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Industrialization and Poverty Reduction in East Asia: Internal Labor Movements Matter[*]

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Abstract: A number of developing East Asian countries have achieved both rapid economic growth and poverty reduction by effectively utilizing global value chains. An essential, but often neglected, condition for their economic development is smooth labor movements from the rural to urban sectors. This paper demonstrates that such labor movements have played an important role in the process of industrialization with global value chains. After conducting some international comparisons, we examine the case of Thailand for its massive labor movements until the mid-2000s as well as discussing stagnant moves in recent years.

Key words: global value chains, agglomeration, Lewis model, informal sector, Thailand

JEL classification: F66, J0, O1, O5

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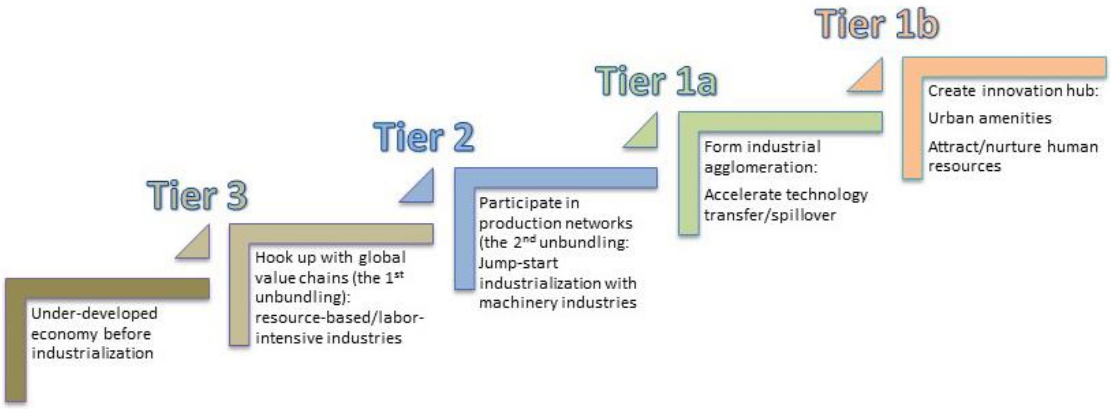
1 – Introduction: GVCs and internal labor movements

In the last three decades a number of developing East Asian countries have achieved both rapid economic growth and poverty reduction while developing economies in other parts of the world such as Sub-Saharan African and Latin American countries have not necessarily experienced both. East Asian countries have applied a novel development strategy that aggressively took advantage of global value chains (GVCs), which has been supported by large labor pools available in these countries.

ERIA (2015) proposes a conceptual framework of the tier structure in industrialization with regard to how a country or a region is connected with GVCs (Figure 1). Tier 3 is a step to hook up with slow GVCs such as what we observed in traditional operations in food processing, garment industry, tourism, and others. Tier 2 is a stage where a country or a region participates in fast and sophisticated international production networks (Ando and Kimura, 2005) or the 2nd unbundling (Baldwin, 2011). Production networks in machinery industries are typical ones though quick operations in other industries such as food processing with cold chains, cut flowers by air, call centers, and software outsourcing are also categorized in this tier. In tier 1a, a country starts forming industrial agglomeration while keeping thick channels of international production networks. The last tier, tier 1b, is a step to create an innovation hub in order to move up to a fully developed economy.

Figure 1 – East Asian development strategy with global value chains



Source: ERIA (2015).

Starting from a slow but stable connection with GVCs (Tier 3), ASEAN Member States and China have participated in quick and well-organized production networks (Tier 2). Furthermore, with tight connectivity with GVCs, the formation of industrial agglomerations has been observed in ASEAN forerunners and China (Tier 1a). Some advanced countries including Thailand, Malaysia, and China have recently faced new challenges for creating innovation hubs (Tier 1b). We do not observe such an organized transition of development ladder in terms of the utilization of GVCs in the other parts of the developing world.

The supply of unskilled labor[1] is crucial in Tiers 3, 2, and 1a where multinationals bring labor-intensive production processes and tasks into less developed countries (LDCs). Production blocks coming from developed countries (DCs) always require various factor inputs other than unskilled labor, but in most cases they are more unskilled-labor-intensive than the overall economic activities in production networks. Indeed, the 2nd unbundling is often more carefully designed and sophisticated in

[1] In this paper unskilled labor is a relative term that is understood in comparison to the overall economic activities in production networks. The analysis in section 4.1 includes data for four decades, and we can observe that as Thailand develops there is a change in the profile of the population that impacts the group we refer to as unskilled labor with an increase in its education level.

utilizing unskilled labor than the 1st unbundling. The abundant supply of inexpensive unskilled labor is no doubt one of the key motivations for production blocks to come to LDCs. The importance of skilled labor is often emphasized, and it does not contradict the importance of the supply of unskilled labor. Production blocks require inputs of both skilled and unskilled labor, and the supply of skilled labor is typically in shortage. In order to take advantage of abundant unskilled labor, we need skilled labor.

LDCs typically have large labor pools in rural sectors. However, they do not necessarily take advantage of labor abundance in industrialization. The participation in GVCs generates demand for unskilled labor, but people in rural sectors cannot readily become employed as unskilled labor in manufacturing in some countries. Whether countries have smooth movements of labor from rural sectors to urban sectors seems to be one of the crucial factors in economic development in the globalization era.

Whether smooth movements of labor are achieved or not can also have profound welfare implications. Labor movements from rural sectors to urban sectors may pull up the income level of the poor and accelerate poverty alleviation. In such a case, economic growth can be inclusive with strong trickle-down effects to the poor. On the other hand, stagnant labor movements may contribute to premature de-industrialization and aggravate income disparity.

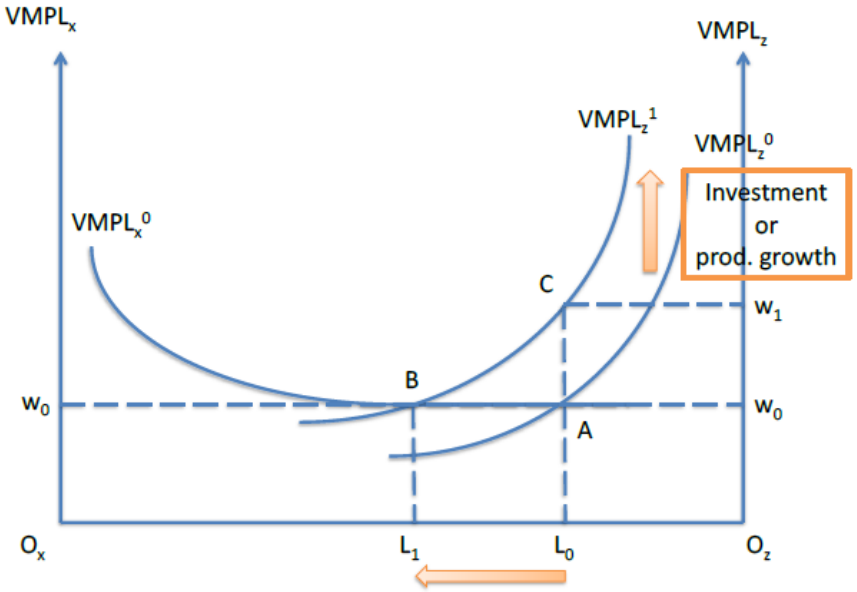
This paper will discuss our claim based on an illustrative model a-la-Lewis and explore evidence that supports it. The study will be organized as follows: section 2 presents an illustrative model a-la-Lewis in order to analyze the consequences of smooth labor mobility and shows some indirect evidence in international comparisons. Section 3 provides overviews of the growth performance achieved by East Asian developing countries with relatively smooth labor movements. Section 4 contains a case

study on Thailand that illustrates the dynamics we present. Section 5 provides the final considerations of the paper.

2 – Industrialization and labor mobility

To better understand the industrialization process with labor movements, we employ a diagram a-la-Lewis (1954) that illustrates a country starting with a large labor pool in the rural sectors (Figure 2).

Figure 2 – Labor movements from the rural to the urban sectors



Source: ERIA (2015).

A country at the starting point of economic development has an economy divided in two sectors that are commonly referred to as rural and urban sectors. The rural sectors are sectors of the economy with low productivity and surplus labor, usually attributed to rural activities or the agricultural sector, although they can also incorporate the informal sector. The urban sectors are largely attributed to the industrial or urban activities, though it can also incorporate the formal sector. In this dual economy, with labor surplus in the rural sectors, there will be a tendency of labor movement to the urban sectors. In Figure 2

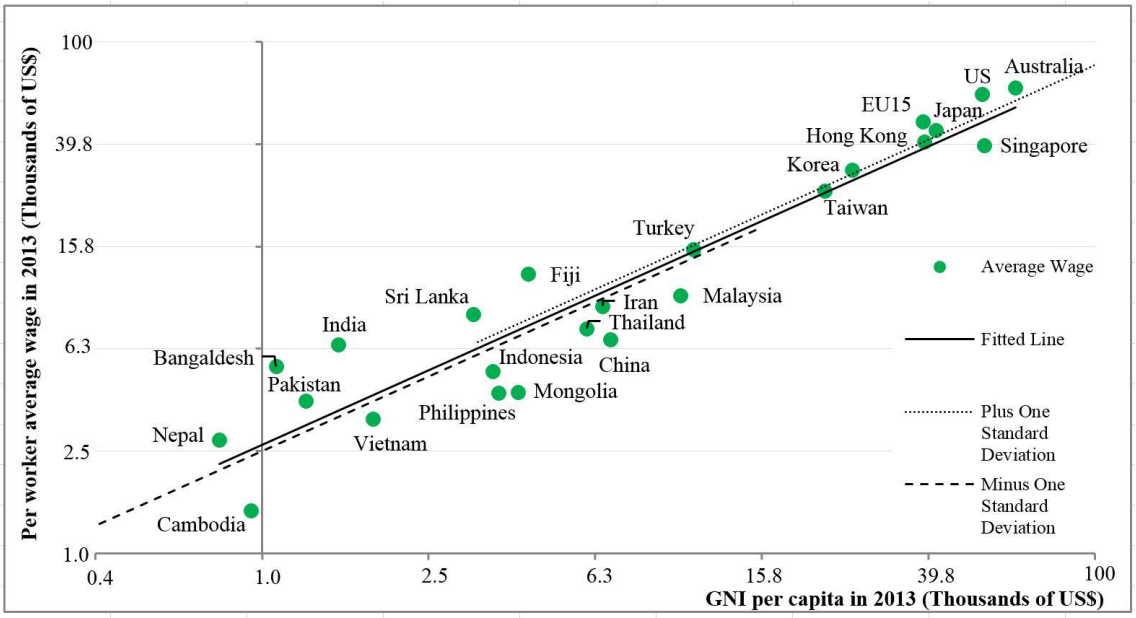
the horizontal axis stands for the total amount of labor available in the economy. Representing the initial values of marginal product of labor there are curves $VMPL_x^0$ (rural sector) and $VMPL_z^0$ (urban sector). The initial equilibrium is given by point A, where the wages in both sectors are w_0 and O_xL_0 represents the initial amount of labor in the rural sector and L_0O_z the initial amount of labor in the urban sector. The flat line BA represents the labor surplus in the rural sector. An increase in investments or productivity growth in the urban sector will shift $VMPL_z^0$ to $VMPL_z^1$. In such a situation, given that the labor can smoothly move between the sectors, the labor equivalent to BA will move from the rural to the urban sector. After point B, new investments or productivity growth will move up $VMPL_z$ further, generating an increase in the wages in both sectors. The point where the labor surplus in the rural sector is extinguished was called in the literature as the Lewis turning point.

A crucial assumption here is that labor can move smoothly from the rural sector to the urban sector. If labor moves, the urban sector can enjoy labor supply without raising wages as far as redundant labor exists. The rural sector can clean up the redundant labor and, after point B and onward, start increasing productivity. In the other extreme, if labor cannot move between sectors, we end up with point C, instead of point B, where the wage increase in the urban sector and a wage gap between two sectors expands. Even if the labor demand in the urban sector exists, labor movements can become slow for various reasons. For example, living conditions for poor people in urban areas are so bad that rural people may not come. Or, educational gaps are so large that rural people are not capable enough to become factory workers in urban areas. Perhaps, trustable middlemen do not exist, and proper information on job conditions in urban areas may not be provided for rural people. In these cases, industrialization may become stagnant, income gaps

between rural and urban may expand, and productivity growth in rural areas may be delayed.

We can actually observe indirect evidence on cross-country differences in internal labor mobility. Figure 3 presents the correlation between the average wage and the gross national income (GNI) per capita in 2013 for some Asian countries and developed countries. The figure shows that given their levels of economic development, proxied by the GNI per capita, the wages in developing East Asian countries are plotted under the fitted line, demonstrating that given their level of development the wages are low. This provides competitive location advantages for labor-intensive industries or production processes. On the other hand, there are countries also with a big labor pool, South Asian countries, which are positioned above the fitted line. The existence of a big labor pool *per se* is not a sufficient condition to have competitive average wages.

Figure 3 – Correlation between per-worker average wage and GNI per capita in 2013



Source: APO Productivity Database 2015.

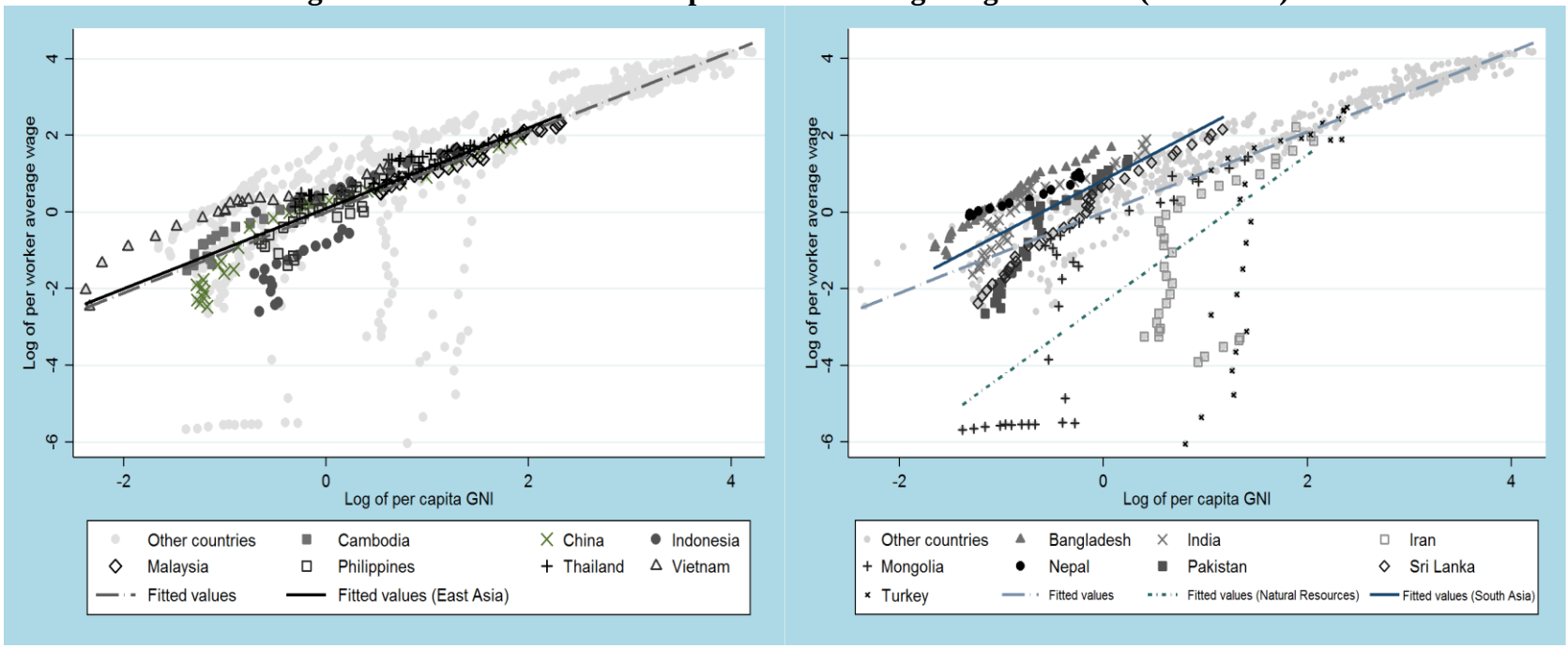
An explanation for this situation is that low average wages in developing East

Asian countries can be attributed to relatively smooth labor movements from the rural to urban sectors, while high average wages in South Asian countries indicate that they are facing difficulties in promoting such labor movements. High wages can hinder the process of development, leaving a pool of workers underemployed.

Figure 4 plots the same correlation for the same group of countries using data for the period 1980-2013. It shows that along the period the developing East Asian countries` moved parallel to the fitted line or in its direction, like in China, Malaysia, the Philippines, and Thailand's cases. On the opposite side, some developing countries moved almost in a vertical way, like Iran, Mongolia, and Turkey, while South Asian countries like Bangladesh, India, Pakistan, and Sri Lanka also moved in the upper position achieving the highest log of per worker average wages. In the left-hand side the fitted line for developing East Asian countries follows the tendency of the fitted line for all countries, almost overlapping it. In the right-hand side the fitted line for South Asian countries and the one for the outliers[2] Mongolia and Iran (natural resources dependent countries) reveal patterns of deviation, been steeper than the fitted line for all countries. These differences illustrate the mentioned smoothness of the labor movements from the rural to urban sectors.

[2] Turkey is also an outlier, but differently from Iran and Mongolia that have abundant natural resources, the Turkish economy faced political turmoil in the 1980s and had a weak currency.

Figure 4 – Correlation between per worker average wage and GNI (1980-2013)



Source: APO Productivity Database 2015.

3 – Rapid and inclusive economic growth

ASEAN and China have aggressively utilized GVCs and have achieved rapid and sustained economic growth. Furthermore, the economic growth has been inclusive in the sense that the ascension of the poor people from the lowest income stratums has been notably successful. As a background, relatively smooth labor movements from rural to urban sectors have helped quick poverty alleviation.

Table 1 indicates the growth rates of these countries, the developing economies in the world with and without China[3], and the world average. With the Philippines in the first decade (1980-1990) as the only exception, during the last three decades these countries' growth rates were higher than the world ones though having obvious slow-downs in the 2000s.

Table 1 – Annual GDP growth rate (GDP constant US$)

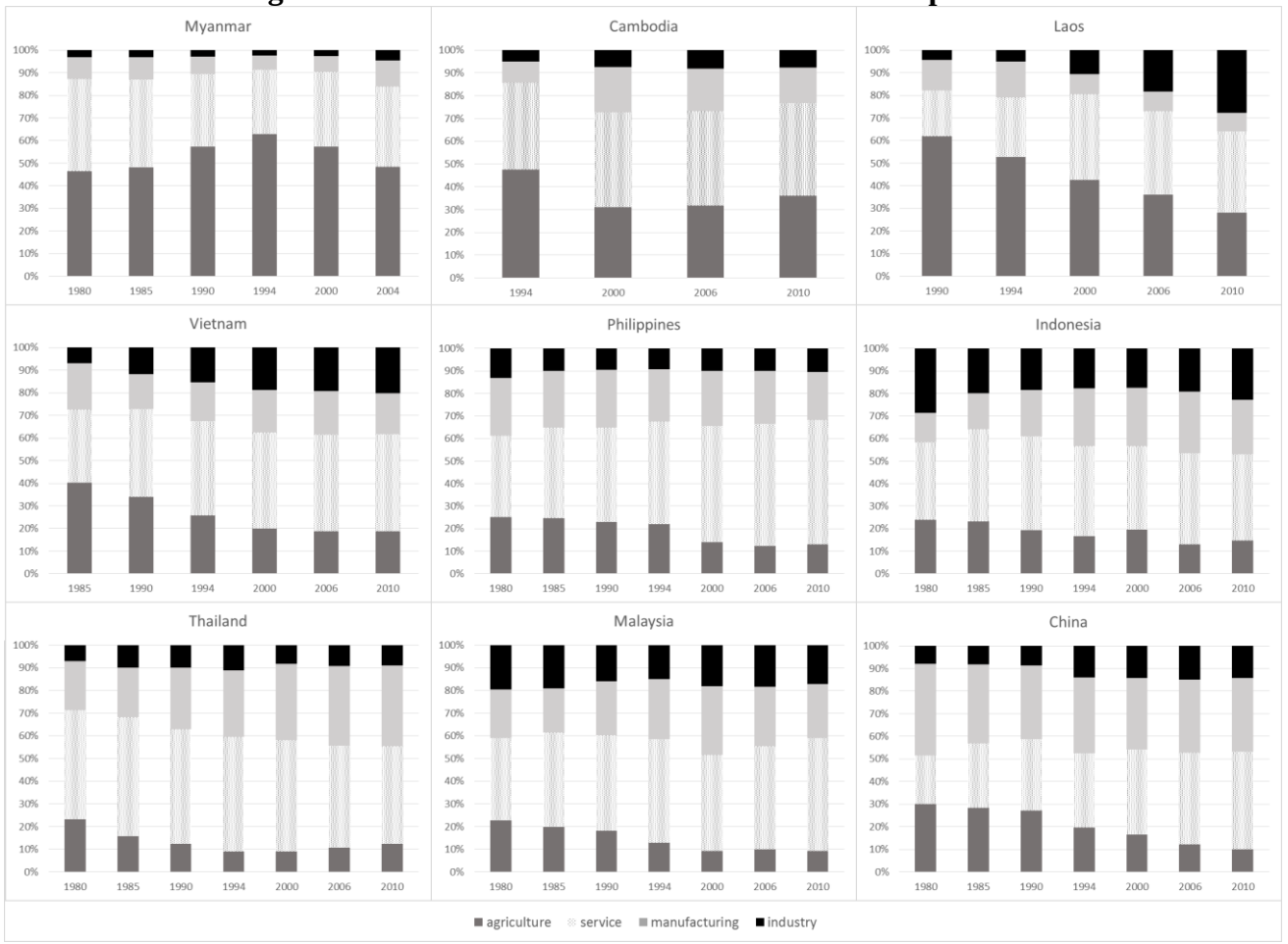
Country Name	1980-1990	1990-2000	2000-2010
Cambodia	-	-	7.2
China	8.4	18.0	9.5
Indonesia	5.8	7.1	4.7
Laos	-	10.5	6.5
Malaysia	5.4	12.1	4.2
Philippines	1.5	4.8	4.3
Thailand	7.1	7.5	3.9
Vietnam	-	12.9	6.0
Developing Economies	3.0	6.8	5.5
Developing Economies without China	2.4	4.4	3.7
World	2.9	4.7	2.3

Source: WDI data.

[3] The developing economies group is composed by countries that World Bank classified as East Asia & Pacific (developing only), Europe & Central Asia (developing only), Latin America & Caribbean (developing only), Middle East & North Africa (developing only), and Sub-Saharan Africa (developing only).

Concomitant to the GDP growth, Figure 5 illustrates a decreasing process in the relative significance of the agricultural sector in the GDP's value added composition. In all countries there are decreases in agriculture's importance. Myanmar is the exception, with an increase in the agriculture`s participation that peaked in 1994 being followed by a decreasing trend.

Figure 5 – Evolution of the GDP`s value added composition[4]



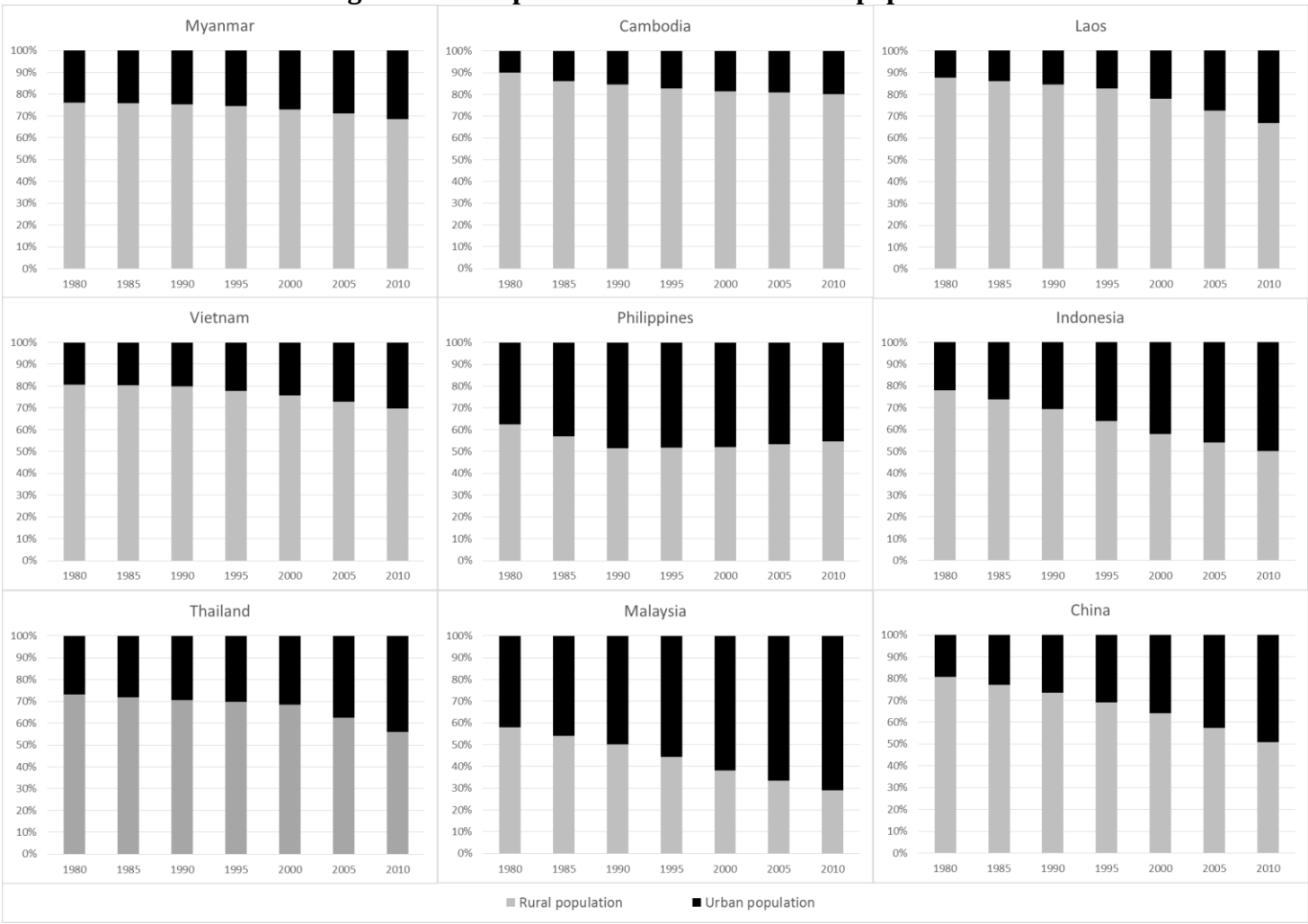
Source: WDI data.

[4] According to World Bank`s definition manufacturing is a subgroup of the industry classification.

Figure 6 demonstrates that the industrialization process moved a part of the population from the rural to the urban areas. Although cities may include poor quarters, they in general offer better infrastructure and consequently basic improvements like access to schools, hospitals, water, basic sanitation services and electricity.

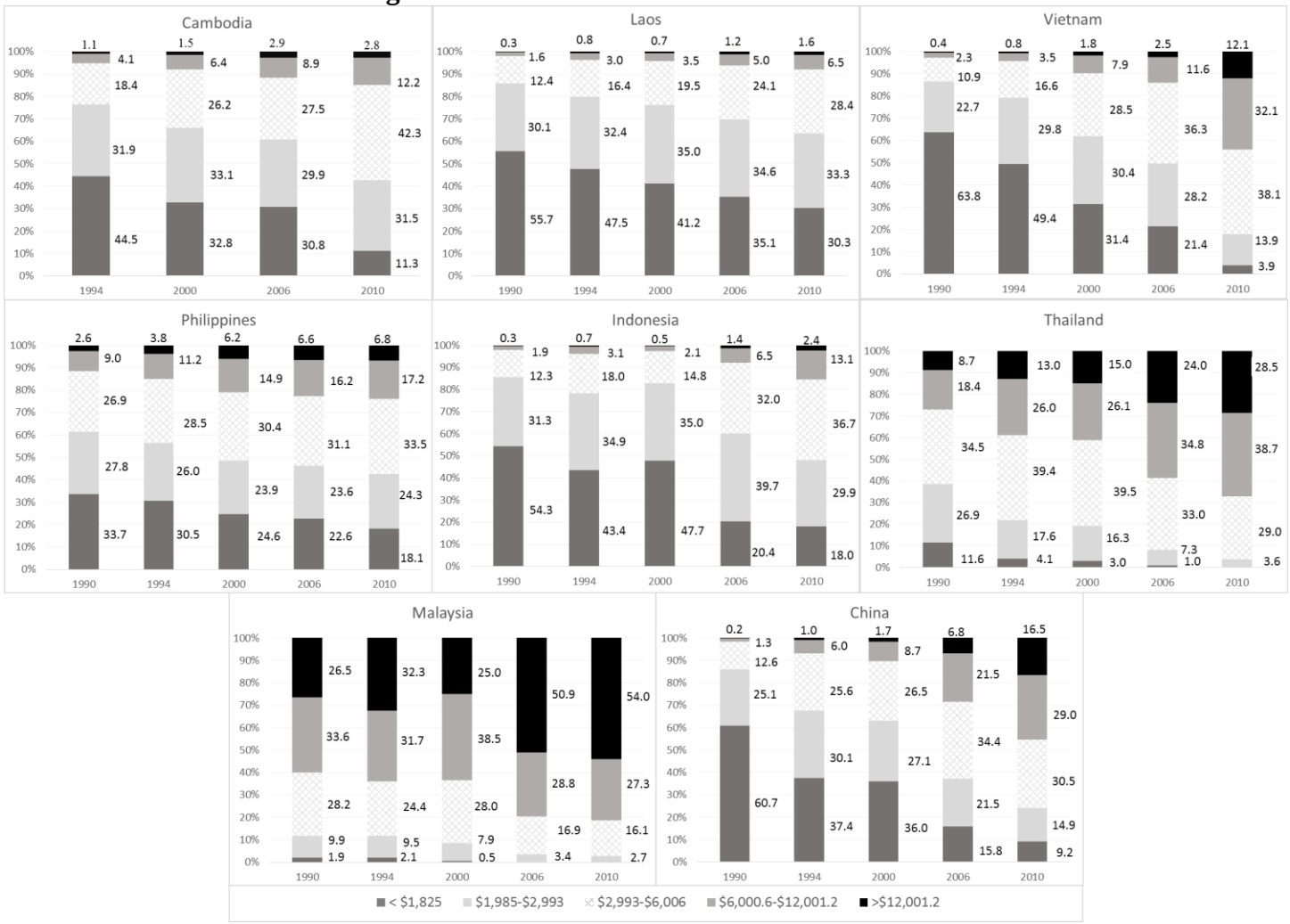
A more direct way of verifying the improvements in the living standards is observing the evolution of the income distribution. Based on data collected by the World Bank PovcalNet, we calculate the necessary income for a family with four persons to live below the poverty line (less than US$ 5 per day), low income stratum (less than US$ 8.2 per day), low middle income stratum (less than US$ 16.44 per day), high middle income stratum (less than US$ 32.88 per day), and over the middle income stratum (more than US$ 32.88 per day). The results in Figure 7 indicate a general reduction in the shares of population below the poverty line and in the low-income stratum. Although development stages widely vary, we observe a steady reduction in the population below the poverty line in all countries.

Figure 6 – Composition of rural and urban population



Source: WDI data.

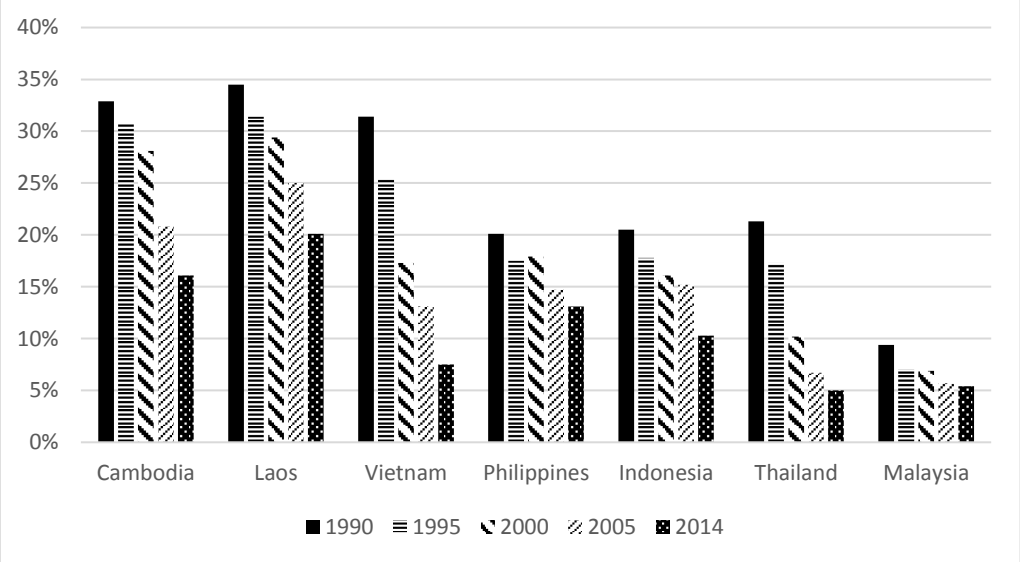
Figure 7 – Evolution of the income distribution



Source: PovcalNet – World Bank.

A complementary way of accessing the improvements in the living standards is to look at the evolution of indexes to measure the improvement of some minimum necessary conditions for a reasonable life. We observe changes in the Global Hunger Index, an index that is a simple average of three components: the percentage of undernourished in the population; the prevalence of underweight in children under five years, in percent; and the under-five mortality rate. Figure 8 indicates that since 1990 there is a clear trend of decreases in this index for all countries. Once again Cambodia and Laos have the worst numbers, though improving, lagging behind the other countries of the region while Thailand and Malaysia have the best results for the region.

Figure 8 - Evolution of the Global Hunger Index



Source: International Food Policy Research Institute (IFPRI).

4 – Case Study: Thailand

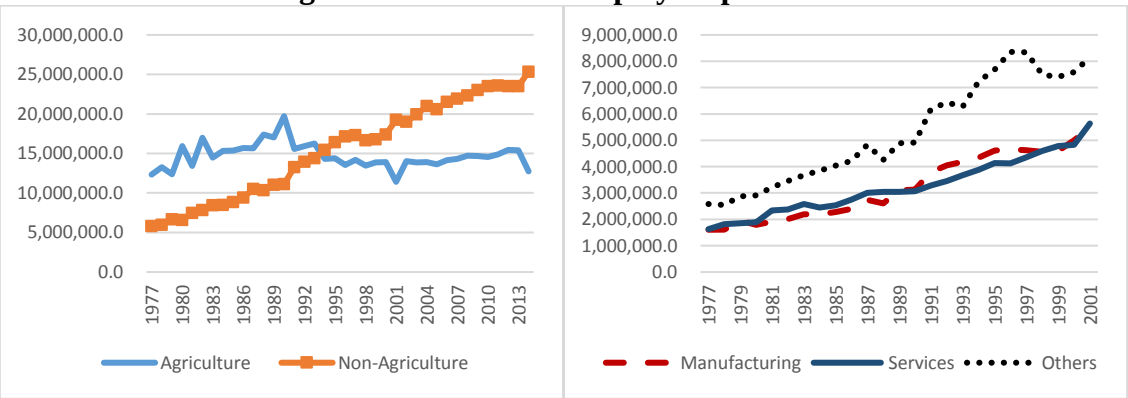
This section will further investigate the nature of labor movements from the rural to the urban sectors in the Thailand case. We separate the time period into two: before the middle of the 2000s and after. In the former period, active labor movements are observed

while some difficulties seem to arise in the latter period.

4.1 – Massive labor movements before the mid-2000s

Compared with other countries in the region, Thailand has a relatively advanced industrialization process. The left side of Figure 9 shows that the number of employees in the agriculture sector peaked in the end of the 1980s decreasing until stabilizing around the 15 million people. The number of non-agricultural employees increased steadily during the whole period, surpassing the agricultural employees in the first half of the 1990s, achieving more than 25 million people in 2014. In other words, in 1977 around 67.9% of the employed workers were working in the agriculture sector, but in the end of the period this share declined to 33.4%, suggesting a smooth labor movement between the sectors. In the right side of Figure 9 the data for non-agriculture sector is disaggregated into manufacturing, services, and other sectors for the available years. There is an increase in employees in the three sectors, with manufacturing and services having a similar trend. The increase in employees in the manufacturing sector becomes steeper in the end of the 1980s after Thailand adopted fiscal, monetary, and trade reforms, besides reorienting the tariff and tax structures to favor local and foreign industries that wanted to produce for export (Hussey, 1993). The adoption of these policies allied with the comparative advantages offered by the cheap unskilled labor lead to an increase in foreign investments. Further investments to improve infrastructure and the consolidation of multinational factories related to the transport and electronic sectors allowed Thailand to step up from Tier 3, to Tier 2, and then to Tier 1a.

Figure 9 – Number of employees per sector



Source: Bank of Thailand statistics.

Another way of verifying these changes is to look at the migration between regions inside Thailand. According to the theory we would expect migration from the rural areas to Bangkok and the surrounding provinces, where the industries of the country are concentrated.

Richter and Tangchonlatip (2011) use census data to calculate the net gain or loss per region considering the migration movements. The results in Table 2 indicate that Bangkok had a net gain of migration for the four periods, while the Northeastern region, the poorest one, had the highest net loss. It is also interesting to verify that the net migration flow to Bangkok increased more than three times from the 1965-70 period to the 1975-80 one. In the subsequent census, the net flow of people to Bangkok jumped to 365.9 thousand people from 1985-90, then decreased to 134.7 thousand from 1995-2000. This decrease is concomitant to an increase in the net migration flow to the Central region of 671 thousand people from 1995-2000. According to Richter and Tangchonlatip (2011), this indicates that from 1990 to 2000 there was a saturation of people in Bangkok, but improvements in the infrastructure around it and the development of production agglomerations led to an increase in migration to the five

peripheral provinces[5] that with Bangkok form the Bangkok Metropolitan Region (BMR). From this period to the 2000s the development of industrial agglomerations in the BMR allowed the Thai economy to move from the Tier 2 to the Tier 1a that is represented in Figure 1.

Table 2 – Net gain or loss by region from Census 5-year migration (thousands)

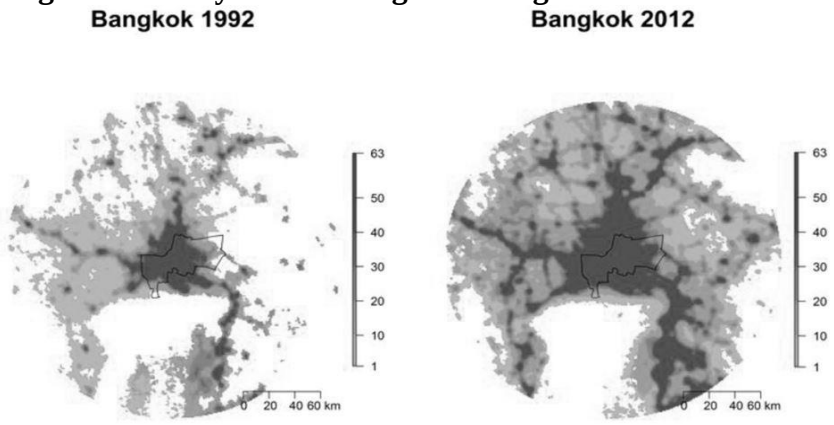
Region	1965-1970	1975-1980	1985-1990	1995-2000
Bangkok	**64.5**	**212.3**	**365.9**	**134.7**
Central Region (excluding Bangkok)	**-11.2**	**-5.8**	**293.4**	**671.0**
Northern Region	**-3.2**	**-23.9**	**-89.3**	**-71.6**
Northeastern Region	**-47.6**	**-181.3**	**-553.7**	**-369.7**
Southern Region	**-2.5**	**-1.3**	**-16.3**	**57.9**

Source: Richter and Tangchonlatip (2011).

An empirical way of showing the intensification of the economic activity in the BMR from the 1990s is using satellite pictures to classify the intensity of the night-time lights in the region (Keola, Andersson, and Hall, 2015). Figure 10 covers an area of 130 kilometers diameter with Bangkok city in the center. The scale varies from light grey (low intensity of night-time light) to dark grey (high intensity of night-time light) in a scale of 63 grades. The light intensity loosely corresponds to the level of economic activity and population density, and thus we can confirm that in 1992 the lights were concentrated inside the Bangkok city, while in 2012 they had already spread to the regions around Bangkok.

[5] The five peripheral provinces are: Samutprakarn, Nonthaburi, Pathumthani, Nakhon Pathom, and Samut Sakhon.

Figure 10 – City size with night-time light from satellite



Source: ERIA (2015), originally drawn by the ERIA-IDE Team.

In order to examine the migrants' characteristics, we make use of census data available through the Integrated Public Use Microdata Series, International (IPUMS-International) project. Given their confidentiality policy, they just provide a sample of the census data. According to IPUMS-International, the unit of the samples they provide is usually a household, which may generate a slight bias in estimating individual statistics. Nevertheless, in order to correct for problems of under or over representation of given individuals in the sample, IPUMS-International offers a weight for each individual observation. Consequently, after correcting the sampled data using the weights it is still possible to obtain an approximation of the general features of the population.

We collected the available data for four points in time from the Population and Housing Census: a sample of 2% from 1970, and samples of 1% from the years 1980, 1990, and 2000.[6] As our main interest is to identify the characteristics of the migration of potential workers to the Central region, we focus our analysis on the group of workers aged from 16 to 60 years old that were classified as residing in the Northern, Northeastern,

[6] The number of observations for each year sample are the following: 772,169 observations in 1970, 388,141 observations in 1980, 485,100 observations in 1990, and 604,519 observations in 2000.

or Southern region (hereafter referred to as outside Central region) or that migrated from these regions to the Central region.[7] We drop individuals that have missing values or unknown answers for the features analyzed.[8]

The individuals are divided into four groups: migrants from outside Central region to Bangkok, migrants from outside Central region to one of the five peripheral provinces, migrants from outside Central region to the rest of the Central region (Central region excluding BMR), and individuals that decided to stay in the outside Central region. This division follows the dynamics of the industrial expansion in Thailand, starting from Bangkok, spreading to the provinces that surround it in the BMR, and later to the other provinces of the Central region. Our intention is to verify the changes in the migration patterns concomitant to the industrialization process.

The first feature we observe is the composition of each group according to the individuals' gender and marital status.[9] The group of individuals that stay outside Central reveals a stable pattern, while Bangkok and the five peripheral provinces show increasing shares of female migrants. Considering the marital status, the majority of the migrants to Bangkok are single, but the share declines to below 50% in 2000. Although not as high as in the first group, the share of single workers that migrated to the five peripheral provinces is also high and follows a similar pattern, decreasing to less than 50% in 2000. The group of workers that stay outside Central reveals the opposite pattern, in comprising mainly by married people.

[7] The group we focus in our work represents the following shares of the population: 28.2% in 1970, 30.5% in 1980, 35.9% in 1990, and 34.3% in 2000.
[8] These trims represent the following shares of the population: 0.01% in 1970, 0.04% in 1980, 0.1% in 1990, and 0.3% in 2000.
[9] Gender and marital status composition is available in Table A1 in the appendix.

The next feature observed is the education level.[10] In general, there was an increase in the workers' education during the period. From 1970 to 1990, the region with the smallest shares of individuals with less than primary level was Bangkok. In 1990 the share of migrant workers with primary level education surpassed 50% in Bangkok, while in the five peripheral provinces the share of migrant workers with secondary level education achieved more than 20%. In general, these two regions received the highest shares of migrant workers with primary and secondary level education, while Bangkok received the highest shares of migrant workers with a bachelor`s degree. Compared with outside Central, migrant workers in the rest of Central also have higher levels of education, similar to the ones in BMR after 1980.

Given the importance of industrialization, we consider three categories of employment sector: manufacturing, services and others. A great part of the individuals that migrated to the five peripheral provinces and Bangkok were employed in the manufacturing or services sector. In the rest of Central region these shares increased along the time, achieving similar levels in 2000. The outside Central region had low shares of employment in the manufacturing sector.

The last feature we observe is the status in employment. The workers are classified in three groups: salaried workers, self-employed workers, and unpaid workers[11]. Although that is not a direct measure of formal and informal employment we expect that workers classified as salaried workers have a higher probability of being in formal employment, while the opposite applies to unpaid workers and to some of the self-employed workers. Salaried workers are in either manufacturing or services

[10] Education level composition is available in Table A2 in the appendix.
[11] According to IPUMS, an unpaid worker is a non-paid person working for some member of his/her own family.

sectors.[12] We observe a very clear pattern where the share of migrants classified as salaried workers is very high for Bangkok and the five peripheral provinces in all years. In the case of the rest of the Central region this number increases in 1980 and from 1990 this region achieves levels similar to the BMR. Meanwhile, outside Central reveals the opposite pattern with very low shares of salaried migrant workers.

This descriptive analysis suggests that in general the workers that migrated to Bangkok and the five peripheral provinces have a higher education level, are employed in the manufacturing sector, and are salaried workers. In order to verify this hypothesis we apply logit and multinomial logit models. Given the data constraints in terms of alternative-specific features, we opted to perform two exercises. Pooling the available data we first verify the differences in the individuals` features according to their choice of migrating or not. The logit model is specified as follows:

$$ln\left(\frac{Pr(y_{it}=z)}{Pr(y_{it}=b)}\right) = \beta_1 female_{it} + \beta_2 single_{it} + \beta_3 age_{it} +$$

$$\sum_{l=1}^{4} \beta_{4+l-1} edu_{lit} + \gamma_p + \delta_r + \theta_t + \varepsilon_{it} \qquad (1)$$

where the probability of individual *i* in year *t* make a decision *z* (migrate to Central region) given the reference category *b* (do not migrate to Central region) depends on individual characteristics like gender, marital status, age, education level *l*, and a set of fixed effects that controls for unobserved shocks related to the province of origin *p*, region of origin *r*, and year *t*.

In the sequence, provided that the individual migrated, we verify the differences in their features considering the destination region. The multinomial logit model is specified as follows:

[12] The relationship between employment sectors and the status in employment composition is available in Table A3 in the appendix.

$$ln\left(\frac{Pr(y_{it}=z_d)}{Pr(y_{it}=b)}\right)=\beta_{1d}female_{it}+\beta_{2d}single_{it}+\beta_{3d}age_{it}+$$

$$\sum_{l=1}^{4}\beta_{(4+l-1)d}edu_{lit}+\gamma_p+\delta_r+\theta_t+\varepsilon_{it} \quad (2)$$

where the probability of individual *i* in year *t* make a decision z_d (migrate to Bangkok if *d*=0 or migrate to the five peripheral provinces if *d*=1) given the reference category *b* (migrate to the rest of Central region) depends on the individual characteristics like gender, marital status, age, education level *l*, and a set of fixed effects that controls for unobserved shocks related to the province of origin *p*, region of origin *r*, and year *t*.

Given the possibility that the education variable could bring endogeneity problems to our estimations[13], we estimate the regressions with and without this variable. The first column of Table 3 reveals that the likelihood of migrating is higher for male, single and younger individuals. The region dummies show that individuals from the Northern and Northeastern regions have higher probabilities of migrating than individuals from the Southern region, while the year dummies indicate that the probability of migration increases during the period. The results of the version with education level controls (column 2) are similar, with the difference that the year dummy coefficients reveal that the likelihood of migrating peaked in 1990 and then decreased in 2000 to a level that was still higher than in 1980. The education level dummies reveal that the higher the education the higher the likelihood that an individual migrates. Considering the multinomial logit results, we also observe that the results with and without education level controls are similar. Female, single, and younger individuals have higher likelihood of migrating to Bangkok or to the five peripheral provinces than

[13] The education variable is observed in the time the data is collected in the census, which is not necessarily identical to the education level before the migration movement, given that the census considers as migrants individuals that migrated in the last 5 years before the data collection. However, considering that our data is restricted to workers age between 16 and 60 years old and that in general people attend to schools in their province of origin, we expect similar results for both specifications.

to the rest of the Central region. The region dummy coefficients reveal that migrants from the Northern region have less probability of migrating to Bangkok than to the rest of Central region, while the coefficients for the other options are statistically insignificant. The year dummies indicate that individuals had a higher probability of migrating to Bangkok in the decades prior to 2000, while in the five peripheral provinces it was the opposite, individuals' probability of migrating to this region steadily increased throughout the period. Migrants with higher education had a higher probability of migrating to Bangkok, while in the case of the five peripheral provinces, individuals with primary education level had the highest probability of migrating, followed by individuals with secondary level education. The coefficients for individuals with a bachelor's degree are statistically insignificant. These results probably reflect the fact that job positions in the service sector that demand individuals with higher education attainments are concentrated in Bangkok. On the other side, the factory agglomeration in the five peripheral provinces generates a demand for workers with some level of education, but not necessarily as high as the university level.

Table 3 – Results of logit and multinomial logit model for migration choice (pooled data)

	Migrated to Central		Migrated to Bangkok		Migrated to five peripheral provinces	
female	-0.21***	-0.18***	0.62***	0.64***	0.51***	0.53***
	(0.02)	(0.02)	(0.04)	(0.04)	(0.05)	(0.05)
single	0.69***	0.60***	0.48***	0.43***	0.11**	0.11*
	(0.02)	(0.02)	(0.04)	(0.04)	(0.05)	(0.05)
age	-0.06***	-0.05***	-0.01***	-0.01***	-0.01**	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
primary		0.66***		0.13***		0.19***
		(0.03)		(0.05)		(0.06)
secondary		1.32***		0.34***		0.17**
		(0.03)		(0.06)		(0.08)
university		1.52***		0.71***		0.16
		(0.05)		(0.11)		(0.14)
Northern region	1.78***	1.83***	-1.35***	-1.20***	-0.07	-0.05
	(0.19)	(0.19)	(0.36)	(0.36)	(0.63)	(0.63)
Northeastern region	1.22***	1.25***	-0.38	-0.27	0.39	0.42
	(0.22)	(0.22)	(0.45)	(0.46)	(0.73)	(0.74)
1970	-1.45***	-0.77***	0.01	0.16**	-1.43***	-1.33***
	(0.03)	(0.04)	(0.06)	(0.07)	(0.11)	(0.11)
1980	-0.98***	-0.42***	0.23***	0.35***	-0.98***	-0.90***
	(0.03)	(0.03)	(0.06)	(0.07)	(0.08)	(0.09)
1990	-0.11***	0.11***	0.22***	0.28***	-0.72***	-0.71***
	(0.02)	(0.02)	(0.04)	(0.04)	(0.06)	(0.06)
Constant	-3.59***	-4.60***	1.32***	0.97***	-0.48	-0.76
	(0.18)	(0.19)	(0.36)	(0.37)	(0.62)	(0.63)
Province of Origin FE	Yes	Yes	Yes	Yes	Yes	Yes
Reference category	Stay outside Central			Migrate to rest of Central		
Pseudo R^2	0.12	0.14	0.10	0.10	0.10	0.10
Observations	647502	642054	27425	27043	27425	27043

Source: Calculated using data from a sample of The Population and Housing Census, 1970-2000, provided by IPUMS-International.
Note: figures in parenthesis are standard errors. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

We re-estimate the model for cross sections in order to capture the changes in migrants' features during the study period. Given the space restriction and the fact that using education level variables does not seem to jeopardize the results, we present just the results for the estimations that control for education levels. As the number of observations decrease and the number of provinces in Thailand is big, we do not consider origin province dummies, controlling only for the origin regions. The first four columns of Table 4 contain the results of the logit model, revealing that the likelihood of

males migrating to the Central region peaked in 1990, and then decreased, becoming statistically insignificant in 2000. The likelihood of single and younger individuals migrating also tended to increase over the study period, but in 2000 we observe a decrease in the migration likelihood for singles. In general individuals with higher education attainments have higher likelihood of migrating. Region dummies reveal that in general individuals from the Northern and Northeastern regions have higher likelihood of migrating than individuals from the Southern region. The last eight columns contain the results for the multinomial logit, indicating that females had a higher probability than males of migrating to Bangkok, while in the five peripheral provinces case the female coefficient was statistically significant just in 1990. In general, single and younger individuals have higher probabilities of migrating to Bangkok. The results for the five peripheral provinces are in general statistically insignificant or similar to the Bangkok results, except for 1990 when single people had a lower migration probability. Some of the education level dummies are statistically insignificant, while the others suggest that individuals with higher education have a higher probability of migrating to Bangkok.

Table 4 – Results of logit and multinomial logit model for migration choice (cross section)

	Migrated to Central				Migrated to Bangkok				Migrated to five peripheral provinces			
	1970	1980	1990	2000	1970	1980	1990	2000	1970	1980	1990	2000
female	-0.16***	-0.18***	-0.34***	-0.02	0.72***	0.25**	1.47***	0.16***	0.01	0.2	1.38***	0.1
	-0.05	-0.05	-0.03	-0.03	(0.10)	(0.10)	(0.06)	(0.06)	(0.21)	(0.15)	(0.09)	(0.06)
single	0.62***	0.69***	1.16***	0.10***	1.10***	0.69***	-0.05	0.55***	0.36	0.24	-0.30***	0.30***
	-0.06	-0.06	-0.03	-0.03	(0.11)	(0.11)	(0.08)	(0.07)	(0.25)	(0.17)	(0.11)	(0.07)
age	-0.03***	-0.04***	-0.05***	-0.06***	-0.03***	-0.03***	-0.01**	-0.01	-0.02*	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	0.00	0.00	(0.01)	(0.01)	(0.01)	0.00
primary	1.31***	0.72***	0.42***	0.53***	1.64***	0.05	0.08	0.02	0.62**	-0.36*	0.07	0.38***
	(0.06)	(0.08)	(0.04)	(0.04)	(0.15)	(0.14)	(0.07)	(0.10)	(0.31)	(0.22)	(0.11)	(0.11)
secondary	1.89***	1.19***	1.30***	1.16***	2.17***	0.30*	0.48***	0.18*	0.55	-0.38	0.62***	0.11
	(0.08)	(0.10)	(0.04)	(0.04)	(0.23)	(0.18)	(0.09)	(0.11)	(0.50)	(0.30)	(0.14)	(0.12)
university	3.77***	2.29***	0.84***	1.74***	2.03***	0.46	0.34*	0.77***	0.31	0.15	0.21	0.27
	(0.13)	(0.17)	(0.08)	(0.06)	(0.39)	(0.37)	(0.19)	(0.16)	(0.51)	(0.51)	(0.28)	(0.18)
Northern region	0.20***	0.48***	0.55***	1.02***	-0.91***	-1.02***	-0.72***	-1.46***	-1.04***	-0.33	0.08	-0.31**
	-0.08	-0.1	-0.05	-0.06	(0.16)	(0.19)	(0.14)	(0.12)	(0.32)	(0.31)	(0.19)	(0.15)
Northeastern region	0.54***	1.10***	1.29***	1.21***	-0.59***	-0.41**	-1.20***	-1.37***	-0.84***	0.16	-0.80***	-0.18
	-0.07	-0.1	-0.05	-0.05	(0.16)	(0.18)	(0.12)	(0.12)	(0.30)	(0.30)	(0.18)	(0.14)
Constant	-4.34***	-4.33***	-3.78***	-3.07***	0.47*	1.43***	1.16***	1.38***	-0.18	-1.04**	-0.71**	-0.18
	-0.12	-0.14	-0.09	-0.1	(0.26)	(0.29)	(0.22)	(0.23)	(0.54)	(0.43)	(0.31)	(0.25)
Reference category	Stay outside Central				Migrate to rest of Central							
Pseudo R^2	0.06	0.07	0.15	0.10	0.14	0.06	0.08	0.04	0.14	0.06	0.08	0.04
Observations	151326	124734	162391	209051	8850	2091	8843	7259	8850	2091	8843	7259

Source: Calculated using data from a sample of The Population and Housing Census, 1970-2000, provided by IPUMS-International.

Note: figures in parenthesis are standard errors. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Given the importance of industrialization and formal jobs for the economic growth and poverty reduction in Thailand, we analyze the features of the migrants considering their employment sector and status in employment. The first half of Table 5 displays the coefficients for the pooled and the cross section regressions related to the employment sector, while the coefficients in the second half are related to status in employment. The pooled data results indicate that female and younger migrants have higher probabilities of being employed in the manufacturing sector, while marital status is statistically insignificant. Migrants with primary or secondary level education have higher chances of being employed in the manufacturing sector. Migrants with a bachelor's degree have a lower probability of working in the manufacturing sector than do migrants with less than primary education. The year dummies reveal that the probability of working in the manufacturing sector increased steadily during the period, while the region dummies are statistically insignificant.

The cross section results indicate that throughout the period males had a higher probability of being employed in the manufacturing sector, but this probability decreased until it become statistically insignificant in 2000. A similar pattern of changes is observed in the case of marital status, with coefficients indicating that single individuals had higher probabilities of being hired in the initial decades, but in 2000 married individuals present higher likelihood. Along the whole period younger people had higher probabilities of being hired in the manufacturing sector. The most interesting result is related to the education level. In the first two decades migrants with university or secondary level education had lower probabilities of being hired in the manufacturing sector than migrants with less than primary education, while the coefficient for primary level educational attainment was statistically insignificant. However, in the last two

decades the individuals with primary and secondary level education had higher probabilities of been hired in the manufacturing sector than individuals with less than primary education.

The pooled data regression for status in employment reveals that younger single males had a higher probability of being hired in salaried positions. The higher the education, the higher the chance of obtaining a salaried job. Region dummies are statistically insignificant, while the year dummies indicate that the probability of becoming a salaried worker increases over time. In accordance with the pooled data results, the cross section analysis indicates that younger single male migrants had higher chances of being employed in salaried positions, however we verify that from 1980 to 2000 there is a trend that indicates a decrease in this probability for males. As expected, the education level reveals that migrants with a higher education level have higher chances of becoming a salaried worker. In general, the region dummies reveal that migrants from the Northern and Northeastern region have higher chances of becoming a salaried worker than migrants from the Southern region.

Overall, in the last two or three decades in the last century, we observe massive movements of people from rural regions to urban/suburban regions, and such movements seem to be increasingly motivated by labor demand in manufacturing and formal sectors or in services sectors and formal sectors. We believe that labor movements were relatively smooth, accelerated industrialization, helped form industrial agglomeration, and contributed to poverty alleviation.

Table 5 – Results of logit model considering employment sector and status in employment

	Workers employed in manufacturing sector					Salaried workers				
	pooled data	1970	1980	1990	2000	pooled data	1970	1980	1990	2000
female	0.15***	-1.35***	-0.69***	0.85***	-0.06	-0.41***	-0.49***	-0.62***	-0.55***	-0.19**
	(0.04)	(0.13)	(0.13)	(0.06)	(0.06)	(0.05)	(0.13)	(0.14)	(0.08)	(0.08)
single	-0.03	0.52***	0.52***	-0.1	-0.11*	0.87***	1.09***	1.18***	1.18***	0.44***
	(0.04)	(0.19)	(0.15)	(0.07)	(0.06)	(0.06)	(0.15)	(0.15)	(0.09)	(0.08)
age	-0.05***	-0.04***	-0.03***	-0.05***	-0.06***	-0.05***	-0.03***	-0.03***	-0.04***	-0.07***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
primary	0.32***	-0.04	-0.16	0.34***	0.61***	0.45***	1.23***	0.84***	0.39***	0.00
	(0.05)	(0.16)	(0.17)	(0.07)	(0.10)	(0.06)	(0.18)	(0.22)	(0.09)	(0.11)
secondary	0.32***	-0.97***	-1.14***	0.63***	0.55***	1.09***	2.35***	2.15***	1.37***	0.46***
	(0.06)	(0.32)	(0.30)	(0.09)	(0.11)	(0.09)	(0.44)	(0.41)	(0.16)	(0.13)
university	-0.67***	-2.39***	-2.74***	-0.59***	-0.29*	1.51***	3.43***	2.82***	1.99***	0.81***
	(0.12)	(0.60)	(1.02)	(0.22)	(0.16)	(0.16)	(0.45)	(0.83)	(0.34)	(0.20)
Northern region	0.1	-0.56***	-0.19	0.22*	0.34***	-0.06	-0.60***	0.58**	0.45***	0.02
	(0.58)	(0.20)	(0.27)	(0.12)	(0.13)	(0.54)	(0.21)	(0.28)	(0.16)	(0.15)
Northeastern region	-0.36	-0.28	-0.23	-0.03	0.35***	0.74	-0.07	1.61***	0.84***	0.32**
	(0.65)	(0.19)	(0.25)	(0.11)	(0.12)	(0.69)	(0.20)	(0.28)	(0.15)	(0.15)
1970	-1.24***					-0.94***				
	(0.08)					(0.08)				
1980	-0.82***					-0.26***				
	(0.08)					(0.08)				
1990	-0.73***					0.03				
	(0.04)					(0.06)				
Constant	0.46	0.04	0.04	-0.26	0.66***	1.88***	1.08***	0.47	1.54***	3.21***
	(0.58)	(0.45)	(0.38)	(0.22)	(0.23)	(0.54)	(0.33)	(0.38)	(0.26)	(0.27)
Province of Origin FE	Yes	No	No	No	No	Yes	No	No	No	No
Reference category	Workers employed in other sectors					Non salaried workers				
Pseudo R^2	0.08	0.10	0.06	0.06	0.06	0.15	0.15	0.18	0.15	0.09
Observations	19180	5081	1479	7170	5450	19693	5239	1532	7253	5669

Source: Calculated using data from a sample of The Population and Housing Census, 1970-2000, provided by IPUMS-International.

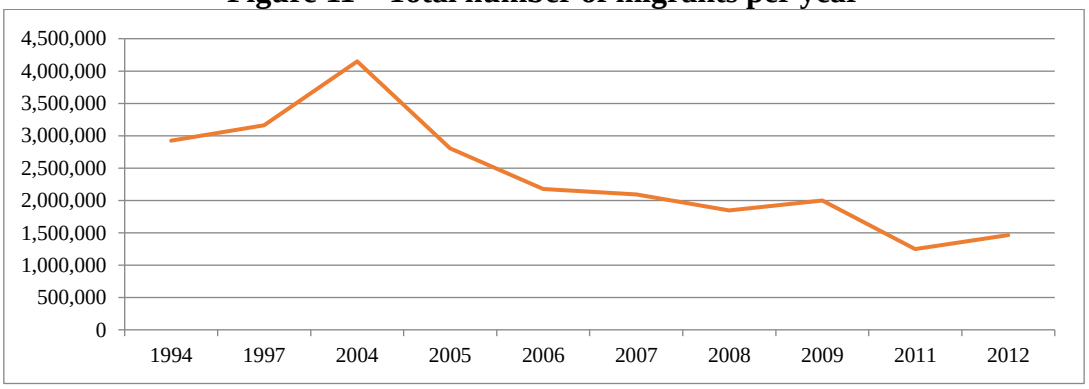
Note: figures in parenthesis are standard errors. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

4.2 – Slowdown of labor movements after the mid-2000s

In the last few decades of the last century, Thailand seems to be very successful in taking advantage of smooth labor movements in order to accelerate industrialization and alleviate poverty at the same time. After the mid-2000s, however, labor movements seem to slow down. In the following, we first discuss whether the slowdown is due to the extinction of redundant labor or not. Our tentative conclusion will be that Thailand still has a massive rural sector and the slowdown is a sort of premature one before exhausting potential migrants. We will discuss possible reasons for it.

First, we check the slowdown of labor movements. Figure 11 plots the total number of migrants per year according to the National Migration Survey for the available years. We verify that the migration movements peaked in 2004 achieving 4,148,951 migrants and then started a decreasing trend along the period reaching the lowest level with 1,248,298 migrants in 2011. Although Thailand still holds a large rural population (see Figure 6) that is supposed to belong mostly to agriculture and rural informal sectors, labor movements from rural to urban have already slowed down.

Figure 11 – Total number of migrants per year



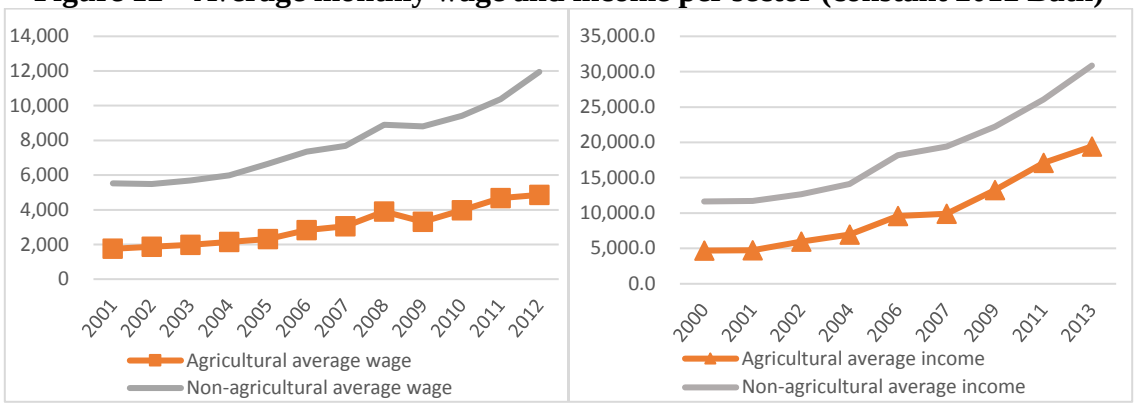
Source: The Migration Survey - Ministry of Information and Communication Technology, National Statistical Office (NSO).

Let us check the average monthly wage for the agricultural and non-agricultural sectors. The left side of Figure 12 plots the available data from Thailand`s Labor Force

Survey, indicating that from the year 2000 to 2012, a period that covers the increase and decrease in migration movements, there seems to be an expansion of the inter-sectoral wage gap after the latter half of the 2000s. This would suggest that labor movements from rural to urban sectors may not be very smooth. We have to be careful that not only non-agricultural but also agricultural wages are increasing over time, which indicates that pure redundant labor in rural sectors has already become extinct, as in the Lewis model. We also check the income data. Thailand`s Household Socio-Economic Survey contains income per household data for eight different groups. We calculate the sector income per household using the simple average of these groups.[14] The right side of Figure 12 reveals a very similar pattern to the average wage per sector though the expansion of the inter-sectoral gap is less distinct. This may reflect the effect of remittances from urban to rural and the increase in non-agricultural income in rural sectors. In summary, although a large labor pool still seems to exist in rural sectors, labor movements from rural to urban have prematurely slowed down since the mid-2000s.

[14] The agricultural sector income is calculated using data from the group of farmers that cultivate their own lands, the group of farmers that cultivate rented lands, and the group of farm employees. The non-agricultural sector income is based on the data from the group of the self-employed, the group of general workers, the group of professional, technical and administrative workers, the group of clerical, sales and services workers, and the group of production workers.

Figure 12 – Average monthly wage and income per sector (constant 2012 Bath)



Source: The Labor Force Survey and The Household Socio-Economic Survey - Ministry of Information and Communication Technology, National Statistical Office (NSO).

Possible reasons for the slowdown of labor movements could be Thai specific or rather general for countries that apply similar development strategies. One possible reason is simply low macroeconomic growth rates in the last decade. Although Thailand had a GDP growth rate of 3.9% in the period 2000-2010 (0.2 percentage point higher than the average of developing countries without China), it was only about half of the previous two periods` rates. This decline in economic growth, particularly in the manufacturing sector, could contribute to a decrease in the pace of labor movements.

Another possible reason is perhaps more serious. As illustrated in Figure 1, Thailand is successful in forming industrial agglomeration (Tier 1a) and now reaches the stage of thinking of how to create an innovation hub (Tier 1b). At this step the domestic industry is required to contribute with more value added to its products, and thus the country needs to conduct innovation and compete in the international market with products with higher quality and value. To accomplish this task, it is necessary to nurture domestic human resources through the promotion of education and R&D activities in order to create a pool of highly-skilled labor. However, as observed, the relatively

unskilled labor pool in rural areas is still very big, leading to a mismatch between the demand and the supply of labor.

The last possible reason is related to international migration. According to Hall (2011), since the 1990s, Thailand opened its borders to movements of people and trade within the Greater Mekong Subregion. Consequently, since the 1990s many migrants, entered Thailand, legally or illegally, from Cambodia, Laos, and Myanmar, increasing the supply of cheap unskilled labor. According to Huguet *et al*. (2012), in 2011 there were around 3.5 million migrants living in Thailand, from which approximately 3 million were working, around 1 million were unregistered, and around 3.2 million migrated from one of the mentioned three countries. A considerable part of these migrants found work in the agriculture sector, possibly inflating the share of employment in this sector. Others were employed in the services or industry sector, competing directly with the Thai labor force. As the number of unregistered migrants is relatively high, some of them were likely employed in the informal sector, also inflating it. However, these migrants employed in the informal sectors are possibly not accounted for in the calculation of the employment shares in industry and services, leading to underestimates of the employment shares of the modern sector.

5 – Final Considerations

In the first part of this paper we examined the path of the developing East Asian countries in the last three decades demonstrating that they achieved both rapid economic growth and poverty reduction. These countries adopted an economic model based on the aggressive utilization of global value chains supported by the large labor pool available. The existence of labor surplus and the smooth labor movements from rural sectors to

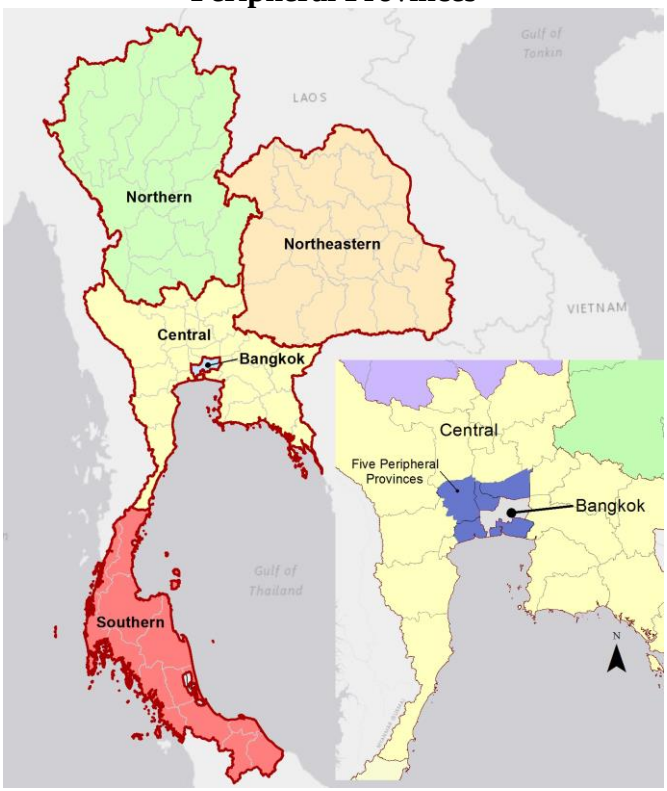
urban sectors allowed for an improvement in living standards and supplied industries with cheap labor giving them a comparative advantage in the international market.

In the following sections we employed the Lewis two-sector model to explain the importance of smooth labor movement between sectors as a key determinant in the development of these countries. Given the data constraints, we focused on the case of Thailand and studied its internal migration. The data showed that in the last three decades the economy maintained high growth rates, supported by an internal migration to Bangkok and the peripheral provinces, and an increase in employment in the services and industrial sectors. However, in the last decade we identified a decline in the labor movement from rural to urban sectors. This decline could be attributed to three possible hypotheses: (i) the decline in the economic growth, particularly in the manufacturing sector, (ii) possible quality mismatches between the supply and demand for labor, and (iii) the migration of workers from neighbor countries.

In summary, we would like to claim that smooth labor movements from rural sectors to urban sectors are one of the crucial elements for the successful achievement of rapid sustained economic growth and poverty alleviation in developing East Asian countries in the last few decades. However, forerunners of economic growth such as Thailand may face new challenges in effectively utilizing a large labor pool at a higher stage of economic development.

Appendix: Supplementary tables and figures

Figure A1 – Thailand map according to the four-region system and the Five Peripheral Provinces



Source: Designed by the authors using ArcMap.

Table A1 – Workers aged from 16 to 60 years old by gender and marital status (%)

Group	Gender	Year				Marital Status	Year			
		1970	1980	1990	2000		1970	1980	1990	2000
Migration to Bangkok	Female	47.8	46.2	50.8	50.2	Single	71.4	69.6	71.3	47.0
	Male	52.2	53.8	49.2	49.8	Married	28.6	30.4	28.7	53.0
Migration to Five Peripheral Provinces	Female	27.9	45.2	47.9	48.1	Single	55.4	53.4	64.0	42.5
	Male	72.1	54.8	52.1	51.9	Married	44.6	46.6	36.0	57.5
Migration to the rest of Central	Female	40.7	38.9	15.5	44.6	Single	38.5	41.0	77.1	37.7
	Male	59.3	61.1	84.5	55.4	Married	61.5	59.0	22.9	62.3
Outside Central (Reference)	Female	48.5	49.4	48.8	48.9	Single	31.0	29.6	28.8	23.3
	Male	51.5	50.6	51.2	51.1	Married	69.0	70.4	71.2	76.7

Source: Calculated using data from a sample of The Population and Housing Census, 1970-2000, provided by IPUMS-International.

Table A2 – Workers aged from 16 to 60 years old by education level (%)

Group	Education	Year			
		1970	1980	1990	2000
Migration to Bangkok	Less than Primary	72.1	71.8	28.2	17.4
	Primary	17.6	16.4	53.2	50.0
	Secondary	7.5	8.7	15.7	23.9
	University	2.8	3.0	2.9	8.6
Migration to Five Peripheral Provinces	Less than Primary	85.8	75.3	29.4	14.9
	Primary	9.4	14.3	46.6	58.8
	Secondary	3.8	7.4	21.4	22.4
	University	1.1	2.9	2.6	4.0
Migration to the rest of Central	Less than Primary	90.9	73.7	29.1	20.9
	Primary	6.4	16.0	55.0	48.9
	Secondary	1.9	7.8	14.1	26.2
	University	0.8	2.4	1.7	4.0
Outside Central (Reference)	Less than Primary	95.5	89.7	67.4	50.7
	Primary	3.6	7.2	25.1	35.6
	Secondary	0.9	2.8	5.2	11.6
	University	0.1	0.4	2.2	2.1

Source: Calculated using data from a sample of The Population and Housing Census, 1970-2000, provided by IPUMS-International.

Table A3 – Workers aged from 16 to 60 years old by employment sector and the status of employment (%)

Group	Employment Status	Employment Sector	Year			
			1970	1980	1990	2000
Migration to Bangkok	Self-Employed	Manufacturing	1.7	1.3	0.9	1.3
	Salaried Worker		17.4	27.6	39.8	32.8
	Unpaid Worker		0.8	1.6	0.8	0.6
	Self-Employed	Services	6.3	5.9	6.0	12.5
	Salaried Worker		64.6	58.7	48.3	46.9
	Unpaid Worker		2.9	2.2	2.2	5.0
	Self-Employed	Other sectors	1.8	0.8	0.8	0.4
	Salaried Worker		2.4	0.7	0.5	0.1
	Unpaid Worker		2.1	1.2	0.7	0.3
Migration to Five Peripheral Provinces	Self-Employed	Manufacturing	0.3	3.5	1.7	0.8
	Salaried Worker		61.3	51.5	63.1	61.8
	Unpaid Worker		0.3	2.0	0.5	0.6
	Self-Employed	Services	6.4	3.5	5.1	9.6
	Salaried Worker		19.9	31.2	23.8	22.7
	Unpaid Worker		4.8	1.5	2.9	2.6
	Self-Employed	Other sectors	0.0	2.0	0.4	0.3
	Salaried Worker		4.3	1.0	1.2	1.2
	Unpaid Worker		2.7	4.0	1.4	0.4
Migration to the rest of Central	Self-Employed	Manufacturing	0.4	0.6	0.2	1.0
	Salaried Worker		8.6	8.1	4.0	35.6
	Unpaid Worker		0.3	0.0	0.2	0.7
	Self-Employed	Services	3.6	2.9	2.4	8.6
	Salaried Worker		13.0	33.5	78.9	35.9
	Unpaid Worker		0.7	2.9	1.6	3.3
	Self-Employed	Other sectors	19.1	13.4	3.2	1.5
	Salaried Worker		13.4	17.4	3.7	10.1
	Unpaid Worker		40.8	21.3	5.9	3.3
Outside Central (Reference)	Self-Employed	Manufacturing	1.0	1.4	1.0	1.3
	Salaried Worker		2.5	3.8	4.8	7.2
	Unpaid Worker		0.4	0.6	0.4	0.5
	Self-Employed	Services	4.2	5.8	6.1	9.5
	Salaried Worker		8.1	11.7	17.2	20.9
	Unpaid Worker		2.0	2.8	2.7	3.8
	Self-Employed	Other sectors	28.5	25.7	23.5	22.6
	Salaried Worker		4.0	3.3	4.3	6.0
	Unpaid Worker		49.2	45.0	40.0	28.4

Source: Calculated using data from a sample of The Population and Housing Census, 1970-2000, provided by IPUMS-International.

References

Ando, M., & Kimura, F. (2005). The formation of international production and distribution networks in East Asia. In T. Ito, & A. K. Rose (Eds.), International trade in East Asia (pp. 177-216). Chicago, United States: University of Chicago Press.

APO Productivity Organization Data Book (2015). Retrieved July, 2015, from http://www.apo-tokyo.org/

Baldwin, Richard. (2011) "21st Century Regionalism: Filling the Gap between 21st Century Trade and 20th Century Trade Rules." Centre for Economic Policy Research Policy Insight No. 56 (May) (http://www.cepr.org).

Bank of Thailand Statistics. Retrieved August, 2015, from https://www.bot.or.th/English/Statistics/Pages/default.aspx

Economic Research Institute for ASEAN and East Asia (ERIA). (2015). The Comprehensive Asian Development Plan 2.0 (CADP 2.0): Infrastructure for Connectivity and Innovation. Retrieved December, 2015, from http://www.eria.org/ERIA-RPR-FY2014-04.pdf

Hall, A. (2011). Migration and Thailand: policy, perspectives and challenges. In Huguet, J. & Chamratrithirong, A. (Eds.), Thailand Migration Report 2011. International Organization for Migration (pp. 17-37), Bangkok. Retrieved November, 2015, from http://publications.iom.int/system/files/pdf/tmr_2011.pdf.

Huguet, J., Chamratrithirong, A. and Natali, C. (2012). Thailand at a Crossroads: Challenges and Opportunities in Leveraging Migration for Development. International Organization for Migration, Bangkok. Retrieved December, 2015, from http://www.migrationpolicy.org/research/Thailand-Leveraging-Migration

Hussey, A. (1993). Rapid Industrialization in Thailand 1986-1991. American Geographical Society, 83(1), pp. 14-28.

International Food Policy Research Institute (IFPRI). Retrieved September, 2015, from http://www.ifpri.org/

Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 6.4 [Machine-readable database]. Minneapolis: University of Minnesota, 2015.

Keola, S., M. Andersson, and O. Hall (2015). "Monitoring Economic Development from Space: Using Nighttime Light and Land Cover Data to Measure Economic Growth", World Development, 66, 322–334.

Lewis, A. (1954). "Economic development with unlimited supplies of labor", The

Manchester School, 22(2), pp. 139-191.
National Statistical Office of Thailand (NSO). Labor Force Survey. Retrieved August, 2015, from http://web.nso.go.th/en/survey/lfs/lfs_main.htm
_____. Migration Survey. Retrieved August, 2015, from http://web.nso.go.th/survey/migrat/migrat.htm
_____. The Household Socio-Economic Survey. Retrieved August, 2015, from http://web.nso.go.th/en/survey/house_seco/socio.htm
PovcalNet. Retrieved June, 2015, from http://iresearch.worldbank.org/PovcalNet/
Richter, K. & Tangchonlatip, K. (2011). Gender and migration. In Huguet, J. & Chamratrithirong, A. (Eds.), Thailand Migration Report 2011. International Organization for Migration (pp. 107-117), Bangkok. Retrieved November, 2015, from http://publications.iom.int/system/files/pdf/tmr_2011.pdf.
World Bank Database. Retrieved June, 2015, from http://data.worldbank.org/