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Schooling Forsaken: Education and Migration

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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 emigration is troubling, even more so is that 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. Our empirical results establish circumstances under forsaken schooling occurs, leaving trade-offs that policymakers' need consider. (136 words)

Key words: migration, traps, poverty, inequality, education, skill **JEL:** O15, P46, F22, I24

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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 a direct benefit 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 argues 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. Instead they may opt 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.

Having a family member migrant not only affects the education decision but reduces the job satisfaction of those left behind. Migrants' relatives who remain the home country learn about wages in the destination country based on information from the size of remittances or from migrants. If wages in a migrant receiving country greatly exceed current wages in the home country, these migrant relatives become dissatisfied with their current jobs (Abdulloev, 2018).

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, because 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 that 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).

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 small.

A recent study of the relationship between migration and professional education in three Central Asian migrant-sending countries—the Kyrgyz Republic, the Republic of Tajikistan, and the Republic of Uzbekistan— found existence of a forsaken schooling phenomenon in all three countries, which may cause a possible loss in human capital formation in the future (Abdulloev, Epstein and Gang, 2020).

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.² The main destination of Tajikistan's migrants is Russia because 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. Section 5 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 important augmenting roles in the 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 to both 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).

 $^{^2}$ 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.

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.³ The survey asks questions on household and individual characteristics, including information on current and returned migrants.⁴ Additional surveys asking questions overlapping with the 2007 survey and sampling subsets of the 2007 households were conducted in 2009 and 2011.⁵ We discuss the latter two waves later in this paper.

We limited our sample to respondents 17-27 years old who pursued their professional education after the collapse of the Soviet Union, as we want to distinguish between schooling and migration decisions in market economies. At age of 17, an individual normally finishes his/her compulsory education and decides on the professional education (either vocational or tertiary) or decides on employment. The upper age limit of 27 (i.e. 17 years old in 1991) is designed to capture individual choices between migration and professional schooling after Tajikistan's independence from the Soviet Union in 1991 (migration was strictly controlled and even prohibited by the central Soviet government). Since independence, Tajikistan has undergone severe economic transformation from plan-based to market economy. Because of the dissolution of the Soviet Union and economic transformation, the majority of stated-owned enterprises lost their value chain linkages with enterprises of other republics, and some enterprises were privatized. Therefore, the factors that influenced decisions on acquiring professional education during the Soviet time (wages were almost the same across the Union) differ from the post-Soviet ones. The total sample size is 7,420 people, with 867 migrants (11.7%) and 6,553 non-migrants. Migration is almost strictly work related. Migrants are defined as those individuals who worked abroad and returned to their homes, as well as those

³ Earlier household level data collection efforts and what they tell us about migration, remittances and education are discussed in Mughal (2007).

⁴ 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 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.

⁵ 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).

who were working abroad at the time of the survey. Schooling is generally completed prior to migration. Out of 437 returned migrants only 8 (1.8%) were enrolled in the academic year of 2006/2007. Those who were still in professional schools during the last academic year are recorded at the level of education they are currently in. The survey was performed during autumn, which is the season when migrants generally return 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 94% of migrants are men. In the non-migrant sample, 56% 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, the years of education do not significantly differ among the groups. Years of schooling were obtained by converting the school degree of respondents to the number of years that are normally required for such degrees. Levels of education are defined using dummy variables for individually completed degrees (see the Appendix for a more details on this assignment).

		All		Men					
Variables	All	Migrant	Non- Migrant	Mean	Migrant	Non- Migrant			
Migrant	0.1168	1	0	0.2210	1	0			
-	[0.0037]			[0.0068]					
Male	0.4957	0.9377	0.4372	1	1	1			
	[0.0058]	[0.0082]	[0.0061]						
Household head	0.0125	0.0058	0.0134	0.0226	0.0062	0.0272			
	[0.0013]	[0.0026]	[0.0014]	[0.0024]	[0.0027]	[0.0030]			
Age	21.5559	23.0600	21.3569	21.6188	23.0800	21.2042			
	[0.0365]	[0.0906]	[0.0388]	[0.0525]	[0.0931]	[0.0599]			
Age-squared	474.5166	538.8754	466.0015	477.5269	539.7220	459.8778			
	[1.5938]	[4.1220]	[1.6927]	[2.3004]	[4.2416]	[2.6044]			
Years of schooling	10.5249	10.8189	10.4860	10.9622	10.8426	10.9962			
-	[0.0324]	[0.0850]	[0.0349]	[0.0440]	[0.0866]	[0.0509]			
Years of schooling-squared	118.5778	123.3033	117.9525	127.2955	123.6494	128.3302			
	[0.6035]	[1.7545]	[0.6424]	[0.8885]	[1.8041]	[1.0186]			
Education levels:									
Primary (Grades 1-4)	0.0329	0.0058	0.0365	0.0139	0.0049	0.0164			
	[0.0021]	[0.0026]	[0.0023]	[0.0019]	[0.0025]	[0.0024]			
Basic (Grades 1-8(9))	0.2007	0.1511	0.2072	0.1542	0.1501	0.1553			
	[0.0046]	[0.0122]	[0.0050]	[0.0060]	[0.0125]	[0.0068]			
	0.5549	0.6690	0.5398	0.5767	0.6704	0.5501			
Secondary General (Grades 9-10(11))	[0.0058]	[0.0160]	[0.0062]	[0.0081]	[0.0165]	[0.0093]			
Secondary Special	0.0418	0.0427	0.0417	0.0375	0.0406	0.0366			
	[0.0023]	[0.0069]	[0.0025]	[0.0031]	[0.0069]	[0.0035]			
Secondary Technical	0.0257	0.0300	0.0252	0.0364	0.0320	0.0377			
	[0.0018]	[0.0058]	[0.0019]	[0.0031]	[0.0062]	[0.0036]			
High	0.1213	0.0980	0.1244	0.1661	0.0984	0.1853			
	[0.0038]	[0.0101]	[0.0041]	[0.0061]	[0.0105]	[0.0073]			
Completed formal professional	0.1888	0.1707	0.1912	0.2401	0.1710	0.2597			
education	[0.0045]	[0.0128]	[0.0049]	[0.0070]	[0.0132]	[0.0082]			
Household's characteristics:									
	11.5142	11.6897	11.4909	11.5914	11.6913	11.5630			

Table 1. Sample Statistics, TLSS 2007

Years of schooling of Head of						
household	[0.0426]	[0.1118]	[0.0459]	[0.0592]	[0.1145]	[0.0687]
Squared years of schooling of Head	146.0451	147.4821	145.8550	147.2325	147.3272	147.2056
of household	[0.8484]	[2.3298]	[0.9098]	[1.1921]	[2.3984]	[1.3709]
No. of children (ages of <15)	1.9908	1.7751	2.0194	1.8581	1.8130	1.8709
	[0.0200]	[0.0565]	[0.0213]	[0.0276]	[0.0588]	[0.0313]
Lives in the capital	0.1337	0.1015	0.1380	0.1289	0.1009	0.1368
	[0.0040]	[0.0103]	[0.0043]	[0.0055]	[0.0106]	[0.0064]
Lives in other urban areas	0.1456	0.1246	0.1483	0.1463	0.1230	0.1529
	[0.0041]	[0.0112]	[0.0044]	[0.0058]	[0.0115]	[0.0067]
Lives in rural areas	0.7208	0.7739	0.7137	0.7249	0.7761	0.7103
	[0.0052]	[0.0142]	[0.0056]	[0.0074]	[0.0146]	[0.0085]
Own land area used for farming	18.5602	15.8258	18.9220	18.2825	15.9926	18.9323
	[0.6266]	[1.0519]	[0.6956]	[0.8664]	[1.1018]	[1.0671]
Rented land area used for farming	8.0500	3.6528	8.6318	7.7303	3.7663	8.8551
	[0.4614]	[0.6225]	[0.5155]	[0.6557]	[0.6579]	[0.8197]
Own land area rented out (sotka)	0.0821	0.0346	0.0884	0.0397	0.0332	0.0415
	[0.0327]	[0.0182]	[0.0369]	[0.0215]	[0.0191]	[0.0270]
Monthly per capita consumption (in	0.1693	0.1733	0.1688	0.1724	0.1723	0.1724
thousands somoni)	[0.0018]	[0.0050]	[0.0019]	[0.0020]	[0.0051]	[0.0021]
Observations	7,420	867	6,553	3,678	813	2,865

Standard errors in brackets

People with primary and basic education mainly remain in Tajikistan. Comparatively more people with education from secondary general or secondary special (vocational) 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). The larger difference is in higher-level education (degrees received from universities) between migrants and non-migrants in the sample: people with higher-level education tend to remain in Tajikistan. If we divide our sample into male migrant and male non-migrant subsamples, more people in male non-migrants have education from tertiary schools. The sample statistics suggest an inverted-U relationship between the education and migration. People at the lower and higher education levels migrate less than those at middle levels (secondary).⁶

We now turn to a more detailed analysis of our sample 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 the variables individual age, age-squared, and gender. Household (not family) characteristics include the variables number of children in the household with ages less than 15, whether the household lives in rural areas (the reference group is living in urban areas),

⁶ 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.

monthly consumption deflated to account for 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 (former or current) migrant. We estimate three models: one including years of schooling and its square; the second with categorical educational levels (the reference is having completed the minimum education level), and the third one with a dummy variable for whether an individual has any professional education. 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 columns 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 on the probability of migration is negative.

In the second model, we relax the quadratic form. Instead of the variables years of schooling and its square, we include dummy variables for the obtained levels of education. The reference group in this model is individuals who have completed the minimum education level (168 respondents). The coefficients of the dummy variables on education levels are increasing up to the secondary general education, falling afterwards, which is related to professional education. Education level variable coefficients for basic, secondary general, secondary special (lower professional) education are positive and statistically significant at the 1% level. The coefficient for secondary technical (technical professional) education is positive and statistically significant at the 10% level. The marginal effects of these variables on the probability of migration also reflect the same inverted-U relationship between the migration decision and education. People choose to migrate at middle level education but are less likely to have migrated with lower or higher (professional) levels of education. In the third model, instead of educational levels we included a dummy variable for whether an individual has or is currently in any professional education (secondary special, secondary technical or high education). Its estimate is negative and statistically significant at the 1% level, implying that people with professional education have lower probability of migrating abroad for work.

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. Coefficients on age and age-squared are positive and negative respectively, and they are statistically significant. People are likely to

migrate in their middle ages, when they are the most economically active.⁷ 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 statistically significant. The effects of own or rented land used for farming also have statistically significant and negative impact on the migration decision, decreasing its probability of migration, reflecting the impact of remittances on the migrant's home-households' consumption.

⁷ See the Appendix for a chart relating age to the probability of migrating.

⁸ 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.

Variables	Estimates		1200 200		Pullation		Marginal	effects	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
	Model 1		Model 2		Model 3		Model 1	enteets	Model 2		Model 3	
Years of schooling	0.0762	***					-0.0078	***				
	(0.0284)						(0.0015)					
Years of schooling-squared	-0.0059	***					(
6 1	(0.0015)											
Primary (Grades 1-4)	(0.2798						0.0414			
			(0.3801)						(0.0564)			
Basic (Grades 1-8(9))			0.8974	***					0.1329	***		
			(0.2872)						(0.0425)			
Secondary General (Grades 9-10(11))			0.9883	***					0.1464	***		
			(0.2829)						(0.0419)			
Secondary Special			0.8700	***					0.1289	***		
			(0.3013)						(0.0446)			
Secondary Technical			0.6000	*					0.0889	*		
			(0.3074)						(0.0455)			
High			0.4128						0.0611			
6			(0.2886)						(0.0428)			
Completed formal professional education			(012000)		-0.4106	***			(010120)		-0.0619	***
·····					(0.0587)						(0.0087)	
Other control variables:					(0.0000.)						(010001)	
Age	1.0913	***	1.1167	***	1.1278	***	0.0162	***	0.0155	***	0.0149	***
8-	(0.1193)		(0.1190)		(0.1188)		(0.0009)		(0.0009)		(0.0009)	
Age-squared	-0.0217	***	-0.0223	***	-0.0227	***	(0.000))		(0.000))		(0.000))	
-81	(0.0027)		(0.0027)		(0.0027)							
Male	1.5405	***	1.5435	***	1.5249	***	0.2316	***	0.2286	***	0.2298	***
	(0.0658)		(0.0662)		(0.0651)		(0.0089)		(0.0088)		(0.0089)	
Head of the household	-1.0523	***	-1.0439	***	(01000-)		-0.1582	***	-0.1546	***	(0.000)	
	(0.2299)		(0.2325)				(0.0344)		(0.0343)			
No. of children (age of <15)	-0.0471	***	-0.0466	***	-0.0462	***	-0.0071	***	-0.0069	***	-0.0070	***
	(0.0140)		(0.0141)		(0.0140)		(0.0021)		(0.0021)		(0.0021)	
Own land used for farming	-0.0018	***	-0.0018	***	-0.0017	***	-0.0003	***	-0.0003	***	-0.0003	***
6	(0.0006)		(0.0006)		(0.0005)		(0.0001)		(0.0001)		(0.0001)	
Rented land used for farming	-0.0038	***	-0.0036	***	-0.0038	***	-0.0006	***	-0.0005	***	-0.0006	***
	(0.0010)		(0.0010)		(0.0010)		(0.0001)		(0.0002)		(0.0001)	
Own land rented out	-0.0072		-0.0053		-0.0070		-0.0011		-0.0008		-0.0011	
	(0.0113)		(0.0103)		(0.0114)		(0.0017)		(0.0015)		(0.0017)	
Monthly per capita consumption (in thousands somoni)	0.1901	*	0.2385	**	0.1632		0.0286	*	0.0353	**	0.0246	
	(0.1152)		(0.1119)		(0.1277)		(0.0173)		(0.0165)		(0.0192)	
Lives in rural area	0.1975	***	0.1629	***	0.1898	***	0.0297	***	0.0241	***	0.0286	***
	(0.0537)		(0.0540)		(0.0536)		(0.0081)		(0.0080)		(0.0081)	
Constant	-15.7382	***	-16.7378	***	-15.8705	***	(0.0000)		(000000)		(010000)	
	(1.3448)		(1.3607)		(1.3275)							
Observations	7420		7420		7420		7420		7420		7420	
Pseudo R^2	0.248		0.259		0.245							

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

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 or higher-level 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 have the same signs of correlation but different size of marginal effects on the probability of migrating.

	Estimates					Marginal effe	Marginal effects			
Variables	Model	1	Model 2	Model 3	Model 1	Model 2		Model 3		
Years of schooling	0.0903	***			-0.0165 **	**			_	
Ū.	(0.0319)				(0.0029)					
Years of schooling-squared	-0.0070	***								
	(0.0017)									
Primary (Grades 1-4)			0.0853			0.0221				
			(0.4074)			(0.1057)				
Basic (Grades 1-8(9))			0.9024 ***			0.2341	***			
			(0.3048)			(0.0789)				
Secondary General (Grades 9-10(11))			0.9631 ***			0.2499	***			
• • • • • •			(0.2994)			(0.0774)				
Secondary Special			0.8162 **			0.2118	**			
			(0.3219)			(0.0834)				
Secondary Technical			0.5889 *			0.1528	*			
			(0.3243)			(0.0841)				
High			0.3339			0.0866				
č			(0.3048)			(0.0790)				
Completed formal professional education			(,	-0.4595 ***		()		-0.1206 ***		
Other control variables:				(0.0619)				(0.0159)		
Age	1.2309	***	1.2553 ***	1.2398 ***	0.0308 **	** 0.0292	***	0.0294 ***		
6	(0.1247)		(0.1242)	(0.1242)	(0.0018)	(0.0018)		(0.0018)		
Age-squared	-0.0246	***	-0.0252 ***	-0.0249 ***	(()		(,		
-81	(0.0028)		(0.0028)	(0.0028)						
Head of household	-1.0574	***	-1.0569 ***	-1.0559 ***	-0.2789 **	** -0.2742	***	-0.2771 ***		
	(0.2352)		(0.2390)	(0.2381)	(0.0616)	(0.0616)		(0.0620)		
No. of children (age of <15)	-0.0236		-0.0235	-0.0254	-0.0062	-0.0061		-0.0067		
	(0.0154)		(0.0156)	(0.0155)	(0.0041)	(0.0040)		(0.0041)		
Own land used for farming	-0.0018	***	-0.0019 ***	-0.0019 ***	-0.0005 **	** -0.0005	***	-0.0005 ***		
	(0.0006)		(0.0006)	(0.0006)	(0.0002)	(0.0002)		(0.0002)		
Rented land used for farming	-0.0039	***	-0.0037 ***	-0.0038 ***	-0.0010 **	** -0.0010	***	-0.0010 ***		
nemed fand about for farming	(0.0011)		(0.0011)	(0.0011)	(0.0003)	(0.0003)		(0.0003)		
Own land rented out	-0.0097		-0.0074	-0.0102	-0.0026	-0.0019		-0.0027		
	(0.0128)		(0.0125)	(0.0134)	(0.0034)	(0.0033)		(0.0035)		
Monthly per capita consumption (in thousands somoni)	0.2693		0.3510 *	0.3226 *	0.0710	0.0911	*	0.0847 *		
inonany per expire concemption (in mousailes comoni)	(0.1856)		(0.1845)	(0.1830)	(0.0489)	(0.0478)		(0.0479)		
Lives in rural area	0.2027	***	0.1663 ***	0.1783 ***	0.0535 *	** 0.0431	***	0.0468 ***		
	(0.0585)		(0.0590)	(0.0587)	(0.0154)	(0.0153)		(0.0154)		
Constant	-15 9194	***	-16 8526 ***	-15 7536 ***	(0.0151)	(0.0155)		(0.0151)		
Constant	(1.3788)		(1.3916)	(1.3571)						
Observations	3678		3678	3678	3678	3678		3678		
Pseudo R^2	0.110		0.123	0 1 1 3	5070	5070		5010		
Pseudo R^2	0.110		0.123	0.113						

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

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 believe that this is a good proxy measure of the incentives for educational attainment. Tajikistan experienced large economic and political shocks after the dissolution of the Soviet Union in 1991. Incentives that affect professional education and migration decisions changed significantly. After the country's independence, households faced the economic downtown, civil war, economic restructuring, broken linkages among enterprises, raised unemployment and so on, which increased intercountry wages differentials among the labor abundant and oil rich countries. Households' heads whose average age is 51 made their decisions on professional education based on factors and conditions during the Soviet period when migration was strictly controlled (Gang and Stuart, 1999). Their decisions to migrate was then driven by post collapse economic shock or increased unemployment. On the other hand, 17-27-year-old adults made their decisions about professional education having the option at the time to migrate to work abroad at nonprofessional occupations with higher wages. We proceeded by excluding household heads from our sample, using their schooling as an instrument for the education decisions of remaining members.⁹

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

⁹ 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.

have any predictive power on the decision to migrate. Such non-variation of these variables makes them relevant instruments in our analysis.¹⁰

		All			Men				
Variables	All	Migrant	Non- Migrant	All	Migrant	Non- Migrant			
Migrant	0.1176	1	0	0.2248	1	0			
	[0.0038]			[0.0070]					
Male	0.4907	0.9374	0.4311	1	1	1			
	[0.0058]	[0.0083]	[0.0062]						
Age	21.5215	23.0452	21.3183	21.5527	23.0644	21.1145			
	[0.0366]	[0.0909]	[0.0389]	[0.0529]	[0.0934]	[0.0601]			
Age-squared	472.9715	538.1961	464.2749	474.5613	539.0025	455.8787			
	[1.5976]	[4.1333]	[1.6957]	[2.3105]	[4.2540]	[2.6089]			
Years of schooling	10.5070	10.8132	10.4662	10.9377	10.8366	10.9670			
	[0.0325]	[0.0852]	[0.0350]	[0.0442]	[0.0869]	[0.0512]			
Years of schooling-squared	118.1459	123.1798	117.4747	126.6618	123.5198	127.5727			
Education levels:	[0.6024]	[1.7571]	[0.6408]	[0.8879]	[1.8069]	[1.0180]			
Primary (Grades 1-4)	0.0330	0.0058	0.0367	0.0139	0.0050	0.0165			
	[0.0021]	[0.0026]	[0.0023]	[0.0020]	[0.0025]	[0.0024]			
Basic (Grades 1-8(9))	0.2012	0.1508	0.2079	0.1538	0.1498	0.1550			
	[0.0047]	[0.0122]	[0.0050]	[0.0060]	[0.0126]	[0.0069]			
	0.5574	0.6705	0.5423	0.5814	0.6720	0.5551			
Secondary General (Grades 9-10(11))	[0.0058]	[0.0160]	[0.0062]	[0.0082]	[0.0165]	[0.0094]			
Secondary Special	0.0415	0.0418	0.0415	0.0373	0.0396	0.0366			
	[0.0023]	[0.0068]	[0.0025]	[0.0032]	[0.0069]	[0.0036]			
Secondary Technical	0.0258	0.0302	0.0252	0.0367	0.0322	0.0380			
TT' 1	[0.0019]	[0.0058]	[0.0019]	[0.0031]	[0.0062]	[0.0036]			
High	0.1182	0.0974	0.1210	0.1616	0.0978	0.1801			
	[0.0038]	[0.0101]	[0.0041]	[0.0061]	[0.0105]	[0.0073]			
	0.1855	0.1694	0.18/6	0.2356	0.1696	0.2548			
Completed formal professional education	[0.0045]	[0.0128]	[0.0049]	[0.00/1]	[0.0132]	[0.0083]			
	11.5121	11.6891	11.4885	11.5861	11.6906	11.5558			
Years of schooling of Head of household	[0.0430]	[0.1123]	[0.0463]	[0.0601]	[0.1150]	[0.0699]			
squared years of schooling of field of	140.0347	147.4900	143.8022	147.2022	147.3441	14/.1011			
No. of shildren (ages of <15)	2 0008	[2.3363]	2 0208	[1.20/1]	[2.4070]	[1.3920]			
No. of children (ages of <15)	2.0008	1.7701	2.0308	1.0732	1.0144	1.0902			
Lives in the capital	0.1302	0 1021	0.1340	$\begin{bmatrix} 0.0281 \end{bmatrix}$	0 1015	0.1288			
Lives in the capital	[0.0039]	[0 0103]	[0.0042]	[0.0055]	[0.0106]	[0.0063]			
Lives in other urban areas	0 1449	0 1241	0.1477	0 1455	0 1225	0 1521			
Lives in other urban areas	[0.0041]	[0.0112]	[0 0044]	[0.0059]	[0.0115]	[0.0068]			
Lives in rural areas	0 7249	0 7738	0 7183	0 7318	0 7760	0 7191			
	[0.0052]	[0 0143]	[0.0056]	[0.0074]	[0 0147]	[0.0085]			
Own land area used for farming	18.7288	15.8434	19,1135	18,5694	16.0124	19.3107			
o with fund allow used for furthing	[0.6341]	[1.0573]	[0.7046]	[0.8854]	[1.1078]	[1.0956]			
Rented land area used for farming	8.0752	3.5580	8.6775	7.7519	3.6658	8.9365			
	[0.4661]	[0.6160]	[0.5214]	[0.6675]	[0.6511]	[0.8388]			
Own land area rented out (sotka)	0.0831	0.0348	0.0896	0.0406	0.0334	0.0427			
	[0.0331]	[0.0183]	[0.0374]	[0.0220]	[0.0192]	[0.0278]			
Monthly per capita consumption (in	0.1676	0.1735	0.1668	0.1693	0.1725	0.1684			
thousands somoni)	[0.0018]	[0.0050]	[0.0019]	[0.0019]	[0.0052]	[0.0019]			
Observations	7327	862	6465	3595	808	2787			

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

Standard errors in brackets

¹⁰ 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.

As the migration is men-dominated, we estimate instrumental variable Probit model for male subsample. 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 5.¹¹

Variables	Structural	Eq:	Reduced H	Form Eq:	Marginal E	ffects	
variables	Migration=	:1/ 0	Years of S	chooling	of Structural Eq		
Years of schooling	0.8457	***			-0.0268	***	
	(0.2244)				(0.0040)		
Years of schooling-squared	-0.0425	***	0.0478	***			
	(0.0102)		(0.0007)				
Age	1.1022	***	-0.2458	***	0.0395	***	
	(0.1926)		(0.0673)		(0.0023)		
Age-squared	-0.0221	***	0.0050	***			
	(0.0040)		(0.0015)				
No. of children (age of <15)	-0.0146		0.0002		-0.0044		
	(0.0146)		(0.0097)		(0.0043)		
Own land used for farming	-0.0012	**	-0.0001		-0.0004	**	
	(0.0006)		(0.0002)		(0.0002)		
Rented land used for farming	-0.0027	**	-0.0005		-0.0008	**	
	(0.0013)		(0.0005)		(0.0003)		
Own land rented out	0.0008		-0.0103		0.0002		
	(0.0117)		(0.0069)		(0.0035)		
Monthly per capita consumption (in thousands Somoni)	0.3129	*	-0.0505		0.0943	**	
	(0.1653)		(0.1084)		(0.0475)		
Lives in the rural area	0.0329		0.1388	***	0.0099		
	(0.0865)		(0.0376)		(0.0254)		
Years of schooling of Household's Head			0.0658	***	0.0000		
			(0.0203)		(.)		
Squared years of schooling of Household's Head			-0.0031	***	0.0000		
			(0.0010)		(.)		
Constant	-17.8244	***	7.4044	***			
	(1.5336)		(0.7002)				
athrho			-0.7954	**			
			(0.3635)				
lnsigma			-0.1684	***			
			(0.0381)				
Wald test of exogeneity $\chi^2(1)$	4.79						
$\text{Prob} > \chi^2$	0.0287						
Observations	3595						

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

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

The coefficients on years of schooling and years of 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, and the Wald test of the exogeneity of the instrumented

¹¹ 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 specifying only the "reduced form" equation for the years of schooling equation (See Wooldridge, J. M. (2010), p.592-593).

variables is also rejected at 5% level. These results from the reduced form equation estimation indicate that individual schooling has a strong correlation with the education of the household head.

After controlling for the endogeneity of the decisions about years of schooling, the estimates of the impacts of 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 schooling is positive and statistically significant, while the coefficient on years of schooling squared is negative and 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 eight points of completed years of education – at each level of education (no education, primary, basic, secondary general, secondary technical, secondary special, tertiary and graduate). 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.

migration for moure a room and real room (Caressions, 1155 2007												
Level of Completed Education	Years of	Marginal Effects										
Level of Completed Education	Schooling	All		Men		Men with IV						
No Education	0	0.0106	***	0.0224	***	0.0000						
		(0.0028)		(0.0056)		(0.0002)						
Primary	4	0.0048	*	0.0100	*	0.0479	***					
-		(0.0027)		(0.0053)		(0.0117)						
Basic	9	-0.0050	***	-0.0102	***	0.0279	*					
		(0.0015)		(0.0029)		(0.0169)						
Secondary General	11	-0.0083	***	-0.0172	***	-0.0303	***					
-		(0.0017)		(0.0033)		(0.0058)						
Secondary Special	12	-0.0097	***	-0.0201	***	-0.0570	***					
		(0.0019)		(0.0036)		(0.0130)						
Secondary Technical	15	-0.0118	***	-0.0247	***	-0.0718	***					
5		(0.0018)		(0.0035)		(0.0172)						
High (Tertiary)	16	-0.0118	***	-0.0244	***	-0.0455	***					
		(0.0016)		(0.0029)		(0.0067)						
Graduate	19	-0.0096	***	-0.0183	***	-0.0006						
		(0.0005)		(0.0012)		(0.0009)						
Observations		7420		3678		3595						

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

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 section 2 and footnote 5. These additional surveys ask questions overlapping with the 2007 TLSS survey, sampling a subset of the same households (Danzer, Dietz and Gatskova, 2013b). The 2009 and 2011 samples are limited to ages of 17-29 and 17-31, correspondingly, where the upper age limit is based on post-Soviet schooling for each survey year. We also estimated the probit regressions for the pooled (panel) sample of the three surveys.¹²

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,

¹² 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.

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 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, school completing youths become discouraged and disappointed in job availability. 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.

Comparing estimates of marginal effects across the biennial samples, we observe large increases in the absolute numbers of marginal effects of education from -0.0118 in 2007 and – 0.0139 in 2009 to 0.0287 in 2011 for tertiary education. 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).

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.

	TLSS 2009						THPS 2011									
Variables		Estim	ates		Ma	rgina	l Effects			Estim	ates		Ma	rginal Effects		
	Model 1	1	Model 2		Model	1	Model	2	Model	1	Model 2	2	Model	1	Model	2
Years of Schooling	0.2437	***			0.0048				0.2482	***			-0.0077	**		
	(0.0617)				(0.0031)				(0.0523)				(0.0031)			
Years of Schooling-Squared	-0.0098	***							-0.0124	***						
	(0.0028)								(0.0024)							
Primary (Grades 1-4)			4.1493	***			0.8328	***			3.8625	***			0.8928	***
			(0.2320)				(0.0514)				(0.4853)				(0.1141)	
Basic (Grades 1-8(9))			4.4035	***			0.8838	***			5.0627	***			1.1702	***
			(0.1382)				(0.0366)				(0.1322)				(0.0377)	
Secondary General (Grades 9-10(11))			4.6282	***			0.9289	***			5.1015	***			1.1792	***
• • • • • •			(0.1165)				(0.0327)				(0.1046)				(0.0334)	
Secondary Special			4.6932	***			0.9419	***			5.0012	***			1.1560	***
			(0.2036)				(0.0475)				(0.1719)				(0.0465)	
Secondary Technical			4.8483	***			0.9731	***			4.8954	***			1.1315	***
2			(0.1978)				(0.0448)				(0.1800)				(0.0475)	
High (Tertiary)			4.5627	***			0.9157	***			4.7149	***			1.0898	***
Other control variables:			(0.1603)				(0.0410)				(0.1325)				(0.0391)	
Age	0.3361	**	0.3198	**	0.0118	***	0.0115	***	0.3718	***	0.3651	***	0.0101	***	0.0097	***
C	(0.1584)		(0.1600)		(0.0021)		(0.0021)		(0.1017)		(0.1023)		(0.0018)		(0.0018)	
Age-squared	-0.0058	*	-0.0055		(,				-0.0067	***	-0.0066	***	(,		(
	(0.0034)		(0.0034)						(0.0021)		(0.0021)					
Male	1.6705	***	1.6599	***	0.3361	***	0.3331	***	1.6532	***	1.6439	***	0.3831	***	0.3800	***
	(0.0883)		(0.0886)		(0.0141)		(0.0141)		(0.0715)		(0.0723)		(0.0117)		(0.0119)	
Head of household	-0.2423		-0.2157		-0.0488		-0.0433		-0.3885		-0.3960		-0.0900		-0.0915	
	(0.2976)		(0.2980)		(0.0599)		(0.0598)		(0.2835)		(0.2835)		(0.0656)		(0.0655)	
No. of children (age of <15)	-0.0584	***	-0.0573	***	-0.0117	***	-0.0115	***	-0.0395	**	-0.0389	**	-0.0092	**	-0.0090	**
	(0.0200)		(0.0201)		(0.0040)		(0.0040)		(0.0159)		(0.0160)		(0.0037)		(0.0037)	
Lives in the rural area	0.3192	***	0.3352	***	0.0642	***	0.0673	***	0.3004	***	0.3066	***	0.0696	***	0.0709	***
	(0.0877)		(0.0883)		(0.0174)		(0.0174)		(0.0755)		(0.0761)		(0.0172)		(0.0173)	
Monthly per capita consumption (in	()		(/						()		((,		(
thousands of Somoni)	0.7385	***	0.7643	***	0.1486	***	0.1534	***	0.0204		0.0197		0.0047		0.0046	
	(0.2145)		(0.2141)		(0.0427)		(0.0425)		(0.0269)		(0.0264)		(0.0062)		(0.0061)	
Constant	-8.2724	***	-11.2060	***					-8.0551	***	-11.8145	***	(,		(,	
	(1.9212)		(1.9172)						(1.2530)		(1.2469)					
Observations	2455		2455		2455		2455		2758		2758		2758		2758	
Pseudo R^2	0.280		0.282						0.260		0.262					

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

	1111 5 22011							
Variables	All sa	Estimates	Male Sample: Estimates					
v al lubició	Model	1	Model	2	Model	1	Model	2
Years of Schooling			0.1214	***			0.1288	***
			(0.0234)				(0.0256)	
Years of Schooling-Squared			-0.0070	***			-0.0077	***
Education levels:			(0.0011)				(0.0012)	
Primary (Grades 1-4)	0.6551	**			0.6409	*		
	(0.3142)				(0.3339)			
Basic (Grades 1-8(9))	1.2118	***			1.2277	***		
	(0.2785)				(0.2915)			
Secondary General (Grades 9-10(11))	1.3099	***			1.2955	***		
•	(0.2760)				(0.2882)			
Secondary Special	1.2404	***			1.1649	***		
	(0.2856)				(0.2995)			
Secondary Technical	1.1175	***			1.1397	***		
,	(0.2871)				(0.2999)			
High (Tertiary)	0.8881	***			0.8242	***		
Other control variables:	(0.2790)				(0.2909)			
Age	0.6696	***	0.6767	***	0.7921	***	0.7984	***
-8-	(0.0592)		(0.0592)		(0.0624)		(0.0625)	
Age-squared	-0.0126	***	-0.0127	***	-0.0153	***	-0.0154	***
1.80 squares	(0.0013)		(0.0013)		(0.0013)		(0.0013)	
Male	1 5944	***	1 5987	***	(0.0012)		(0.0010)	
	(0.0433)		(0.0432)					
Head f household	-0 6470	***	-0.6614	***	-0.6112	***	-0 6248	***
Tiend T Household	(0.1398)		(0.1394)		(0.1423)		(0.1418)	
No. of children (age of < 15)	-0.0554	***	-0.0566	***	-0.0347	***	-0.0353	***
rto. of children (uge of (13)	(0.0002)		(0.0001)		(0.054)		(0.0102)	
Lives in the rural area	0.2177	***	0 2317	***	0.2502	***	0 2646	***
Lives in the furth area	(0.0388)		(0.0386)		(0.0424)		(0.0421)	
Monthly per capita consumption (in thousands Somoni)	0.0300		0.0284		(0.0+2+)		0.0220	
wonuny per capita consumption (in thousands Somoni)	(0.0273)		(0.020+		(0.0240)		(0.022)	
Voor of 2000	0.2225	***	(0.0272)	***	(0.0274)	***	(0.0277)	***
	(0.0416)		(0.0411)		(0.0464)		(0.0160)	
Voor of 2011	(0.0410)	***	(0.0411)	***	(0.0404)	***	(0.0400)	***
rear of 2011	(0.4703)		0.4989		0.3193		(0.0477)	
Constant	(0.0431) 12 1007	***	(0.0429) 11.4570	***	(0.0479)	***	(0.0477)	***
Constant	-12.1097		-11.43/0		-11.9088		-11.3223	
	(0.7505)		(0.7064)		(0.7774)		(0./301)	
Observations	12633		12633		6203		6203	
Pseudo K-squared	0.272		0.266		0.109		0.101	

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

Level of Education	Years of Schooling	TLSS 20	09	THPS 2	011	Pooled Sample		
No Education	0	0.0113	0.0113 ***		***	0.0156	***	
		(0.0038)		(0.0043)		-0.0014		
Primary	4	0.0217	***	0.0289	***	0.0113	***	
		(0.0027)		(0.0046)		-0.0022		
Basic	9	0.0134	***	0.0061		-0.001		
		(0.0035)		(0.0037)		-0.0014		
Secondary General	11	0.0059	*	-0.0057	*	-0.0062	***	
		(0.0034)		(0.0033)		-0.0014		
Secondary Special	12	0.0018		-0.0114	***	-0.0085	***	
		(0.0037)		(0.0035)		-0.0015		
Secondary Technical	15	-0.0103	*	-0.0258	***	-0.014	***	
		(0.0055)		(0.0045)		-0.0018		
High (Tertiary)	16	-0.0139	**	-0.0287	***	-0.015	***	
		(0.0059)		(0.0043)		-0.0017		
Graduate	19	-0.0212	***	-0.0275	***	-0.0148	***	
		(0.0049)		(0.0017)		-0.0008		
Observations		2455		2758		12633		

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

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



	Linear probability regression: 2SLS			3SLS	
Vatiables	First stage: Years	First stage: Years of	Second stage:	(1)	(2)
	Of schooling	schooling-squared	Migrant	Migrant	Years of schooling
Years of schooling			0.180***	0.131**	
			(0.0673)	(0.0587)	
Years of schooling-squared			-0.00888***	-0.00719**	
			(0.00334)	(0.00303)	
Migrant					-128.8***
Other control variables:					(20.47)
Age	0.612***	16.50***	0.141***	0.143***	14.08***
	(0.152)	(2.755)	(0.0246)	(0.0231)	(2.981)
Age-squared	-0.0102***	-0.293***	-0.00273***	-0.00274***	-0.264***
	(0.00348)	(0.0631)	(0.000541)	(0.000509)	(0.0623)
Male	0.799***	15.91***	0.205***	0.217***	27.48***
	(0.0616)	(1.117)	(0.0102)	(0.00761)	(4.320)
No. of children (age of <15)	-0.103***	-2.009***	-0.00648**	-0.00836***	-1.056***
	(0.0186)	(0.337)	(0.00258)	(0.00224)	(0.293)
Own land used for farming	0.000722	0.0174*	-0.000170**	-0.000163**	-0.0242***
	(0.000574)	(0.0104)	(7.45e-05)	(7.00e-05)	(0.00883)
Rented land used for farming	-5.36e-05	0.00325	-0.000286***	-0.000297***	-0.0421***
	(0.000774)	(0.0140)	(0.000100)	(9.43e-05)	(0.0125)
Own land rented out	-0.00701	-0.168	-0.000377	-0.000366	-0.0189
	(0.0108)	(0.197)	(0.00139)	(0.00131)	(0.149)
Monthly per capita consumption (in thousands					
Somoni)	1.366***	28.71***	0.0249	0.0461*	3.736
	(0.206)	(3.733)	(0.0297)	(0.0260)	(2.836)
Lives in the rural area	-0.334***	-10.22***	0.00304	0.00247	3.832***
	(0.0709)	(1.285)	(0.0156)	(0.0147)	(1.199)
Years of schooling of Household's Head	-0.0275	-1.659***			1.078**
-	(0.0289)	(0.525)			(0.445)
Squared years of schooling of Household's Head	0.00815***	0.215***			-0.0527**
	(0.00146)	(0.0264)			(0.0219)
Constant	1.111	-112.3***	-2.551***	-2.290***	-171.4***
	(1.641)	(29.75)	(0.511)	(0.463)	(35.83)
Observations	7,327	7,327	7,327	7,327	7,327
R-squared	0.111	0.149		0.037	-188.059
IV F-stat			14.65		
Durbin pval			0.00884		

I able 10. Linear Propability Regressions for Simultaneous Migration and Schooling Decisions, 112	LSS 2007
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5. Conclusion

This paper shows how opportunities for international migration may affect the education decisions of potential migrants. Our empirical work illustrates the form of the link between education and migration for a high emigration country. 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 that still dominate their home country professional incomes. The next or near-next group making their decisions 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.

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. This then, as almost all of the literature tells us, is detrimental to economic growth and welfare.

The story we have just told examines the phenomenon of forsaken schooling resulting from opportunities abroad. While high-skilled emigration 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.

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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.



Probability of Migrating by Age