = (1 - p)F/(1 - p \times F)$, where F = fraction of Gurkha men with at least 10 years of education (pre 1993 fraction + estimated incentive effect) and p = probability of joining the British Gurkha Army.

share of non-immigrants with at least eight years of education increased by 2.5 percentage points for the older eligible cohort. Among the younger eligible cohort of Gurkha men living in Nepal, the fraction with at least 10 years of education, with at least a high school degree, and with a college degree increased by 9.8 percentage points, 10.2 percentage points and 7.2 percentage points respectively, implying a net improvement in their domestic human capital stock even after allowing for emigration.

3.6. *Labour Market Outcomes*

Human capital literature suggests that eligible Gurkha men living in Nepal should benefit from their higher levels of education, even if they initially pursued further education for a foreign labour market. I examine whether an increase in schooling led to better labour outcomes for eligible Gurkha men by estimating (1) for the non-migrant sample and use their employment status as the dependent variable. The results from Table 8 suggest that the share of Gurkha men from the younger eligible cohort employed in the agricultural sector decreased by 3.1 percentage points and those with salaried jobs increased by 3.7 percentage points. The former estimate is statistically significant at the 10% level. On the other hand, Gurkha men from the older eligible cohort are 1.3 percentage points less likely to be employed in agriculture and 4.3 percentage points more likely to be employed in salaried work. The two estimates are statistically significant at the 10% level.

The estimates for younger eligible Gurkha men are likely to be biased downward because they were more likely to be enrolled in school and not to have entered the labour force at the time of the 2001 Census. In addition, other important labour market indicators such as earnings are not available in 2001 Nepal Census. Tables 9 and 10 estimate the impact on a richer set of labour market variables using a non-migrant sample from the 2008 NLFS.[23] The results suggest that the share of young

Table 8

Impact on Employment of Eligible Gurkha Men (Non-migrants)

	Observations	Employed (1)	Employed in agriculture (2)	Employed in salaried job (3)	Months employed (4)
Panel (a)					
Young eligible cohort (males aged 6–12)	320,592	0.064 (0.0441)	−0.031* (0.0174)	0.037 (0.0319)	0.71 (0.416)
Panel (b):					
Old eligible cohort (males aged 13–21)	293,946	0.042 (0.0283)	−0.013* (0.0061)	0.043* (0.0229)	0.47 (0.295)

Notes. This Table reports the estimates of γ in (1). The sample is restricted to individuals who are living in Nepal in 2001. The specification includes age dummies, ethnicity dummies, age dummies × ward dummies, and age dummies × rural birth dummy. The standard errors are reported in parentheses and are adjusted for within-ethnicity correlation. *10% Significance; **5% Significance; *** 1% Significance.

[23] In 2008, the youngest individual in the sample, who was 6 years old in 1993, would be 21 years old. Therefore, the 2008 data contains more reliable information about the labour market experience of all individuals in the sample.

Table 9

Impact on Employment of Eligible Gurkha Men (Non-migrants)

		Any employment		Non-agriculture employment		Wage employment	
	Observations	Hours > 0 (1)	Total hours (2)	Hours > 0 (3)	Total hours (4)	Hours > 0 (5)	Total hours (6)
Panel (a)							
Young eligible cohort (males aged 6–12)	6,559	−0.003 (0.0356)	0.66 (2.740)	0.092*** (0.0340)	4.42* (2.356)	0.107** (0.0423)	6.63** (2.780)
Panel (b):							
Old eligible cohort (males aged 13–21)	6,926	−0.008 (0.0311)	−1.06 (1.603)	0.030 (0.0328)	0.94 (1.527)	0.036 (0.0321)	2.30 (1.768)

Notes. This Table reports the estimates of γ in (1) using the 2008 NLFS. The sample is restricted to individuals who were living in Nepal in 2008. The specification includes age dummies, ethnicity dummies, age dummies × district dummies, and age dummies × rural birth dummy.The standard errors are reported in parentheses and are adjusted for within-ethnicity correlation. *10% Significance; **5% Significance; ***1% Significance.

Table 10

Impact on Employment of Eligible Gurkha Men (Non-migrants)

		Underemployment				
	Observations	Desired > actual (1)	Desired – actual hours (2)	Monthly earnings (3)	Government employee (4)	Permanent employee (5)
Panel (a):						
Young eligible cohort (males aged 6–12)	6,559	−0.022* (0.0117)	−0.77* (0.4084)	12.53** (4.989)	0.086*** (0.0198)	0.088*** (0.0295)
Panel (b):						
Old eligible cohort (males aged 13–21)	6,926	−0.005 (0.0120)	0.07 (0.3975)	5.43* (3.252)	0.052*** (0.0150)	0.063* (0.0354)

Notes. This Table reports the estimates of γ in (1) using the 2008 NLFS. The sample is restricted to individuals who were living in Nepal in 2008. The specification includes age dummies, ethnicity dummies, age dummies × district dummies, and age dummies × rural birth dummy. The standard errors are reported in parentheses and are adjusted for within-ethnicity correlation. *10% Significance; **5% Significance; ***1% Significance.

eligible Gurkha men employed in non-agricultural sectors increased by 9.2 percentage points, in wage jobs by 10.7 percentage points, in government jobs by 8.6 percentage points, and in permanent jobs by 8.8 percentage points. These estimates are statistically significant at the 1% and 5% levels. While I find no improvement in the employment status of younger eligible Gurkha men (Table 9, columns 1 and 2), the results from Table 10, column 1 suggest that they are 2.2 percentage points less likely to be underemployed.[24] The gap between their desired and actual hours of work in the

[24] Underemployment is defined as working fewer than 40 hours in the previous week.

previous week declined by 0.77 hours. Both estimated impacts on underemployment (Table 10, columns 1 and 2) are statistically significant at the 10% level and signify about 38% improvement over the average.

Table 10, column 3 shows that their monthly earnings increased by US$12.53, a 68% increase over average monthly earnings of US$18.30. Given that younger eligible Gurkha men who remain in Nepal raised their education by 1.19 years, this implies an increase in monthly earnings of about US$10.5 with each additional year of schooling. The result should be interpreted with caution, however, because the earnings data exclude income generated through households' own agricultural production.[25] It is likely to overestimate the impact on earnings because eligible Gurkha men are less likely to be involved in agricultural production following the change (see Tables 8 and 9). The impacts on the older eligible cohort are also positive but more muted. According to Table 10, panel (*b*), the share of older eligible Gurkha men employed in government and permanent jobs increased by 5.2 and 6.3 percentage points respectively, and their monthly earnings increased by US$5.43. The former estimate is statistically significant at the 1% level and the latter two estimates at the 10% level.

4. Conclusion

The global debate on the impacts of emigration on education in developing countries is fuelled by many conflicting claims. Empirical evidence is limited because emigration and education decisions are endogenously determined. This article addresses the endogeneity concern by focusing on a specific event that occurred in 1993 and led to a plausibly exogenous increase in relatively skilled emigration prospects for Nepali men of Gurkha origin. The introduction of education as a selection criterion for the British Gurkha Army induced Gurkha men to invest in more human capital and even led to a net increase in the education levels of those who remained in Nepal. The welfare benefits of emigration extend to those who were unsuccessful in emigrating by raising their demand for education while growing up, thereby improving their domestic labour outcomes in later life. These benefits are realised in the context in which Nepali men – both Gurkhas and non-Gurkhas – have alternative migration options.[26] Following the change to the British Grukha Army recruitment criteria, the average education of non-migrant Gurkha men increased by 1.19 years. This increase allowed them to move closer to the higher education level of non-Gurkha Nepali men, therefore narrowing the interethnic inequality in education.

From a policy perspective, an understanding of the drivers of individual-level heterogeneity is crucial for maximising welfare gains for source countries. Government policies can target factors that influence the ability of individuals to benefit from emigration such as education infrastructure and credit markets. The differential estimates reveal that the positive impact on human capital investments immediately

[25] The monetary value of labour in one's own agriculture production is difficult to estimate in developing countries because most agricultural households do not participate in commercial agriculture and consume all of their agricultural produce. According to the 2011 NLSS, more than 50% of agricultural households consume all their produce, and a median agricultural household sells 9% of their produce.

[26] According to National Planning Commission (2008), 12% of individuals of working age reside abroad.

following the introduction of the educational requirement was muted in regions with a limited supply of schools but no such response gap was found among younger cohorts. The number of schools and teachers increased nationally in the decade following the change, which may have been instrumental in inducing a positive educational response from individuals in regions that initially lacked adequate infrastructure to absorb the increased demand. The role of governments and private institutions in effectively allocating resources in response to added demand for education could be crucial in determining both the overall and distributional impacts of emigration.

Lastly, the benefits from more education for Gurkha men are not confined to their labour market performance. Greater human capital investment could lead to improvements in their own and their children's health and nutritional outcomes. It could change their preferences for marriage, fertility and gender equality, as well as improve their economic and social aspirations. In this way, emigration may affect views not just directly, through exposure and openness to other cultures, but also indirectly, by increasing education. Social inequalities based on gender and caste are rife in developing countries and cultural norms that are responsible for such hierarchies have been hard to change and are often cited as one of the main barriers to development (Hoff and Pandey, 2014). While it is beyond the scope of this article, the empirical strategy could be extended to examine some of the wider socio-economic and cultural changes that may have been induced in Gurkha communities as a result of the addition of an educational requirement for recruitment into the British Gurkha Army. This topic is left to future research.

Appendix A. Supplementary Tables

Table A1

Lifetime Earnings of a British Gurkha Soldier

Timeline	Income	Present value*
1. Recruitment into the British Gurkha at age 20†		
New entrant	$20,880.00	$20,880.00
Rifleman (Level 1–Level 5)	$155,267.00	$150,408.79
Lance corporal (Level 1–Level 5)	$209,777.00	$193,450.02
Corporal (Level 1–Level 7)	$331,694.00	$287,931.15
Sergeant (Level 1–Level 7)	$374,737.00	$303,276.62
Subtotal	$1,092,355.00	$955,946.58
2. Retirement from British Gurkha at age 45‡		
(Between age 45–65, the pension is calculated under early departure payments structure)		
(*i*) Between 45–55		
Highest pensionable salary × years of service × 1/70 × (50% + 8.3335%)		
= 56,512 × 25 × 1/70 × 58.3335% = $11,773.37 × 10 =	$117,733.67	$87,562.87
1st Lump Sum = 3 × Pension	$35,320.11	$27,472.74
Subtotal	$153,053.78	$115,035.61
(*ii*) Between 55–65		
Highest pensionable salary × years of service × 1/70 × (75%) =		
56,512 × 25 × 1/70 × 75% = $15,137.14 *x*10 =	$151,371.43	$101,815.75

Table A1
(*Continued*)

Timeline	Income	Present value*
Subtotal	\$151,371.43	\$101,815.75
(After age 65, the pension is calculated under AFPS 05)		
(*iii*) Between age 65– 75		
Highest pensionable salary × years of service ×1/70 = 56,512 × 25 × 1/70 = \$20,182.85 *x* 10 =	\$201,828.57	\$122,773.76
2nd Lump Sum = 3 × Pension	\$60,548.57	\$38,520.11
Subtotal	\$262,377.14	\$161,293.87
Total	\$1,659,157.35	\$1,334,091.81

Notes. *Present value of income is calculated using a discount factor of 0.99. †*Salary* for British Gurkha soldier is based on the pay rates reported by the UK Ministry of Defence as of April 2009. ‡Pension for retired British Gurkha soldier is based on 'Armed Forces Pension Scheme 05: Your Pension Scheme Explained' published by Service Personnel Policy (Pensions), The UK Ministry of Defence on January 2007.

Table A2
Ethnicity Weights in the Synthetic Gurkha

Ethnicity	Weight
Cheetry	0.063
Brahmin	0.034
Tharu	0.094
Newar	0.045
Kami	0.157
Yadav	0.074
Muslim	0.095
Damai	0.130
Sarki	0.233
Other	0.076

Notes. This Table reports the weights on each non-Gurkha ethnicities in the synthetic Gurkha ethnic group. The weights are calculated to minimise the mean squared difference between the education of Gurkha and synthetic Gurkha ethnic groups across ages 22 to 44. Based on the mathematical algorithm provided by Abadie and Gardeazabal (2003), I choose W to minimise $(\boldsymbol{X}_G - \boldsymbol{X}_N\boldsymbol{W})(\boldsymbol{X}_G - \boldsymbol{X}_N\boldsymbol{W})$, where $\boldsymbol{W} = \{(w_1, \ldots w_J)$ subject to $w_1 + \cdots + w_J = 1, w_J \geq 0\}$. $\boldsymbol{X}_G$ is a $(k \times 1)$ vector of average years of education at each age ineligible birth cohorts for the Gurkha ethnic group, where $21 \leq k \leq 44$. $\boldsymbol{X}_N$ is a $(k \times J)$ matrix with average years of education for k ineligible birth cohorts and J non-Gurkha ethnicities.

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Additional Supporting Information may be found in the online version of this article:

Data S1.

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