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Emigration, Wages, and Agricultural Transformation in Myanmar's Mon State

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Abstract

As it emerges from decades of military rule and international economic sanctions, the country of Myanmar ranks among the least advanced economies on the South-East Asian peninsula. Low wages and lack of prospects have long prompted the Burmese to seek income opportunities in neighboring countries, but this outflow of labor force has greatly intensified over the past decade. In the migrant-sending economy, this can result in significant labor-market pressures which raise wages and erode farmer profits. Using primary household data from Mon State, a southern state neighboring Thailand, we provide insights into these phenomena. We document the extent of migration flows, finding that almost a third of the labor force of Mon State is currently away (mostly in Thailand). Regression estimates reveal a significant relationship between migration and wage levels. We use past propensity to migrate as an instrument for current migration to demonstrate that the relationship between migration and high wages is causal. Finally, we further apply this methodology to explore the relationship between migration and changes in agricultural practices, and find that migration is prompting farmers to abandon labor-intensive technologies, thus precipitating transformation in the rural economy of Mon State.

Keywords: migration, labor, mechanization, rural transformation, Burma

JEL codes: O13, O15, F22

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Introduction

One of the largest streams of migrants in South-East Asia flows from Myanmar to Thailand. Over the period 2005-2010, Myanmar sent out almost half a million migrants to Thailand, making it the country with largest net out-migration flow on the peninsula.[1] This represents about 1% of its 2010 population, estimated at 52 million by the World Bank. All indicates that emigration has continued to accelerate at a rapid pace since then. This large outflow of labor force could have huge implications for how the country develops.

Myanmar is currently undergoing an extreme political and economic makeover. The first democratically elected government in decades took office in 2016. The country is experiencing very high levels of growth, currently around 8% GDP growth per year according to the ADB website. However, it is not yet clear whether Myanmar will follow a path of export-led growth based on labor-intensive manufacturing, as some of its neighbors did. As the Myanmar economy is being transformed by rapid growth and accelerated engagement with the world economy, a depletion of labor resources may have dramatic repercussions on the country's growth path. Wage levels, in particular, are likely to be a decisive factor, as they play a major role in attracting foreign investment.

The majority of Myanmar's population is rural, and agriculture generates about half of the county's GDP, according to World Bank indicators. Many migrants originate from the rural sector, where opportunities are scarce and wages lower than in the urban sector. However, Myanmar's rural economy is overwhelmingly based on non-mechanized smallholder agriculture, thus dependent on the availability of cheap labor. In that context, rapidly rising labor costs could have the potential to threaten the long-term viability of agricultural livelihoods, and by extension the food security of the country. Given the remarkable size of migration flows out of Myanmar, there is a compelling case for gathering data and generating knowledge about the extent of these phenomena. It leads to the two central questions of this study: is migration out of Myanmar pushing rural wages upwards? And if so, how are farmers coping with rising labor costs?

Answering these questions is not straightforward. Economic theory is ambiguous on the matter: on the one hand it tells us that removing migrants out of the labor force will tend to tighten the labor market and lead to rising wages. At the same time, remittances raise incomes and buying power, which may also pull prices and wages upward. On the other hand, theory also tells us that none of these wage impacts will actually take place if there exists a highly elastic supply of labor (either within the economy or coming from neighboring regions). If that is the case, every migrant who leaves can be easily replaced by another worker without upward pressure on wages. In addition, even if labor supply is inelastic, migration flows may not be large enough to have an economically significant impact on the wage. The question of whether

[1] We consider mainland Southeast Asia as being comprised of Cambodia, Lao, Myanmar, Thailand, Vietnam, and Peninsular Malaysia. Though Malaysia sends slightly more migrants, it also receives more, making it a net receiver of migrants. Myanmar, in contrast, saw huge emigration and almost no immigration over that period.

migration affects wages in any way is therefore far from trivial. In this article we try to use econometric methods to show that migration is, indeed, impacting wages significantly.

If migration does affect wages, as our results suggest, this may also be having deep consequences on economic incentives for farmers. On the one hand, higher wages should induce farmers to increase labor-efficiency on the farm: they may for instance invest in machinery, or switch to less labor-intensive crops. On the other hand, if these investments are not possible or profitable, farmers may experience decreasing profitability until the point where they prefer to leave the land fallow. Again, theory is not able to give us a clear-cut response to this question. Whether or not migration is influencing farmers to alter their production practices is therefore an empirical question, and we need to examine the specific Myanmar context in order to shed light on it.

Existing literature relating to Myanmar gives us precious little information to answer these questions, partially owing to the country's relative isolation over much of the past few decades. The literature we do have on the topic of Myanmar-Thailand migration tends to refer to the time of civil unrest, when students and political dissidents fled into exile and conflict led to forced displacement (Caouette & Pack, 2002; Grundy-Warr, 2004). Since then, migration increasingly became economically motivated, with unskilled laborers crossing the border in search of higher wages in Thai farming, manufacturing, and services. There does exists a fair amount of literature about Myanmar migrants *in their host country*, including their economic impact on the Thai economy (Martin, 2007), their working conditions (Chantavanich, Vungsiriphisal, & Laodumrongchai, 2007), or their health status (Aung, Pongpanich, & Robson, 2009; Wiwanitkit, 2002). One study also provides some insight on the flow of remittances from Myanmar migrants, but the data it uses dates back to 2002, and was collected in Thailand from the migrants themselves, not the recipients (Turnell, Vicary, & Bradford, 2008). Overall, we have very little information about the way migration and remittances might be shaping the Myanmar economy.

This paper is a first attempt to fill this information gap, focusing on the rural areas of Mon State, which neighbors Thailand and is the origin of a large share of the migrants. To the best of our knowledge, this is the first study of impacts of Myanmar migration on the home economy based on household data collected in Myanmar, and the first to do so after the 2011 reforms which initiated the political and economic "opening up" of the country. Using a representative sample from rural Mon State, we shed light on the importance of these migration flows, and their impact on rural labor markets and agricultural transformation.

Mon State is an ideal setting to hone in on these questions. Despite it being one of the least-populated states of Myanmar (2 million inhabitants, or about 4% of the population), it is the source of 27% of the country's migrants to Thailand, making it by far the largest sender (IOM & ARCM, 2013). The impacts of migration are readily visible throughout the rural landscape, most conspicuously in the remittance-fueled boom in house construction. Mon State is thus a uniquely well suited area to establish the link between migration flows, rural wages, and agricultural practices.

Nevertheless, establishing those links is not straightforward, due to the abundance of confounding factors. Specifically, the challenge lies in the fact that factors which influence migration behavior might also determine local wages. In the absence of panel data, we rely on cross-sectional econometrics to generate our estimates. In particular, after presenting results from regressions of local wages on migration variables, we shift to an instrumental variables approach to try and reveal a causal relationship between migration and high wages. We use past propensity to migrate at the village level to instrument for current migration. We apply a similar methodology to reveal shifts in farmer behaviors. The remainder of this article starts by presenting background information. Section 3 provides information on the empirical strategy, section 4 discusses results, followed by conclusions.

Data, Background, and Motivation

The Mon State Rural Household Survey

This research is based primarily on data from the Mon State Rural Household Survey (MSRHS), which was collected in June of 2015 and refers to the preceding 12-month period. The sampling used a stratified two-stage design based on preliminary summary data and maps from the 2014 Population and Housing Census of Myanmar. The primary sampling units were the census enumeration areas (EAs), which are segments defined within the village tracts and wards for the purposes of the data collection for the 2014 Census. Based on the survey objectives, the sampling frame was limited to rural households, and strata and substrata for the sampling were defined so as to oversample EAs with more activities of interest (rice, rubber, orchards, or marine fishing). Sample weights are applied throughout the analysis to reflect this sampling strategy. The final sample size was 140 EAs and 1,680 households.

In each of the sampled EAs we collected general information using a community questionnaire, and household-specific information with a household survey. The community survey was administered in public areas to a select group of up to 6 official respondents. The group of respondents usually included prominent village figures, such as village leaders, religious leaders, youth group or women's group representatives, etc. Gender-diverse groups were selected where possible. Questions focused on village-wide infrastructure (roads, electricity, waterways, etc.), the availability of services (banking, schooling, etc.), information on local projects and programs, as well as environment factors, natural disasters, conflict, land, and prices.

The household questionnaire was administered to 12 households in each of the 140 sample EAs. The number of households per township varies substantially, reflecting the size of the rural population (Mawlamyine is primarily urban, thus mostly not covered by our sample). In each household, we interviewed one primary respondent (usually the head of the household, but another member could answer in their place if necessary). It collected complete demographic information on household members, as well as education, health, and occupation. In addition to current household members, it also recorded details about migrants both short-

and long-term, thus enabling this analysis. Major sections of the survey were also devoted to income-generating activities both agricultural and non-agricultural.

Migration out of Mon State

Mon State is one of the smaller states of Myanmar, located in the southern part of the country along the coast of the Andaman sea. Its capital, Mawlamyine, is the fourth largest city in Myanmar with an approximate population of 300,000. A map of Mon State, which is divided into ten administrative townships, is provided in Figure 1.

The Mon State economy is largely based on agriculture and fisheries, the main crops being rice, rubber, and tropical fruit trees. Industrial activity is scarce, and mostly limited to the transformation of agricultural or fish products. Though the state is largely agricultural, yields are low compared to big agricultural exporters like Thailand or Vietnam. In fact, due to a late monsoon season, poor soils, and lack of water-control infrastructure, rice yields are also lower than many other rice-producing regions of Myanmar (IFPRI, 2016). Our data shows that while it is still the dominating activity, agriculture only provides 25% of the rural incomes in Mon State.

Another major source of income is the cash sent by migrants in the form of remittances. The southern tip of the state borders Thailand, and migration has become one of the pillars of the Mon economy: our data shows that about 40% of all households reported having a member currently living in Thailand long-term. The remittances those migrants send home constitute about 22% of all rural incomes, nearly as much as agriculture itself.

Figure 1 Map of Mon State and townships

The large wage differential between Myanmar and Thailand is what motivates workers to cross the border in search of better-paid opportunities. Typical low-skill wages hover around $3-$5 USD per day in Mon State, but can easily be double or triple that in Thailand. Mon state is not the only Myanmar state bordering Thailand, and worker migration is common all along the porous border. However, the historic, cultural and linguistic proximity between Mon and Thai people mean that the ethnic Mon find it easier to integrate into Thai society than most other workers from Myanmar. Figure 4 in the appendix shows that this trend is in fact accelerating.

Migration and wages

The household members who actually migrate are mostly young men and women of working age. There are only slightly more male migrants than female migrants: 45% of migrants in our sample are women. As shown in Table 1, the average age of non-seasonal migrants at the time of migration is about 24 years, with no difference between males and females. Further, 75% of non-seasonal migrants were between the ages of 17 and 35 at the time of migrating. Most migrants also have relatively low levels of education, with only 4.9 years of schooling on average. The majority of migrants (84%) have never been to high school. Almost a third of them (29%) had not finished primary school at the time of migrating. Again, these figures do not vary substantially between genders. The table also shows that about half of the migrants come from a landless household, which means that while landlessness may be one of the push factors, it certainly is not the only explanation for the large migration flows. We also see that the vast majority of migrants already have a relative at the destination, emphasizing the importance of migration networks. This notion of networks underpins our instrumental variables strategy.

Table 1 Characteristics of migrants by gender

Item	All Migrants	Male	Female
Mean age	24.0	24.3	23.7
Age groups (%)			
Schooling age (1-16)	15%	14%	15%
Younger working population (17-35)	75%	75%	75%
Older	10%	10%	10%
Education			
Mean years of schooling	5%	5%	5%
Never attended high school	84%	85%	84%
Other characteristics			
Household is landless	53%	51%	54%
Have a relative at the destination	71%	66%	76%

In addition, our data suggest that the propensity to migrate is a universal trend in Mon state, regardless of geography or income class. In fact, wealthier households are more likely

to have a migrant (60% of those in the highest income quintile do), which likely reflects both the fact that they can afford sending migrants abroad and the wealth they receive in remittances.

An important consequence of this massive movement of workers is that the population of Mon state is missing a large share of its labor force. The pyramid in Figure 2 represents the population in our sample, and illustrates the dramatic lack of residents aged 20 to 55 years. This picture is partly what motivates the search for impacts of migration on the Mon economy, and on wages and agricultural practices in particular.

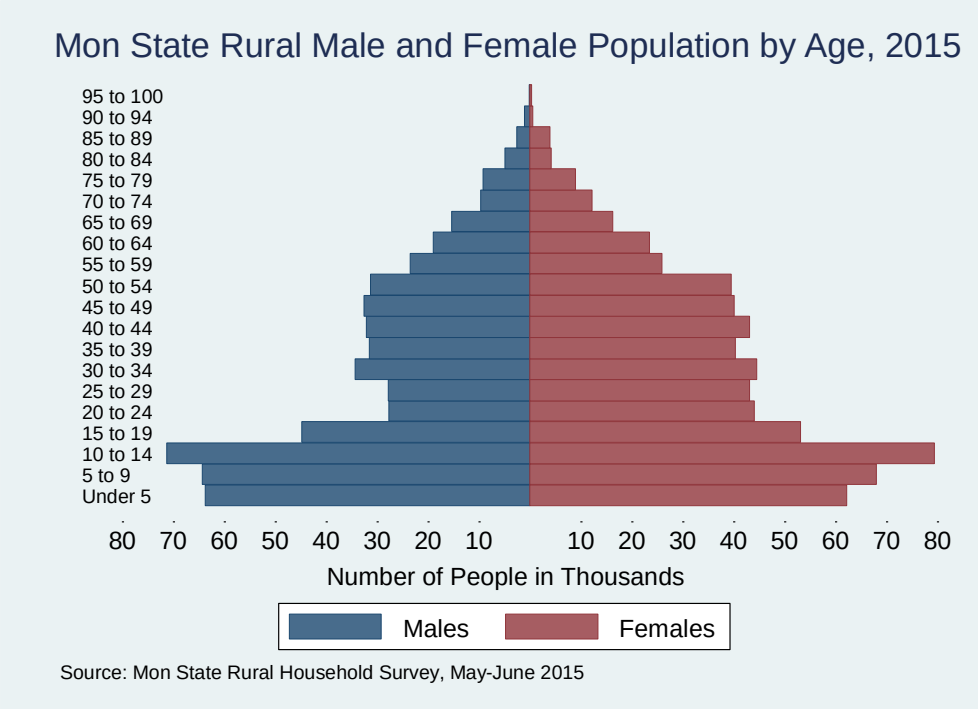

Figure 2 Population Pyramid of Rural Mon State (2015)

A first look at the wage patterns can be obtained graphically. We plot the average daily wage for unskilled rice workers by township in Figure 3, ordering the ten townships from North to South. The figure shows that wages in Mon state rise as we move closer to the southern border with Thailand. The geographic pattern in wages visible in the figure shows that unskilled workers are able to secure higher wages in townships closer to Mon State's border with Thailand. This suggest that there might be a correlation between migration and local wages. While this picture is a helpful visual representation of our central result, it only provides a very crude assessment of this correlation. The remainder of this article aims to deliver the nuance and robustness necessary to bolster our hypothesis that it is in fact migration that is exerting upward pressure on local wages.

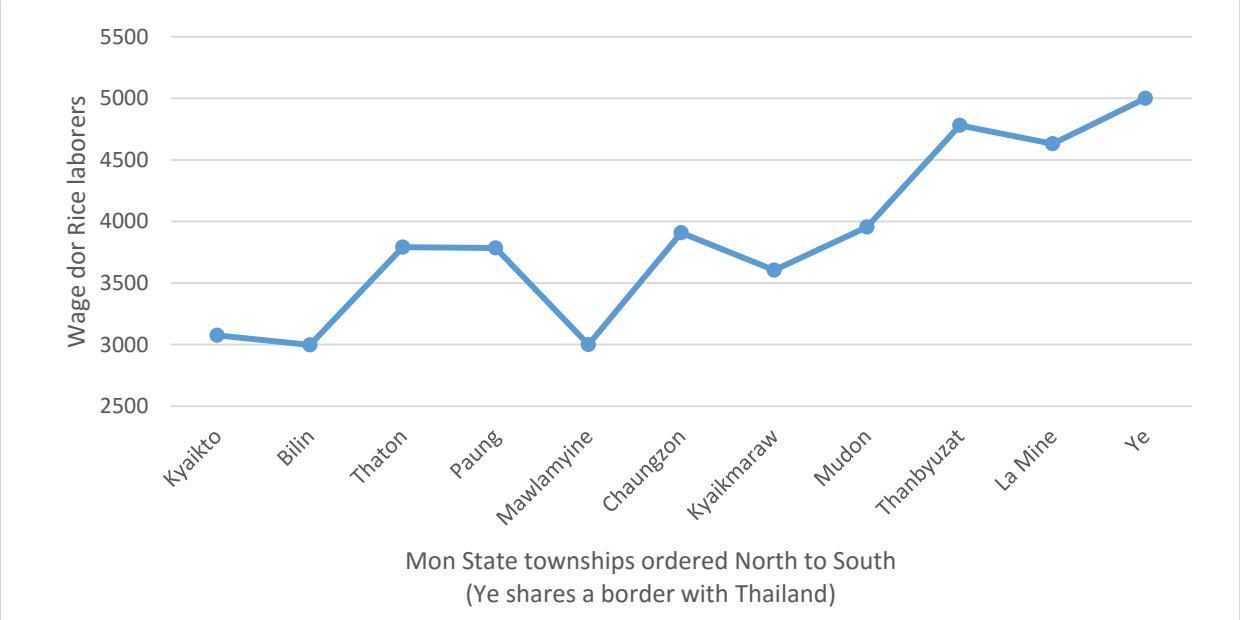

Figure 3 Geographic pattern of daily wages for rice workers.

Empirical Strategy and Data Summary

Regression and Instrumental Variables Approach

The importance of studying the consequences of emigration on migrants' home economy has increasingly been gaining recognition in the economic literature. However, advances in this field are limited by empirical hurdles which make identification of causal effects particularly challenging.

While it is easy to correlate geography with wages, as we did in Figure 3, proving that this relationship is due to migration is much less straightforward. We bolster this analysis with correlations, at the EA level, between wages and the distance to the Thailand border, as well as a variety of migration variables. However, places closer to Thailand may happen to have higher wages for entirely different reasons – for instance due to agro-ecological conditions. For that reason, we need to employ econometric methods that control for such exogenous factors. We also provide extensive evidence that these correlations between migration and wages remain robust in a variety of regression specifications.

However, even with all confounding factors controlled for in a regression framework, there remains the issue that the decision to migrate is not a random one. Migrants are not randomly taken out of households, which means we cannot simply compare households with migrants to households without them and conclude that migration explains any differences we find. In other words, the migration decision is eminently endogenous, and we have to rely on additional econometrics to strip this endogeneity out of our results. If we had access to panel data, we could rely on fixed-effects methodologies to control for these intrinsic household characteristics that may be determining the decision to migrate. However, data on migration

in Myanmar is scarce and we are limited to a cross-sectional dataset. Under these circumstances, we have to rely on an instrumental variables (IV) empirical strategy.

The methodological issue we are facing is not uncommon in the literature on migration, and there are several precedents for the use of instrumental variables to evaluate impacts of migration. One common IV used in the migration literature is based on the idea that migration networks facilitate and drive further migration from the same communities. Therefore, being in an area with strong migration networks influences the decision to migrate, while being largely exogenous to household or member characteristics.

Numerous researchers have employed this strategy using historical migration as a proxy for migration networks, such as regional migration rates, historic migration rates, or transport infrastructure. The assumption necessary for this approach is that the variables used as an instrument have no impact on current outcomes of interest (wages and agricultural practices in our case, but also working status, child health, inequality, or education) other than through their influence on the current decision to migrate.

In that spirit, Hanson & Woodruff (2003) instrument whether a household has external migrants by interacting historical state migration patterns to the US from Mexico in the 1950's and household characteristics such as the age, education, and marital status of the head of the household. Hildebrandt and McKenzie (2005) go further back into history and use the US migration rate from Mexico in 1924 as an instrumental variable for current migration. Similarly, McKenzie & Rapoport (2007) interact migrant households with migrant networks which they define as the proportion of all individuals aged 15 and over in a given community who have ever migrated and further instrument the migration network variable with historic state-level migration rates by using migration rates from 1924. Using a slightly different proxy for historic migration rates, Woodruff & Zenteno (2007) look at the relationship between migration networks and microenterprises in Mexico by using the distance from the capital city to the rail lines as an instrument for current migration patterns. The authors justify their selection based on high correlations between historic state migration rates and distance to rail lines up to the early 1990s.

Where historic rates are not available, authors often rely on current migration rate at the village or township level to proxy for the idea of migrant networks. Acosta (2006) uses village migrant networks measured by the proportion of families that have a member abroad and the number of international migrants who returned two or more years ago as instrumental variables. Although Damon (2010), uses a panel dataset in her research, she follows the approach by Acosta (2006) and uses the percentage of households in a community that receive remittances to instrument for migration as a proxy for network of migrants from a community. Similarly, (De Brauw, 2010) uses a panel dataset to look at impact of seasonal migration on agricultural production and uses the percentage of the commune that was seasonally migrating as an instrumental variable.

In this paper we also follow these strategies and use the past proportion of households with migrants in a village to instrument for current migration, both at the community level

(current proportion of households with migrants in an EA) and at the household level (whether or not a household has a migrant).

Summary Statistics

Table 2 presents summary statistics of all the wage and migration variables we use in the analysis. Four types of wages are presented, distinguished by gender (male or female) and season (slack or peak). Males are paid significantly more than females in both seasons, which is why we control for gender throughout our analysis. We also present three types of migration-related variables we will use in the econometric analysis: measures of distance to Thailand, measures of current migration at the EA level, and proxies for migration or migration networks.

Table 2 Summary Statistics of wage and migration variables

Variable	Mean	SD
Wage variables (MMK/day):		
Peak season wage for unskilled females	3404	781
Slack season wage for unskilled females	3082	853
Peak season wage for unskilled males	4694	937
Slack season wage for unskilled males	4280	1043
Distance variables (means at the EA level)		
Distance to the nearest border crossing (km)	117	38
Distance to the nearest point on the border (km)	84	20
Migration variables (means at the EA level)		
Percent of hh with international migrants	40%	21%
Percent of hh with any type of migrant (including local or temporary)	49%	21%
Percent of hh who receive remittances	37%	21%
Ratio of international migrants to local laborforce	0.39	0.29
Proxies for migration networks		
Percentage of hh who had international migrant prior to 2005	12%	12%
Percentage of hh with migrants returned more than 2 years ago	5%	8%
Percentage of hh with migrants returned within past 2 years	5%	7%
Number of hhs with migrant members abroad in the community	172	201
Observations	**280**	

Note: 1000 MMK is about 1 USD – though the rate fluctuates.

In terms of geographic correlation, Figure 3 showed a striking upward trend in wages when moving southward through Mon State, which is also moving closer to Mon State's border with Thailand. However, this border is short, and Mon State residents also have the option of crossing into Thailand through Karen State (moving eastward). This is in fact closer to some of the EAs in our sample, such that moving South is not necessarily moving closer to Thailand. In order to add this nuance, we used coordinates in the Global Positioning System to compute the distances between each EA in the sample and the nearest official border crossing (of which there are two: one in Mon State, one in neighboring Karen State). Finally, to account for potential illegal crossing, we also computed the distance from each EA to the nearest point on the Thai border. We use both variables as geographic proxies for ease of migration.

We also use a variety of measures of migration, current and past. By all measures, migration is a very common phenomenon. Statistics in Table 2 show that almost half (49%) of households have a migrant, 40% if we limit that to long-term international migrants. Most households receive remittances. We also computed the ratio of migrants to locals among the working-age population, and find it equal to 0.39, meaning that 28% of the workforce is currently working abroad.[1]

The bottom part of the table reports variables we use as proxies for migration networks. The percentage of households from the sample who had a migrant in 2005, at 12%, suggests that migration has increased rapidly over the past ten years. We also use returned migrants as indicators of networks: the share of households with a former migrant that returned more than two years ago, and the same share for those returned within the past two years. We expect that such measures are related to the ease with which current migrants-to-be can find ways to follow their predecessors. However, they should not be directly related to the wage. If anything, return migrants would add to the local labor force and decrease wages, which is the opposite of what we find. Finally, the count of households with a member abroad (which was estimated during the community survey) gives another proxy for the presence of migrant networks in the community.

Finally, we also extracted a set of community characteristics that serve as control variables for our regression analysis. We control for a variety of confounding factors which may affect migration and wages, such as for instance the availability of transportation, which could facilitate travel. We control for the availability of electricity and processing infrastructure, as those facilitate the local development of the private sector and might retain migrants. The availability of mechanized agricultural services is included as it may affect the unskilled labor market. In addition, we control for all types of shocks and disasters, including floods, droughts, social unrest, etc. We culled those variables either from the community survey or from the household survey. Table 3 reports the percentage of communities satisfying each of these criteria.

[1] The ratio is defined as (number of migrants aged 15-60) / (number of locals aged 15-60).

Table 3 Community characteristics

Does the community have access to the following?	**Share answering "yes"**
Public transport to urban center	0.22
Publicly provided electricity within the village	0.44
Infrastructure for processing	0.16
Migrant brokers operating in the village	0.10
Access to large farm equipment	0.78
Access to mechanical services	0.68
Has the community ever been affected by the following? (percentage answering yes)	
Destructive flooding	0.30
Drought	0.12
Cyclone	0.19
Severe crop disease	0.49
Fire	0.22
Declining fish stocks	0.44
Erosion	0.16
Salinization	0.32
Other natural disaster	0.10
Was the community affected by violent conflict or unrest in the past 5 years?	0.07
Did the community experience the following in the past year?	
Destructive flooding	0.24
Drought	0.10
Cyclone	0.04
Severe crop disease	0.36
Fire	0.10

Results

Simple Correlations and OLS Regressions

We start by looking for correlations between wages and an array of migration-related variables. We take the analysis to the EA level (Figure 3 showed means by township, of which there are 10), and correlate wages to measures of distance to Thailand and various proxies for the propensity to migrate or remit. In simple correlation analysis, we cannot control for gender as a covariate, so we break down wages by gender in addition to seasonality.

The top part of Table 4 shows strong negative correlations between wages and both distance measures. Slack season wages for males and females are all significantly lower in EAs further away from Thailand. Peak season wages for males and females were also negatively significantly correlated with distance from an official border crossing, but insignificantly correlated to the nearest point on the border. The signs and significance of these

coefficients confirm the intuition illustrated by Figure 3, namely that being closer to Thailand is associated with higher wages.

For each EA, we used measures of migration or proxy variables for migration networks to see if we could find a concurring correlation. We find strong indication that wages are positively correlated to all these measures, as all coefficients are positive and most are significant. There is a strongly significant positive correlation between the fraction of households who currently have an international migrant and all four measures of local wages. Wages are also significantly correlated with the percentage of households who receive remittances (from migrants). The proxies for migration tend to display slightly lower levels of significance, but still show mostly positive and significant correlations. Although we only have 12 observations for each EA and potentially a fair amount of noise in the data, these results appear to be robust. Finally, we tried using a variable from the community survey that would not be subject to this small sample issue: the number of households in a community who have a migrant (which the group of respondents were asked to approximate). Although only two of the coefficients were significant, we also find a positive correlation with wages.

Table 4 Correlations between wages and migration

	Male Wages		Female Wages	
Variable	Peak Season	Slack Season	Peak Season	Slack Season
Distance variables				
Distance from EA to closest official border crossing	-0.277**	-0.387***	-0.330***	-0.406***
Distance from HH to Nearest Border in km	-0.0511	-0.250**	-0.0332	-0.211*
Measures of current migration				
Percent of hh with international migrants	0.330***	0.246**	0.464***	0.295***
Percent of hh with any type of migrant (including local or temporary)	0.276**	0.212*	0.419***	0.295***
Percent of hh who receive remittances	0.322***	0.242**	0.390***	0.257**
Ratio of international migrants to local laborforce	0.428***	0.229**	0.414***	0.190*
Proxies of migration networks				
Percentage of hh who had international migrant prior to 2005	0.249**	0.142	0.380***	0.232**
Percentage of hh with migrants returned more than 2 years ago	0.255**	0.170	0.268**	0.152
Percentage of hh with migrants returned within past 2 years	0.143	0.248**	0.212*	0.278**
Number of hhs with migrant member abroad in the community	0.187*	0.158	0.185*	0.134

"* p<0.1 ** p<0.05 *** p <0.01

All these observations comfort us in the notion that there is a robust correlation between migration and wages in the migrant-sending economy. However, we know there may be a number of confounding factors underlying the correlations we observe, which prompts to look for more evidence using a regression framework enabling us to control for variables which might influence wages.

In the regression analysis, we controlled for several potentially confounding factors. We added a control for each of three agro-ecological zones (coastal, lowland and upland), in case the correlations we found are not simply reflective of geographic or environmental features. Distance to an urban center and presence of public transport capture the level of integration with regional markets. Presence of agricultural machinery services and processing infrastructure capture agricultural practices and rural development. The availability of such services are likely to affect wages because of the substitutability between machine and human labor in many stages of the agricultural production process. Finally, we control for all forms of natural disasters such as floods, droughts, pests, as well as for different indicators of armed conflict, as such events may affect both wages and the propensity to migrate.

Results of the regression analysis are presented in Table 5, using the percentage of households in the EA who have an international migrant as our measure of migration. To avoid multiplying results, we ran the regressions separately for slack season and peak season wages, but jointly for male and female labor (controlling for gender with a covariates). For each slack and peak season wages we report results from three specifications, using an increasing number of covariates as controls. Results largely confirm what we found with the correlation analysis: there is a very strong and robust relationship between migration and wages at the local scale.

As a robustness check for the results presented in Table 5, we ran similar regressions using all of the other distance, migration, or migration network variables we have in the dataset. For each variable, we ran the same specification, namely the one that includes all the possible covariates. The results are presented in

Table 6, and only report the coefficient on the migration-related variable. The results strongly confirm the relationship we found, with all but two coefficients displaying the expected sign with significance.

We thus find a very strong indication that local unskilled wages are higher in communities that are closer to Thailand, send more migrants, or have stronger migration networks. While these results tend to bolster our hypothesis that migration and local wages are intimately related, they are still not proof that migration *causes* upwards wage pressures. Indeed, it may be that what we observe is the result of endogeneity between migration and wage variables, as explained in the methodology section. Therefore, we turn to an instrumental variables regression strategy to alleviate some of those concerns.

Table 5 Ordinary Least Squares regression results

	(1)	(2)	(3)	(4)	(5)	(6)
		Peak Season			Slack Season	
VARIABLES						
Percentage of hh with international migrants	**27.41*** **	**24.90*** **	**24.96*** **	**28.10*** **	**25.25*** **	**28.61*** **
	(5.282)	**(5.383)**	**(5.574)**	**(5.903)**	**(6.151)**	**(5.603)**
Female wage	-1,259***	-1,268***	-1,282***	-1,184***	-1,188***	-1,190***
	(109.4)	(106.7)	(105.9)	(121.1)	(121.1)	(105.4)
distance to urban center in miles	-11.79*	-7.089	-8.764	-7.177	-6.194	-11.24
	(6.243)	(6.274)	(6.627)	(7.080)	(7.333)	(6.847)
public transport to urban center	-164.0	-300.4**	-245.6*	68.43	1.693	77.08
	(129.4)	(130.6)	(142.7)	(144.4)	(149.8)	(143.2)
Lowland zone	-336.0**	-366.6**	-438.3**	151.3	128.7	-47.22
	(154.9)	(153.9)	(174.0)	(171.3)	(175.7)	(173.8)
Upland zone	-302.1**	-249.4	-241.8	-13.61	-5.898	-55.73
	(149.2)	(151.0)	(181.3)	(165.6)	(174.3)	(178.3)
Publicly provided electricity within the village		332.7***	281.7**		26.84	-97.01
		(123.4)	(130.1)		(140.3)	(127.9)
Community has infrastructure for processing		58.73	91.58		345.9**	346.7**
		(145.1)	(148.8)		(159.6)	(145.0)
percentage of hhs without ag land		-778.2***	-767.1***		-445.8*	-559.8**
		(220.8)	(230.9)		(252.6)	(228.2)
access to large farm equipment F2		-105.1	-66.90		14.99	3.100
		(177.0)	(185.4)		(202.8)	(190.2)
access to mechanical services F4		156.6	194.7		121.5	449.4**
		(160.9)	(173.0)		(184.1)	(177.7)
Controls for shocks (dummy variables)			Yes			yes
Observations	245	243	241	251	249	247
R-squared	0.418	0.465	0.508	0.340	0.363	0.545

Note: Specifications including controls for shocks include 13 indicator variables for weather the community experienced the following in the previous year: flooding, drought, cyclone, crop disease, fire, declining fish stocks, other natural disaster; or ever experienced erosion, soil salinization, declining fish stocks, conflict, control by a non-governmental armed group. Coefficients were omitted in the interest of space.

Table 6 Robustness check - Regressions of wages on various migration-related variables

	Peak Wages	Slack Wages
Distance Variables		
Distance to the nearest official border crossing	-5.568**	-9.405***
Distance to the nearest point on the border	-2.271	-10.45**
Migration measures		
Percent of hh with international migrants	13.17***	8.879**
Percent of hh with any type of migrant (including local or temporary)	11.34***	6.453*
Percent of hh who receive remittances	14.00***	9.421**
Ratio of international migrants to local laborforce	1104.9***	576.6**
Proxies of migration networks		
Percentage of hh who had international migrant prior to 2005	21.06***	11.42*
Percentage of hh with migrants returned more than 2 years ago	22.87**	16.38*
Percentage of hh with migrants returned within past 2 years	27.41**	47.15***
Number of hhs with migrant member abroad in the community	0.662*	0.621
Observations	241	247

Note: All cells report the coefficient of interest from the regression of a wage variable (column) on a migration-related variable (row) and all the same controls as in columns (3) and (6) in Table 5. All other coefficients were omitted in the interest of space.

Instrumental Variables Regression Analysis (IV)

Our IV strategy relies on the instrumentation of current levels of migration at the EA level by a variable that proxies for the strength of migration networks. Given the choice of variables we have, there is a multitude of combinations of a network variable and a migration variable to choose from. We report results from two specifications. In the first, we regress local wages on the ratio of migrants to local labor force, but instrumenting the latter with the percentage of households who had a migrant in 2005. In the second, we regress local wages on the share of households with a migrant, but instrumenting the latter with the share of households with a recently-returned migrants (within the past two years).[1]

Results of the IV regression provide additional support to the notion that migration impacts wages. Table 7 shows that, even when instrumented by past migration, the ratio of migrants to labor force is positively correlated to wage levels both in slack and peak season. Similarly, the percentage of households with international migrants positively affects local wages, even when instrumented by return migrants. Unlike for OLS results, using an IV strategy allows us to reveal a causal relationship. As long as we believe that the instrument is appropriate, meaning that the instrumental variable does not influence current wages except

[1] Choosing other combinations of instrumental/instrumented variables does not change the nature of our conclusions.

through its influence on the instrumented variable, our results suggest that migration is causing higher wages.

We ran several tests to bolster our confidence in these results. The value of the LM test statistic is large enough to allows us to reject underidentification, meaning that the instrument we chose is correlated with the endogenous regressor. We can also reject weak identification, as the F-statistics for the Kleibergen-Paap weak identification test all exceed the critical value of 16.38 (Stock & Yogo, 2005). Finally, the p-value in the Anderson-Rubin allows us to reject endogeneity of our instruments all four regressions. These test provide some measure of reassurance that our instrument is valid, and thus suggest that our specification is, in fact, revealing the causal relationship between migration and upward pressure on local wages.

Impacts of Migration on Agricultural Practices

Higher wages have deep consequences for farmers, who often operate their farms at very low margins and may not be able to cope with rising costs. In areas with limited access to liquidity, these issues can compound further, as agriculture typically requires high labor inputs when households tend to be short on cash. Thus we are likely to see households attempt to reduce labor use as they face rising wages. In this section, we make use of a similar IV approach to see whether migration is contributing to agricultural transformation in Mon State by causing shifts in agricultural practices.

While the previous analysis was performed at the EA level, the following specifications require working at the household level. The new IV framework is very similar to the previous one: we use the share of households in the EA who had a migrant in 2005 as an instrument. This time however, rather than instrumenting for the current share of households with migrants (at the EA level), we use it to instrument for whether a household has a migrant member or not. The final outcomes of interest are all binary variables describing various agricultural practices.

The results of this analysis at the household level are presented in Table 8. We find that migration has significant impact on the production decisions of rice farmers, prompting them to shift away from labor use. They are less likely to hire workers for rice production, whether it be local workers or migrant workers. They are also less likely to rely on animal drought power for land preparation, which is more labor-intensive than mechanical power. Thus, it seems that migration is prompting mechanization in the rice sector.

Looking at the rubber sector, we find that households with migrants are more likely to own rubber trees. This echoes a narrative often heard in the field, whereby residents of Mon State often invest in rubber plantations using the money and skills they earned in Thailand. However, while they are more likely to plant rubber trees, they are less likely to hire workers to tap those trees, which again points to the labor-market effects of migration.

Finally, we also find that households with migrants are less likely to engage in resource extraction activities (fishing, firewood of bamboo collection, etc.), but more likely to own a

motor vehicle. Both of these results testify to the fact that migration participates significantly to the transformation of the rural landscape currently underway in Mon State.

Table 7 Results of the second stage of IV regression

	(1)	(2)	(3)	(4)
Instrumental variable (proxy for networks)	**Share of households who had migrants in 2005**		**Share of household with migrants who returned within past 2 years**	
	Peak Wages	Slack Wages	Peak Wages	Slack Wages
Endogenous variable:				
Ratio of migrants relative to EA laborforce (instrumented)	1290.2***	730.1*		
	(297.0)	(337.8)		
Percentage of hh with international migrants (instrumented)			35.97**	25.18*
			(11.87)	(11.38)
Controls:				
Female wage	-1280.2***	-1188.3***	-1280.2***	-1190.1***
	(98.25)	(103.9)	(113.8)	(110.4)
distance to urban center in miles	-10.22	-14.99*	1.376	-7.731
	(6.121)	(6.708)	(8.448)	(7.989)
public transport to urban center	-256.6	39.68	-73.25	184.4
	(132.3)	(142.0)	(172.5)	(172.4)
lowland	-287.3	59.06	-201.9	174.8
	(165.3)	(177.9)	(203.0)	(207.1)
	(1)	(2)	(3)	(4)
Instrumental variable (proxy for networks)	**Share of households who had migrants in 2005**		**Share of household with migrants who returned within past 2 years**	
upland	-170.4	-26.11	-287.5	-46.42
	(171.0)	(184.0)	(194.2)	(191.5)
publicly provided electricity within the village	184.5	-184.6	146.9	-213.5
	(121.2)	(128.1)	(143.2)	(138.4)
community has infrastructure for processing	201.9	442.9**	162.5	421.3**
	(138.7)	(144.4)	(159.9)	(152.0)
percentage of hhs without ag land	-514.0*	-505.1*	-158.5	-223.6
	(230.2)	(244.0)	(346.8)	(325.9)
access to large farm equipment	63.91	113.6	-137.8	-83.65
	(168.7)	(188.2)	(210.5)	(234.1)
access to mechanical services	-46.09	349.0*	-340.1	158.0
	(166.5)	(175.4)	(246.5)	(211.0)
Shock dummies	yes	yes	yes	yes
Constant	5949.8***	5318.6***	5053.7***	4601.6***
	(317.4)	(348.2)	(603.7)	(591.0)
N	241	247	241	247
r2	0.528	0.508	0.366	0.445
F statistic for weak identification (Kleibergen-Paap)	147.196	115.653	15.524	16.426
Anderson-Rubin chi-sq test of significance of endogenous regressors	0.000	0.032	0.001	0.019
LM test statistic for underidentification (Anderson or Kleibergen-Paap)	97.672	84.603	16.160	17.017

Note: Endogenous variable instrumented by percentage of households in the sample who had a migrant in 2010. Shock dummies include indicator variables for weather the community experienced the following in the previous year: flooding, drought, cyclone, crop disease, fire, declining fish stocks, other natural disaster; or ever experienced erosion, soil salinization, declining fish stocks, conflict, control by a non-governmental armed group.

Table 8 Impacts on migration on household behavior, second-stage IV

Outcome	Migrant Household
Agriculture - Rice	
Household hired workers (locals or migrants) for rice production	-0.461***
Household uses animals for land preparation in rice production	-0.440***
Agriculture - Rubber	
Household owns rubber trees	0.430***
Household hired workers for rubber production	-0.446***
Other	
Household engages in resource extraction	-0.164**
Household owns land motorized transportation asset	0.485***

Conclusion

The wage differential between Myanmar and Thailand is prompting many workers to seek jobs across the border. Nowhere is this phenomenon more pronounced than in Mon State, where our data shows almost a third of the local labor force is working abroad. Our analysis revealed that wage levels in rural Mon State are intimately related to proximity with Thailand, that migration has a significant effect on wages for unskilled workers of both genders, and that it is prompting farmers to shift towards labor-saving crops and technologies.

Naturally, there are limitations to our methodology, prime among them the fact that our identification strategy relies on the assumption that our instruments are valid. While the instruments passed all the available econometric validity tests, there always remains the possibility that they are endogenous in some way we are not able to test for. With that caveat in mind, we still believe that this paper provides compelling evidence of the dramatic effects that migration is having the rural economy of Mon State.

The conclusion that migration causes wages to rise was not necessarily expected. Areas with a large surplus of cheap labor can send large fractions of its labor force away without experiencing any labor shortage or wage pressure. Mon State is neither very large nor very hard to travel through, but we found that enough wage variation between the different EAs to reveal strong impacts. The fact that we were able to identify these impacts both in slack and peak seasons, and with such strong significance, is striking. It suggests that there are no large labor surpluses in Mon State, and labor supply is not very elastic.

Economic theory would predict that wages equalize over time as migrants move from low-wage to high-wage areas. Indeed, just as Mon State residents are moving to Thailand, there exist flows of temporary migrant workers coming from more northern regions to Mon State itself, filling some of the void left by Mon workers. However, these movements are primarily seasonal (harvest time) and have not, as our results demonstrate, led to full geographic equalization of wages. Frictions in the labor markets and transportation costs may ensure that the current wage gradient between central Myanmar, Mon State, and Thailand, is maintained in the short-to-medium run. As long as that is the case, we are likely to see the movement away from labor-intensive agriculture accelerate.

The implications for the Mon State rural economy run deep. Rice production in particular is continuously becoming less profitable. We already see a dramatic shift towards mechanized technology, and a preference for higher-value crops such as rubber. Mechanization, however, may not be an economical option for farmers at lower levels of the productivity spectrum. There is anecdotal evidence that some farmers are leaving their land fallow, others broadcasting rice seed simply to keep their land in use, or just lending it out free of charge to other farmers. Ultimately, a rural economy based on smallholder rice production may not be able to sustain itself under such labor market dynamics, likely leading to land consolidation and increasing numbers of households stepping out of agriculture. Even in the rubber sector, farmer profits are getting squeezed as low world prices coincide with rising wages, and some plantation owners are having to refrain from harvesting their trees. Migration may thus be a catalyst of a deagrarianization trend in Mon State, rather than a trigger of modernization of agricultural practices.

Remittances further contribute to this accelerating this trend, as they inject unprecedented wealth into the Mon economy, boosting consumption of goods and services. The construction sector, in particular, is experiencing rapid growth as migrants invest their savings in housing. Whether or not such growth will be enough to absorb the workers released by agriculture is unclear, and so far it has not prevented migration to Thailand to keep accelerating. As the economy of Mon State becomes increasingly dependent on migration and remittances, it is important to realize that this carries some risks, such as for instance exposure to currency exchange-rate shocks.

While our results only apply to Mon State, some of our implications are relevant for all of Myanmar. Firstly, cheap labor is an important resource not only for agriculture but also for light manufacturing. A rapid rise in wages may prevent small-scale industry to take root and thwart the hopes for economic transition. Second, as agriculture is already underperforming, the fact that rising wages may create excessive strain on agricultural profits is not to be taken lightly. Rising wages prompt mechanization, but they can also bankrupt the smallholder economy, thus significantly slowing down agricultural growth on balance. As Myanmar is facing rapid economic transformation, additional work should focus on understanding the determinants of wages throughout the country.

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Annexes

Table 9 Allocation of sample EAs and households for Rural Mon State Household Survey, by strata

Stratum	Predominant activity	Total		1-Low substratum		2-High substratum	
		Sample EAs	Sample households	Sample EAs	Sample households	Sample EAs	Sample households
1	Marine fishing	35	420	18	216	17	204
2	Orchards	35	420	12	144	23	276
3	Rubber	35	420	4	48	31	372
4	Rice	35	420	3	36	32	384
Total		140	1,680	37	444	103	1,236

Table 10 Migration flows in South-East Asia, 2005-2010

	Population	In	Out	Net
Myanmar		0	498	-499
Thailand		508	15	493
Vietnam		19	448	-430
Cambodia				
Lao		0	75	-75
Malaysia		696	610	85
Singapore		721		721
Philippines				
Indonesia		0	1276	-1277

Source: http://www.global-migration.info/VID_Global_Migration_Datasheet_web.pdf

Also see: http://www.global-migration.info/

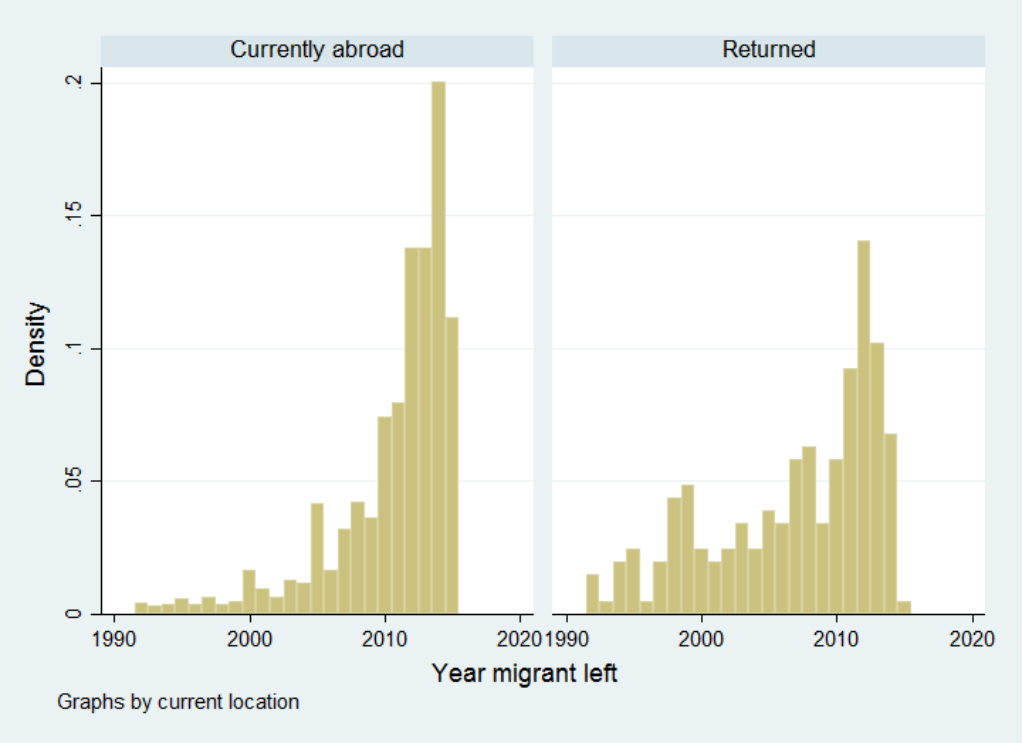

Figure 4 Distribution of the year migrants left (current migrants and returned migrants)

Table 11 Largest expenses made using remittances (% of responses)

	All migrants	Males	Females
House construction	26.4%	28.5%	24.1%
Purchase agricultural land	19.3%	14.6%	24.1%
Pay medical expenses	13.2%	11.4%	15.0%
Purchase land for housing	9.3%	11.4%	7.2%
Donations to monasteries	7.9%	9.2%	6.6%
Purchase agricultural assets / fishing equipment	6.4%	5.2%	7.7%
Pay debts	5.8%	5.1%	6.5%
Pay for ceremonies	5.6%	5.7%	5.5%
Purchase durable assets	2.5%	3.6%	1.4%
Other	3.7%	5.4%	1.9%
TOTAL	**100%**	**100%**	**100%**