Kajian Malaysia, Vol. 33, Supp.1, 2015, 1–14

INTERTEMPORAL CHANGES OF THE INFLUENCE OF ENVIRONMENTAL DEGRADATION ON MIGRATION: THE CASE BETWEEN MALAYSIA AND ASIA-PACIFIC COUNTRIES

Wilson Ow Chee Seong[1*], Baharom Abdul Hamid[2] and Muzafar Shah Habibullah[3]

[1,2]Taylor's Business School, Taylor's University, MALAYSIA
[3]Faculty of Economics and Management, Universiti Putra Malaysia, MALAYSIA
[*]Corresponding author: wilson.ow@taylors.edu.my

The purpose of this study is to determine the intertemporal changes that occurred in 1990 and 2000 in the link between migration and environmental degradation in the Asia Pacific region. The study used carbon dioxide emission index, gross domestic per capita income, consumer price index and distance among the countries to conduct a cross-sectional analysis to investigate this relationship. Two different points of time were regressed cross-sectionally and White standard was employed to remove traces of heterogeneity. Results clearly indicated that intertemporal effects between 1990 and 2000 were negligible. Overall, the study found that in the case of Malaysia and Asia Pacific countries, there had been no significant relationship between environmental degradation on emigration. However, other factors such as difference in the price level and inter-country distance influenced emigration significantly. Environment degradation, difference in price level and inter-country distance were found to be insignificant in influencing immigration.

Keywords: intertemporal changes, Malaysia, Asia Pacific countries, migration, environmental degradation

INTRODUCTION

Migration is as old as humanity itself, and its importance and relevance have not diminished over centuries. There are many reasons that motivate individuals or groups of people from one geographic location to migrate to another location such as poor employment opportunities or political instability in the home country. As a consequence, some countries which are popular destinations of migrants often experience large scale migration either on a permanent or temporary basis resulting in significant social changes. Therefore, a thorough understanding of migration and its consequences is essential as it will allow

policymakers to devise strategic immigration policies that will mutually benefit both the host and source countries.

Freeman (2006) argues that economic, geographical and social factors are three important macro considerations that motivate people to migrate. In this study, we focus on the economic and geographical factors based on the gravity model of immigration postulated by Lewer and Van den Berg (2008). Additionally, we also make comparisons of the impact caused by these two macro variables at two different time periods i.e. the years 1990 and 2000 and investigate the contribution of other factors such as the income, price and distance, similar to the study by Clark, Hatton and Williamson (2007), and Karemera, Ogueldo and Davis (2000). This paper also investigates the intertemporal significance of various factors such as environmental degradation, income per capita, price levels and distance on emigration and immigration.

Background of Immigration and Emigration in Malaysia

Malaysia is currently a popular destination for migrant workers from countries in Asia. According to the Economic Planning Unit (EPU) Report 2013, there are about 2.8 million migrant workers from the 12 million total labour force in the country. The manufacturing sector is the largest employer of foreign workers accounting for 0.728 million immigrants while other sectors such as domestic (14.2%), plantation (16.2%), construction (14.9%) and other services (10.3%) made up the other main composition of foreign workers'. In recent years, Malaysia has also seen an upsurge in migrant workers in the services sector, which has not been a trend in the 1990s. For instance, Malaysia employed 231,229 foreign workers in the services industry, 307,167 in manufacturing, 200,474 in plantation and 68,266 in construction in 2000 (Economic Planning Unit, 2013).

In terms of nationality, the largest group of migrants workers are from Indonesia (65.7%), followed by Nepal (10.8%) and India (7.6%). These groups of immigrants are largely made up of low skilled workers. The main reason for the large influx of migrant workers in the country is the economic progress which has given rise to this structural shift in labour migration (Nair and Jantan, 2006). In comparison, it can be said that there was a surplus of labour supply when agriculture was the main contributor to the nation's economy. Hence, emigration or outward migration was more common in Malaysia during that period. However, the trend apparently has seen a decline with Malaysia's rapid economic development. In the current context, our country is highly dependent on foreign labour for the plantation and construction sectors, and subsequently there has been an influx of foreign workers, including those who enter illegally, in the country. Hence, we need to tackle issues related to the employment of illegal migrants and also ensure that there is a systematic deployment of legal foreign labour (Wong, 2010).

Hugo (2008b) explains that transnational migration due to globalisation is a complex phenomenon made up of a system of linkages between the origin and destination countries and personal factors. For instance, the risk profile of a potential migrant also plays a significant role in his/her decision to migrate. Another factor is the anticipated rise in income which raises the possibility of high migration rates (Gallup, 1994). Additionally, the relaxation of migration policies in many South East Asian countries which are in dire need of migrant workers has also catalysed transnational migration (Kaur, 2007).

Transnational migration has brought about its attendant problems. Currently, there are more than 785,000 Malaysians working abroad (Arbee, 2010). Most of them are mainly highly skilled workers whose employment elsewhere contributes to a phenomenon known as "brain-drain" in this country, while low skilled workers, some who enter the country illegally, constitute the majority of migrant workers in the country. Both these trends pose challenges that have to be seriously addressed by our policymakers.

Background of Migration in Asia-Pacific Region

The history of migration in the Asia Pacific region is long and diverse. During the post World War II period, there was a large migration of Asian workers who sought employment in Singapore and Hong Kong. From the 1990s onwards, labour began to flow in a larger scale into East Asian countries such as Japan, South Korea, Taiwan, Malaysia and, more recently, into Thailand. This has given South East Asia an image as the "newest migratory pole" (Findlay, Jones and Davidson, 1998). By mid-1990s, migrant workers accounted for over 20% of the labour force in Singapore, 12% in Malaysia, 10% in Hong Kong and 6% in Thailand (Athukorala, 2006) as jobs that fit the profiles of the workers were plentiful in these countries. Most of these workers were predominantly unskilled and semi-skilled while the proportion of skilled migrant labour remained low (Manning, 2002).

The migration pattern of foreigners moving to Australia has also undergone distinct changes over the decades. About 5.4 million immigrants have entered Australia since 1945, first as permanent settlers and later as citizens. Since the late 1970s, Asia has contributed significantly to the growing migrant population in Australia and in 1980s, Asians made up around half of the migrants in the country (Bureau of Immigration, Multicultural and Population Research, 1995). New Zealand has experienced a similar situation. Between 1981 and 2006, the number of overseas-born people in New Zealand rose from approximately 450,000 to 920,000, an increase of more than 100%. Furthermore, the number of nationalities which had more than 10,000 people in New Zealand increased from 5 to 16 (Bryant and Law, 2004).

Another migration trend is internal migration, mainly from rural to urban areas within a country. This is largely contributed by declining job opportunities

in rural areas and increased opportunities in urban areas. Deshingkar (2006) asserts that internal migration is likely to increase at a faster rate than international migration in Asia. For example, in China, internal migration has increased dramatically, from about 26 million people in 1988 to 126 million in 2000 (GHK/IIED, 2004). Economic opportunities in the urban areas have fuelled the movement of labour from rural to urban areas in the Asia-Pacific. According to Organization for Economic Co-operation and Development, OECD (2001), the migration trend in Asia, especially in Korea and Malaysia has evolved from one-way emigration to two-way streams involving emigration of locals and immigration of foreigners.

LITERATURE REVIEW

Migration and Environmental Degradation

The livelihood of a population can be severely affected as a result of deteriorating environmental conditions. Hence, it is natural for people to emigrate in search of a "cleaner" environment and better quality of life to escape from worsening conditions at home which may compromise their health. Environmental decline plays a statistically significant role in out-migration (Reuveny and Moore, 2009) and migrants may leave due to a variety of reasons such as out of desperation (Myers, 1997), but usually to another place within the same region (Castles, 2002). Although environmental hazards encourage people to migrate to safer places, it must be combined by other factors such as relocation policies (Warner et al., 2010). In other words, people's decision to emigrate is normally induced by a multitude of factors related to environmental, political, social and economic concerns.

In some underdeveloped countries, people have migrated due to deterioration of the environment. Sometimes this deterioration is also human-induced, causing problems such as flooding and landslides. Alscher (2011) in his study on Hispaniola Islands namely Haiti and Dominican Republic found that the migrants who left the islands because of the loss in economic sustainability and their livelihoods suffer. In short, there seems to be a two-way causal relationship between environmental degradation and migration. In addition, the lack or withdrawal of state support may have indirectly contributed to the incentives to migrate. Warner (2010) mentioned that this forced migration may indicate a vulnerability of the balance between social–ecological system and human adaptability. By highlighting the environmentally induced migration in Mozambique, Vietnam and Egypt, results showed that migration and environmental degradation can be bidirectional.

Migration and Income Level

The migration-development nexus has been extensively discussed in the literature. Many studies have used the gravity model to analyse this inextricable relationship including Egger (2000); Carillo and Li (2004); Lewer and Van den Berg (2008). The results conclude that international migration can be compared to a gravitational-like force that is explained in the model. In essence, the gravitational pull results in higher level of immigration from a country with lower gross domestic product (GDP) per capita to a country with higher GDP per capita. This is because of the potentially higher income that they can earn that will provide them with a better standard of living in the destination country.

Keenan and Walker (2011) also concur that there is a link between potential income and migration decisions, mainly driven by differences in mean wages between countries known as the "pull" factor. Similarly, Mayda (2010); Felbermayr, Hiller and Sala (2010); Ortega and Peri (2009) also note that the difference in the level of income between destination and origin countries has a significant effect on migration patterns.

Although, per capita income is believed to be the main driving force for migration from "poorer" to "richer" countries, the level of skills of migrants also plays a significant role in migration decisions. Basically, the higher the skill of a worker, the greater is the incentive to move to a richer region. However, a lower-skilled worker tends to relocate to a comparatively less wealthier region (Giannetti, 2003).

There are also other positive effects of migration. For example, it can contribute to higher economic growth of the countries of origin as migrant workers are likely to transfer funds to their families in their countries of origin (Catrinescu et al., 2009). Also, the host countries are likely to benefit significantly as a result of the diversity of skills that the migrants have (Ottaviano and Peri, 2006).

Migration and Price Level

Living costs can contribute to the difference in real or actual income because prices of goods and services affect the purchasing power or real income. Hence, people tend to migrate to seek a better standard of living to close the gap between level of income and cost of living. Standard migration theories advocated by Todaro (1969), and Harris and Todaro (1970) posit that rural-urban migration is often induced by the perceived expected or real income as indicated in many studies such as Zhang and Song (2003) and Zhu (2002) who observed this trend in China.

Moreover, studies also show that increased migration leads to a decrease in prices in certain sectors of the economy. For instance, Cortes (2008) argues that the price of services such as housekeeping and gardening become

significantly lower when there is a high volume of migrants in a particular area. On the other hand, prices of houses may increase with the increase in population and the subsequent demand. Hence, Ley and Tutchener (2001) who observed a tremendous rise in real estate prices in Toronto and Vancouver between 1971 and 1996 argue that there is a robust relationship between Consumer Price Index (CPI) and immigration. As house price plays a significant role in determining the level of CPI, significant increases in house prices could lead to rapidly rising CPI.

Migration and Distance

Another factor that determines migration patterns is the distance between source and host countries, which has a bearing on transportation costs (Schwartz, 1973). Although transportation cost is, in fact, an opportunity cost that increases with distance (Levy and Wadycki, 1974), this is still a barrier that hinders people's decision to migrate. A similar trend has been observed in intra-country migration by Lemistre and Moreau (2009) in France the distance between cities and higher transportation costs had affected the mobility of youths from one area into another. On the other hand, migration is not only confined to rural-to-urban direction. The migration trend indicated the reverse in the direction of migration in certain countries. Tabuchi (1998) found out that lower transportation costs encourage migration from urban to rural regions. In addition to the cost factor, border sharing between countries led to greater incidence of migration than that of trade (Heliwell, 1997).

METHODOLOGY

This section describes the methodology used to investigate the relationship between Malaysia's bilateral migration flows and its determinants which are environmental degradation (carbon emissions), nations' income level (GDP per capita), price levels (CPI) and geographical distance (kilometres). Data for this study was taken from the World Bank Global Bilateral Migration and World Databank: World Development Indicators database.

This study is modelled after Karemera, Ogueldo and Davis (2000) who used a modified gravity model to determine the factors that influence migration using panel data of 70 countries over a time period from 1976 to 1986. In addition, the methodology is also based on Mayda (2010) who investigated the determinants of bilateral immigration flows into 14 OECD countries between 1980 and 1995. The study has also drawn ideas from earlier studies that focused either on a cross-section (Borjas, 1987; Yang, 1995) or have concentrated on a single destination country over time (Brucker, Siliverstova dan Trubswetter 2003).

The focus of this study is migration into Malaysia, both as a single origin and a single destination country for migrants from the Asia-Pacific region. We undertook a cross sectional analysis due to the unavailability of time series data. Using the gravity model, we attempt to investigate the antecedents using net migration as the dependent variable. Other factors such as institutional settings and social network are not included because it is outside the perimeters of this study as our main focus is to investigate the economic and geographical factors that induce immigration. However, the lack of explanatory variables is not without problems. As there can be reverse causality between migration flows (emigration and immigration) and income level, there are concerns that this may lead to problems with estimates. To address this, we take the assumption that migration flows and income level are predetermined as stated by Mayda (2010). The data used here is from 1990 and 2000, involving 24 countries from the Asia-Pacific region including Malaysia. Results obtained from 1990 are compared to that of 2000. To cater for heteroskedasticity, which is common in a cross sectional analysis, we used White Standard Error where the following equations are estimated for their respective effects.

Model 1

$$LEMI_{(m\ to\ f)} = \beta_0 + \beta_1 logCOE_f + \beta_2 logGDPPC_f + \beta_3\ logCPI_f + \beta_4 logDIST + \varepsilon$$

Model 2

$$LIMMI_{(f\ to\ m)} = \delta_0 + \delta_1 logCOE_f + \delta_2 logGDPPC_f + \delta_3 logCPI_f + \delta_4\ logDIST + \mu$$

Abbreviations

$LIMMI_{(f\ to\ m)}$: logarithm of number of foreign citizens from the respective country migrating to Malaysia.

$LEMI_{(m\ to\ f)}$: logarithm of number of Malaysian citizens migrating to the respective foreign country.

$logCOE_f$: logarithm of foreign carbon dioxide emission level (proxied by carbon dioxide emission per capita [in USD]).

$logGDPPC_f$: logarithm of foreign income level (proxied by the respective countries Real Gross Domestic Product per capita [in USD]).

$logCPI_f$: logarithm of foreign price level (proxied by the respective countries Consumer Price Index).

logDIST : distance from Malaysia to foreign country, in kilometer.

RESULTS AND ANALYSIS

For Model 1, the estimations and results for 1990 and 2000 are shown and summarised in Table 1. The results for 1990 reveals that the signs are consistent with the theory that there are positive relationships between (1) emigration and

degradation level and between (2) emigration and price level. However, inverse relationships are found between (3) emigration and income (4) emigration and geographical distance. Comparison between the results in 1990 with 2000 shows changes in the analysis for migration and income level but remains unchanged between migration and the other variables i.e. environmental degradation, price level and distance.

Table 1: Results for determinants for emigration (Model 1)

Variables	1990	2000
Constant	18.6083*	–21.0255
	(2.407)	(–1.5975)
Degradation	0.5982	0.4647
	(0.9)	(0.5712)
Income	–0.2214	0.0539
	(–0.2399)	(0.0635)
Price	1.5453*	8.8617*
	(2.6905)	(2.9599)
Distance	–2.0331*	–1.4491*
	(–3.4626)	(–2.2716)

Note: *Significant at 5% level; **Significant at 10% level; ( ) denotes t-statistics. Figures above have been corrected for heteroscedasticity by using the White Standard Errors.

The results indicate that there is a positive relationship between emigration and environmental degradation for both 1990 and 2000. The findings suggest that higher foreign environmental degradation has contributed to higher emigration. However, the effects are insignificant. This is probably because environmental degradation is not a major inducer of emigration. In other words, issues related to environmental degradation is not sufficiently critical to motivate potential migrants to move to regions with a "cleaner" environment. Hence, the empirical findings of this study do not concur with the findings in other studies that postulate environmental degradation as a contributing factor for emigration.

In the analysis of the link between emigration and foreign income, the estimations derived from data from 1990 also appear to contradict with previous findings. Though insignificant at 5% level, the negative relationship indicates that emigration decreases when GDP per capita increases and vice-versa. This phenomenon is more evident in developed countries which indicate that there is a downward sloping portion of the migration hump showing that emigration slows down when national income grows. As the sample countries consists of both developing and developed countries, there could be some further explanations attributing to this development. Hence, further exploratory studies are needed to shed more light into the nature of the relationship. Even with year 2000 data, the relationship did not yield insignificant estimates, despite the change in coefficient

figures. In other words, the GDP per capita variable is not significant enough to determine the rate of emigration. It appears that income levels do not attract nor repel potential migrants as the financial motivation to emigrate is not supported by the empirical findings in this study.

The most significant findings of this study is that price level and distance play important roles in the people's decision to emigrate. Since, higher price levels are associated with rising cost of living, the resulting fall in the purchasing power leads to higher level of emigration. Given the significantly positive relationship between price level and emigration, increasing cost of living and the resulting fall in real income can be considered as one of the push factors of emigration. The findings of this study, to an extent, support the literature that posits real income in the wake of rising living costs and reduced purchasing power plays a key plays role in influencing decisions to migrate.

The findings of this study also support the argument that higher cost of travelling (due to the distance) discourages emigration and vice versa. The variable is significant at 5%. Using Malaysia as a focal point for measuring distance, countries that are geographically closer can expect their citizens to choose Malaysia as a host destination. Basically, lower travelling costs increase emigration while higher travelling costs due to distance discourage it. This has been observed for both years and is consistent with Lemistre and Moreau's findings (2009).

On the whole, it can be summed up that emigration is not mainly driven by environmental degradation (carbon dioxide emissions) and financial reasons (GDP per capita), but by price level, distance and other factors that have not been included in this study. Hence, this paper argues that the intertemporal changes are minimal as there have been minimal changes in the patterns of migration vis-à-vis the factors investigated in the period of 10 years.

Table 2 shows the results derived from estimating Model 2 using data from 1990 which indicates that immigration is only positively related to price while being negatively related to environmental degradation, income and distance. Of the coefficients obtained, only the distance coefficient is significant at 5%. This implies that shorter distance encourages higher immigration levels and vice-versa. Hence, it is natural for Malaysia to expect more immigrants from neighbouring countries than or from countries which are geographically further. As the estimates for the environmental degradation are statistically insignificant, it indicates that environmental degradation does not influence immigration.

The data from 2000 data yielded unexpectedly similar findings. The signs are positive for the price and distance variables. However, none of the coefficients are significant even at the 10% level. Over a time period of 10 years, it is noted that distance had lost its "importance" as an important reason immigration. This could be attributed to factors such as diminishing cost of travel and better and more efficient communication networks between countries and regions.

Table 2: Results for determinants for immigration (Model 2)

Variables	1990	2000
Constant	–1.1454	–18.6889
	(–0.0782)	(–0.6187)
Degradation	–0.4421	–0.0675
	(–0.6478)	(–0.0516)
Income	–0.5217	–0.0063
	(–0.4527)	(–0.0054)
Price	2.702	4.1283
	(3.8981)	(0.6798)
Distance	–0.5306*	0.6749
	(–2.6366)	(0.4587)

Note: *Significant at 5% level; **Significant at 10% level; ( ) denotes t-statistics. Figures above have been corrected for heteroscedasticity by using the White Standard Errors.

The findings of this study suggest that the variables that were investigated do not motivate immigration. One possible reason is that environmental factors may have a catalyst effect on migration rather than a causal effect. Moreover, the poor would have lesser means to migrate to other regions despite the unfavourable environmental conditions that beset them. It is difficult to establish a direct causality as other studies indicate social, economic and political factors forming the strongest push factors for migration (Bogardi and Renaud, 2006). Other scholars such as Ho and Tyson (2011) argue that reasons for migration cannot be sufficiently explained by the push-pull factors as it involves complex individual decision-making process. Instead, migration should not be viewed too simplistically because the influencing factors may not be mutually exclusive. As posited by Hugo (2008a; 2008b) migration between Asia-Pacific countries including Malaysia is a complex interactive system rather than a unidirectional permanent relocation of population.

One of the limitations of the present study is the lack of the data on recent migration patterns. This may have some effects with regard to the accuracy of the estimations. The data used in the data and the subsequent findings, may not have meaningful implications in policy-making today. Furthermore, we could only conduct a cross-sectional analysis as we could not obtain time series data. Ideally, a 30-year time series data will facilitate a much more rigorous econometric analysis.

Another drawback is that the migration data do not differentiate between skilled and unskilled labour. As skilled labour migration is vital for the economic growth of a nation in the long run, it is imperative for the relevant authorities to have the necessary knowledge to formulate strategic immigration laws to attract the right kind of labour. Since migration can be influenced by the risk profile or behavioural characteristics of the migrants themselves, it is crucial for Malaysia

to have more specific data on migrants who come into the country. Basically, risk-takers have a greater tendency to migrate even when they come from environmentally favourable conditions while risk-adverse migrants may want to stay put despite any form of environmental degradation.

The current study also assumes that the relationship between the variables is unidirectional but the causality between migration (emigration and immigration) and the explanatory factors of GDP per capita and price levels can be bidirectional. The possibility of endogeneity problems, as a result, could have, thus, led to biased estimates. The seemingly independent variables of income and price level could be correlated, leading to problems of endogeneity. Studies should be carried out in other regions using larger sample sizes and qualitative variables such as immigration policies and migrants' perception and other quantitative variables like income-inequality, exchange rates and real interest rates.

CONCLUSION

The findings of this study suggest that environmental or economic factors do not play a big role in catalysing emigration as much as geographic proximity and price levels. The study also notes that there are insignificant intertemporal changes between the findings for the years 1990 and 2000 period. The changes are insignificant and hence, we believe that environmental factors may not be a key factor that influences migration decisions in this region. Based on the findings, it can be stated that emigration and immigration will not become significantly higher in the near future as the level of environmental degradation in this region is still manageable. Thus, this paper argues that this cannot be regarded as a pertinent "push" factor.

However, it must be noted that there is greater awareness of environmental issues among citizens and the possible direct or indirect impact of the state of environment. As the world becomes more inter-connected, environmental issues rank as one of the top national concerns for many countries. Thus, more research needs to be conducted to investigate the possible links between environmental factors and migration. Such research will also provide a more in-depth understanding of why people migrate in general.

Based on the findings of this study, we opine that it is fundamental for all governments to formulate policies and strategies to reduce the cost of living so that emigration levels especially among skilled workers and professionals are reduced. At the same time we should also take advantage of the possible economic pull factors and explore avenues to attract highly-skilled productive workers from abroad.

ACKNOWLEDGEMENT

This study was funded by the Research University Grant Scheme (RUGS).

REFERENCES

Alscher, S. 2011. Environmental degradation and migration on Hispaniola Island. *International Migration* 49(1): 164–188.

Arbee, A. R. 2010. Malaysian emigration – The Malays are leaving too. *Berita Harian*, 8 March.

Athukorala, P. C. 2006. International labour migration in East Asia: Trends, patterns and policy issues. *Asia-Pacific Economic Literature* 20(1): 18–39.

Bogardi, J. J. and F. Renaud. 2006. Migration dynamics generated by environmental problems. Paper presented at the 2nd International Symposium on Desertification and Migrations, Almería, 25–27 October.

Borjas, G. J. 1987. Self-selection and earnings of immigrants. *American Economic Review* 77(4): 531–553.

Brucker, H., B. Siliverstova and P. Trubswetter. 2003. International migration to Germany: Estimation of a time-series model and inference in panel cointegration. DIW Discussion paper No.391.

Bryant, J. and D. Law. 2004. *New Zealand's diaspora and overseas-born population (No. 04/13).* Wellington: New Zealand Treasury.

Bureau of Immigration, Multicultural and Population Research (BIMPR). 1995. *Immigration update*. Canberra: Australian Government Printing Services (AGPS).

Carillo, C. and C. Li. 2004. Trade blocks and the gravity model: Evidence from Latin American countries. *Journal of Economic Integration* 19(4): 667–689.

Castles, S. 2002. Environmental change and forced migration: Making sense of the debate. In New issues in refugee research. Working Paper No.70. United Nations High Commissioner for Refugees, Geneva.

Catrinescu, N., M. Leon-Ledesma, M. Piracha and B. Quilin. 2009. Remittances, institutions and economic growth. *World Development* 37(1): 81–92.

Clark, X., T. J. Hatton and J. Williamson. 2007. Explaining U.S. immigration 1971–1998. *Review of Economics and Statistics* 89(2): 359–373.

Cortes, P. 2008. The effect of low-skilled immigration on U.S. prices: Evidence from CPI data. *Journal of Political Economy* 116(3): 381–422.

Deshingkar, P. 2006. Internal migration, poverty and development in Asia. Paper presented at Asia 2015: Promoting growth, ending poverty, London. 6–7 March.

Economic Planning Unit (EPU) Report. 2013. Population and labour force. http://www.epu.gov.my/en/population-and-labourforce/ (accessed on March 2013).

Egger, P. 2000. A note on the proper econometric specification of the gravity equation. *Economic Letters* 66(1): 25–31.

Felbermayr, G., S. Hiller and D. Sala. 2010. Does immigration boost per capita income? *Economic Letters* 107(2): 177–179.

Findlay, A. M., H. Jones and G. M. Davidson. 1998. Migration transition or migration transformation in the Asian dragon economies? *Journal of Urban and Regional Research* 22(4): 643–663.

Freeman, R. B. 2006. People flows in globalization. Working Paper w12315. National Bureau of Economic Research.

Gallup, J. L. 1994. Migration in Malaysia: Heterogeneity and persistence. Faculty Working Paper 108, Institute of Economics and Sociology, Hanoi, Vietnam.

GHK International Consulting Services and International Institute for Environment and Development. 2004. Final report of China urban poverty study. Department for International Development (DFID), China.

Giannetti, M. 2003. On the mechanics of migration decisions: Skill complementarities and endogenous price differentials. *Journal of Development Economics* 71(2): 329–349.

Harris, J. R. and M. P. Todaro. 1970. Migration, unemployment and development: A two-sector analysis. *American Economic Review* 60(1): 126–142.

Helliwell, J. F. 1997. National borders, trade and migration. *Pacific Economic Review* 2(3): 165–185.

Ho, Y. J. and A. D. Tyson. 2011. Malaysian migration to Singapore: Pathways, mechanisms and status. *Malaysian Journal of Economic Studies* 48(2): 131–145.

Hong, T. C. and A. S. Santhapparaj. 2006. Skilled labor immigration and external trade in Malaysia: A pooled data analysis. *Perspectives on Global Development and Technology* 5(4): 351–366.

Hugo, G. J. 2008a. In and out of Australia: Rethinking Indian and Chinese skilled migration to Australia. *Asian Population Studies* 3(4): 267–291.

_____. 2008b. Quantifying transnationalism: Asian migration to Australia. In *Migration, development and environment. Migration processes from the perspective of environmental change and development approach at the beginning of the 21st century*, eds. R. Stojanov and J. Novosak, 172–208. Newcastle: Cambridge Scholars Publishing.

Karemera, D., V. I. Ogueldo and B. Davis. 2000. A gravity model analysis of international migration to North America. *Applied Economics* 32: 1745–1755.

Kaur, A. 2007. Migration matters in the Asia-Pacific region: Immigration frameworks, knowledge workers and national policies. *Migration and Integration in the Asia-Pacific Region* 9(2): 135–157.

Keenan, J. and J. R. Walker. 2011. The effect of expected income on individual migration decisions. *Econometrica* 79(1): 211–251.

Lemistre, P. and N. Moreau. 2009. Spatial mobility and returns to education: Some evidence from a sample of French youth. *Journal of Regional Science* 49(1): 149–176.

Lewer, J. and H. Van den Berg. 2008. A gravity model of immigration. *Economic Letters* 99(1): 164–167.

Ley, D. and J. Tutchener. 2001. Immigration, globalisation and house prices in Canada's gateway cities. *Housing Studies* 16(2): 199–223.

Levy, M. B. and W. J. Wadycki. 1974. What is the opportunity cost of moving? Reconsideration of the effects of distance on migration. *Economic Development and Cultural Change* 22(2): 198–214.

Lim, L. L. 1996. The migration transition in Malaysia. *Asian and Pacific Migration Journal* 5(2–3): 319.

Manning, C. 2002. Structural change, economic crisis and international labour migration in East Asia. *World Economy* 25(3): 359–84.

Martin, P. 2009. Migration in the Asia-Pacific region: Trends, factors, impacts. Human Development Research Paper 2009/32. United Nations Development Programme.

Mayda, A. M . 2010. International migration: A panel data analysis of the determinants of bilateral flows. *Journal of Population Economics* 23(4): 1249–1274.

Myers, N. 1997. Environmental refugees. *Population and Environment* 19(2): 167–182.

Nair, P. R. and N. Jantan. 2006. International migration in Malaysia. Paper presented at Expert Group Meeting of Regional Census Programme For Asia & Pacific (ESCAP), Bangkok, Thailand. 25–26 November.

Organisation for Economic Co-operation and Development (OECD). 2001. *International migration in Asia: Trends and policies*. n.p.: OECD.

Ortega, F. and G. Peri. 2009. The causes and effects of international migrations: Evidence from OECD countries 1980–2005. Working Paper 14833. National Bureau of Economic Research.

Ottaviano, G. and G. Peri. 2006. The economic value of cultural diversity: Evidence from U.S. cities. *Journal of Economic Geography* 6(1): 9–44.

Reuveny, R. and W. H. Moore. 2009. Does environmental degradation influence migration? Emigration to developed countries in the late 1980s and 1990s. *Social Science Quarterly* 90(3): 461–479.

Sadiq, K. 2005. When states prefer non-citizens over citizens: Conflict over illegal immigration into Malaysia. *International Studies Quarterly* 49(1): 101–122.

Schwartz, A. 1973. Interpreting the effect of distance on migration. *Journal of Political Economy* 81(5): 1153–1169.

Tabuchi, T. 1998. Urban agglomeration and dispersion: A synthesis of Alonso and Krugman. *Journal of Urban Economics* 44(3): 333–351.

Todaro, M. P. 1969. A model of labor migration and urban unemployment in less developed countries. *American Economic Review* 59(1): 138–148.

Warner, K. 2010. Global environmental change and migration: Governance challenges. *Global Environmental Change* 20(3): 402–413.

Warner, K., M. Hamza, A. Oliver-Smith, F. Renaud and A. Julca. 2010. Climate change, environmental degradation and migration. *Natural Hazards* 5(3): 689–715.

Wong, D. 2010. The national context of migration research in Malaysia. Which nation, what state, whose migration? In *National paradigms of migration research*, 301–314. Göttingen, Germany: V&R Unipress GmbH.

Yang, P. Q. 1995. *Post-1965 immigration to the United States*. Westport, CT: Praeger.

Zhang, K. H. and S. Song. 2003. Rural-urban migration and urbanization in China: Evidence from time-series and cross-section analysis. *China Economic Review* 14(3): 386–400.

Zhu, N. 2002. The impacts of income gaps on migration decisions in China. *China Economic Review* 13(2–3): 213–230.