Temporary Migration for Long-term Investment *

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Abstract: In the presence of credit constraints, temporary migration becomes an effective strategy for workers to accumulate capital and finance self-employment activities back home. Data from a new large-scale survey of temporary migrants from Bangladesh provide novel and direct evidence for this link. We use these data to estimate a dynamic model of entrepreneurial investment under financial constraints and asset repatriation by migrants. We then simulate the effect of changes in important policy parameters on emigration, migration duration, asset repatriation and self-employment. Our findings imply that changes in migration costs and conditions abroad have important dynamic repercussions on the labor trajectories of workers over their entire life cycle, including self-employment after return. Vice versa, better access to credit for entrepreneurs at home lowers the extent and duration of migration. This endogenous adjustment in migration behavior mitigates part of the positive effect of policies aiming to support business creation, which highlights the need to jointly investigate migration and self-employment decisions.

JEL codes: J61, D15, F22, O13

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1 Introduction

Temporary migration is common in many parts of the world. As one of the most prominent examples, millions of workers from South and Southeast Asia go to oil-rich Persian Gulf countries on temporary employment visas every year and return home once their contracts expire (OECD 2008; World Bank 2018). For these mostly low-skilled workers, such temporary migration episodes are not only a means to increase their current income and support families at home, but they form an integral part of their lifetime human and physical capital accumulation and investment strategies. Yet, research on temporary labor migration and related economic outcomes, especially within a dynamic context, has been relatively limited, mainly due to data availability (Dustmann and Görlach 2016). Analyzing temporary migration as part of workers' lifetime utility maximization and as a means to overcome credit constraints requires following their labor market trajectories over time and across borders. Standard national surveys and administrative data sources do not ask detailed questions about workers' employment histories and focus on current labor market outcomes instead. Such data limitations prohibit the dynamic modelling of migration episodes. More importantly, static analyses are unable to identify how decisions on when and where to migrate, how long to stay, how much to save, and what kind of employment options to pursue back at home, are intertwined.

In this paper, we estimate a dynamic model of emigration, return and self-employment decisions using a new dataset, which provides novel and direct evidence on the link between temporary migration and self-employment. We focus on contract workers from Bangladesh, where temporary migration is pervasive and economic activity strongly depends on migrants' repatriated savings. We use the estimated model to evaluate the effects of changes in the conditions under which migration takes place, such as the fees paid or the wages earned, on workers' lifetime earnings and employment trajectories. We further show that core development policies, such as loan subsidies for entrepreneurs, can trigger an adjustment in the extent and duration of migration, mitigating part of the policy's intended effect, because the incentive to migrate and accumulate savings abroad may be reduced. This highlights the need to jointly investigate migration and other investment decisions from this dynamic perspective.

The model is closely tailored to the institutional context, in which limited number of foreign job contracts poses a binding constraint to migration choices, demand for migrant labor varies with oil revenues, and migrants face wage and employment risks. The model captures the fact that (i) pre-migration employment outcomes, (ii) access to credit, (iii) migration costs, (iv) foreign labor demand and wages abroad, (v) risk of dismissal and

deportation, and (vi) costs and returns of entrepreneurship jointly determine emigration, timing of departure, choice of destination and duration abroad, as well as the decision to enter self-employment. Migration duration, for instance, is affected by migration costs, and the extend to which these have been covered on credit, but also by the level of assets required to start a better paying self-employment activity. Credit conditions for setting up a business, in turn, determine not only the accessibility of self-employment, but also the incentive to migrate and the amount of savings repatriated by migrants. Thus cost-benefit analyses of implemented policies must account for potentially offsetting changes in migration behavior.

Our main data source is a new and unique survey of return migrants in Bangladesh that was specifically developed to answer these questions. The Bangladesh Return Migrant Survey (BRMS) was designed with the idea that temporary migration is an integral part of workers' life cycle employment process. Hence, it provides very detailed information on the entire employment and migration history of a sample of 5,000 temporary migrants who had returned to Bangladesh at the time of the data collection. This is one of the very few comprehensive surveys on temporary migrants globally and, to the best of our knowledge, the first of this kind in a country from where migration is almost exclusively based on guest worker contracts.[1] The dataset includes detailed information on migrants' personal and family backgrounds, their labor market outcomes before migration, expectations prior to departure about earning and saving prospects abroad, migration expenditures and sources of finance, wages and employment histories at the foreign destination, as well as labor market activities and earnings after return to Bangladesh.

We complement data from the BRMS with nationally representative household and firm surveys, and our modelling of both emigration and return migration choices accounts for selection into the return migrant sample. In particular, the Bangladeshi Household Income and Expenditure Survey (HIES), which provides information on both non-migrants and current migrants, allows us to model the initial emigration decision. We account for the fact that emigration is restricted by the requirement to attain a work visa, and make foreign labor demand an explicit part of our model. We document and leverage the fact that the volume of Bangladeshi emigration strongly depends on the oil price.[2] All major destination countries for Bangladeshi migrants are oil exporters, and fuel revenues exogenously shift the demand for migrant labor in destination countries. To identify individual preference parameters which

[1]For less regulated contexts, in which emigration is more often undocumented than for the case of Bangladesh, the Mexican Migration Project (MMP) and the Egypt Labor Market Survey (ELMS) have a similar design. While the latter is not specifically focused on temporary migrants, it includes a module on past migration of household members currently living in Egypt.

[2]The positive association between oil prices and emigration to the GCC has also been evidenced by Wahba (2015) for Egyptian migrants.

govern migrant supply through emigrate and migration duration decisions, our structural estimation fits the model to data on both emigration rates and the time migrants spend abroad.

Our newly collected data and analysis provide novel and direct evidence on the linkages between self-employment and migration. First, comparing activities before and after migration, we document a strong shift into self-employment upon return. Second, our survey directly asks how self-employment has been financed. Around half of the return migrants in our sample report savings from abroad as their main source of financing. Third, although typically lower than the capital needed for self-employment, migration related expenses in the case of Bangladesh are substantial. We find that low-skilled workers are often able to borrow to pay for migration expenses while they rarely can borrow to finance self-employment activities. One explanation is that migrant workers in our context hold a formal job contract that makes loan repayment more secure and shirking more difficult than for entrepreneurial profits. The credit market can be thought of as segmented, with a clear distinction between migration loans and entrepreneurship loans, with higher or even prohibitive interest rates in the latter. Fourth, we show the empirical dependency of migration duration on the cost of migration and on wages earned abroad, and we document a causal positive effect which earnings accumulated abroad have on self-employment after return.

Why is self-employment, then, so attractive for low-skilled workers? Even though it has been argued that self-employment is a last resort for workers in some contexts in developing countries, evidence from Bangladesh indicates that the vast majority of the self-employed have voluntarily chosen this activity (Gutierrez, Kumar, M. Mahmud, et al. 2019). While informal wage employment usually is readily available for workers, self-employment often generates higher income, but also requires accumulating sufficient assets in the presence of tight credit constraints.[3] We discuss different employment types and resulting income levels in greater detail later in the paper. To motivate our focus on self-employment as an objective of many migrants from Bangladesh, we also show that alternative mechanisms, such as asset accumulation for marriage, are not supported by our data.

We use the estimated structural model to evaluate the effects of three core policy parameters on temporary migration and self-employment in Bangladesh. First, we consider a subsidy that lowers the cost of migration. In our dynamic model, this policy not only raises the prevalence of emigration, but also shifts it to younger ages and reduces the time migrants stay abroad. As a result, we find these effects to lead to a sizable increase in repatriated savings and overall business creation. In particular, emigration at a younger

[3]We should note that self-employment options available in Bangladesh primarily consist of relatively simple occupations such as owning a small store, driving a taxi or running a small business.

age and earlier return contribute to higher self-employment even conditional on the level of repatriated assets, since the longer payoff period makes entrepreneurial investment more profitable for younger individuals. Second, we examine a loan subsidy that reduces the interest rate for entrepreneurial loans. While this naturally makes self-employment a more attractive and accessible option, the policy's effect is mitigated by an endogenous adjustment in migration behavior. Specifically, we estimate that cutting the lending rate in half would lower the emigration rate by 6.1 percent and reduce the average migration duration by 6.6 percent. Taken together, these imply a decrease in in asset repatriation by 7.2 percent. Our joint modeling of migration and entrepreneurship highlights the importance of these endogenous responses, which cost-benefit analyses of policies need to account for. Finally, we investigate an information treatment that aligns individuals' expectations about their foreign earnings potential with the average earnings for different migrant groups observed in our data. Our model predicts that information about the true expected wages paid at a destination decreases emigration by a sizable 24 percent. Whereas individuals naturally benefit from better informed decisions, policy makers aiming to boost business creation may in fact favor individuals overestimating foreign wages, as it encourages emigration and asset formation.

The context in this paper critically differs from the Mexico-U.S. corridor or from migration from Africa and the Middle East to Europe, the focus of much of the existing research. Migration from Bangladesh is almost exclusively regular and temporary, mediated by officially registered agencies. Entry into the main destination countries in the Persian Gulf and Southeast Asia is strictly conditional on holding an employment contract. Due to tight enforcement and severe punishments, overstay and undocumented stays are very rare.[4] Migrants are able to extend their stay if an employment contract is renewed, but must return home otherwise. Temporary migrants from Bangladesh, like most migrants from other origin countries in South and South East Asia, also pay high upfront costs to work overseas. We show in this paper that upfront monetary costs paid to intermediary agents, who match workers with employers in the destination countries, play a critical role in the timing and duration of emigration, and subsequently for self-employment patterns in Bangladesh.

On a theoretical level, the relation between migration and self-employment under credit constraints has been investigated by Rapoport (2002) and Djajić (2010). We build on their insights, and extend the empirical literature on temporary migration and entrepreneurship in several ways. First, we model emigration, the destination choice and return migration

[4]Southeast Asian destination countries like Singapore apply very strict deportation measures to address overstay. Among the GCC countries, overstay is punished by imprisonment in Saudi Arabia and the United Arab Emirates.

jointly with the self-employment decision, accounting for financial constraints. Among the earlier and influential papers that link migration to entrepreneurship, McCormick and Wahba (2001) focus on emigration from Egypt and Dustmann and Kirchkamp (2002) on Turkey. They are followed by Piracha and Vadean (2010) for Albania, Wahba and Zenou (2012) and Mahé (2019) again for Egypt and Brück, Mahé, and Naudé (2018) for the Kyrgyz Republic. Several papers aim at isolating the causal relationships between migration and financial investments. These include Mesnard (2004) for Tunisia, Yang (2006), Yang (2008) and Khanna, Theoharides, and Yang (2020) for the Philippines, Woodruff and Zenteno (2007) for Mexico, and Batista, McIndoe-Calder, and Vicente (2017) for Mozambique.[5] Whereas most papers restrict attention to the link between return migration and entrepreneurship in the country of origin, Wahba (2015) for instance accounts for the selection of migrants from the non-migrant population and for the selectivity of returns. We draw on the insights developed in this literature, but our paper is the first to directly estimate a dynamic structural model of the relationships between migration and self-employment, explicitly accounting for credit constraints, migration costs, the risk of lower than expected earnings abroad and exogenous contract termination.

Methodologically, the paper contributes to the literature that uses dynamic life cycle models to examine the determinants and effects of international migration. Prior papers that estimate dynamic life cycle models to study temporary migration include Kirdar (2012), Kleemans (2015), Girsberger (2017), Lessem (2018), Görlach (2020), and Adda, Dustmann, and Görlach (2021). This more structural economic literature so far has not examined the role of entrepreneurship back home on migration decisions.[6] Although the context we consider, in which stay in a destination country is strictly conditional on having an employment contract, significantly differs from prior work, this feature of contract migration is shared by many other sending countries in South and Southeast Asia. Our paper, therefore, provides new insights on the dynamics of temporary migration from similar developing countries in which migration is highly regulated, and self-employment represents an attractive option over informal wage jobs at home.

The paper is organized as follows. Section 2 provides the contextual background on temporary labor migration from Bangladesh. Section 3 presents the new dataset and reports descriptive statistics for our sample. Section 4 introduces a set of stylized facts that inform and motivate the dynamic model laid out in Section 5. Section 6 discusses estimation and identification of this model, whereas Section 7 presents our results. Section 8 concludes.

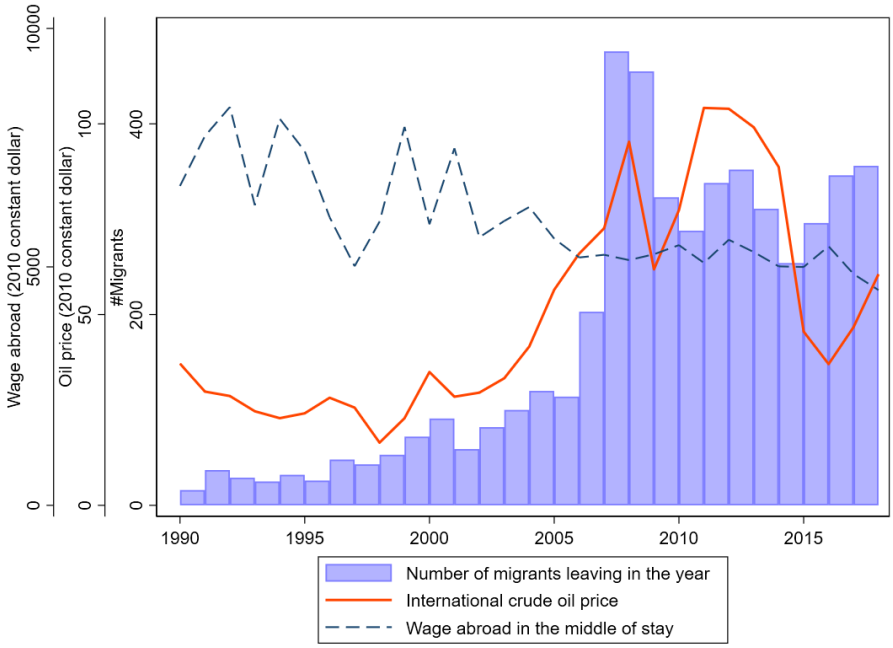
[5] Also see Wahba (2014), Rapoport and Docquier (2006) and Naudé, Siegel, and Marchand (2017) for related surveys.

[6] See Dustmann and Görlach (2016) for a survey of the structural literature on temporary migration.

2 Background and Context

Bangladesh is one of the main origin countries of low-skilled labor migrants. It ranked 5th worldwide, with an estimated stock of 7.8 million of workers abroad at the time of our survey in 2018 (World Bank 2018). The incidence of migration among the working age population is also high. As of 2016, about 13 percent of the total working age male population of Bangladesh (ages 15-64) was employed overseas. Oil-exporting Gulf Cooperation Council (GCC) countries compose the main destinations for these migrants, with over 750,000 workers leaving annually in recent years. The magnitude of migration outflows rose steadily over time as labor demand in the main destination countries increased. Despite the long-term secular trends of emigration, Figure 1 also shows noticeable year-to-year variation that are closely tied to fluctuating oil prices. Fuel exports are an important source of income in all main destination countries, and a major determinant of labor demand. This strong association between oil prices and emigration from Bangladesh is reinforced by the tight regulation of immigration in destination countries, where migration is tied to an employment contract. The figure also shows that wages earned by migrants to not exhibit a similar correlation with oil prices. This indicates that labor demand indeed poses the binding constraint, whereas supply at prevailing wage differences between destinations and Bangladesh is rather elastic. We will exploit this feature in our estimation of the model presented in Section 5.

Figure 1: Migration from Bangladesh and global oil prices



Sources: Bangladesh Return Migrant Survey (BRMS) for the number of migrants who left overseas in a given year and wage levels overseas; OPEC Reference Basket for crude oil prices. *Notes:* The crude oil price for a given year is the inflation-adjusted annual average price in US dollars. Wages abroad for a given year are calculated as the inflation-adjusted average wage of migrants overseas in that year.

Temporary labor migration from Bangladesh is almost entirely low-skilled, reflecting the average education level in the underlying working-age population (Barro and Lee 2013). The gender distribution among the migrants is strongly skewed, with men representing the vast majority of migrants from Bangladesh.[7] The prevalence of male labor migration is driven by the low labor force participation of women (Rahman and Islam 2013), combined with a demand for foreign labor concentrated in brawn-based occupations.[8] The share of women among temporary migrants has increased in recent years, boosted by a 2015 bilateral agreement with Saudi Arabia.

Due to labor market regulations and strict residency laws in the main destination countries (GCC members and Southeast Asian countries), emigration from Bangladesh is temporary by design. Acquisition of citizenship or permanent residency in the destination coun-

[7]Over the period 1991 to 2014, women represented 4 percent of total emigration from Bangladesh, according to Bureau of Manpower, Employment and Training administrative data.

[8]According to the 2016/2017 Bangladesh Labor Force Survey, the labor force participation of women between the ages 15-64 was 35 percent, compared to 85 percent for men in the same age group.

tries are effectively impossible, irrespective of migrants' occupation, education, nationality or duration of stay (Wahba 2015; Fargues 2011; Fargues and De Bel-Air 2015). Low-skilled migrants' stay is strictly conditional on a valid employment contract. These are typically of fixed duration and tied to a specific employer, but contract renewals are possible to extend duration, again conditional on the continued agreement of the employer. The initial duration of the work permit for low-skilled migrants is one year in Malaysia and two years in Singapore, and they can be renewed up to a total duration of 10 years in both countries. There is no explicit cap on total duration of stay for migrants in the GCC countries. However, since their residence at the destination is conditional on holding a contract, migrants cannot stay after they have retired. Similarly, a job loss or the expiration of the contract means mandatory and automatic return to the home country. Furthermore, low-skilled migrants are usually not allowed to migrate with their families. This generates additional costs to migrating and provides further incentives to return.

Besides international migration, internal rural-urban migration is widespread. Although transportation costs have been shown to be important (Bryan, Chowdhury, and Mobarak 2014), the financial constraints for overseas migrants which we investigate in this paper, are considerably tighter, and complemented by strictly enforced legal restrictions.

3 Data

3.1 The Bangladesh Return Migrant Survey (BRMS)

The primary data source in this paper is a newly collected dataset with unique information on full employment histories, migration expenditures, expectations and demographic characteristics of migrants. The Bangladesh Return Migrant Survey (BRMS), conducted by the World Bank in 2019, consists of a sample of 5,000 temporary migrants who had returned from employment overseas to Bangladesh at the time of the survey. It is one of the largest datasets on temporary migration conducted to date and, to the best of our knowledge, the first of this kind in a country from where migration is almost exclusively based on guest worker contracts. It also is the first comprehensive survey on temporary return migrants from Bangladesh, one of the major migrant sending countries globally. It was designed for an analysis of the economic activity of recently returned temporary migrants in rural and semi-urban areas of Bangladesh, and covers all districts in the country.[9]

Eligibility to the BRMS survey was restricted to migrants who had returned from employment overseas to Bangladesh since 2010. This restriction was motivated by reducing

[9]Bangladesh consists of 8 divisions which are further split into 64 administrative districts.

possible recall issues regarding past migration experience while maintaining some variability in the timing of returns. The sampling frame used for the survey was the Bangladesh Census of Population and Housing 2011. The survey sampling used a two-stage stratified cluster sample design: in the first sampling stage, a total of 250 unions throughout Bangladesh were randomly selected from the rural and semi-urban unions of the Census. In the second sampling stage, households with return migrants where randomly selected from a listing carried out in each selected union to identify households with return migrants.

The dataset has several features that enable us to fill important data gaps identified in prior work. First, the survey was designed with the understanding that temporary migration decisions are part of a life cycle optimization process by the workers. As a result, the survey includes very detailed retrospective questions on the entire employment histories of migrants both in Bangladesh (before and after their migration episodes) and while they were abroad. The data allow us to construct the full employment trajectories of the workers in the sample with detailed information on each episode including destination country, dates and duration of stay, labor market outcomes such as wages, occupation, and the reasons for returning.

The survey also records the costs of each migration episode, finely disaggregated by cost categories and the source of financing. Such detailed data are typically not collected in household surveys that include migration modules.[10] Those expenses, however, play a critical role in migration decisions in the context of Bangladesh and other South Asian countries, where they are known to be very high relative to worker' earnings (International Labour Organization 2015; Farole, Cho, Bossavie, et al. 2017).

Questions on expectations held prior to migration regarding labor market outcomes such as wages and savings, allow us to compare them to actual outcomes. G. Borjas and Bratsberg (1996) postulate that lower than expected earnings may be an important reason for return migration from the U.S., where it is less strictly enforced, and McKenzie, Gibson, and Stillman (2013) provide empirical evidence on expectations for migrants from Tonga. Even though recall might be imperfect, our data are the first that allow us to link pre-migration expectations to realized earnings on an individual level.

Finally, the survey collects additional information on migrants' most recent migration episode, such as remittances sent, monthly expenses and savings, professional and personal difficulties encountered, and overall impressions. The survey also includes a detailed module on other demographic characteristics, household enterprises and assets.

[10] One exception is the Labor Market Panel Survey for Egypt, one of the few labor market surveys in sending countries that include a detailed module on past migration, and collects information on intermediary fees paid by migrants. Different from Bangladesh, migration from Egypt includes a larger share of undocumented migrants, in particular in European destination countries.

3.2 The Household Income and Expenditure Survey (HIES)

As the BRMS only covers households with return migrants, we complement it with a nationally representative household survey that samples both non-migrants and current international migrants. The Household Income and Expenditure Survey (HIES, 2016-2017 wave) was designed to be representative at the national and division level. The HIES collects detailed data on the labor market outcomes of each household member such as employment, earnings, and industry of employment, which are comparable to the labor market information captured by the BRMS. Information on non-migrants and current international migrants are collected through an absentee module administered to the household members who stayed in Bangladesh. The HIES also includes information on the debt and assets of the household, as well as detailed expenditure that allows us to calculate household consumption and savings rates.

The Census of Population and Housing 2011 was used as the sampling frame for both the HIES and the BRMS. While the HIES covers both rural and urban areas, the BRMS sampling was designed to capture a representative sample of recent return migrants in rural and semi-urban areas of Bangladesh. We thus restrict the HIES sample to rural and semi-urban areas in all of our comparisons. The HIES was carried out two years earlier than the BRMS.[11] This is an advantage in our context as current migrants in 2016 are likely to be more comparable to the return migrants captured in 2019 by the BRMS. Indeed, the median return migrant in the BRMS had been back in Bangladesh for two years. A. Ahmed, F. Ahmed, Bossavie, et al. (2020) show that the sample composition of temporary migrants in the HIES and the BRMS are quite similar, and that the characteristics and destinations of migrants in the two surveys are also similar to those in administrative data covering the entire population of temporary migrants from Bangladesh.[12]

3.3 Descriptive Statistics

Table 1 reports the summary statistics of the BRMS sample of returning migrants.[13] As mentioned earlier, a clear majority of migrants are men. Women represent only 4 percent of returnees in the survey sample which is consistent with statistics from administrative data from the Bureau of Manpower, Employment and Training (BMET). The low level of female migration can be explained by the low labor force participation of women in

[11] The Bangladesh HIES was carried between April 2016 and March 2017.

[12] The Bureau of Manpower, Employment and Training in Bangladesh publishes aggregate data on the number, composition and destinations of legal migrants from Bangladesh by year of departure.

[13] For a detailed description of the BRMS and its sample characteristics, see A. Ahmed, F. Ahmed, Bossavie, et al. (2020).

Bangladesh and difficult work conditions in the main destination countries (International Labour Organization 2015; Farole, Cho, Bossavie, et al. 2017). In addition, there is social pressure on women to stay behind as they bear household responsibilities and low-skilled temporary migrants are not allowed to take their families with them. Given the small share of female migrants in the sample, combined with the fact that post-migration patterns are likely to differ between genders, we restrict our working sample to men.

Most temporary migrants in the sample have some secondary schooling, while 17 percent have never attended school and only 2 percent have some tertiary education. The average years of schooling in the male sample of return migrants is 6.5 years, which is low compared to average educational attainment across the world (Barro and Lee 2013). Returning migrants have a higher level of schooling than the non-migrant male working age population in Bangladesh (5.8 years), but lower than migrants who are currently overseas (7.6 years), according to the HIES 2016. These differences are largely explained by the older age of returnees compared to current migrants, and increasing education levels across cohorts.

About 75 percent of temporary migrants in the sample have returned from GCC countries. Saudi Arabia is the main destination, with about 25 percent of migrants, closely followed by the United Arab Emirates. Malaysia represents 13 percent of temporary migrants and is the largest destination in Southeast Asia. Only a minority of temporary migrants were employed in other high income countries. Singapore is the leading destination among advanced high income economies.

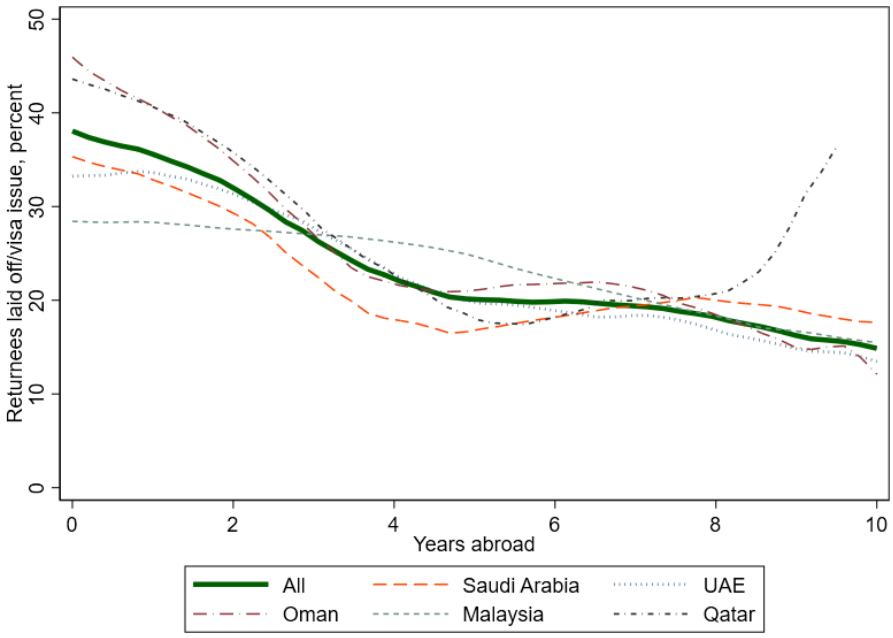
Returning migrants in the sample have been back, on average, for 3 years, with a median of 2 years. The mean current age in the sample is 38, with average departure and return ages of 29 and 35, respectively. Therefore, most workers do not migrate overseas immediately upon entering the labor force, but often work for more than a decade before going abroad.

Table 1: Summary statistics

	BRMS		HIES			
	Return migrants		Non-migrants		Current migrants	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Socio-econmonic characteristics						
Male†	0.96	0.20	0.48	0.50	0.96	0.19
Rural/Semi-urban	0.99	0.10	0.95	0.22	0.99	0.11
Age currently	37.9	8.2	35.3	11.4	34.1	8.8
Age category						
18-24	0.03	0.17	0.21	0.41	0.14	0.34
25-34	0.35	0.48	0.28	0.45	0.39	0.49
35-44	0.39	0.49	0.25	0.43	0.32	0.47
45-54	0.20	0.40	0.19	0.39	0.13	0.34
55-59	0.03	0.17	0.07	0.25	0.02	0.14
Years of schooling	6.6	4.0	5.6	5.0	7.3	3.6
Education level						
Illiterate	0.16	0.37	0.30	0.46	0.08	0.26
Below secondary (1-5)	0.24	0.43	0.25	0.44	0.26	0.44
Some secondary (6-9)	0.36	0.48	0.21	0.41	0.38	0.48
Above some secondary (10-12)	0.22	0.41	0.17	0.37	0.25	0.43
Tertiary (16+)	0.02	0.15	0.06	0.24	0.03	0.16
Married currently	0.88	0.32	0.77	0.42		
Married before migration	0.58	0.49				
Migration costs						
Total costs, 2010 constant dollar	4,203	2,121				
Costs by usage, 2010 constant dollar						
Intermediary fees	2,318	2,195				
Visa/Passport	998	1,544				
Government fees	50.9	224				
Other costs	746	1,386				
Fraction of migrants who borrowed	0.56	0.50				
Share of costs financed by borrowing*	0.76	0.30				
Stay abroad						
Destination country						
*GCC***	0.74	0.44			0.62	0.49
Southeast Asia	0.17	0.38			0.21	0.41
Other country	0.08	0.28			0.17	0.38
Age at departure	28.5	7.2			28.1	8.1
Duration of stay at destination	6.5	5.6			6.3	5.2
Return earlier than planned	0.25	0.43				
Annual income, 2010 constant dollar	5,299	4,703				
After return/Currently						
Age at return	34.9	8.1				
Years since return	2.7	2.6				
Employment status currently***						
Not working	0.17	0.38	0.16	0.36		
Waged worker	0.29	0.45	0.56	0.50		
Self-employed	0.54	0.50	0.28	0.45		
Annual income, 2010 constant dollar	1,280	499	1,163	1,174		
Observations	4,709		47,137		3,571	

Notes: Sample is restricted to males aged 18-59. †Here, the mean is the share of males in the full sample. *Conditional on having taken a loan to migrate. **For column 3 to 6, the GCC does not include Bahrain, which is coded as "others" in the original HIES data. ***These statistics exclude individuals who have been back in Bangladesh for less than a year at the time of the survey.

Figure 2: Incidence of unplanned returns among all returning migrants

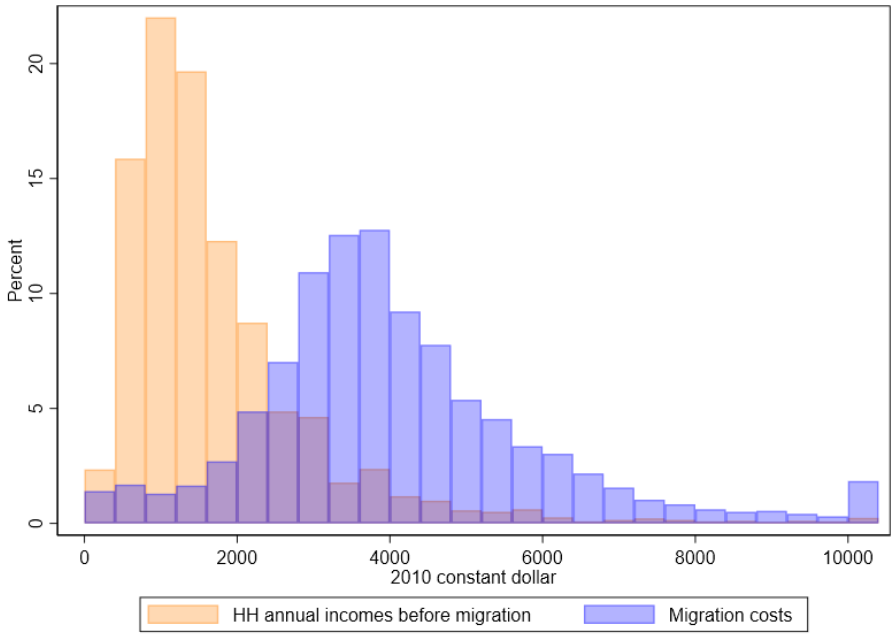


Source: Bangladesh Return Migrant Survey (BRMS)
Note: Returns are categorized as unplanned if migrants report that their main reason for returning was being laid off by their employer, having visa issues, or being expelled from the destination country. Statistics are reported for the top five destinations of return migrants in the BRMS sample.

Despite tight legal restrictions governing migration from Bangladesh, we observe substantial variation in the duration of migration episodes in our sample (Table 1). The median and mean duration of stay among migrants to all destinations are 4.7 and 6.5 years, respectively. Close to a quarter of migrants stayed abroad for less than two years, while a similar proportion stayed overseas for more than 9 years. Almost half of return migrants in the sample returned earlier than they expected or before the end of their employment contract. This implies many of the return migration in our sample were involuntary. As shown in Figure 2, there is a negative relationship between the share of forced returns and duration of stay overseas. Temporary migrants who stayed overseas for only a year or two often returned because they were laid off or had Visa issues. The share of forced returns is of about 40 percent among migrants who spent at most a year overseas, compared to less than 20 percent for those who spent 8 years or more. This pattern hold across different destinations. Repeated temporary migration, as captured at the time of the survey, is uncommon: 97

percent of returning migrants in the BRMS have made only one trip abroad, excluding short visits during holidays. The very high fixed costs of temporary migration is likely to be the driving factor behind the limited incidence of repeated migration.

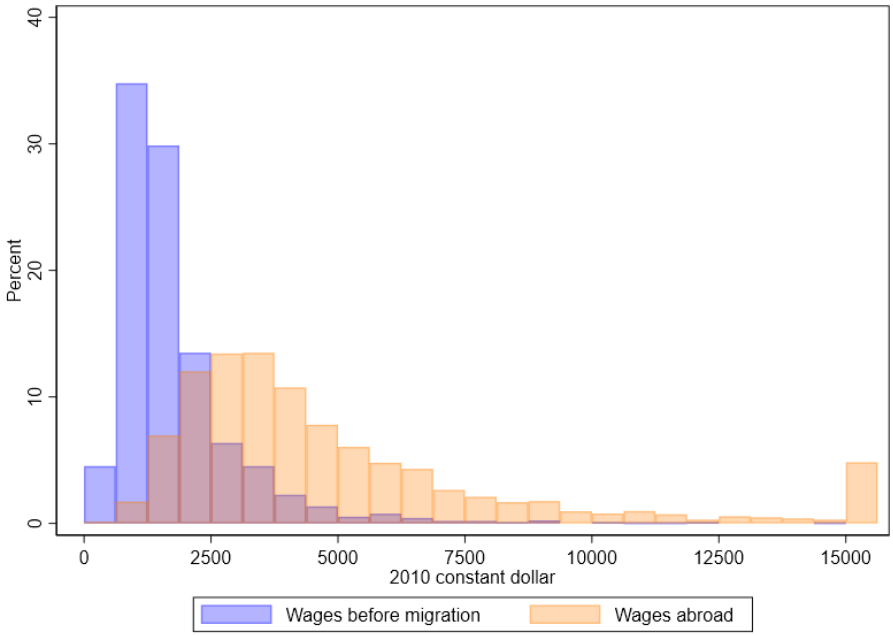
Figure 3: Temporary migration costs and annual household income at the time of departure



Source: Bangladesh Return Migrant Survey (BRMS)
Notes: Annual household income before migration and migration costs are denoted in 2010 constant USD. The last bar in each distribution includes annual household incomes or migration costs above $15,000.

Temporary migration represents a considerable investment for workers. Total expenses for any migration episode are quite large compared to earnings in Bangladesh or even overseas (Figure 3). The median total cost reported by returning migrants equals close to one year of foreign earnings, three years of earnings of a wage worker in Bangladesh or over two years of household income. Intermediary fees are by far the largest item, at 55 percent of total migration costs, followed by visa fees with about 20 percent of costs. As a result of these large upfront costs, most migrants in the sample report that they had to borrow to finance their migration.

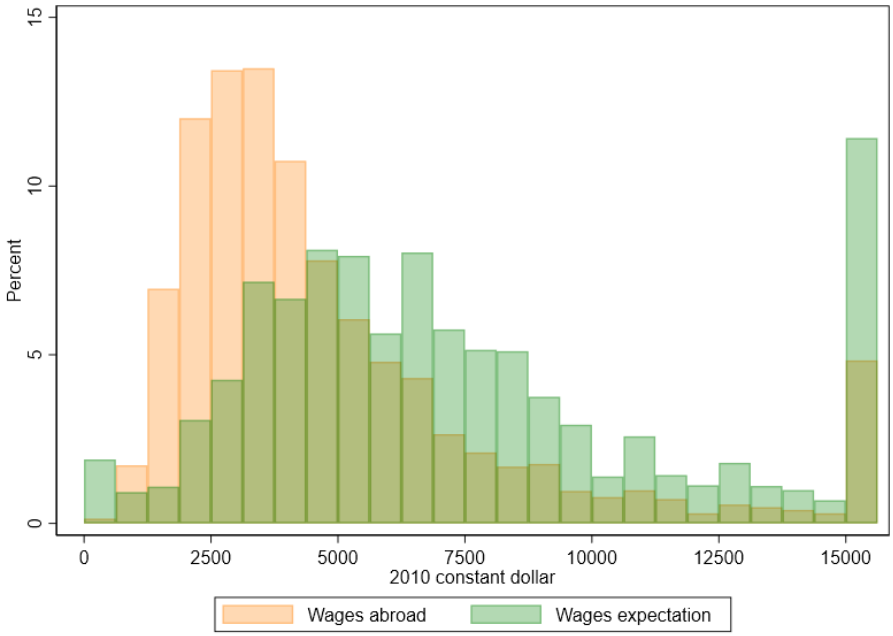
Figure 4: Earnings of temporary migrants in Bangladesh and abroad



Source: Bangladesh Return Migrant Survey (BRMS)
Note: Wages are annual and measured in 2010 constant USD. Statistics are for individuals who were employed before migration and after return to Bangladesh. The last bar of the distribution includes annual wages above $15,000.

These high expenses appear worthwhile for many migrants, as the median wage abroad exceeds their pre-migration wage in Bangladesh by around three times (Figure 4). While almost all migrants are employed in low-skilled jobs, we observe differences in wage levels across different destinations. For instance, the median wage in Malaysia—the destination with the highest wages among the top five destinations—is about 45 percent higher than it is in Qatar. Finally, expectations of migrants about their own earnings potential abroad are even higher. As shown in Figure 5, prior to their departure, migrants systematically overestimate the wages they will earn abroad by a large margin. The median overestimation is around 50 percent. In our empirical analysis, we show how reducing this overestimation would improve welfare.

Figure 5: Expected and actual earnings of temporary migrants overseas



Source: Bangladesh Return Migrant Survey (BRMS)
Note: Earnings are annual and measured in 2010 constant USD. Data on wage expectations prior to departure was collected retrospectively at the time of the survey. The last bar of each distribution includes annual wages above $15,000.

4 Stylized Facts on Temporary Migration and Entrepreneurship

This section presents several stylized facts that motivate the analytical model, estimation and policy simulations.

Stylized Fact 1: *The rate of self-employment is significantly higher among returning migrants*

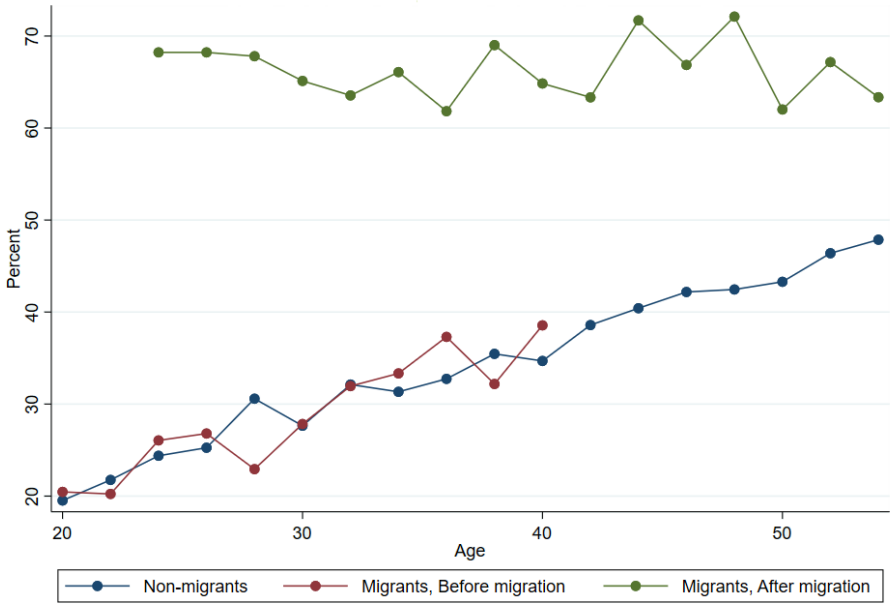
Three main patterns emerge when we analyze the share of working-age men who are self-employed at a given age and by migration status. As Figure 6 shows, first, self-employment increases with age for both non-migrants and migrants before their migration. This pattern is compatible with the existence of credit constraints people face. Workers need to accumulate a certain level of assets to cover the startup expenses of self-employment and entrepreneurial activities. Second, the self-employment rates for both non-migrants and for migrants prior to their move abroad are very similar across ages (blue and red lines in Figure 6). Migrants and non-migrants may differ in other dimensions, yet their propensity to become self-employed in the absence of migration is almost identical. Third, and most importantly for this paper, the rate of self-employment of returning migrants is considerably higher than that of non-migrants and migrants before moving, at any age (green line versus the red and blue lines). The gap in self-employment rates between return migrants and non-migrants is the largest at younger ages.[14] For instance, 65 percent of 30 year old migrants in our sample are self-employed after return, versus 28 percent of non-migrants. While this difference has been pointed out in different contexts, our data facilitate a comparison not only with non-migrants, but also with migrants' activity prior migration. This within-individual comparison strengthens the case that migration is instrumental in business creation in the country of origin. As opposed to the non-migrants, the rates of self-employment for return migrants are high across ages, between 60 and 70 percent. As a result, the gap in self-employment narrows with age, but never closes. In support of these patterns, data from the BRMS show that over 90 percent of the enterprises owned by return migrants have been established after return. In other words, self-employment patterns are not driven by other forces such as returning migrants taking over the family businesses after return. This descriptive evidence highlights the role played by temporary migration in accelerating transitions of workers into self-employment. As we show below, faster asset accumulation is the main

[14] Figure 6 includes both dependent and self-employed workers in agriculture. Excluding that sector reduces the self-employment rate but otherwise the pattern carries over.

channel behind this observation.

While self-employment can be a last resort for workers in certain contexts (Gindling and Newhouse 2014), evidence from Bangladesh indicates that the vast majority of the self-employed choose it for other reasons. Gutierrez, Kumar, M. Mahmud, et al. (2019) report that 82 percent of the self-employed list the ability to work independently and higher incomes as the main reasons behind their decisions. The same study also finds that the self-employed stay in the same activity much longer than casual laborers and wage employees in the private sector. Self-employment thus appears to be an "absorbing state" for many workers in Bangladesh.

Figure 6: Share of self-employment among the employed working age population

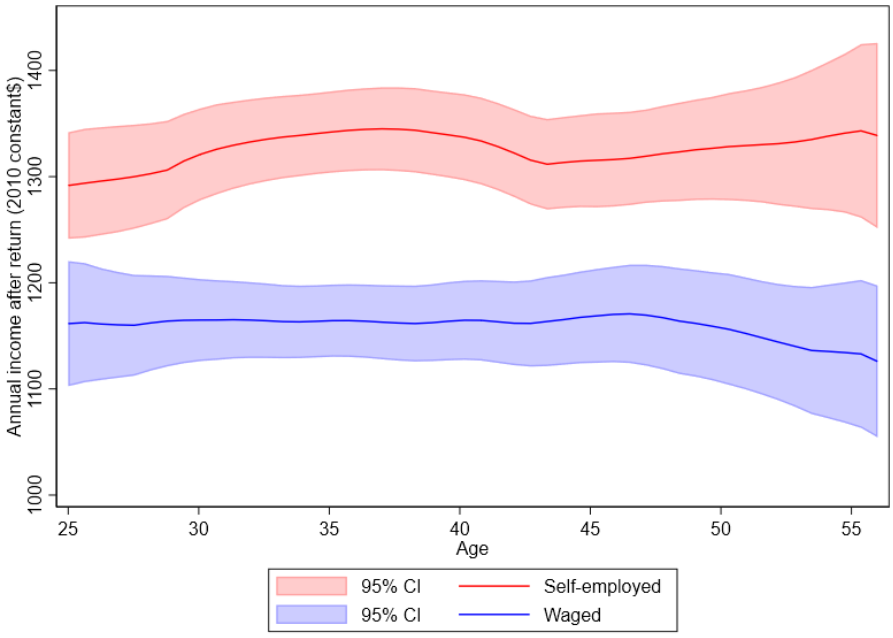


Sources: Bangladesh Return Migrant Survey (BRMS) for migrants; Household Income and Expenditure Survey (HIES) for non-migrants.
Notes: Statistics are for males aged 20-55. To smooth the curve, each point is the mean of a two-year age cohort.

Figure 7 shows that the self-employed earn higher incomes than wage workers, at any given age. Median monthly earnings of migrants after their return is 168 USD for entrepreneurs with paid employees and 101 USD for self-employed individuals with no other paid employees. In contrast, median earnings of returning migrants who work as casual

laborers is 83 USD.[15] These earnings patterns by employment status are consistent with those of non-migrant workers in Bangladesh as shown in the Household Income and Expenditure Survey (HIES) and in Gutierrez, Kumar, M. Mahmud, et al. (2019). In addition to higher monthly earnings, Figure 7 highlights another important distinction: income levels of wage workers start to decline after age 45, presumably due to the physically demanding nature of many jobs. Self-employed workers, in contrast, can sustain their employment and already-higher income levels for much longer, until age 65 in most cases (as reported in the HIES). These patterns, combined with the evidence listed earlier, is strongly indicative of the attractiveness of self-employment compared to wage employment in maximizing lifetime welfare.

Figure 7: Earnings of workers after return, by type of employment



Source: Bangladesh Return Migrant Survey (BRMS).
Note: Earnings are annual and in 2010 constant USD. The curves report average unconditional monthly wages after applying a local polynomial smooth. Due to the small number of observations in the tails, the sample is restricted to males aged 25-55.

[15] Earnings are adjusted to 2010 constant dollars.

Stylized Fact 2: *Entrepreneurs face tight credit constraints while migrants are able to borrow to finance migration expenses*

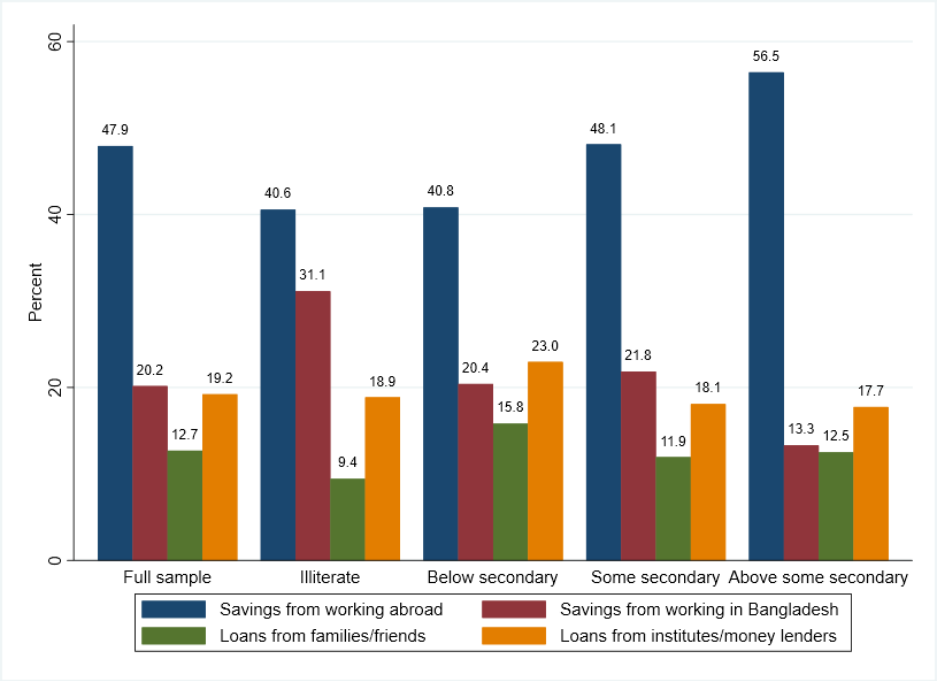
As in many other developing countries, individuals in Bangladesh who want to start a business need initial capital, but face credit constraints.[16] Although self-employment appears to be the preferred employment option among many low-skilled workers in Bangladesh, most individuals enter it at a relatively later age. In the HIES data, the median age of self-employed individuals in Bangladesh is 42, compared to 33 for wage employees, and 35 for daily laborers. In addition, the share of self-employed workers increases steadily with age, from about 20 percent at age 20 to close to 50 percent at age 55 (Figure 6).[17] In contrast, Figure 6 above shows a high self-employment rate among returnees even at younger ages. These patterns are consistent with the existence of credit constraints preventing individuals to start self-employment activities at a younger age as they need to accumulate savings.

Several other data sources provide more direct evidence of credit constraints faced by individuals seeking self-employment. According to the World Bank Bangladesh Informal Firms Survey of 2010, the average startup cost of a self-employment activity represents about two and half years of the average household income. The 2010 Survey of Firms in Bangladesh reports that only 10 percent of current employers funded their startup capital though Bank loans, a finding also supported by W. Mahmud (2006). For the specific population of returning temporary migrants studied by this paper, the BRMS data show that 70 percent of individuals who are currently self-employed used their own savings – and primarily savings accumulated while working abroad – as the main source of finance (Figure 8). In contrast, 19 percent of self-employed return migrants in the BRMS sample report using loans from private lenders as their primary source of finance. These shares do not show much variation across education groups.

[16] For cross-country evidence on credit constraints to self-employment in developing economies, see Beck (2007).

[17] Using a large sample of workers in developing countries around the world, Gindling and Newhouse (2014) also evidence that the rate of self-employment in developing economies increases with age until the mid-forties, although it tends flattens after that.

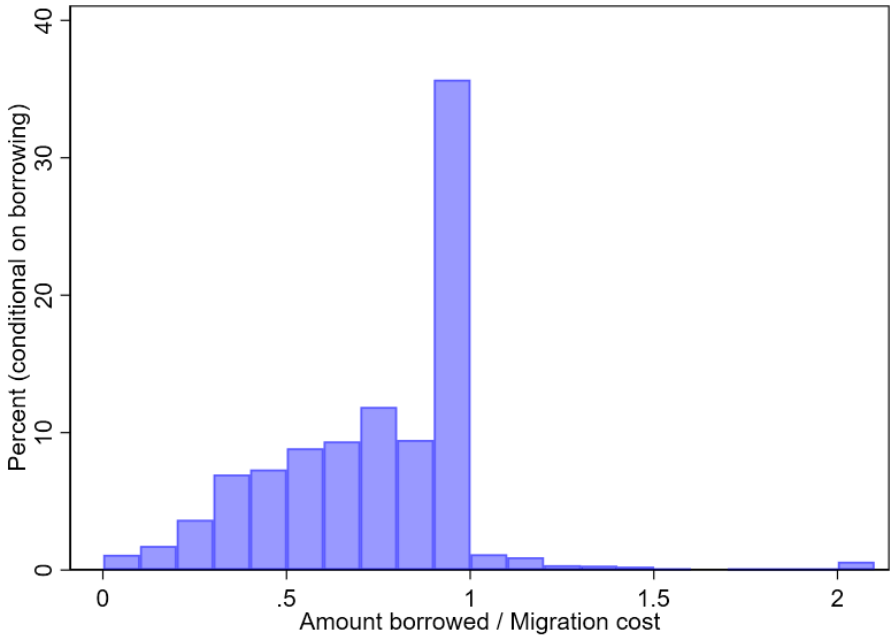
Figure 8: Primary source of startup capital for self-employment



Source: Bangladesh Return Migrant Survey (BRMS)
Note: For each non-agricultural enterprise owned by the household, a return migrant chooses two sources of startup capital for the question "what were the main sources of start-up capital for this enterprise?". This graph shows the distribution of the primary source that respondents list.

While there is strong evidence of severe credit constraints faced by start-up entrepreneurial activities in Bangladesh, migrants often use credit to pay for their upfront migration related expenses and fees. Figure 9 shows that, in our sample, around 70 percent of the migrants from Bangladesh used loans to finance the majority of their migration expenditures. Among those who borrowed, over 35 percent of the migrants covered all of their migration costs through a loan. On average, 60 percent of the total costs were covered by a loan among the migrants who borrowed to finance their expenses.

Figure 9: Distribution of the share of total migration costs financed by a loan



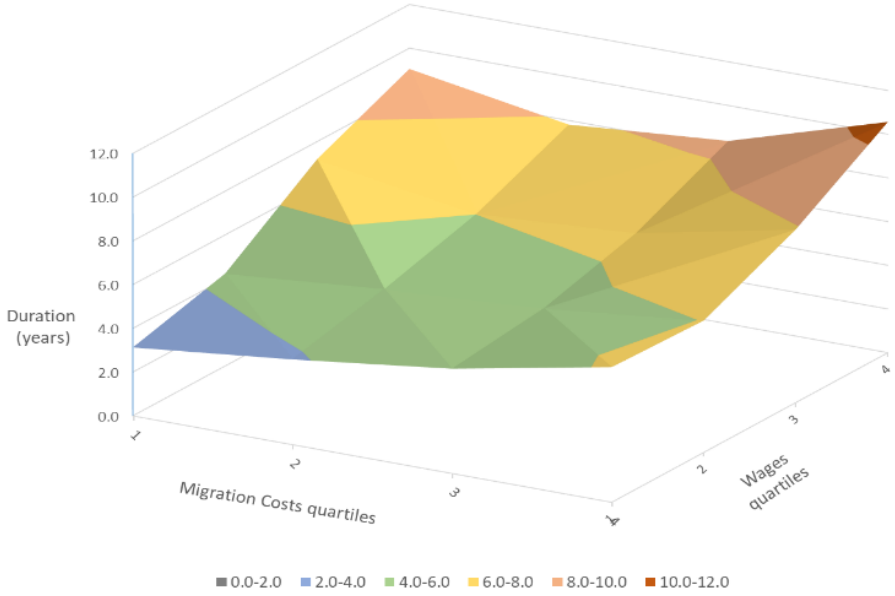
Source: Bangladesh Return Migrant Survey (BRMS).
Note: The graph shows the distribution of the loan to migration cost ratio, conditional on borrowing. The last bar to the right of the distribution captures loan amounts that are over twice the migration costs, which represent less than 1% in the sample.

The ability to borrow for migration, but not for self-employment, can be explained by several reasons. First, it is significantly less risky for lenders to finance a worker's migration expenses. As we discuss earlier, low-skilled workers going to the Persian Gulf or Southeast Asian countries cannot migrate without a valid contract that specifies a wage and initial duration. Such contracts serves as a strong indication to lenders that the migrant will have the requisite income to pay back the loan. In addition, migrants cannot settle permanently in these countries, and almost never migrate with their families. In short, they have relatively secure wages and are guaranteed to come back home. In contrast, earnings from self-employment are more uncertain and risky. The likelihood to default on business loans is therefore higher than for a loan to finance migration. Second, the agency problem faced by lenders is more pronounced in the case of entrepreneurship. While migrants' earnings abroad are easily verifiable given the formal nature of migration arrangements, it is difficult for lenders to verify self-employment earnings. The markets for migration loans and entrepreneurship loans can thus be thought of as two separate credit markets, where in the latter case interest rates are either significantly higher or possibly prohibitive.

Stylized Fact 3: *Duration of stay overseas increases with migration costs and wages*

There is a strong positive association between migration costs, wages abroad and the duration of stay at the destination country (Figure 10). First, migrants who pay higher upfront migration expenses tend to stay longer at the destination. This finding is intuitive if migrants aim to achieve a minimum level of net savings during their migration episode. Holding everything else equal, an increase in migration costs raises the length of stay required to recover the upfront expenses and reach the level of desired savings.

Figure 10: Duration of stay abroad, as a function of migration costs and wages overseas



Source: Bangladesh Return Migrant Survey (BRMS)
Note: Wages are grouped into four quartiles according to monthly wages abroad in 2010 PPP-adjusted USD. Migration costs quartiles are based on total migration costs in 2010 PPP-adjusted USD.

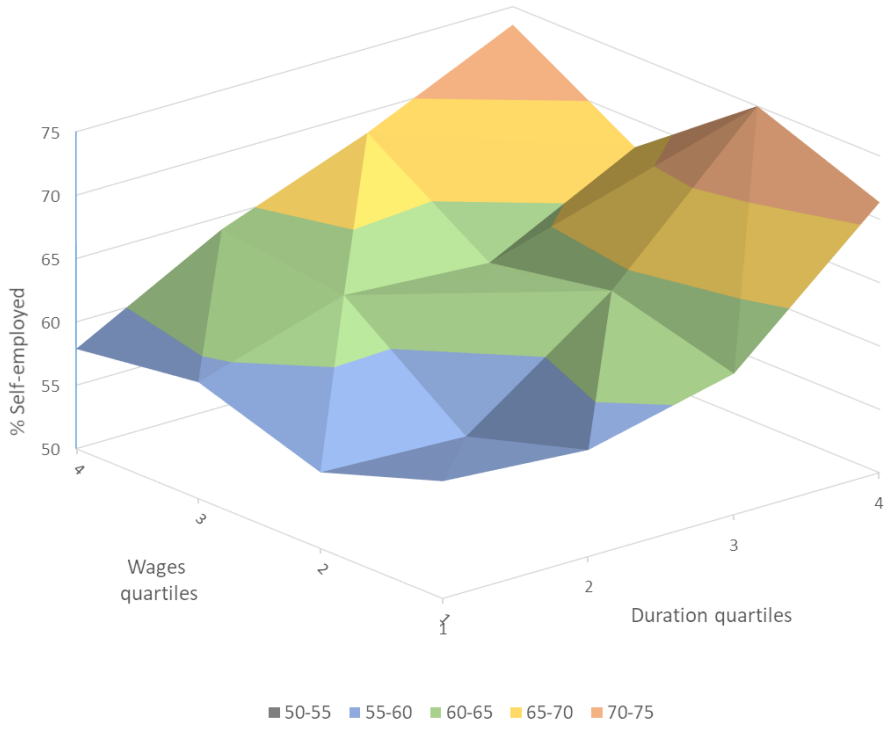
Second, migrants who earn higher wages at the destination country also stay there longer. The literature on the relationship between migrants' wages and duration of stay suggests that this relationship could go in either direction. On one hand, higher wages can increase incentives to stay longer to maximize lifetime earnings. On the other hand, migrants with a target level of savings can reach this target earlier when they have higher wages. Figure 10

indicates that the first channel tends to prevail, in particular when upfront costs are high. We do not find strong evidence in the data that the risk of being forced to return due to visa issues or contract termination decreases for higher skilled migrants. Yet, the model we estimate below accounts for this possibility.

Stylized Fact 4: *Higher earnings abroad increase the likelihood of self-employment after return*

The likelihood of a migrant to become self-employed after returning home increases with his net cumulative earnings abroad. These earnings are a function of migration duration, migration costs, and wages abroad. Figure 8 above indicates that earnings abroad are the main source of the investment capital for workers who became self-employed after their return. In line with this, Figure 11 shows that both monthly wages abroad and duration of stay increase the probability of self-employment after return.

Figure 11: Share of self-employment after return by duration of stay and monthly wage abroad



Source: Bangladesh Return Migrant Survey (BRMS)
Notes: The sample is restricted to return migrants who were employed at the time of the survey and had been back to Bangladesh for at least a year. Wages are grouped into four quartiles according to the monthly wages abroad in 2010 PPP-adjusted USD.

To complement this descriptive evidence, we regress self-employment status after return on workers' total earning overseas controlling for observable factors, first using an OLS estimation. Formally, the equation we are interesting in estimating is the following:

$$SelfEmp_{idot} = \alpha + \beta \ln(Cum.Earning_{idot}) + X'_{it}\theta + \gamma_o + \delta_d + \eta_t + \epsilon_{idot} \quad (1)$$

Where the dependent variable $SelfEmp_{idot}$ is a binary variable taking the value one if individual i from division o becomes self-employed after returning from country d in year t, zero otherwise. X_{it} is a vector of control variables, including age and age squared at the time of survey, a dummy for self-employment before migration, education level dummies. γ_o, δ_d and η_t represent origin division fixed effects, destination countries fixed effects and year of return fixed effects, respectively. The main explanatory variable of interest, the logarithm of cumulative earnings overseas, is the logarithm of the workers' monthly wage

in the destination country in PPP Bangladeshi Takas multiplied by the duration of stay abroad, and β is the main coefficient we are interested in estimating.[18]

Column (1) and (4) of Table 2 first report the estimates for β when Equation 1 is estimated using a simple OLS estimation. Both columns show that there exists a positive and statistically significant correlation between total earnings abroad and the likelihood of self-employment after return, both in the full sample and among working individuals. OLS coefficients, however, may not be intepreted as causal, as total earnings at destination are likely to be endogenous to the desire to become self-employed after return. In particular, the optimal migration duration and the occupational choice after return may be determined simultaneously (Dustmann and Kirchkamp 2002).

To address this endogeneity issue, we instrument total earnings overseas by exploiting the specific context of migration from Bangladesh, the largest part of which is directed to countries from whom fuel exports are a major determinant of economic activity. Specifically, we use the growth rate in oil prices during the migrants' stay overseas, interacted with the oil dependency of the GDP of the country of destination. The oil price growth rate is calculated as the ratio of oil prices when the individual returned to Bangladesh over the one when the individual left the country. The destination-specific oil GDP dependency is measured by the mean of the annual oil rent over GDP in a each destination country for all years from 1996 to 2017. Formally, the instrumental variable for total earnings abroad, denoted Z_{idt}, is constructed as:

$$Z_{idt} = OilGrowth_{it} \times OilGDP_{d} \tag{2}$$

The intuition behind this instrumental variable strategy is that exogenous fluctuations in oil prices affect migrants' duration of stay overseas by increasing labor demand by employers and the likelihood to have their labor contract extended. The power of the instrument thus resides in oil prices affecting migrants' total earnings through adjustment in quantities rather than prices. Indeed, we do not observe any visible association between wages overseas and oil prices, while demand for foreign labor appears very responsive to oil prices (Figure 1). Such adjustments through quantities as opposed to prices in response to GDP shocks in destination countries has also been evidenced by McKenzie, Theoharides, and Yang (2014) in the context of migration from the Philippines. Importantly, since we condition on full sets of year and destination effects, only the interaction of oil price growth and the share of oil revenue in GDP is used for identification.

[18]PPP rate in the middle of migration is used to convert foreign currency to Bangladeshi Takas.

Table 2: Earnings abroad and self-employment after return, reduced-form estimation

	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample			Working individuals only		
	OLS	2SLS	First Stage	OLS	2SLS	First Stage
Dependent Variable	Self-employed	Self-employed	ln(Cum.Earn.)	Self-employed	Self-employed	ln(Cum.Earn.)
ln(Cum. Earning abroad)	0.031***	0.112***		0.040***	0.110**	
	(0.008)	(0.032)		(0.009)	(0.047)	
Oil price growth × Oil rents/GDP			0.855***			0.824***
			(0.119)			(0.112)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Year of return FE	Yes	Yes	Yes	Yes	Yes	Yes
Origin division FE	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics of excluded instruments		51.9			54.3	
Observations	3354	3354	3354	2775	2775	2775

Notes: * p<0.10, ** p<0.05, * p<0.01. Standard errors clustered at the destination-origin level are reported in parenthesis. The sample is restricted to males age 18-59 and excludes individuals who have been back in Bangladesh for less than a year. Control variables include age and squared age at the time of survey, educational attainment, and a dummy for self-employment prior to migration. Oil price growth is the ratio of oil price at the time of return over the one at the time of departure.

One possible identification issue regarding the exclusion restriction may be that fluctuations in oil prices directly affect the relative attractiveness of wage- and self-employment activities in the home country (El-Mallakh and Wahba 2021). This might arise, for instance, when wage and self-employment work are concentrated in different sectors in Bangladesh. Two arguments mitigate this concern: First, the estimation conditions on a full set of year effects, so that only the interaction with destination country specific oil shares in GDP provide the identifying variation used.

Second, the majority (two thirds) of rural and semi-urban return migrants who compose our sample work either in small scale agriculture or retail businesses. According to the 2016 industry-level Input-Output tables for Bangladesh, both sectors have a very small share of input value coming from coke or refined Petroleum, which is around 1.2 percent in agriculture and 0.2 percent in retail. We do, however, observe a slightly higher importance of the transportation sector for self-employed (21 percent) compared to wage workers (15 percent) in our sample. Since transportation is more dependant on oil-derived inputs compared to other sectors, we also run our IV estimation on a sample that excludes workers employed in transportation. The results of this robustness check are reported in Table A2, and show that the IV coefficients are virtually identical once the transportation sector is excluded.

To provide further evidence that oil prices do not directly affect the relative attractiveness of self-employment and wage work in Bangladesh, we investigate changes in the share of self-employment among non-migrants over time, and its possible association with fluctuations in oil prices. We do so by using several waves of the Bangladesh Labor Force Survey which is nationally representative and available at several points in time between 2000 and 2017, and by focusing on workers who have not migrated overseas. As shown in Figure A1, the fraction of non-migrants who are self-employed in rural and semi-urban areas - which are the areas covered by the BRMS survey - is fairly stable over time. We also do not observe any noticeable association between the share of self-employment and large fluctuations in oil prices over time.

Columns (2) and (5) of Table 2 display our estimation results using this instrumental variable approach. The first-stage coefficient on the oil price instrument reported in column (3) and (6) is of the expected sign; a positive growth in oil prices during the migrant's stay abroad increases the total value of earnings overseas in local currency. The coefficient is statistically significant at the one percent level and the F-statistic for the excluded instrument suggests a strong first stage. The estimated effect of cumulative earnings overseas on the likelihood to become self-employed after return is sizable, with a semi-elasticity of around 0.1. As shown in Table A2, those findings are virtually unchanged when we exclude return migrants who are employed in the transportation sector, which uses a higher fraction of

oil-derived inputs than other sectors of activity.

These stylized facts jointly suggest that accumulating financial assets overseas to become self-employed after return is a key driver of temporary migration from Bangladesh. For other contexts, human capital accumulation abroad has been pointed out as an important factor. A wage premium for returning migrants has been estimated for instance for migrants from Hungary (Gang and Yun 2000), Albania (De Coulon and Piracha 2005), West-Africa (De Vreyer, Gubert, and Robilliard 2010), Mexico (Lacuesta 2010; Reinhold and Thom 2013), Romania (Ambrosini, Mayr, Peri, et al. 2015) and Egypt (Marchetta 2012; Wahba 2015; El-Mallakh and Wahba 2017; El-Mallakh and Wahba 2021).

In the context of migration from Bangladesh, however, human capital accumulation overseas is unlikely to be a key determinant of temporary migration decisions and post-return outcomes. The vast majority of migrants from Bangladesh are employed in low-skilled jobs in the GCC and South-East Asian countries. Those occupations rely on physical strength and tend to be repetitive, providing little opportunity for learning and human capital accumulation. In addition, the occupational patterns of individuals before, during, and after migration do not seem compatible with the human capital accumulation hypothesis (Table A3). While two thirds of temporary migrants in the sample were employed in the construction sector at destination, only 10 percent were employed in the same sector after returning to Bangladesh (Panel A of A3). This proportion is only slightly higher than for non-migrants in the HIES data (7 percent). In addition, 24 percent of the returning migrants were employed in construction *prior* to their migration. This suggests that some migrants accumulate experience in the sector prior to departure. The proportion of migrants employed in construction, however, is significantly lower after return. Likewise, only 14 percent of returning migrants were working either in retail or agriculture overseas, while over two thirds were employed in either of these two sectors back in Bangladesh. Furthermore, migrants who were employed in the construction sector overseas do not transition into that same sector at significantly higher rates after return, compared to individuals who were employment in transport and utility (panel B of A3). Similarly, temporary migrants employed in transport and utility overseas do not disproportionately transition into that sector after return. Overall, this descriptive evidence on sectoral patterns lends little supports for human capital accumulation as a driver of temporary migration patterns from Bangladesh.

Another possible motivation for temporary migration from low-income countries is the improvement of marriage market prospects through asset accumulation overseas. The marriage and migration patterns of temporary migrants in the BRMS sample, however, do not seem compatible with this hypothesis. Appendix Figure A2 depicts the shares of married individuals before and after migration, at a given age. If migrants were moving overseas to

improve their migration prospects, one would expect the share of temporary migrants who are married after migration (compared to the share before departure) to be shifted upwards. However, as shown in Figure A2, the share of individuals who are married before and after migration, at any given age, is virtually unchanged.[19] This descriptive evidence does not support the marital prospect improvement as a major mechanism driving temporary migration decisions in our context.

5 Model

We present a dynamic model that allows us to capture the emigration, return migration as well as wage and self-employment decisions of temporary migrant workers across multiple destinations and time periods. Each individual i in the model is identified by his education level e_i and age a_{it} at time t.[20] While education is fixed over the lifetime of the individual, age increases by one in each time period (year). Every individual makes several interrelated decisions in each period t. First, he chooses a location $l_{it} \in \{B, M, O, Q, SA, UAE\}$ to live and work in that period. Besides the option of staying in Bangladesh (B), he can choose among the top five foreign destinations. These are, in alphabetical order, Malaysia (M), Oman (O), Qatar (Q), Saudi Arabia (SA) and the United Arab Emirates (UAE), which jointly account for 82 percent of all migrant workers in our sample. Modelling the choice between alternative destinations is important, as for instance a worsening in the conditions in one country will divert migrant flows elsewhere (Bertoli, Moraga Fernández-Huertas, and Ortega 2013).

If the migrant is already residing in a foreign destination, $d \in \{M, O, Q, SA, UAE\}$, the individual, then, chooses whether to extend the stay for another period at the same location or return to Bangladesh.[21] Since it is quite rare among migrants from Bangladesh, we rule out the possibility of moving directly from one foreign destination to another.

The second critical decision of the individual is about his employment type, denoted by $s_{it} \in \{S, W\}$ where the option S indicates self-employment and W indicates wage employment. Emigration, return or self employment decisions have a financial component.

[19] Unreported results show that the same holds when we disaggregate the sample by education groups. These results are available upon request.

[20] We use male pronouns to refer to the migrants since over 95 percent of them are men, as seen in Table 1.

[21] We use the phrase 'destination' and superscript d to refer to the five foreign countries that host a large majority of the migrants. The phrase 'location' and the superscript l refer to any one of these countries as well as Bangladesh. In other words $d \in \{M, O, Q, SA, UAE\}$ and $l \in \{B, M, O, Q, SA, UAE\}$.

If a wage worker in Bangladesh decides to emigrate to a foreign destination or switch to self-employment, then he has to undertake an investment which needs to be financed via personal savings, borrowing or a combination. If the individual stays in his current location and employment, he continues to allocate that period's income between savings and consumption which, in turn, determine his stock of assets and future investment decisions. We now describe each of these decisions and variables in more detail.

5.1 Employment and Assets

Wage employment in any given location l yields labor income $w_{it}^l = w^l(e_i, a_{it}, \alpha_{it}^{l,W})$ which is a function of the education level e_i, current age a_{it}, as well as on unobserved random factors $\alpha_{it}^{l,W} \sim N(0, \sigma_{l,W}^2)$. When working in one of the foreign destinations, $d \in \{M, O, Q, SA, UAE\}$, migrant workers face an exogenous risk that their contract is terminated, in which case, they are forced to return to wage employment in Bangladesh. The probability of termination and forced return, $\delta_{it}^l = \delta^l(e_i, a_{it}, y_{it})$ is specific to the destination and, again, depends on an individual's age and education level, as well as on the time since migration to the destination country, denoted by y_{it}. In parallel, wage workers in Bangladesh also face a risk of unemployment which we denote by $\delta_{it}^B = \delta^B(e_i, a_{it})$. Migration duration naturally does not enter this expression since the individual is at home. Individuals are assumed to be risk neutral utility maximizers, and we adjust wages in Bangladesh by these employment probabilities.

Both wages in Bangladesh and in foreign destinations are in principle, like other prices, equilibrium outcomes. However, Figure 1 shows that the real wages paid to Bangladeshi migrants in our sample neither vary with international oil prices nor with the scale of migration, but are relatively stable over the time period we consider. As such, we can rule out any major equilibrium wage effects of migration on wages in destination countries. Relative to the non-migrant workforce, migrants are a much smaller fraction in Bangladesh than in destination countries. Furthermore, estimates of wage effects of emigration that the literature provides, are generally small. Dustmann, Frattini, and Rosso (2015), for instance, estimate a wage elasticity with respect to emigration from Poland of 0.02.[22] We thus also abstract from equilibrium wage effects in Bangladesh, which we believe to be of second order relative to the mechanisms investigated in the paper.

Our data suggest that potential migrants tend to overestimate their (future) foreign wages prior to their emigration. In line with this observation, we assume the emigration decision is

[22]Overall, there is little consensus, however, with estimates ranging from small positive wage effects of emigration estimated for different OECD countries by Docquier, Ozden, and Peri (2014) to negative effects estimated by Aydemir and G. J. Borjas (2007).

based on destination-specific *expected* wages, denoted by $\tilde{w}_{it}^d = \mathrm{E}[\tilde{w}^d|e_i, a_{it}]$. However, once they are abroad and start to work, migrants realize their *actual* wages for period t, denoted as w_{it}^d. All future decisions are then based on these amounts since future wages are subject to shocks with mean zero and individuals are assumed to be risk neutral.

Self-employment is an option for wage workers who are in Bangladesh and it requires an initial investment C_e^I. We let this investment to vary across education groups to account for the heterogeneity of businesses operated by individuals with different education levels. In return, self-employment generates profits $\pi_{it} = \pi(e_i, a_{it}, \alpha_{it}^S)$ per period, which again vary with the education level and the age of the individual as well as unobserved factors given by $\alpha_{it}^S \sim N(0, \sigma_S^2)$. Since the overwhelming majority of migrants in our survey are contract wage workers when they are abroad, we assume that the self-employment option is available only when workers are in Bangladesh.

Migration costs and labor demand at destination are critical in shaping emigration decisions and their timing. The main reason for emigration for most migrants is the ability to earn higher wages while working abroad. However, emigration requires an upfront payment of fees and expenses which we denote by $C_{it}^d = C^d(e_i, a_{it})$. The amount is specific to destination country $d \in \{M, O, Q, SA, UAE\}$ and dependent on the individual's age and education level. While they are abroad, migrants further suffer from an education and destination-specific disutility η_e^d in each period, arising from their separation from their family and friends who stay in the home country.

Besides the financial cost, migration is constrained by skill-specific labor demand in destination countries. As documented in Figure 1, aggregate migration is strongly related to the price of oil whose exports are the main source of revenue in all major destination countries. We account for this dependence by specifying a function that relates revenues from oil to the share of individuals with education level e who can locate a job and obtain a work visa in destination d, conditional on his desire and financial ability to move there. The probability λ_{et}^d of getting a visa is related to the level of fuel revenues $fuelRev_{dt}$ in destination d and year t through the relation $\ln(\lambda_{et}^d) = \phi_e^d + \psi \ln(fuelRev_{dt})$.[23] Figure 1 also shows that the real wages paid to migrants do not track the oil price, but are approximately constant over the time period we consider, despite a strong variation in oil prices.

Credit constraints and asset accumulation process link self-employment and mi-

[23]Fuel revenues are measured in USD, deflated to 2010, and we restrict realizations of λ_{et}^d to $[0, 1]$. Importantly, as for the case of Filippino migrants analyzed by Bertoli, Fernández-Huertas Moraga, and Keita (2017), labor demand in the main destinations for Bangladeshi migrants is correlated, and our specification of λ_{et}^d accounts for this.

gration decisions. Both self-employment and emigration to a foreign country generate higher incomes (in expectation), but require upfront investments as defined above. Individuals can finance these investment amounts from their current savings, or through borrowing or a combination of the two options. The level of private assets accumulated by an individual at time t is denoted by A_{it} and yield real interest at a rate r_A. Assets A_{it} can have a negative value, implying that the individual is in debt at time t, in which case a higher lending rate $r_L > r_A$ accrues.

Many migrants finance their trip through loans, but not all individuals may have access to credit. We assume that an individual with education level e can cover migration fees and expenses through credit with probability p_e. Without access to credit, migration costs have to be fully financed from individual savings. Hence, with probability $1 - p_e$, migration to destination d requires that $A_{it} \geq C^d(e_i, a_{it})$. In the case of investment for self-employment, we assume that a maximum of 50 percent of the investment costs can be covered via borrowing. This ratio is based on the guidelines of the Microcredit Regulatory Authority (MRA) in Bangladesh and reflects the credit constraints faced by entrepreneurs as discussed above. Becoming self-employed requires that $A_{it} \geq 0.5C_e^I$. We also assume that a share q of individuals inherits a business, and can start their working life as entrepreneurs without having to accumulate the upfront investment cost C_e^I. We take this fraction directly from the data.

The savings rate is given by ρ^l, which is the share of income saved when the individual is in location l. In our calibration, we take this parameter directly from the data. Subject to the inequality constraints above, the stock of assets of an individual then accumulates according to the following equation:

$$\begin{aligned} A_{it+1} = \quad & (1+r)A_{it} \\ & + \quad \rho_i^l(\mathbb{1}[s_{it} = W]w_{it}^l + \mathbb{1}[s_{it} = S]\pi_{it}) \\ & - \quad \mathbb{1}[l_{it-1} = B \cap l_{it} = d]C^d(e_i, a_{it}) \\ & - \quad \mathbb{1}[s_{it-1} = W \cap s_{it} = S]C_e^I \end{aligned} \tag{3}$$

In this expression, ρ_i^l is the location-specific savings rate, s_{it} is the indicator variable on whether the individual is self-employed ($s_{it} = S$) or a wage worker ($s_{it} = W$), C^d is the destination specific migration fee and C_e^I is education specific investment cost for self-employment. If his asset level is negative (because he is still repaying a loan), then the individual pays interest at a rate $r = r_L$. If the individual has a positive level of assets, then he earns returns at the rate of $r = r_A < r_L$. Hence, an individual will use all of his savings before borrowing to finance self-employment or migration expenses. The expression

$\mathbb{1}[l_{it-1} = B \cap l_{it} = d]$ is an indicator variable that is equal to 1 if an individual is in Bangladesh in period $t-1$ and migrates to destination country d at the beginning of period t. Therefore, has to pay the migration fee $C^d(e_i, a_{it})$ for that destination. Similarly, the expression $\mathbb{1}[s_{it-1} = W \cap s_{it} = S]$ defines an indicator variable that is equal to 1 if an individual is a wage worker in period $t-1$, becomes self-employed in period t, and has to pay the self-employment investment cost C_e^I. Finally, we assume, individuals own an initial stock $A_{e,0}$ of assets, depending on their education level e at the beginning of their working life.

5.2 Welfare

Utility in each period consists of three components: (1) Consumption, c_{it}, is given by income minus savings. The income might come from wage employment abroad or in Bangladesh (given by w_{it}^l for location l), or the profits from self-employment, π_{it}. Savings is given by a share ρ_i^l of income. (2) Individuals experience an education and location-specific disutility from migration, η_e^l. This is equal to zero if the individual is living in Bangladesh, or negative if he is in a foreign country. (3) There are transitory taste shocks ε_{it}^l arising from location, and when in Bangladesh from sectoral choices, denoted by ε_{it}^s. The overall consumption is

$$c_{it} = (1 - \rho_i^l)(\mathbb{1}[s_{it} = W] w_{it}^l + \mathbb{1}[s_{it} = S] \pi_{it}^l) \tag{4}$$

In this expression, $\mathbb{1}[s_{it} = S]$ is an indicator variable that is equal to 1 if the individual is self-employed as we explained in equation (3) above. $\mathbb{1}[s_{it} = W]$ is the corresponding indicator variable for wage employment. With consumption defined as above, the utility level of individual i in period t at location l is given by

$$u_{it} = c_{it} + \eta_e^l + \varepsilon_{it}^l + \mathbb{1}[l_{it} = B] \varepsilon_{it}^s \tag{5}$$

where $\mathbb{1}[l_{it} = B]$ indicates whether the individual is in Bangladesh. Wages earned in foreign destinations and the corresponding consumption are transformed accounting for price level differences between destinations and Bangladesh. This is in line with most families staying behind and financing consumption through remittances sent by the migrant. It also implies that a higher purchasing power of the destination country's currency in Bangladesh facilitates faster asset accumulation and will impact migration duration, see also Yang (2006), Yang (2008), Akay, Brausmann, Djajić, et al. (forthcoming), and Albert and Monras (2020).

Individuals maximize their discounted expected lifetime utility over the sequences of location and self-employment choices, and subject to the evolution of the vector of state

variables $\Omega_{it} = \{t, e_i, a_{it}, A_{it}, s_{it}, l_{it}, y_{it}, \alpha_{it}^S, \alpha_{it}^W, \varepsilon_{it}^s, \varepsilon_{it}^l\}$ as explained above. The maximized lifetime value at time t is, then, given by

$$V_{it}(\Omega_{it}) = \max_{\{l,s\}} \sum_{\tau=t}^{T} \beta^{\tau-t} \mathrm{E}[u_{i\tau}(\Omega_{i\tau})], \tag{6}$$

where individuals live until period T.

Value functions depend on the location and employment choices. We first define $W_{it}^{B,W}$, which denotes the value for a wage-worker who is currently in Bangladesh and faces probability λ_{et}^d that he can obtain a work visa for foreign destination d. With probability p_e, agents have access to a migrant loan, and their value includes the choice between all locations

$$\begin{aligned} W_{it}^{B,W} = \mathbb{E}\max\{ \quad & V_{it}^B, \\ & \lambda_{et}^M \tilde{V}_{it}^M + (1-\lambda_{et}^M) V_{it}^B, \\ & \lambda_{et}^O \tilde{V}_{it}^O + (1-\lambda_{et}^O) V_{it}^B, \\ & \lambda_{et}^Q \tilde{V}_{it}^Q + (1-\lambda_{et}^Q) V_{it}^B, \\ & \lambda_{et}^{SA} \tilde{V}_{it}^{SA} + (1-\lambda_{et}^{SA}) V_{it}^B, \\ & \lambda_{et}^{UAE} \tilde{V}_{it}^{UAE} + (1-\lambda_{et}^{UAE}) V_{it}^B \quad \}. \end{aligned} \tag{7}$$

In this expression, the first term is the value in Bangladesh. The subsequent terms are sums of values in each destination and Bangladesh, weighted by the probability of being able to migrate to that destination. If the agent has no credit access (with probability $1 - p_e$), his value is given by (7) only if $A_{it} \geq C^d(e_i, a_{it})$. Instead, when assets cannot cover the cost of migration, the agent cannot migrate, and the value is simply given by $W_{it}^{B,W} = V_{it}^B$.

The value in Bangladesh, V_{it}^B, depends on the decision between wage and self-employment, which are subject to the individual's asset level. If an individual has enough assets A_{it} to meet the investment cost, $A_{it} \geq 0.5C_e^I$, he has the option to become self-employed. If he does not have enough assets, an individual would continue as a wage worker. Value in Bangladesh is, therefore, given by:

$$V_{it}^B = \begin{cases} \mathbb{E}\max\{V_{it}^{B,W}, V_{it}^{B,S}\} & , if\ A_{it} \geq 0.5C_e^I \\ V_{it}^{B,W} & , if\ A_{it} < 0.5C_e^I \end{cases} \tag{8}$$

where $V_{it}^{B,W}$ and $V_{it}^{B,S}$ denote values of wage and self-employment at home, respectively. The value attributed to wage-employment in Bangladesh is, in turn, given by the following

expression:

$$V_{it}^{B,W} = (1-\rho^B)w_{it}^B + \beta\mathbb{E}[W_{it+1}^{B,W}] + \varepsilon_{it}^{B,W} \tag{9}$$

Similarly, the value for self-employment is given by

$$V_{it}^{B,S} = (1-\rho^B)\pi_{it} + \beta\mathbb{E}[V_{it+1}^{B,S}] + \varepsilon_{it}^{B,S} \tag{10}$$

We assume that self-employed individuals do not migrate, as they would have to leave their businesses behind, and they stay self-employed from that period forward. This is supported by our data, where only a small fraction of the respondents report as being self-employed at the time of their migration. Accordingly, the continuation value in equation (9) is given by $\mathbb{E}[W_{it+1}^{B,W}]$, since wage workers can change occupations and locations and their continuation value involves this optimizing decision. In contrast, the continuation value in equation (10) is given by $\mathbb{E}[V_{it+1}^{B,S}]$, as individuals stay self-employed.

The expected value before migration to destination d depends on (potentially biased) wage expectations. This value individuals expect to obtain if they were to move from Bangladesh destination d at time t is

$$\tilde{V}_{it}^{d} = (1-\rho^d)\tilde{w}_{it}^d + \eta_e^d + \beta\mathbb{E}[\tilde{W}_{it+1}^{d}] + \varepsilon_{it}^{d} \tag{11}$$

In this expression, as a reminder, $\tilde{w}_{it}^d = \mathrm{E}[\tilde{w}^d|e_i, a_{it}]$ is the wage potential migrants expect to earn before migration takes place and η_e^d is the education specific disutility. Finally, $\mathbb{E}[\tilde{W}_{it+1}^{d}]$ is the expected continuation value *before* the migrant arrives in destination d and observes the true wage. It is defined as

$$\tilde{W}_{it}^{d} = (1-\delta_{it}^d)\max\{V_{it}^{B,W}, \tilde{V}_{it}^{d}\} + \delta_{it}^d V_{it}^{B,W}, \tag{12}$$

where δ_{it}^d is the probability of losing the job at the destination and being forced to return to Bangladesh. Having defined all of its components, l^* is the optimal location decision that maximizes the expression in equation (7) and gives $W_{it}^{B,W}$.

The value after migration to destination d depends on the realized wage w_{it}^d and enters the return migration decision. It is given by

$$V_{it}^{d} = (1-\rho^d)w_{it}^d + \eta_e^d + \beta\mathbb{E}[W_{it+1}^{d}] + \varepsilon_{it}^{d} \tag{13}$$

where continuation values *after* migration to destination d (when the actual wage is observed)

is given by

$$W_{it}^{d} = (1 - \delta_{it}^{d}) \max\{V_{it}^{B,W}, V_{it}^{d}\} + \delta_{it}^{d} V_{it}^{B,W} \tag{14}$$

6 Estimation and Identification

Several components of our model are directly observed in the data. These include the cost C_{it}^{d} of migration to destination d, earnings w_{it}^{l} and profits π_{it} by individual characteristics at location l, saving rates ρ^{l}, as well as earnings expected prior to emigration, $\tilde{w}_{it}^{d}$. Furthermore, the survey contains information on the reason for return migration, including whether a work contract has been terminated. We use this information to compute the corresponding probabilities δ_{it}^{d} within each group of migrants. Appendix B, and in particular Tables A4 and A5 provide further details. In the World Bank Bangladesh Informal Firms Survey 2010, we observe that the share q of businesses are inherited. Finally, r_A and r_L that are, respectively,. the interest rates earned on savings or paid on migrant loans are obtained from Mallick (2012) and Berg, Emran, and Shilpi (2013).

Beyond these elements, we estimate the structural parameters of the model by method of simulated moments, minimizing the distance between informative moments computed for a population of agents simulated from the model and the counterpart of these moments observed in the data. In total, we jointly estimate 52 parameters pertaining to the demand in each destination country for workers of a given education level (parameters determining the share λ_{et}^{d} of would-be migrants that obtains a work visa), agents' destination-education specific disutility from migration η_{e}^{d}, their initial stock of assets $A_{e,0}$, the share p_{e}^{L} who can finance migration on credit, as well as the cost C_{e}^{I} of setting up a business. The latter three sets of parameters are education-specific, and identified by having the model match the observed asset level, the fraction of migrants who reports having financed their migration on credit, and the self-employment share in our sample. The remaining parameters are identified by observed migration patterns. Note that the intensity and distribution of emigration from Bangladesh to different destination countries are affected both by labor demand λ_{et}^{d} and by agents' preferences η_{e}^{d}. To disentangle the two effects, we target both emigration shares and migration durations conditional on having migrated to a given destination. The disutility η_{e}^{d} from staying abroad determines both the emigration and the migration duration decision. Motivated by Figure 1, the share λ_{et}^{d} in contrast primarily affects emigration. The termination or expiration of work permits is observed directly and accounted for through δ_{it}^{d}.

Motivated by Figure 1, we let λ_{et}^{d} vary with destination countries' fuel revenues. Under

the assumption that (i) the former are exogenous, (ii) labor supply by Bangladeshi migrants always exceeds labor demand in destination countries (or is very elastic, as suggested by the wage trend depicted in Figure 1), and (iii) the elasticity of the probability of locating a job in a destination with respect to fuel revenues equals the elasticity of migration with respect to fuel revenues in a destination, the relation between fuel revenues and migrant demand can be identified as an estimate of ψ in an estimating equation

$$\ln(migrants_{dt}) = \phi^d + \psi \ln(fuelRevenues_{dt}) + u_{dt}. \tag{15}$$

We thus feed a regression estimate of ψ into the structural model, and estimate intercepts ϕ_e^d for each migrant group by letting the model match the respective observed emigration rate. The vector $(\psi, \phi_1^M, ..., \phi_4^{UAE})$ then parameterizes λ_{et}^d, the probability of locating a foreign job. Estimating a life cycle model requires an assumption on agents' expectations about the paths for fuel revenues in destination countries over time. We fit quadratic trends to fuel revenues in the main destination countries over the period 2000-2017, and assume that agents' expectations are based on these trends.

Taken together, We estimate the 52-element structural parameter vector $\boldsymbol{\theta} \equiv (\eta_1^M, \eta_2^M, ..., \eta_1^O, ..., \eta_4^{UAE}, \phi_1^M, ..., \phi_4^{UAE}, A_{1,0}, ..., A_{4,0}, C_1^I, ..., C_4^I, p_1, ..., p_4)'$ of the model in Section 5 by method of simulated moments, minimizing the distance between moments $\boldsymbol{m}_m$ simulated from the model and the corresponding data moments $\boldsymbol{m}_d$ from the HIES and BRMS samples.[24] Specifically, we minimize the estimation criterion

$$crit(\boldsymbol{\theta}) = (\boldsymbol{m}_d - \boldsymbol{m}_m(\boldsymbol{\theta}))' \boldsymbol{W} (\boldsymbol{m}_d - \boldsymbol{m}_m(\boldsymbol{\theta})),$$

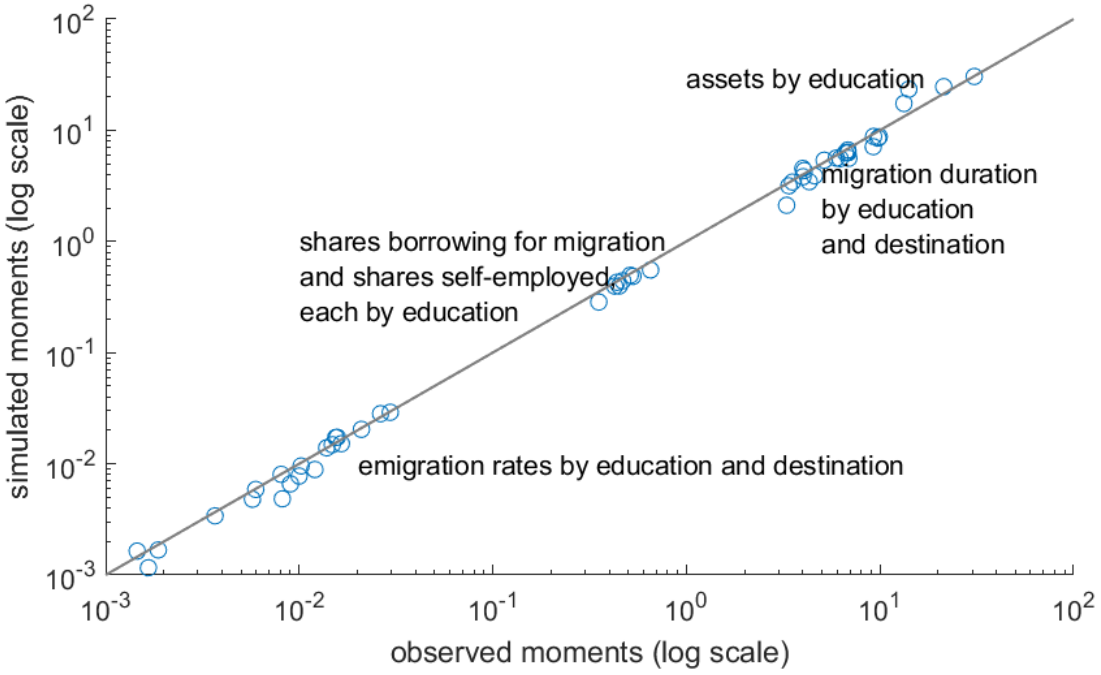
where $\boldsymbol{W}$ is a diagonal weighting matrix with the inverse variances of the data moments on the diagonal.

The moments targeted are listed in Appendix Table A6, and Figure 12 shows the model's good overall fit. The figure plots moments simulated by the model against their empirical counterparts. For better visibility, we use log scales and indicate the different groups of moments in the graph. The precise magnitudes for all moment are shown in Appendix Tables A7-A9. As a non-targeted, but important feature of the contract worker migration we consider, Figure 13 shows the relation between migration costs, dismissal risk and migration duration. The vast majority of temporary workers in the Persian Gulf and Southeast Asia are subject to visas that are tied to a job contract. Dismissal implies that migrants are

[24] The simulation draws individuals from the sample-specifc age-education distribution, and mirrors the empirical sampling scheme of the BRMS in selecting former (simulated) migrants who have returned since 2010.

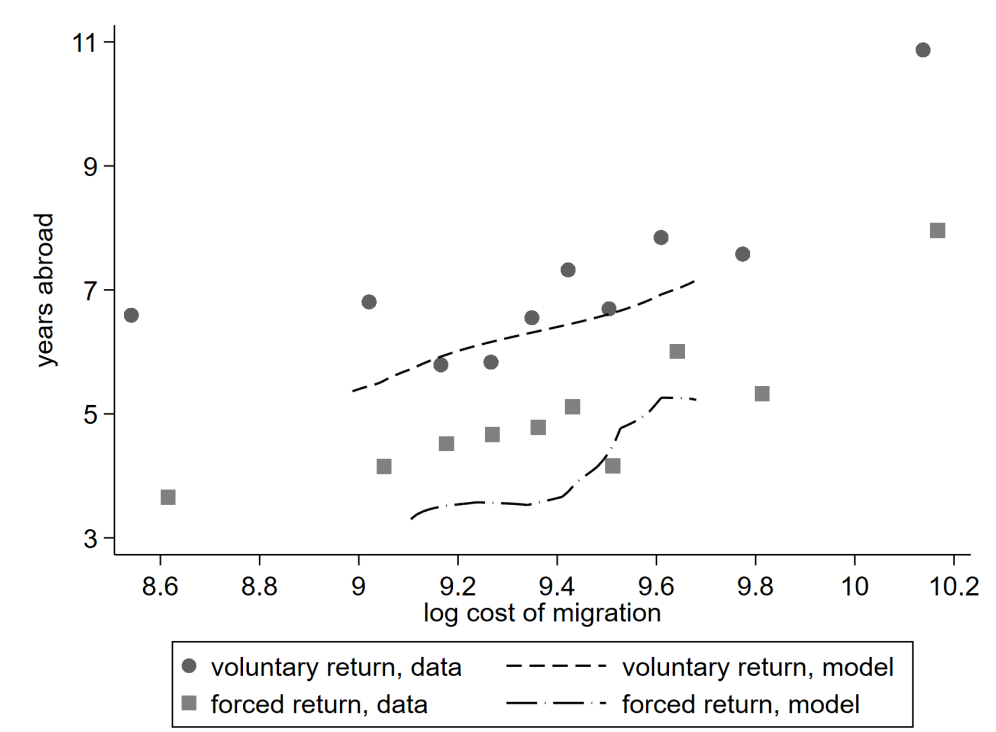
forced to return home, regardless of whether migrant's savings target has been met. The figure shows that the model matches the positive relation between the cost of migration and migration duration quite well, also whether or not a migrants was forced to return home due to dismissal or visa issues.

Figure 12: Model fit: estimation moments



Note: The figure shows the overall fit of the model by plotting moments simulated from the model against the corresponding moments observed in the data (using log scales). Model moments are based on a simulation of 100,000 individuals. Data moments are computed from BRMS and HIES data, see text. Each circle represents one targeted moment, with groups of moments indicated in the graph. For precise magnitudes see Appendix Tables A7-A9.

Figure 13: Model fit: Migration cost, duration and forced return.



Note: The figure shows the fit of the model for the (non-targeted) relation between migration cost and migration duration, separately for migrants who were forced to return due to layoff or visa issues and for those who were not. Model moments are based on a simulation of 100,000 individuals of whom 21,007 migrate at some point during their lifetime. Data moments are computed from the BRMS, see text.

Table 3 lists our estimates for the initial stock of assets of agents with different levels of education, the investment costs for self-employment they face, as well as the probabilities with which agents of different education levels have access to credit to finance migration expenses. While all moments contribute jointly to the estimation of the model's parameters, the last column indicates the moment related most directly to the identification of each parameter. The total initial stock of assets strongly varies by education level, ranging from around 5,500 USD (adjusted for PPP) for individuals without any secondary education to 10,000 USD for higher skilled individuals. These initial asset levels are considerably lower than the savings that are accumulated over time and measured by the time of the survey after individuals return from abroad. Investment costs required for self-employment (that are compatible with the self-employment rates in our data) does not vary much by education level, averaging slightly over 30,000 USD (adjusted for PPP). Finally, Table 3 shows the

probabilities that agents have access to finance a migration. These range from 54 percent for the least educated individuals to almost 100 percent for those with completed high school education. These probabilities are identified by matching the observed shares borrowing for migration. Recall, however, that an actual migration also requires agents to locate a foreign job.

Table 3: Structural parameter estimates: Initial stock of assets, investment costs and credit access parameters

Parameter	Point estimate	Standard error	Identifying moment
A_1^0	5.558	(0.706)	stock of assets, education level 1
A_2^0	6.790	(0.045)	stock of assets, education level 2
A_3^0	7.671	(0.172)	stock of assets, education level 3
A_4^0	10.069	(1.428)	stock of assets, education level 4
C_1^I	32.078	(0.851)	share self-employed, education level 1
C_2^I	31.963	(0.685)	share self-employed, education level 2
C_3^I	33.103	(1.185)	share self-employed, education level 3
C_4^I	31.813	(1.671)	share self-employed, education level 4
p_1^L	0.541	(0.075)	share borrowing, education level 1
p_2^L	0.568	(0.026)	share borrowing, education level 2
p_3^L	0.606	(0.003)	share borrowing, education level 3
p_4^L	0.982	(0.066)	share borrowing, education level 4

Notes: Asymptotic standard errors in parentheses. Assets and investment costs are denoted in 1,000 PPP adjusted USD. Education levels 1-4 refer to illiterate, some primary, some secondary and high school degree, respectively.

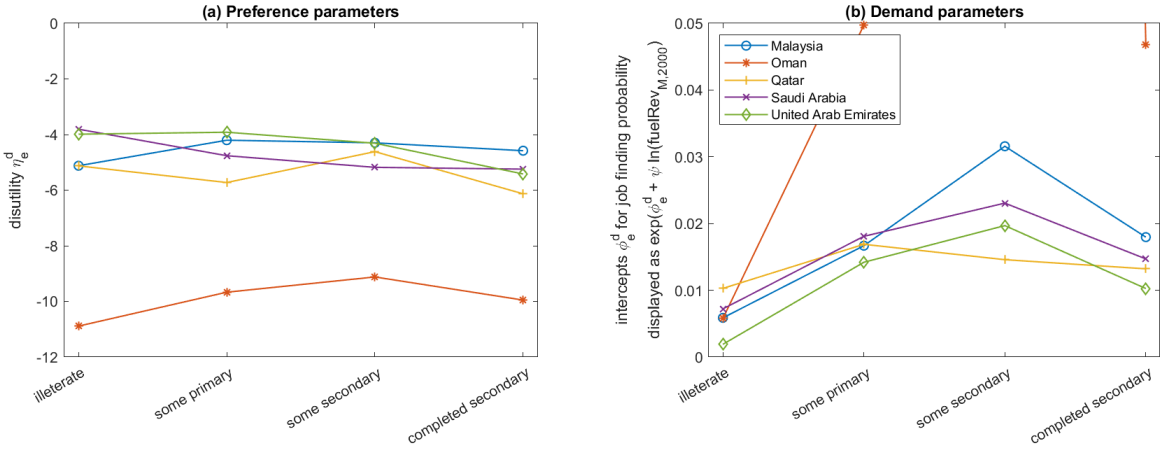
We show the larger subsets of parameters pertaining to preferences (η_e^d) and foreign labor demand (ϕ_e^d) graphically in Figure 14.[25] The left panel of Figure 14 shows that utility losses η_e^d from migration are largest for less skilled migrants in Oman and Qatar. Note that these losses are conditional on wages and job loss risk at a destination. Given the assumed utility function, the absolute magnitude of η_e^d corresponds to forgone utility in thousands of PPP adjusted dollars. The displayed estimates are the values for η_e^d that make the model match

[25]The full list of estimates, their standard errors, as well as the moment most directly contributing to identification of each parameter, are relegated to Appendix Tables A10 and A11.

observed emigration rates and migration duration across education groups and destination countries.

The absolute magnitudes of demand parameters ϕ_e^d are not readily interpretable, as they denote intercepts in a function determining the percentage of visa applications that is granted. The right panel of Figure 14 hence displays—for each education group and destination—probabilities λ of locating a job offer that would result for a baseline level of oil revenues, which we take to be oil revenues in Malaysia in 2000. These probabilities are generally smallest for the least educated individuals, and highest for Oman.[26]

Figure 14: Structural parameter estimates: Preference and labor demand parameters



Notes: The left graph shows structural parameter estimates of utility losses from working abroad, by destination and education; the right graph shows estimates of the intercepts ϕ_e^d in the labor demand functions λ_e^d. Education levels 1-4 refer to illiterate, some primary, some secondary and high school degree, respectively. All estimates and their standard errors are listed in Appendix Tables A10 and A11.

[26]For better visibility, we cut the graph at 5 percent probability. The full set of estimates is shown in Appendix Table A11. The apparent outlier Oman is a result of an empirically relatively high migrant numbers despite comparatively low wages and a high risk of dismissal and forced return, which the model needs to match.

7 Policy Simulations

Our model links the decisions on where, when and for how long to migrate to the financial decisions on self-employment after returning back home. We use the estimated model to evaluate three core policy interventions pertaining to the economic conditions under which migration and self-employment decisions are made. First, we consider cuts to the cost of migration. Second, we examine a subsidy that reduces the interest rate for entrepreneurial loans. Finally, we investigate an information treatment that aligns individuals' (overly optimistic) expectations about their foreign earnings potential with the average earnings observed in our data.

Our analytical model is flexible regarding the direction of most of these effects. For instance, lower costs of migration, our first policy intervention, make migration more attractive but its impact on self-employment is not clear. On the one hand, we may observe less self-employment in Bangladesh as workers favor migration as a means to achieve higher incomes. On the other hand, a rise in migrant savings may contribute to financing entrepreneurial activities. These two opposite effects have been documented for the specific case of Bangladeshi agricultural workers in Malaysia within a government mediated migration program by Shrestha, Mobarak, and Sharif (2019). Our simulations predict that decline in migration costs not only affects the emigration decision, but also its timing and the duration of the employment abroad. We show that these changes lead to sizable increases in repatriated savings and business creation upon return.

Similarly, lower interest rates on entrepreneurship loans may discourage emigration as workers simply borrow more rather than accumulating savings abroad. Alternatively, workers who originally considered self-employment out of reach, now, may decide to migrate, save and become entrepreneurs after their return since credit conditions have improved. Again, our results show that, while a decline in interest rates naturally makes self-employment more attractive, the policy's impact is actually mitigated by an endogenous adjustment in migration behavior. This opposing effect needs to be accounted for within a cost benefit analysis for this policy.

In terms of our third policy intervention, the information treatment regarding expected wages abroad, there are again two opposing effects. While individuals naturally benefit from better informed decisions, such a treatment in fact limits business creation in Bangladesh. In conclusion, our policy simulations clearly show that the direction of these ambiguous relations are critical to identifying the impact of policy interventions.

7.1 Lowering of Migration Costs

Costs of migration, as mentioned earlier, receive significant attention, especially from policy-makers. For many low-skilled temporary migrants from poor countries, their inability to pay for these expenses is the main impediment to taking advantage of significantly higher wages abroad. In our sample, an average migrant pays almost a full-year's salary to cover these expenses. Even if borrowing is available, high rates of interest further increase the burdens migrants face. Thus, lowering migration costs, either by limiting exploitative behavior of intermediary firms or through migration subsidies is one of the most frequently demanded policy interventions by migrants, policy advocates and academics (World Bank 2018).

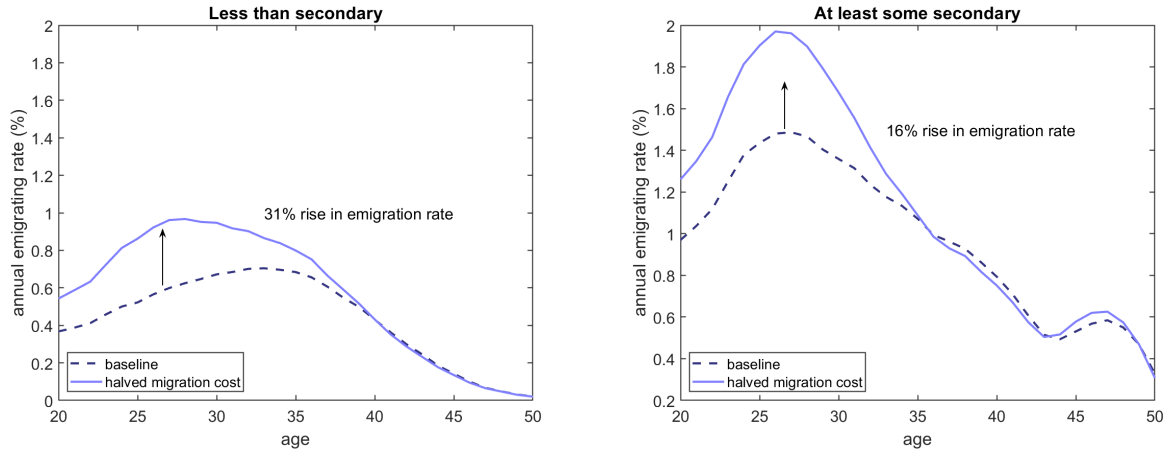
An immediate effect of lowering of the cost of migration is an increase in emigration and a shortening of the duration of migration episodes. The graphs in Panel A of Figure 15 show the effects of lowering migration costs by half on emigration rates over the life cycle of individuals with different education levels. As liquidity constraints are most binding for younger workers, the expansionary effect is higher for them. For example, annual emigration rate increases from 0.5 percent to 0.9 percent for 25-year old workers with less than secondary education. In addition, the peak migration age drops from 33 to 28 since the workers do not need higher personal savings to pay for these fees. Similarly, the annual emigration rate for 25-year old workers with some secondary education jumps from 1.4 percent to 1.9 percent. There is minimal impact for either education group after age 35. Finally, the overall impact on the migration rate is an increase of 31 percent (16 percent) over the lifetime of a worker with less than (at least some) secondary education.

In our dynamic model, migration costs are linked to all of the other decisions, such as the length of time a migrant chooses to work abroad as well as his age of departure. Everything else equal, and conditional on having their job contracts extended, migration duration will be longer if the cost of migration and, in particular, the amount of debt that needs to be financed, is higher. With a 50 percent reduction in the cost of migration, Panel B of Figure 15 shows a marked leftward shift in the distribution of years spent abroad. The dashed line shows the distribution of duration at the baseline of expenses. The dotted line is the new distribution of the original migrants and the solid line is the distribution of all migrants under the lower cost, including new migrants. For lower-educated migrants, however, there is a counteracting effect, in that a lower cost of migration facilitates migration at younger ages (see Panel A of Figure 15). With much of their working life ahead, these younger migrants tend to stay abroad for longer. Besides the general leftward shift in the distribution of migration durations, the left figure in Panel B shows a decrease in the density for very short migrations, deriving from the larger share of young migrants. Therefore, among the migrants without secondary education, many of the longer-duration workers shorten their stays while

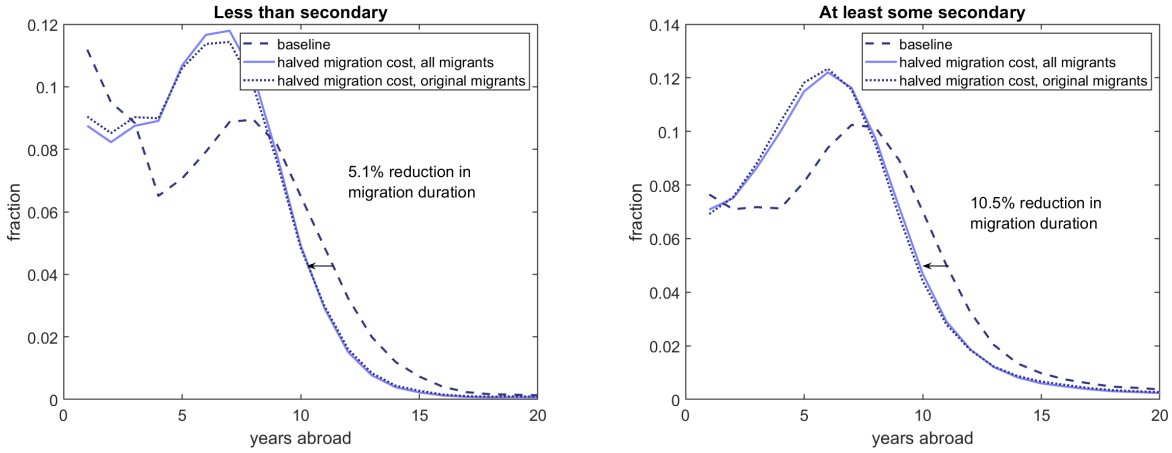
some of the very short-duration workers (up to 2 years) stay longer. The net effect is that workers bunch around the median duration of 7 years, and there is a 5.1 percent reduction in the average migration duration. In the case of the workers with some secondary education (figure on the right), there is a uniform shift to the left in the duration with an average reduction rate of 10.5 percent.

Figure 15: Simulated Effects of a Decrease in Migration Costs

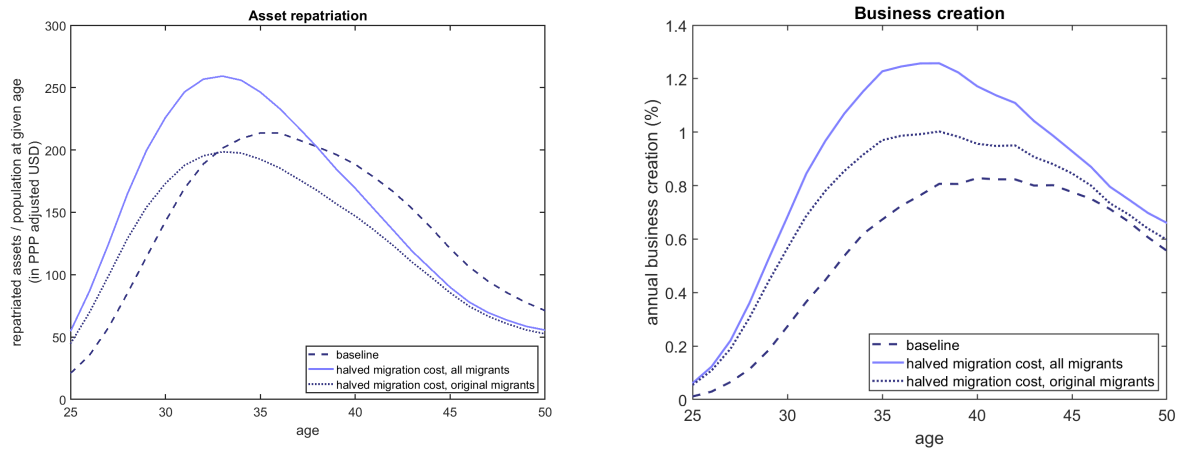
Panel A - Age of Migration



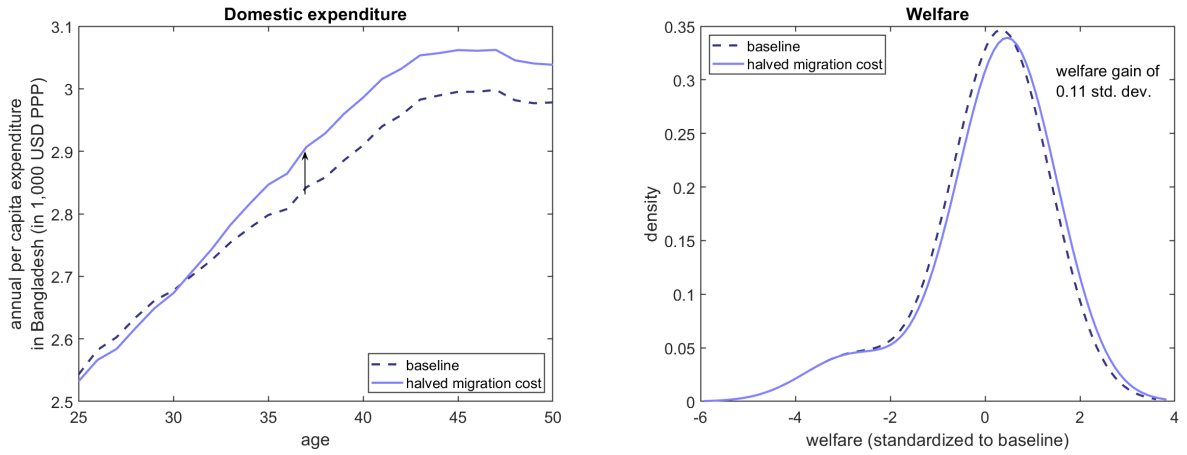
Panel B - Duration of Migration



Panel C - Assets and Self-employment



Panel D - Domestic Expenditure and Welfare



Note: Figures show the effects of a cut in the cost of migration by 50 percent. Predictions are based on a simulation of 100,000 individuals from the model.

Lower initial migration expenses, the resulting earlier departures and shorter migration durations imply a higher level of accumulated savings, with important implications for business creation. Panel C of Figure 15 illustrates these effects. The left figure shows a pronounced shift towards younger ages of the accumulated and repatriated assets when the migration costs are halved. Original and new migrants, however, show significant behavioral differences in this respect. Original migrants (dotted line) return earlier but with about the

same level of assets. Once we account for new migrants (solid line), the level of repatriated assets per capita of the Bangladeshi population rises significantly, implying that the new migrants save more than the original migrants. In addition, these assets are repatriated at younger ages.

Together, the increase in emigration at young ages, and the ensuing rise in repatriated assets early in life are the main reason why we observe an expansion of self-employment and entrepreneurship. The figure on the right in Panel C of Figure 15 shows that the same 50 percent decrease in migration costs raises business creation, in particularly for younger workers. For example, the annual business creation rate increases from 0.7 percent to 1.2 percent for 35-year old workers, the median age of return migration. We see that about half of the expansion is due to increased investment by existing migrants, who return earlier in life, while the other half derives from new migrants. The overall effect is a sizeable boost in business creation and self-employment.

All of these effects of lower migration expenses – younger emigration, shorter migration duration, faster accumulation of savings, higher and earlier entry into self-employment – jointly contribute to significant welfare gains. We observe a rise in domestic expenditure in Bangladesh (net of migration expenses) over individuals' life cycle, as shown in the left figure of Panel D of Figure 15. The overall effect is a gain of 0.11 standard deviations in the lifetime welfare across the population, including non-migrants. We should note, however, that these gains arise at the higher end of the welfare distribution (right figure of Panel D). There is minimal change on the left tail of the welfare distribution as the very poor still cannot afford to migrate and then move to self-employment. It is the middle and upper-middle income groups who manage to take advantage of the lower migration costs, migrate in higher numbers and then become self-employed.

7.2 Decrease in Lending Rates

Credit constraints faced by workers who would like to seek self-employment and entrepreneurial opportunities are among the main motivations to migrate. Working abroad at higher wages (and under relatively demanding conditions), saving some of these extra earnings and bringing them home enable workers to finance self-employment activities upon their return. A policy relevant question then is what would happen to migration patterns, savings and self-employment levels when domestic credit constraints were eased. We model such policy interventions through a 50 percent reduction in the interest rate faced by the workers on self-employment loans.

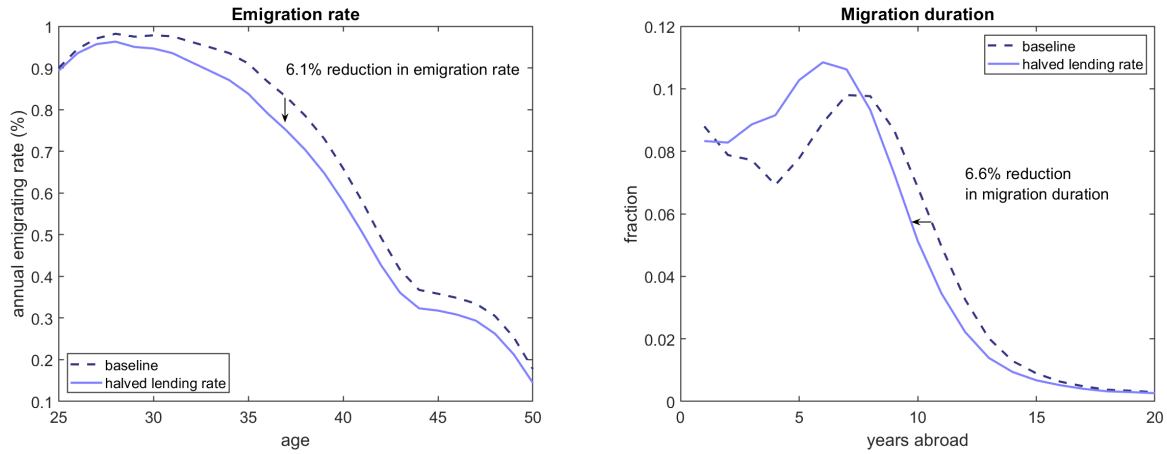
An improvement in the credit conditions for self-employment, as expected, mitigates

emigration pressures. As Figure 16 shows, cutting the lending rate on loans to finance a business by half impact migration duration and asset repatriation. Panel A reveals that the overall emigration rate decreases by 6.1 percent, distributed rather evenly across age groups. At the same time, migration duration shrinks by 6.6 percent. In sum, lower borrowing rates for entrepreneurship leads to a decline of migration at both the extensive and intensive margins. Fewer migrants who stay abroad for shorter periods of time, in turn, imply a lower level repatriated assets. The left figure of Panel B shows that assets repatriated by migrant workers decline by 7.2 percent, and that this effect is stronger for workers beyond age 35. The endogenous adjustment in migration behavior is due to the fact that financing self-employment through loans has become less expensive.

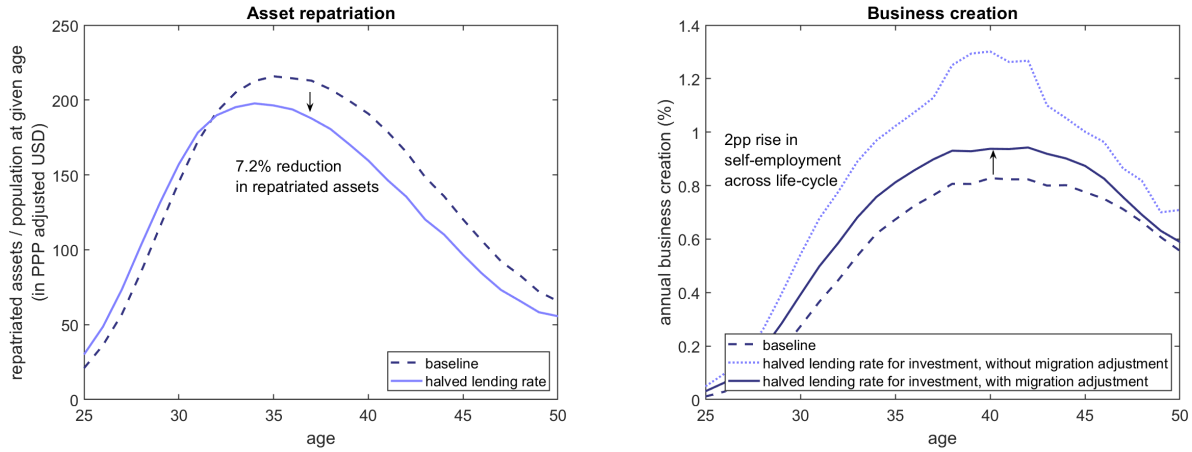
These effects mitigate part of the positive direct effect of lower interest rates on business creation. The right figure in Panel B of Figure 16 shows that without any adjustment in migration, the 50 percent cut in lending rates on business loans would boost the annual business creation rate for a 35 year old worker from 0.7 to about 1 percent. The counteracting effect of less migration and fewer repatriated savings instead only leaves a net effect of 0.8 percent for workers at that age. Across the life cycle, this accumulates to a 2 percentage point increase in the self-employment rate in Bangladesh. These patterns demonstrate the importance of a joint consideration of migration and self-employment decisions when designing policies aiming to foster entrepreneurial activity.

Figure 16: Simulated effects of a Decrease in the Lending Rate for Self-employment

Panel A - Emigration and Migration Duration



Panel B - Assets and Self-employment



Note: Figures show the effects of a cut in the interest rate for entrepreneurial loans by 50 percent. Predictions are based on a simulation of 100,000 individuals from the model.

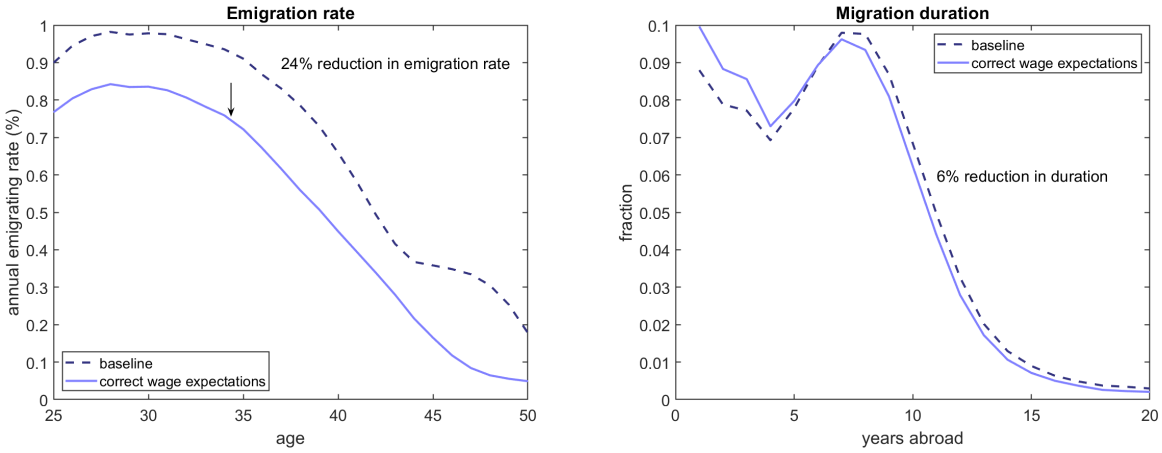
7.3 Wage Expectations

One of the interesting observations from our survey is that workers appear to have biased expectations about their employment opportunities aboard. More specifically, their wage and savings expectations prior to migration are systematically higher than the actual wages and savings realized once they are abroad.

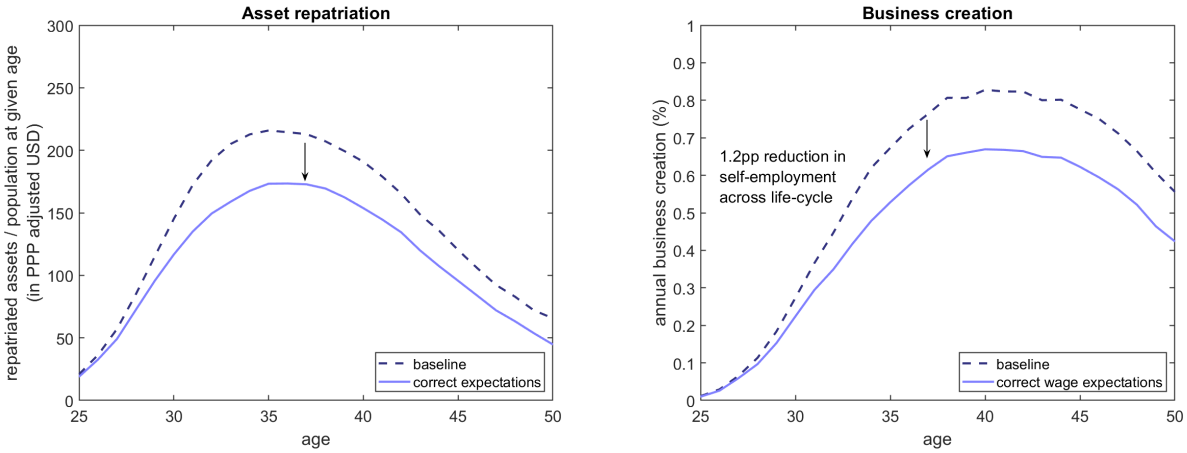
In this section, we use the model to evaluate the effect of an active information dissemination policy that would align individuals' expectations about their earnings potential abroad with the actual mean earnings of Bangladeshi migrants we observe in the sample. The left figure in Panel A of Figure 17 shows that the implied reduction in expected earnings leads to a sizable reduction in the emigration by 24 percent, almost uniformly distributed across age groups. The reduction in emigration duration (figure on the right) is milder at around 6 percent. These two results imply that the overall impact of correcting the wage expectations is on the extensive margin (fewer migrants) than the intensive margin (shorter episodes). The resulting decline in repatriated savings (left figure in Panel B of Figure 17), in turn, leads to a decline in the rate at which new businesses are created, which accumulates to a 1.2 percentage point reduction in self-employment over the life cycle (see the right figure in Panel B). Whereas individual welfare unambiguously benefits from the better choices agents can make under more accurate information about foreign earnings, business creation is actually enhanced by individuals' exaggerated expectations.

Figure 17: Simulated effects of correct expectations about earnings abroad

Panel A - Emigration and Migration Duration



Panel B - Self-employment



Note: Figures show the effects of an alignment of individual wage expectations with averages realized wages (conditional on observables). Predictions are based on a simulation of 100,000 individuals from the model.

8 Conclusion

For millions of low-skilled workers from South and Southeast Asian countries, temporary migration to the high-income GCC and East Asian countries is a central part of their working lives. Not only do they earn significantly higher incomes while working abroad, immigrant workers accumulate savings that they use to finance self-employment and entrepreneurial

activities upon their return home. Thus, their decisions on when to migrate, which country to move, how long to stay, how much to save, what kind employment to seek after returning home are intricately linked.

Most papers in the migration literature focus on the wage and labor market gains during the migration episode. They employ cross-sectional analysis, mainly due to data constraints. In contrast, our paper highlights the interdependence between workers' decisions at each stage of the life cycle, and the dynamic effects of temporary migration on workers' economic activity upon return. While prior work usually focuses on the role played by economic conditions at destination in return decisions, our paper models the central role played by self-employment aspirations back home. A joint dynamic analysis of migration and self-employment decisions is crucial for the design of policies that aim at overcoming financial constraints to self-employment, as endogenous adjustments in migration behavior may mitigate part of the intended effects of business creation.

The data for this paper come from a unique survey, *the Bangladesh Return Migrant Survey* (BRMS), which was specifically designed to investigate the patterns and determinants of the temporary migrants' lifetime employment trajectories, earnings and welfare. We construct a dynamic framework that models how the pre-migration labor market outcomes, timing and duration of the migration episode, saving levels and post-return employment outcomes are all tightly intertwined. More specifically, we show how the savings accumulated abroad enable the the workers to overcome the credit constraints they face for entrepreneurship. We estimate our dynamic model using data from the BRMS and the nationally representative Household Income and Expenditure Survey. Using our estimated model, we then explore how changes in exogenous parameters, such as the cost of migration or interest rates on loans, simultaneously affect migration and investment decisions, as well as lifetime welfare.

We find that a rise in emigration and a reduction in the duration of migration following a decline in migration costs both contribute to an increase in savings and self-employment. In contrast, a reduction in interest rates for entrepreneurial investment reduces migration and savings levels, mitigating part of the positive effect on self-employment. Throughout, we observe changes in both the extensive and intensive margins of migration and investment decisions. These results confirm that policymakers have to take such dynamic externalities into account when designing their policy interventions. Given the similarities with other migrant sending countries, the findings of this paper are of relevance beyond the context of Bangladesh.

References

Adda, Jérôme, Christian Dustmann, and Joseph-Simon Görlach (2021). "The Dynamics of Return Migration, Human Capital Accumulation, and Wage Assimilation".

Ahmed, Amer, Faizuddin Ahmed, Laurent Bossavie, Çağlar Özden, and He Wang (2020). "Temporary Migration and Development: A New Dataset from Bangladesh". *Unpublished manuscript*.

Akay, Alpaslan, Alexandra Brausmann, Slobodan Djajić, and Murat Kırdar (forthcoming). "Purchasing-Power-Parity and the Saving Behavior of Temporary Migrants". *European Economic Review*.

Albert, Christoph and Joan Monras (2020). "Immigration and Spatial Equilibrium: The Role of Expenditures in the Country of Origin".

Ambrosini, William, Karin Mayr, Giovanni Peri, and Dragos Radu (2015). "The Selection of Migrants and Returnees in Romania: Evidence and Long-run Implications". *Economics of Transition* 23.4, pp. 753–793.

Aydemir, Abdurrahman and George J Borjas (2007). "Cross-Country Variation in the Impact of International Migration: Canada, Mexico, and the United States". *Journal of the European Economic Association* 5.4, pp. 663–708.

Barro, Robert and Jong Wha Lee (2013). "A New Data Set of Educational Attainment in the World, 1950-2010". *Journal of Development Economics* 104, pp. 184–198.

Batista, Catia, Tara McIndoe-Calder, and Pedro Vicente (2017). "Return Migration, Self-selection and Entrepreneurship". *Oxford Bulletin of Economics and Statistics* 79.5, pp. 797–821.

Beck, Thorsten (2007). "Financing Constraints of SMEs in Developing Countries: Evidence, Determinants and Solutions". *KDI 36th Anniversary International Conference*, pp. 26–27.

Berg, Claudia, Shahe Emran, and Forhad Shilpi (2013). "Microfinance and Moneylenders: Long-run Effects of MFIs on Informal Credit Market in Bangladesh". *World Bank Policy Research Working Paper*.

Bertoli, Simone, Jesús Fernández-Huertas Moraga, and Sekou Keita (2017). "The Elasticity of the Migrant Labour Supply: Evidence from Temporary Filipino Migrants". *Journal of Development Studies* 53.11, pp. 1822–1834.

Bertoli, Simone, Jesús Moraga Fernández-Huertas, and Francesc Ortega (2013). "Crossing the Border: Self-selection, Earnings and Individual Migration Decisions". *Journal of Development Economics* 101, pp. 75–91.

Borjas, George and Bernt Bratsberg (1996). "Who Leaves? The Outmigration of the Foreign-Born". *The Review of Economics and Statistics* 78.1, pp. 165–76.

Brück, Tilman, Clotilde Mahé, and Wim Naudé (2018). "Return Migration and Self-employment: Evidence from Kyrgyzstan". *IZA Discussion Paper* 11332.

Bryan, Gharad, Shyamal Chowdhury, and Ahmed Mushfiq Mobarak (2014). "Underinvestment in a Profitable Technology: The Case of Seasonal Migration in Bangladesh". *Econometrica* 82.5, pp. 1671–1748.

De Coulon, Augustin and Matloob Piracha (2005). "Self-selection and the Performance of Return Migrants: the Source Country Perspective". *Journal of Population Economics* 18.4, pp. 779–807.

De Vreyer, Philippe, Flore Gubert, and Anne-Sophie Robilliard (2010). "Are there Returns to Migration Experience? An Empirical Analysis Using Data on Return Migrants and Non-migrants in West Africa". *Annals of Economics and Statistics/Annales d'économie et de statistique* 97, pp. 307–328.

Djajić, Slobodan (2010). "Investment Opportunities in the Source Country and Temporary Migration". *Canadian Journal of Economics/Revue canadienne d'économique* 43.2, pp. 663–682.

Docquier, Frédéric, Çağlar Ozden, and Giovanni Peri (2014). "The Labour Market Effects of Immigration and Emigration in OECD Countries". *The Economic Journal* 124.579, pp. 1106–1145.

Dustmann, Christian, Tommaso Frattini, and Anna Rosso (2015). "The Effect of Emigration from Poland on Polish Wages". *The Scandinavian Journal of Economics* 117.2, pp. 522–564.

Dustmann, Christian and Joseph-Simon Görlach (2016). "The Economics of Temporary Migrations". *Journal of Economic Literature* 54.1, pp. 98–136.

Dustmann, Christian and Oliver Kirchkamp (2002). "The Optimal Migration Duration and Activity Choice after Re-migration". *Journal of Development Economics* 67.2, pp. 351–372.

Fargues, Philippe (2011). "Immigration without Inclusion: Non-nationals in Nation-building in the Gulf States". *Asian and Pacific Migration Journal* 20.3-4, pp. 273–292.

Fargues, Philippe and Françoise De Bel-Air (2015). "Migration to the Gulf States: The Political Economy of Exceptionalism". *Global Migration: Old Assumptions, New Dynamics*, pp. 139–166.

Farole, Thomas, Yoonyoung Cho, Laurent Bossavie, and Reyes Aterido (2017). *Bangladesh Jobs Diagnostic*. World Bank.

Gang, Ira and Myeong-Su Yun (2000). "Returns to Returning". *Journal of Population Economics* 13.1, pp. 57–79.

Gindling, T. H. and David Newhouse (2014). "Self-Employment in the Developing World". *World Development* 56, pp. 313–331.

Girsberger, Esther Mirjam (2017). "Migration, Education and Work Opportunities". *IZA Discussion Paper* 11028.

Görlach, Joseph-Simon (2020). "Borrowing Constraints, Migrant Selection, and the Dynamics of Return and Repeat Migration". *Unpublished manuscript*.

Gutierrez, Italo, Krishna Kumar, Minhaj Mahmud, Farzana Munshi, and Shanthi Nataraj (2019). "Transitions between Informal and Formal Employment: Results from a Worker Survey in Bangladesh". *IZA Journal of Development and Migration* 9.1, pp. 1–27.

International Labour Organization (2015). "The Homecoming: Profiling the Returning Migrant Workers of Bangladesh". *International Labour Organization*.

Khanna, Gaurav, Caroline Theoharides, and Dean Yang (2020). "Abundance from Abroad: Migrant Income and Long-Run Economic Development".

Kirdar, Murat (2012). "Estimating the Impact of Immigrants on the Host Country Social Security System When Return Migration is an Endogenous Choice". *International Economic Review* 53.2, pp. 453–486.

Kleemans, Marieke (2015). "Migration Choice under Risk and Liquidity Constraints". *Unpublished manuscript*.

Lacuesta, Aitor (2010). "A Revision of the Self-selection of Migrants Using Returning Migrant's Earnings". *Annals of Economics and Statistics/Annales d'Économie et de Statistique* 97-98, pp. 235–259.

Lessem, Rebecca (2018). "Mexico-US Immigration: Effects of Wages and Border Enforcement". *The Review of Economic Studies* 85.4, pp. 2353–2388.

Mahé, Clotilde (2019). "Return Migration and Self-employment: Is There a 'Jack-of-All-Trades' Effect?" *Unpublished manuscript*.

Mahmud, W (2006). "Local Business Dynamics: Ground Realities and Policy Challenges". *Institutional Reform and the Informal Sector (IRIS)*, p. 13.

El-Mallakh, Nelly and Jackline Wahba (2017). "Return Migrants and the Wage Premium: Does the Legal Status of Migrants Matter?" In: *Economic Research Forum Working Paper Series No*. Vol. 1133.

— (2021). "Upward or Downward: Occupational Mobility and Return Migration". *World Development* 137, pp. 105–203.

Mallick, Debdulal (2012). "Microfinance and Moneylender Interest Rate: Evidence from Bangladesh". *World development* 40.6, pp. 1181–1189.

Marchetta, Francesca (2012). "Return Migration and the Survival of Entrepreneurial activities in Egypt". *World Development* 40.10, pp. 1999–2013.

McCormick, Barry and Jackline Wahba (2001). "Overseas Work Experience, Savings and Entrepreneurship Amongst Return Migrants to LDCs". *Scottish journal of political economy* 48.2, pp. 164–178.

McKenzie, David, John Gibson, and Steven Stillman (2013). "A Land of Milk and Honey with Streets Paved with Gold: Do Emigrants Have Over-optimistic Expectations about Incomes Abroad?" *Journal of Development Economics* 102, pp. 116–127.

McKenzie, David, Caroline Theoharides, and Dean Yang (2014). "Distortions in the international migrant labor market: evidence from Filipino migration and wage responses to destination country economic shocks". *American Economic Journal: Applied Economics* 6.2, pp. 49–75.

Mesnard, Alice (2004). "Temporary Migration and Capital Market Imperfections". *Oxford economic paper* 56.2, pp. 242–262.

Naudé, Wim, Melissa Siegel, and Katrin Marchand (2017). "Migration, Entrepreneurship and Development: Critical Questions". *IZA Journal of Migration* 6.1, pp. 1–16.

OECD (2008). *International migration outlook*. OECD publishing.

Piracha, Matloob and Florin Vadean (2010). "Return Migration and Occupational Choice: Evidence from Albania". *World Development* 38.8, pp. 1141–1155.

Rahman, Rushidan Islam and Rizwanul Islam (2013). "Female Labour Force Participation in Bangladesh: Trends, Drivers and Barriers". *International Labour Organization*.

Rapoport, Hillel (2002). "Migration, Credit Constraints and Self-employment: A Simple Model of Occupational Choice, Inequality and Growth". *Economics Bulletin* 15.7, pp. 1–5.

Rapoport, Hillel and Frédéric Docquier (2006). "The Economics of Migrants' Remittances". *Handbook of the Economics of Giving, Altruism and Reciprocity* 2, pp. 1135–1198.

Reinhold, Steffen and Kevin Thom (2013). "Migration Experience and Earnings in the Mexican Labor Market". *Journal of Human Resources* 48.3, pp. 768–820.

Shrestha, Maheshwor, Ahmed Mushfiq Mobarak, and Iffath Anwar Sharif (2019). "Migration and Remittances". *World Bank Group: Social Protection and Jobs*.

Wahba, Jackline (2014). "Return migration and Economic Development". In: *International handbook on migration and economic development*. Edward Elgar Publishing.

— (2015). "Selection, Selection, Selection: the Impact of Return Migration". *Journal of Population Economics* 28.3, pp. 535–563.

Wahba, Jackline and Yves Zenou (2012). "Out of Sight, out of Mind: Migration, Entrepreneurship and Social Capital". *Regional Science and Urban Economics* 42.5, pp. 890–903.

Woodruff, Christopher and Rene Zenteno (2007). "Migration Networks and Microenterprises in Mexico". *Journal of development economics* 82.2, pp. 509–528.

World Bank (2018). *Moving for Prosperity: Global Migration and Labor Markets*. World Bank Group.

Yang, Dean (2006). "Why do Migrants Return to Poor Countries? Evidence from Philippine Migrants' Responses to Exchange Rate Shocks". *The Review of Economics and Statistics* 88.4, pp. 715–735.

— (2008). "International Migration, Remittances and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks". *The Economic Journal* 118.528, pp. 591–630.

Appendix

A Other descriptive figures and tables

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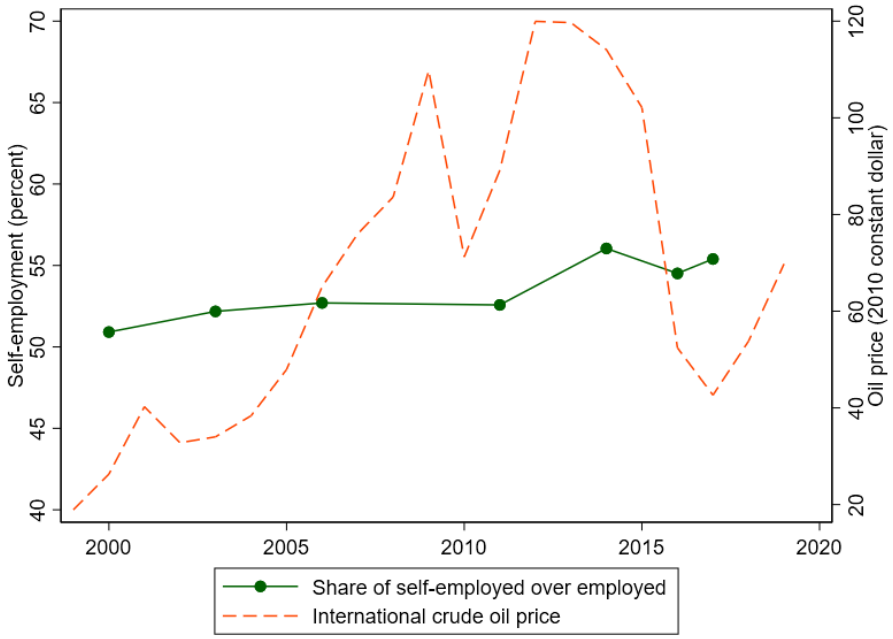
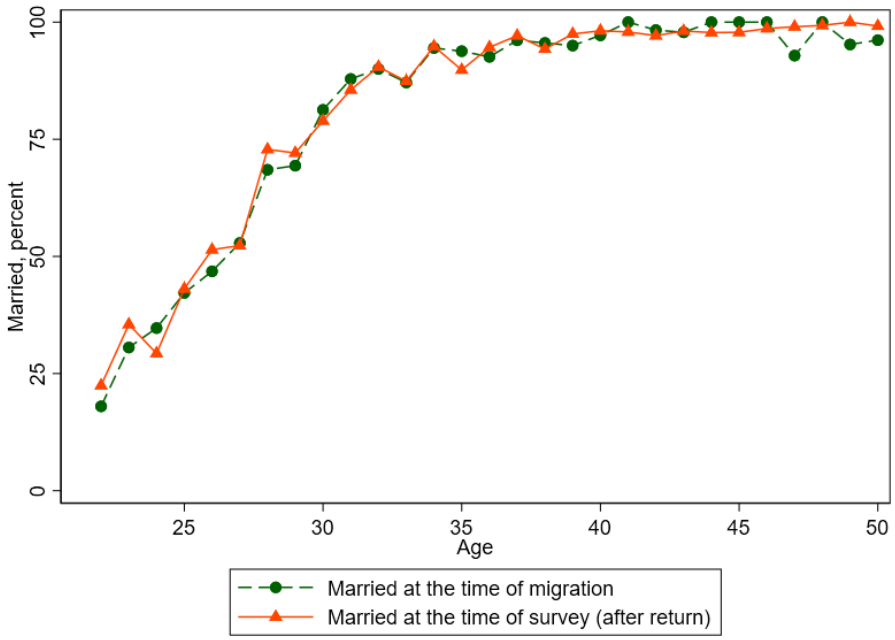
Figure A1: Share of self-employed workers in Bangladesh and global oil prices



Sources: Bangladesh Labor Force Surveys 1999-2017 for share of self-employment; OPEC Reference Basket for crude oil prices.
Note: The sample is restricted to employed males aged 18-59 in rural or semi-urban areas.

Figure A2: Marriage patterns of temporary migrants from Bangladesh



Source: Bangladesh Return Migrant Survey (BRMS).
Note: The sample is restricted to males aged 22-50.

Table A1: Sample comparison of the HIES 2016/17 and the BRMS 2018/19 (males, age 18-59)

	HIES non-migrants		HIES current migrants		BRMS retrun migrants	
	N	Mean	N	Mean	N	Mean
Male (among all age 18-59)	98,856	0.47	3,703	0.97	4,910	0.96
Rural/Semi-urban	46,937	0.92			4,709	0.99
Age category						
18-24	46,937	0.21	3,571	0.15	4,709	0.03
25-34	46,937	0.29	3,571	0.39	4,709	0.35
35-44	46,937	0.25	3,571	0.32	4,709	0.39
45-54	46,937	0.18	3,571	0.12	4,709	0.20
55-59	46,937	0.07	3,571	0.02	4,709	0.03
Age	46,937	35.2	3,571	33.9	4,709	37.9
Education						
Illiterate	46,786	0.30	3,563	0.07	4,709	0.16
Below secondary (1-5)	46,786	0.25	3,563	0.26	4,709	0.24
Some secondary (6-9)	46,786	0.21	3,563	0.39	4,709	0.36
Above some secondary (10-15)	46,786	0.18	3,563	0.25	4,709	0.22
Tertiary (16+)	46,786	0.06	3,563	0.02	4,709	0.02
Years of education	46,786	5.62	3,563	7.27	4,709	6.54
Years of staying abroad			3,560	6.10	4,709	6.46
Destination country						
GCC*			3,571	0.65	4,709	0.71
South Asia			3,571	0.20	4,709	0.17
Others			3,571	0.16	4,709	0.12
Employment status **						
Self-employed	46,937	0.26			3,333	0.54
Waged worker	46,937	0.58			3,333	0.29
Not working	46,937	0.16			3,333	0.17
Annual income, current BDT	27,851	138,417			3,151	152,292
Annual income, 2010 constant dollar	27,851	1,163			3,151	1,280

Notes: *Bahrain is not included, as it is classified as "Others" in the HIES. 3.6% migrated to Bahrain in the RMS. **For the BRMS, the sample is restricted to migrants who have lived in Bangladesh for at least one year since return.

Table A2: Self-employment and total earnings abroad, excluding the transportation sector

	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample			Employed only		
	OLS	2SLS	First Stage	OLS	2SLS	First Stage
Dependent Var	Self-employed	Self-employed	ln(Earning)	Self-employed	Self-employed	ln(Earning)
ln(Cum. Earning abroad)	0.027***	0.114**		0.037***	0.101**	
	(0.009)	(0.031)		(0.009)	(0.049)	
Oil price growth × Oil rents/GDP			0.866***			0.832***
			(0.112)			(0.104)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Year of return FE	Yes	Yes	Yes	Yes	Yes	Yes
Origin division FE	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics of excluded instruments		60.3			63.8	
Observations	3004	3004	3004	2425	2425	2425

Notes: * p<0.10, ** p<0.05, * p<0.01. Standard errors clustered at the destination-origin level are reported in parenthesis. The sample is restricted to males age 18-59 and excludes individuals who have been back in Bangladesh for less than a year. Control variables include age and squared age at the time of survey, educational attainment, and a dummy for self-employment prior to migration. Oil price growth is the ratio of oil price at the time of return over the one at the time of departure.

Table A3: Distribution and transition of temporary migrants across sectors of activity

Panel A: Distribution of temporary migrants by sector of activity

Sector	Before Migration %	During Migration %	After Return %
Agriculture	22.2	3.0	25.9
Construction	23.8	66.6	9.6
Manufacturing	2.5	5.1	1.7
Retail, Hotel, Restaurant	37.9	11.1	42.1
Transport, Utility	10.4	10.3	19.4
Other services	3.3	4.0	1.4
Total	100.0	100.0	100.0

Panel B: Transitions of temporary migrants across sectors of activity

	Sector After Return					
Sector During Migration	Agri. %	Cons., Manu. %	Rtl., Htl., Restr. %	Trans., Utility %	Other serv. %	Total %
Agriculture	34.0	11.0	39.0	15.0	1.0	100.0
Construction, Manufacturing	26.1	12.3	40.8	19.5	1.3	100.0
Retail, Hotel, Restaurant	25.3	5.5	51.4	16.2	1.6	100.0
Transport, Utility	23.7	12.0	42.5	20.7	1.2	100.0
Other services	23.7	7.6	38.9	27.5	2.3	100.0
Total	25.9	11.3	42.1	19.4	1.4	100.0

Notes: The sample is restricted to employed individuals.

B Details on the structural estimation

This appendix provides further detail on the structural estimation of the model presented in Section 5. Table A4 lists the parameters governing how the cost C_{it}^d of migration to destination d, earnings $\tilde{w}_{it}^d$ expected there, and the earnings w_{it}^l and profits π_{it} realized in any location l vary by individual characteristics. Each of these outcomes is specified as a linear function of age and education, with separate functions for each location. The corresponding coefficient estimates are displayed in Table A4. Similarly, the risk of being

dismissed and forced to return, δ_{it}^d, is a function of age and education, and again destination country specific. The relation of this probability to individual characteristics is estimate through a probit specification.

Table A5 further lists observed saving rates ρ^l in each location, and borrowing and lending rates based on Mallick (2012) and Berg, Emran, and Shilpi (2013). Finally, we let $\beta = 0.95$ and consider working lives until age $T = 60$. In line with our assumption of linear utility, we assume that individuals' value at the end of life is given by their stock of assets at time T, and if owning a business, the value of investment cost C_I^e.

Table A4: Auxiliary regressions for the model

Dependent variable	Country	Coefficient in the regression						SD of residuals
		Constant	Age	Below secondary	Some secondary	Above secondary	Duration	
ln(self-employment income)	B	8.236	0.0009	0.0130	0.0292	0.0269		0.335
ln(waged income)	B	8.065	0.0012	0.0494	0.0720	0.1038		0.312
ln(wage abroad)	M	9.379	-0.0041	-0.0349	-0.0859	-0.0386		0.487
ln(wage abroad)	O	9.241	0.0087	-0.0478	0.0418	-0.0395		0.807
ln(wage abroad)	Q	8.495	0.0143	0.2333	0.1288	0.2804		0.507
ln(wage abroad)	SA	8.951	0.0031	0.1658	0.1970	0.3226		0.602
ln(wage abroad)	UAE	8.928	0.0048	0.0578	0.1246	0.2926		0.509
ln(wage expectation)	M	9.392	0.0174	-0.0079	-0.0924	0.0500		0.827
ln(wage expectation)	O	9.448	0.0090	-0.0245	0.0504	0.1691		0.850
ln(wage expectation)	Q	8.810	0.0203	0.0495	0.4443	0.3088		0.921
ln(wage expectation)	SA	9.149	0.0174	0.1693	0.2941	0.3651		0.779
ln(wage expectation)	UAE	9.358	0.0154	0.0493	0.0987	0.2324		0.700
ln(migration costs)	M	9.540	-0.0095	0.0048	0.0247	0.0248		
ln(migration costs)	O	9.390	-0.0043	0.0007	0.0035	-0.0099		
ln(migration costs)	Q	9.050	0.0026	0.1120	0.2640	0.2040		
ln(migration costs)	SA	9.795	-0.0096	0.0516	0.0008	0.0155		
ln(migration costs)	UAE	9.527	-0.0045	-0.0300	0.0281	-0.0213		
forced return (probit coefficients)	M	-2.464	0.0146	0.0788	0.1120	-0.0007	0.0021	
forced return (probit coefficients)	O	-1.900	0.0156	-0.0136	-0.0260	-0.0226	-0.0321	
forced return (probit coefficients)	Q	-1.674	0.0112	-0.0099	0.1010	-0.0209	-0.0365	
forced return (probit coefficients)	SA	-3.019	0.0268	0.1040	0.2870	0.2780	-0.0186	
forced return (probit coefficients)	UAE	-2.400	0.0191	0.0092	0.0137	0.0129	-0.0114	

Notes: Incomes are annual. All monetary variables are converted into 2010 PPP adjusted dollar. Age in the regressions of self-employment and waged incomes in Bangladesh is the age at the time of the survey; age in the regressions of wages abroad, wage expectation and forced return is the age at the year of return; age in the regressions of migration costs is the age at departure. "Below secondary" is 1-5 years of schooling, "Some secondary" is 6-9 years of schooling and "Above secondary" is 10-15 years of schooling but excluding college and above. M stands for Malaysia, O for Oman, Q for Qatar, SA for Saudi Arabia, and UAE for United Arab Emirates.

Table A5: Other parameters in the model

Parameters	Country	Value
Price level relative to Bangladesh	M	1.62
Price level relative to Bangladesh	O	1.66
Price level relative to Bangladesh	Q	2.30
Price level relative to Bangladesh	SA	1.52
Price level relative to Bangladesh	UAE	2.31
Saving rate	M	0.347
Saving rate	O	0.289
Saving rate	Q	0.303
Saving rate	SA	0.354
Saving rate	UAE	0.384
Saving rate	B	0.114
interest rate of savings	B	0.05
interest rate of loans for migration	B	0.22

Notes: Relative price level is the ratio of nominal exchange rate and PPP rate between destination country and Bangladesh in 2012, from World Bank Development database. Saving rate in destination countries is the share of remittance and cash taken back to home over total earnings abroad, from RMS. Saving rate in Bangladesh is 1 minus the share of household consumption expenditures over household incomes, calculated from the HIES. Interest rate of savings and loans is from literature. M for Malaysia, O for Oman, Q for Qatar, SA for Saudi Arabia, and UAE for United Arab Emirates.

Table A6: Moments to fit in the model

Moments	Country	By education level			
		Illiterate	Below secondary	Some secondary	Above Secondary
%Self-employed after return		0.450	0.513	0.529	0.653
Share of borrowing		0.469	0.437	0.427	0.353
Assets at the time of survey (2010PPP$)		13,291	14,086	21,332	30,687
Duration in the destination	M	6.807	6.629	6.900	6.824
Duration in the destination	O	4.592	4.000	4.060	4.310
Duration in the destination	Q	3.293	3.531	3.383	3.992
Duration in the destination	SA	9.919	9.768	9.233	9.266
Duration in the destination	UAE	5.150	5.950	6.220	6.839
%Emigrants to the destination	M	0.0037	0.0139	0.0210	0.0148
%Emigrants to the destination	O	0.0019	0.0100	0.0165	0.0081
%Emigrants to the destination	Q	0.0015	0.0057	0.0090	0.0082
%Emigrants to the destination	SA	0.0060	0.0157	0.0295	0.0263
%Emigrants to the destination	UAE	0.0017	0.0102	0.0154	0.0120

Notes: The percentage of migrants to a given destination is from the HIES 2016-2017; Duration in the destination, the percentage of self-employed after return and assets at the time of survey is from the BRMS. "Below secondary" is 1-5 years of schooling, "Some secondary" is 6-9 years of schooling and "Above secondary" is 10-15 years of schooling but excluding college and above. M stands for Malaysia, O for Oman, Q for Qatar, SA for Saudi Arabia, and UAE for United Arab Emirates. Assets do not include the house value.

Table A7: Model fit for emigration rates by destination and education

Moment	Data	Std. Dev.	Model
emigration to Malaysia, education level 1	0.004	(0.001)	0.003
emigration to Malaysia, education level 2	0.014	(0.001)	0.014
emigration to Malaysia, education level 3	0.021	(0.001)	0.020
emigration to Malaysia, education level 4	0.015	(0.001)	0.015
emigration to Oman, education level 1	0.002	(0.000)	0.002
emigration to Oman, education level 2	0.010	(0.001)	0.008
emigration to Oman, education level 3	0.017	(0.001)	0.015
emigration to Oman, education level 4	0.008	(0.001)	0.008
emigration to Qatar, education level 1	0.001	(0.000)	0.002
emigration to Qatar, education level 2	0.006	(0.001)	0.005
emigration to Qatar, education level 3	0.009	(0.001)	0.007
emigration to Qatar, education level 4	0.008	(0.001)	0.005
emigration to Saudi-Arabia, educ. level 1	0.006	(0.001)	0.006
emigration to Saudi-Arabia, educ. level 2	0.016	(0.001)	0.017
emigration to Saudi-Arabia, educ. level 3	0.030	(0.002)	0.029
emigration to Saudi-Arabia, educ. level 4	0.026	(0.002)	0.028
emigration to the UAE, education level 1	0.002	(0.000)	0.001
emigration to the UAE, education level 2	0.010	(0.001)	0.010
emigration to the UAE, education level 3	0.015	(0.001)	0.017
emigration to the UAE, education level 4	0.012	(0.001)	0.009

Notes: Data sample standard deviations in parentheses. Education levels 1-4 refer to illiterate, some primary, some secondary and high school degree, respectively.

Table A8: Model fit for migration duration by destination and education level

Moment	Data	Std. Dev.	Model
mean years in Malaysia, education level 1	6.807	(0.440)	6.364
mean years in Malaysia, education level 2	6.629	(0.355)	6.264
mean years in Malaysia, education level 3	6.900	(0.295)	5.600
mean years in Malaysia, education level 4	6.824	(0.412)	6.645
mean years in Oman, education level 1	4.592	(0.477)	3.891
mean years in Oman, education level 2	4.000	(0.325)	3.819
mean years in Oman, education level 3	4.060	(0.226)	4.340
mean years in Oman, education level 4	4.310	(0.400)	3.444
mean years in Qatar, education level 1	3.293	(0.777)	2.113
mean years in Qatar, education level 2	3.531	(0.546)	3.420
mean years in Qatar, education level 3	3.383	(0.281)	3.167
mean years in Qatar, education level 4	3.992	(0.568)	4.531
mean years in Saudi-Arabia, educ. level 1	9.919	(0.508)	8.721
mean years in Saudi-Arabia, educ. level 2	9.768	(0.439)	8.491
mean years in Saudi-Arabia, educ. level 3	9.233	(0.354)	7.115
mean years in Saudi-Arabia, educ. level 4	9.266	(0.399)	8.796
mean years in the UAE, education level 1	5.150	(0.301)	5.375
mean years in the UAE, education level 2	5.950	(0.263)	5.618
mean years in the UAE, education level 3	6.220	(0.268)	5.556
mean years in the UAE, education level 4	6.839	(0.310)	6.267

Notes: Data sample standard deviations in parentheses. Education levels 1-4 refer to illiterate, some primary, some secondary and high school degree, respectively.

Table A9: Model fit for self-employment, asset level and borrowing by education level

Moment	Data	Std. Dev.	Model
stock of assets, education level 1	13.291	(1.037)	17.404
stock of assets, education level 2	14.086	(0.792)	23.378
stock of assets, education level 3	21.332	(1.186)	24.647
stock of assets, education level 4	30.687	(2.082)	30.455
share borrowing, education level 1	0.469	(0.018)	0.443
share borrowing, education level 2	0.437	(0.015)	0.429
share borrowing, education level 3	0.427	(0.013)	0.396
share borrowing, education level 4	0.353	(0.017)	0.285
share self-employed, education level 1	0.450	(0.024)	0.398
share self-employed, education level 2	0.513	(0.020)	0.496
share self-employed, education level 3	0.529	(0.017)	0.485
share self-employed, education level 4	0.653	(0.021)	0.554

Notes: Data sample standard deviations in parentheses. Education levels 1-4 refer to illiterate, some primary, some secondary and high school degree, respectively.

Table A10: Structural parameter estimates: Preference parameters

Parameter	Point estimate	Standard error	Identifying moment
η_1^M	-5.121	(0.423)	mean years in Malaysia, education level 1
η_2^M	-4.204	(0.042)	mean years in Malaysia, education level 2
η_3^M	-4.298	(0.080)	mean years in Malaysia, education level 3
η_4^M	-4.581	(0.521)	mean years in Malaysia, education level 4
η_1^O	-10.888	(0.346)	mean years in Oman, education level 1
η_2^O	-9.669	(0.030)	mean years in Oman, education level 2
η_3^O	-9.121	(0.044)	mean years in Oman, education level 3
η_4^O	-9.952	(0.085)	mean years in Oman, education level 4
η_1^Q	-5.128	(0.046)	mean years in Qatar, education level 1
η_2^Q	-5.725	(0.054)	mean years in Qatar, education level 2
η_3^Q	-4.616	(0.060)	mean years in Qatar, education level 3
η_4^Q	-6.131	(0.368)	mean years in Qatar, education level 4
η_1^{SA}	-3.808	(0.253)	mean years in Saudi-Arabia, educ. level 1
η_2^{SA}	-4.761	(0.145)	mean years in Saudi-Arabia, educ. level 2
η_3^{SA}	-5.179	(0.141)	mean years in Saudi-Arabia, educ. level 3
η_4^{SA}	-5.244	(0.056)	mean years in Saudi-Arabia, educ. level 4
η_1^{UAE}	-3.988	(0.084)	mean years in the UAE, education level 1
η_2^{UAE}	-3.917	(0.120)	mean years in the UAE, education level 2
η_3^{UAE}	-4.313	(0.424)	mean years in the UAE, education level 3
η_4^{UAE}	-5.418	(0.180)	mean years in the UAE, education level 4

Notes: Asymptotic standard errors in parentheses. Education levels 1-4 refer to illiterate, some primary, some secondary and high school degree, respectively.

Table A11: Structural parameter estimates: Foreign labor demand parameters

Parameter	Point estimate	Standard error	Identifying moment
ϕ_1^M	-8.873	(0.230)	emigration to Malaysia, education level 1
ϕ_2^M	-7.829	(0.016)	emigration to Malaysia, education level 2
ϕ_3^M	-7.191	(0.013)	emigration to Malaysia, education level 3
ϕ_4^M	-7.755	(0.029)	emigration to Malaysia, education level 4
ϕ_1^O	-9.174	(0.434)	emigration to Oman, education level 1
ϕ_2^O	-7.020	(0.184)	emigration to Oman, education level 2
ϕ_3^O	-3.318	(0.189)	emigration to Oman, education level 3
ϕ_4^O	-7.080	(0.123)	emigration to Oman, education level 4
ϕ_1^Q	-9.134	(0.130)	emigration to Qatar, education level 1
ϕ_2^Q	-8.639	(0.092)	emigration to Qatar, education level 2
ϕ_3^Q	-8.785	(0.204)	emigration to Qatar, education level 3
ϕ_4^Q	-8.884	(0.275)	emigration to Qatar, education level 4
ϕ_1^{SA}	-12.129	(0.132)	emigration to Saudi-Arabia, educ. level 1
ϕ_2^{SA}	-11.210	(0.060)	emigration to Saudi-Arabia, educ. level 2
ϕ_3^{SA}	-10.967	(0.069)	emigration to Saudi-Arabia, educ. level 3
ϕ_4^{SA}	-11.417	(0.103)	emigration to Saudi-Arabia, educ. level 4
ϕ_1^{UAE}	-11.795	(0.193)	emigration to the UAE, education level 1
ϕ_2^{UAE}	-9.789	(0.052)	emigration to the UAE, education level 2
ϕ_3^{UAE}	-9.462	(0.098)	emigration to the UAE, education level 3
ϕ_4^{UAE}	-10.114	(0.172)	emigration to the UAE, education level 4

Notes: Asymptotic standard errors in parentheses. Education levels 1-4 refer to illiterate, some primary, some secondary and high school degree, respectively.