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ABSTRACT

Schooling Forsaken: Education and Migration*

We examine the phenomenon of forsaken schooling resulting from opportunities abroad. The brain-drain/gain literature takes as its starting point the migration of educated/professional labor from poor origin countries to richer host countries. While high-skilled migration is worrisome, many international migrants accept low-skilled positions in host countries. Their willingness to do so arises from very large host-home earnings differentials. At home this can lead to reduced educational investment as people forgo schooling because of opportunities to migrate to high paying low-skilled jobs. This suggests possible time-inconsistencies between short-run economic gains from migration and negative long-term effects from missing human-capital investment. We analyze data from Tajikistan, where approximately one-third of the labor force works outside of the country. We offer an explanation of our empirical results with a theoretical model, allowing us to establish the circumstances under which this type of forsaken schooling can occur and the trade-offs that policymakers' need consider.

JEL Classification: O15, P46, F22, I24

Keywords: migration, traps, poverty, inequality, education, skill

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1. Introduction

The persistence of large wage differentials among countries continues to have dramatic influences on people's lives. In examining international migration, the literature offers two opposing views of its effects on the sending economy: the brain-drain and the brain-gain.[1] The brain-drain highlights the negative direct impacts of skilled/educated emigration on those left behind; not necessarily the immediate family for whom there is an immediate and obvious trade-off, but the whole economy (Bhagwati and Hamada (1974); Grubel and Scott (1966)). The brain-gain emphasizes the second-round positive impacts on the source country of international emigration through remittances, enhanced returned migrants' skills (Co, Gang and Yun, 2000; Dai, Liu, and Xie, 2015) and skill acquisition by those intending to migrate (Beine, Docquier and Rapoport, 2008).

Remittances alleviate financial constraints faced by migrants' families in the home country and may be used to enhance educational attainment by migrants' children or others in the household. With increased income, migrant families can afford to pay school fees, transportation and school essentials. In addition, families can hire labor to work in households, family owned businesses and farms, thereby freeing children from doing such work and allowing them to spend more time on education (Dimova, Epstein and Gang, 2015). Duryea, Cox and Ureta (2003) find remittances have a significantly larger impact than other income on school retention. Their results are consistent with subsequent findings by others (Acosta, 2006; Calero, Bedi, & Sparrow, 2009). Amuedo-Dorantes and Pozo (2010) find a positive effect of remittances on children's education in the Dominican Republic. Yang (2005) finds that exogenous shocks to foreign exchange rates, increasing the value of remittances received by migrant families, had favorable effects on the educational attainment of children.

Another group of brain-gain studies argue that the growth of a migration "culture" might induce more human capital formation in migrants' home country (Mountford, 1997; Stark, Helmenstein, and Prskawetz, 1997, 1998; Stark and Wang, 2002; Edwards and Ureta, 2003; Piracha, Randazzo and Vadean, 2013). Beine, Docquier and Rapoport (2001, 2008) suggest that migration might lead to a "beneficial brain-drain" through a "demonstration effect" if the benefits of increased investments in education exceeds the costs of skilled labor emigration. On the flip side, as often migration results in immigrants working at lesser skilled jobs then

[1] See Dimova (2017) for an excellent perspective on this literature.

their home country training would suggest, there is also discussion of a brain-waste phenomenon among immigrants (Weiss, Sauer and Gotlibovski, 2003; Özden, 2006).

We argue that given existing international wage differentials and information on the earnings of low skilled labor in higher income host countries, individuals and families under reasonable conditions may forgo professional or continued education, opting to migrate abroad to high paying unskilled jobs, especially when those jobs are paying multiples of their home pay, even for skilled migrants taking unskilled host country jobs. Such an income gap might lead to the rejection of professional education and training by individuals in migrants' home countries in expectation of migrating. We know from observation as well as from the theoretical literature that such extreme pay gaps do exist and can be sustained over the long term as argued by Kravis and Lipsey (1983), Bhagwati (1984), Panagariya (1988), and Feldman and Gang (1990).

Where the existence of high paying low-skilled jobs abroad reduces educational investment at home, this can give rise to a *forsaken schooling trap*. Moreover, remaining migrant family members may choose to restructure their housework because of the migrant's absence. The increase of housework for children might result in their dropping out of school. Parental absence because of migration often means less parental control over children's education, with perhaps slower progress in school (Antman, 2012; Elsheniti, 2014). The remaining young adults might anticipate joining their migrant relatives in unskilled work abroad and choose not to attend school beyond mandatory levels.[2]

This is a demonstration effect as the brain-gain literature has argued; only here it works in the opposite direction – what Stark and Byra (2012) refer to as a back-door brain-drain. Here the demonstration effect results in a loss, leaving the country trapped. Since skills and education are major drivers of economic growth and development, as a result of foregone schooling the migrant sending country might not progress further towards having a knowledge-based, advanced economy. Stark and Byra (2012) argue that eventually migrant sending countries suffer from reduced aggregate skill formation, producing more unskilled and fewer skilled laborers. The country might be caught in a low level equilibrium from which it is difficult to escape – one which is stable at a lower education level then is good for generating growth. Indeed, it may be less costly for non-professionals to accept low-skilled jobs (Fields, 1974).

[2] In related work, Abdulloev (2013) demonstrates the existence of a discouraged worker effect among relatives of migrants.

The type of situation we describe is part of the conventional wisdom. With the aim of maximizing the standard of living at home, each individual (informed by family and other constraints) during her or his lifetime has to decide on her or his occupation. Consider a simple world with two basic job-types: professional (skilled, highly educated) or non-professional (unskilled or at least not-as-skilled). If the individual chooses a professional occupation, his expected income is higher than that of the lower occupation level, but most likely he has a low emigration probability since with a professional occupation he cannot work easily in a host country under the same conditions as local professionals. What we are saying is that since many host countries establish barriers to foreigners' employment (work visas, quotas, local licenses, etc.), it may be difficult for immigrants who are professionally educated to find high quality jobs that pay well in the host country. Professionals might end up in the same immigrant jobs as non-professionals. On the other hand, if an individual decides to forgo studying and take up unskilled employment, i.e. without acquiring professional education, he still has the opportunity to migrate and find a better paid (but still low skilled) job abroad. Of course, such decisions on acquiring professional education in the home country depend on a variety of factors – expected earnings in the host and home country, individual status, the probability of finding a job in the two countries, etc. Yet, the incentives for investing in higher level education may become quite low.

In the next section, we provide an empirical study based on the case of Tajikistan. We chose this former Soviet Republic because it has high general education completion rates (i.e. up to the stage of deciding on continuing to professional studies or entering the labor force) and significant external migration involving approximately one-third of its labor force.[3] The main destination of Tajikistan's migrants is Russia as a consequence of the jobs available and the existence of regional free labor movement agreements (Mughal, 2007).

There are large wage differentials between the countries: average monthly wages in Tajikistan were 8.5 times lower than in Russia (Statistical Committee of CIS, 2011). In section 3 we take up the question of statistical identification. Section 4 discusses several empirical robustness checks. In section 5, we present a possible explanation for our results using a theoretical model of the decision to acquire professional education at home and discuss conditions under which

[3] The phenomena we are highlighting are not restricted to Tajikistan. There is evidence in the literature of similar declines in educational attainment in Spain during the housing burst, in the choices made by Thai rural-to-urban migrants, among home country households of Albanian emigrants, Turkish migration to Germany, and so on.

the possibility of migrating may decrease the probability of individuals choosing such an education. Section 6 concludes.

2. Empirical study: Case of Tajikistan

Tajikistan remains the poorest among former Soviet countries with 31.3% of its population living below the poverty line in 2015 (World Bank, 2017) and significant external migration – approximately one-third of the labor force is working abroad. The main destination of Tajikistan's migrants is Russia (Abdulloev, Epstein & Gang, 2015). Remittances and migration are playing an important augmenting role in lives of Tajik families: migrants' households finance up to half of their consumption through remittances (World Bank, 2009). Tajikistan was the most externally dependent economy worldwide with remittances comprising 47% of its GDP in 2012.

At the same time literacy is high in Tajikistan. It inherited a Soviet system of education which requires all children at age 7 to attend elementary schools, and guarantees their free education, in general basic schools until the age of 16. With enforced free compulsory education, there is no significant effect of migration on children's education; for example, in households with a current migrant 8% of children ages 8 to 15 have not been in school in comparison to 6% of children in households without a migrant. After completing their general education at ages 16-17, a young adult can choose either to continue their schooling and acquire "professional education" or enter the labor force. The migration choice is attractive for graduates as wages in Russia are eight times higher than in those in Tajikistan (Statistical Committee of CIS, 2011; for evidence on the professional wage premium, see Strokova and Ajwad, 2017).

As a part of the response to the recognition of current migration trends and other related social issues in Tajikistan, data were collected in 2007 for the Tajikistan Living Standards Measurement Survey (TLSS, 2007) highlighting migrants and their families.[4] The survey asks questions on household and individual characteristics, including information on current and returned migrants.[5] Additional surveys asking questions overlapping with the 2007 survey and

[4] Earlier household level data collection efforts and what they tell us about migration, remittances and education are discussed in Mughal (2007).

[5] The survey was conducted in two parts: the first part was in September-October 2007, i.e. during the Ramadan month; the second part was conducted after Ramadan, in October-November 2007. However, some households were not visited during the second part: 54

sampling subsets of the 2007 households were conducted in 2009 and 2011.[6] We discuss the latter two waves later in this paper.

We excluded from the sample those respondents who were still in school as we want to distinguish between decisions on finishing schooling and migration.[7] Our sample includes individual respondents, working ages of 16-65.[8] The total sample size is 16,506 people, with 1,536 migrants (9.3%) and 14,970 non-migrants. Migration is almost strictly work related. Migrants are defined as those individuals who worked abroad and returned to their homes within last 12 months, as well as those who were working abroad at the time of the survey. Schooling is generally completed prior to migration. Out of 590 returned migrants only 18 (3%) were enrolled in the academic year of 2006/2007. Furthermore, we exclude those who were in school during the last academic year. This treatment of the sample will allow us to better to estimate the correlation between the schooling and probability of migration regardless of whether the migrant is current or a recent returnee. The survey was performed during autumn, which is the season when migrants generally return back to Tajikistan (due to cold weather conditions in the primary host, Russia).

The sample statistics with division into migrant and non-migrant subsamples are reported in the Table 1. Migration in Tajikistan is male dominated; about 93% of migrants are men. In the non-migrant sample 57% are women. Non-migrants have more children in their households and live in urban areas. They also have comparatively more access to agricultural land.

Overall, migrants have more years of education. Years of schooling were obtained by converting the school degree of respondents to the number of years which are normally required for such degrees. Levels of education are defined using dummy variables for individually

households due to adverse conditions and 100 households could not be found, and 216 households (in the Sughd province) were surveyed with the combined questionnaire for the two parts. Our sample excludes those respondents who appeared only during the second Round of the survey.

[6] The first two waves of the survey come from the TLSS administered by the World Bank and UNICEF. The third wave of the panel, the Tajikistan Household Panel Survey (THPS 2011) was designed and implemented by the Institute for the East and Southeast European Studies as a follow-up of the TLSS (Danzer, Dietz and Gatskova, 2013a).

[7] We do not create a "still in school" category as we study the relationship between completed education and the migration decision. Students who are still in school would be fully correlated with non-migration decision, resulting in multicollinearity.

[8] We also performed the analysis below restricting the sample to the 16-35 years old. The results are consistent.

completed degrees (see the Appendix for a more details on this assignment). The comparison of education levels shows that people with

Table 1. Sample Statistics, TLSS 2007

Variables	All		Migrant		Non-Migrant	
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
Migrant	0.0931	0.2905	1		0	
Male	0.4778	0.4995	0.9297	0.2558	0.4315	0.4953
Age	34.9214	12.7428	30.7728	9.4077	35.3470	12.9622
Age-squared	1381.8708	979.5539	1035.4108	656.1093	1417.4194	1000.1301
Years of schooling	10.9784	3.0235	11.1732	2.6630	10.9584	3.0574
Years of schooling-squared	129.6654	60.2588	131.9271	57.2467	129.4333	60.5564
Education levels:						
Primary (Grades 1-4)	0.0340	0.1812	0.0098	0.0984	0.0365	0.1875
Basic (Grades 1-8(9))	0.1708	0.3763	0.1035	0.3047	0.1777	0.3823
Secondary General (Grades 9-10(11))	0.5259	0.4993	0.6087	0.4882	0.5174	0.4997
Secondary Special	0.0793	0.2702	0.0905	0.2870	0.0782	0.2684
Secondary Technical	0.0525	0.2231	0.0703	0.2558	0.0507	0.2194
High	0.1135	0.3173	0.1126	0.3162	0.1136	0.3174
Completed formal professional education	0.2454	0.4303	0.2734	0.4459	0.2425	0.4286
Household's characteristics:						
No. of children (ages of <15)	2.3267	1.8203	2.1615	1.7779	2.3436	1.8238
Lives in the capital	0.1416	0.3487	0.1094	0.3122	0.1450	0.3521
Lives in other urban areas	0.1510	0.3580	0.1276	0.3338	0.1534	0.3604
Lives in rural areas	0.7074	0.4550	0.7630	0.4254	0.7017	0.4575
Own land area used for farming	17.0448	48.0369	16.3197	35.5852	17.1192	49.1367
Rented land area used for farming	6.7225	35.8796	4.0736	23.1437	6.9943	36.9286
Own land area rented out (sotka)	0.1061	3.7023	0.0495	0.6869	0.1120	3.8814
Monthly per capita consumption (in thousands somoni)	0.1643	0.1377	0.1720	0.1350	0.1635	0.1379
Observations	16,506		1,536		14,970	

primary and basic education mainly remain in Tajikistan. Comparatively more people with education from secondary or vocational (secondary special and technical) schools are migrants; this is because the non-migrant sample is dominated by women, who in Tajikistan at this time did not generally obtain a professional degree (Abdulloev, Gang and Yun, 2014). There is no difference in higher level education (degrees received from universities) between migrants and non-migrants in the sample.[9] The sample statistics suggest an inverted-U relationship between

[9] If our sample is divided into male migrant and male non-migrant subsamples, more people in male non-migrants have education from vocational and tertiary schools. Moreover, educational differences between migrants and non-migrants in Table 1 are not significant, as the sample is not restricted to male subsample. As the migration is male dominated, we control for gender in our regressions which show significant difference in decisions on migration and professional education. (For sample statistics restricted to the male subsample, please see the Appendix).

the education and migration. People at the lower and higher education levels migrate less than those at middle levels (secondary).[10]

We now turn to a more detailed analysis of our sample in order to further study the education-migration relationship. We estimate a probit model on the individual decision to migrate as an index function of schooling, individual and household characteristics. Other individual characteristics include variables on individual age, age-squared, and gender. Household (not family) characteristics include variables on the number of children in the household with ages less than 15, whether the household lives in the rural areas (the reference group is living in urban areas), monthly consumption deflated due to regional price differences, as well as the household's access to and usage of the agricultural land. The dependent variable is whether an individual is a migrant. We estimate two models: one including years of schooling and its square; a second with categorical educational levels. The coefficient estimates and their marginal effects for both models are reported in Table 2.

Here too we find an inverted-U relationship between the decision to migrate and education. The schooling variables in the Model 1 show such a relationship. The decision to migrate is increasing in schooling – the coefficient on years of schooling is positive and statistically significant the coefficient on years of schooling squared is negative and statistically significant. The marginal effect of schooling has a negative impact on the probability of migration.

In the second model, instead of variables on years of schooling and its square, we relax the quadratic form and instead include dummy variables on the obtained levels of education. The reference group in this model is individuals who have completed the minimal education level (390 respondents). The coefficients of the dummy variables on education levels are increasing up to the secondary general and secondary special education, falling afterwards. All education level variable coefficients, except that on primary education, are positive and statistically significant at the 1% level. The estimate on the variable primary education is also positive but statistically significant at a lower significance level, 10%. The marginal effects of these variables on the probability of migration also reflect the same inverted-U relationship between

[10] We do not include indicator variables for oblast (region). It is common to distinguish the Pamiris, who have different language; however, the same is true of the Uzbeks, Russians and Kyrgyz's. Using a dummy variable for oblast would not work as the Badakhshan is not fully inhabited by one language group, there also different subethnic groups of Pamiris, and the Mugrhab district in Badakhshan is inhabited predominantly by Kyrgyz.

the migration decision and education. People choose to migrate at middle level education, but are less likely to have migrated with lower or higher levels of education.

Table 2: Probit Regression on Migration Decision, TLSS 2007
(Dependent Variable: Migrant=1/0)

Variables	Estimates		Marginal Effects	
	Model 1	Model 2	Model 1	Model 2
Years of schooling	0.0438 **		-0.0046 ***	
	(0.0185)		(0.0009)	
Years of schooling-squared	-0.0034 ***			
	(0.0009)			
Primary (Grades 1-4)		0.4211 *		0.0568 *
		(0.2250)		(0.0303)
Basic (Grades 1-8(9))		0.5920 ***		0.0798 ***
		(0.1859)		(0.0251)
Secondary General (Grades 9-10(11))		0.7720 ***		0.1041 ***
		(0.1818)		(0.0245)
Secondary Special		0.8063 ***		0.1087 ***
		(0.1893)		(0.0256)
Secondary Technical		0.7205 ***		0.0971 ***
		(0.1912)		(0.0258)
High		0.5749 ***		0.0775 ***
		(0.1874)		(0.0253)
Other control variables:				
Age	0.1049 ***	0.0904 ***	-0.0005 **	-0.0010 ***
	(0.0109)	(0.0109)	(0.0002)	(0.0002)
Age-squared	-0.0017 ***	-0.0016 ***		
	(0.0002)	(0.0002)		
Male	1.4081 ***	1.3741 ***	0.1903 ***	0.1853 ***
	(0.0429)	(0.0429)	(0.0058)	(0.0058)
No. of children (age of <15)	-0.0601 ***	-0.0580 ***	-0.0081 ***	-0.0078 ***
	(0.0094)	(0.0094)	(0.0013)	(0.0013)
Lives in rural area	0.1692 ***	0.1853 ***	0.0229 ***	0.0250 ***
	(0.0372)	(0.0372)	(0.0050)	(0.0050)
Own land used for farming	-0.0005	-0.0005	-0.0001	-0.0001
	(0.0003)	(0.0003)	(0.0000)	(0.0000)
Rented land used for farming	-0.0017 **	-0.0017 **	-0.0002 **	-0.0002 **
	(0.0007)	(0.0007)	(0.0001)	(0.0001)
Own land rented out	-0.0035	-0.0036	-0.0005	-0.0005
	(0.0029)	(0.0029)	(0.0004)	(0.0004)
Monthly per capita consumption (in thousands somoni)	0.3448 ***	0.2983 ***	0.0466 ***	0.0402 ***
	(0.0868)	(0.0883)	(0.0118)	(0.0119)
Constant	-3.7252 ***	-4.1188 ***		
	(0.1935)	(0.2495)		
Observations	16,506	16,506	16,506	16,506
Pseudo R^2	0.204	0.206		

Standard errors in parentheses: * p<.10, ** p<.05, *** p<.01

The probability of migrating is also increasing with individual's age but at a slower pace indicating a similar relationship as we find for education. People are likely to migrate in their middle ages, when they are the most economically active.[11]

[11] See the Appendix for a chart relating age to the probability of migrating.

Coefficients on age and age-squared are positive and negative respectively, and they are statistically significant. Migration in Tajikistan is male-dominated and the majority of migrants are from the rural areas; the coefficients and marginal effects of being a male or living in rural areas is positive and statistically different from zero. Having more children decreases the probability of migration; the effect of this variable is negative and also statistically significant. While the effects of own land used for farming or rented out does not have a statistically significant impact on the migration decision, renting land for farming decreases this probability.[12] Household consumption is positively related to migration, reflecting the impact of remittances on the migrant's home-households' consumption.

We also estimate both models for the subsample of men; as international migration from Tajikistan is male dominated. The estimates and marginal effects of variables for both models are reported in Table 3. Not surprisingly, the estimated Model 1 with continuous variables on years of schooling and years of schooling squared have the same signs and significance level as in our previous full sample regression. This implies the strong inverted-U relationship between education and the decision to migrate. The overall marginal effect of years of schooling on the probability of migration is still statistically different from zero. Also, we see that the education levels support the inverted-U relationship between education and migration. The marginal effect of education on the probability of migration increases with education level, reaching the highest impact at the secondary general education level and then decreases. Having only primary education does not have any statistically significant effect on the probability of migrating as compared to having no education. Other individual and household characteristics variables are similar but the marginal effects are twice as large in absolute size on the probability of migrating.

[12] Land ownership is not endogenous with migration as the land is state property and families are given it for certain period of time. Own land plots are either smaller in size or non-arable. They are mostly received through presidential distribution to rural families. Good arable land is rented.

Table 3: Probit Regression on Migration Decision: Male Subsample, TLSS 2007 (Dependent Variable: Migrant=1/0)

Variables	Estimates		Marginal Effects	
	Model 1	Model 2	Model 1	Model 2
Years of schooling	0.0484 **		-0.0104 ***	
	(0.0207)		(0.0017)	
Years of schooling-squared	-0.0040 ***			
	(0.0010)			
Education levels:				
Primary (Grades 1-4)		0.3779		0.0936
		(0.2486)		(0.0615)
Basic (Grades 1-8(9))		0.5691 ***		0.1409 ***
		(0.1986)		(0.0491)
Secondary General (Grades 9-10(11))		0.7505 ***		0.1859 ***
		(0.1934)		(0.0478)
Secondary Special		0.6990 ***		0.1731 ***
		(0.2016)		(0.0499)
Secondary Technical		0.6845 ***		0.1695 ***
		(0.2026)		(0.0501)
High (Tertiary)		0.4887 **		0.1210 **
		(0.1988)		(0.0492)
Other control variables:				
Age	0.1017 ***	0.0881 ***	-0.0012 ***	-0.0020 ***
	(0.0113)	(0.0113)	(0.0004)	(0.0004)
Age-squared	-0.0017 ***	-0.0015 ***		
	(0.0002)	(0.0002)		
No. of children (age of <15)	-0.0493 ***	-0.0477 ***	-0.0122 ***	-0.0118 ***
	(0.0102)	(0.0102)	(0.0025)	(0.0025)
Lives in the rural area	0.2015 ***	0.2159 ***	0.0500 ***	0.0535 ***
	(0.0408)	(0.0407)	(0.0101)	(0.0101)
Own land used for farming	-0.0005	-0.0006	-0.0001	-0.0001
	(0.0004)	(0.0004)	(0.0001)	(0.0001)
Rented land used for farming	-0.0016 **	-0.0016 **	-0.0004 **	-0.0004 **
	(0.0007)	(0.0007)	(0.0002)	(0.0002)
Own land rented out	-0.0035	-0.0037	-0.0009	-0.0009
	(0.0033)	(0.0032)	(0.0008)	(0.0008)
Monthly per capita consumption (in thousands Somoni)	0.3816 ***	0.3219 ***	0.0946 ***	0.0797 ***
	(0.1186)	(0.1177)	(0.0294)	(0.0291)
Constant	-2.2943 ***	-2.7163 ***		
	(0.2078)	(0.2605)		
Observations	7,887	7,887	7,887	7,887
Pseudo R^2	0.061	0.062		

Standard errors in parentheses: * p<.10, ** p<.05, *** p<.01

3. Potential endogeneity and identification

An issue with our regression analysis is the potential endogeneity of the schooling variables: perhaps decisions on schooling are taken simultaneously with the migration decision. In this case, the estimated effect of schooling might be biased. In order to account for the endogeneity issue of the continuous schooling variables, years of schooling and years of schooling squared, we use the instrumental variable probit model, where the structural equation is on the decision to migrate and the reduced form equation is the decision on years of schooling.

The excluded explanatory variable in the structural equation is the schooling of household heads – both years of schooling and years of schooling squared. We proceeded by excluding household heads from our sample, using their schooling as an instrument for the education decisions of remaining members.[13] The summary statistics of the new subsample without household heads are reported in the Table 4. This table shows that the years of schooling and years of schooling squared of household heads do not significantly differ between migrant and non-migrant subsamples, i.e. they do not have any predictive power on the decision to migrate. Such non-variation of these variables makes them relevant instruments in our analysis.[14]

Table 4. Summary Statistics: Sample with Excluded Heads of Households, TLSS 2007

Variables	All		Migrant		Non-Migrant	
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
Migrant	0.0996	0.2994				
Age	31.2949	11.4068	28.0777	7.6451	31.6507	11.6951
Age-squared	1109.4752	839.0462	846.7566	502.4166	1138.5292	863.4160
Male	0.3666	0.4819	0.9167	0.2764	0.3057	0.4607
Years of schooling	10.6061	2.9001	10.9720	2.6370	10.5656	2.9250
Years of schooling-squared	120.8987	54.5779	127.3323	55.8671	120.1872	54.3893
Household's characteristics:						
Years of schooling of Household's Head	11.1366	3.9374	11.1161	3.6738	11.1389	3.9656
Squared Years of schooling of Household's Head	139.5270	75.3200	137.0536	71.7306	139.8005	75.7046
No. of children (ages of <15)	2.3906	1.8717	2.1073	1.8252	2.4219	1.8743
Lives in the rural area	0.7308	0.4436	0.7678	0.4224	0.7267	0.4457
Own land used for farming	18.1235	49.5546	17.0144	37.5171	18.2461	50.7105
Rented land used for farming	7.2327	37.2336	3.6269	18.2497	7.6315	38.7462
Own land rented out	0.0982	3.5389	0.0504	0.6816	0.1035	3.7225
Monthly per capita consumption (in thousands Somoni)	0.1587	0.1273	0.1725	0.1410	0.1572	0.1256
Observations	12,543		1,249		11,294	

The estimates of the decision to migrate structural equation and the decision about schooling reduced form equation are from an instrumental variable Probit based on Maximum Likelihood Estimation and are reported in Table 5.[15] The coefficients on years of schooling and years of

[13] We use the IV model to control the decision on the professional education of migrants by parental education. The children's choice of level of education is strongly correlated with parental education, which was received at during the Soviet system.

[14] There should not be mean differences between decisions on migration and non-migration; parental education should explain only the decision on education, but not the migration decision.

[15] The parameters are estimated using Maximum Likelihood Estimation (IV Probit). A nice feature of this method is that it allows controlling the endogeneity of individual's years of schooling and years of schooling-squared (by adding the residuals to break the correlation between the endogenous explanatory variable and unobservables) in the likelihood function by

schooling squared of the household heads both strongly predict schooling decisions by other household members. The coefficient on the variable years of schooling of the household head is positive and statistically significant. The coefficient on the variable years of schooling squared of the household head is negative and statistically different from zero. These results from the reduced form equation estimation indicate that individual schooling has a strong correlation with the education of the household head.

Table 5. IV Probit Regression for Simultaneous Migration and Schooling Decisions, TLSS 2007

Variables	Structural Eq: Migration=1/0		Reduced Form Eq: Years of Schooling		Marginal Effects of Structural Eq.	
Years of schooling	0 .5867	***			-0.0125	***
	(0.1315)				(0.0028)	
Years of schooling-squared	-0.0303	***	0.0502	***		
	(0.0065)		(0.0003)			
Age	0 .0786	***	0.0406		0.0023	***
	(0.0195)		(0.0056)	***	(0.0004)	
Age-squared	-0.0011	***	-0.0006	***		
	(0.0003)		(0.00008)			
Male	1.3610	***	-0.0813	***	0.2308	***
	(0.1176)		(0.0181)		(0.0115)	
No. of children (age of <15)	-0.0595	***	0.0003		-0.0101	***
	(0.0111)		(0.0051)		(0.0016)	
Lives in the rural area	-0.0193		0.2106	***	-0.0033	
	(0.0548)		(0.0212)		(0.0096)	
Own land used for farming	-0.0007	*	0.00007		-0.0001	*
	(0.0003)		(0.0002)		(0.00006)	
Rented land used for farming	-0.0024	***	0.00007		-0.0004	***
	0.0006		(0.0002)		(0.0001)	
Own land rented out	-.00023		-0.0001		-0.0003	
	(0.0022)		(0.0020)		(0.0004)	
Monthly per capita consumption (in	0.4927	***	-0.0634		0.0835	***
thousands Somoni)	(0.1150)		(0.0580)		(0..0196)	
Years of schooling of Household's Head			0 .0836	***		
			(0.00997)			
Squared years of schooling of			-0.0040	***		
Household's Head			(0.0004)			
Constant	-5.6181	***	3.4855	***		
	(0.2870)		(0.1095)			
Observations	12,543		12,543		12,543	
/athrho			-0.5995	***		
			(0.1800)			
/lnsigma			-0.0468	***		
			(0.0160)			

Wald test of exogeneity (/athrho = 0): chi2(1) = 11.09, Prob > chi2 = 0.0009
Standard errors in parentheses: * p<.10, ** p<.05, *** p<.01

After controlling for the endogeneity of the decisions about years of schooling, the estimates on individual years of schooling and years of schooling squared in the structural equation on the migration decision still show the inverted-U relationship. The coefficient on years of

specifying only the "reduced form" equation for the years of schooling equation (See Wooldridge, J. M. (2010), p.592-593).

schooling is positive and statistically significant, while the coefficient on years of schooling squared is negative and also statistically different from zero. The marginal effect of years of schooling is negative and statistically different from zero.

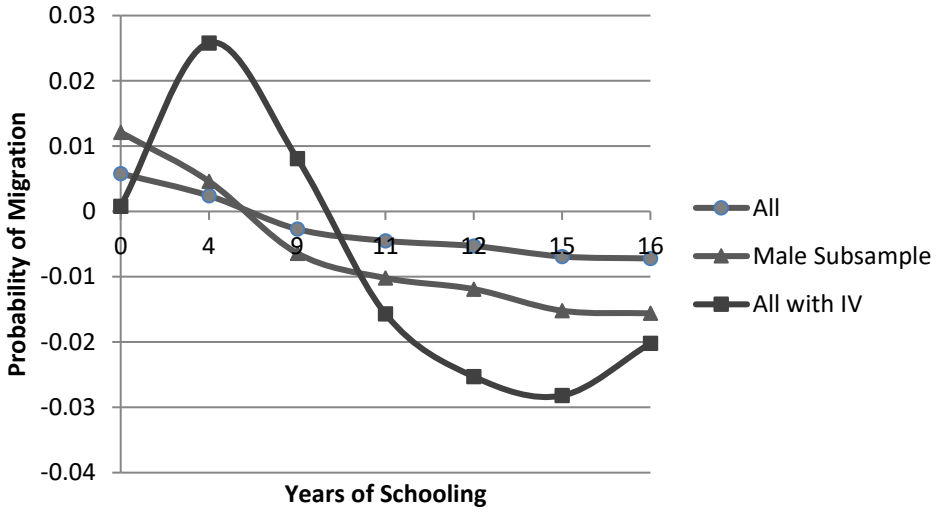
We calculate the marginal effects of the years of schooling on the probability of migrating for Model 1, using the whole sample and male subsample, at seven points of completed years of education – at each level of education (no education, primary, basic, secondary general, secondary technical, secondary special, and tertiary). As the graduate level is the highest level of education and no other level of formal education exists after it, we do not present the marginal effect for this level. The same exercise is repeated for the IV Probit Regression of the whole sample. The calculations are reported in Table 6. When we connect the marginal effects at each level of education with a line as in Graph 1, it shows a clear concave relationship between the education and migration decisions. Both Graph 1 and Table 6 show that after receiving the secondary education (at 9-11 years of schooling) the small increase in years of schooling – moving towards receiving professional education – reduces the probability of migration.

Table 6. Marginal Effects of Years of Schooling on Probability of Migration for Model 1 Probit and IV Probit Regressions, TLSS 2007

Level of Completed Education	Years of Schooling	Marginal Effects		
		All	Male Subsample	All with IV
No Education	0	0.0058 ***	0.0121 ***	0.0008
		(0.0019)	(0.0041)	(0.0011)
Primary	4	0.0024	0.0046	0.0258 ***
		(0.0017)	(0.0035)	(0.0026)
Basic	9	-0.0027 ***	-0.0064 ***	0.0081 *
		(0.0009)	(0.0019)	(0.0042)
Secondary General	11	-0.0045 ***	-0.0102 ***	-0.0157 ***
		(0.0010)	(0.0019)	(0.0047)
Secondary Special	12	-0.0053 ***	-0.0119 ***	-0.0253 ***
		(0.0010)	(0.0020)	(0.0078)
Secondary Technical	15	-0.0069 ***	-0.0152 ***	-0.0282 ***
		(0.0012)	(0.0023)	(0.0050)
High (Tertiary)	16	-0.0072 ***	-0.0156 ***	-0.0202 ***
		(0.0011)	(0.0022)	(0.0014)
Observations		16,506	7,887	12,543

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Graph 1. Representation of Marginal Effects of Years of Schooling on Probability of Migration for Model 1 Probit and IV Probit Regressions, TLSS 2007



4. Empirical Robustness

In this section we highlight the most important of the many robustness checks we performed. These are summarized in Tables 7, 8, 9 and 10 and Graph 2.

We replicated the same Models 1 and 2 probit regressions using more recent data for Tajikistan: the 2009 Tajikistan Living Standards Measurement Survey (TLSS, 2009) and the 2011 Tajikistan Household Panel Survey (THPS, 2011) as referenced in the introduction. These additional surveys ask questions overlapping with the 2007 TLSS survey, sampling a subset of the same households (Danzer, Dietz and Gatskova, 2013b). We also estimated the probit regressions for the pooled (panel) sample of the three surveys.[16]

The additional model 1 estimates of years of schooling and years of schooling-squared show the strong inverted-U relationship between education and migration decision. In Model 2, where we estimate the impact of each level of education on the probability of migration, the estimation results indicate that compared to people without education, people with lower professional (vocational) education tend to migrate more than those who have high (tertiary) education.

Since Model 2 results indicate the impact of each educational level in comparison to the reference group of people without education, this picture does not reflect how the increase in schooling has an effect on the probability of migration. In order to estimate the correlation of the small change in schooling on the probability of migration, we estimate the marginal effects of years of schooling using Model 1 at each level of education. By connecting each point of the estimates, we are able to define how the correlation of years of schooling diminishes with the probability of migration. This relationship is shown in Graph 2.

Looking at Graph 2 and bringing forward the probit generated 2007 curve from Graph 1, we see the same basic shape in the relationship between years of schooling and the probability of migration for 2007, 2009 and 2011 – something of the inverted-U, with the probability of migration increasing as schooling increases, peaking and then declining with still more schooling. Moreover, with each later year we see that the probability of migration is higher for

[16] To check on the sensitivity of our results to the age span of the sample, we also performed the analysis restricting the sample to the 16-35 years old (not reported). The results are consistent.

those less schooled and lower for those staying in school; more people lacking professional education tend to migrate from Tajikistan than people with professional education. The education-migration relationship becomes clearer with each subsequent survey: more people lacking professional education choose to migrate, while people with professional education remain at home. Even though the country has good overall school enrollment rates, there is high youth discouragement in finding jobs after school completion. More and more choose to not go for higher studies, instead migrating abroad. Ajwad and others (2014) report that the quality of education in Tajikistan is becoming an issue, inducing many to forego "costly" low-quality professional education.

We also estimate linear probability models using two stage least squares and three-stage estimation for systems of simultaneous equations with head of household's schooling and its square as the exclusion restrictions for the regressions. Results are presented in Table 10, which also shows the inverted-U relationship between education and migration decisions.

Comparing coefficient estimates across the biennial samples, we observe large increases in the probit coefficients on education increase by very large magnitudes – from .3779 in 2007 and .1495 in 2009 to 3.5622 in 2011 for primary education, for example. The marginal effects are also different by large magnitudes. These results are repeated in the other specifications. These results suggest that education variables become stronger predictors of the migration decision after the 2008 world financial crisis, reflecting structural changes in the migration process in Tajikistan (Danzer & Ivaschenko, 2010).

Table 7: Probit Regression on Migration Decision (Dependent variable: Migrant==1/0), TLSS 2009 and THPS 2011

Variables	TLSS 2009				THPS 2011			
	Estimates		Marginal Effects		Estimates		Marginal Effects	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Years of Schooling	0.1231 ***		-0.0021		0.2109 ***		-0.0069 ***	
	(0.0389)		(0.0016)		(0.0376)		(0.0018)	
Years of Schooling-Squared	-0.006 ***				-0.0108 ***			
	(0.0018)				(0.0017)			
Primary (Grades 1-4)		0.1495		0.0232		3.5622 ***		0.6471 ***
		(0.3002)		(0.0467)		(0.4551)		(0.0841)
Basic (Grades 1-8(9))		0.2923		0.0454		4.5661 ***		0.8294 ***
		(0.2544)		(0.0395)		(0.0992)		(0.0260)
Secondary General (Grades 9-10(11))		0.4692 *		0.0729 *		4.6509 ***		0.8448 ***
		(0.2465)		(0.0383)		(0.0727)		(0.0227)
Secondary Special		0.5211 **		0.081 **		4.6776 ***		0.8497 ***
		(0.2641)		(0.041)		(0.1058)		(0.0267)
Secondary Technical		0.5626 **		0.0874 **		4.6936 ***		0.8526 ***
		(0.2637)		(0.0409)		(0.1147)		(0.0275)
High (Tertiary)		0.2834		0.0441		4.3590 ***		0.7918 ***
		(0.2593)		(0.0403)		(0.0954)		(0.0257)
Other control variables:								
Age	0.1179 ***	0.1116 ***	-0.0006	-0.0009 **	0.1035 ***	0.0967 ***	-0.0013 ***	-0.0018 ***
	(0.0173)	(0.0175)	(0.0004)	(0.0004)	(0.0161)	(0.0160)	(0.0004)	(0.0004)
Age-squared	-0.0019 ***	-0.0019 ***			-0.0018 ***	-0.0017 ***		
	(0.0002)	(0.0002)			(0.0002)	(0.0002)		
Male	1.4434 ***	1.4207 ***	0.2246 ***	0.2208 ***	1.4375 ***	1.4039 ***	0.2609 ***	0.2550 ***
	(0.0661)	(0.0662)	(0.0098)	(0.0099)	(0.0576)	(0.0579)	(0.0090)	(0.0092)
No. of children (age of <15)	-0.0651 ***	-0.0629 ***	-0.0101 ***	-0.0098 ***	-0.0506 ***	-0.0483 ***	-0.0092 ***	-0.0088 ***
	(0.0149)	(0.0149)	(0.0023)	(0.0023)	(0.0119)	(0.0120)	(0.0021)	(0.0022)
Lives in the rural area	0.1681 ***	0.179 ***	0.0262 ***	0.0278 ***	0.1496 ***	0.1636 ***	0.0271 ***	0.0297 ***
	(0.0606)	(0.0607)	(0.0094)	(0.0094)	(0.0550)	(0.0557)	(0.0099)	(0.0100)
Monthly per capita consumption (in thousands of Somoni)	0.363 **	0.3782 **	0.0565 **	0.0588 **	0.0182	0.0167	0.0033	0.0030
	(0.1602)	(0.163)	(0.0248)	(0.0252)	(0.0219)	(0.0212)	(0.0040)	(0.0038)
Constant	-4.3295 ***	-4.0351 ***			-4.1890 ***	-7.6984 ***		
	(0.3525)	(0.3766)			(0.3515)	(0.2878)		
Observations	5,647	5,647	5,647	5,647	5,804	5,804	5,804	5,804
Pseudo R^2	0.226	0.227			0.235	0.235		

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table 8: Pooled Probit Regression on Migration Decision (Dependent variable: Migrant==1/0), TLSS 2007, TLSS 2009 and THPS 22011

	All sample: Estimates		Male Sample: Estimates	
	Model 1	**Model 2**	**Model 1**	**Model 2**
Years of Schooling		0.0830 ***		0.0849 ***
		(0.0155)		(0.0174)
Years of Schooling-Squared		-0.0050 ***		-0.0054 ***
		(0.0007)		(0.0008)
Education levels:				
Primary (Grades 1-4)	0.3914 **		0.3560 *	
	(0.1774)		(0.1979)	
Basic (Grades 1-8(9))	0.6281 ***		0.5996 ***	
	(0.1475)		(0.1594)	
Secondary General (Grades 9-10(11))	0.7873 ***		0.7504 ***	
	(0.1446)		(0.1556)	
Secondary Special	0.8287 ***		0.7336 ***	
	(0.1502)		(0.1617)	
Secondary Technical	0.7931 ***		0.7512 ***	
	(0.1512)		(0.1621)	
High (Tertiary)	0.5777 ***		0.4862 ***	
	(0.1486)		(0.1595)	
Other control variables:				
Age	0.0970 ***	0.1077 ***	0.0888 ***	0.0988 ***
	(0.0080)	(0.0080)	(0.0083)	(0.0083)
Age-squared	-0.0017 ***	-0.0018 ***	-0.0016 ***	-0.0017 ***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Male	1.3875 ***	1.4197 ***		
	(0.0306)	(0.0305)		
No. of children (age of <15)	-0.0611 ***	-0.0635 ***	-0.0460 ***	-0.0479 ***
	(0.0066)	(0.0065)	(0.0072)	(0.0071)
Lives in the rural area	0.1651 ***	0.1533 ***	0.2139 ***	0.2029 ***
	(0.0274)	(0.0273)	(0.0300)	(0.0299)
Monthly per capita consumption (in thousands Somoni)	0.0279	0.0296	0.0224	0.0238
	(0.0203)	(0.0212)	(0.0210)	(0.0222)
Year of 2009	0.1765 ***	0.1719 ***	0.1829 ***	0.1794 ***
	(0.0294)	(0.0294)	(0.0326)	(0.0326)
Year of 2011	0.3386 ***	0.3450 ***	0.3445 ***	0.3514 ***
Constant	-4.1887 ***	-3.9356 ***	-2.6797 ***	-2.4055 ***
	(0.1946)	(0.1533)	(0.2046)	(0.1634)
Observations	27,957	27,957	13,426	13,426
Pseudo R^2	0.222	0.220	0.078	0.077

Standard errors in parentheses: * p<.10, ** p<.05, *** p<.01

Table 9. Marginal Effects of Years of Schooling on Probability of Migration for Model 1 Probit Regression, TLSS 2009 and THPS 2011

Level of Completed Education	Years of Schooling	TLSS 2009		THPS 2011		Pooled Sample	
No Education	0	0.0104	***	0.0144	***	0.0096	***
		(0.0010)		(0.0022)		(0.0010)	
Primary	4	0.0099	***	0.0184	***	0.0064	***
		(0.0025)		(0.0023)		(0.0013)	
Basic	9	0.0025		0.0032		-0.0011	
		(0.0019)		(0.0023)		(0.0008)	
Secondary General	11	-0.0014		-0.0052	**	-0.0042	***
		(0.0018)		(0.0021)		(0.0008)	
Secondary Special	12	-0.0033	*	-0.0091	***	-0.0056	***
		(0.0019)		(0.0022)		(0.0008)	
Secondary Technical	15	-0.0082	***	-0.0176	***	-0.0088	***
		(0.0024)		(0.0023)		(0.0010)	
High (Tertiary)	16	-0.0094	***	-0.0188	***	-0.0094	***
		(0.0025)		(0.0020)		(0.0009)	
Observations		5,647		5,804		27,957	

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Graph 2. Representation of Marginal Effects of Years of Schooling on Probability of Migration for Model 1 Probit Regressions, TLSS 2009, THPS 2011 and Pooled Sample

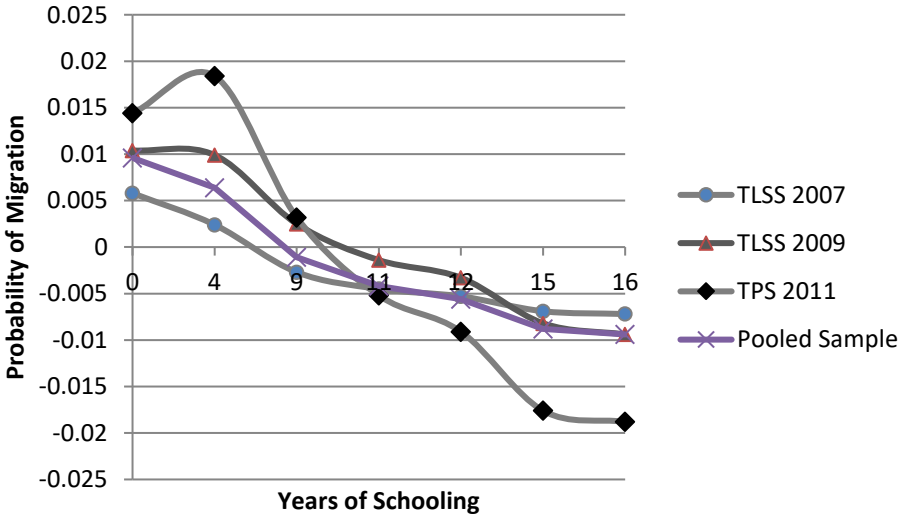


Table 10. Linear Probability Regressions for Simultaneous Migration and Schooling Decisions, TLSS 2007

	Linear probability regression: 2SLS			3SLS	
Variables	**First stage: Years Of schooling**	**First stage: Years of schooling-squared**	**Second stage: Migrant**	**(1) Migrant**	**(2) Years of schooling**
Years of schooling			0.107***	0.0990***	
			(0.0273)	(0.0268)	
Years of schooling-squared			-0.00505***	-0.00518***	
			(0.00136)	(0.00135)	
Migrant					-233.0***
					(42.14)
Other control variables:					
Age	0.413***	7.423***	0.00147	0.00587***	2.352***
	(0.0127)	(0.235)	(0.00248)	(0.00175)	(0.447)
Age-squared	-0.00541***	-0.0950***	-0.000014	-0.00007***	-0.0320***
	(0.000172)	(0.00320)	-0.000034	(-0.000025)	(0.00612)
Male	0.971***	20.97***	0.236***	0.246***	55.35***
	(0.0513)	(0.953)	(0.00732)	(0.00611)	(9.946)
No. of children (age of <15)	-0.0717***	-1.429***	-0.00717***	-0.00824***	-1.906***
	(0.0134)	(0.248)	(0.00153)	(0.00145)	(0.429)
Own land used for farming	0.000177	0.00210	-8.02e-05	-0.00008	-0.0161
	(0.000490)	(0.00910)	(5.40e-05)	-0.000053	(0.0110)
Rented land used for farming	0.00008	0.000301	-0.000224***	-0.000223***	-0.0505***
	(0.000642)	(0.0119)	-0.000071	-0.000070	(0.0166)
Own land rented out	-0.00444	-0.0869	-0.000205	-0.000222	-0.0550
	(0.00676)	(0.126)	(0.000745)	(0.000735)	(0.146)
Monthly per capita consumption (in thousands Somoni)	1.414***	29.31***	0.0751***	0.0962***	20.78***
	(0.192)	(3.575)	(0.0229)	(0.0210)	(5.252)
Lives in the rural area	-0.478***	-13.67***	0.00150	-0.00608	3.682**
	(0.0554)	(1.029)	(0.00905)	(0.00843)	(1.455)
	-0.00233	-1.723***			2.014***
Years of schooling of Household's Head	(0.0208)	(0.386)			(0.570)
Squared years of schooling of Household's Head	0.00810***	0.244***			-0.0950***
	(0.00109)	(0.0202)			(0.0261)
Constant	2.503***	-19.77***	-0.539***	-0.506***	-34.49***
	(0.245)	(4.549)	(0.109)	(0.107)	(9.014)
Observations	12,543	12,543	12,543	12,543	12,543
R-squared	0.156	0.177	0.037	0.063	-488.893
IV F-stat			63.16		
Durbin pval			0.000025		

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

5. A Possible explanation - A Story from a Theoretical Model

Our empirical work above shows the form of the link between education and migration for a high emigration country. Here we supply a background story, in the form of economic theory and educational choices, to demonstrate our thinking that the ability to migrate and obtain high wages would/may decrease the desirability of higher schooling. This then, as almost all of the literature tells us, is detrimental to economic growth and welfare.

We consider a population of workers whose utility is separable and linear in private consumption that is provided by expenditure of a wage, w, and in occupational status, s,

$$W(w, s) = w + s \,. \qquad (1)$$

The worker's occupation determines status. To simplify we assume workers are either employed in a professional occupation or a non-professional occupation. We think of status, s, as partly a shorthand for educational achievement. A non-professional worker will have a status level of $s=0$ while a professional worker will have a status of $s>0$. All workers are risk neutral in income and risk averse to their status.

Workers maximize present discounted utility, with a rate of time preference $r>0$. The model is set in continuous time. The only choice that a worker makes is selection of educational type: one that leads to either a professional occupation or one that leads to a non-professional occupation. We assume that all workers have the same abilities; thus, if an individual chooses to study the professional track the individual will succeed in obtaining a professional job. In the home market a professional worker will earn w_p and an non-professional worker will earn $w_{n..}$ With probability $q(p)$ a professional worker will migrate and find a job while with probability $q(n)$ a non-professional worker will migrate and find a job.

$V(p)$ and $V(n)$ are the expected lifetime utilities of professional and non-professional workers, respectively[17]. $U(p)$ and $U(n)$ are the expected lifetime utilities of professional and non-professional workers, respectively, who have migrated. For a professional worker,

$$rV(p) = w_p + s + q(p)\big(U(p) - V(p)\big), \qquad (2)$$

[17] In a similar way to Epstein and Hillman (2003).

and for a non-professional worker,

$$rV(n) = w_n + q(n)(U(n) - V(n)). \tag{3}$$

From (2) and (3), we have,

$$V(p) = \frac{w_p + s + q(p)U(p)}{r + q(p)} \quad \text{and} \quad V(n) = \frac{w_n + q(n)U(n)}{r + q(n)}. \tag{4}$$

The wage at which a worker is indifferent between being a professional or a non-professional will satisfy $V(p) = V(n)$. If $V(p) < V(n)$, the individual becomes a non-professional worker while if $V(p) > V(n)$ the individual becomes a professional worker. Denote by w_p^* the wage professional workers are paid at which they are indifferent between becoming a professional and a non-professional. From (4) we compute w_p^*,

$$w_p^* = \frac{(w_n + q(n)U(n))(r + q(p))}{r + q(n)} - (s + q(p)U(p)). \tag{5}$$

If wages in the professional occupation are less than w_p^*, this individual will decide not to obtain professional qualifications. On the other hand, if the wages the professional worker earns are at least w_p^*, then this individual will decide to become a professional worker.

Now let us consider how w_p^* changes as parameters change. Increasing the reputation and status (*s*) that a professional obtains from his profession decreases the wage that makes the individual indifferent between occupations. Thus as the status (*s*) of professionals increase, more individuals become professionals, $\frac{\partial w_p^*}{\partial s} < 0$. What this says that as the status a worker receives from becoming a professional increases, the wage that will make him indifferent between being and not being a professional decreases, thus increasing the number choosing a professional occupation and the extra schooling this choice entails.

If individual preferences for the present (*r*) increase, we have $\frac{\partial w_p^*}{\partial r} = (w_n + q(n)U(n))\frac{(q(n) - q(p))}{(r + q(n))^2}$. The sign of this expression depends on the difference

between the probabilities of emigration for the two occupations. If the probability of a professional worker emigrating is lower than the probability of a non-professional worker emigrating, $(q(n)-q(p))>0$, then increased preference for the present increases the wage that makes the individual indifferent. The main idea is that as time preference increases, the weight on the future decreases and people care more about the present, thus if the probability of migrating for a professional worker is lower than for a non-professional worker, the wages needed for a worker *i* to choose the professional occupation increase and the wage has to go up to make him want to migrate.

Emigration options,* w_p^**, and choice of profession

Let us now consider how different emigration possibilities affect w_p^*. As the expected lifetime utility of professional workers who emigrate, *U(p)*, increases, the wage that makes the individual indifferent decreases, $\frac{\partial w_p^*}{\partial U(p)}<0$, as he can gain more by emigrating. And as the expected lifetime utility of non-professional workers who emigrate, *U(n)*, increases, the wage that makes the individual indifferent increases, $\frac{\partial w_p^*}{\partial U(n)}>0$, since the opportunity cost has increased. This is a comparative static calculation. The effect of a change in the migrant's utility on w_p^* depends on the utility the migrant obtains after migration. If a professional worker obtains a high utility after migration, then he will be willing to become a professional at a lower wage (lower w_p^*); however, if there are more benefits for a nonprofessional worker in the host country, then the worker needs a higher wage to become a professional. Thus, it all depends on the opportunities the worker may have in different locations. For locations that individuals can migrate to that have more opportunities for professional workers (relative to nonprofessional workers) the value of w_p^* decreases, while for locations that a nonprofessional worker has more opportunities (relative to a professional worker) the value of w_p^* increases**.** In other words, one can think of it as an option to migrate to different places with different expected income.

Note that if $w_p > w_p^*$ then individuals will choose a professional occupation. With probability *q(p)* the individual after becoming a professional worker will emigrate. However, with

probability *1- q(p),* the individual will not emigrate and will stay at in the home country. If earnings in the host country are such that this wage is sufficiently large, then individuals are choosing a professional occupation in order to emigrate and earn high wages in the host country. However, only a proportion *q(p)* actually emigrate while a proportion *1- q(p)* do not emigrate. In the literature this is called a *brain-gain* since some individuals who decided to become professionals in order to emigrate in the end stayed in their home country adding to its human capital. Hence, the home country benefits from the possibility of emigration.

Introducing return migration into the model

To better understand the results, consider the extreme case where the probability of migrating is low for the professional worker while it is higher for the non-professional worker. For emphasis, and only for emphasis reasons, assume that professionals have a zero probability of emigrating $q(p) = 0$. Changing this to a positive probability will not change the main results presented below.

Explicitly write the lifetime utility of a migrant taking into consideration the probability of return migration. With probability *k(n)* a non-professional migrant will return home. This can happen, for example, as a result of being illegal and thus apprehended and deported, q_1, or the immigrant simply decides to return home with probability q_2. An immigrant's utility is independent of the identity of his or her previous employer. Hence,

$$rU(n) = w_f - k\,(U(n) - V(n)), \qquad (6)$$

where, w_f is the immigrant's monthly income in the host country, *U(n)* is the expected utility of an employed non-professional worker who migrated, and *V(n)* is that worker's expected lifetime utility.

From (6) we obtain that

$$U(n) = \frac{w_f + V(n)}{k + r}\ . \qquad (7)$$

Rewrite the lifetime utility of an individual taking into consideration components determining the lifetime utility of an immigrant. Substituting (7) into (4), we obtain

$$V(n) = \frac{w_n + q(n)\left(\frac{w_f + V(n)}{k+r}\right)}{r + q(n)}. \qquad (8)$$

Thus,

$$V(n) = \frac{w_n(k+r) + q(n)w_f}{(r+q(n))(k+r) - q(n)} \quad . \qquad (9)$$

Let us use this to update the wage that makes the individual indifferent between choosing to be a professional and a nonprofessional worker. Comparing (9) with $V(p) = \frac{w_p + s}{r}$ (the expected discounted utility of a professional worker with a probability of migrating equaling zero, $q(p)=0$), we see that the wage of a professional worker that will make the individual indifferent between becoming a professional worker or a non-professional worker will satisfy $V(p) = V(n)$. If $V(p) < V(n)$ then the individual becomes a non-professional worker; if $V(p) > V(n)$ the individual becomes a professional worker. Denote by w_p^{**} the wage a professional worker must earn to make him indifferent between becoming a professional worker and a non-professional worker. From (4) we compute w_p^{**},

$$\frac{w_p^{**} + s}{r} = \frac{w_n(k+r) + q(n)\, w_f}{(r+q(n))(k+r) - q(n)}. \qquad (10)$$

Thus, when accounting for the possibility of return migration, the wage that a professional has to earn in the host country to make an individual indifferent between this occupation and being a non-professional, must satisfy

$$w_p^{**} = r\frac{w_n(k+r) + q(p)w_f}{(r+q(n))(k+r) - q(n)} - s. \qquad (11)$$

This wage determines whether an individual will be a professional or non-professional worker. Consider how it changes with changes in the parameters. Increasing the reputation and status (s) a professional worker obtains from his profession will decrease the wage that makes the individual indifferent between the professions. Thus as status, s, increases more individuals

will stay in school and become professional workers, $\frac{\partial w_p^{**}}{\partial s} < 0$. As the income of a non-professional worker in the home country or host country increases, w_n or w_f, the wage that makes the individual indifferent between the two options increases $\frac{\partial w_p^{**}}{\partial w_n} > 0$ *and* $\frac{\partial w_p^{**}}{\partial w_f} > 0$.

As the probability of migration increases, *q(n)*, the wage that makes the individual indifferent, w_p^{**} will increase: $\frac{\partial w_p^{**}}{\partial q(n)} = r\frac{\left(w_f + w_n - w_n(k+r)\right)}{\left((r+q(n))(k+r) - q(n)\right)^2} > 0$ since $r + k \le 2$ and $w_f \ge w_n$.

Thus if monthly wages in the host country are higher than those in the home country, $w_f \ge w_n$, then increasing the probability of migration will increase the chances an individual will choose a non-professional occupation.

The story we have just told examines the phenomenon of forsaken schooling as a result of opportunities abroad. While high-skilled migration is worrisome, many international migrants accept low-skilled positions in host countries. Their willingness to do so arises from very large host-home earnings differentials. If the wages of professional workers are not sufficiently high, individuals will decide not to become professionals since the chances of migrating and earning a higher discounted utility will be better for non-professionals. At home this can lead to reduced educational investment as people forgo additional schooling because of opportunities to migrate to high paying low-skilled jobs – the market is discouraging people from investing in education. This suggests there might be time-inconsistencies between short-run economic gains from migration and negative long-term effects from missing human-capital investment. Our modeling allows us to establish the circumstances under which this type of forsaken schooling will occur and the trade-offs that policymaker's need to consider (Epstein, 2013 and Epstein and Gang, 2010).

6. Conclusion

This paper shows how opportunities for international migration may affect the education decisions of potential migrants. Tajikistan is an excellent choice for a case study of this relationship because of the high rate of labor migration from Tajikistan (mostly to Russia) and the importance of remittances for household income and consumption. Tajikistan also has excellent household level data with which to look at the relationship between migration and

education, and the last three TLSS surveys form a panel that can be used to observe changes in education and migration in the same households over time. The topic is also important for education and labor policy formulation. Underinvestment in education may have short run benefits to households, but, in the long run, economic growth and development can be negatively impacted by the lack of skill in society.

Existing wage differences in migrant host and home countries might induce people in the home country to forgo professional education, opting to migrate abroad for high paying unskilled work. We show how an individual's choice of whether to pursue professional education might be affected by the opportunity to migrate. Opting for higher education provides a higher expected income at home than for unskilled labor, and the potential migrant will face a lower emigration probability. However, with large enough international wage differentials even professionals will migrate, and since it is difficult for professionals to find a high quality and well paid job in the host country, many end-up taking unskilled jobs which still dominate their home country professional incomes. The next or near-next group making the decision to continue their schooling (once it becomes optional) or not, may forgo professional education as their expected earnings in the home country are low relative to potential migrant destinations. The worker takes the opportunity to migrate and find a better-paid unskilled job abroad. We offer a possible explanation for these results in a theoretical model that enables us to understand better our empirical results. Our theory explains the forsaken schooling phenomenon as a result of low-skilled and skilled workers accepting low-skilled positions in host countries, which leads to the forgoing of professional schooling in the home country. We expect, therefore, people who decide to migrate abroad to have either lower years of schooling, or generally have not completed professional schools (technical-vocational or tertiary). Of course, our theoretical model is one out of many possible explanations.

Using the case of literate Tajikistan, the most remittance dependent country in the world, we show that the decision to migrate is a concave function of education. The probability of migrating is increasing with non-professional (primary, basic and general secondary) education, but shrinks for those with professional education. This relationship remains robust even after accounting for the endogeneity of years of schooling. Such results suggest that people in Tajikistan will choose to forgo the professional education in favor of migration. This can give rise to a foregone schooling trap, where the existence of high paying low-skilled jobs abroad reduces educational investment.

The education-migration relationship becomes clearer over subsequent survey years, implying that more people without professional education choose to migrate, while people with professional education remained in their home country. Even though the country has good overall school enrollment rates, the youth are highly discouraged by their failure in finding jobs after completing school, and therefore choose to not go for higher studies, but migrate abroad.

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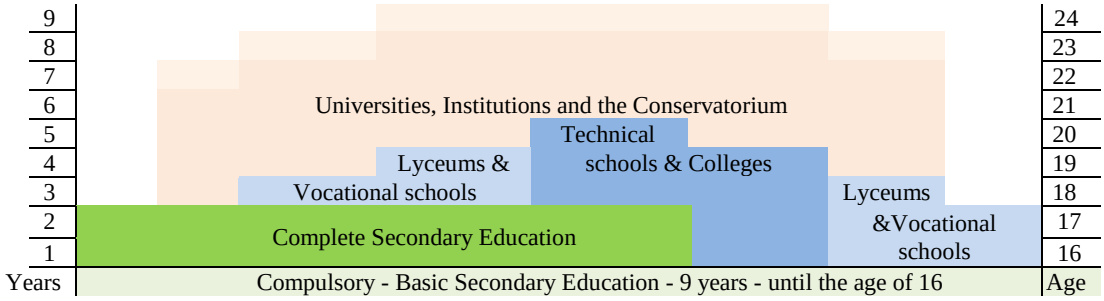
Appendix

Schooling, Age and Degrees

The following chart lays out the structure of Tajikistan's educational system, the translation of degrees into years of schooling, and the normal corresponding students' ages.



In this paper, professional education starts at years of schooling category "Professional lyceums and Vocational schools" corresponding to age 16 or 9 years of compulsory basic education. These are the lower band for the professional education categories. With professional education from lyceums and vocational schools, people work at low professional occupations. For high education at least 16 years of schooling are needed: 11 years of general + 5 tertiary.

Male Sample Statistics, TLSS 2007

Variables	All		Migrant		Non-Migrant	
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
Migrant	0.1811	0.3851				
Age	35.3029	12.6170	30.7878	9.4458	36.3011	13.0065
Age-squared	1405.4637	978.8125	1037.0497	658.3958	1486.9152	1018.5730
Years of schooling	11.7065	2.9120	11.1898	2.6474	11.8207	2.9554
Years of schooling-squared	145.5206	63.7959	132.2150	57.2563	148.4623	64.7894
Education levels:						
Primary (Grades 1-4)	0.0164	0.1268	0.0091	0.0950	0.0180	0.1328
Basic (Grades 1-8(9))	0.1137	0.3175	0.1015	0.3021	0.1164	0.3208
Secondary General (Grades 9-10(11))	0.5031	0.5000	0.6134	0.4871	0.4787	0.4996
Secondary Special	0.0975	0.2967	0.0854	0.2796	0.1002	0.3003
Secondary Technical	0.0882	0.2837	0.0742	0.2622	0.0913	0.2881
High	0.1661	0.3722	0.1113	0.3147	0.1782	0.3827
Completed formal professional education	0.3518	0.4776	0.2710	0.4446	0.3697	0.4828
Household's characteristics:						
No. of children (ages of <15)	2.3044	1.8225	2.1975	1.7904	2.3281	1.8288
Lives in the rural area	0.7165	0.4507	0.7703	0.4208	0.7046	0.4563
Own land used for farming	17.1589	47.6357	16.4510	36.1209	17.3154	49.8245
Rented land used for farming	6.5127	35.3031	4.2031	23.7473	7.0234	37.3610
Own land rented out	0.1041	3.7366	0.0490	0.7037	0.1163	4.1157
Monthly per capita consumption (in thousands Somoni)	0.1655	0.1284	0.1703	0.1338	0.1644	0.1272
Observations	7887		1428		6459	

Probability of Migrating by Age